

**VCE Sound Ordinance
Investigation and Recommendations
New Orleans, Louisiana**

For

City Council of New Orleans

By

Oxford Acoustics, Inc.

April 10, 2014

Project No. 11-01883-03



356 CR 102 Oxford, MS 38655
662-513-0665
www.oxfordacoustics.com

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Office of Kristin Gisleson Palmer
Councilmember, District "C"
1300 Perdido, Suite 2W70
New Orleans, LA 70112

Attention: Councilwoman Palmer and City Council

Report Draft: VCE Sound Ordinance
Investigation and Recommendations
New Orleans, Louisiana
11-01883-03

Councilwoman Palmer:

This report covers the investigation and recommendations regarding the Vieux Carre Entertainment Zone VCE (Bourbon St.) sound ordinance and current acoustic conditions for the City Council of New Orleans, Louisiana. The work was performed in accordance with Motion M-14-19 and attached scope, which were accepted by the city council in February 2014.

Thank you for the opportunity of working with you on this project. Please call me if we can help you further.

Very truly yours,

David S. Woolworth
Principal
Oxford Acoustics, Inc.

GENERAL SUMMARY STATEMENT

These recommendations and report are built on the work in “New Orleans Sound Ordinance and Soundscape: Evaluation and Recommendations”. Due to the complexity of issues and the technical nature of some of the material in this report, it is recommended that the reader be familiar with or can refer to that document. This report may be read by itself, but some of the explanations are omitted or simplified to avoid redundancy or the creation of an overly burdensome document.

It is important that the summary of the NOLA Soundscape Study is reiterated here:

“Four main issues have been identified that should be addressed immediately to improve the quality of life for all of those affected by unwanted sound:

- (1) The lack of provisions to address low frequency sound in the current ordinance.
- (2) The current methods designated for determining violations in the Vieux Carre Entertainment District (VCE) need to be simplified.
- (3) The lack of focused enforcement resources.
- (4) Violations of the sound ordinance are considered criminal violations and should be changed to civil violations.

All of these items need to be addressed in tandem for a successful code revision and improvement in quality of life.

The balance to be struck is to keep the city livable for everyone while allowing a sonic environment that is conducive to the development, evolution, and continuance of New Orleans' cultural traditions and protecting and enhancing attractiveness to visitors. The current debate regarding noise also necessitates a sustained effort on the education and cooperation of the key players and the general public for a lasting solution.”

We believe that this collective effort to specifically address the Vieux Carre Entertainment District (VCE) has resulted in a good first step at managing the complex soundscape of the city; many unresolved issues remain directly related to the VCE and surrounding areas.

As noted in the New Orleans Sound Ordinance and Soundscape Study, it is critical that a dedicated Sound Management program be the cornerstone of success in managing the issues related to sound complaints and quality of life. Legislation without an appropriate mechanism to educate, aid in compliance, and enforce sound laws will be ineffective.

We recommend that the City Council identify the party or parties that will ensure adherence to time lines, be able to review and approve the next steps for managing the sound of the VCE, and ensure a smooth transition into the health department's taking responsibility. Continuity of this effort is critical.

Since this is the first step in improving the quality of life for the stakeholders, and knowing that there remain a number of outstanding issues that must be addressed, this step must be executed, evaluated, and built upon.

Recommended Sound Levels

The recommended sound levels for the Vieux Carre Entertainment District are based on three criteria that should be met for a balanced approach:

- 1) As a priority, the sound from the venues should not interfere with emergency communication (i.e. police radios) on the street. While crowd sound can get louder than the sounds coming from the doorways, crowd sound is always fluctuating, and in the presence of an emergency situation will typically drop off to an acceptable level.
- 2) The effect of emanating sounds from entertainment venues should not create unacceptable sound levels inside the residences of the adjacent Vieux Carre Residential or Commercial Districts. The propagation of sound has been studied extensively from source to receiver, and the proposed limits are based on a conservative case of internal sounds for the average adjacent properties. It is understood there will be exceptional cases and acoustic anomalies that must be resolved through mediation and site-specific mitigation treatments.
 1. The inherent shape of the VCE zone and widely varying distances from Bourbon St. of the adjacent zones puts some residences in a proximity that may warrant rezoning or soundproofing of these structures. This is discussed in greater depth in **VCE ANALYSIS**.
- 3) The emanating sound levels proposed also considers the operational sound levels inside a venue with an open facade. The inside level relative to the doorway (measurement point) level is appropriate to achieve a 95-100dBA¹ inside the venue for most venues “as is”. Higher sound levels can be achieved with any combination of the use of sound control techniques, loudspeaker placement, and appropriate sound engineering and monitoring technology.
 1. It was an expressed concern by venue owners that high crowd sound levels would interfere with field enforcement measurements, potentially creating an artificially high sound level attributable to an entertainment venue.
 1. A simulation was performed with a simulated independent music source and crowd source: the results in **Appendix A7** show this to be a manageable condition when it occurs; the use of dBC as the sole sound level limit metric will be appropriate.
 2. It is understood (see ASSUMPTIONS) that the sound enforcement will be performed by appropriately trained and educated sound management group from the Health Department. Appropriate training and experience allows enforcement to distinguish between the different sources.²

¹Woolworth, New Orleans Soundscape and Sound Ordinance Report: Evaluation and Recommendations, p48.

²Conversations with Paul Van Orden, Portland Oregon's sole sound enforcement officer for 25 years, March 2014.

Executive Summary of Recommendations

1) The nature of sound ordinance violations should be changed from criminal to civil.

1. This issue is analyzed in New Orleans Sound Ordinance and Soundscape: Evaluation and Recommendations (herein referred to as “**NOLA Soundscape Study**”).

2) VCE ORDINANCE RECOMMENDATIONS- revision of the current sound ordinance as it relates to the VCE, including:

1. **A sound level cap** for emanating properties measured at the source based on an empirical study of sound propagation to the nearest residential zone and sound penetrating a building in reasonable repair.
 1. Nighttime and daytime Bourbon facade and side street levels for open and closed facades are proposed.
 2. Evidence and explanation for the sound levels proposed are found in **2. VCE ANALYSIS, 5. RELATED CONCERNS** and **Appendix A**, as well as the **NOLA Soundscape Study**.
2. **A measurement position** for these sound limits at the plane of the property line opening of the emanating venue.
3. **The time of measurement** to be reduced to 20 seconds, allowing for multiple measures as needed.
4. **The change in metrics** from L_{A10} and L_{Amax} to L_{Aeq} and L_{Ceq} .
 1. The inclusion of C weighting (L_{Ceq}) is intended to address low frequency sounds and their propagation.
 2. The use of equivalent level (Leq) allows us to adopt simple modern standards intended to identify low frequency problems in residences.
5. **A sound level cap for street amplifiers** in the VCE should be revised to a new level and include the dBC metric.

3) RELATED CONCERNS AND RECOMMENDATIONS to be considered in conjunction with the above VCE ORDINANCE RECOMMENDATIONS

1. Courtyard sound deserves further evaluation after compliance to the ordinance is in place. Recommendations for reduction of sonic footprint of courtyards have been developed in FQMD educational meetings, and some help may be required from the Vieux Carre Commission to facilitate the approval of sound proofing measures.
2. Receiving property (specifically those affected by the VCE) sound level limits should be determined after compliance to the ordinance is in place and the new soundscape conditions are evaluated. Receiving property issues are discussed in detail with preliminary recommendations on sound level limits.

3. Constitutionality of Sec. 30-1456 and Sec. 66-205 limiting the hours of street performance on Bourbon St. and relevance of musicians agreements.
 1. This is an opportunity to examine the curfew with an understanding that regular enforcement is pending. Issues are evaluated briefly with proposed legislation.
4. Motor vehicle and motor vehicle loudspeaker sound continues to be an annoyance to residents; suggested methods for addressing this issue are presented.

Assumptions

Health Department:

The use of the Health Department to oversee all sound management activities is assumed based on the allocation of funding by the French Market Corporation for that purpose, and discussions with the City Council and Health Department up to this writing. The use of the Health Department is critical for two main reasons:

- 1) The scope of the sound management program entails education, outreach, permitting, mediation, field investigations and other duties in addition to enforcement.
- 2) The commitment of training, execution of above scope, level of expertise required, and dedicated time for enforcement is beyond the current resources of the NOPD.

At this writing there are two positions advertised by the New Orleans Health Department: (1) CODE ENFORCEMENT CASE SPECIALIST I, and (2) CODE ENFORCEMENT CASE SUPERVISOR. The Health Department has indicated that they plan to add an additional 2 employees for the program beyond the case specialist and case supervisor, and that enforcement will begin at the end of 2014. This is assumed to be accurate.

PROJECT DESCRIPTION.....1
 Location
 Design Data Provided

PURPOSE AND SCOPE OF STUDY.....1
Investigation Program

1. METHODS AND PROCEDURES.....2
 1. Method
 2. Meetings
 3. Feedback
 4. Soundscape method
 5. Reports to City Council

2. VCE ANALYSIS: SOUNDSCAPE, ORDINANCE, AND OTHER FACTORS.....5
 1. Current VCE Ordinance
 2. Comments on the Recommendations

3. RECOMMENDATIONS – GENERAL.....10

4. RECOMMENDED SCOPE OF PROPOSED LEGISLATION FOR THE VCE.....11
 1. Legislation
 2. Time line of Legislation and Compliance

5. RELATED CONCERNS AND RECOMMENDATIONS.....13
 1. Courtyards
 2. Receiving Residence Measurements And Sound Level Limits
 1. Condition Of Receiving Residence
 2. Recommendations On Receiving Residences
 3. Curfew Of Street Performers On Bourbon St.
 4. Motor Vehicles

ADDITIONAL STUDIES.....21

LIMITATIONS.....21

ACKNOWLEDGMENTS.....21

FIGURES AND TABLES

PAGE

Figure 1: Zoning Map of the VCE.....5

Figure 2: Street Amplification on Bourbon St.8

Figure 3A: Cracks or gaps in windows (and doors) are the source of significant sound leakage.....16

Figure 3B: Window Unit air conditioners are a typical flanking path for outside sounds....16

Figure 4: Approximate indoor and outdoor levels observed during monitor deployment.....17

Table 1: Distance from the center of Bourbon St. to the adjacent zone.....6

Table 2: Sound Sources of the VCE.....6

Table 3: Boom car sound levels.....20

APPENDICES

APPENDICES

Appendix A – Selected Data and Analysis	1
1. Overnight monitors.....	2
2. Daytime Facade Closing Experiments.....	7
3. FQMD Sound Walks.....	10
4. Propagation Analysis.....	14
5. Angle of Incidence of Low Frequency Sound on Windows.....	16
6. Courtyards.....	17
7. Controlled Simulation of Crowd Sound and Music.....	19
Appendix B – Reports for City Council	22
• Report #1: February 2-8, 2014.....	23
• Report #2: February 9-19, 2014.....	24
• Report #3: February 20-26, 2014.....	25
• HHNC presentation 3-17-14.....	26
Appendix C – French Quarter Management District (FQMD)	28
• Government Committee Recommendations, 4-7-14.....	29
• Government Committee Meeting Minutes February 3, 2014.....	29
• Government Committee Sound Ordinance Worksheet 3-11-14.....	31
Appendix D – French Quarter Business League (FQBL)	38
• Meeting notes 3-14-14.....	39
• Letter from FQBL, 3-26-14.....	42
• Return Correspondence, 3-28-14.....	46
• Letter from FQBL 4-6-14.....	47
Appendix E – Example Curfew Ordinance Revision and Musicians' Agreements	51
• Example Curfew Ordinance Revisions. Source: Ashlye Keaton, Esq.....	52
• Musicians' Agreements. Source: MACCNO via French Quarter Archives	
◦ 1979.....	56
◦ 1996.....	57

PROJECT DESCRIPTION

LOCATION

The investigation was performed on Bourbon Street (Vieux Carre Entertainment District) and into the bordering areas of the Vieux Carre Residential and Commercial Districts.

PROPOSED INVESTIGATION AND PURPOSE

The purposes of this investigation are to explore the acoustical conditions and soundscape in the Vieux Carre Entertainment District with direct community involvement, and to provide engineering, cultural, economic, legislative, and enforcement analysis leading to recommendations for revision of the VCE sound ordinance, with a focus on brick and mortar structures.

PROVIDED BY THE CITY OF NEW ORLEANS

1. Permission to perform the investigation and coordinate activities through the FQMD.
2. Advising on details and progress reviews by the City Council and staff.
3. Zoning maps.

PROVIDED BY THE FRENCH QUARTER MANAGEMENT DISTRICT (FQMD)

1. Aid in coordinating meetings (venue, materials, agendas).
2. Overseeing of communications/announcements to members and community.
3. Supply of materials related to zoning, laws, and layout of the VCE.
4. FQMD Government Committee iterative assessments of NOLA Soundscape Study.
5. FQMD Government Committee recommendations

PROVIDED BY MACCNO

1. Videotaping and posting of all FQMD interactive educational lectures.

SCOPE

The following services were performed:

1. Collected and reviewed project data available to us and prepared an investigation program.
2. Re-evaluation of current VCE noise code.
3. Additional meetings and conversations with the business and neighborhood associations and the enforcement community to hear concerns and establish a network to aid in the investigation.
4. Soundwalks of the Vieux Carre Entertainment District (Bourbon St.) to evaluate noise levels with and without the public. Public walks utilized elements of the soundscape method. Both walks utilized the cooperation of venues and owners to temporarily suspend entertainment activities for comparative measurements.
5. Testing of building facade closure variations to evaluate noise escaping the structure.
6. Empirical evaluation of sound propagation from source (VCE) to listener (nearest residences).
7. Empirical simulation of crowd and music levels combined to examine influence on Sound Level Meter measurements.

8. Evaluation of the information/data obtained, and preparation of this report of our conclusions and recommendations.
9. Periodic reporting to the City Council.
10. Additional meetings, correspondence and communications with community members and organizations.

METHODS AND PROCEDURES

Method

The following method was used to generate the recommendations and report:

- 1) Public meetings were organized through the French Quarter Management District (FQMD) to involve all stakeholders. The meetings included an interactive educational lecture component with demonstrations and employed tools from the soundscape method (soundwalks) to allow participants to compare subjective impressions with objective measurements.
 1. Feedback was actively solicited during meetings and from non-attende stakeholder.
 2. All meetings were posted in video form online for non attendees. (www.maccno.org)
 3. Additional outreach was made available to non attendees.
- 2) Public update reports were provided to the City Council (see **Appendix B**)
- 3) Analysis of collected data and further discussions with stakeholders, organizations, and other sound enforcement communities were conducted.
 1. Data and conclusions from NOLA Soundscape Study were evaluated in comparison to the new data and information collected.
- 4) Report and recommendations are made based on the community feedback and data analysis.
- 5) Drafting of ordinance coordinated with City Council office(s).

Meetings

All FQMD lecture and discussions available at <http://maccno.com/>

HHNC meeting available online at http://www.nolacitycouncil.com/video/video_legislative.asp

The following public meetings and private meeting (attended with council staff) were executed:

- 1) FQMD 2-17-14 3pm
 1. Lecture and discussion material included:
 1. Brief Overview of the VCE Sound Management Investigation
 2. Introduction to sound measurement
 3. Enforcement
 4. Solicitation of comments and feedback
- 2) FQMD 2-24-14 3pm
 1. Lecture and discussion material included:
 1. Good Neighbor Policy

2. Professionalism
 3. A look at the frequency spectrum
 4. Tools for monitoring and controlling sound/reducing sonic footprint
 5. Using a consultant/contractor (for reducing sonic footprint)
 6. Solicitation of comments and feedback
2. The meeting also utilized field tests to subjectively relate facade opening/closing effects and perceived sound levels with decibel readings. The facade tests required higher than normal (club source) sound levels in order to create effects that could be noticed over the existing street activity. The decibel reductions were measured, but were found to be not as significant as the daytime controlled tests with lower background sound levels. It is noted that a wide variety of stakeholders attended.
- 3) FQMD 3-6-14 11pm
 1. Sound walk with community members utilizing elements of the soundscape method allowing people to correlate subjective impressions with objective measurements. See data in **Appendix A4**.
 - 4) French Quarter Business League FQBL 3-14-14
 1. Interactive meeting to present proposed changes to the VCE methods and ordinance. See Presentation in **Appendix D**.
 - 5) FQMD 3-14-14
 1. Sound walk with community members utilizing elements of the soundscape method allowing people to correlate subjective impressions with objective measurements. See data in **Appendix A4**.
 - 6) New Orleans City Council Housing and Human Needs Committee HHNC 3-17-14
 1. http://cityofno.granicus.com/MediaPlayer.php?view_id=3&clip_id=1767
 2. The meeting functioned as an update to the City Council on the work following report #3 (see **Appendix C** for reports and presentation slides) and included the general approach to the recommendations along with questions for the HHNC to consider.
 - 7) FQMD 3-17-14 3pm
 1. Lecture and discussion
 1. Courtyard Noise Control
 2. Selected data
 3. General approach to recommendations
 2. Sound walk with community members utilizing elements of the soundscape method allowing people to correlate subjective impressions with objective measurements. See data in **Appendix A4**.

Feedback

All feedback was responded to via email, phone calls, or in person; the information was incorporated into the investigation.

Soundscape method

The investigation utilized the soundscape method in the public meetings in the form of sound walks. The soundscape method is a powerful educational tool to allow stakeholders to experience sonic environments subjectively and also relate that to objective (sound level) measurements.¹ Discussions before and after the walks with the groups helped to share impressions, clarify technical questions, and generated feedback for the report.

Some results from the discussions related to the soundscape method:

- 1) Time of day, nearness to the source, and the ambient sound levels from people and other street sources affected the listeners' perceptions of loudness; at night time the surrounding activity (sound) level appeared to “mask” or “blend” the source. That is, a given sound level at night time was typically less noticeable than during the day given the overall level of activity and the background sound levels.
- 2) Listeners noted that their musical preference could affect their relative judgment as to perceived loudness of a source (i.e. sources of the same objective sound level may be subjectively judged differently in regard to subjective loudness or unpleasantness).
- 3) Frequency content of the sounds emanating from a source affected perception of a source.
 1. Overly “bassy” or very “trebly” sounds had a greater potential to being described as unpleasant.
- 4) Participants had different impressions on loudness and unpleasantness, although it varied from person to person, day to night, and even between walks. There was general consensus on several locations that were “too loud” and the decibel readings clearly bore this out as well.

Reports to City Council

The reports to the City Council are shown in **Appendix B**.

¹Siebein, “Types of soundwalks and their applications in soundscape design”, J. Acoust. Soc. Am. 134, 4020 (2013)

related businesses.¹ It appears, little regard was given to buffering noise and its effects on residents. **Table 1** below takes a closer look street-by-street at the distances that must be considered:

DISTANCE TO ADJACENT ZONE FROM CENTER OF BOURBON				
	Toward Royal		Toward Dauphine	
	NE	SE	NW	SW
St Ann	60'	205'	70'	140'
Orleans	270'	50'	75'	75'
St. Peter	60'	60'	85'	70'
Toulouse	80'	50'	115'	231'
St. Louis	140'	90'	150'	150'
Conti	45'	300'	100'	145'
Bienville	275'	95'	150'	85'
Iberville	150'	CBD-3	175'	CBD-3

Table 1: Distance from the center of Bourbon St. to the adjacent zone.
It is 15' from the center of Bourbon to the facade of its buildings, so sound sources can actually be closer than the numbers shown.

Examining these distances, it is unrealistic that the closest residences will be able to reach the suggested target interior sound levels even with reduced entertainment venue sound levels on Bourbon. There are too many sound sources including crowds (tourism numbers are expected to rise) in too close a proximity to these homes; solutions such as incentives for soundproofing or development of a buffer zone with different requirements are be in order in addition to reducing sound levels.

The character of the sound of music has changed over the last decades to include low frequency (LF) sounds, especially low frequency pulsing sounds present in most modern popular music (NOLA Soundscape Study, Section 1). Low frequencies are harder to contain at the source, travel further than middle and high frequencies, and penetrate into other buildings more easily. Unwanted low frequency pulsing noise is even more annoying due to the pulsing nature of the signal. The need to address low frequency sound complaints are a priority for any revisions of the New Orleans sound ordinance (NOLA Soundscape Study, Section 2). The use of the metric dBC that includes low frequencies is critical to addressing this issue while keeping the methods as simple as possible.

The following significant sound sources were identified:

Source	Path	Type
Entertainment venues (DJ and live music)	Sound travels out to the street and courtyard	Continuous, Significant low frequency (LF).
Crowds	Street and courtyard generated. Also can react to ambient sounds. (i.e. the Lombard effect in which a person raises their voice to be heard over the background sounds)	Continuous in presence, transient in sound level, Not LF.
Street performers	Street based, with and without loudspeakers	Transient in presence, continuous in level, some LF.
Amplified demonstrations	Street based loudspeakers	Transient in presence, continuous in level, Not LF.
Motor vehicles	Street based, exhaust pipes and loudspeakers	Transient, LF.

Table 2: Sound Sources of the VCE

All of the sources above need to be examined, even though the scope was directed toward brick and mortar structures (entertainment venues).

Crowd noise varies greatly over the course of an evening and can vary considerably between nights. People do not produce low frequency sounds, so it stands to reason that the comparative use of the metrics dBA (middle and high frequencies) and dBC (includes the low frequencies as well) will distinguish between the music of a venue and the crowd if the music is louder. French Quarter Business League submitted a letter (see **Appendix D**) and three videos documenting very high continuous crowd sound levels (88-96dBA, and a short window of 102dBA) without any music in the immediate vicinity, expressing a valid concern: “How will enforcement distinguish between crowd sound and music if the crowd is extremely loud?” This prompted a controlled experiment (See **Appendix AY**) in which crowd sounds were played back through a loudspeaker in a room side by side with a musical selection through another loudspeaker, and the crowd sound levels were varied to examine the influence on the sound level readings (dBA and dBC). The results of this experiment point to the use of dBC as the primary metric for determining sound level violations during crowded conditions, as well as using dBA to provide guidance on any effects the crowd has on that (dBC) reading. In addition to this information, it is understood that the health department will have dedicated trained individuals capable of distinguishing between excessive crowd and excessive music sounds.

Street loudspeaker regulations are currently unenforced and these loudspeakers (1) pose a safety risk as they are so loud in the immediate vicinity (up to 50') as to hinder emergency communication, and (2) equally important is that if the street loudspeakers are not managed, it will not matter so much if the entertainment venues limit their sound output while street loudspeakers are free to project at high sound levels, adversely affecting the residents. In addition, businesses on Bourbon have expressed frustration in having to stop their musicians due to being swamped by sound produced by portable loudspeakers in the street. **Street loudspeakers are a critical part of the VCE regulations and need consideration parallel with the brick and mortar legislation.**

Consideration for the complete ban of outside loudspeakers on Bourbon St. runs into constitutional free speech issues as well as cultural issues for street performance. The appropriate limits for street loudspeakers are couched as time, place, and manner. In regard to sound, it would fall under manner, which would be sound level. Distance from other sound sources (place) could reduce the conflict of the sonic space which everyone occupies.

¹ Campanella, Richard, “Bourbon St: A History”, LSU Press, 2014, p224.



Figure 2: Street Amplification on Bourbon St. Left: Two larger speakers under a hotel window. Center: Street preachers get ready for the evening. Right: A double 12'' cabinet with open back in the middle of the road, able to broadcast in two directions. These pictures were taken between 7:00pm and 7:15pm on 2-17-14 during a venue location documentation walk; the street loudspeakers are captured by chance.

Motor vehicle sound is considered fully transient sound and is addressed below in the section **RELATED CONCERNS AND RECOMMENDATIONS.**

Current VCE Sound Ordinance:

The current VCE ordinance and enforcement procedures have been analyzed in depth (NOLA Soundscape Study, Section 7 and Appendix D) and it was determined that they were in need of revision or replacement. The existing ordinance has sound level limit provisions for entertainment venues (66-202) and right of way loudspeakers (66-203(3)), and also a time of day limit on street performance (30-1456), none of which are currently enforced. Some of the critical elements that a new VCE ordinance requires are:

- 1) Positive identification of the sound source and its sound level.
- 2) Sound level limits and metrics that address low frequency sound levels (pulsing sounds).
- 3) Appropriate metrics for measuring in a complex sound field.
- 4) Simplification of methods such that sound sources (venues) can self regulate.
- 5) Reduction in time of measurement to facilitate multiple measurements over the course of an evening.
- 6) Realistically achievable and enforceable limits that protect residents but also provide consideration for New Orleans economic engine of tourism.
- 7) Street loudspeaker regulations to be enforceable and appropriate in the complex sonic and geographical environment of Bourbon St.

Two additional items were developed and discussed during this study:

- 1) **Daytime levels:** During the day, the Bourbon St. promenade is closed, putting pedestrian traffic on the sidewalk directly next to the venues. The venues are generally quieter during the day and reach higher evening sound levels starting at 10pm (see **Appendix A1**). The street sound levels are generally quieter as well. This points to the possibility of a daytime sound level limit that would be lower than night time. It is apparent that the Bourbon St. timetable of operations is about 12 hours off of a regular workday schedule, so this appears to be realistic and appropriate.
- 2) **Side streets:** Part of the investigation examined the reduction of sonic impact on residents if side street facing openings were closed, as well as the front openings (demonstrated at February 24 FQMD soundwalk, and **Appendix A2 Data**). While the reduction of sound on a side street affecting residents due to side facade closure was dependent on the source sound level and the relative sound level of the street background sound, it was clearly identified as a means to reduce impact on the residential areas. The two options that are presented for consideration are (1) A side street limit for open facades, or (2) closure of the side facades.

Comments on the Recommendations:

The recommendations in the following sections are as close to meeting criteria as stated in the GENERAL SUMMARY STATEMENT from the various standpoints as possible, with some compromise necessary on parts of the perimeter of the VCE. This is due to the highly variable distance from the center of Bourbon to the nearest zone on each side of each side street. The recommendations do meet the following criteria:

- 1) Emergency communication on Bourbon St. is not compromised by sound from amplified devices. The limit of 85dBA/95dBC is established as a maximum level at the middle of the street or intersections.
- 2) Sound levels emanating from many entertainment venues are reduced from existing levels, specifically from venues with open facades that have DJ's or live music. Venues that have lower levels at the point of emanation are not affected.
- 3) Residential indoor sound level limit criteria on side streets are met at 150' or closer to the intersection of Bourbon, depending on sound sources, sound levels, and actual propagation attenuation. 150' is considered the distance worst case regarding highest sound level and minimum propagation attenuation that will meet indoor sound level criteria of a residence.
- 4) Metrics, levels, and methods are established such that (1) crowd noise is accounted for and (2) self monitoring is possible.

It is additionally recommended that the residences that are within the 150' distance are considered for assistance to soundproof/weatherproof their building shell

THE RECOMMENDED SOUND LEVELS SHOULD NOT BE THE BASIS FOR THE REMAINDER OF THE CITY'S SOUND ORDINANCE, BUT THE METHODOLOGY SHOULD PROVIDE USEFUL INFORMATION IN DETERMINING THE BEST SOLUTIONS FOR EACH ZONE AND ITS INDIVIDUAL NEIGHBORHOODS.

RECOMMENDATIONS - GENERAL

All sound offenses shall be changes from criminal to civil offenses.

This recommendation follows one of the main points of the NOLA Soundscape Study, Section 4.

It should be noted that penalties should be sufficient to deter illegal behavior in the absence of criminal penalties (jail time):

- The current limit of \$500/offense is considered a weak deterrent to VCE businesses unless multiple tickets are issued. Legislation to raise the monetary limit of fines would require the state legislature's approval.
- Penalties associated with occupancy or ABO permitting should be considered, especially where there is a repetitive history of ticketing and/or complaints. Clarity to legislation and enforcement will strengthen the Alcoholic Beverage Control Board's ability to evaluate noise issues when they are part of complaints brought before the board.

Definitions:

Leq (equivalent continuous sound level) is defined as the steady sound pressure level which, over a given period of time, has the same total energy as the fluctuating sound pressure level being measured. Leq is the root mean squared (RMS) sound level with the measurement duration used as the averaging time.

A-weighted sound pressure level means the sound pressure level as measured on an ANSI-SI.4-1971 Type 1 or Type 2 sound level meter using the A-weighted network. It is the approximate sound level as heard by the human ear, measured in decibels, and denoted as dBA.

C-weighted sound pressure level means the sound pressure as measured on an ANSI- SI.4-1971 Type 1 or Type 2 sound level meter using the C-weighted network. This measurement includes most of the low frequency information omitted in A-weighting, and is denoted as dBC.

LAeq: the A weighted equivalent continuous sound level (dBA Leq)

LCeq: the C weighted equivalent continuous sound level (dBC Leq)

RECOMMENDED SCOPE OF PROPOSED LEGISLATION FOR THE VCE

1) All measurements for the VCE sources shall be taken at an opening even with the plane of the street side facade of the building.

- Positively identifies the sound source in a complex sound field.
- Measurement point allows venues to monitor themselves easily.

2) The measurements will utilize the metrics LAeq and LCeq, with the limits to be established.

- LCeq will be utilized to address low frequency sounds.
- In practice, the enforcement will need to distinguish between crowd sound and sound generated by the establishment; in cases that the crowd noise is significant, LCeq can be employed exclusively. In cases where crowd noise is considerable, methods and guidelines will be developed by the Health Department to assess the particular situation (see **Appendix A7** simulation).
- The reasoning behind Leq is outlined in FQMD presentation #1 February 17, 2014; this includes appropriate metrics for a complex (events) sound field.

3) The measurement duration shall be 20 seconds. Repeated measurements are permitted as required.

- Allows for multiple measurements over a short period or an evening.
- Reduces procedural burden.
- Simplifies self compliance.
- The issuance of warnings shall be at the judgment of the Health Department sound management officer.

4) The sound levels measured at the street side facade of VCE buildings are not to exceed:

Description	LAeq	LCeq
Daytime open facade facing Bourbon 7am - 10pm	87 dB	97 dB
Night time* open facade facing Bourbon 10pm -7am	92 dB	102 dB
Side street open facade (24 hours)	87 dB	97 dB
Closed facade facing Bourbon (measured at curb)	N/A	97dB
Closed facade side street (measured at curb)	N/A	92dB

For all measurements consideration must be provided for (1) crowd noise, and (2) plainly intrusive events. All corner doors are considered to be facing Bourbon.

*Applies to special events including Bourbon St. Mall (Sec. 154-608) openings outside of normal schedule.

- Protects residents against low frequency sounds.
- Realistically achievable and enforceable.
- This is with the understanding that limits function as a cap during peak operations (typically 10pm to 4am), and are not expected to be the operational levels at other times.
- Side Street Open Facade sound levels can be further tailored (reduced) to specific side street and distance to adjacent VCR/VCC zone

5) Alternate compliance for closed facades facing Bourbon St. will be 97 dBC Leq at 5' from the facade. Side street facade limit will be 92 dBC at 5' from the facade. Both are 24 hour measurements.

- Puts the measurement effectively at the curb.
- This regulation holds for any fully closed building side and should be measured in the center of the building.

6) Amplified sources on the VCE public right of way shall have a sound level limit of 91dB LAeq and 96dB LCEq at 3 ft.

- This includes but is not limited to dancers, street preachers and amplified street musicians.
- The legislation may or may not include such a provision, which will limit the loudspeaker level at a given distance to reduce overlap of sonic footprints
 - Limit the place (distance from other street sources or venues) and orientation (i.e. aimed only along Bourbon) if the City Council wishes to entertain these options.

Time Line of Legislation and Compliance

A time line will need to be established for the VCE legislation to ensure all of the businesses affected have an opportunity to comply with the law, as well as get the Health Department sound management program operational.

The time line should include:

- 1) Legislation introduction, evaluation, and final approval
- 2) Legislation effective date
- 3) Alerting VCC to issues regarding variances to appropriately manage sonic footprints and their response
- 4) Compliance period:
 1. Compliance plan submission deadline 1 (i.e. turn down, construction, technical, trial and error, etc)
 2. VCC approvals of any required variances
 3. Fire Marshal approval
 4. Compliance plan resubmission deadline 2 (final)
 5. Construction period
 6. Field compliance date
- 5) Self enforcement (if needed)
- 6) Operational grace period with field monitoring and refinement of Health Department guidelines and procedures.
- 7) Health Department enforcement

RELATED CONCERNS AND RECOMMENDATIONS

The following are important concerns to be addressed in future phases of sound ordinance legislation and sound enforcement procedural development to ensure comprehensive and fair policy as it relates to the VCE and the rest of New Orleans.

Courtyards

The VCE study examined courtyards including geometries, adjacencies, sampling of sound levels. The following observations were made:

- 1) Typical courtyard sound levels of VCE businesses were measured (**Appendix A6**).
- 2) Loudspeakers were present in many of the courtyards or the buildings open to the courtyard. This is in violation of the loudspeaker placement ordinance Sec. 66-209.
- 3) Large reflecting surfaces (hard walls) caused buildup of sound in courtyards.
- 4) Some courtyards had lower walls and/or clear or reflecting paths to adjacent residential areas.
- 5) Restrictions by the Vieux Carre Commission (VCC) are a concern in regard to erection of barriers and soundproofing.
- 6) The increase in courtyard population generally resulted in higher sound levels.
 1. There was clear evidence of the Lombard effect in which people raise their voices to be heard clearly over the existing background noise, including other conversations, background music, and other sound sources.

Discussion:

Courtyards are particularly difficult to regulate as they can be dominated by the sound of patrons' conversations, which can produce high sound levels with regard to an adjacent neighbor. It is critical that the VCC is sensitive to the need to protect residents when putting limits on the sound control methods available to the courtyards; the VCC can restrict the type, size and nature of barriers and other noise control measures.

Due to the limited ability to control low frequency sounds and their propagation, it is advised that all establishments limit the production of these sounds outdoors, or the "spilling" of these sounds from the inside of the venue to the outside courtyard.

The responsible use of courtyard loudspeakers to provide ambient or background sounds is possible. Suggestions for minimizing sonic footprint with loudspeakers are shown below.

Recommendations for Courtyards:

We are not prepared to suggest a sound level limit for courtyards, but the following can be used as an outline for courtyard regulations (see **Appendix A6** for data and analysis):

- 1) A dBC level cap as one guideline for lower activity to ensure bass sounds do not create problems for residents. This can be established through the use of a typical limit adjusted based on interactive feedback from nearby residents.
- 2) The use of LCEq-LAeq as a means of determining objectively whether the crowd sound is the dominant factor in the overall sound level.
 1. This can also be used in tandem with the judgment of the trained sound management officer.

- 3) Location of measurement can include both the emanating and receiving properties.
- 4) Measurement location will be critical: the measurement must be at least 5' from a wall or a conversation. This method should be verified in the field.
- 5) Any courtyard loudspeakers should have a sound level limit, although this may be venue specific (see below 2.2.3). This will aid in the reduction of the Lombard effect.
- 6) Events could be permitted x times a year with appropriate restrictions (time frame, maximum sound levels, etc).
- 7) A set of general recommendations for minimizing the sonic footprint of courtyards were presented at the 3-17-14 meeting (www.maccno.com). They include:
 1. Methods of sound control including barriers and sound absorbing materials.
 2. Suggested limits to courtyard loudspeakers:
 1. Only for “ambient” music
 2. Loudspeakers should minimize bass frequencies. This can be done with equalization, a selection of a primarily midrange to high frequency loudspeaker, or a combination of the two.
 3. Potentially having a sound level limit at a set distance (i.e. 3 ft.). This recommendation can be found in detail in the NOLA Soundscape Study (p. 63); such a level may vary from venue to venue.
- 8) The Vieux Carre Commission (VCC) should be involved in the effort to reduce sonic footprints and help to arrive at solutions with minimal impact on the historical character of the courtyards.
- 9) We are currently examining the use of localized active noise control (ANC) to reduce impact from smaller sources (perimeter) or on to specific smaller receivers (such as a window). Such a technology may have its application in hard to manage areas.

Receiving Residence Measurements And Sound Level Limits

Receiving residence sound level limits were considered during the NOLA Soundscape Study and the VCE study:

- 1) The sound levels recommended at the facades of Bourbon street establishments are based on a backwards propagation model utilizing an allowable threshold sound level on the inside of the adjacent buildings in the VCR. In other words a given sound level at the facade of an establishment should guarantee a non exceedance of maximum sound level inside the adjacent residences from that source.
 1. The propagation model is again examined in the **Appendix A4**.
- 2) The internal sound level limit of 45dBA Leq are common in other sound ordinances (i.e. State of California, Portland, Oregon), and currently the intra-dwelling sound limit in New Orleans at night is 45 dBA L₁₀, 55dBA L_{max}.

- 3) The NOLA Soundscape Study includes information regarding guidelines of measuring and identifying low frequency issues in the residence. (see NOLA Soundscape Study Section 7)
- 4) Complications for measuring inside residences include:
 1. Positive Identification of a source in a complex sound field (see below).
 2. Condition of the receiving property (see below).
 3. Access to the structure at the time of complaint or at a later time for verification.
- 5) An external sound level can be considered for the property line of the receiving residences as well. During the study the businesses and residents inquired about two points of measurement due to anomalies in sound propagation, as there will be outliers to the general propagation model discussed above. Issues surrounding this:
 1. Positive identification of the offending sound source in a complex sound field may be problematic during typical evening Bourbon St. operations. There may be more than one source donating to the problem. Positive ID may require venues taking breaks during operational hours or having controlled testing during off hours. Determination of appropriate temporary controls (i.e. sound levels at the source lower than legislated) may be in order until the problem is remedied.
- 6) Angle of incidence on the facade of the building:
 1. One concern expressed was whether the direction from which the sound originated, or whether the sound was a random or diffuse field, affected the ability of sound to penetrate the facade of a building. A brief (theoretical) study of the angle of incidence on windows revealed that there was no difference in the penetration of low frequencies, whether they came head-on to the building or if the sound was grazing the building. The main differences occurred in the 2kHz octave range, which typically will apply to voice frequencies (consonant sounds).

Condition of receiving residence.

An important concern investigated in the NOLA Soundscape Study (Appendix E) and shown again in this study (below) is the ability of a residence to reduce sound from the outside. The basic assumption is that if one closes their windows and doors in a city, they should have some degree of quiet enjoyment of their homes. The quality of the construction and maintenance of a home/apartment/condo can vary considerably, and this directly reflects on the ability of a residential building envelope to reduce outside sound. Thermal insulation can be correlated to acoustic insulation to some degree¹. The combination of a temperate climate, a low priority for thermal performance, and a high percentage of historical homes with some not properly maintained ultimately results in a lower expectation in the reduction of outdoor sounds.

All buildings or rooms with openings (i.e. gaps in windows & doors, open chimneys, window AC units) are considerably more susceptible to external sound than those that are weatherized or better maintained. When comparing New Orleans with other cities and an expectation of quiet enjoyment, we should realize that other cities with similar sound levels have different building environments. New Orleans weather and building types in some cases requires that the building envelope “breathes” which also lets in (or out) sound.

¹Woolworth, David, “Relating acoustics and thermal performance”, J. Acoust. Soc. Am. **134** , 4126 (2013) .



Figure 3A: Cracks or gaps in windows (and doors) are the source of significant sound leakage. Even a well sealed window is considered the weak point of any typical building envelope construction. A fundamental solution is to weatherize the windows and doors, however issues with the climate and breathing of the building envelope can limit the effectiveness of such measures.
Picture: Hermann Grima House on St. Louis.



Figure 3B: Window Unit air conditioners are a typical flanking path for outside sounds. This air conditioner and others encountered in the field were the equivalent of leaving the window open. Running the unit creates sound to mask the outside sounds, but also creates a higher inside sound level. Open chimneys are significant sound flanking paths as well.
Picture: Hermann Grima House on St. Louis.

The use of “plainly audible” in regard to residences must consider the condition of the building envelope; for example, inside the Hermann Grima house on the second floor, a conversation by passing pedestrians is clearly audible, so external sounds easily penetrate the windows due to air gaps. HUD provides a maximum external Day Night Level (DNL) of 65dB before requiring special consideration for a more robust (soundproof) building envelope (this translates to 55dB at night, however, we are measuring in the vicinity of 65dB (crowd + entertainment noise) at night within the first ½ block of Bourbon. This means that that the bordering residential area requires special approvals if it were to go through HUD for funding. Should there be a “buffer zone” with incentives for sound proofing?

The HUD minimum standard for a building envelope is an attenuation of 20dB. From the NOLA Soundscape Study Appendix E it was determined that the average reduction of a facade in reasonable repair is 24dBA/18dBC.

This leads to two questions:

- 1) Where do we draw the line at “reasonable expectation” of a receiving residence? We believe that this is covered in the NOLA Soundscape Study Appendix E paper on the facades of residential buildings.
- 2) When we examine other city's ordinances for their sound level limits, we need to keep in mind that the same external sound levels have a very different impact on poorly insulated homes or historical homes. This means two things:
 1. There can be an intention of reducing sound levels of a city to accommodate the architecture but this means in a world that all cities have gotten louder, there is considerable work required to quiet down all the sources (transportation, entertainment, industry).
 2. There can be an intention of condoning an cultivating a culture of repair of the historical structures and as a result making them more sound resistant.

This leaves us with quite a dilemma as each of the above approaches by themselves can be may be impractical for a complete solution. It may be that the best solution takes into account both parts: reducing sound levels wherever possible and providing incentives for thermal (and sound) insulation for those that desire it.

While a maximum internal level should be established for intrusive sounds, expectation of inside sound level should be tempered with the condition of the building given the same external sonic conditions, and this is the type of judgment reserved for properly trained enforcement.

The City of Austin currently offers a low interest loan program for clubs to improve soundproofing and reduce sonic footprint with directional loudspeakers, additionally it has proposed building envelope criteria for new construction (Austin City Council Resolution 20111215-060) A sound proofing program could be considered for residences bordering the VCE district especially in the first ~150' of side streets from the intersection of Bourbon . This could be extended to other parts of the city that are exposed to excessive sound from traffic, industry, entertainment, and tourism.

2/21/14 monitor deployment	<u>LAeq</u>	<u>LCeq</u>	<u>LCeq-LAeq</u>	NOTES:
Indoor monitor 2A deployed 11:49pr ▶	54.8	64.5	9.8	flanking path open air conditioner overlooking courtyard; brick wall + window
Outdoor monitors 1A and 3 deployed ▶	70.2	77.5	7.4	rooftop overlooking active courtyard band inside venue
Indoors 5' from open chimney	45.2	64.6	19.4	abutting a courtyard solid brick construction
in fire grate (open chimney)	56.6	69.6	13	same; noted in next room over courtyard sound not perceived
				chimney and air conditioner are flanking paths- voices clearly audible at opening
				Apparent reduction with flanking 15dBA/13dBC

Figure 4: Approximate indoor and outdoor levels observed during monitor deployment. Note that flanking paths were observed via the air conditioner and the open chimney. In the room with the chimney outdoor music sounds and voices were distinguishable, and in the room next door no outdoor sounds were audible; neither room had windows, only brick walls.

Recommendations on Receiving Residences:

- 1) Night time external receiving property sound level limit adjacent to the VCE should be no greater than 65dBA /80dBC based on a building envelope in reasonable repair. This based on the facade study showing average reduction of 24dBA/18dBC for sound penetrating a building. These limits should be considered for only the most active zones (i.e. overlaid buffer zone for VCR/VCC). Creation of a buffer zone would allow for lower levels throughout the remainder of the VCR/VCC.
 1. Lower limits are encouraged if they can be achieved in regard to all sources. Some sheltered neighborhoods in the same zone will easily achieve significantly lower levels due to their proximity to all sound sources and shielding by other structures.
 1. Lower limits may require exemptions; neighborhoods can establish their own permissions with regard to sources that are higher than the sound level limit. An example of this Bacchanal in the Bywater, where a neighborhood and a venue have a working relationship.
 2. Higher limits may be appropriate in the case of transportation/industrial noise or other sources, but are not recommended.
- 2) Night time internal receiving property sound level limit of 45dBA from all sources.
 1. Low frequency measurement should include the limit of 20 LCEq-LAeq. Also see **Appendix A4** for short discussion on relative LCEq-LAeq to overall levels.
 1. Methods of measurement must be established by the sound management group (see NOLA Soundscape Study Section 7)
 2. Reasonable expectation of the building's state of repair must be met.
 3. All internal (residential) sound sources must take into account
- 3) Tactile or visible vibration of a residence coinciding with the low frequency source should be considered. This would fall under “plainly perceived” and rest with the judgment of trained sound management officers.

Curfew of Street Performers on Bourbon St.

Currently there exists a law restricting street performance on Bourbon St.:

Sec. 30-1456. Use of Bourbon Street restricted.

It shall be unlawful for any person to perform any street entertainment on the street or sidewalk of Bourbon Street from the uptown side of Canal Street to the downtown side of St. Ann Street between the hours of 8:00 p.m. and 6:00 a.m.

(Code 1956, § 42-109.1(b))

And also a citywide ban on musical instruments after 8pm:

Sec. 66-205. Persons playing musical instruments on public rights-of-way. It shall be unlawful for any person to play musical instruments on public rights-of-way between the hours of 8:00 p.m. and 9:00 a.m. Persons may obtain a temporary permit as provided by this article. The provisions of this section shall not apply to any person who has obtained a temporary permit as provided for by section 66-176 or are specifically exempted from the

provisions of this article as provided by sections 66-138 and 66-139 or any noise resulting from activities of a temporary duration, for which a temporary permit has been granted by the city as provided for in section 66-176.
(Code 1956, § 42A-15)

This has been challenged by musicians advocates and others as unconstitutional: in a discussion with Paul Van Orden of Portland Oregon sound enforcement it was discovered that in his experience 10pm is considered to be a constitutionally appropriate cut off time, the reason being it is recognized in nearly every ordinance as the time at which the traditional evening hours begin.

This is, however, when the evening activities on Bourbon St. actually begin and sound levels begin to rise. The curfew time requires careful consideration:

Opponents of a 10pm cutoff time are justified in their fear that this will only encourage street performers to go later, as there are many examples witnessed of late night street performance (after 10pm) on Bourbon St. and beyond due to lack of enforcement. Proponents of a 10pm cutoff point to a selectively enforced 8pm curfew and resulting court cases; it is also thought that if the sound ordinance is revised and enforced, then the curfew should be revised for constitutionality and enforced evenly. Still others wish to consider the elimination of any curfew.

It is also of interest that the permits referred to in 66-205 are not issued by the city department of finance for this purpose, and according to 30-1452, no such permit is valid inside the Vieux Carre or Central Business District (NSS p54). This has been interpreted as no permit is needed for street performance.

In the event that no legislative and/or enforcement agreement can be reached, we can attempt to return to local negotiations between the businesses, residents, street performers, and other street amplified sources. Included in **Appendix E** are two street performer agreements from 1979 and 1996 supplied by MACCNO which are a good starting point to utilize in such negotiations. These negotiations should also include education of street performers regarding “good neighbor” policy/busker code of ethics(<http://www.buskersadvocates.org/>).

Motor Vehicles

During the investigation, three vehicular sound sources were clearly (audibly) identifiable during the soundwalks and other time spent walking around: (1) motorcycles without appropriate mufflers, (2) “Boom cars”, and (3) Party buses. All sources are considered transient, but are so loud and to be extremely disturbing to the recipient who does not desire to hear them. The sound generated will typically be found generated in all parts of the French Quarter, not necessarily the VCE.

Motorcycles:

Currently the motorcycle muffler issue is regulated by the city ordinance Section 154-314 and sound level limits are placed on motorcycles by Section 66-206, Table 2.

In regard to sound enforcement using a decibel meter there are extreme challenges to calibrating a meter or having an operational meter present during a drive-by of a motorcycle out of compliance; after that, if the motorcycle is moving, it requires another vehicle with the authority to stop it. Keeping these things in mind, two methods may be more effective at reducing excessive sound from motorcycles:

- 1) Examining motorcycles that are parked for the appropriate EPA approved muffler (Section 154-314).
 1. This may be extended to educating the local clubs through flyers and visits to the clubs themselves.
- 2) Introduction of a “plainly audible” ordinance specific to motor vehicles that can be enforced by the police. See reference in NOLA Soundscape Study, Appendix H.

Boom Cars

Several boom cars were measured at Bourbon intersections as they crossed over the promenade from side streets.

Measurement	LAeq	LCeq	LCeq-LAeq
Boom car Beinville	89	105	16
Boom car Conti	87	103	16
Boom car Conti	91	105	14

Table 3: Boom car sound levels

All of the measurements are above the recommended limit of 85dBA, 95dBC in the intersection (INT) or middle of street (MOS). For the low frequencies this is considered 4 times as loud as the recommended level. It can be seen that from the LCeq-LAeq measurement that it is extremely “bass heavy”; this is due to the a combination of equalization and the filter the body of the car provides for middle and high frequencies. As with motorcycles, the source travels through all the zones in the French Quarter, however the difference is that boom car levels are controlled by a volume knob.

- 1) In this case, the plainly audible standard may be the only way to provide any enforcement to reduce the impact of these sources.

Party Buses.

The party buses are similar to boom cars, but are limited to streets around the perimeter of the French Quarter.

ADDITIONAL STUDIES

It is recommended that the City Council continues to collect information on the French Quarter to propose solutions to create a comprehensive solution to the VCE (and entire Vieux Carre) sound issues, including items discussed in the RELATED CONCERNS section of this report.

LIMITATIONS

The recommendations contained in this report are our best professional judgment as to the procedures to be followed in the ordinance revision process. There may be additional conditions not disclosed by this investigation, or environmental changes not anticipated. However, in our opinion the recommended legislation is the first steps to resolving the priority noise ordinance issues and maps out further work to complete a comprehensive noise policy tailored to the needs of the City of New Orleans.

REVIEWERS

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