

https://dspace.org/

Urban response: an exploration of architectural systems modulated through mediums of digital sound and music

Lepore, Raffaella

2011-10-17
http://hdl.handle.net/10539/10564

Downloaded from a DSpace repository. https://dspace.org/

URBAN RESONANCE

AN EXPLORATION OF ARCHITECTURAL SYSTEMS MODULATED THROUGH MEDIUMS OF DIGITAL SOUND & MUSIC

RAFFAELLA LEPORE



1
BRAAMFONTEIN
Johannesburg

The revived urban setting of Braamfontein - the location of an exploration in URBAN RESONANCE. (Photo taken by Andrea Shapiro (2010)).

track 1

DECLARATION

I, Raffaella Lepore, 0500868E, am a student registered for the course Master of Architecture [Professional] in the year 2010. I hereby declare the following:

I am aware that plagiarism [the use of someone else's work without permission and/or without acknowledging the original sources] is wrong. I confirm that the work submitted for assessment for the above course is my own unaided work except where I have stated explicitly otherwise. I have followed the required conventions in referencing thoughts, ideas, and visual materials of others. For this purpose, I have referred to the Graduate School of Engineering and the Built Environment style guide. I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my unaided work or that I have failed to acknowledge the source of ideas or words in my own work.



Raffaella Lepore
26 October 2010

ACKNOWLEDGEMENTS

I would like to dedicate this thesis to my loving family Giuseppe, Guida, Andrea and Michael. Thank you for supporting me in everything I went through during my studies. Thank you mom and dad for giving me this chance to study and for all the work, time and effort you put into it. Thank you Andrea for being a supporting brother and for putting up with me - you are always there when I need your help. Thank you Michael for your unconditional love, encouragement and support through all my tears. To the Reis family - for your encouragement through it all.

Thank you to Hilton for your guidance and help this year - you pushed me to do my best. To Nina Cohen, Hannah Le Roux, Nabeel Essa and Lone Poulsen for the continuous crits and help with my architectural issues in the past two years. To Jack, Danielsun, the Parkhurst BRT and all my classmates for the amazing experience of studying with such great people. Bronni-Bron and T-Dog - I truly found great friends in you. Thanks for all the laughs and for pushing me through the last stretch of thesis. To the Big Five and all my friends for removing me from the encapsulating world of architecture at exactly the right times.



MOTIVATION I What

music do you like? This seems to be the first question we all ask other people that we're meeting for the first time and I never seem to have an answer for it. I, like most people, love music (and all types at that); and being able to play the piano is my connection to this powerful art form. I have used my thesis year as a way of exploring the 'other' side to music – its systematic and scientific side, through sound. Music is a science as well as an art and I feel that because of my analytical ways of seeing the world – a thesis topic combining my love for music and a method of breaking it down into its most basic form: sound; was perfect. So, here goes…



(image source: http://2010.emrgnsee.com/_wp/wp-content/uploads/2010/05/martyparty.jpg)

ESSAY 01

ABSTRACT pg 15:00
on URBAN RESONANCE

INTRO pg 17:00
on architectural systems in johannesburg

URBAN RESONANCE pg 21:00
the theory of architectural systems modulated by sound

track 1 RESONANT SYSTEMS
Resonant Systems
Sources of Systems and Their Interstitial Space

track 2 URBAN RESONANCE
Social Resonance
The Medium of Urban Architecture

track 3 SOCIAL MODULATION
Digital Social Modulation
Spaces of Encounter
Spatial Amplification

track 4 DIGITAL MUSICAL SYNTHESIS
Multi-Notation – Sound and Music in Social Being
Digital Synthesis in Music Technology
Spatial Synthesis of Digital Music
Institutionalization of Experimental Music

track 5 JHB MUSICAL SEQUENCING
Sampling the Johannesburg Style
Tuning Johannesburg into Digital Music

track 6 MULTITRACKING ARCHITECTURAL SYSTEMS
Coding Through Building Program
Channels of [Social] Encounter in Contemporary JHB
Physical Acoustic Modelling

All icons (as shown to the right) make reference to an audio sound track that can be found on the CD provided with the document or can be played by clicking on the icon (if document is in pdf format). Please feel free to engage fully with the sound tracks as compliments to the essay writings.



ABSTRACT I URBAN RESONANCE explores the connections between architectural design and the multifaceted conceptual links to the idea of resonance in sound. This comparison is made in respect to the fact that a building is somewhat required to resonate with its urban context as well as to orchestrate the resonance relating to systems of **people, built form and program**, within itself. In using the concept of resonance, it is seen that these three systems, although separately definable, work together in one architectural environment – influencing each other in some way whether beneficial or not. I have chosen these three components of architectural design in response to Johannesburg's urban and social context, and will explore their integration through celebrating their interstitial spaces of influence and resonance with each other. I seek to allow this idea in design, to produce new meaningful social encounters brought about by the exploration of cross-programming in a building coupled with an architectural response that enforces these social ideas. In the framework of Johannesburg, the question is not necessarily what the systems are but maybe rather how they can be unified and brought together in a building design. **Sound** is one of the least substantially manipulated and considered parts of building design, yet its relationship to inhabitants and their social connections to each other and space is powerful enough to allow people to perceive their surroundings solely through the things that they hear. URBAN RESONANCE is the explicit exploration of collective social 'being' in a building that uses sound and music to unify its programmatic and physical design within the context of Braamfontein, Johannesburg.


NELLY'S HAIR SALON
Cell: 078 217 7929 / 073 924 7799
NELLY'S HAIR SALON
Cell: 078 217 7929 / 073 924 7799
Hair Salon
LAUNDRY
INTERNET CAFE
KORTE ST
60 MIN
STATION ST

INTRO

THROUGHOUT architectural accounts of the past, the role of the architect has been that of a coordinator (Bouman, 2008: 80). This role, in its most simplistic mode, has been to harmonize certain identified architectural systems that a user experiences in a building – this being without taking into consideration eras of architectural 'styles'. This thesis seeks to investigate three identified architectural systems: program, physical atmosphere (Wigley, 2008) and the users of a space (and their social interfaces); as well as the ability of these systems to resonate with each other through the way we as architects chose to compose them. The cross-programming of a building plays a large role in the types of people that are brought into a space that may not have been brought together otherwise and therefore is seen as an architectural system within itself. It is then complimented by the physical building design (the most static system) which allows these differing groups of users to come into contact with each other. This then brings about the 'resultant' system of how the users encounter each other in space. As discovered through further investigation, sound and music are remarkably linked to our corporeal experience of the world and further, our ability to socially interact within our environments especially with other people. Therefore, if sound and music are able to connect us to our physical environments as well as our social environments – what is the relationship between sound and architectural systems? Can it be assumed that applying different facets of sound and music to the three architectural systems will augment physical and social interface composed by a building design?

Even though a building may be in itself arranged according to these systems which are rooted in sound and music, it will always be part of a larger, more encompassing system of URBAN RESONANCE. URBAN RESONANCE here refers to applying the above identified systems to the greater context of the building – the city in which it is sited. In both the micro and macro systems of a single building, whether linear or matrix, the elements of architectural innovation and development of these systems in our contemporary world are those interstitial, overlapping points of the systems. This is stated in reference to the idea that in the past, architects have become overly obsessed with singular systems such as the built form or even solely the social arrangement of a building (Bouman, 2008: 80); but in our contemporary world interrelating of all these systems in an inclusive manner allows us to design building that may bridge social and physical gaps found in our society. In Johannesburg, a post-apartheid city still suffering the effects of segregation (Acebillo, 2007; Bremner, 2007), there is a necessity for socially inclusive architectural and urban projects that allow for public difference (Watson, 2006) to produce social encounters that would not have otherwise happened.

Music and sound in the past century have grown to become inherently socially inclusive through their ability to remain 'multitextual' (Born, 1995, 17) and to remain open to multiple interpretations as well as their wide availability. Here, socially inclusive implies that all people are able to communicate with and relate to one another through sound and music, however just as how our methods of social communication have been altered by the invention of the Internet – so has musical communication and innovation. Thus, programs based in not only the performance of music but also the research into, production and consumption of it, begin to pull diverse users of sound (not only performers but also students and technical engineers) into one unifying building design. In order to be able to make use of sound and music in the systematic design of a building, it is necessary to understand where music and sound production stand today, especially in our context of Johannesburg.

The contemporary music industry of Johannesburg is one of great diversity with numerous musical genres and has been characterized as an industry of collaboration and experimental methods of hybridizing local as well as international music trends. The open availability of musical technology to most people of the public has somewhat democratized (Miller, 2010) the music industry, making it a common ground for most of the public. Braamfontein is a part of the Johannesburg inner city that has come to be associated with many of these characteristics of the music industry. It is a culturally diverse, vibrant area (mainly due to its many student residents) which due to its many cultural music and arts facilities is one of the cultural centres for the city of Johannesburg. It is also a centre of tertiary educational facilities that give it the ability to become a place of great innovation in the technological development of music in Johannesburg. Therefore, by understanding its ability to become the context to a building that incorporates music and sound in its physical, social and programmatic systems, this diverse area could be the start of a novel Johannesburg URBAN RESONANCE.



2
BLK JKS
right

The BLK JKS - a Johannesburg originated Afro-Jazz band, are representative of the type of 'next generation' music in South Africa. The photo demonstrates the urban culture of some of our South African music and how new music is developing into an association with a city (image source: http://www.idsnews.com/blogs/livebuzz/?p=2283)



URBAN RESONANCE

RESONANT SYSTEMS

re-so-nance
to facilitate oscillation at a particular frequency

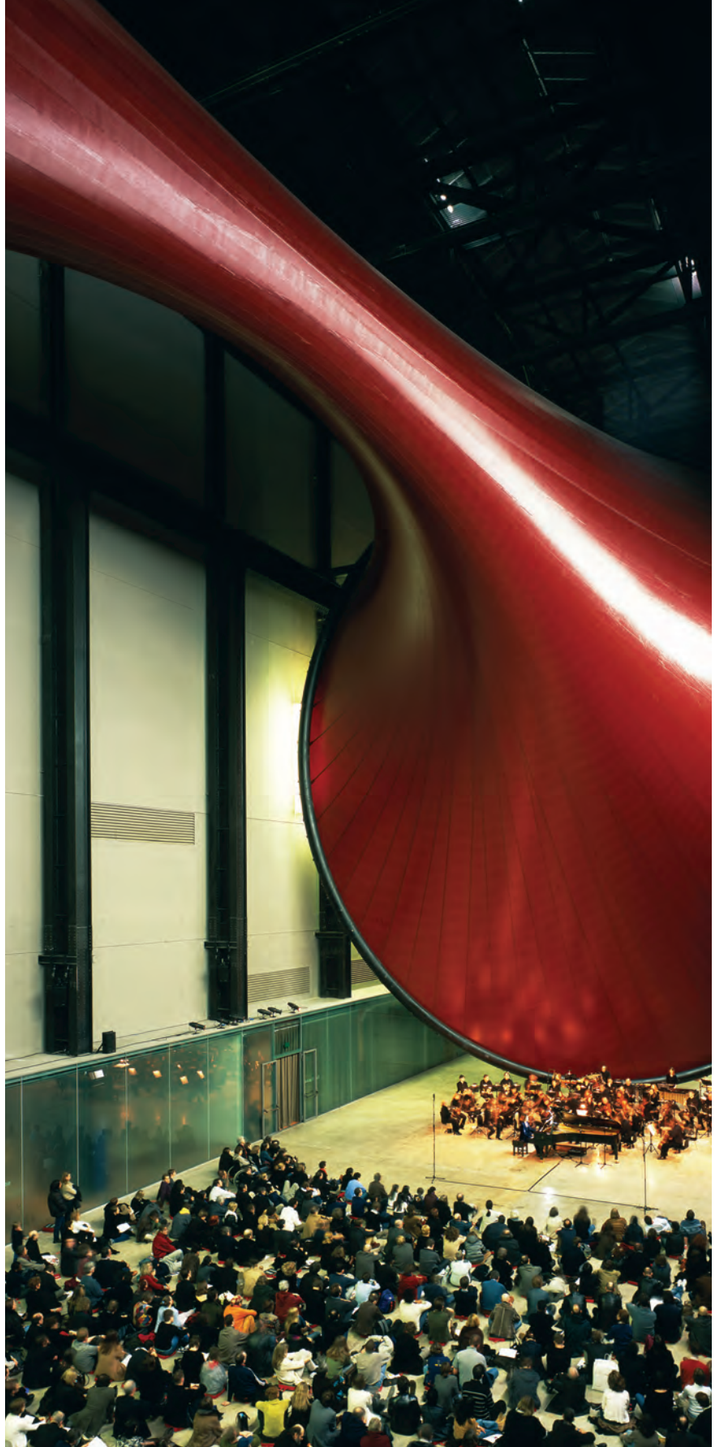
ARCHITECTURE is a physical manifestation of manipulated non-physical properties that encircle it. This reveals an architectural ambience – a sort of atmospheric 'aura' that surrounds a building produced by its manipulation of the physical properties of light, sound, climate and many others (Wigley, 2008). According to Wigley (2008:42), 'in the end, it is the climate of ephemeral effects that envelops the inhabitant, not the building', where the building becomes a mere material device that facilitates a given atmosphere within the greater corporeal environment and context surrounding it (Wigley, 2008). Therefore, architecture is a series of systems within systems that allow an inhabitant to experience a certain systematic-composition that an architect has mediated.

In light of the manipulation of multiple systems in a single building – the idea of resonant systems being applied to architecture comes to the vanguard. A resonant system, in sound, is one which is able to store cyclic waves of sound (produced by particular sound sources) and to easily allow sound waves to move within a medium (Wilkie, 1997: 88). Resonant systems, according to this understanding, can be applied to many modes of architecture, in that the physical form of the building becomes the medium which facilitates the programmatic, physical and ephemeral relationships (the sound waves) between these linear or matrix systems.

3
MARSYAS, LONDON
ANISH KAPOOR (2002)
right

Anish Kapoor's sculpture, Marsyas, displayed in the Tate Modern Museum in 2002 explores the idea of a built structure's ability to create an experience for the viewer that makes a comment on the idea of interstitial space and the experience of the unified systems of architecture (www.tate.org.uk). The Turbine Hall in which this sculpture was built was completely altered by the insertion of the horn-like sculpture - producing a new architectural resonant system for the viewers.

This project became a point of reference for me in the shape of it's form - resembling that of a fog horn dealing with the explicit use of sound in space (image source: http://www.brightonfestival.org/press_images/press_images1.aspx.)



SOURCES OF SYSTEMS AND THEIR INTERSTITIAL SPACE

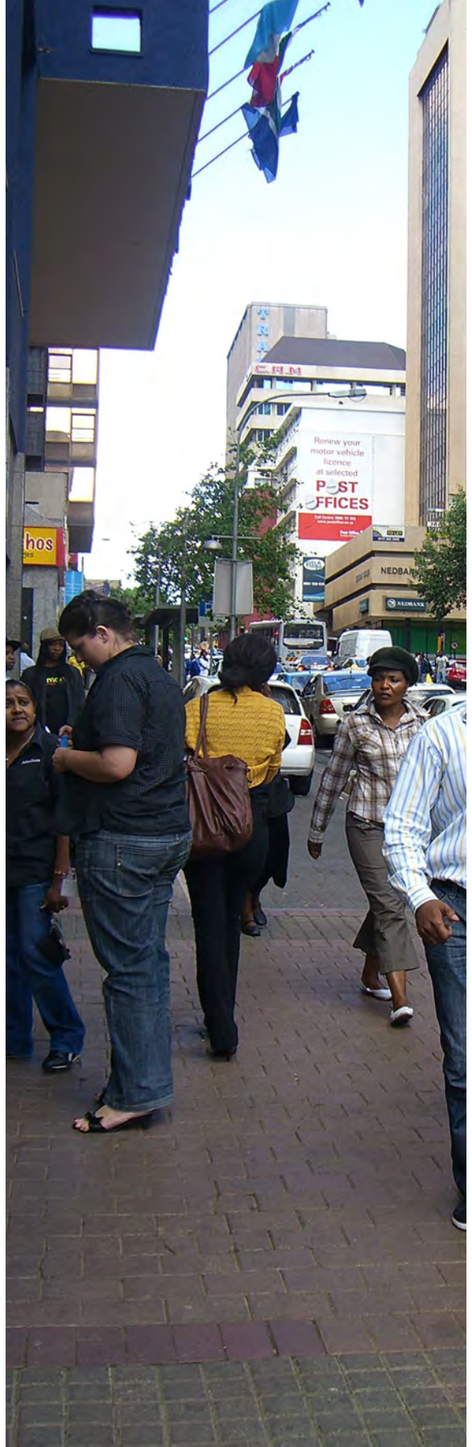
Architecture in some way needs to be able to facilitate and augment the multifaceted interrelation of contemporary systems and space. In order to facilitate these architectural systems, the source of their origins needs to be identified so as to employ them in a design. Each system has an effect on another system and therefore, the interstitial space (whether physical or ethereal) between the systems becomes the most appealing component to create architectural atmospheric moments out of (Spiller, 2008: 89). This is evident through David Adjaye's statement in an interview with Peter Allison (2006: 128) where he says, 'there is overlap and the overlap is where the blurring occurs, the editing occurs'. The uniqueness of each architectural project – and therefore the systems needed to be incorporated – originates inventive forms of architecture experienced differently by each user. Although the inhabitant may be moving between multiple systems, they should feel like they are moving through one continuous system (Adjaye cited in Allison, 2006: 128).

The systematic use of sound and music programmatically, physically and theoretically is the basis on which this thesis is designed. Sound is one of the least materially manipulated and considered parts of building design (Pallasmaa, 1996), yet its relationship to inhabitants and their social connections is powerful enough to allow people to perceive their surroundings through the things that they hear (See Track 4: Digital Musical Synthesis). Although, the correlation of a physical experience with the sounds of an environment is rarely consciously appreciated – sound can become a stimulating and dynamic part of that interstitial space discussed above.

URBAN RESONANCE

re-so-nance
to facilitate oscillation at a particular frequency

URBANITY is compromised of many interacting complex systems that come together to form a holistic impression of an urban space. The two main systems present in all cities are those of people/inhabitants and architecture (the physical built form of the city), and they can collectively be understood in the term URBAN RESONANCE. A city is not only made up of a sequence of technologies, infrastructures and lawful bodies – but it also has to deal with real people (with their lived experiences and memories) and architectural forms (Mbembe & Nutall, 2007: 30). The inhabitants of any city become a dynamic, shifting and livening component of urban life. As a whole they are in themselves a resonant system of social exchanges between various groups of people. The built form of the urban environment on the other hand is a static, somewhat constant element of cities that affects the ways in which the dynamic system of people interact and socially adapt as seen by Castells (2004b: 441) who says that the city is a socio-spatial system of communication. The built form of any city is also a system of physical exchanges of the space between buildings as well as the material relationships of the architecture and their individual resonant systems. Awareness of these two systems and their effects on each other becomes the basis for understanding the underpinning of **URBAN RESONANCE**.



SOCIAL RESONANCE

The city stands as a storage place of collective resonances – where shared exchanges and feedback systems exhibit the evolution of the city as a social manifestation. People are social beings (Cross, 2006) where our exchanges with others, whether strangers or people we know, are part of living within an urban context. Our spaces of social being in cities today have to deal with 'difference' (Watson, 2006). We are all part of different communities and cultures that are forced to coexist in spatial constraints (Castells, 2004: 444) but where these communities have to come together in urban space can be places of tension or places of tolerance which is enhanced, supervised, guided or worsened by their physical built form. I seek to accept and celebrate the complex intricacies of present-day urban life through its compound activities of people and their differences (Watson, 2006). This is especially fitting for the context of Johannesburg where social networks form a large part of how the city works (see Track 3: Social Modulation).

THE MEDIUM OF URBAN ARCHITECTURE

Every city has a different 'tune' characterized by its atmosphere and nature within a highly complex built system where architectural design is no longer simply about proportioning structures but is inclusive of interaction between people, between buildings and all transient elements of a city (Oosterhuis & Schueler, 2008; Achtypi, Giamarelos & Karandinou, 2008). The idea of urban social space and the built environment has to be looked at in specificity of individual cities especially when trying to define and understand this concept in terms of a developing city such as Johannesburg where often left over and interstitial areas become appropriated as social space. Sound is a major underlying part of this complex system of a built setting and how we relate to our physical environments, with its materials and physical attributes quite literally making a city a resonant urban system that transfers physical sound waves. The cities of today are not designed or experienced as 'monolith[s]' (Sassen, 2006: 13) but rather have many unused or modest spaces especially in the case of Johannesburg. Therefore on a more conceptual level, the sound of a city (which like its tune is different for every urban setting), often does not relate directly to the city as a whole but more to the spaces of social culture and exchange (DJ Rupture cited in Manaugh, 2009: 149) where people are a vital component to the production and assimilation of a city's 'sound' and character.

SOCIAL MODULATION

mo-du-lation
giving movement to sound

MODULATION is a process by which sound is given 'movement' through transformation of its properties (Wilkie, 1997: 66). This idea can be applied to the process by which the virtual world changed the properties of how we relate to each other through communication. Therefore, has architecture experienced a change in spatial requirements of social space due to this transformation of communication?

In reference to Castells (2004) idea, our spatial context will continuously be altered and developed by social communication (Castells, 2004b), and this spatial context 'does not reflect society, it expresses it' (Castells, 2004b: 441). Built environments are an essential part of our social systems and are influenced by how we relate to each other. With digital changes in our methods of social networking and interaction over the past two decades, our cities and architecture are becoming increasingly 'digitally porous' (Mitchell, 2008: 84), incorporating digital systems in the ways our social spaces and architectures are developing. Therefore, it is crucial to explore the evolution on our social communication to be able to amplify this change in architectural design and future facilitation of these outcomes spatially.

DIGITAL SOCIAL MODULATION

Societies rely on communication as the source of their interaction with one another. This interaction manifests itself through written and oral communication as well as nonverbal body language and exchanges. Oral communication is theoretically constrained by the use of words and grammar that limit it in the specificity of its meaning (Cross, 2006: 3; Spiller, 2008). By limiting communication to being able to define something with words may not necessarily provide for an inclusive social environment between communities that may not understand a particular form of oral communication. It is this restraint to verbal communication that has sparked a greater desire to investigate methods of communication through sound and music (see Track 4: Digital Musical Synthesis), which warrants multiple interpretation as a base for its qualities of social inclusion.

Within a short span of time, our methods of communication have drastically evolved into something of another nonphysical dimension. No longer is physical or aural contact necessary to be able to communicate with other people. And even more profoundly, no longer is a common geographical location important in socially connecting with others. Our social ties and connections can be maintained at a level of global interface. This is mainly thanks to the development of the technology of the computer and the Internet. These devices make our life's activities faster, with the dissemination of information and communication occurring at a 'real-time' pace (Duckworth, 2005; Bouman, 2008; Mitchell, 2008). But what does this mean for our physical social environments?

As architects of today, we are faced with designing for the 'dissemination of proximity' (Bouman, 2008: 80) in human social interface. It therefore calls for architects to rethink what we broadly refer to as 'social space'. Does it mean that because of our new methods of social networking that we actually don't necessarily need space to socialize in with other people? A social space should not be limited to only being with people that you know and would normally socialize with. A social space is an inclusive environment where individuals can exercise their inherent need for social 'being' through communication and interaction with other various people, whether the interaction causes debate, self-reflection or even new companionship (Bouman, 2008; Watson, 2006).

In the context of Johannesburg, a major question that needs to be asked is whether these public social spaces are dynamically produced by chance or whether they are forced onto a city grid with the hope that people will use them? A view of 'public space' which interests me is described by Enwezor (2006: 8) in his writings about a group of political artists working in Kinshasa who use public space in their work, where he says that, '...public space is never a given. It must constantly be produced but as a fundamental part of civil society'. This idea is reiterated throughout his writing on David Adjaye's work and begins to redefine space of social being not as a place but rather a space of encounters (Enwezor, 2006: 10). It should be a place where you would be able to come across and negotiate with other people, 'things' and spatial systems that you would not normally encounter, to actually produce social interaction not only facilitate it.

This idea that social space is not made but rather it is constructed (Enwezor, 2006: 8)



brings to the forefront the idea of whom or what makes a space 'public' and 'social'? If people make a space public then what will it mean to our changing society who seems to care for physical contact less and less? In his essay, 'Designing to Socialize', Ole Bouman (2008: 78) states that,

> Simply spending time with someone humbles, teaches, relativizes, enthuses, brings one to dialogue. You met the other, coincidentally, in the train, the store, the stadium, the library, or, less coincidentally, in the army, the factory, the neighbourhood party, or the sports team.

He then goes on to describe that these methods of social encounter in society no longer exist – we hardly ever randomly meet and interact with a person in a stadium or the train, our experience of social space is limited because we have begun to privatize our social spaces [1] (Watson, 2006) limiting them to include types of people and cultures that we already know and are accustomed to.

A restriction found in digital communication and technological refuge is that meaningful chance encounter rarely ever happens over the Internet like it would in physical space. The social networking systems used on the Internet today can be seen to mimic and facilitate your already existing social networks rather than produce new ones, where we make contact with people via search engines rather than through complex conversations (Bouman, 2008: 78). The friends you have in 'real-life' are probably the friends you have on Facebook, and the superfluous friends you accept on Facebook you probably don't communicate with digitally or even in 'real-life' therefore you are still disconnected to the people you are disconnected to in your physical social environments. If we are to take Internet dating for example, this is also not a chance encounter as you have to consciously register on a website as well as consciously chose possible social connections. When speaking about social encounter – it is meant that one would not intentionally meet a different person – but rather one would encounter someone in a space that is totally by chance. It is this digital constraint on human social being that further emphasizes a need for some sort of physical social space for exchange and dynamic social intersection.

Applying this idea to the city of Johannesburg is difficult because we have so many diverse groups of people within this large city. I feel that in Johannesburg you are absolutely able to meet someone on the street randomly because of our characteristic 'friendliness' demonstrated explicitly by the FIFA Soccer World Cup. In Johannesburg, it is still quite easy to speak to new people at the shopping till or bus stop but I feel that it is very rare that one would choose to fully socialize in a space with people dissimilar to oneself, out of one's comfort zone as well as to make new meaningful social connections within our context. Although our society is heavily influenced by the global shift into digital social networking – I strongly feel that in Johannesburg there is still the potential to produce new social encounters due to the fact that digital forms of social networking are not overtly utilized by majority of its inhabitants – as many people don't have access to computers or the Internet, therefore, there is still a somewhat strong emphasis on physical socializing. It is vital to begin to analyse this unique setting of social encounter.

1. In the nineteenth century, the development of industrialisation began to deteriorate public life due to the privatization of space. This then escalated to a point where in the late twentieth century, some would argue that there was a 'death' of public space because many people moved to the suburbs. This offered fewer and fewer opportunities for chance encounter of strangers. (Watson, 2006).

URBAN RESONANCE

SPACES OF ENCOUNTER

Certain sensitivity and complexity is needed when trying to understand the context of social encounters in the city of Johannesburg (CoJ). It is sensitivity directed towards its many differing social environments all contained within one city. The CoJ has been described as 'polycentric' (Mbembe & Nuttal, 2004: 30), with its new urban economic 'centres' such as Sandton and Midrand[2] , undergoing a kind of fortification (Mbembe & Nuttal, 2004: 31). The suburban areas of Johannesburg have also taken on a character of fortified bastions with little social contact between neighbours and visitors. After recent regeneration programs for the inner city of Johannesburg, it has become a place of great concentration for urban upgrade (Mapetla, 2006). There has therefore been an increase in the diversity of people coming to live, work and study in the city which has the potential to deepen Johannesburg's **URBAN RESONANCE** through varying social encounters and urban upgrade.

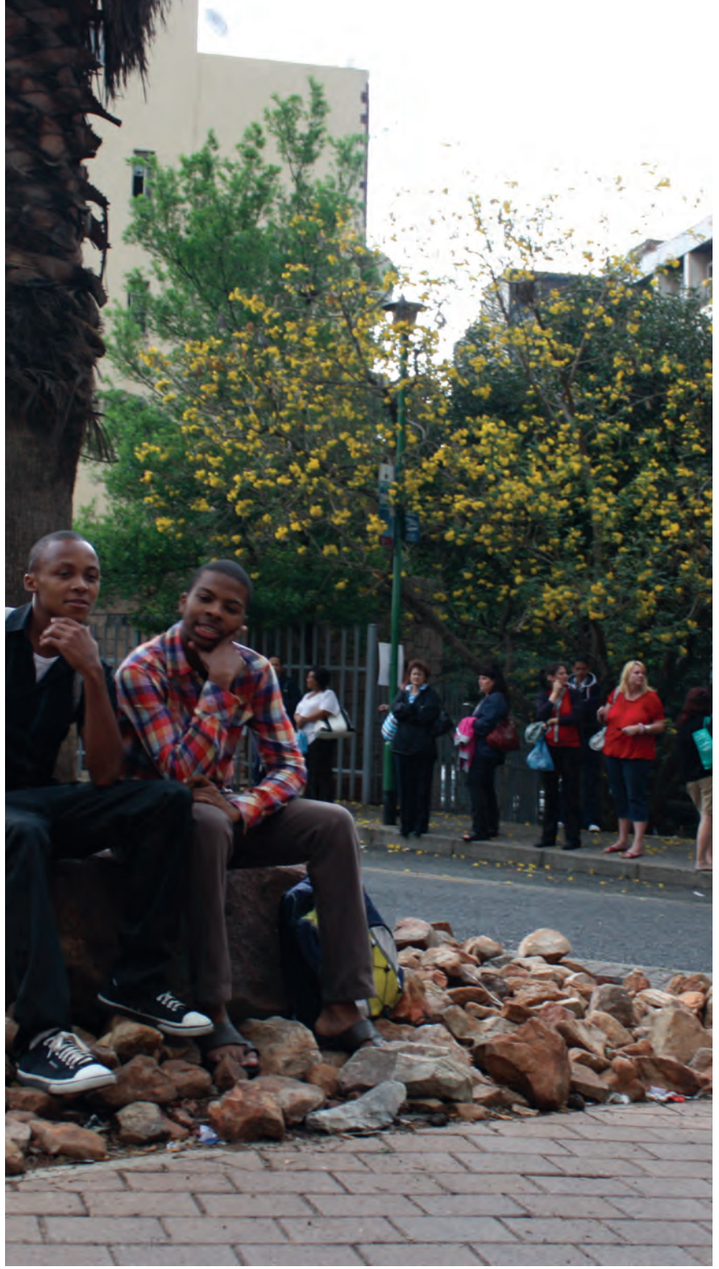
In Johannesburg, there is still a somewhat rich use of physical space for social interaction especially evident in its inner city. Nearly every street corner is filled with people moving, interacting and sharing socially. These spaces are rarely found in large public parks or sizeable town squares as they were in the past – they occur all over the city in places where close physical human interaction occurs such as the streets, local corner shops, and niche spaces. A large portion of Johannesburg's planned large social spaces can sometimes be seen as unsuccessful because they are under utilized due to their ambiguity of use. Ambiguity may in some cases actually render a space multiply useful, but in the context of Johannesburg, where its inhabitants may sometimes feel the pressures of safety, programming space to a certain extent gives people a purpose for being in the 'openness' of social exchange.

Although, a major constraint on these social spaces is similar to that of digital networking Internet sites – there is still little social encounter occurring where the diversity; racially, socio-economically or religiously, of most of these spaces is minimal. Consequently, a site with a rich movement of diverse people moving through it could be used to stimulate other spaces of social encounter being developed in the city of Johannesburg (Watson, 2006). It should be noted that there is no methodical way of 'being' in a collective space and that there will therefore be differing appropriations of the same space by many people (Watson, 2006). Design therefore, must accommodate those differences (Watson, 2006). When referring to 'public' space, I do not mean all of the citizens of Johannesburg should be considered in a design, by referring to 'public social encounter' I mean that even if the architect identifies a certain group of people to inhabit their building – that maybe through cross-programming of the building another set of defined users can also be included. The resulting social encounter between these groups of identified public users can then be accommodated through physical architectural design.

Braamfontein, an area situated in the in which they live. Students have a sense of interest in seeing, experiencing and being part of new developments. It is these aspects of Braamfontein that have initiated an interest in siting my building within this vibrant area.

2. These urban centres were developed after the degradation of the inner city of Johannesburg during the 1990s (Mapetla, 2006), where many corporate businesses left their locations in the inner city to Sandton and Midrand among others, due to the urban poor overtaking of many its buildings.





5,6,7,8
BRAAMFONTEIN, JOHANNESBURG
left, below & previous page

There are many small and unconventional spaces of encounter in Braamfontein, as well many diverse people within its context. All these images are taken of people that demonstrated our South African ability to stumble upon and meet other people on the street (mainly) - where we were able to strike up conversations with each of these people.



SPATIAL AMPLIFICATION

Public social space is a difficult part of architecture as it can begin to display power and difference, and how one approaches it can begin to physically shape inclusive and exclusive environments in an urban setting. In the case of Johannesburg, it would be detrimental to our development socially (and therefore architecturally) to ignore the ability of our architecture to become exclusionary. This is evident in Castells (2004b: 443) view that, 'enclosing themselves in their communities, urban social movements may contribute to further spatial fragmentation, ultimately leading to the breakdown of society'.

Another difficulty met with trying to design public social space is that one cannot really predict how the space will be appropriated and if it will be used to its full extent. Sassen (2006: 15) speaks about the fact that non-monumentalised and non-ritualised space brings a quality of modesty to a space, emphasizing its opportunity to be used as social interface because of its ability to take on new materials, meanings and qualities over time. A space that becomes epic is not able to change over time because of its static nature and because it becomes heavily associated with its role as a monument. This then leads to the idea that a social space should be less of a place and more of a space – especially in order to be able to evolve over time with the changes experienced in society. It should be constructed by its movement, materiality, and association to its inhabitants and not necessarily its scale and vast expanses.

track 4

DIGITAL MUSIC SYNTHESIS

syn-the-sis
electronically producing sound

Synthesizing a piece of music means to be able to electronically create the sounds that comprise the song (Wilkie, 1997: 100). By applying this idea to the development of virtual music in the past century, one is able to more clearly understand its effect on musical performance space, contemporary music buildings and especially the programmatic effects of incorporating digital music into my intervention.

As mentioned above, our human methods of communication through verbal and written language can be somewhat limiting by locking our social connection with other people into words. This chapter will explore the ability for music and sound to enhance our social 'being' within our surroundings – both physical and social (Cross, 2006). Throughout the history of Western musical development, the consumption of music by society has greatly influenced the way in which it is produced and composed by musicians (Carew, 2001), thus having an influence on how music enhances our social being. Up until about the nineteenth century Western music was almost solely an artist form of Western cultural production (Carew, 2001). These traditional ideals in music were then questioned throughout the musical avant-garde of the twentieth century and the convergence of artistic music and technologies in new sound production mimicked the digital development of our social communication.

A restriction found in this fusing of music and technology were the exclusionary environments produced by the technological separations of society, as explored in the case study of the IRCAM (Institute de Recherché et de Coordination Acoustique/Musique) building; an addition to the Georges Pompidou Centre in Paris. Our popular music of today and many other forms of music have been influenced by this evolution of digital music and sound production, performance and consumption of the avant-garde. So how have the architectural needs of these digital functions in sound experimentation and music changed in our contemporary context? The exploration of a case study in the newly built Dee and Charles Wyly Theatre in Texas will provide some insight into new spatial adaptabilities of the twenty-first century fulfilling the needs of flexible collective environments.

MULTI-NOTATION – SOUND AND MUSIC IN SOCIAL BEING

An investigation in sound[1] is energized by the idea that it forms part of our social-being. We communicate through sound, we navigate our lives through sound and most of all, hearing (as well as touch, taste and smell) cannot never be 'switched off' (Blesser & Salter, 2007a: 6) – making it an arguably more integrated part of our perceived social environments than that of sight.

In its many formations sounds are strung together to produce a number of 'systems' including music, resonance, dissonance and noise – each one varying in its organization of sound or lack thereof. Sound is an embedded component of our everyday lives, yet we infrequently notice its influence on our social interfaces with other people, with places and with our physical environments. Sound is holistically part of a physical model. It travels through an environment of corporeal substance, and is received by a device of perception – our ears. We then interpret this sound and are able to use it in our connections with our surroundings through our sense of hearing. The physicality of sound is subsequently transformed into a part of a nonphysical realm of sensory and perceptual being (Blesser & Salter, 2007a: 2).

SOUND AND SOCIAL BEING

In Western culture, we define our ability to perceive our surroundings through our five senses, namely touch, taste, sight, hearing and smell. Sight has become the dominant manner in which our intellect and perception of self has occurred (Pallasmaa, 1996). But where does sound fit into our perception of the world?

Due to the lack of importance of hearing in our perceptions of an environment, we tend to only gain recognition of sound when it is one of an intrusive nature – essentially only taking note when our aural environment is unpleasant. Because of this disregard we become 'functionally deaf' (Blesser & Salter, 2007b) to local sounds and signals, something which has not always occurred in the history of urban dwelling. In 19th century French villages for example, being socially-included depended on one's ability to hear the bells of the town. The bells were a form of long-distance communication (which has significantly changed in today's world), and without being able to hear them – you were not socially included in the activities of the town. A similar process of social inclusion occurs today, in our contemporary world, where we are socially connected by being able to engage in an acoustic dialogue with others around us. This might be contested in light of the current methods of nonverbal digital communication, but what sound brings to the table is of more importance in communication than that of its digital written form - sound is able to broadcast dynamics (Blesser & Salter, 2007a: 7) such as emotion. It is also important to note that rehabilitation workers often feel that deafness is more of a social encumbrance than that of blindness (Blesser & Salter, 2007a: 4), due to a complete separation of the person from the emotional connection to communication with other people – rendering the person emotionally detached. In Africa oral history is passed from generation to generation - placing a great significance to the idea of sound in social communities.

Sound has a unique power to connect us to

1. Sound is an occurrence of fast cyclic movements due to a change in air pressure that move through mediums of gas, liquids and solids (Wilkie, 1997: 98).

URBAN RESONANCE

the corporeal world and its activities. This is demonstrated in the idea that 'sound transports the external world into our consciousness' (Blesser & Salter, 2007b: 1). Sight requires one to focus on a target whereas hearing allows for multiple perceptions; sight requires a light source as opposed to hearing being perceptible at all times. Due to this increase in emphasis of visual 'information' given to us by our surroundings – it can be inferred that maybe it is easier to make use of the other human senses to affect the ways in which people connect to their surroundings (Oosterhuis & Schueler, 2008: 93).

Hearing and sound perception is not purely biological (in the decoding of sound in our neural auditory system) but can be conditioned to our social environments (Cross, 2006). In fact, our social concept of the five principal senses is greatly influenced by our cultural contexts (Blesser & Salter, 2007a: 4). For example, the Aivilik Eskimo community does not consider vision as the most important of the senses in experiencing space; this is because their physical environment is a large open stretch of land without any visual markers. Therefore, this community makes use of all the other senses as devices in which to navigate their spaces (Blesser & Salter, 2007a: 4).

Music is a system of sound that is considered to be harmonious and pleasing to the ear. This is opposed to noise and dissonance which are the arrangement of sounds in an unpleasant, sudden or undesired manner. This comparison of arranged versus ad hoc systems of sound demonstrates the idea that the organized arrangement of sound is more conducive to allowing human beings to positively relate to their social situations. As Cross (2006: 3) explains, music (as a definitive word) is something found mainly in Western ideals, but it must be noted that all societies have something which can be seen (in western terms) as music. And as he suggests, most cultures expect their members to engage with music in some way. This demonstrates the inherent social quality found in music in all cultures (whether Western or not).

9
below

New forms of sharing music are based in mobile connectivity with the music - where most people are able to download music in any space (image source: www.kirbysings.com)



MUSIC AS A SOCIALLY ENCOURAGING SYSTEM OF SOUND

Music has the ability to address both individual and communal applications (Cross, 2006: 6) and is in some ways seen as a form of sound-communication, as opposed to the mere placement of tones in a successive sequence. We could ask ourselves what a piece of music is trying to 'say' to us. And the answer would be dissimilar to every person, but at the same time a collective group of people could be partial to the same composition. This is because music's boundaries are transitory (DJ Rupture cited in Manaugh, 2009: 153). The qualities of sounds placed together in a musical composition have to blend with one another (as in a resonant system) to allow for the music to express a holistic communicational transmission to the audience.

Musical communication is dissimilar to that of language (Born, 1995; Cross, 2006). It's 'multitextuality' (Born, 1995: 17) and it's ambiguity in meaning, allow for its multiple decoding, which renders it as resilient to becoming ideological (Born, 1995) in its denotations within society. This characteristic of music forms the basis with which humans are able to demonstrate social flexibility, augmenting the idea that human interactions are based on 'human musicality' (Cross, 2006: 2) and the ability of music to instantly change our moods. But a crucial part of this human musicality is that music is a sociocultural occurrence which cannot be explored outside of the cultural context in which it is placed (Cross, 2006). For the purposes of this thesis, the definition and meaning of music will be understood in the culture of Johannesburg (See Track 5: JHB Musical Sequencing). Johannesburg's musical environment is beginning to reflect that of international trends and ideals in collaboration and experimentation with many varied forms of music yet it has roots in our varied forms of South African genres.

Another advantage to embracing musical communication is that music has a way of allowing for non-confrontational interaction between its listeners (Cross, 2006: 10). This is particularly important in the context of Johannesburg, maybe music can become the basis (or beginning) of an integration of social interaction removing the current tensions of social encounter in the context of Johannesburg? Centring the program of my building on the incorporation of the art of music and the science of sound – will allow my intervention to address many of the issues extracted from the above explorations in social being in our contemporary world. Cross (2006: 8) describes music as being a framework in which successful social interaction is almost guaranteed to occur especially in situations where one is not sure of how people will relate to one another as in collective social spaces.

10
WITS CAMPUS, BRAAMFONTEIN
right

The matrix student centre on the Wits campus is often a place for lunchtime performances. These informal events bring many of its students into one space, forcing them to negotiate the very small space. This also demonstrates the new ways in which people gather to appreciate music - and that it's not always a formal dedicated space for performance.

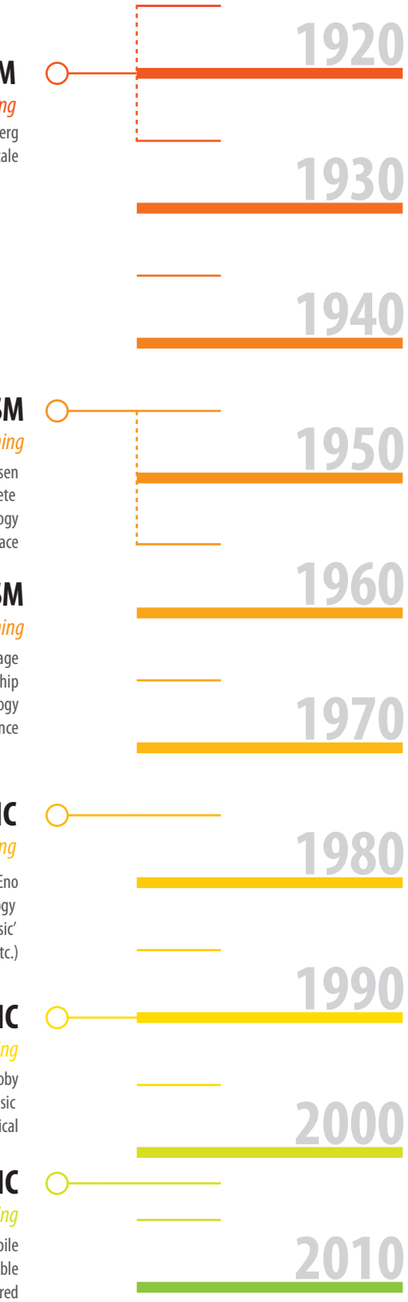


track 4.1

track 4.2

track 4.3

track 4.4



11
SUMMARY DIAGRAM OF HISTORY
right

THE HISTORY OF DIGITAL SYNTHESIS IN MUSICAL TECHNOLOGY

The Internet modifies anything it comes in contact with – and there is no exception to the influence on the Internet and computer on music. It has offered new forms of musical distribution and artistic interface on a global scale (Duckworth, 2005: 1). It has also altered the ways in which we see the science of music, the ways in which we record and experiment with sound. The synthesis of music with technology became a prominent characteristic of the musical avant-garde of the mid-twentieth century. This discourse of past developments in the technologies associated with music will be explored through the tracing of the development of experimental music through the twentieth century, demonstrating the effects of technology on musical communication, production and its meaning in social settings.

MUSICAL MODERNISM

In the 1920s Western music, like architecture, began to experience review and revolution in its underlying principles through the development of modernist music. These principles included the very formal ways in which musical performances were listened to as well as how music was composed within the major dogma of tonality[1] which, had lasted almost three hundred years with the maturity of baroque, classical and romantic music (Born, 1995: 47; Duckworth, 2005).This new modernist period gave rise to a sub-movement known as 'serialism' - developed by the musician Arnold Schoenberg (1874–1951). It was based in prescriptive and rationalized compositions of atonality where an evasion of any tonal citation or 'thematic form' (Born, 1995: 48) was used in songs composed during this period. Within this new method of composing music a 'twelve-note series' (Born, 2995: 48) was developed where instead of the traditional eight-notes forming a scale[2] with which you would compose a song - a series of twelve notes was used in one scale and an emphasis on the pitch (the frequency (Wilkie, 1997: 79)) of the notes was more important than their tonal hierarchical relationships (Born, 1995: 48). This formed a new 'language' for music – a new way of creating and forming relationships between the basic components of music – sounds[3].

Society has always played an important role in the development of music over time. Their acceptance or rejection of music and its principles forces musicians to change the ways in which they perform or even 'sell' their music to the public. This was no different to the musical serialist avant-garde. Like all avant-gardes there were public outrages and scandals associated with the ideas behind serialist music and therefore these musicians had to use defensive, secretive and unpublicized methods of producing their works. This of course set up the formation of an elite group of people being able to appreciate the music being born out of modernism (Born, 1995: 50).

1. Tonality is the composition of music within a hierarchical arrangement of keys and related keys within a scale of notes (Wilkie, 1997: 103).

2. A scale is the playing of a progression of consecutive notes (Wilkie, 1997: 92).

3. These serialist views on music were not predominant at the time - serialism had two opposing trends. These were the 'neoclassicists' and the 'popular' music movements. Popular music (with musicians such as Erik Satie (1866-1925) and Claude Debussy (1862-1918)) became considered as the 'other' form of musical modernism as it was viewed as a less serious mode of musical composition by serialist musicians. And neoclassicism (with musicians such as Igor Stravinsky (1882-1971)) endeavored to augment their present musical environment by making reference to the tonal principles from the baroque, classical and romantic music periods of the eighteenth and nineteenth centuries. (Born, 1995: 49).









12
DEVELOPMENT OF MUSICAL TECHNOLOGY
above (top to bottom)

First digital sound recorder of 1950

First tape recorder of the 1970s, made use of cassette tapes.

First CD walkman of the 1980s, using the CD (Compact Disc) Rom as a method of sound recording.

Today's development of the MP3 player, using computer technology to digitally record sound.

This is one of the major problems associated with the idea of 'progressive' music where people can become marginalised once elitist groups form and there can be a seclusion of the music from the general public.

THE SERIALIST AVANT-GARDE

After the advent of World War II, there was a revived and even greater amplification of serialist ideals in music. It became the overriding, deeply theorized method of musical composition in the 1950s and began to manifest itself largely in specific places in the world – one general location being Europe, led by musicians Pierre Boulez and Karlheinz Stockhausen (1928-2007). This method of training composers became dominant, for some decades following this intensification, throughout many international institutions[4] that taught its theory in Musique Concrete[5] in which it was encouraged to use sounds that do not usually have musical connotations in the composition of songs (Devroop, 2002: 12; Wilkie, 1997: 69).

This generation of musical composers began adding more strata to its already complex compositional approach, becoming engrossed in exploring the science of sound by experimenting with its acoustic principles and physical phenomena. Due to this new direction of this musical avant-garde[6] – the serialist artists began to turn to technology for the investigation, theorization and production of sound (Born, 1995: 51). This led them to relocate the production of music to the laboratory through means of experimentation, instead of the studio through means of acoustic instruments. By the 1950s the development of tape-recording became available for use by composers with access to the university structures that offered explorations in these technologies[7] (Born, 1995: 52; Devroop, 2002: 11-16) .

This then led to a visionary brief and manifesto, calling for a building that would become a central laboratory for music where 'the fundamental facts of music could be investigated' (Varese cited in Born, 1995: 52) – hence the development of the IRCAM Institute (head by Boulez) (see Section: Institutionalization of Experimental Music: The Case of the IRCAM Institute, below). These developments in the marriage of the composition and theory of music also set up the expansion of new musical curricula in universities calling for innovative disciplines in music through musicology, theory and music analysis (Born, 1995: 53) and the use of scientific and technological research. Serialism was therefore legitimized through its inclusion into academia (Born, 1995: 53-54; Devroop, 2002).

4. At the time, the foremost European institution offering education in this progressive musical thinking was that of Darmstadt, Germany (led by Stockhausen and Boulez). With another major institution leading the way for serialist movement being that of Princeton in the United States of America (USA), led by Milton Byron Babbitt (Born, 1995: 50-51).

5. Musique Concrete is a French term that describes this style of music as 'concrete' or 'real'. It is a type of electro-acoustic music, made of a collage of sounds that weren't considered musical during that time. To render this style 'concrete', it was recorded on tape (Devroop, 2002: 12; Wilkie, 1997: 69).

6. The serialists of Schoenberg's time were quite different to what the post-war serialists of the 1950s became. In Schoenberg's generation serialism was still a practice (the 'twelve-tone method' (Born, 1995: 54) and not a theory, whereas serialists such as Boulez were heavily embedded in musical theories that dominated the way in which music was composed according to their principles (Born, 1995).

7. By this period the major technologies available in music production were that of the Long Playing record (LP) and the transistor (used in the development of digital instruments) in 1948, the multitrack in 1953 (sparking the idea of one person being able to produce a whole song by themselves), the RCA (Radio Corporation of America) synthesizer in 1957 and developments in computer music in the early 1960s (Devroop, 2002: 14-16).

MUSICAL EXPERIMENTALISM

During this post-war period, although serialism dominated the music culture it was not the only development within the musical avant-garde. The main alternative to serialism was that of experimental music led by the American composer John Cage (1912-1992) and his followers. These experimental musicians were seen as the less 'serious' composers of the time compared to that of Boulez and Stockhausen. Although Cage was taught by Schoenberg and understood serialist theories, he developed his own model in music which was highly contradictory to serialist thinking. Cage looked at the opposing idea of 'chance' in music where there was no order or mathematical calculation to musical composition. He also looked at the idea of using not only sound in musical composition but silence, too (Duckworth, 2005: 11). This is evident in the way that Duckworth (2005: 16) states that, 'Cage's intention was to allow the audience to determine its own artistic experience as a means of drawing its attention to the sounds of its environment'. Cage saw music as a term for all sound entering the human ear and not only an ordered system of sound. Although different in theory, both serialism and experimentalism broke away from traditional methods of historical tonal composition. Experimentalism refrained from any formal musical notation and depended largely on the interpretive performance of the musicians (Born, 1995: 59; Duckworth, 2005: 15).

Experimental music sought to reduce the importance and seriousness of the composer-performer's role in performance and looked to rely on the uniqueness of each performance with a new audience who would be involved in producing the environment into which the music was played (Duckworth, 2005: 15). This changed the traditional idea of the performer playing a piece of music at the audience versus the audience becoming part of the performance by continuing with their conversations, silences and social interactions of coming together to watch a recital, while a musical performance was taking place in the 'background' or ambient space (Duckworth, 2005: 17-18).

Similar to the serialists, experimental musicians believed very heavily in the research into and use of new technologies as a resource of new sound mediums in music production – the difference between the two musical movements is demonstrated in their use of the technology, where the experimentalists used technology as a tool for their compositions as opposed to a generator of composition as the serialists used it (Born, 1995: 63). The experimentalists rejected the use of 'high-technology' focused at groups of elite musicians, and its rooting in academic institutions, and looked to using small, portable, low-tech multimedia devices in recording, producing and performing their music. Over time this set up political tensions between serialist artists (backed by East Coast Universities in the USA) who had access to high-technologies in musical production and



13
JOHN CAGE PERFORMANCE
above

The musical performance, *Sightsoundsystems* (for a festival of art and technology in Toronto) by John Cage in 1968 demonstrates the musical principles of Experimentalism. The performance was a chess match between Cage and the artist Marcel Duchamp in which each movement of the chess pieces was converted into an electronic sound. This shows his ideas of altering audience-performer relationships and the conventions of musical performance at that time (image source and reference: http://blog.chess.com/kurtgodden/still-a-victim-of-chess)

URBAN RESONANCE

the experimentalist artists (backed by West Coast Art colleges in the USA) who faithfully made use of self-made or commercial forms of sound technology (Born, 1995: 63).

The difference in technology used by the two genres manifested itself through directing their focuses in performance in opposite directions. While the serialists depended on high-technology and setting up large pieces of equipment in order to perform, the experimentalists made use of portable technologies therefore being able to perform their pieces in changing spatial environments (Duckworth, 2005: 63). Because most of the experimentalist performances 'took place in nonconcert venues such as parks, industrial spaces, and people's lofts, the result brought together a sometimes startling juxtaposition of actions, objects, people, and unstructured events' (Duckworth, 2005: 15).

THE EVOLUTION OF INTERACTIVE MUSIC

During the 1970s the evolution of 'ambient music' came into being and a new composer, Brian Eno, began to develop musical composition (based on that of Cage's ideals) that depended largely on the computer and technological devices in its production and performance. Digital technology (which are systems based on binary code), became one of the biggest developments in music of the twentieth century (Devroop, 2002: 16). It allowed for inventions of MIDI[8] sequencing which produced an internationally standardized method of digitally synthesizing music.

This genre of ambient musical composition, and consecutively the generative music genre of the mid-1990s, rested closely on computer-improvised music that filled the 'background' of many environments such as elevators, shopping malls or even streets (Duckworth, 2005). Eno sought to remove his persona from 'musical landscape[s]' (Duckworth, 2005: 21), and himself describes generative music as being 'unpredictable', 'unrepeatable' and 'unfinished' (Eno cited in Duckworth, 2005: 24). He then goes on to say that our future (in which music will take its place) will be 'filled with generative graphics, generative narratives, generative architecture' (Duckworth, 1005: 24) where all these components will be a response to evolutionary forms of culture.

Today, we seem to be caught in a world of digital interactive music where anyone with a computer, IPod and the Internet can be involved in creating and consuming music (Duckworth, 2005). After Eno, artists such as John Oswald and Moby (starting in the 1980s) have come to the forefront in the way that digital and experimental music has manifested itself today (Duckworth, 2005: 25-33). These artists fall into an undefined area of musical composition where originality, copyright and ownership of songs begin to be blurred. A term, coined by Oswald, for this is 'plunderphonic music'. This is where whole songs by other musicians (as well as parts of songs) are sampled and placed together without an attempt to conceal the original source. Interactive music can be seen as inclusionary as it allows all types of people to enter its realms and to become involved in the process of making music. Secondly, this music is non-prescriptive as the serialist movement was and can continuously evolve into new forms of musical composition. It is multidirectional and incorporates a non-hierarchical approach to music, where a shift from the 'ancient world of hearing' to a 'modern world of listening' and finally to a 'virtual world of interactivity' has redefined our relationship to music as a general public. Therefore, as according to Duckworth (2005: 161-169) new meanings become associated to the words 'availability' (of the music), 'portability' (of how we listen to music), 'collectivity' (of how we appreciate music which, thanks to the Internet does not bind us to the same geographical location), and finally 'communication' (how we connect with others musically).

INCLUSIONARY ENVIRONMENTS OF THE MUSICAL AVANT-GARDE

This history in the development of digital and virtual music of today demonstrates a parallel relationship of the progression of musical communication to the ways in which human communication and social networking has evolved over time (See Track 3: Social Modulation). It is, most importantly, also a demonstration of the change and development of our music culture (especially in terms of performance) and the relationship between composers, performers, their music and the audiences listening to and consuming it.

As music advances from these ideals – there has become a less and less personal connection with the music through the ability of all people to download mass amounts of music. In light of our present musical context in Johannesburg (See Track 5: JHB Musical Sequencing) I feel that my intervention, programmatically and subsequently physically, needs to be a combination of the desire to progress in musical technologies but should also be a building that allows for an inclusive, diverse interaction of non-musicians with progressive musical innovations that are products of the activities taking place in the building. It should also be able to provide multiple and multi-set-up spaces that are able to facilitate differing forms of musical performance and collective gathering whether formal or informal.

Although, a shift in thinking about the constructs of music occurred with the development of the musical avant-garde, it began to bring to life the ideas and developments of music as an integrated part of our environments, not as an exhibition of musical know-how but rather an interactive, collaborative and experiential part of our everyday lives (Duckworth, 2005). Of course, this then paralleled the development of new musical technologies and has led us to our present-day situation of readily available music and music software, generating an integration of the average person as a possible music producer, composer as well as consumer (in the most fundamental sense of the word – a user) of music – therefore allowing one to become an originator and composer of their own social milieu.

8. MIDI (Musical Instrument Digital Interface) is a hardware developed in 1983 that sets up a language of directives that allows many computers to sync with each other and to be remotely controlled (Wilkie, 1997: 61).

INSTITUTIONALISATION OF EXPERIMENTAL MUSIC
THE CASE of the IRCAM INSTITUTE

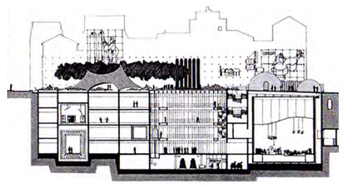
The IRCAM Institute founded by Boulez and currently head by Frank Madlener (www.ircam.fr) is a major case study in the maturity of this thesis by understanding the ways in which it performed in its ability to integrate the science behind music (sound), the art of musical composition, and consequently the social inclusion of the public in these processes especially achieved through the programming of the building. This case study has become a critical part of this thesis because of its relevance in our contemporary setting in terms of laboratories of music and sound and changes in musical production, with its complex systems sparking the idea of URBAN RESONANCE.

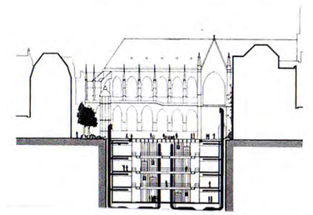
The Institute de Recherché et de Coordination Acoustique/Musique (Institute for Research and Coordination of Acoustics/Music) was originally designed and built in 1975 by Renzo Piano and Richard Rogers. It flanks the Centre Georges Pompidou in Paris, France (Ermanno, 1990: 47; Born, 1995: 102), and is built underneath the Place Stravinsky (a public square). The building was situated in the cultural and economic centre of Paris (Born, 1995: 102). There are two national theatres in the district surrounding the building and it is situated next to a redeveloped commercial area of Paris (Born, 1995: 102). The original building was then extended in 1989 with the addition of a tower (adjacent to the Place Stravinsky square) designed and built by Renzo Piano alone (Ermanno, 1990: 38). The initial building design houses sound research laboratories, performance spaces and educational facilities below ground, over four levels. The lowest floor encloses the distinctive performance space of the building, the Espace de Projection. The second-lowest floor housed the public entrance foyer with open-plan technical areas and soundproofed studios. And the highest underground level contains the offices for the staff of the Institute. The new tower building was then built to house an additional digital library and new offices for the administration of the IRCAM institute (Born, 1995: 103).

As discussed earlier, the IRCAM building was designed and set up in a time where the technological dominance over music was gaining power. One of the main attempts of the Institute was to assimilate musical composition with sophisticated scientific inventions (Born, 1995: 107-111), with the Institute developing new hardware and software for sound production in the musical world[1] . This set up what can be perceived as an exclusionary environment for all those who were not part of the 'high technological culture' of the IRCAM as Born (1995: 15) puts it. This is somewhat reflected in the 'mystery' behind the building and its hidden physicality underground. The primary objective of the IRCAM was to expand the cultural principals of the musical avant-garde but through many of the changes in the way that the Institute was run over time, there seemed

1. The Institute, after many struggles where money was not being made by its functions due to political reasons of funding, began to self-sustain economically by selling hardware and some software being developed there. As well as through public performances given by many of the well-known serialist musicians of the time. (Born, 1995: 107-111).







14, 15
IRCAM INSTITUTE (addition), PARIS
RENZO PIANO (1989)
above (top to bottom)

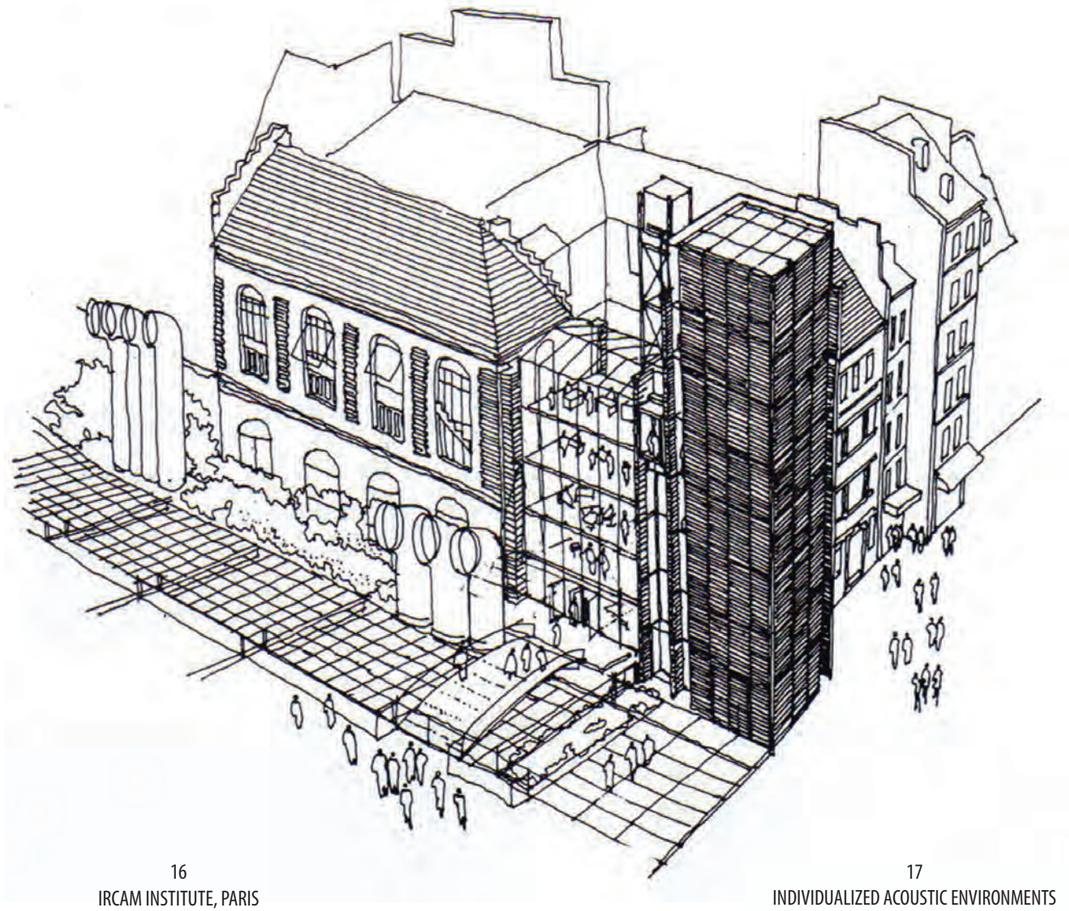
View of the IRCAM building from the Stravinsky Square, with the only visible part of the design being the terracotta clad tower. (image source: http://www.critiquethis.us/2009/09/08/cheap-piano-renzo-piano-building-workshop-1966-2008/)

Sections of the IRCAM building (Ermanno, 1990: 47).

to become a shift towards a bureaucratic processes through the need for the Institute to produce money for its funders (which were based in several universities and private institutions), and pushing a sort of commodification of the music produced by the Institution (Born, 1995: 104). The commercial and theoretical characterization of music in the IRCAM Institute demonstrated a loss in music's ability to be ambiguous and all-encompassing. This is still remnant in today's music world but due to our public's turn towards social inclusion and cooperation – music has started to take on the characteristics of collaboration in multidisciplinary teamwork on the production and performance in music in many ways.

Today, the IRCAM Institute still provides many of the functions it offered in its initial social context. This is demonstrated in the current three core areas of the Institute's organization namely: Research, Creation and Transmission (www.ircam.fr). The Institution seems to have distanced itself from the association of it being an exclusionary establishment and has been able to overcome some practical and ideological connections in its operation (Born, 1995: 308). I cannot fully comment on whether the contemporary readily available technology of digital music for most average people has altered the meaning of the IRCAM Institution in society today, or whether the Institution has resolved to change its relation to the new audiences of the public who are not necessarily part of the research activities going on in the building. I think that it has been a bit of both as the Institute has altered its original program details and now provides education in computer music training (including a digital library), cultural outreach, interdisciplinary research (with musicians, engineers, performers and technicians) as well as the inclusion of contemporary classical music in its program (www.ircam.fr). .

Architecturally, the building being almost completely removed to underground, with the exception of glass bricks used in the paving of the square above it for the incorporation of light into the spaces below, seems to remove itself from the possibility of its musical program to socially enhance its setting. It has no particular relationship to the city in which it is sited, especially in terms of visual or acoustic connection. And it has removed its opportunity to physically use the sound (which is in essence the basic premise of the development of the building) of Paris or spaces around it to influence its physical manifestation. Discovering the underground expanse of building can be spatially quite exciting for people using the building but I feel that in designing programs such as this, is where the application of urban resonant systems could come into place. The relationship between the building and the city (aurally and physically) could produce some interesting transition spaces. And the relationship between the acoustics needs of the differing programs presents the opportunity to explore exciting interstitial spaces between the functions. Although the building was built to suit another social context compared to that of the present-day, this will be the challenge of my intervention - to be able to suit the social and technological musical developments of 30 years time. Or at least to leave itself open to future refurbishment and ability to adapt to the changing environments.

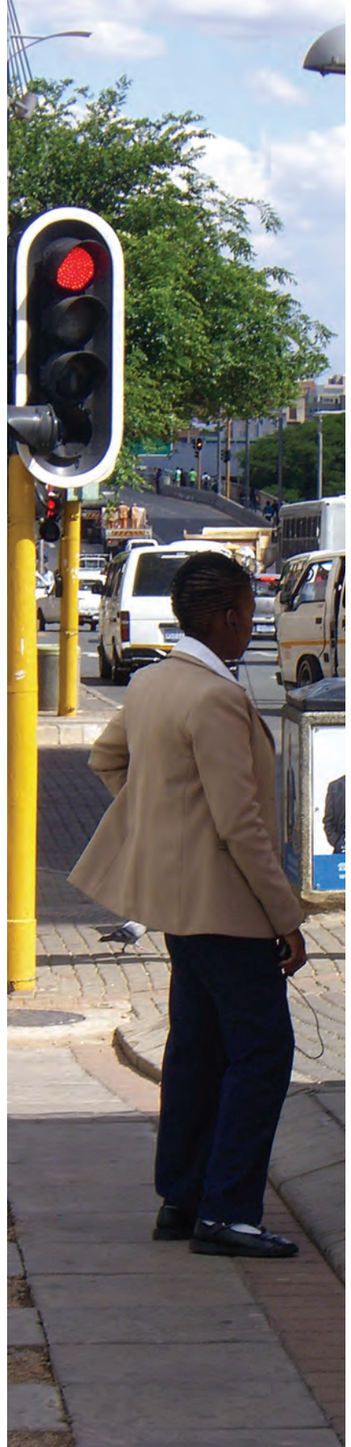


16
IRCAM INSTITUTE, PARIS
RENZO PIANO & RICHARD ROGERS(1975)
above

Axonometric sketch of the view of IRCAM building from the Centre Pompidou. The tower on the right and the ship-like flutes are the only visible structures of the IRCAM building from above ground (Ermanno, 1990: 38).

17
INDIVIDUALIZED ACOUSTIC ENVIRONMENTS
right

While walking through the streets of the city - it is quite evident that many people (especially the youth) create individual music and acoustic environments.

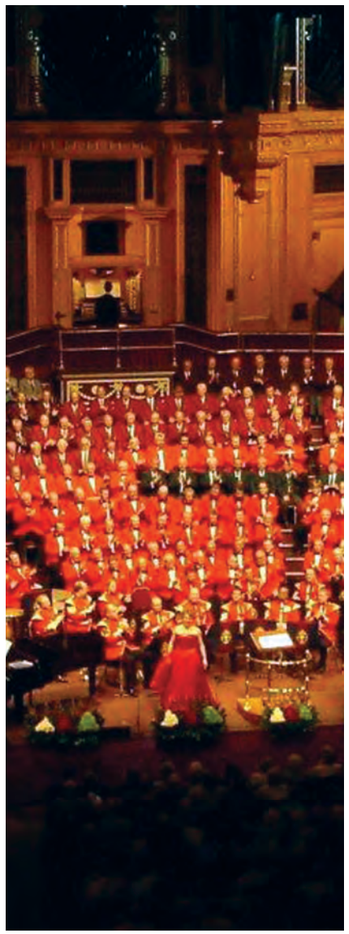


SPATIAL SYNTHESIS OF DIGITAL MUSIC

In our contemporary world of music – most of our sonic experience of music and space is that of a static format (Parker, 2008). Our predominant everyday connection today to digital music is through the encoding of sound on a CD or MP3 and many other formats and less on live performance. Numerous people experience their surroundings within their own musical worlds created by the use of iPods and other devices – with little attention ever given to the live (natural) sounds of a context. (Parker, 2008: 32; Blesser & Salter, n.d.). This removal from a physical world into a new musical one constructed by chosen playlists, isolates us from other people, environments and contexts even though we are physically present in a space. This in turn can become detrimental to the ability of a place to become socially inclusive through sound and by the method of encountering other people in social spaces by chance.

After experimentalism and the rise of music as a commodity where the theoretical knowledge of the professional musician was key – the invention of the Internet and virtual music (and music sharing) has actually brought back an emphasis on the process of making music and not only making a product out of it (Hugill, 2008). It has brought back the communal appreciation of music and its creative process. There will, however, always be some commodity trader that tries to make a profit off of music but altogether there seems to be retreat to a social connection to music-sharing initiated by the Internet. Hugill (2008: 158) sets out three types of digital music: user-controlled; computer-controlled and composer/performer controlled.

In the form of user-controlled digital music the domination of recorded sound over live sound has given recorded sound an associative power over that of live sound – where a listener can choose the song he wants to listen to at a chosen volume, repeatedly. But to many musicians (composer/performer-controlled music) – live performance is dynamic and most artistically expressive compared to that of recorded sound because each performance is different and unexpected and the physical environment in which it is performed adds to the dynamism of live performance (Parker, 2008: 33). This shows the importance of incorporating live performance in any musically (and sonically) programmed building. Programmatically, live performances also allow for mass dissemination of musical trends and publicizing one's music to an audience, here again legitimizing the ability of social encounter in live performance which is highly influenced by its built and physical setting.



19
ROYAL ALBERT HALL, LONDON
(1871)

above

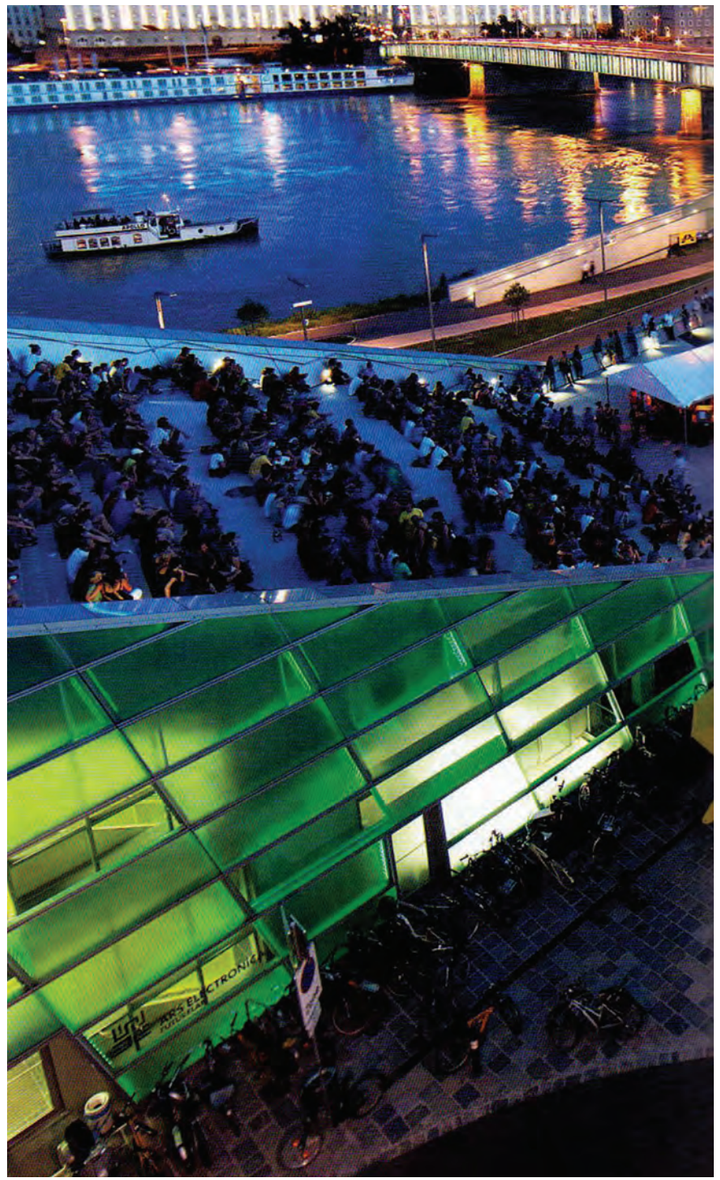
This concert hall demonstrates a classical performance space. It also demonstrates the needs for good spatial acoustics and audience-performer relationships. (image source and reference: http://mikebm.wordpress.com/2008/12/07/architecture-for-music-royal-albert-hall/)

THE TRANSFORMATION OF MODERN MUSIC SPACE

Experimentation is the stimulant of development and progress in any field of operation – notwithstanding the experimental fields of sound and music as verified during the musical avant-garde. If experimentation is the basis of the progressive endeavours of new forms of digital and virtual music, then what type of building or facility encompasses the needs for experimentation? The laboratory is typically associated with experimentation (as clearly demonstrated by the IRCAM building). The laboratory is a space where, through controlled conditions, quantifiable outcomes can be measured. Due to the fact that music and sound are evidently socially stimulating – it would be difficult to apply the archetypal typology of a laboratory to a place where progressive social environments are used to form developing musical and acoustic systems. Therefore a new definition of laboratory must be set out in light of the ideals of digital music and sound in social communication and interface within my intervention. What if we saw a laboratory as a place of semi-controlled conditions where non-quantitative but rather qualitative outcomes are encouraged? A user of the building should be able to openly experience the progressive exploration of a matrix of architectural-resonant-systems instead of the building imposing an ordered, linear method of spatial experience. The intrinsic ability of architecture to dominate an environment renders it difficult to completely remove the perception of control from the laboratory as a basic typology, but the degree to which an environment is controlled to form an architectural atmosphere, can be influenced by interrelation of architectural systems (resonant systems) and how they stimulate engagement with the user.

On his essay about the integration of digital interface with architecture, Neil Spiller (2008: 87) speaks about the fact that in our ever evolving technological world of architecture needs to synthesize and facilitate its interrelation with digital devices. He claims that we should not see 'Digital Architecture' (Spiller, 2008: 87) as opposition to 'normal' corporeal architecture but that all architecture will have to respond to it in some way in the near future and should therefore lend itself to becoming digitally integrated. In the context of the developing nature of Johannesburg (and our global musical tendencies), the advancement of technology fits within a sliding-scale of availability, technological-know-how and social stigma/connection with technological devices. The availability of music production software (especially in terms of sound engineering and recording) is very high in the general public with anybody being able to set up a home recording studio with ease (Miller, 2010; Shapiro, 2010). There has been an adjustment in the traditional role of a musician and composer who plays music for an elite, privileged audience into a modern role of a musician who can perform in an informal setting (with minimal equipment and specialized acoustic requests). The role of the audience member has also gone from 'receiving to interacting' (Oosterhuis & Schueler, 2008: 93) where virtual music available on the Internet allows audiences to be addressees not only in a physical performance but a virtual one too. This has notably altered many of the spatial requirements in the culture of musical performance and production.

From ancient Greek and Roman times until the twentieth century spaces of performance for musicians were compact architectural design where lines of sight and auditory clearness were



perfected. The seating was raked to allow for this and there later came the addition of vertically assembled exclusive boxes around the auditoriums (Mitchell, 1995: 60-61). As technological developments of the serialists and experimentalists began to influence the musical world – the relationships between the performer and the audience began to change; where the audience was encouraged to interact with the musical performance (Duckworth, 2005). Today, musical performance occurs in many different ways in different cultures and societies from bands performing live to electronic musical performance to choral gospel choirs singing. Their spatial and acoustic needs are all differing, as well as their relationship to their audience. Therefore the multiplicity of performance space needed in a contemporary musical venue has a direct influence on the ways in which architects now design for performance.

20
ARS ELCTRONICA BUILDING (addition), LINZ
TREUSCH ARCHITECTURE (2007)

left

The Ars Electronica building uses its sloped roof for auditorium seating for peformances. This 'auditorium-like' outdoor space also has a strong relationship to it's urban context - allowing the city to become part of the social form of musical appreciation (Architecture & Urbanism, vol 473 February 2010 pg 112).



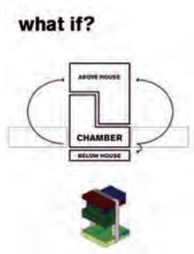
21, 22, 23
DEE & CHARLES WYLY THEATRE, TEXAS
REX/OMA (2009)
above

View from the outside of the Wyly Theatre building - the internal performance space having a connection to the exterior of the building (Gallanti, 2010: 82-83).

right (top to bottom)
Drawings of the Wyly Theatre building demonstrating its verticality and relationship of the 'above-house' to the 'below-house' (image source: http://www.sundancechannel.com/sunfiltered/2010/07/rem-koolhaas-sweeps-the-biennale/).

The public entrance foyer of the Wyly Theatre (Gallanti, 2010: 84), demonstrating the public's removal from any back-of-house functioning.







THE CASE OF THE WYLY THEATRE

This need for dynamic uses of performance space in contemporary culture can be examined in the design of the Dee and Charles Wyly Theatre by REX/OMA. This contemporary performing arts building, built in 2009, in the city of Dallas, Texas displays the increasing requirement of performance spaces in our modern context to allow for multiple functions of differing genres and cultures of performance. The building has turned the typically horizontally spread layout of back-of-house, performance space and front-of-house functions of a venue like this, on its side by translating these functions respectively into 'below-house', performance space and 'above-house' (Rasmus, 2010). This in turn has freed up the adjacencies of the performance space allowing it to have a direct relationship to the external context of the building, permitting the city to become a backdrop to the performance space. As seen in, the design of the seating and mechanical systems of the performance space also tolerates multiple configurations of the stage from proscenium to thrust to traverse (and a few more) (Gallanti, 2010; Rasmus, 2010). The more private functions of rehearsal and costume rooms have been extended to the higher levels of the building (Gallanti, 2010: 499). The building has reconceived the way in which the public relates to the internal programs of the building. Even though the performance space is the main feature and most public program of the building, I feel that the only connection that a public audience member may have with the building is through the performance space. The 'behind-the-scene' operations have been neatly tucked above this and there is perhaps the loss of the ability of the audience encountering the performers and vice versa as demonstrated in where the entrance lobby to the performance space is quite enclosed by the walls of the performance space.

There are many lessons learnt from the Wyly Theatre design. Firstly, there is a challenge in vertically containing new interpretations of performance and cultural space due to its requirements in large expanses of space rendering the elevated programs excluded. I may have qualms about the choice to completely cut the possibility of social encounter out of the building by doing this but I feel that it is an interesting way of seeing a contemporary musical research and performance building. It has potentials in creating dynamic programmatic relationships whether physical or sensory. It is also relevant in the context of Braamfontein due to its development in high-rise buildings as well as the need for the re-use and upgrade of existing buildings in the area. Secondly, the theatre's relationship to the city as a backdrop is an exciting way of creating new public space in the city and I enjoy the thought of an audience member being not only someone paying for the performance but also someone merely walking past the building but both experiencing something different to each other. Finally, due to our largely diverse music tendencies in contemporary society – allowing the stage and audience connection to be altered according to the needs of the performance (Gallanti, 2010: 81) leaves the building open to future technological developments.

JHB MUSICAL SEQUENCING

se-quence-ing
performance data recorded on a device

Musical sequencing is the process by which a song is recorded on a digital device (Wilkie, 1995: 93). Digitally recording a song means that a composition needs to be compiled and a certain context needs to be set up for the recording of that song to take place in. This is much like understanding the context into which my intervention will be situated – Johannesburg. The composition of my building will have to be a physical manifestation of a musical, sonic, social and physical environment of Johannesburg and more specifically Braamfontein. Although music, technology, art and science have in the past been seen as exclusionary explorations of a developing world, it is a challenge to many of cultural disciplines (including architecture) to be able to incorporate the socially-inclusive qualities of sound, music and acoustics into their engagement with dynamic social environments. While this thesis looks to provide a method of seeing architecture as a resonant-system in its interface between the building and its urban setting, the public and the building, the musician and non-musician, as well as the art and technology of music and sound, it also seeks to understand the development of musical social settings found in Johannesburg.

SAMPLING THE JOHANNESBURG STYLE

The tune of every city sets up the relationships between its built and physical environment with its users. As defined in Track 1 – it is the atmosphere of the city. This section seeks to define what is about Johannesburg's tune that inspires the design of a building for sound and music in its context.

In order to determine the necessity of a building for the development of digital sound and music in Johannesburg, one needs to primarily establish the digital musical condition of Johannesburg. Within South Africa as a whole, music has a valued correlation to our cultural heritages and to the political struggles faced in the country during the Apartheid era, and has a particular method of nation-building and social inclusion (Miller, 2010). It is important to observe that although Johannesburg is an African city – our music culture is as locally and internationally diverse as our population. When searching the South African music website (www.samusic.co.za) it is clear to see that in recent years a lot of our popular music has become the fusion of local African cultural music with Western (mainly Americanized) forms of music such as hip-hop and jazz. Therefore, it can be observed that South Africa is gaining identity on an international playing field in terms of unique musical experimentation. We have emergent music genres in everything from gospel to kwaito to South African rock music and all of these genres are linked to using digital modes of production. It should also be noted that Johannesburg is one of the leading cities in South Africa in musical development and cultural appreciation (Harrison, 2005). By increasing and augmenting this ability for the South African music industry to come to the forefront in musical experimentation, will encourage the idea of inclusion needed (Acebillo, 2007) through expanding the collaborative and interdisciplinary processes already occurring in musical production.

With this said, according to Professor Devroop (2002; 2010) and confirmed by Miller (2010), there is very little governmental support and recognition (economically and socially) in our artistic music industry today, especially in terms of classical and avant-garde musical education. Most governmental funding and recognition in any industry in South Africa is driven by commerce – and industries which do not produce economic grounding in their explorations are rarely supported sufficiently for their successful development. But as suggested by Professor Devroop (2002; 2010), there could be a possibility that by linking our musical education to that of advances in technology and allowing music to become multidisciplinary in its development, could firstly, increase the need for technical (and not solely artistic) number of musical jobs in the country and could secondly, by this same token increase governmental support to the essential art of musical creation. As suggested above, our music industry has taken the move to digital production and performance of music, which therefore means that tertiary education in art music, will need to be transformed in the degrees it offers to meet the industry standards in technological advancement.

The University of the Witwatersrand (Wits) has in recent years incorporated a course in musical technology (Shapiro, 2010) into their musical syllabus but in the opinion of Professor Devroop (2002: 24; 2010), it still has not fully met the technological desires of the music industry in order for it to grow (compared to that













24
SOUTH AFRICAN MUSICAL PERFORMERS
top to bottom; left to right

These images represent the contemporary musical context of Johannesburg and South Africa, and are representative of our growing musical reputation. Most of the performers shown are internationally know in some way, and continue to allow South African music to grow on an international basis. Many of these acts took part in the opening ceremony of the FIFA World Cup 2010 concert in Soweto and have claimed their spaces as up-and-coming South African performers.

track 5.1

Spoek Mathambo
(image source: http://www.pasounds.fr/2010/05/07/playdoe-bubble-freeze-ep/)

Die Antwoord
(image source: http://www.thesocialite.co.za/tag/die-antwoord/)

BLK JKS
(image source: http://www.idsnews.com/blogs/livebuzz/?p=2283)

Freshly Ground
(image source: http://freshlyground.images6.com/freshly-ground____.html)

Soweto Gospel Choir
(image source: http://streettalkin.com/ssoweto-gospel-choir-and-free-swaray-african-safari-ensemble/)

Johannesburg Philharmonic Orchestra
(image source: http://www.aaross.co.za/Orchestral.aspx)

Dirty Paraffin
(image source: http://africasacountry.com/2010/06/23/lake-of-stars/)

Kurt Darren
(image source: http://2.bp.blogspot.com/_K-X9rkO4wXA/S_aZ7y9-mSI/AAAAAAAAAAM/NvCOf0tYirk/s1600/kurt.JPG)

HHP
(image source: http://mikastefano.wordpress.com/page/15/)

Hugh Masekela
(image source: http://www.umass.edu/fac/centerwide/pressRoom/pr_images/hugh_masekela_2.jpg)

Zebra and Giraffe
(image source: http://rwrant.co.za/wp-content/uploads/2009/12/ZebraGiraffe.jpg)

of some other universities in South Africa). Wits is also strongly associated with that of classical music education and has only recently (approximately seven years ago) introduced contemporary music to its syllabus (Shapiro, 2010). Therefore, I pose the idea of incorporating (not physically but programmatically) my intervention into the educational requirements for the Department of Music at Wits in the teaching of digital mediums of music. My design could be a channel for allowing these developments in musical knowledge and experimentation to occur. The inherent curiosity and ambition of students also augments the ability of the intervention and the Music Department of Wits to be characterized with leading musical progression and invention.

TUNING JOHANNESBURG INTO DIGITAL MUSIC

Johannesburg is a demographic, economic and cultural centre for South Africa, with a prominent amount of South Africa's technological development occurring in this city (Bremner & Subiros, 2007: 14). It therefore has become an eminent point of reference for progress and development in all these sectors of our country. One of the most important aspects of Johannesburg as a city is its need for social integration (Acebillo, 2007; Bremner, 2007) and inter-cultural assimilation. But as Acebillo (2007: 10) suggests, in recent years it has been the small-scale schemes of the city of Johannesburg that have been able to provide for this – much like the modest social spaces discussed in Track 3. It is also recommended that this 'fractured city of that [apartheid] era is being used to generate urban clusters to create new city-centre areas with access to public space' (Acebillo, 200: 10). This is particularly applicable to Braamfontein, Johannesburg. I have chosen to site my intervention in Braamfontein and, as previously established, it is an area which has and is undergoing large amounts of regeneration encouraging many people to 'come back' to the inner city to work, live and socialize – diversifying its inhabitants. But what is also so pertinent to the area is that it is the cultural centre of the inner city with numerous traditional theatres within its district as well as the Wits School of Arts bordering its interface with the university. Therefore in reference to Acebillo's statement, Braamfontein is arguably one of the areas in the inner city with the possibility to produce and enforce that of social public space as well as cultural music production.



25
(image source: http://www.samro.org.za/master/news_detail/two_pianos_four_hands_to_take_on_the_world/)

INTERVIEWS

STEPHEN SHAPIRO *MUSIC STUDENT*

Currently a masters jazz performance student at the University of Nevada Las Vegas, Stephen Shapiro has been studying music for the six years. He graduated from Wits in 2008 and worked for a while as an assistant engineer in a recording studio called Chris Chameleon Crossley Productions (CCCP) in Johannesburg. He was involved in a small sound company that provided live sound for bands and DJs but has since moved to America to study.

DR. CHATRADARI DEVROOP *MUSICIAN*

Dr. Chatradari Devroop is currently the Deputy Director of the Directorate Music at the University of South Africa (UNISA). Devroop completed his Doctorate in the design of Musical Technology curriculums through the University of Pretoria in 2005 (www.unisa.ac.za). He is also an active performer and academic in music with a great interest resting in the development of musical technology in musical education. He also serves on the Board of Trustees of the Southern African Music rights and is currently writing a second publication.



PHILIP MILLER *MUSICAL COMPOSER*

Phillip Miller is one of South Africa's most renowned musical composers. His works include the music for the South African television series Yizo Yizo , RE-wind, a Cantata for Voice, Tape & Testimony, an award-winning piece based on the testimonies of South Africa's Truth and Reconciliation Commission as well as a long-standing collaboration with the world-renowned William Kentridge. He is also currently working on an opera on the life of Saartjie Baartman called The Hottentot Venus. For more information on Miller, go to www.philipmiller.info.



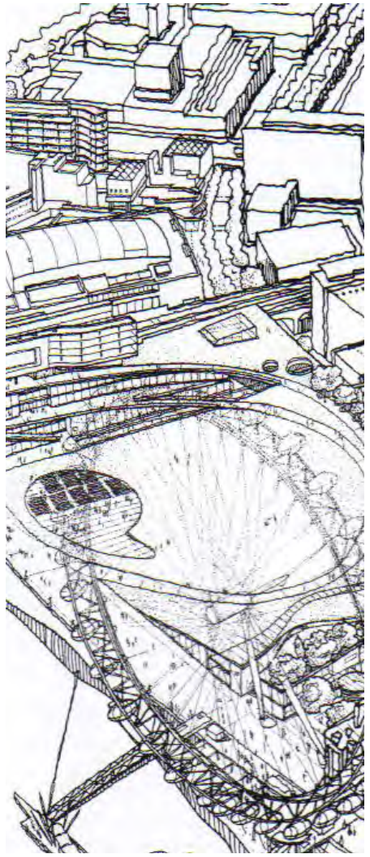
26
above
(image source: http://www.courtingjustice.com/About.html)

right (top to bottom)
'The Black Box' by William Kentridge is an artwork for which Philip Miller wrote the music. It is one of the many collaborations between these two artists (image source: http://www.artthrob.co.za/06june/listings_gauteng.html)









27, 28, 29
SOUTHBANK CULTURAL CENTRE, LONDON

above
Rick Mather's aerial view sketch of the South Bank Centre (Powell, 2000: 15).

right (top to bottom)
Site map of the South Bank district in London, indicating the South Bank Centre of buildings (image source: www.southbankcentre.co.uk/sites/default/files/documents/Map_of_Southbank_Centre_-Overview.pdf).

Royal Festival Hall of London, today (image source: http://www.srv-londonimages-1.londontown.com/2005/November/0M757468_429long.jpg).

THE CASE OF THE SOUTHBANK CULTURAL CENTRE, LONDON

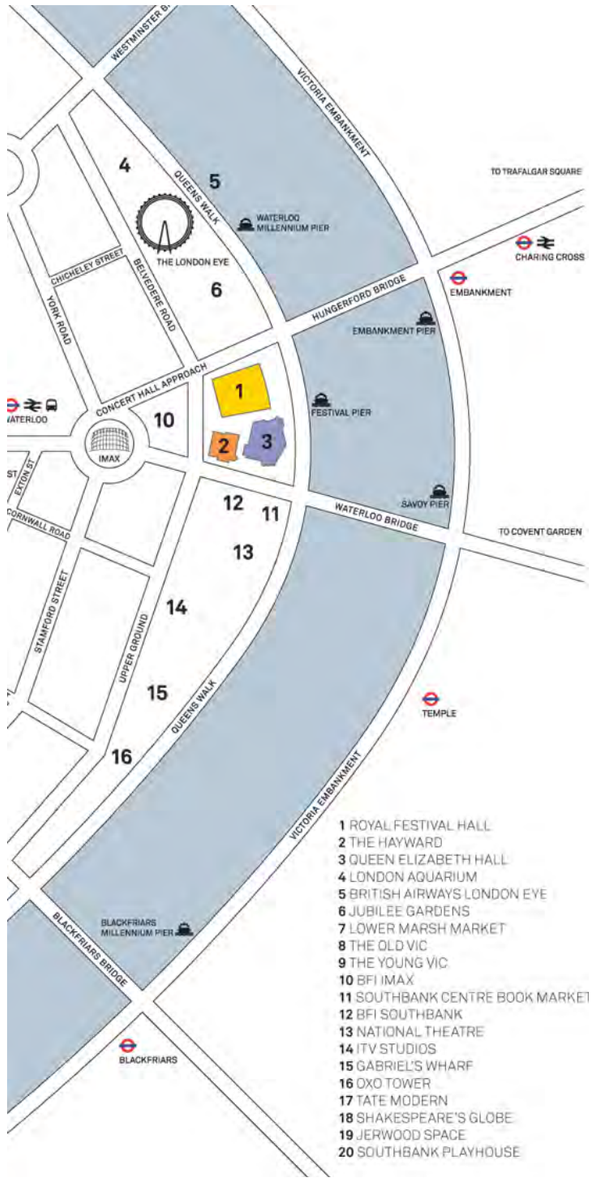
In many ways, on a smaller scale, we can compare Braamfontein to that of London in its ability to become one of the progressive music capitals of the country. London's music scene has become a blend of many different genres of music from classical movements to 'underground' musical developments such as grime[1]. These 'underground' emergent music genres occur in a variety of informal spaces therefore their spatial significance is not key to this investigation. Rather, their association of the city with new developments in music not necessarily consumed by the general public is of most interest to me. Mostly, these forms of music at some stage have become quite commercial but at the same time there are probably more evolving genres of music that we as general international public do not know about.

London is also home to a complex of traditional music and cultural buildings run as a single art complex (Powell, 2000: 12-13) that form the Southbank Cultural Centre which acts (quite literally) as a 'gateway' on the River Thames in London. The complex (originally built during the 1960s) includes buildings such as the Royal Festival Hall, the National Theatre, The British Film Institute and the Queen Elizabeth Hall (Goulthorpe, 2000:21; Powell, 2000). It will be studied on an urban level to begin to explore the ability of interstitial social space to enhance this music 'corridor's' urban engagement.

In 1951, the Festival of Britain exhibition was held on the south bank of the River Thames in London. This was the initial motive for the design of the Royal Festival Hall (RFH) which became part of this large trade fair event, but as with most 'post-event' structures, when the Festival of Britain had concluded, the RFH was abandoned and its relationship to the city of London was forgotten (Mullins, 2007: 1). In the 1960s a few more buildings were added to the river bank alongside the RFH but the area as a whole was quite isolating and derelict. The buildings had no physical relationship to each other or to the riverside. It was only in the 1980s that the Greater London Council's vision of the area becoming an open foyer began to bring life back to this district. In the early 2000s a new chief executive and chairman, Michael Lynch and Lord Hollick (respectively), envisioned physically renewing the area by connecting all these buildings into a cultural centre for London. (Mullins, 2007: 1).

A masterplan for the area was then drawn up and through its phased construction (due to a need to raise funds along the construction process), has finally been completed. This included a refurbishment of the Royal Festival Hall, a new social space between the buildings (with restaurants and shops) as well as a new relationship being made to the Thames River by the buildings of the centre (Mullins, 2007: 2). The most motivating capacity of this project is that of the interstitial spaces between the buildings. These spaces have become the life of what happens internally in the buildings as shown in. What is of most relevance is that they are not large public squares with centralized fountains – but are rather small spaces that one can discover and appreciate. There is a diverse scale to these spaces. They have improved pedestrian movement through the district by their redesign. It is the idea of the complex of buildings working together as a hallway (Mullins, 2007) of public social space re-aligning the south bank of London's main

1. Grime music is a genre of electronic rap music born out of and associated with London that rose to international acceptance in the 1990s (DJ Rupture cited in Manaugh, 2009: 151).



natural feature to the centre of London and to the other side of the river as well.

Although very different, Braamfontein tends to remind me of the original state of the South Bank district prior to its upgrade. Braamfontein presently has numerous theatres, museums and cultural venues within a relatively contained space of the inner city but that have no relation to each other. It has the potential to become a reference point in Johannesburg for new music and progressive cultural accomplishments as well as a space of interstitial social encounter. Its recent regeneration has rendered its streets and pavements comparatively safe and vibrant at the same time. Its dual association with multiple educational facilities also drew me to the area as it has the potential to become a place of innovative developments in sound research and production while still linking to the idea of a musical performance district.



MULTI-TRACKING ARCHITECTURAL SYSTEMS

mul-ti-tracking
a record that overlays more than one instrumental track to produce a whole song

Multitracking in the digital music world refers to the electronic overlaying of more than one instrumental track to produce a cohesive song (Wilkie, 1997: 69). In architecture, this can so clearly be applied to three identified systems of interface, namely, the program, the space for social encounter (users) and the physical built form as mentioned above. In order to understand, holistically, how these systems would intercept one another – it is important to identify the individual systems that have directly influenced the design and development of my architectural intervention.

CODING THROUGH BUILDING PROGRAMME

In their essay about contemporary urban and architectural projects of Johannesburg, Bremner and Subiros (2007: 17-18), have identified five principle types of South African projects that are encouraging the development of Johannesburg as a post-apartheid city – seeking to integrate its URBAN RESONANCE. Two of these types of projects that resonate with this thesis are those projects which re-compose existing space and projects which integrate the city as a whole. I feel that these two principles can be achieved even just through cross-programming a project where seemingly disjointed programs are brought together into one project which is able to create a sense of forced interaction between the users of the two; this may then lead to an enduring relationship between these programs. An architect becomes the intermediary of all systems in the building including that of program and the interface of users of a building. And as Bouman (2008: 80) so clearly puts it,

> Reconsider the act of getting people together, not through the building per se, but through means that can also be completely non-constructivist. In this way architecture is going beyond itself by going back to its primary justification: holding people together or holding them apart.

This is clearly supported by his idea that program can be composed – an architect does not necessarily have to design for a known program but can rather originate it and through building design can promote it (Bouman, 2008: 80). This built manifestation of programmatic systems can also leave sufficient scope for its user's future appropriation, and in this way architecture can become a medium for the architectural resonant systems described in Track 1. Programmatically, my intervention seeks to fuse the technical and scientific aspects of music (which are essentially rooted in sound) with that of the creative and artistic expressions of music bringing together audiences and users such as students, lecturers/teachers, scientists, recording musicians (not necessarily professional), professional musicians, musical performers (of all genres), technicians, sound artists, and any general digital music enthusiasts; producing much needed contemporary South African social spaces of encounter within the music industry. The intention in providing such a facility is two-fold:

Firstly, it is a method of enhancing Braamfontein's current identity of being a cultural district in the inner city of Johannesburg. Yet it intends to provide a more holistic and inclusive environment of music than what is being offered at the moment in the area, which is mainly based in classical music production and performance. This facility is able to become a 'market place of ideas and contact of knowledge' (Enwezor, 2006: 11), promoting the development of the contextual music industry on an international standard but with local ideals in music being encompassed.

Secondly, the fact that Wits has a vision for being a leading South African, African and global university (http://web.wits.ac.za/AboutWits/IntroducingWits/MissionandVision.htm) is not fully reflected in its provisions in music education (Devroop, 2002; Shapiro, 2010) but this could be somewhat overcome by associating my intervention with a proposed upgrade of musical education, research and production at Wits. As seen in the case of the IRCAM Institute (figure 4), solely associating musical research





30, 31
BRAAMFONTEIN, JOHANNESBURG
above (top to bottom)

The southern boundary and south-eastern corner of Wits are two of its main physical boundaries with the city, yet it doesn't open up in anyway to its surroundings.



32
BRAAMFONTEIN, JOHANNESBURG
above

View over the railway tracks and the Nelson Mandela Bridge, which make up a major part of the characteristic of Braamfontein, as well as its acoustic atmosphere.

and technology with an institution can begin to remove the socialness of music and sound from nontechnical people of the public. Therefore, it is the objective of my intervention to programmatically link itself to the university but to still have noninstitutional programs in sound and music as a method of social inclusion and complex production. Wits is presently physically removed from the city and is calling for a reconnection to its surroundings (Dewar, Louw & Urban Solutions, 2009) and therefore by allowing for a nonphysical relationship of the facility to the university will encourage the connection of the university to the city. The intervention will also allow the Department of Music to generate an income from renting the spaces within the building – which will allow for an integrated development of sound and music which is not dependent on government grants.

PHYSICAL ACOUSTIC MODELLING

'Buildings have to change, buildings have to adapt…in the same way as a city they have to raise excitement and develop a character that makes them special' (Oosterhuis & Schueler, 2008: 92). This statement demonstrates one of the key intentions of this thesis. With current developments in communication and its congruence with the technological development of music production and consumption – there is a supplication for architecture (and its many interfacing systems of program and physical environments) to begin to adapt to this. The built environment of Johannesburg's inner city has been an incorporation of many differing types of architecture. One of its most dominant is that of the modernist style. Buildings designed in this manner are hardly distinguishable – their individual distinctions being so minor, hidden in the details (Spiller, 2008: 88). But as Spiller (2008: 88) argues, 'the nuances that architecture delivers can only be personal and personally mnemonic, to the observer/user'. These nuances such as the buildings 'tune' or atmosphere, its materials and other inhabitants can begin to develop the experience a person has in a space.

Very little emphasis is placed on designing spaces with specific configurations and materials to manipulate the auditory architecture of a space. A musical performance auditorium is a blatant example of 'aural architecture' (Blesser & Salter, 2007a: 1), using space as a device of sonic resonance to enhance the experience of it. If a space is not sonically-dependent then why should it be shaped around its aural qualities?

Aural architecture[1] is closely related to our ability as humans to 'see' with our ears (Blesser & Salter, 2007a: 2). We are able to relate to space, navigate it and experience it in a more encompassing manner than that of sight. Although, I am not trying to undermine the importance in sight (and therefore light) as a spatial experience of architecture, I am suggesting a new meaning be seen in the resonance of aural architectures with our ability to fully experience a space – the sounds it makes, incorporates or reduces. Hearing vehicular traffic in the physical setting of a rain forest would not be the spatial experience that we would imagine in our minds (Blesser & Salter, 2007a: 2), but it may produce new meanings of that space for the inhabitants in which this is experienced. Hearing, as previously established, is not purely a biological phenomenon, and is reliant on our memories, cultural and social settings. Aural architecture exists whether it is designed or not – therefore it is the intention of this thesis to explore a more inclusive aural identity on the social spaces employed (Blesser & Salter, 2007a), as a method of deepening the experiential attributes of space.

Although we depend on sound as a means of experiencing space, it can also be said that sound depends just as much on the physicality and materiality of a space (Devroop, 2010). And the livening of both space and sound depend equally on activity - people. A soundscape is an exchange between activity, space and sound (Blesser & Salter, 2009; 2007a). Soundscapes are dynamically different to that of landscapes, and physical static environments. Therefore, could it be assumed that the ability to achieve dynamic forms of social interaction could also be enhanced through the production of varying soundscapes in space?

Every space, place and environment produces an inherent soundscape because of how it is utilized but rarely do we as inhabitants notice it (Parker, 2008: 32) – unless it is altered enough for one to detect it. As a result, in order to be able to make use of sound in building design, the materials and rhythms of the aural atmosphere are two important aspects to consider (Achtypi, Giamarelos & Achtypi, 2008: 10). To be able to shape the immaterial (sound) one needs to compose the material (built form). And in order for the immaterial (sound) to change the aural architecture of a space the intrinsic rhythmic pattern of that sound needs to be altered. I am although, not suggesting that my intervention become a sensory overload of sound and many other physical attributes; but rather, a physical manifestation of a composed soundscape and social milieu pertinent to Braamfontein, Johannesburg. For all the grounds discussed in this chapter, it is felt that being able to use my design as a channel to connect an inhabitant of Johannesburg, to its city's tune or to remove them from a noisy soundscape of the city or even to allow the inhabitant to experience an aural connection to any of the programs in the building (themselves based in sound), that I will be able to conceive of a physical building with a certain Johannesburg URBAN RESONANCE enhanced by its programmatic and social systems.

CHANNELS OF [SOCIAL] ENCOUNTER IN CONTEMPORARY JOHANNESBURG

The two previous systems discussed are more tangible and controlled whereas the system of social encounter seems to come as a resultant of how the other two systems relate to one another. The removal of 'the corporeal' from social relations is calling for the re-examination of how social beings come together physically in an era of virtual realities and individual privatized socialization. Is a single building housing compartmentalized activities (Bouman, 2008) still appropriate in the context of a need for stimulus in new hybrid forms of social being? The ability for architecture to 'resolve' social problems is not necessarily instituted in its physical form. The fact that it is physically present obviously affects our relationship to it and to our socially-stimulated physical environments. The architecture of a resonant system would become a channel for the in-



33
BRAAMFONTEIN, JOHANNESBURG
above

Many social encounters within the city occur on the streets and their pavements.

1. It is important to note the difference between an aural architect and an acoustic architect. As suggested by Blesser and Salter (2007a: 1), an aural architect is not necessarily a trained professional in the physics of sound and its affect on materials but is rather anybody who selects attributes of spatiality that match the aural intention of the space. For example, someone opening a window onto a street edge becomes an aural architect through inviting the acoustics of the street into their interior spatiality (Blesser & Salter, 2007a: 8).

teraction and exchange of energy between people with differing programmatic intentions in order for their intended uses to partially hybridize to form a common social arena (Spiller, 2008: 88).

Different architects understand the design and function of architecture in diverse ways. Bouman (2008: 80) suggests that there are two principle kinds of architects today: architects that are passionate about the materialization of a building and those who are fervent in understanding how people's lives are controlled within architecture. At times these two kinds of architects struggle to understand each other's points of view. But as established in Track 2 (URBAN RESONANCE) I feel that in the context of Johannesburg both these viewpoints on architecture should resonate with each other as they are both critical in constructing positive contemporary South African social space; and the way in which a chosen program affects that is critical to how people begin to make use of and have pride in it (Bouman, 2008).

An important part of Johannesburg's social space is our society's fear of non-secure, dangerous place. It feels as though many people in our social setting of Johannesburg are still somewhat scared to walk its streets, connect with the city and most importantly each other. Therefore, it is imperative to consider the fact that not all designs intended for safety need to keep people out (Bouman, 2008; Watson, 2006) – they can also be intended to bring people in who will begin to harmonize in a common space which will in turn provide for a space of social security rather than what can be categorized as 'safe' by physically restrictive means. One way to achieve this is through incorporating the street and simple spaces where the public are, into parts of the 'safe' internal environment of the buildings forming the initial relationship of the public with a building (Enwezor, 2006).

Time plays a large role in allowing architecture to truly 'become' in a community; but to begin with, architecture may require its occupants to experience its composition of resonant systems with a different lens to what they have been (Spiller, 2008: 90). In reference to Watson's (2006) ideas, it is completely idealistic to think that social projects of music and sound can completely socially relieve all problems in Johannesburg especially in terms of racial and social difference, which can inhibit social encounters in space. But as she suggests, Watson (2006: 171) explains that perhaps a more industrious approach to initiating places of social difference would be by constructing numerous spaces of 'multiple publics' (Watson, 2006: 171) which can all begin to overlap (forming a conceptual resonant system with each other) and perhaps through time will be able to self-sustain.

URBAN RESONANCE



DESIGN 02

DESIGN PROGRESSION
selecting the basis for an architectural design response

track 8 PROJECT BRIEF pg 68:00

track 9 PROGRAMME DEVELOPMENT pg 72:00
Programmatic Arrangements
Sound Users
Explorations of Programme

track 10 SITE SELECTION & ANALYSIS pg 80:00
Braamfontein as a Musical reference
A Sound Site

DESIGN DEVELOPMENT
development of a unique resonant architectural system

track 11 RESONANCE AS CONCEPT pg 120:00
Multitracking Programme; Built Form & People

track 12 CONCEPT RESPONSES pg 122:00
Programmatic Resonance
urban: site acoustics
building: programme distribution

Social Resonance
urban: site activity
building: enhancing social encounter

Architectural Resonance
urban: the built context
building: architecture and sound

FINAL DESIGN
the resonance of program; city & people

track 13 DESIGN ANALYSIS pg 150:00
Urban Resonance

track 14 THE JOBURG SOUNDBOX pg 158:00

OUTRO pg 169:00
lessons learnt in systems design

LIST OF REFERENCES pg 170:00
a base in the theory of URBAN RESONANCE

BIBLIOGRAPHY pg 171:00



DESIGN PROGRESSION

PROJECT BRIEF

establishing a design synopsis

In light of the idea of URBAN RESONANCE, and its call for connections between people and architecture, as well as each other within that architecture, it is necessary to begin to understand the possible responses of an intervention to the issues of social and physical resonance of buildings within our context of Johannesburg. The Joburg SoundBox proposes the idea of integration, innovation and growth of an urban area through the use of diverse programming that may produce a positive social public environment in a building and our city. The use of sound through program is a basis for initially openly bringing people to a building that then allows for social 'being' within that space.

The building seeks to become a prominent space in the city of Johannesburg where all types of people in the music industry (including radio djs, recording artists, sound engineers and students) and the public are able to come in contact with one another. Its program is based in the research, production, performance and consumption of sound and music; and the building must become an open system for the contemporary technological growth and advancement of our music industry. Thus creating an integrated musical building that is an expressive space of innovation, advancement and distinctiveness for the context into which it is placed. It is about deterring from the idea that musical buildings are purely built for performances, and that through inter-system design (as established in the essay) of a building - a new unique form of Johannesburg sound building can be designed.



LAGOS, NIGERIA
EMEKA OGBOH

In his artwork *The Lagos Soundscapes*, the artist Emeka Ogboh has used sound as a basis for mapping the city of Lagos, Nigeria. He has taken definitive sounds of the city and combined them to produce a unified city soundscape - demonstrating the idea of the connections between a city and it's aural environment.



BOSTON CITY CAMPUS
BRAAMFONTEIN

Within Braamfontein there is already a culture of sound in everyday life shown through the association of a celebrity radio dj, such as dj fresh shown in this image, with a tertiary educational facility - showing an obvious appeal to the students through music.

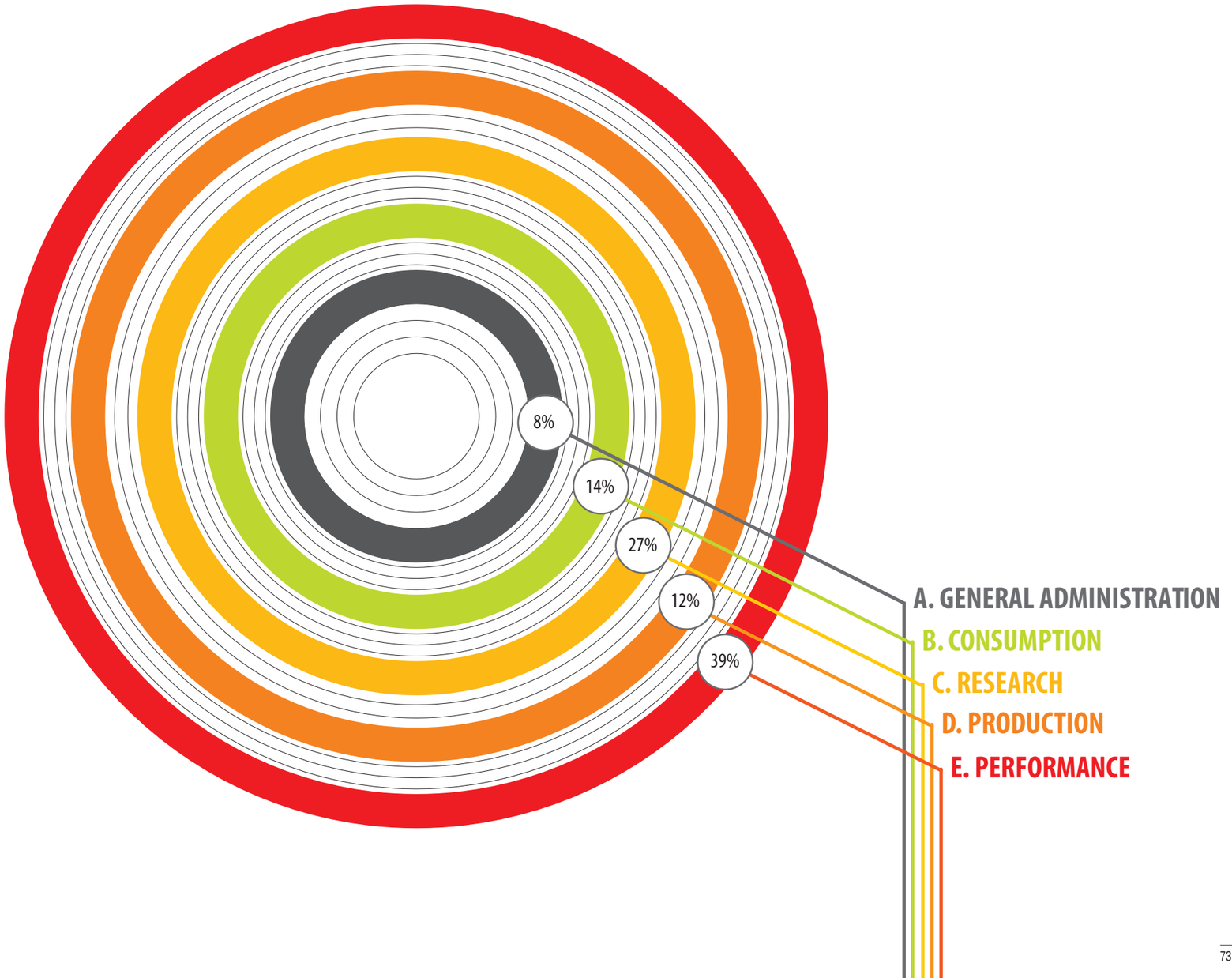
PROGRAMME DEVELOPMENT

generating a framework for social encounter

PROGRAMME can become the basis of a building design in bringing different people into a unified space - in which each user has an individual need for the building. By cross-programming a building, one is able to produce social encounters that may have not happened in a 'normal' situation.

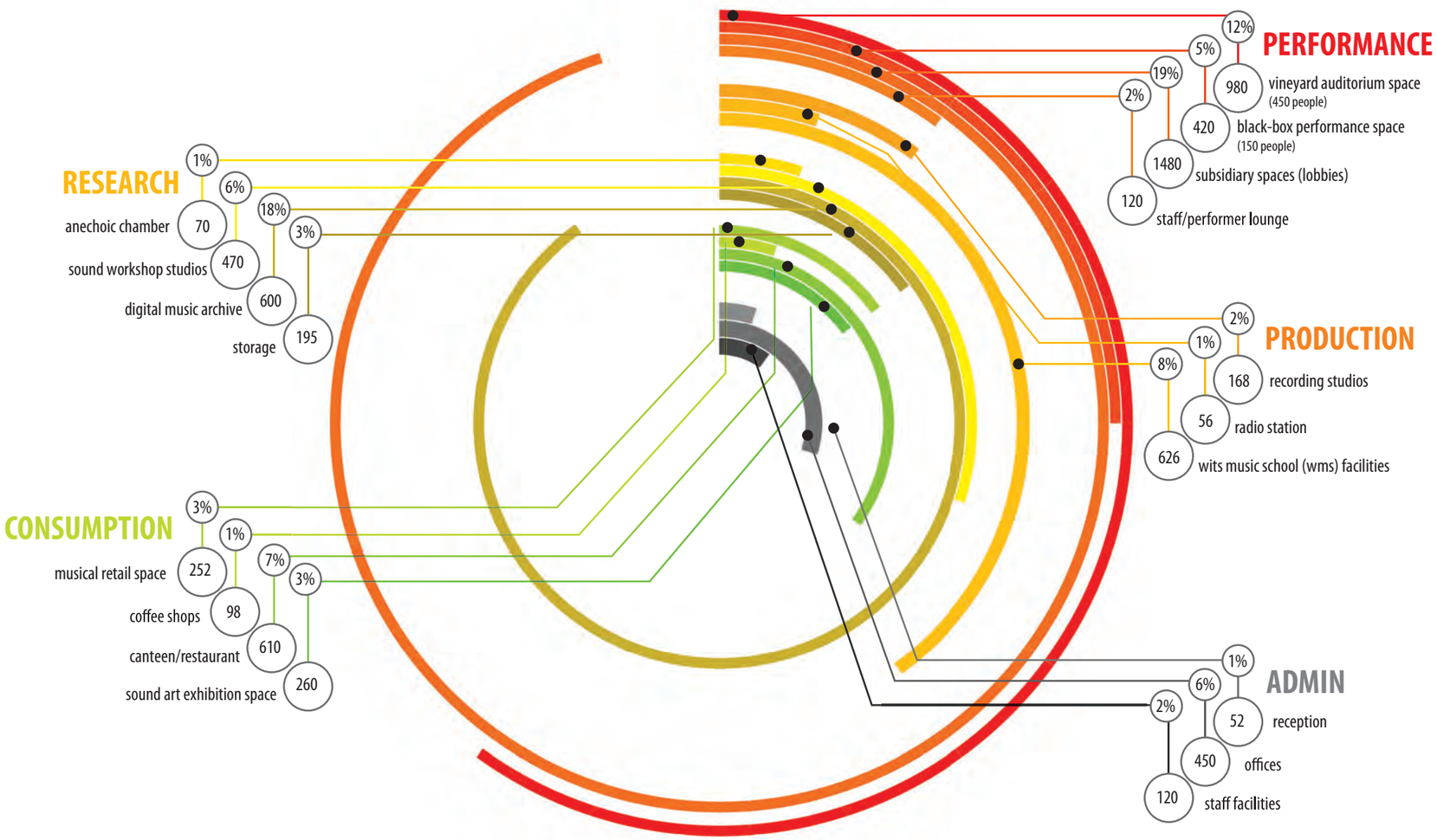
Building programs designed solely for musical performance can begin to render spaces (usually large, open volumes) useless for most of the day as well as for many nights of a week where buildings are only inhabited for performance evenings. Therefore, by diversifying the program to include a daytime usage will allow for the building to become an active part of the city where people can continuously make use of it's spaces.

The Joburg SoundBox seeks to be a complimentary space of contemporary (as opposed to classical) musical expression - by uniting technical programs based in sound with that of performance. It is not solely a cultural performance space but rather a fusion of science, education, performance and production of sound and music. By housing these functions in one building encourages the idea of chance encounter creating new meaningful social networks for the people making use of it's functions.



PROGRAMMATIC ARRANGEMENTS

The following diagram is a detailed breakdown of the programs and spaces (in sqm) provided for in my intervention. It is clear to note that the lobby spaces for the performance volumes are the largest spaces of the building and therefore have become a major spatial component in the idea of interstitial space of the programmatic system designed. The lobbies and breakaway spaces for each program become important through their use as social spaces in which social encounter can manifest itself.



Four main groups of program have been designed in order to truly understand the diverse music industry of Johannesburg and the programs involved in it's manifestation. These groups are:

RESEARCH

Programs based in the research of sound and music are intended to put the Wits School of Music 'on the map' by providing for a facility that may become the centre of innovation in musical technology in South Africa.

PRODUCTION

Musical production forms a large part of the music industry of South Africa as most musical students land up in some sort of music production and recording environment (Shapiro, 2010) due to the difficulty in pursuing a successful career in music in South Africa.

PERFORMANCE

It is inevitable that with music comes the need to perform it. Therefore a performance space is designed as a connection to the public that enter and use the building. It also becomes the most outward expression of what is happening inside the building as most musicians rely on performance as a way of giving themselves a name in music.

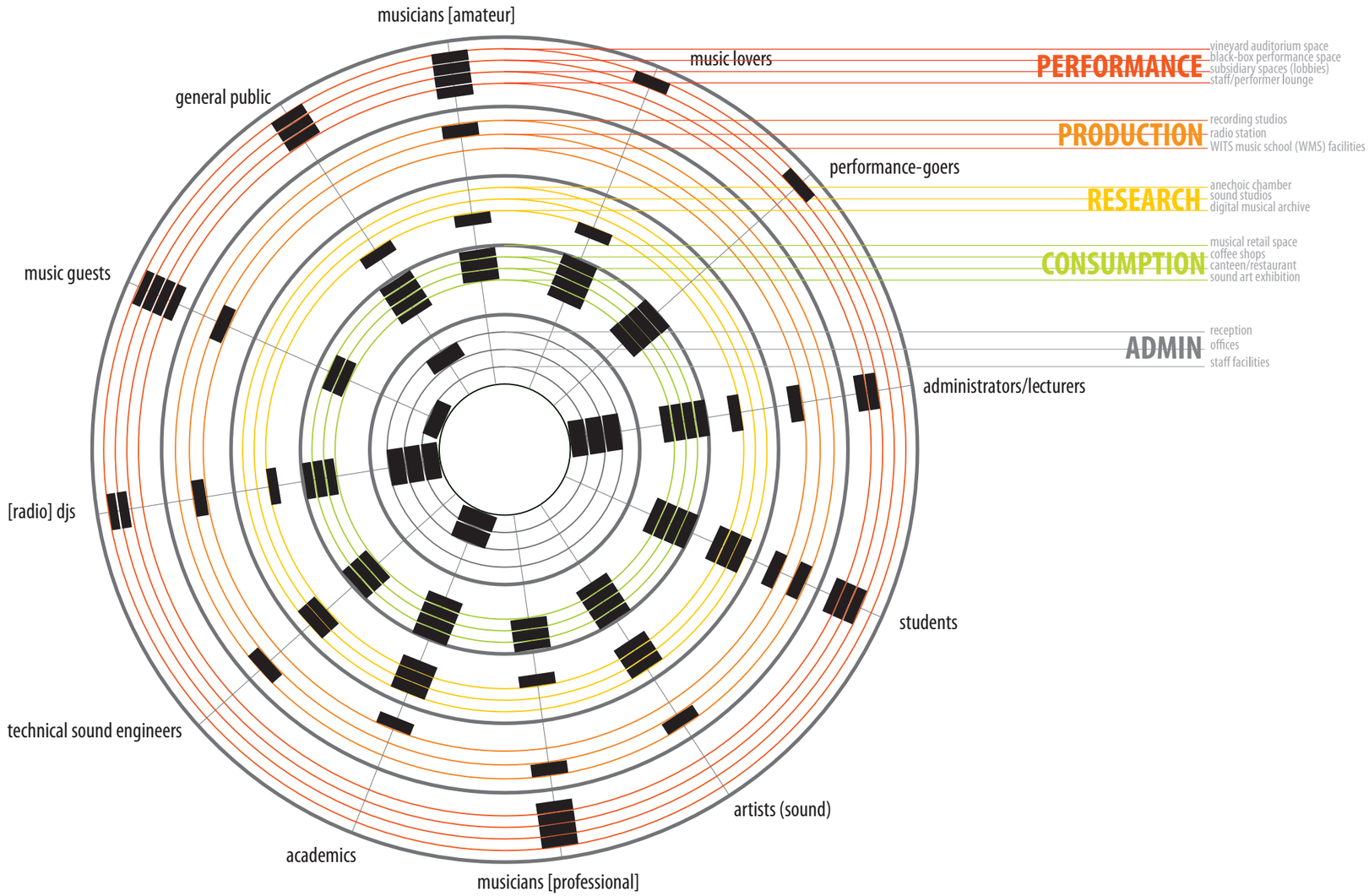
CONSUMPTION

Consumption is seen as the last process of the music and sound cycle. Therefore, my intervention provides for the sale and consumption of music and musical instruments. As well as the appreciation for the industry in a sound art exhibition in which artists who work with sound can exhibit their work.

SOUND USERS

A major system discussed throughout this thesis is that of social encounter. The program of the Joburg SoundBox is the driver for social encounter, and the diagram to the right shows the types of people that may use the building and the possible spaces in which they may encounter each other. The more black markings within one concentric circle - the more people that are likely to have a chance at meeting each other in this space.

Most of the building users will be moving through the spaces of consumption such as the restaurant as well as the exhibition space - therefore strengthening the idea of the importance of the lobby in connecting the various programs of the building, with the programs of consumption activating these lobby spaces to create diverse social environments.



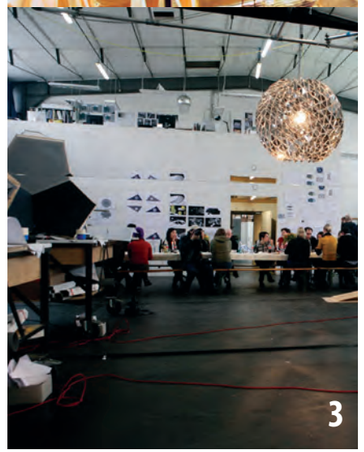
EXPLORATION OF PROGRAMME

The following images were initial inspiration drivers for the design process. These images show the range of the types of spaces that the intervention may cater for as well as the ability for sound to architecturally express itself through surface, material and large open volumes.

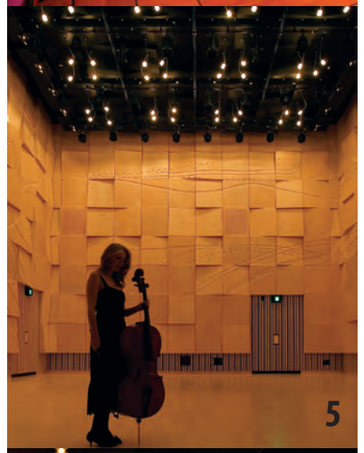
It also shows the ability of the programs provided for to become diverse in scale and volume. They offer an interesting mix of spatial explorations which in turn would make a dynamic building design in which users would be able to 'discover' spaces and programs.





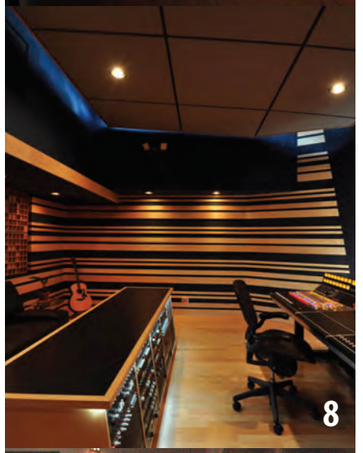














PHOTOGRAPHIC EXPLORATION OF PROGRAM

1. sound workshops/studios

These spaces are used in the making of artworks or the use of professionals in testing physical explorations of sound. and are utilised by artists, engineers or even students testing out experiments.

(image source: http://lh4.ggpht.com/_vgTZjD-ru8SU/RoLSDHQ9gjI/AAAAAAAABIk/mrOwWw5pG6A/Berlin+Documenta+07+003.jpg)

2. anechoic chamber

An anechoic chamber are one of the quietest spaces on earth. These chambers are used when testing anything to do with sound.

(image source: http://www.audioheritage.org/images/misc/2000-tour/northridge/anechoic2.JPG)

3. sound workshops/studios

(image source: http://www.olafureliasson.net/studio/lg/studio-8.jpg)

4 & 5 multiuse black-box performance space

(image source: http://www.mimoa.eu/images/8751_l.jpg)
(image source: http://neoskosmos.com/news/sites/default/files/MRC2.JPG)

6. musical recital hall

A recital hall is a small performance space that will be used mainly by the students of the music school. It is intended to seat about 60-80 people.

(image source: http://blog.mixonline.com/briefingroom/wp-content/uploads/2009/02/eastwest_studio.JPG)

7 & 9 sound art exhibition space

The exhibition space provided for in my intervention is based on the exhibit mainly of artists using a medium of sound in their artwork. There will also be a partially permanent portion of the exhibition.

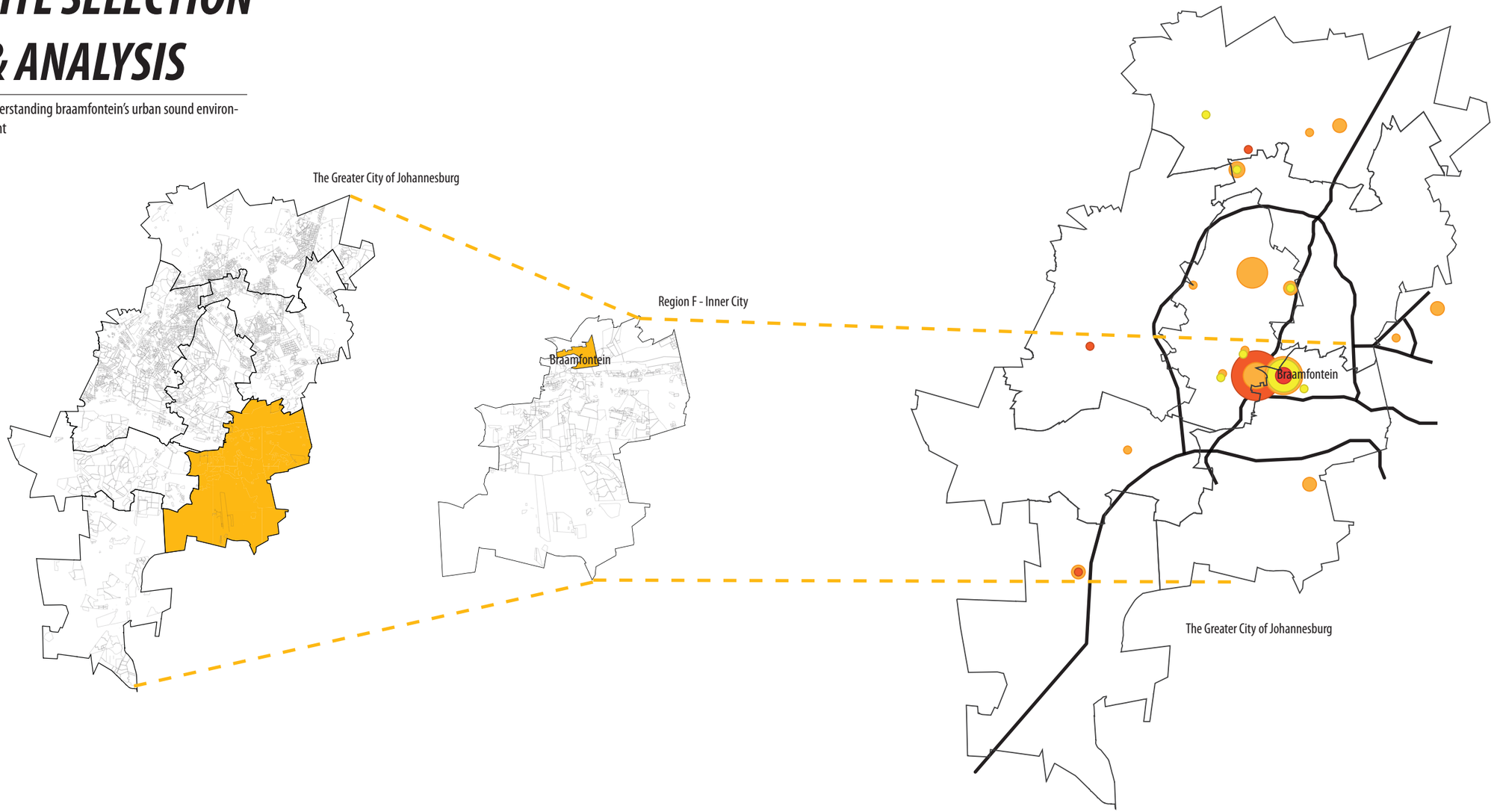
(image source: http://www.escape-mechanism.com/news/uploaded_images/gallery01-763444.jpg)
(image source: http://blog.svconline.com/briefingroom/wp-content/uploads/2009/04/sound_exhibit.JPG)

8. recording studio

these spaces offer the smallest volume of acoustic capabilities within the building.
(image source: http://blog.mixonline.com/briefingroom/wp-content/uploads/2009/02/charleston_sound.JPG)

SITE SELECTION & ANALYSIS

understanding braamfontein's urban sound environment



PROGRAM JOHANNESBURG

Through mapping out prominent production and performance spaces (as these two are the most tangible programs of sound to any average person) within the Greater Johannesburg region - it can be seen that many of these programmatic functions are currently:

1. ***individualised*** (and do not have any relation to one another)

2. ***dispersed*** across varying areas around Johannesburg with the performance spaces clustering themselves around the Johannesburg inner city and Braamfontein districts.

This exploration furthered the investigation of Braamfontein as a possible space of integrated and concentrated potentials for the design of an academic yet public facility in the centre of Johannesburg.

PRODUCTION - recording studios

PERFORMANCE - musical & theatrical

PRODUCTION - radio stations



BRAAMFONTEIN
JOHANNESBURG

A view down one of the streets of Braamfontein.

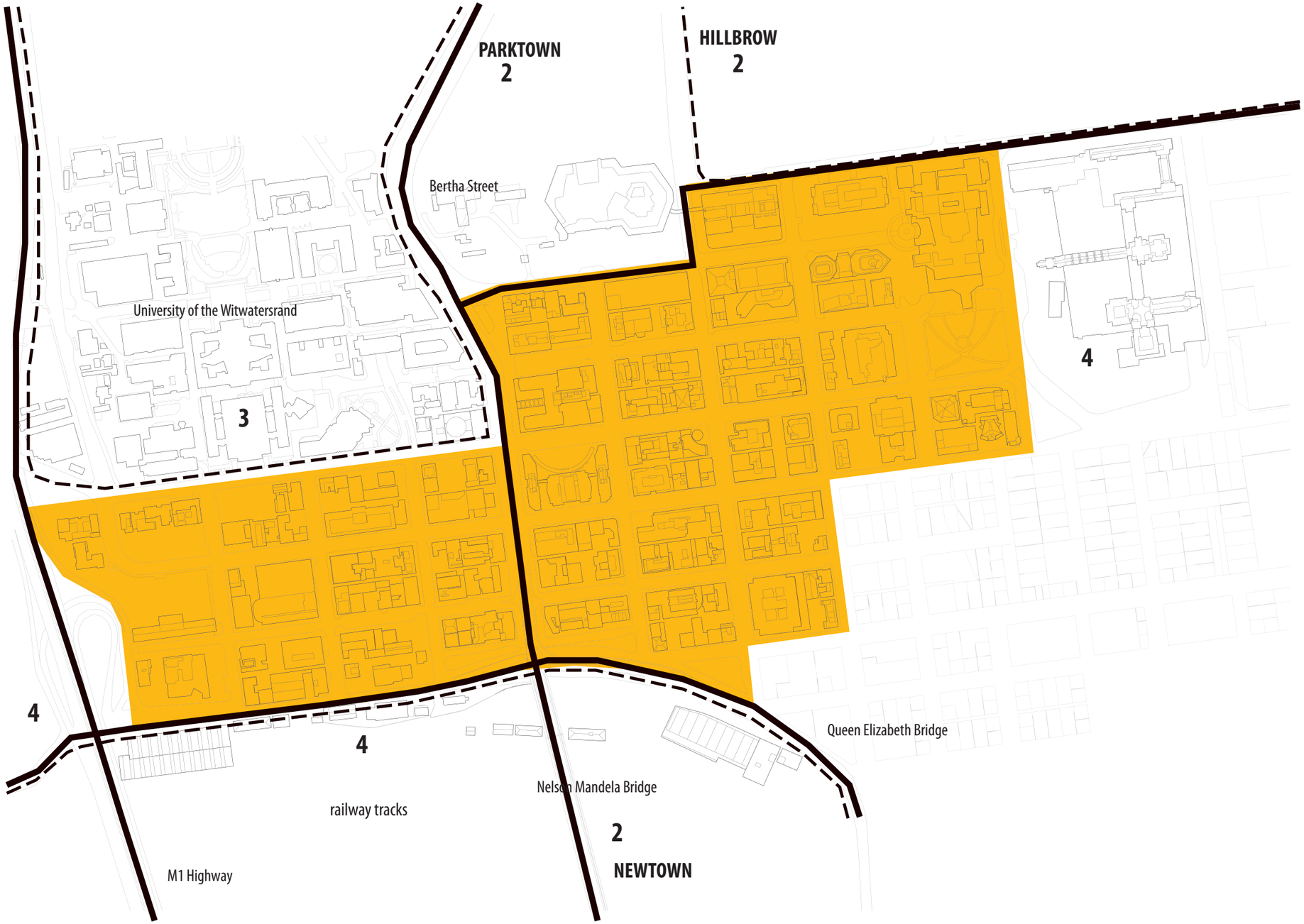
BRAAMFONTEIN AS A MUSICAL REFERENCE

In order for the idea of a specified program based in sound to activate social 'being' in a building - one has to find a location where the people that will use these programs will be able to gain from the introduction of the building into the area and vice versa. Judging from the mapping of the user groups of my intervention - the location of a building used by all these varying types of people would be well-suited to Braamfontein (as discussed in the Essay). Braamfontein may be seen as a prominent cultural area of Johannesburg because of it's varying performance spaces and museums - and one cannot overlook the growth of the district over the past few years and its expansion in student and art-based population (Levy, 2010). It is also a suitable area for my intervention in the fact that it is not the city centre itself but it is in close proximity to it, and has taken on the role of a cultural and academic arc within the city of Johannesburg (Dewar, Louw & Urban Solutions, 2009). Therefore, to introduce a building of sound and musical innovation and integration into this context could be well assimilated into the area, and can begin to re-activate the identity of Braamfontein as a contemporary cultural area of Johannesburg to its population (whether dynamic or static) - attracting people into the surrounding regions of Johannesburg in order to make use of its facilities. I see my intervention as an urban catalyst for the integration of Braamfontein's two identities as a cultural as well as academic district.

As established in the JDA Braamfontein Urban Design Framework of 2002 (Albonico, Sack & Mzumara (2002), this area has instituted itself as a corporate, educational and civic precinct and was calling for the upgrade and introduction of public space and buildings within it's boundaries. Since this document has been written, the urban district of Braamfontein has certainly seen some large scale upgrade and injection of public spaces and investment in this identity, such as South Point's Grove Square on the corner of Melle and De Korte Streets as well as the new art museum being developed by Wits on the corner of Jorissen and Bertha Streets.

Braamfontein also has a large diversity of people that pass through it everyday. Because of the University of the Witwatersrand (Wits) constituting a major part of the area and with so many small tertiary educational facilities within Braamfontein- there are a great number of students, academics, general public and administration workers entering this district everyday to use its facilities. One of the foremost problems with the relationship of the University with the rest of its context is that Wits has physically cut itself off from the context in which is sits. The people using it's facilities never have to leave its boundaries on foot and venture into the city - rendering the whole of Wits as an island of potential users in Braamfontein. Therefore, I have undertaken to allow my intervention to be the initial gesture of the University with the city, and what better way to do it than through a building based in the design around sound and music - which are both in themselves socially-connecting as well as academically stimulating.





SELECTING BRAAMFONTEIN JOHANNESBURG

Choosing Braamfontein as a site context for the Joburg SoundBox came about due to four main reasons, discussed below. It was with the line of thought that the context in which the building is to be located needed to be academically associated (whether physical or not) that can still provide for the public to come in off of the streets to be able to enjoy the building. This too would be to keep a dynamic flow of people through the spaces in order to produce the social encounters as previously spoken about.

The four main reasons for choosing Braamfontein are as follows:

1. It is a ***diverse*** context in which many people would be coming in contact with the building - rendering it a new and pioneering space in the city of Johannesburg.

2. Braamfontein is ***central*** to most areas in the city of Johannesburg. It is for the most part quite a destination place with people coming to make use of specific spaces.

3. It is in ***close proximity*** to Wits, whom I have chosen to associate the development of the Joburg SoundBox with. The project could be a possible collaboration between Wits and a private sector investor in which the Wits School of Music would be able to rent the spaces out to any public user in order to gain an income from the building for the development of research conducted by the faculty.

4. Braamfontein is a ***physically-bound area*** with the railway tracks to its south, and Wits to its north as well as the M1 highway on its western boundary and the large Civic Centre city block on its eastern side. It is this characteristic that renders Braamfontein a plausible area for the Joburg SoundBox due to the fact that through being so condensed people and buildings are forced to negotiate space with one another and to therefore interact with one another.

barriers

blockages

north



FIGURE-GROUND BRAAMFONTEIN

The figure-ground of Braamfontein (shown to the left) illustrates the area's rectangular city grid with each standard full block dimensions being about 95 m in width by about 64 m in length. The grid of Braamfontein lies approximately 8° from true north. The buildings are quite densely situated on the grid but there are far more lower-scale (1 to 3 storey) buildings in Braamfontein compared to that of the Johannesburg inner city - rendering its street less economically busy and a lot 'slower' than that of the inner city. There are also a few open spaces throughout Braamfontein (see aerial map), with many of them being 'green' but not very well utilised by the inhabitants of the area.

north



PROGRAM
BRAAMFONTEIN

The mapping to the left indicates the programs of research, production, performance and consumption existing within the context of Braamfontein. It can be noted that Braamfontein houses quite a few of the programs in it's vicinity - but these are also individualised and do not take the opportunity to feed off of one another. The radio station and recording studios are also spaces that are rented within other buildings. In this regard, the Joburg SoundBox, seeks to make use of these two characteristics of the existing programs in that it intends to allow the programs to integrate with one another to allow musical relationships to be formed. But by coupling the building with 'non-musician-based' facilities can begin to bring about meaningful social environments that truly diversify the public space of Braamfontein.

It is from this mapping that it can be seen that Braamfontein truly has the potential of becoming a place where one could walk from building to building to use different facilities within its district. The Joburg SoundBox makes use of this diagram in the selection of a site that begins to sit within this context and to produce its own identity as the space of fusion between academics and culture.

PERFORMANCE
PRODUCTION
RESEARCH
CONSUMPTION

north



1



5


2



6



3



7


8


9


10a


10b

BUILT FORM
BRAAMFONTEIN

facing page (numbering taken from page above)

The following photographic exploration of the buildings mapped above shows the current architectural typology of Braamfontein - where it's buildings are largely office blocks with stacked floor levels and solid facades. I feel that Braamfontein is lacking an architectural expression of it's identity in music, culture and education. All the buildings mapped house exciting musicians, producers and performances yet if a person entered this area for the first time - they probably would not be able to be excited by the architectural forms presently as public spaces.

this page

In recent years there have been many upgrades to existing buildings within Braamfontein - and through the use of brightly painted walls and contemporary architectural expressions, it's identity as an arts-based district is coming to life. These spaces allow Braamfontein to bring people back to the inner city of Johannesburg which may become a catalyst for positive social experience where many people from differing cultures and backgrounds are able to use a common space in the inner city. This may to some extent counteract the currently dispersed city of Johannesburg.

8. A new development by Adam Levy (a young property developer enthused by the urban possibilities of Braamfontein) on the corner of Juta and De Beer Street - to be used as shops and commercial space for the retail of art and art exhibition.

9. The recently developed Grove Square and La Munu Hotel (corner Melle and De Korte Streets).

10a. Wits University Corner building as it stands today.

10b. A rendering of the new Wits Art Museum (currently under construction) showing the proposed relationship between the university and the city. (image source: http://web.wits.ac.za/PlacesOfInterest/WAM/Support/WAMintheNews.htm)



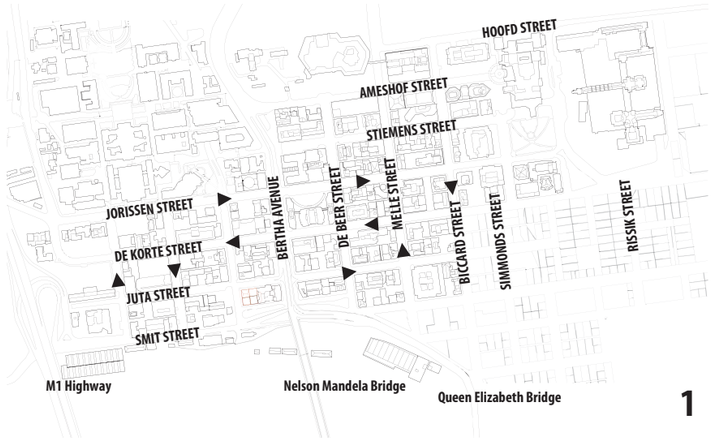
SCALE
BRAAMFONTEIN

Braamfontein has a range of differing scale in its built form with many of its buildings being under five storeys. A number of the buildings in this precinct are used as office blocks and therefore the height of some of its building comes about due to this.

The scale of the buildings mapped out with similar programmatic functions are all low scale buildings except for the Joburg Theatre complex. This then re-iterates the fact that by housing these functions in one building may be a way of forcing interaction between them and so they can feed off of the movements of people through a single space.

low 1-3
4-6
7-9
10-12
13-15
16-18
high 19-21

north



1



2



3



4



5

MOVEMENT BRAAMFONTEIN

Movement through this Braamfontein is highly based in vehicular movement but what is positive to note is that because it has a high level of student inhabitants - there is a lot of pedestrian movement throughout Braamfontein as well. Therefore, designing a building around the movement of people in the area is very feasible and by depending on passing 'trade' so-to-speak is a realistic part of design in this area. The main high movement of people walking on the streets is to catch transport to and from the area, or to get something to eat at a lunchtime break. Therefore, the pedestrian movement of the space (as well as the vehicular) is not a leisurely movement - people mainly walk with a destination in mind and not necessarily to linger in the street space.

1. General road networking in Braamfontein
2. BRT and Metrobus routes in the area.
3. Major mini-bus taxi movement
4. Predominant pedestrian movements routes
5. Predominant vehicular movement

Bus stops ●
One way streets ▲

north



PEOPLE
BRAAMFONTEIN

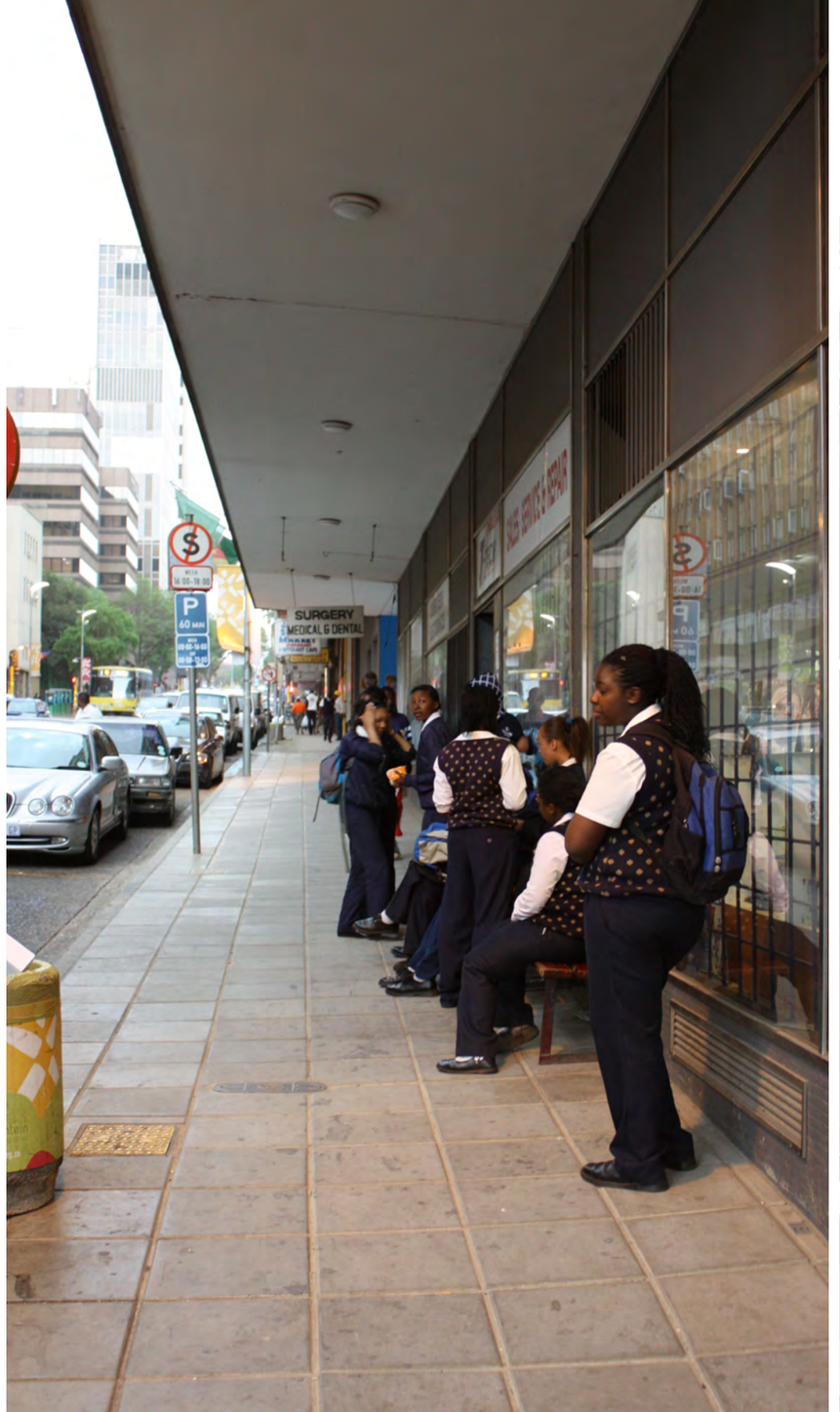
Understanding the types of people inhabiting the area will help to determine whether the idea of social resonance can truly occur in the Joburg SoundBox. As stated before, this area offers a lot of differing functions as an academic, cultural and corporate area of Johannesburg - and therefore brings together professionals, students, academics and business people together in one urban setting. Therefore, it is this quality of social resonance in Braamfontein that drove the idea that the Joburg SoundBox could become a place where students are able to meet professionals in their field of study, and professionals to meet other professionals and so on.

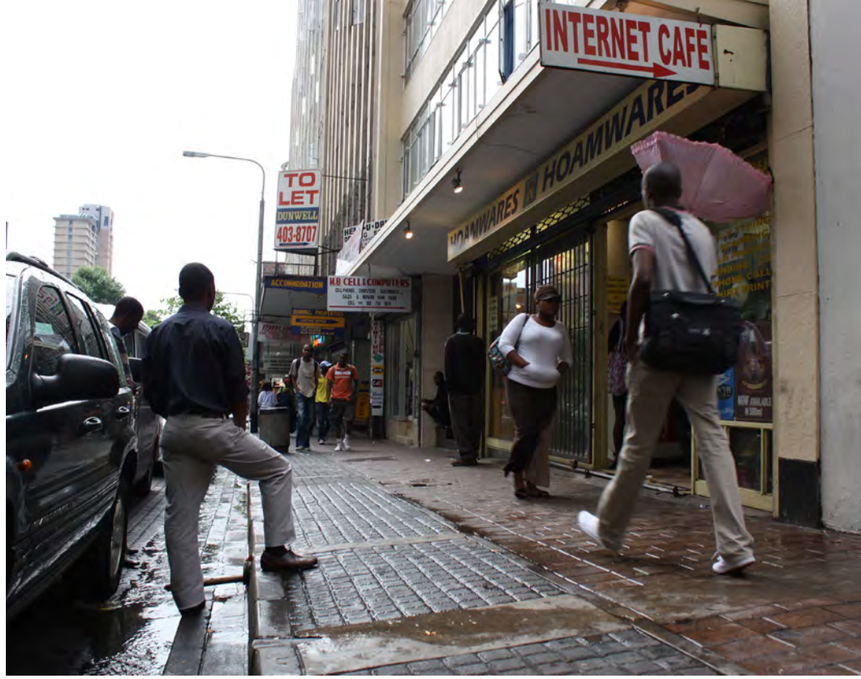
While walking on the streets of Braamfontein, it is clear that the students of the area add an injection of life and colour into it's context. Their dress sense and music culture can obviously be traced into the current contemporary South African musicians as shown in the essay, and therefore by providing a building that could possibly brings these musicians to one space to record and perform their music can bring this life into the building to produce a vibrant public space. One way to definitely unite students is through the use of music and sound, also shown in how most of the youth walking on the streets have headphones in their ears (even if they are walking with other their friends around them).



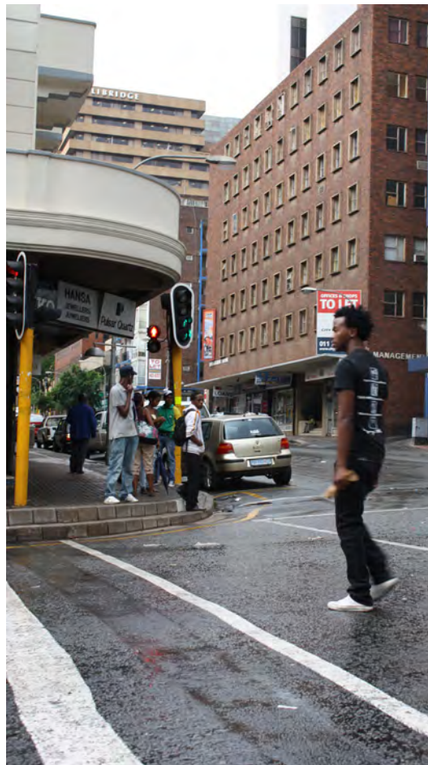

SCULPTURED TATTOO
TATTOO & BODY PIERCING




SURGERY
MEDICAL & DENTAL
P
60 MIN


INTERNET CAFE
TO LET
403-8707
ACCOMMODATION
MB CELLS COMPUTERS







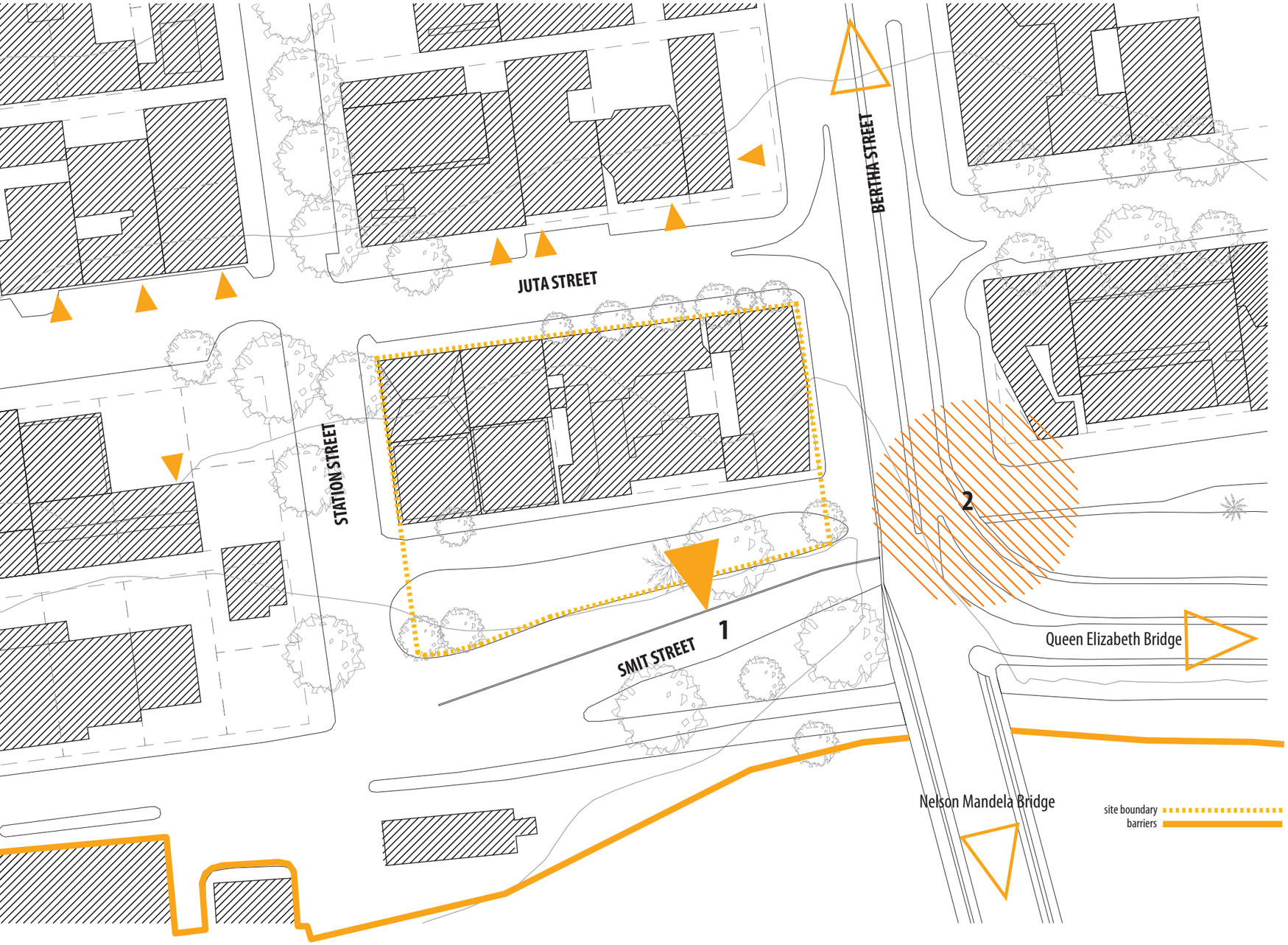
A SOUND SITE

The requirements of a site for the design of the Joburg SoundBox rested in the ability for the site to encourage the idea of URBAN RESONANCE, where the building designed would be able to connect with its city, with its users and to become an architectural expression of the internal programmatic functions. Through doing this - the intervention would then be able to outwardly infuse the district of Braamfontein with the same creative energy that is occurring within the existing buildings.



BRAAMFONTEIN
JOHANNESBURG

A view from the Nelson Mandela Bridge overlooking the railway tracks to the west. This photo demonstrates the connection of my selected site (to the right of the image) with it's urban settings.



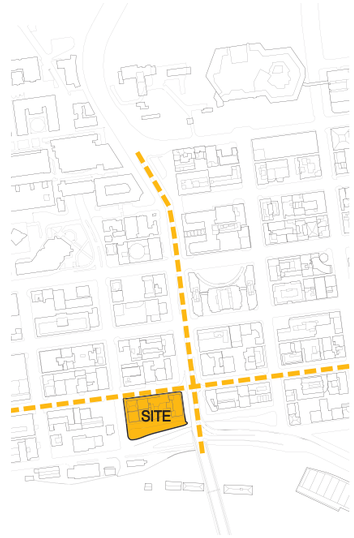

1 The views that can be overlooked by the building on higher levels - due to the ground floor views being disturbed by that of the railway tracks.



2 the fence on the underside of the bridge blocks E-W movement along the road to the south of the site, it is proposed to remove the fence to open up this movement path across the southern side of the site.

SITE CHARACTERISTICS BRAAMFONTEIN

The chosen site for the Joburg SoundBox is shown in the map below. The choice seemed obvious after visiting the area and discovering this prominent site that is completely underplayed at the moment. It's position is perfect in that is allows a visual connection from the building over the city and vice versa. It also has a lot of people walking past it across the Nelson Mandela Bridge. Its close proximity to Wits - truly allows the university to extend its campus outwards toward the city.



entrances into buildings

views over JHB city centre

blockage under bridge

site boundary
barriers

north



A view the southern side of the site towards the Nelson Mandela Bridge



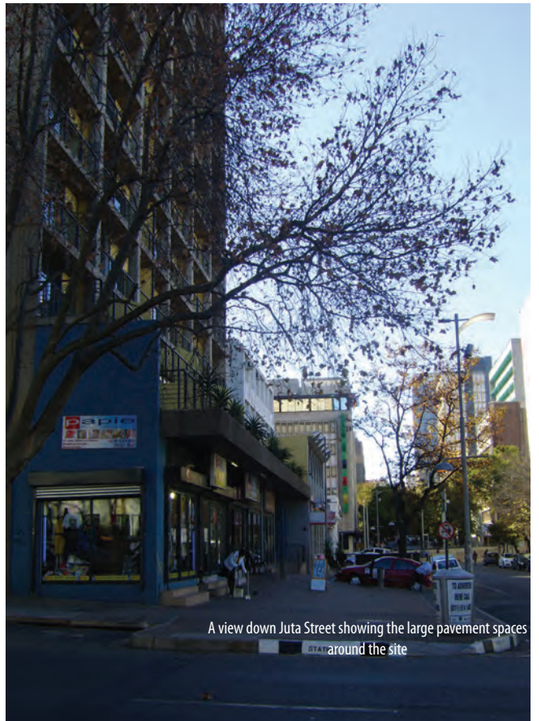
A view up the street on the eastern boundary of the site



Relationship between the Nelson Mandela Bridge and the site



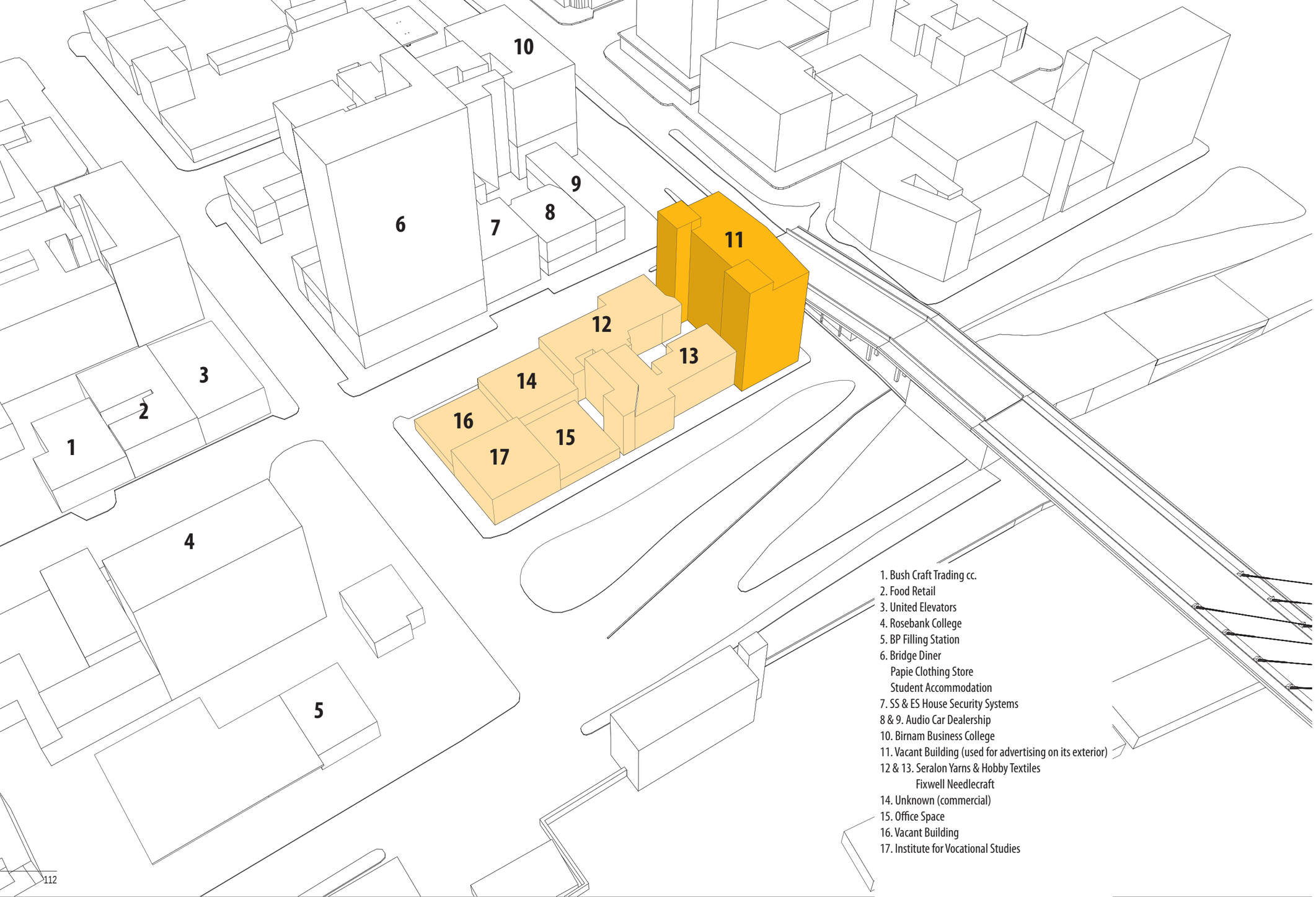
A view west, down the southern side of the site towards Station Street



A view down Juta Street showing the large pavement spaces around the site



A view up the ramp onto the Nelson Mandela Bridge



1. Bush Craft Trading cc.
2. Food Retail
3. United Elevators
4. Rosebank College
5. BP Filling Station
6. Bridge Diner
   Papie Clothing Store
   Student Accommodation
7. SS & ES House Security Systems
8 & 9. Audio Car Dealership
10. Birnam Business College
11. Vacant Building (used for advertising on its exterior)
12 & 13. Seralon Yarns & Hobby Textiles
   Fixwell Needlecraft
14. Unknown (commercial)
15. Office Space
16. Vacant Building
17. Institute for Vocational Studies

SITE RESPONSES
BRAAMFONTEIN

The site sits within a cluster of buildings that are programmatically varying within themselves but are typical to that of Braamfontein. To the west of the site is the Rosebank College where there are continuous streams of students hanging around and moving about the site. The large-scale building to the north of the site is a student housing apartment block, again encouraging the movement of students in and around the site.

The Nelson Mandela Bridge bounding its eastern side - seems to cut off this edge of the site from the other side of the bridge physically, but has a great visual relationship to the bridge, hence the eastern-most building on the site currently being wrapped in advertisements.

As demonstrated in the mapping - most of the existing buildings on the site will be demolished except for the building on its eastern most edge. This decision was made because of the fact that the buildings that are being demolished are of a very low scale and would not benefit the design of a new and innovative building in the context. They are also currently not being utilised for any major functional programs that would be detrimental to remove from the context. I have chosen to re-use and upgrade the largest building on the site because of a few decided reasons:

a. this building acts as a ***'bookend'*** to the site - when walking along Juta Street towards the Bertha Street it feels as though the road is an outdoor room more than a street - and this beautiful characteristic would be lost through the demolition of this building.

b. it also acts as a ***reference point*** and statement of the site to the existing Braamfontein context. It is used as a conceptual juxtaposition between the old and the new in further design development (to be placed on the site).

c. finally, this building is ***currently vacant*** and by making use of its shell will bring life back into it's concrete skeleton and it will begin to form part of a new architectural system - truly expressing the idea of URBAN RESONANCE.

to re-use
to demolish

north



1 & 2



3


4


5


6


7



8 & 9



11

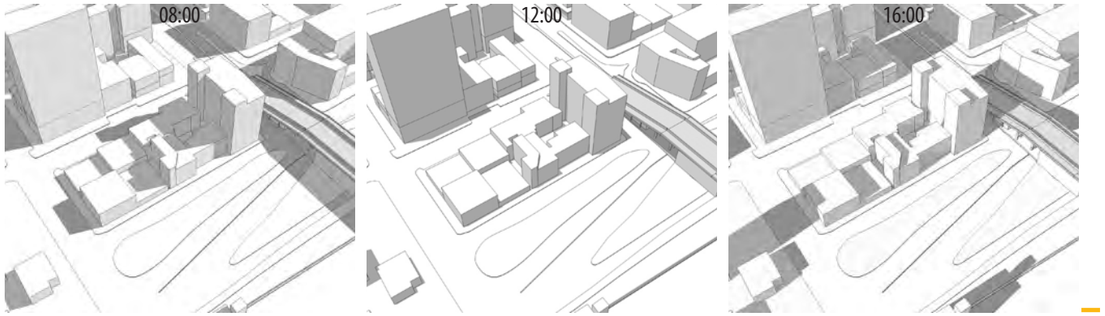

12


14 & 16

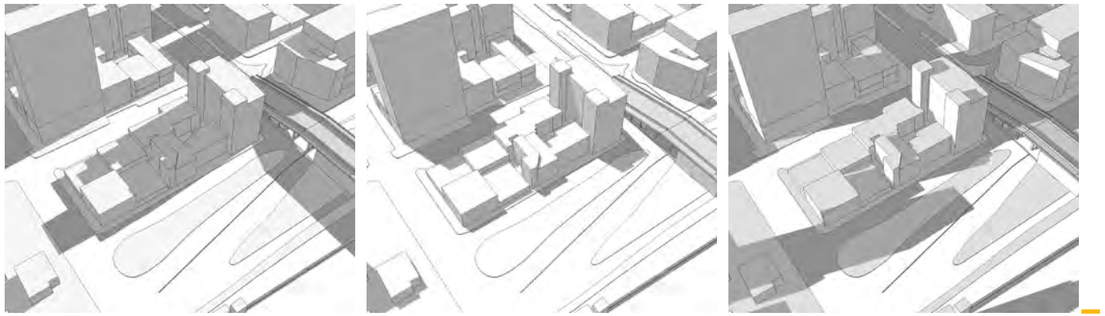

15 & 17



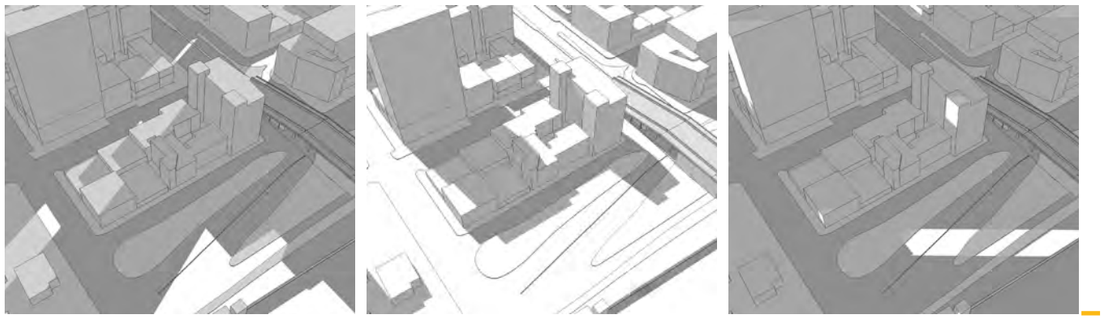
13



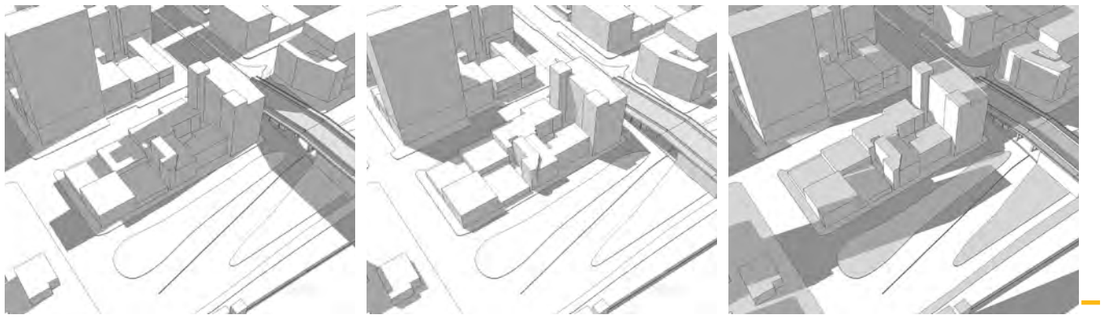
DECEMBER (SUMMER)



MARCH (AUTUMN)



JUNE (WINTER)



SEPTEMBER (SPRING)

SUN STUDY
SITE

Due to the fact that the Joburg SoundBox will be situated within a somewhat dense urban context - it is imperative to understand to the amounts of light that will be available to the building during the course of a year. As shown to the left the site does receive some good amounts of northern light throughout most of the year.

Due to the fact that the site is not bound on its southern edge by any significant built form (which happens to be the edge of the site that has the views over the city), a nice amount of low level southern light can be made use of and will not produce any glare when using this side of the site to visually connect to the surrounding city.

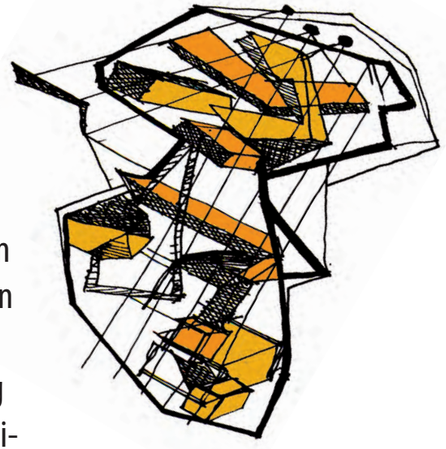


A model taken from the preliminary design process of the design charette initiating the concept of resonance.

DESIGN DEVELOPMENT

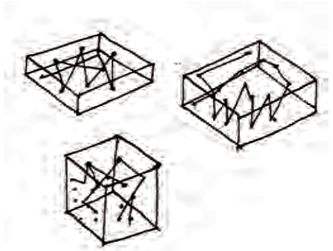
RESONANCE AS CONCEPT

embodying the systems of URBAN RESONANCE

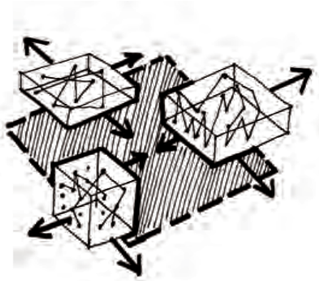


THROUGHOUT the investigation of URBAN RESONANCE in this document - the most conclusive concept or definition that can be given to the idea of resonance is the integration of separate components by an interstitial combining element to create a new whole. In the context of my architectural exploration, the 'separate' components referred to have been defined as the cross-programming of space, the production of inclusive social environments as well as the architectural expression of a design. The interstitial binding element in this regard is sound (as a basic unit of music and a common social expression). By applying the ideas of sound to all three systems - allows them to become a unified system through a common driver, with particular personal interest in the spaces in which they all interface with one another.

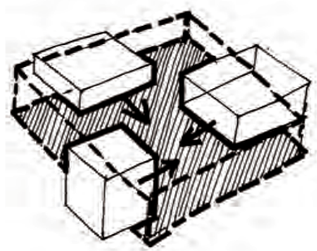
The following section of the document is an analytical investigation of how these three systems are dealt with in the design development process. Each section (dedicated to one of the three systems) studies the application of sound, music and culture to that system, firstly on an urban level and secondly on a building design level.



1. SEPARATE COMPONENTS OF DESIGN
Program; People; Built form

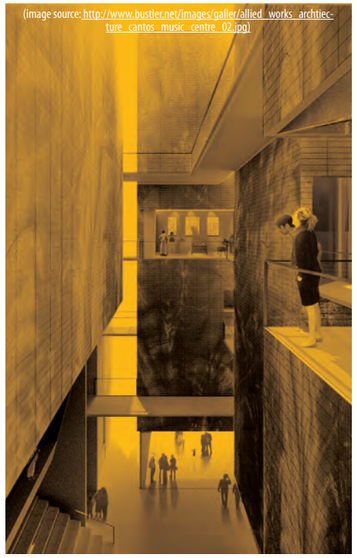


2. INTERSTITIAL BINDING ELEMENT
Sound and Music



3. AN EXPRESSIVE PHYSICAL ENVIRONMENT
The Joburg SoundBox





(image source: http://www.bustler.net/images/galler/allied_works_architecture_cantos_music_centre_02.jpg)



(image source: http://www.bustler.net/images/galler/allied_works_architecture_cantos_music_centre_04.jpg)







PROGRAMMATIC RESONANCE

The programme of the Joburg SoundBox, as already established, is what brings specific people into the building and is designed for the development of the industry of sound and music. But on a more architectural level - the acoustics of each of the programs in themselves are important, so that they each one can function acoustically within the context into which they are placed.

SOCIAL RESONANCE

The concept of social resonance in the Joburg SoundBox manifests itself through the interstitial spaces of waiting, lobbies and circulation as these are the common spaces between all of the programs included. The driver behind the ability for my building to produce positive social encounter is not explicitly designed through the use of sound, but these spaces are activated by programs based in performance and consumption.

ARCHITECTURAL RESONANCE

The architectural resonance of the Joburg SoundBox comes about through the use of sound as a formal architectural driver. The specified programmatic spaces are heavily dependant on sound and acoustics to function, thus the building as a whole should cater for an internal environment that is conducive to sound movements throughout its spaces. I have chosen to architecturally express the use of sound as a formal driver in order to allow the building to gain an identity within the context of Braamfontein as well as to allow for a dynamic space in the urban context.

CONCEPT RESPONSES

generating the basis for an architectural resolution

PROGRAMMATIC RESONANCE

The acoustic needs of the programs based in sound production, performance and research, is the major driver behind the overall massing and initial placement of the program across the site. In order to position the programs on the site effectively three mappings need to occur:

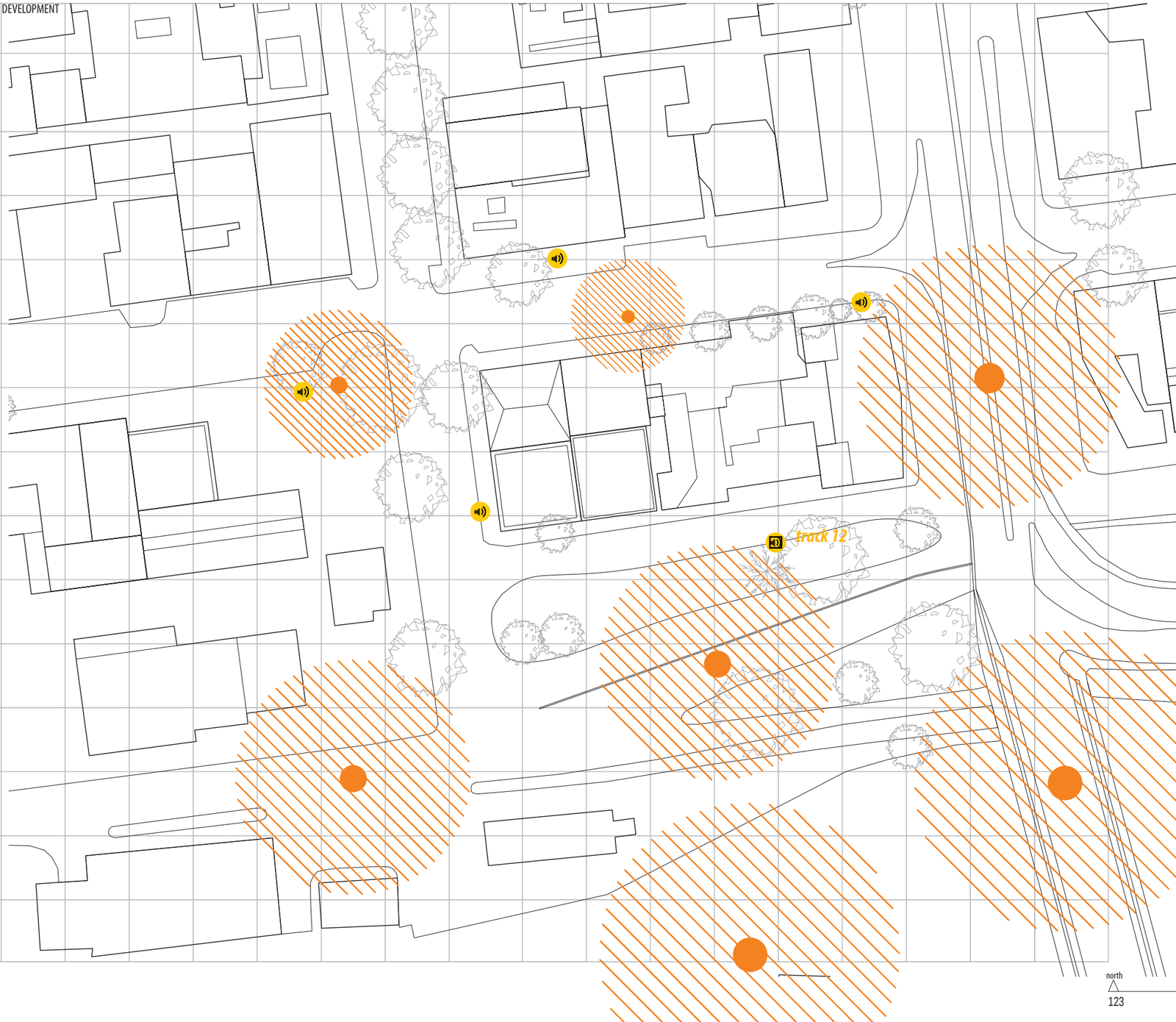
1. The ***acoustic surroundings*** of the site
2. The ***acoustic requirements*** of the internal programs
3. The ***sound produced*** from within the programs (affecting programs around it)

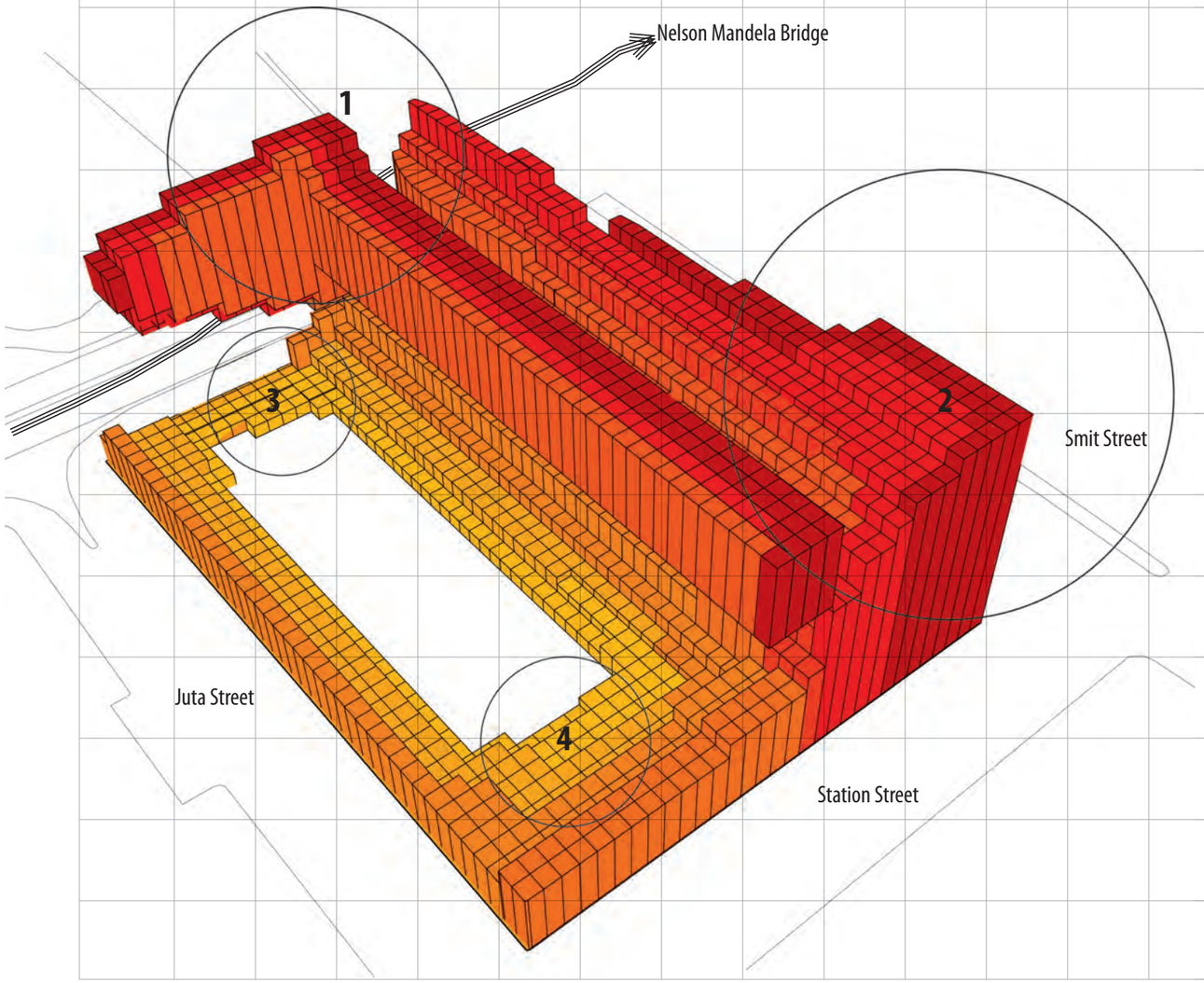
By understanding the acoustics of the site - the internal programs can be arranged in relation to this, by loud internal programmes being placed on loud regions of the site and so on.

Once this overall placement has been attempted, analysing the internal acoustic environment can then occur, and the programs may be shuffled to truly be placed in the perfect position for their full acoustic functioning.

The final positioning of the programs on the site comes about from a negotiation process of balancing the acoustic needs and productions of each internal space with the production of sound from around the site.

reoccurring dominant source of sound





1. ***The Nelson Mandela Bridge***

The bridge is a major source of sound to the site because of the high volume of cars moving over it, and because it is a highly pedestrian-trafficed part of Braamfontein. Due to its slope up past the site the sound is only propagated at a higher level.

people (general street noise)	+-60 dB
cars (heavy traffic)	+-90 dB

2. ***Smit Street & Railway Tracks***

The southern side of the site is by far the noisiest part of the site as there as high number of vehicles travelling past it on Smit Street as well as a slight echo occurring as they pass underneath the bridge. Another major factor of the high level of sound on this side of the site is that of the trains moving at erratic times of the day. The sound produced by the trains is also only propagated at higher levels because of the wall that fences off the tracks to the city as well as the trees and vegetation in the park south of the site absorbing some of the sound.

trains	+-110 dB

3. ***Service Road***

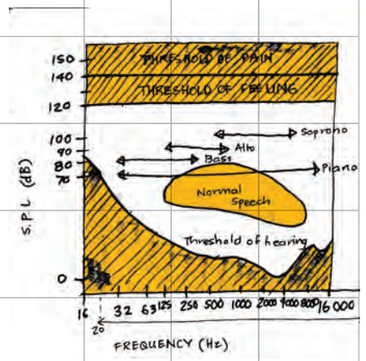
The service road to the east of the site is the quietest part of its ground floor plane. Not many cars pass this side of the site and only few people make their way up this way because of the unsafe area underneath the bridge.

4. ***Public Corner of the Site***

The north-western corner of the site is the dominant public corner. Many students from the Rosebank College hang around in the street and around this space on the pavement. Therefore, because there are mainly people and a few cars passing this side of the site - it is a relatively quiet section.

URBAN:
SITE ACOUSTICS

The map to the left is a three-dimensional mapping of the two-dimensional diagram above. It indicates the position of the ***loudest and softest areas*** of acoustics across the site. It is an indication of the number of cars, people, or trains moving around the site, which each produce a differing loudness of sound that has been mapped on a grid placed on top of the site. The park to the south has been included in this mapping because it is a green space within Braamfontein, and therefore it's trees and vegetation are able to somewhat alter the sound moving from the railway tracks towards the building. The mapping is an average of the sounds produced in the morning as well as the afternoon.

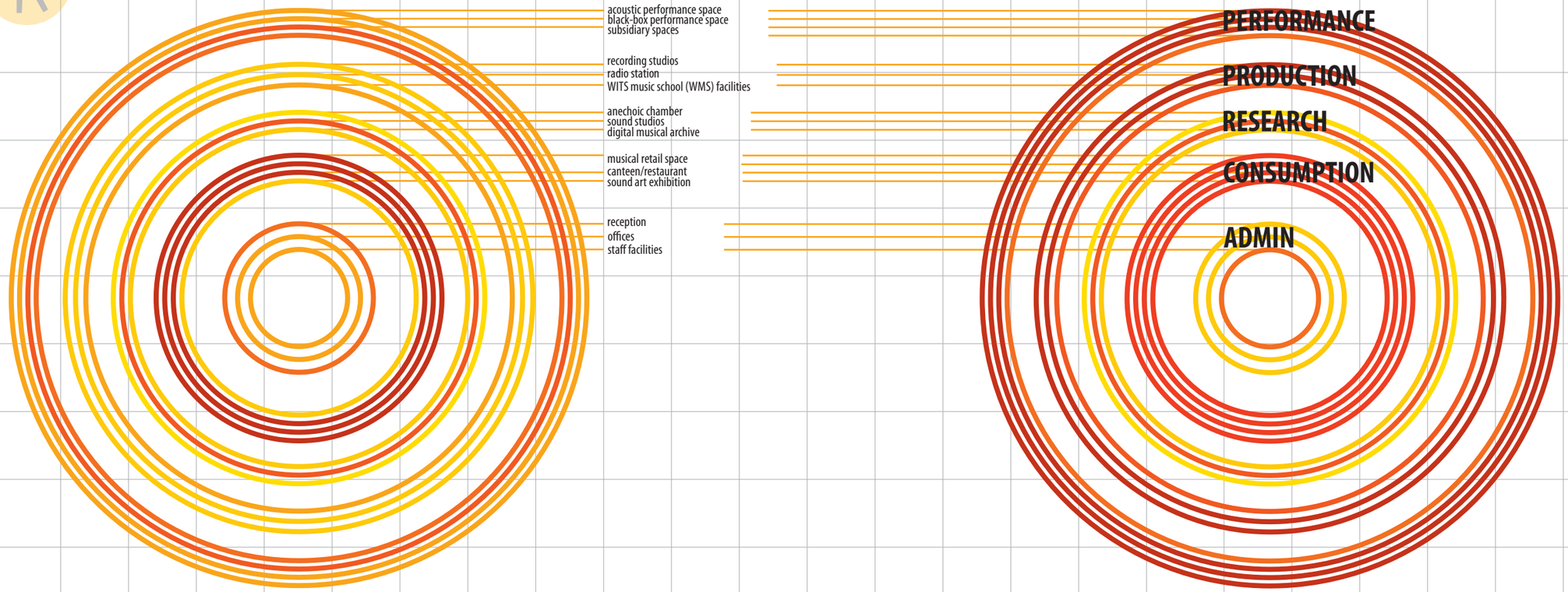


The above image (drawn in reference to Greenland (1998)), indicates the tolerances of sound by the human ear according to the frequencies of the sound being produced.

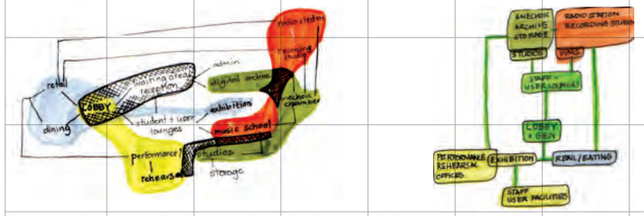
All sound figures used above are taken in reference from Greenland (1998).

low
low-medium
medium-low
medium
medium-high
high

north



ACOUSTIC ENVIRONMENT REQUIRED BY PROGRAM

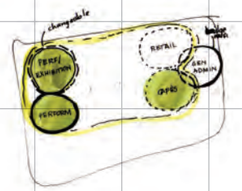




Sketches showing the exploration in the acoustic relationships of the building programs

SOUND PRODUCED BY PROGRAM





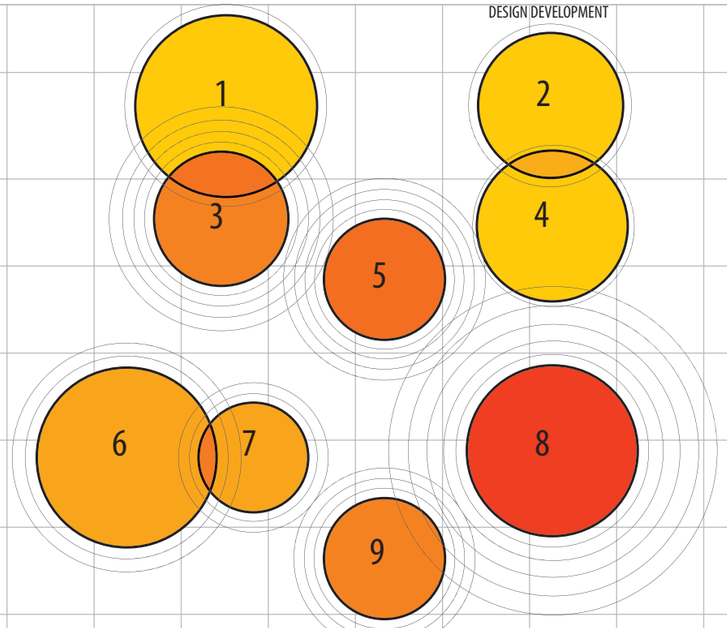
low
low-medium
medium-low
medium
medium-high
high

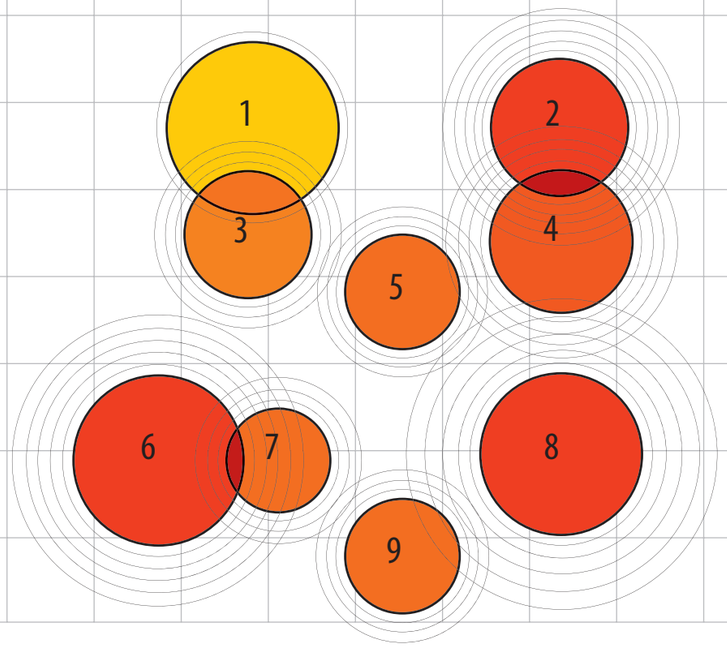
BUILDING:
BUILDING PROGRAMME

The internal acoustic environment of the Joburg SoundBox has been analysed according to the sound ***produced*** by each programme versus the sound environment ***required*** by each one. The arrangement of the programmes on the site is then determined on a complimentary basis where differing programmes are positioned adjacent to, and above and below each other depending on their acoustic needs.

In order to be able to design for acoustics, one should understand the range of frequency that the building program in question is producing. The following list of estimated frequencies, taken from Greenland (1998), is an indication of the types of frequencies to be generated by some of the programs within this urban soundbox:

Amplified Music	120 dB
Street Noise	80dB
General Office	60dB
Lecture Hall	60dB



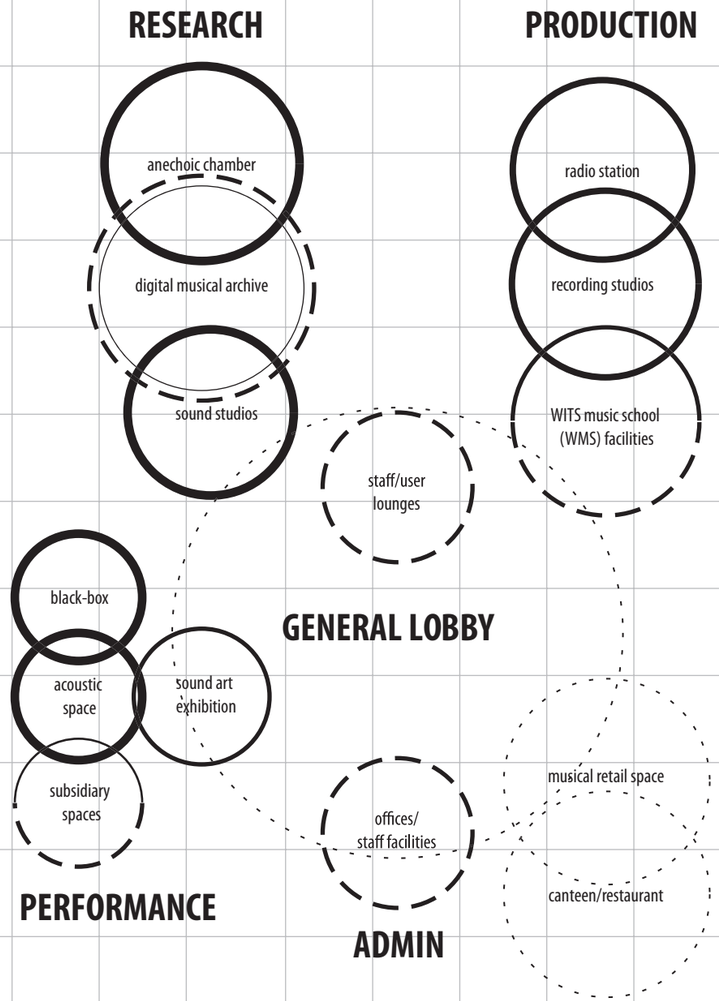


1. Anechoic Chamber
   Digital Musical Archive
2. Radio Station
   Recording Studios
3. Sound Studios
4. Wits Music School Facilities (WMS)
5. Staff/User Lounges
6. Black-Box Theatre
   Auditorium
   Subsidiary Spaces
7. Sound Art Exhibition
8. Musical Retail Space
   Restaurant
9. Offices/Staff Facilities

facing page

The finalised positioning of the programmatic groupings within the building itself.

this page



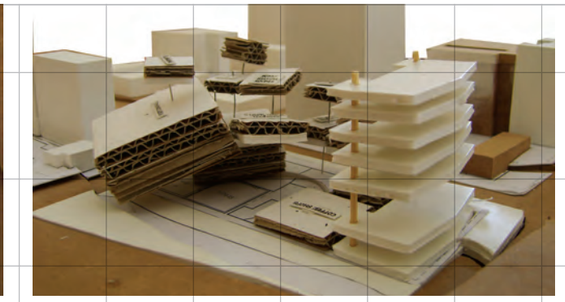
The positioning of the programs in terms of their acoustic needs and production, forms one aspect in the understanding of how these programs will begin to resonate with one another. The ***acoustic permeability*** of the spaces with each other will also allow the determination of a physical built response to the ways in which the spaces interrelate.

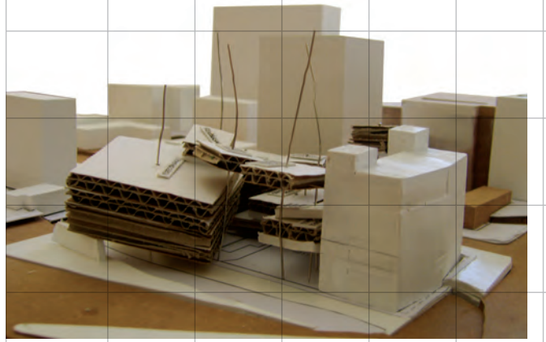
This mapping clearly shows the acoustically dependant spaces versus the more open spaces that can become interstitial connections from one impermeable space to another,

It is also clear to note here that all the functions of the building overlap in one clear space - ***the lobby***. The lobby of the building is the major acoustically and physically connective space and offers the perfect opportunity for the idea of social resonance within the building.

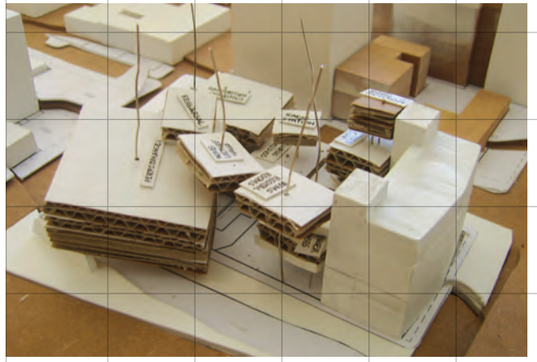




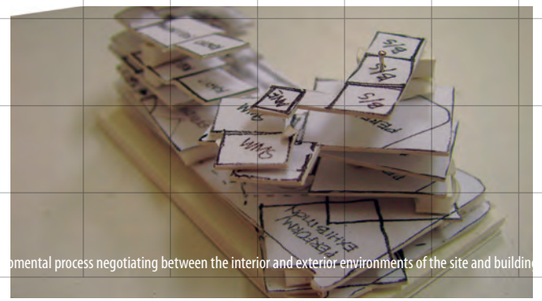






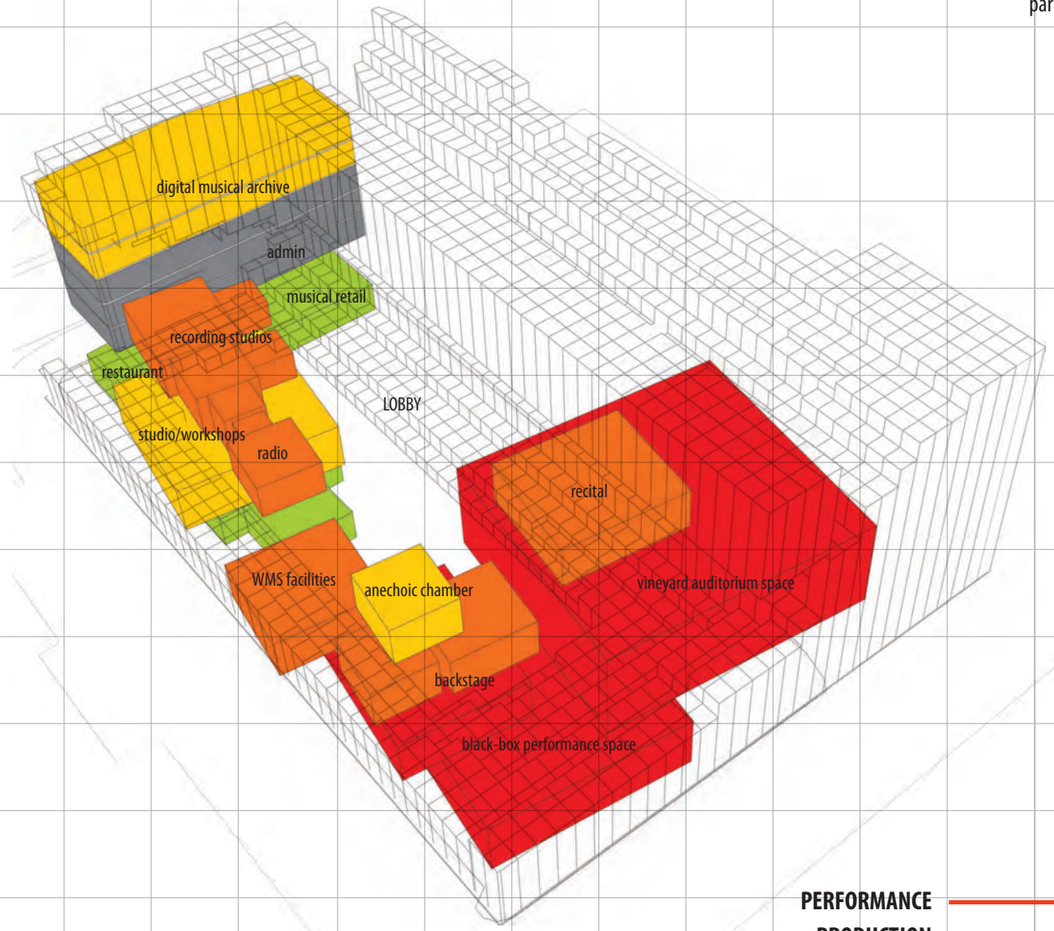






Conceptual model exploration of the positioning and massing of spaces within the building - as a de omental process negotiating between the interior and exterior environments of the site and buildin

The preliminary ***massing and positioning*** of the programmatic acoustic boxes on the site is shown in the image to the left. It has been overlaid on top of the site acoustic mapping to demonstrate the integration of the internal and external acoustic needs of each program. the positioning of these programs on the site has varied slightly from this but is for the most part the same.



PERFORMANCE
PRODUCTION
RESEARCH
CONSUMPTION
ADMIN

SOCIAL RESONANCE

The social resonance of the Joburg SoundBox is expressed through the building's response to people's movement within and around the building. The objective of social resonance within the building is to encourage it's users to encounter each other through interstitial spaces throughout the design - in the use of circulation and break-away spaces. The design of these spaces is crucial in subtly promoting their use as a break away space.

The mapping to the right shows the ***activity levels of people*** around the site. It clearly indicates the major movement across its northern and eastern edges and collective spaces of activity indicated by the clouds of orange. The greatest pedestrian movement around the site occurs up the ramp of the Nelson Mandela Bridge on the east of the site.

daytime clusters of activity

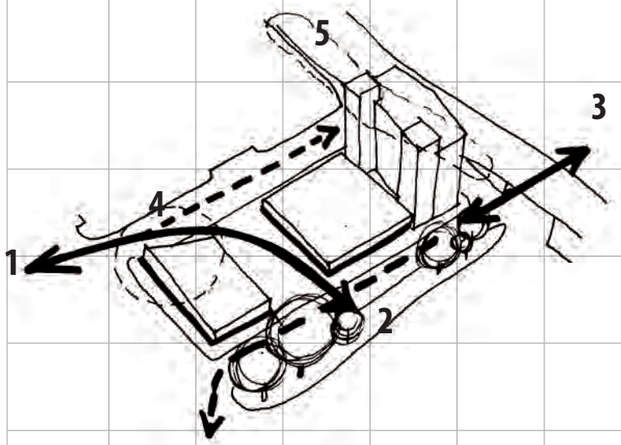
nighttime clusters of activity

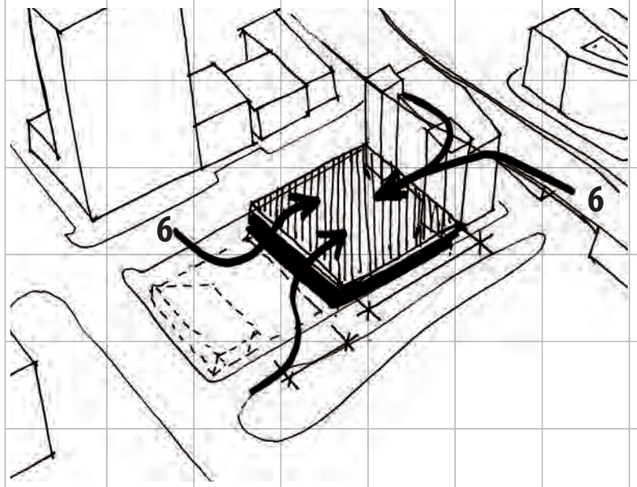
predominant pedestrian movement around the site



north


PRIME





URBAN: SITE ACTIVITY

The major urban gestures made by through design in order to promote social movement through the building are demonstrated through the two sketches shown below.

1. & 2. The north-western corner of the site, as previously discussed, is the most public interface of the building with the ground floor plane of the site. Therefore, I have chosen to create a sort of ***thoroughfare*** through the building ***linking*** the northern side of the site with the park to the south of the site - encouraging movement through the building. The building entrance gestures towards this corner of the site by angling itself into the building, also gently pulling people through the space.

3. I am suggesting the ***removal of the fence*** and upgrade of the underneath the bridge that will create a large E-W pedestrian link from one side of the Nelson Mandela Bridge to the other side - therefore further activating the southern side of the site. Currently, not many people walk under the bridge, mainly because it is unsafe as well as uncomfortable to walk through it's narrow openings to get from one side of the fence to the other.

4. ***Activation of the 'public' corner*** of the site will also encourage people to spend time around the building - therefore possibly enforcing the system of social encounter.

5. Because the building is suggested to be the property and development of the University, many of its users will be coming from the campus north of the site and therefore, it is assumed that they will most likely be making use of Bertha Street as ***a major link*** between the two.

6. The most significant urban gesture of the Joburg SoundBox is it's ***raised social platform*** which becomes a sort of common foyer space onto which all users of the building are brought together and dispersed from into the more private sections of the building. The reasons for raising this platform are as follows:

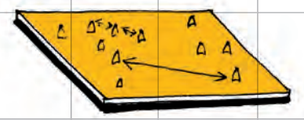
firstly, it creates a dominant ***connection and entrance*** to the building directly from the Nelson Mandela Bridge where most people are walking past the site.

secondly, the raised platform also creates a sort of ***urban stage*** that is able to overlook the beautiful views of the inner city to its southern side, which would not be possible without raising it. And more importantly, is able to ***express*** to people outside of the building what the functions of the building are.

lastly, it forces people to ***move through*** the lower entrance lobby on the ground floor and up through the building - activating the building's interior spaces.

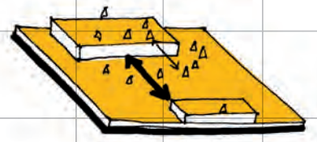
BUILDING: ENHANCING SOCIAL ENCOUNTER

The following series of diagrams demonstrates the development of design decisions made in terms of the physical social platforms in order to create an internal social environment that allows people to make connections with one another; visually, physically and socially.



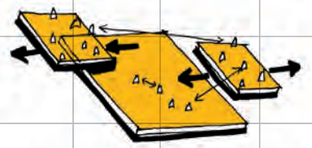
FLAT PLANE SOCIAL PLATFORM

The use of a flat plane in creating social encounter is ineffective in that people are only able to connect with other in their direct path - and not to encounter people beyond this.



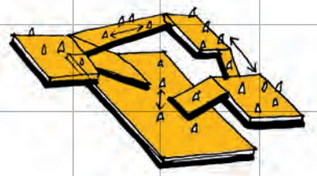
CHANGING LEVELS

Changing the levels on top of the platform begins to produce visual links across the space - but cuts the platform space up, rendering the lower level spatially unexciting.



RAISING PLATFORM LEVELS;
VARYING PLATFORM SIZE

By varying the platform sizes - an interesting and dynamic spatial quality is brought about where people are able to overlook other platforms but to still be connected in one space. Raising the levels opens up the area underneath the platform, keeping the lower level completely open.



CONNECTING PLATFORMS

Connecting the platforms with tilted planes (ramps) then creates a secondary social space that has a faster movement through it but it is able to break away onto the social platforms, activating these as slower or pause social spaces.

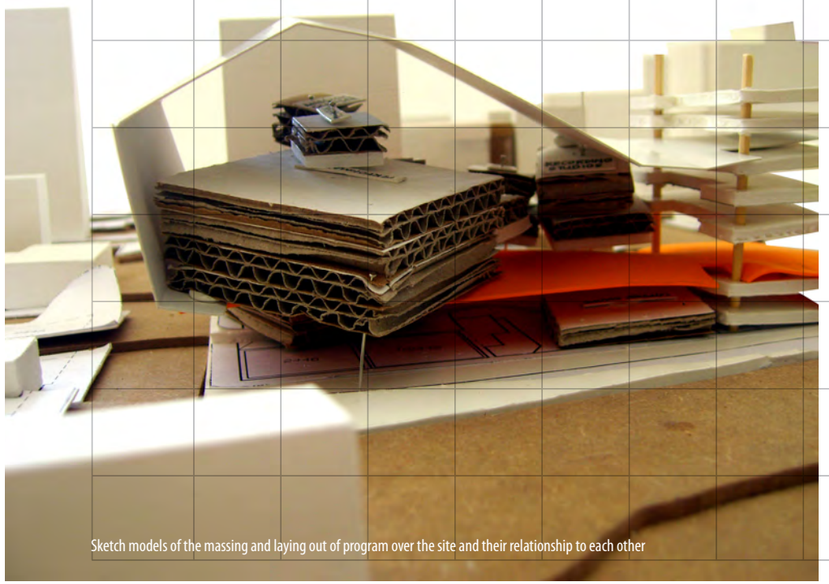


CONTAINING PROGRAM

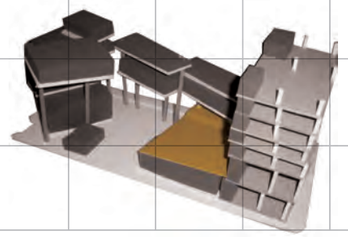
By designing the programmatic spaces to be quite contained forces users of the program boxes to take breaks on the social ramping and platform system - further activating it's social intention.

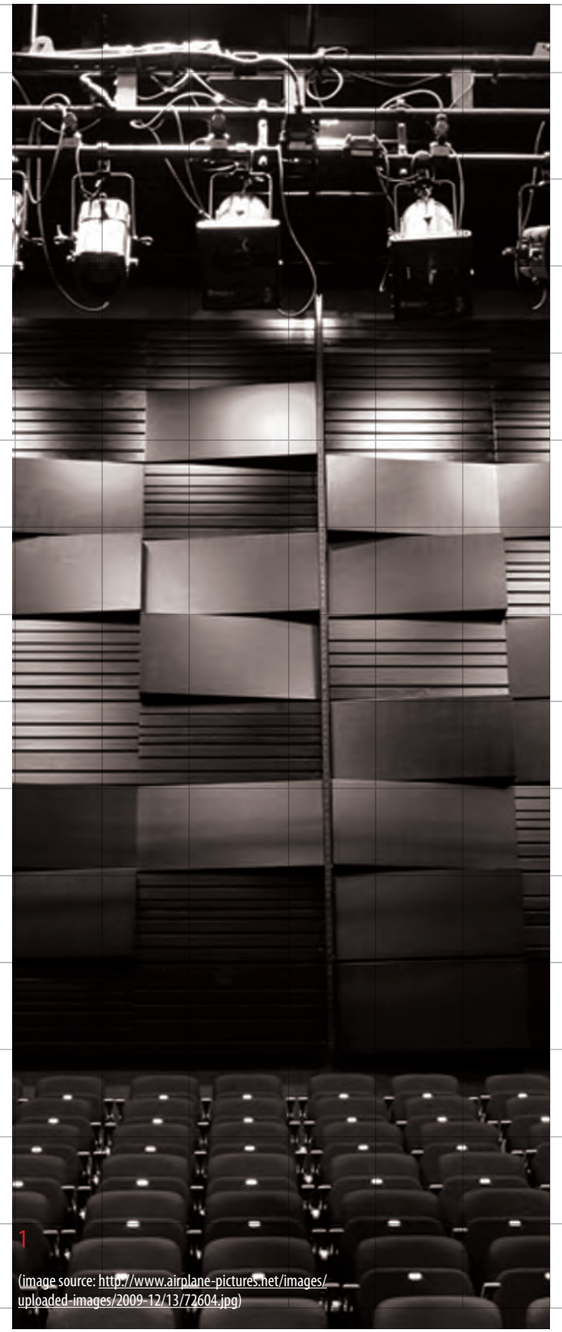






Sketch models of the massing and laying out of program over the site and their relationship to each other





1

(image source: http://www.airplane-pictures.net/images/uploaded-images/2009-12/13/72604.jpg)

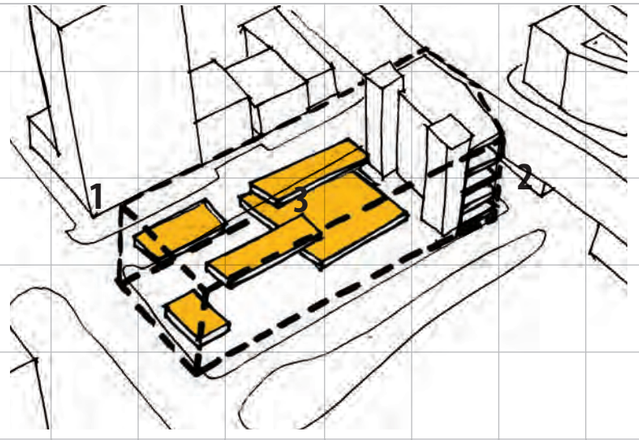
INTERVIEW

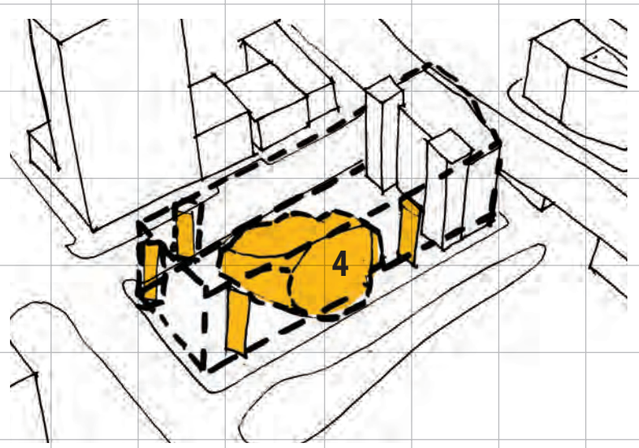
DANNY LIEBENBERG *ACOUSTIC ENGINEER*

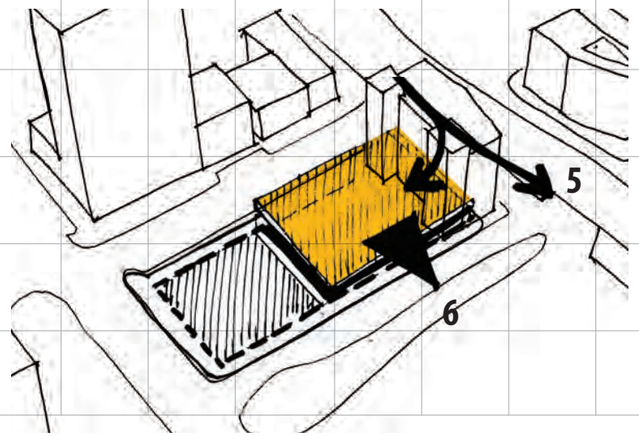
Danny Liebenberg, an experienced acoustic engineer has been involved in designing the acoustic environments for many of the buildings in Johannesburg and South Africa. His company, *Acoustic Design and Engineering Services*, have designed the acoustics for the Cape Town International Airport as well as the Sci Bono Building in Newtown (Liebenberg, 2010).

ARCHITECTURAL RESONANCE

The built form of the Joburg SoundBox explores the idea of outwardly expressing the building's functional needs in acoustics and sound. The building, as established in the site analysis, should produce a new and exciting space in the context of Braamfontein, as well as a new identity for the Wits School of Music and the music industry of Johannesburg in general. Therefore, the basics in acoustic design in architecture have been explored as a design driver for the Joburg SoundBox as a method of creating a expressive and innovative environment in the city.







URBAN: SITE CONTEXT

The diagrams shown to the left are indications of the major formal gestures of the Joburg SoundBox on an urban level.

1. & 2. It is the intention of the building is to ***juxtapose the formal typology*** of the office block of Braamfontein by matching the scale of the existing building on the site that will be incorporated into the design.

3. This juxtaposition will then be further enhanced by the ***breaking up of the internal floor plates*** of the Joburg SoundBox, by not having a regular horizontal repetition within the building, created by the arrangement of the programmatic boxes on differing levels.

4. The major auditorium space (called the Vineyard Auditorium) is the most public function of the all of the programs and therefore because of it's large volume causing it to protrude from the building, it will become an ***outward expression of the idea of acoustics and architecture*** (discussed further in the following section). This component of my design becomes the building's expression to the public that it is a musical building, encouraging people to enter the building and enjoy its internal spaces.

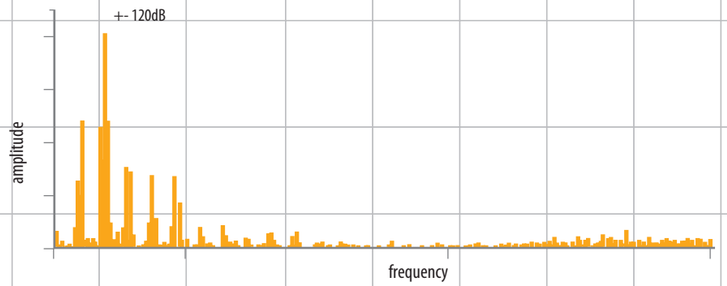
5. The idea of URBAN RESONANCE is that a building's physicality can resonate with its surroundings as well as its users and program. Therefore, the Joburg SoundBox has made the gesture of ***connecting to the bridge*** in order to activate the building by the people walking past it, as well as connecting the bridge back into the building.

6. The urban platform (as discussed above) also gestures towards the Johannesburg inner city ***making use of its views*** as a way of connecting the city back into the building.

BUILDING:
ARCHITECTURE & SOUND

The ability for humans to distinguish between different sounds is based on the timbre (tone) of the noise. This allows us to differentiate between sounds that may have the same pitch and loudness. The quality of sound rests in three major areas of exploration that have influenced the design of my building directly:

1. ***Form*** of the instrument
2. ***Materiality*** of acoustic space
3. The general ***movement of sound***



Graph showing the sound waves produced by a vuvuzela

1. FORM OF THE ACOUSTIC MEDIUM

In designing for sound the form of any surface or space is crucial in understanding how the sound will travel throughout that space. This is due to the characteristic of sound being a wave of energy that bounces off of other surfaces losing energy at each 'bounce' (Greenland, 1998).

The translation of this concept into architectural design is in the idea of surface, and layering of that surfaces. It also lies in the ideas of nonparallel planes in acoustic space to allow the sound wave to be dispersed as opposed to being reflected directly back to the sound source.

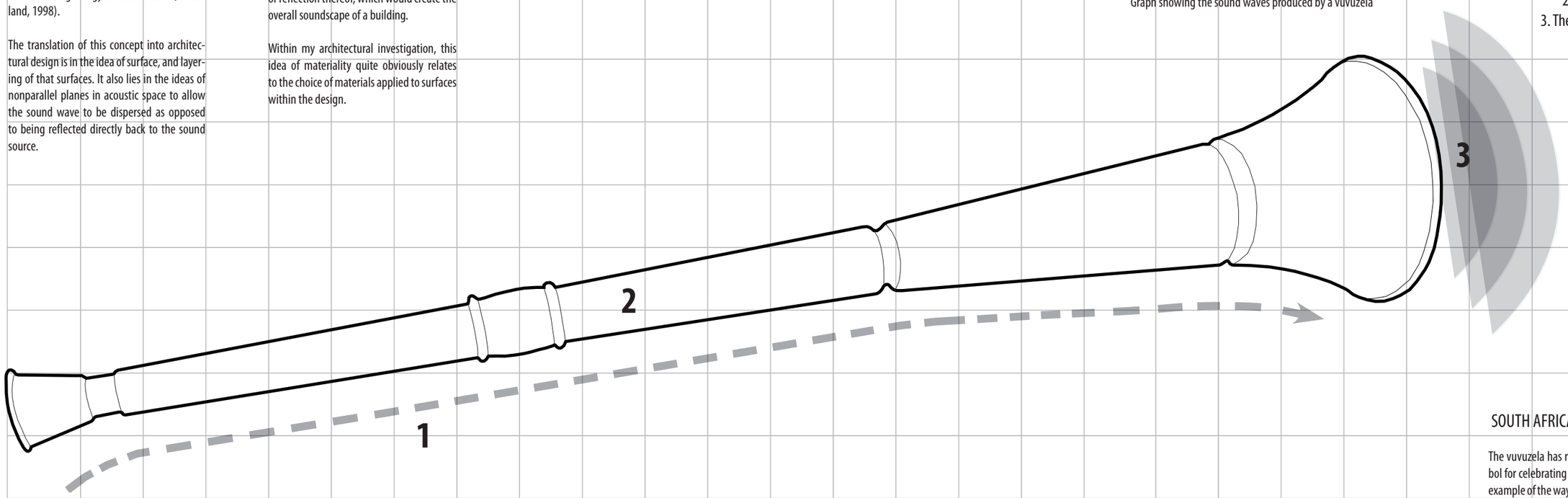
2. MATERIALITY OF ACOUSTIC FORM

Due to sound being an energy wave and having to lose energy to every surface that it bounces off of - the materiality of those surfaces is crucial in acoustic design. The materiality aids the absorption of the energy or reflection thereof, which would create the overall soundscape of a building.

Within my architectural investigation, this idea of materiality quite obviously relates to the choice of materials applied to surfaces within the design.

3. GENERAL MOVEMENT OF SOUND

By understanding the general movements of sound in space allows the building design to truly make use of sound to its fullest potential.



THE VUVUZELA
SOUTH AFRICA'S SOCIO-ACOUSTIC SYMBOL

The vuvuzela has recently become an international symbol for celebrating South African soccer and it is a perfect example of the ways in which sound can become a form of social connection and integration. No matter what country you were from, you were able to blow a vuvuzela as a sign of support for your team during the 2010 FIFA World Cup.

It is believed (quite controversially) that the vuvuzela is designed in direct reference to the kudu horn, which in many black South African cultures was used to summon people in villages to community meetings and events. Therefore, I have used the principles of design of this South African social-acoustic symbol as a method of understanding the basic movement and behaviour of sound.

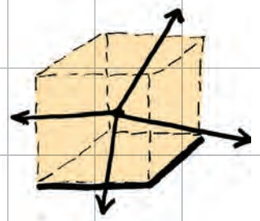


(image source: http://tech2.in.com/media/images/2010/Jun/img_230372_fifaworldcup2010.jpg)



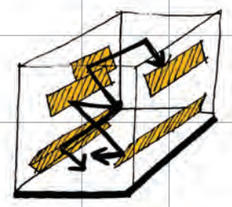
1. SPHERICAL SURFACES

The sphere is one of the worst acoustic shapes to be used in space (Liebenberg, 2010), because it reflects many sound waves back to the sound source creating a confusion of sound waves moving through the same space.



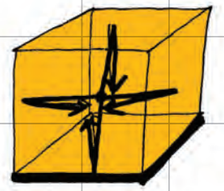
2. POROUS SURFACES

Any acoustic space with a porous wall or surface with discontinuities in material allow sound to travel right through them - losing all sound to the spaces within the surface of the object (Devroop, 2010).



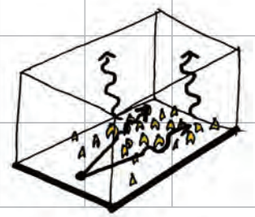
3. FACETTED, NON-PARALLEL SURFACES

The ideal wall surface for any design based on sound is a facetted surface where no planes are parallel to each other. This shape of surface allows for the absolute dispersion of sound throughout a space (Liebenberg, 2010).



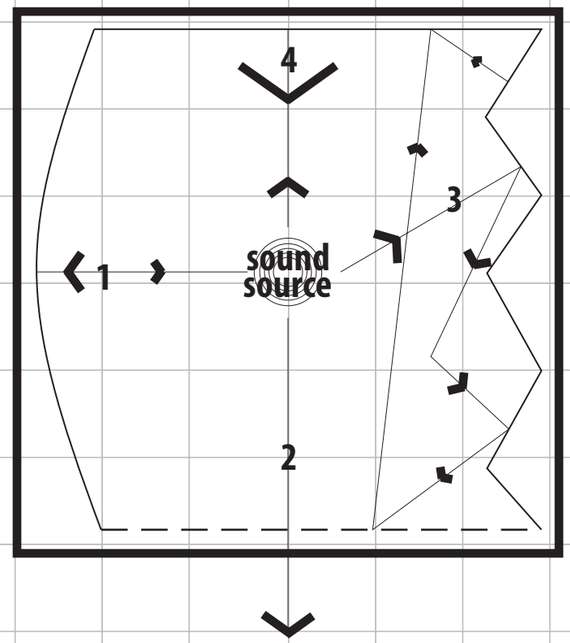
4. PLANAR SURFACES

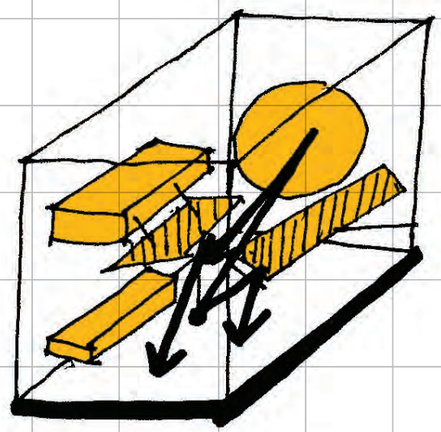
The planar, hard surface is also a terrible shape of wall to use within acoustic spaces as it too reflects unwanted sound back to the sound source (Liebenberg, 2010).



5. PEOPLE IN SPACE

Although people occupying a space are not a significant change in architectural shape of internal surface - it should be noted that people in a space can alter the acoustic environment of that space because their clothes and bodies are adsorbent and don't reflect sound (Greenland, 1998). In the same breadth, because people absorb sound - they emit a lot of heat through the absorption of the energy from the sound waves.





1. ACOUSTIC FORM

Understanding the shape of space and it's effects on sound, was the basis for a design rooted in the expression of sound in architectural form. A few basic shapes of surface have been explored in determining the ways in which the Joburg SoundBox will truly become a resonant architectural soundbox through its acoustic environment.

OUTCOMES

Through this investigation of sound, the general principles extracted and used in the design of the Joburg SoundBox, are:

a. The idea that ***surface and layering*** are important parts of effective acoustic design and altering acoustic environments.

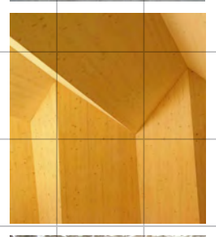
b. As shown in the diagram to the left - the general idea of resonance and how it brings things together to force an interaction between them is quite evident in the design of my intervention. By placing differing acoustic surfaces within a unified space may create a ***dynamic acoustic environment.***

BARRIERS



CONCRETE

0.01 @ 125 Hz
0.02 @ 2000 Hz



TIMBER

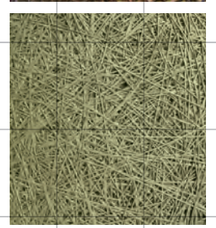
0.15 @ 125 Hz
0.06 @ 2000 Hz



GLASS

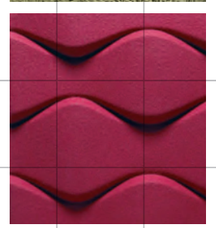
0.35 @ 125 Hz
0.07 @ 2000 Hz

REFLECTORS



WOODWOOL

0.1 @ 125 Hz
0.6 @ 2000 Hz



RUBBER

0.02 @ 125 Hz
0.03 @ 2000 Hz



PEOPLE (PER PERSON)

0.2 @ 125 Hz
0.5 @ 2000 Hz

ABSORBERS

2. MATERIALITY OF ACOUSTIC SPACE

The materiality of a building plays a large role in its ability to reduce sound. When understanding the acoustic capabilities of a material, one should firstly understand that noise reduction is based in the modification of sources of sound. Therefore, in order to reduce a sound one must modify the movement of the sound from the source- this is usually achieved through the use of barriers, surfaces and planes; with the materiality of the planes becoming the critical choice in design. I have used the following principles in the design of the Joburg SoundBox.

PRINCIPLES

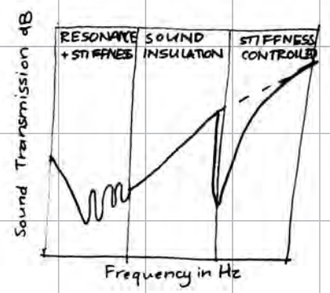
1. The ***stiffness*** of a material versus the resonance of a material are used differently for different frequencies of sound produced in the space

2. Increasing the ***mass*** of a material allows for a reduction in sound but increase in weight of the building.

3. ***Coupling materials*** that have naturally different resonances (usually because of their density) allows for noise reduction as sound waves cannot travel through the acoustically differing materials.

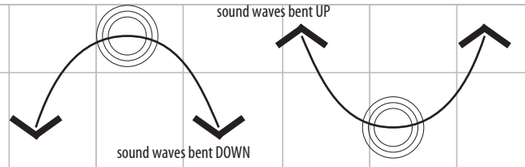
The number shown in the table to the left is known as an absorption coefficient, and it indicates the ability for a material to absorb sound waves and therefore reduce noise, which is also affected by the frequency of the sound to be absorbed. The figures have been taken from Greenland (1998).

The smaller the number the more sound reduction will occur.

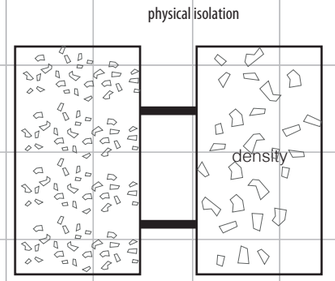


The above diagram demonstrates the ability of different types of material to resist specific frequencies moving through them

All sound figures used above are taken in reference from Greenland (1998)



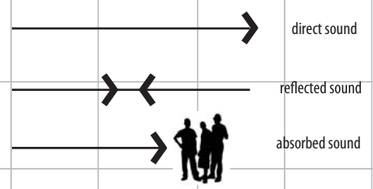
nighttime daytime



acoustic isolation



acoustic distance



sound characteristics

3. MOVEMENT OF SOUND

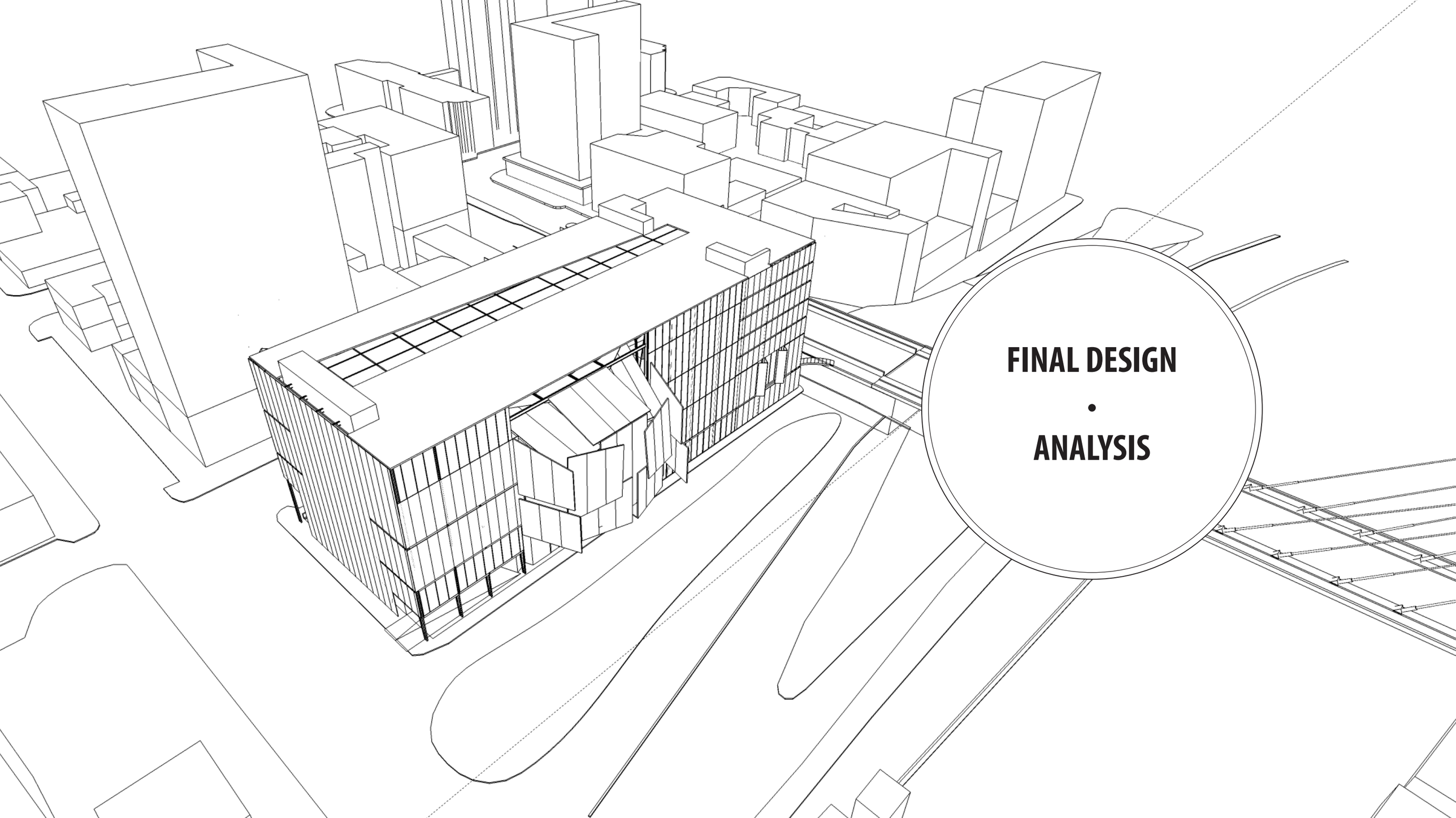
The images to the left describe some general principles in understanding the movement of sound in space, and are made use of in less explicit means as the section on the shape of an acoustic medium (above).

1. ACOUSTIC ISOLATION

By allowing space to be physically and acoustically separate from one another, creates a good acoustic environment (Greenland, 1998).

2. ACOUSTIC DISTANCE

Lower frequencies (bass tones) of sound travel longer distances than that of high-pitched sound (Greenland, 1998).



FINAL DESIGN
•
ANALYSIS

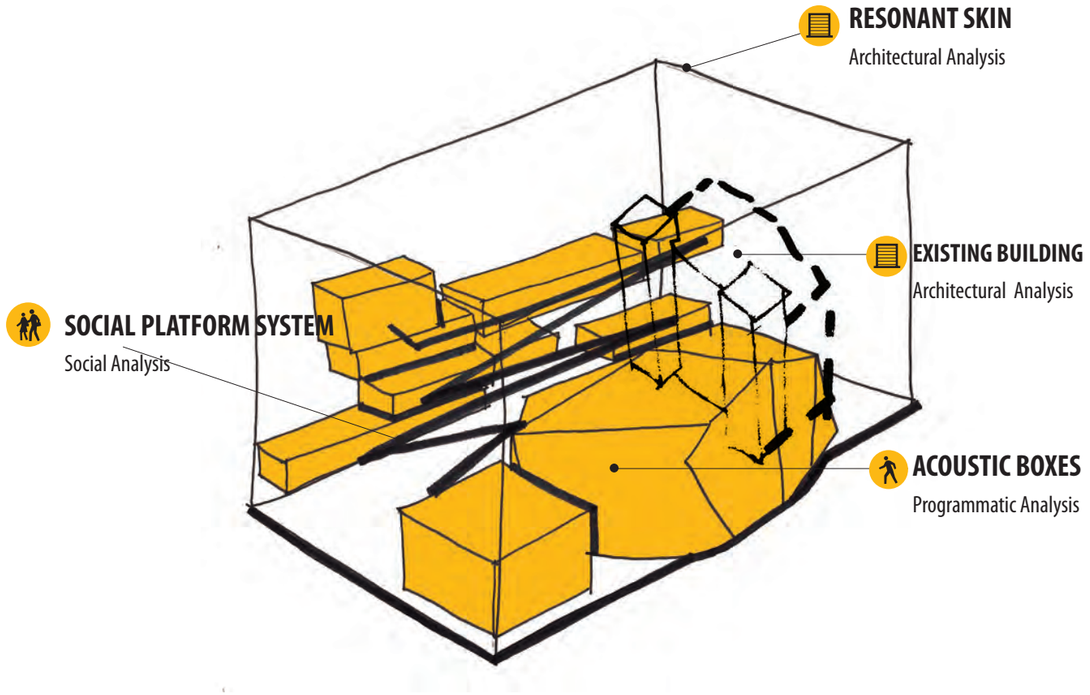
DESIGN ANALYSIS

understanding the Joburg SoundBox

The Joburg SoundBox is the culmination of the notion of resonance and resonant systems in architecture. The building design has come about from explorations in methods of bringing together the elements of program, social inclusion and acoustic design into a single building that expresses the ways in which these elements interact with one another through certain design decisions.

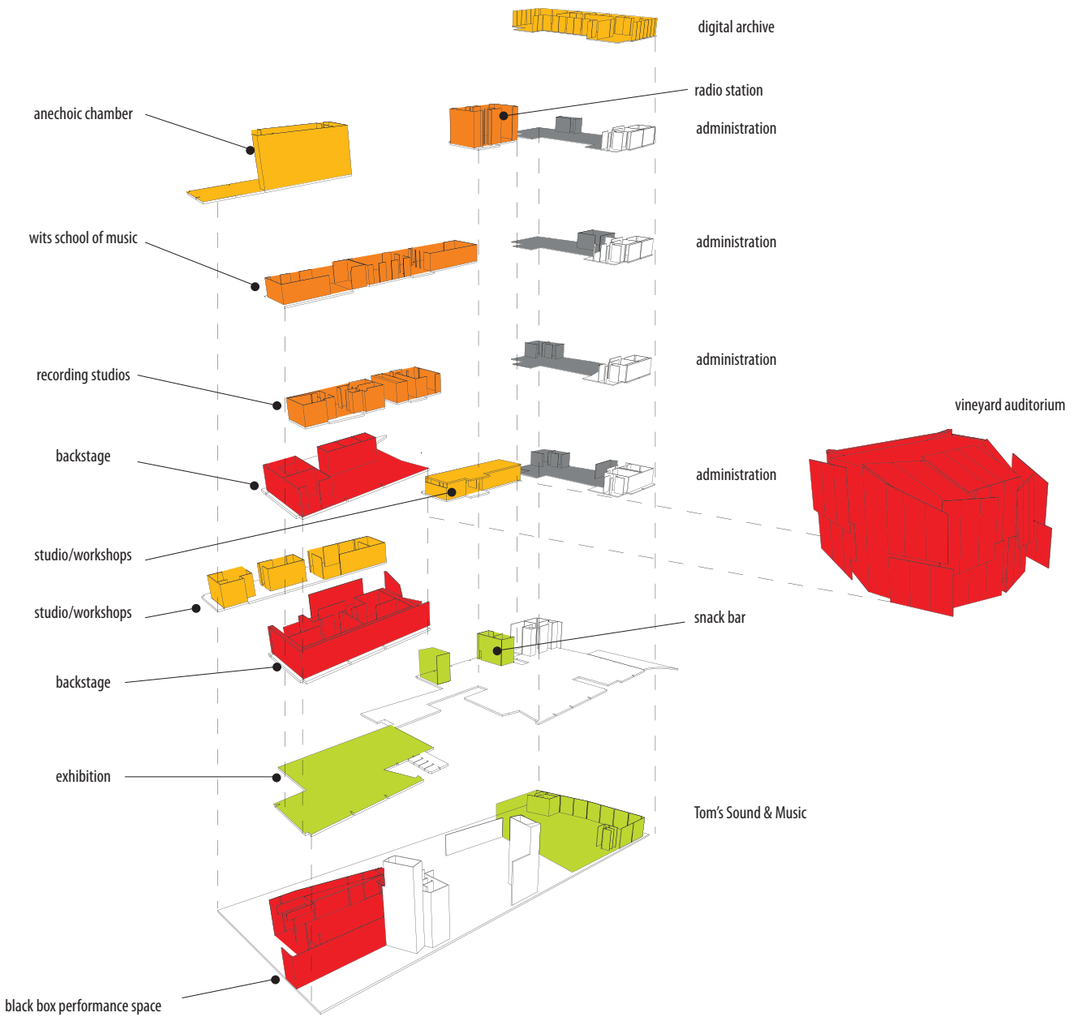
The analysis of the final design resolution will be organized around the same three systems as the design development analysis. This will be done so as to correlate the decisions made in the final process with those made in the investigation of sound and architecture previously.

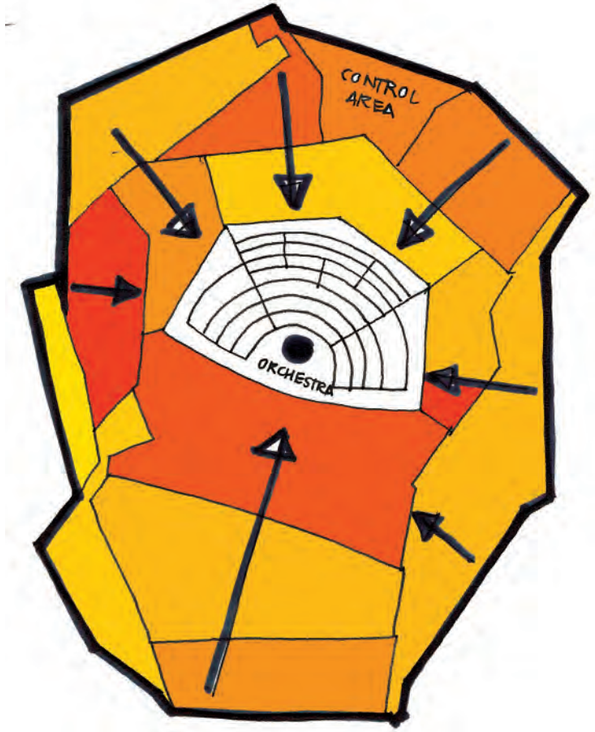
FOUR MAIN DESIGN COMPONENTS
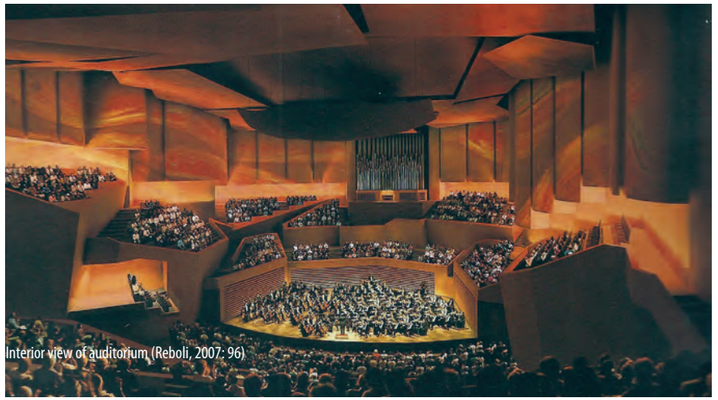


PROGRAMMATIC ANALYSIS

Acoustic programmatic boxes placed within the Joburg SoundBox





Floor layout plan of the Vineyard Auditorium of Copenhagen's Concert Hall designed by Ateliers Jean Nouvel demonstrating the number of audience boxes within the auditorium (drawn from Reboli (2007: 94)).



Interior view of auditorium (Reboli, 2007: 96)

VINEYARD AUDITORIUM

The Vineyard Auditorium is the most public facility of all of the acoustic boxes and therefore it takes on the role of becoming an outward expression of the relationship between sound and form. Therefore, the auditorium projects from the building as an expression and identity of the internal functions of the building.

This configuration of auditorium was chosen for three main reasons:

1. The central location of the stage creates a ***unique dynamic*** between the audience and the performer.

2. Every seat within the auditorium is relatively close to the stage due to the horizontal, asymmetrical arrangement of seating boxes. This also creates an ***intimacy between the audience and the performer*** as well as between the pockets of audience seating.

3. The final reason for making use of this unique auditorium configuration is that the asymmetrically planned seating boxes double up as ***facetted surfaces*** for the reflection of sound within the space .

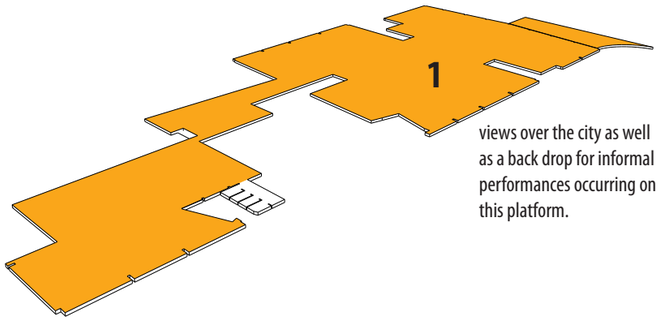
PERFORMANCE
PRODUCTION
RESEARCH
CONSUMPTION
ADMIN

SOCIAL ANALYSIS

The social spaces within the Joburg SoundBox are defined in three main types:

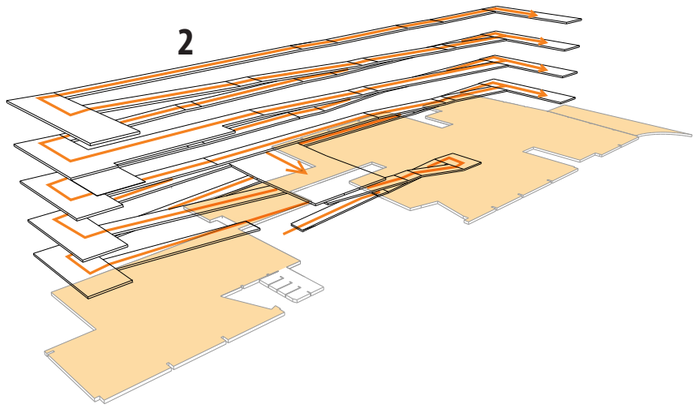
1. The main ***URBAN PLATFORM*** (acting as a connective lobby for all functions of the building)
2. The ***circulation ramps***
3. The ***social platforms*** which are used as break-away spaces from the internality of the programs.

All three of these elements are contained within one open volume that runs the height of the building in order to keep it light and open to interaction between platform heights.

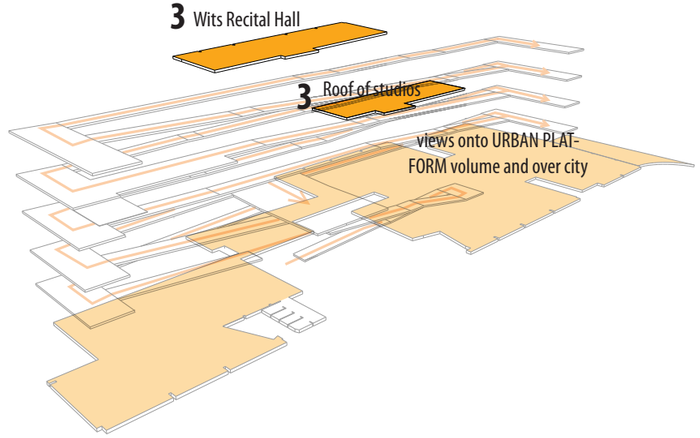


views over the city as well as a back drop for informal performances occurring on this platform.

The main URBAN PLATFORM is the culmination of all of the social platforms that run throughout the building. The URBAN PLATFORM is also a space for the informal performance of music and any other performances such as fashion shows, as well as a common lobby area for the building.



The ramping system runs throughout the height of the building and becomes the connective social space within the building.



There are two main social platforms as indicated on the image that are dispersed from the ramping systems and become much slower spaces of social 'being'.

north

ARCHITECTURAL ANALYSIS

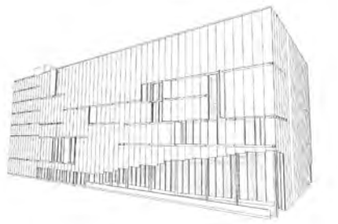
The driver for the architectural form is, as previously established, based in the use of sound and it relationships to surface and material in architecture. The main overall architectural response to the concept of resonance is the skin of the building . This is because the skin is the part of the building design that houses all of the separate parts of circulation, program and social inter-activity.

The outer form and skin of the Joburg SoundBox is a unified structure that encompasses all of the interior functions and is the component of the design that allows the internal happenings of the building to be-come legible from the outside. The skin, which is openable (as shown in the image), is used to naturally ventilate the social platforms within the building as large numbers of people may be gathering on the URBAN PLATFORM for performances.

While the skin is a unified whole there are two elements that allow the skin to express the idea of sound and architecture:

1. The ***protruding auditorium*** becomes a crucial part of the building's outer appearance and becomes the identity of the building.

2. The ***skin itself is able to become facetted*** by making use of open-able panels in the skin surface that double as ventilation and shading for the large volumes within the building.



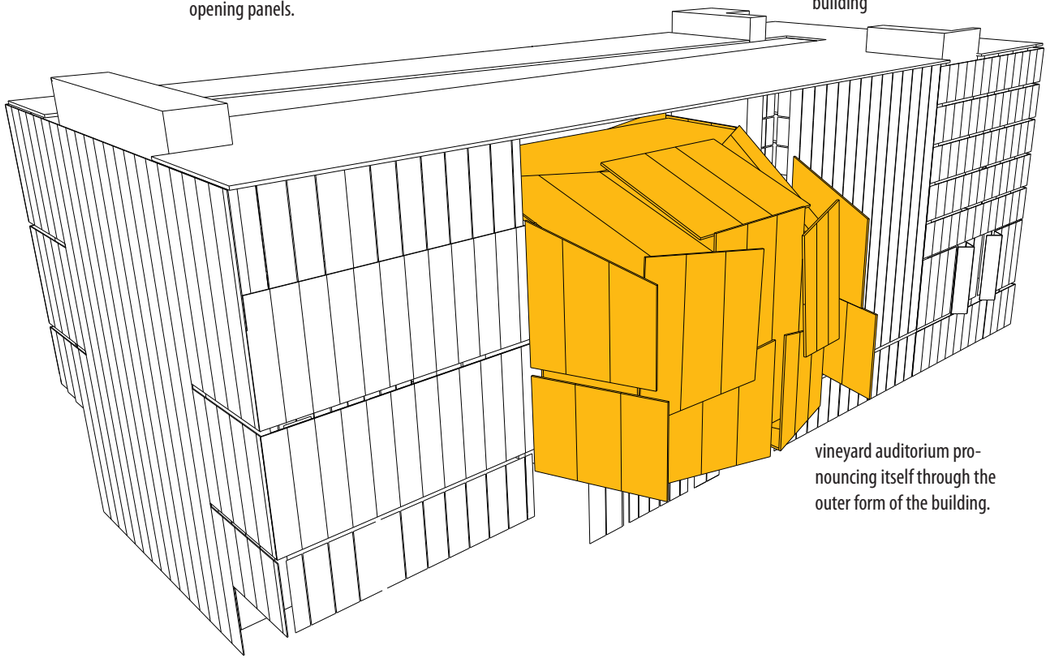
north-facing resonant skin with closed outer panels



north-facing resonant skin with open outer panels

resonant skin being
able to facet through its
opening panels.

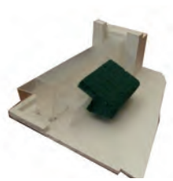
the skin envelopes the existing
building as a method of unifying the
design to truly force a resonance
of all the internal workings of the
building

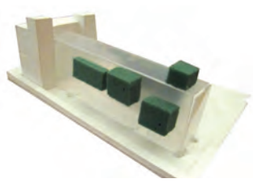


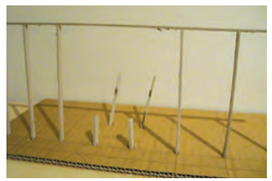
vineyard auditorium pro-
nouncing itself through the
outer form of the building.

Models showing the derivation of form for the Joburg SoundBox







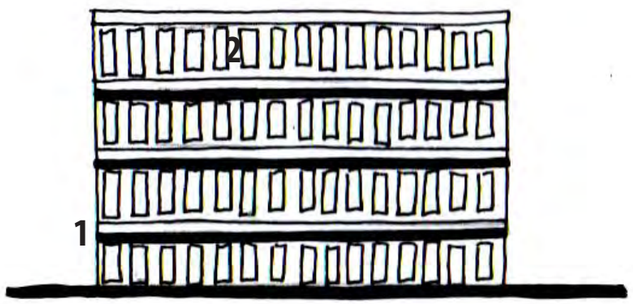


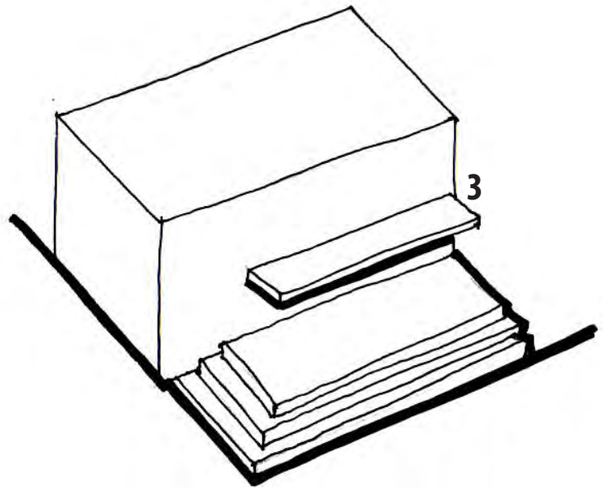












BRAAMFONTEIN FACADE STUDY

In order for the outer resonant skin to be designed in a manner that makes reference to its context but creates a contemporary, expressive facade in the context of Braamfontein - a quick study of the surrounding buildings within Braamfontein was conducted.

The Joburg SoundBox seeks to make reference to the existing through it's skin but to use the auditorium as a break from this existing monotony of the surrounding buildings which all seem to be very similar. The opening panels of the outer box also seek to allow the facade to change and differentiate depending on its users and their functioning within the building.

The three main outcomes of the study are:

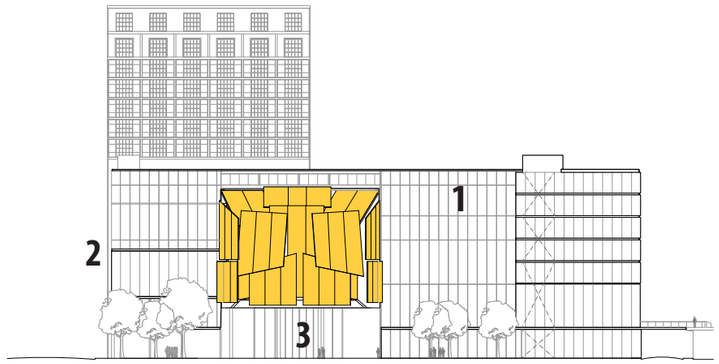
1. Most of the buildings within Braamfontein have emphasis placed on the horizontal through the use of ***deep recessed horizontal bands*** that create deep horizontal shadows on the facade

2. This emphasis on the horizontal layers of the building is heightened through the use of ***small vertical windows*** that collectively create horizontal stripes across the building.

3. Many of the buildings also make use of ***emphasised overhangs over their entrances*** to announce the entrances to passers-by. This characteristic is used within the Joburg SoundBox due to the fact that there are three main entrances into the building which must all be made clear as it is a public facility and legibility of the building is crucial in its use.



NORTHERN ELEVATION



SOUTHERN ELEVATION

JOBURG SOUNDBOX FACADE STUDY

The Joburg SoundBox seeks :

1. To firstly, create an ***emphasis on the vertical*** as a contrast to the existing. This is because of the fact that the building makes use of volumes more than floor plates in the acoustic programmatic boxes and therefore, the facade expresses this use of volumetric, vertical space within the building.

2. To ***express the floor slabs*** of the acoustic boxes through the facade in reference to the traditional emphasis of the horizontal bands on existing buildings as well as an articulation of the new versus the old within this design. The existing building's slabs are also expressed through the encapsulating resonant box in order to express the new design in contrast to the old floor plates of the existing building.

3. To ***articulate the entrances*** into the building through the use of the panels gradually becoming shorter on the northern and eastern facades of the building as well as the large overhang of the vineyard auditorium over the southern entrance.

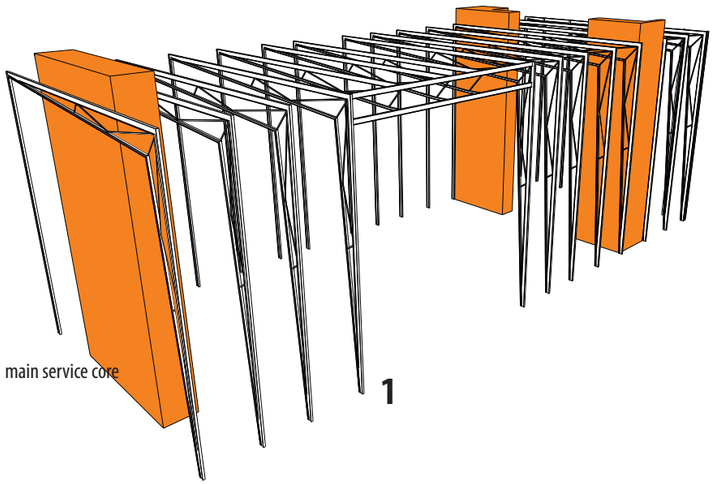
STRUCTURAL SYSTEMS

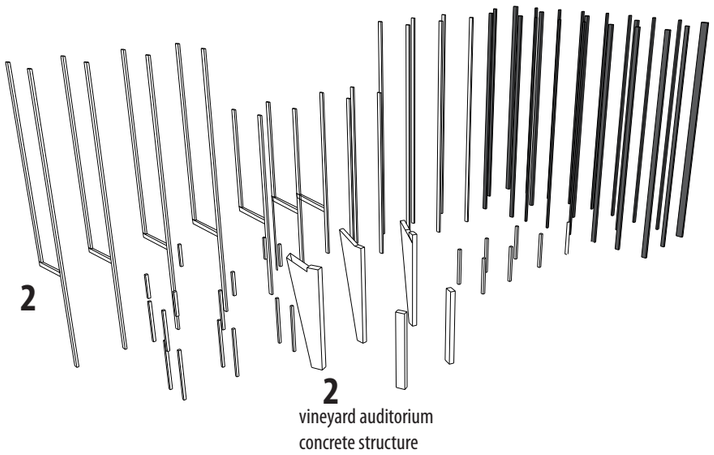
In reference to the idea of structural separation in acoustics there are two main structural systems that occur within the Joburg SoundBox in order to diffuse sound between the programmatic boxes and the noisier outer social spaces.

1. An ***outer steel structure*** is used in order for the box encasing the internalities of the building to feel light and resonant of the surroundings.

2. The internal acoustic boxes and platforms are structurally resolved through the use of a ***heavier concrete structure*** (shown in the diagram to the left).

Due to its' large volume, the vineyard auditorium is also held up by larger concrete columns that taper as they touch the ground.





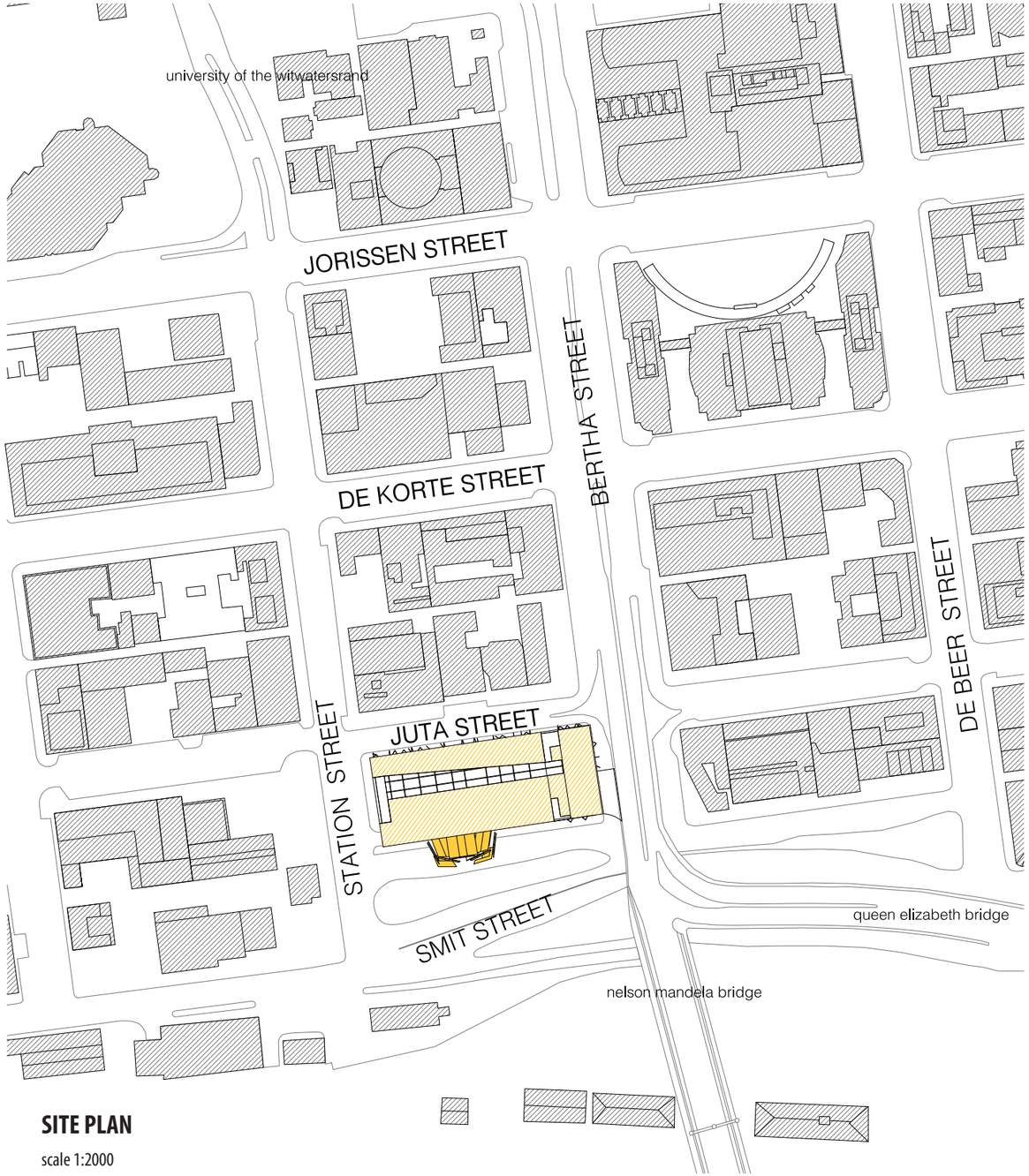
FINAL DESIGN
•
DRAWINGS

THE JOBURG SOUNDBOX

Centre for the Research, Production & Experience of Sound and Music



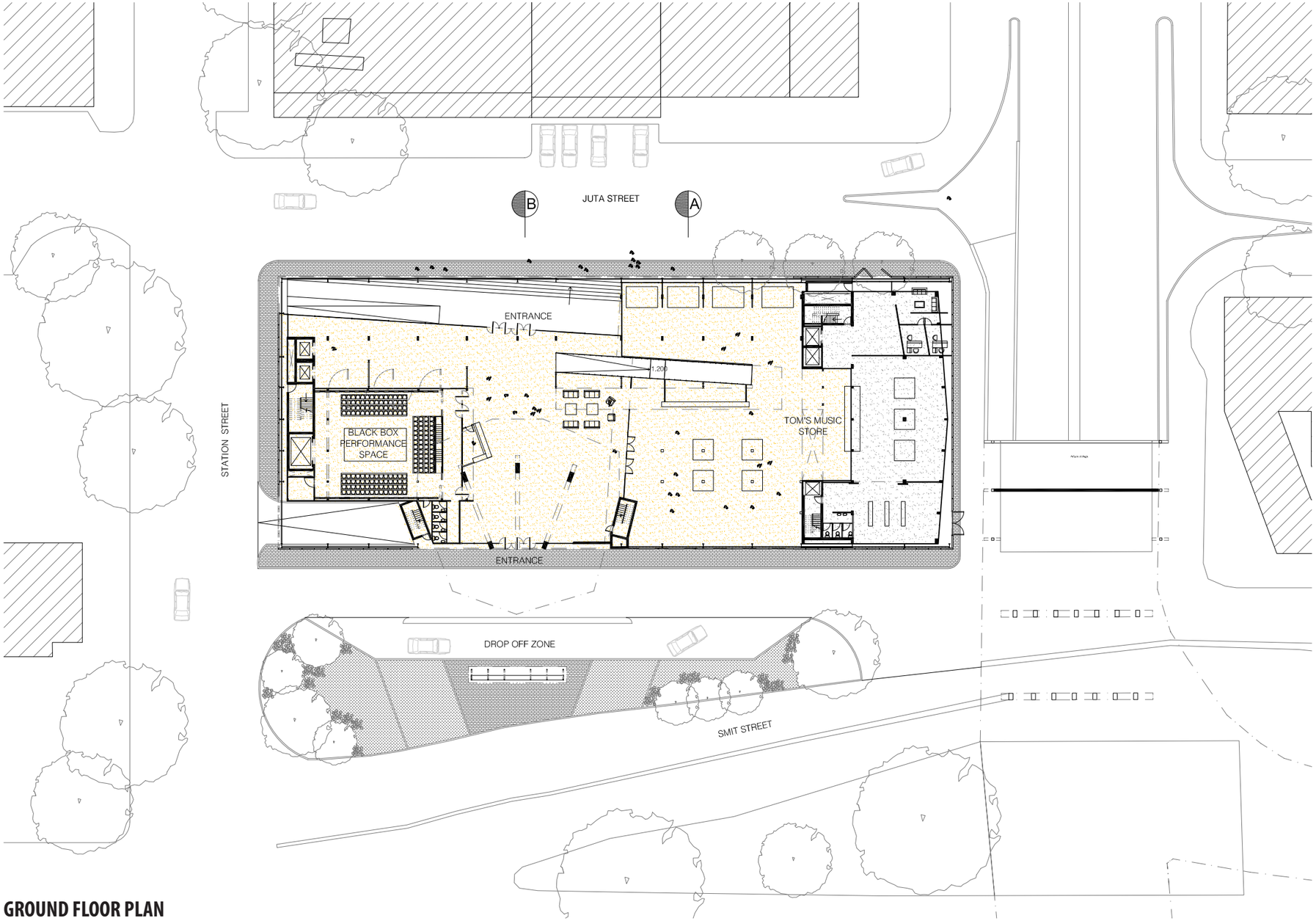
A view up Juta Street eastwards, towards Bertha Street showing the entrance into the Joburg SoundBox



SITE PLAN

scale 1:2000

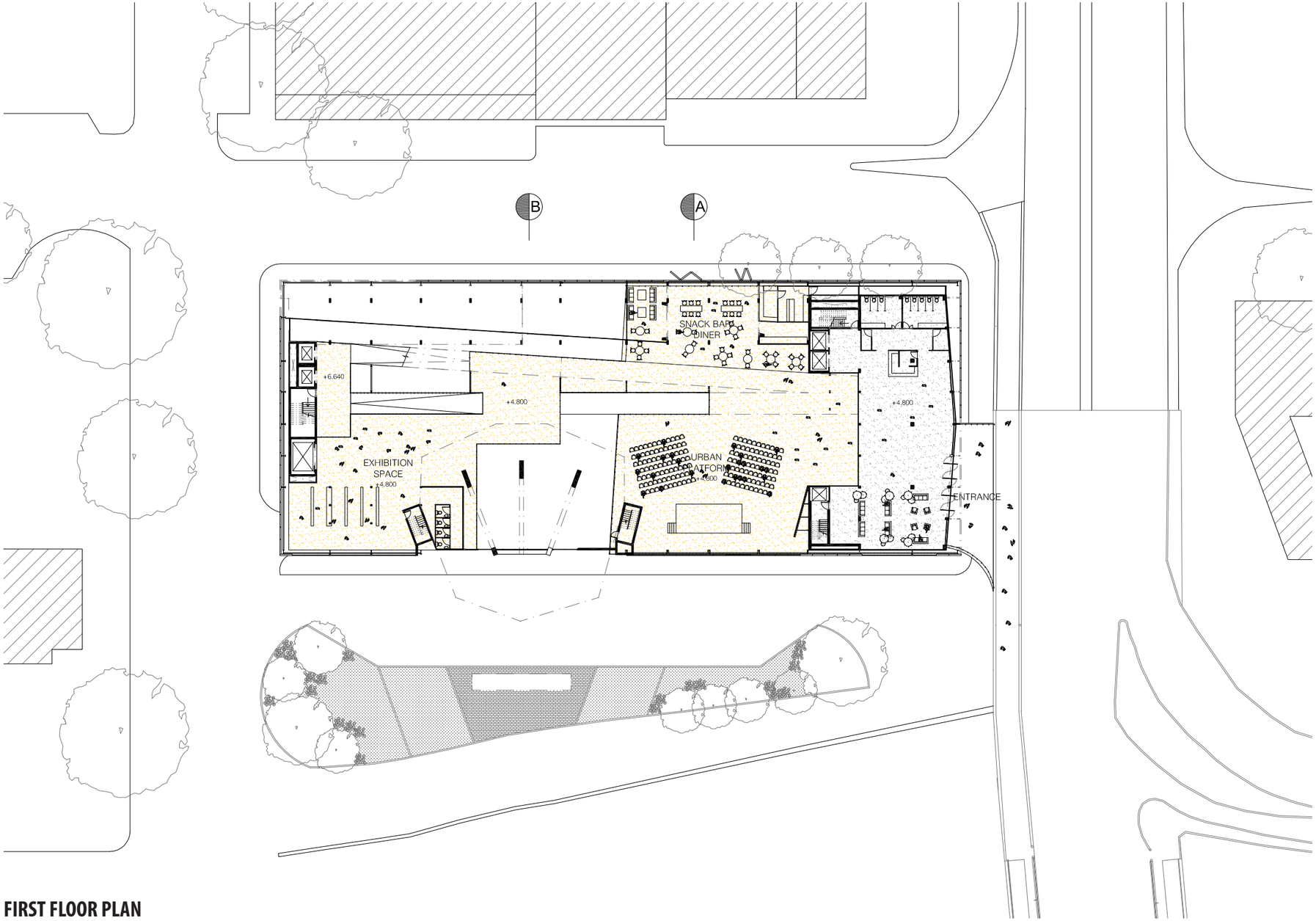




GROUND FLOOR PLAN

scale 1:500

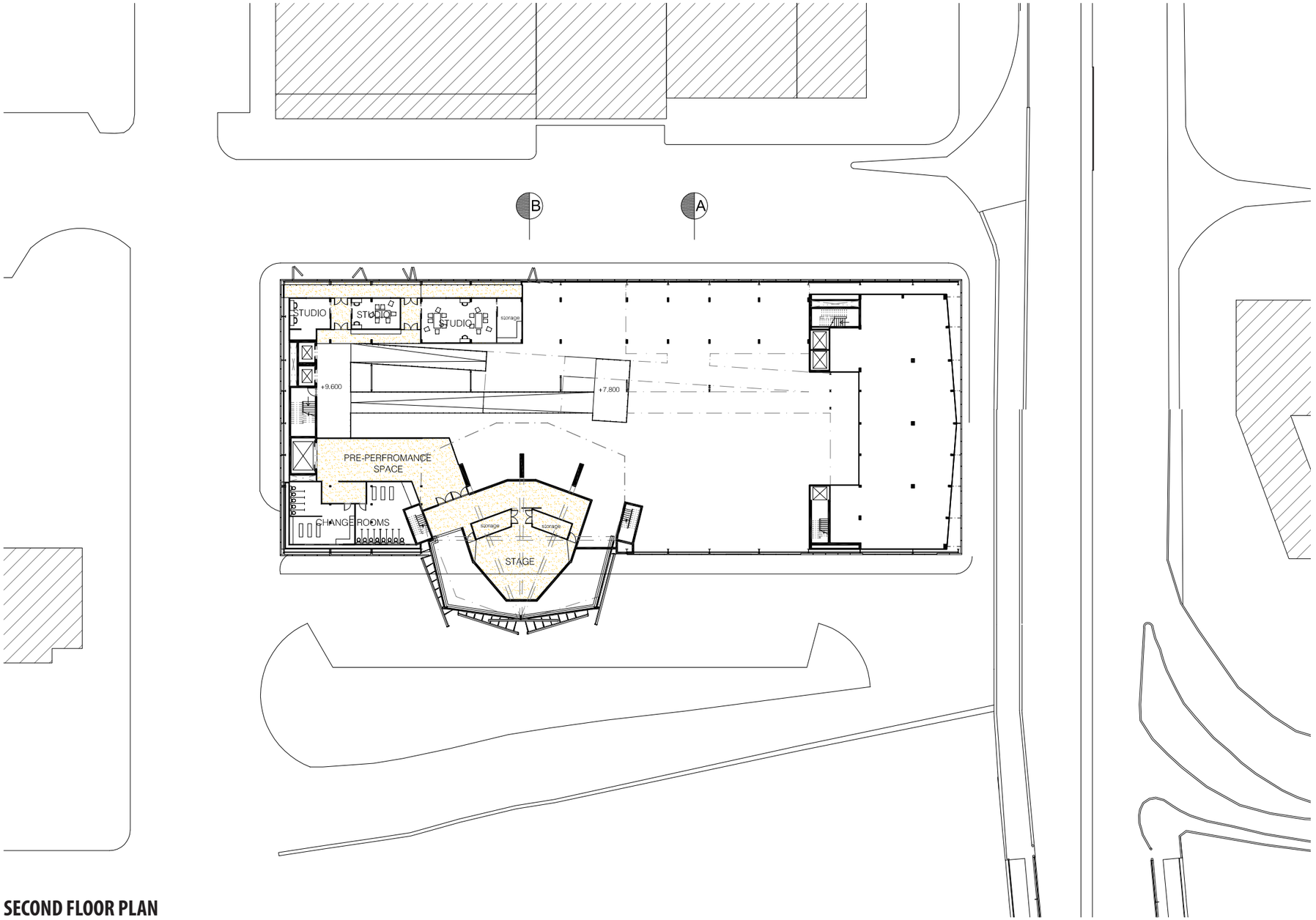
north



FIRST FLOOR PLAN

scale 1:500

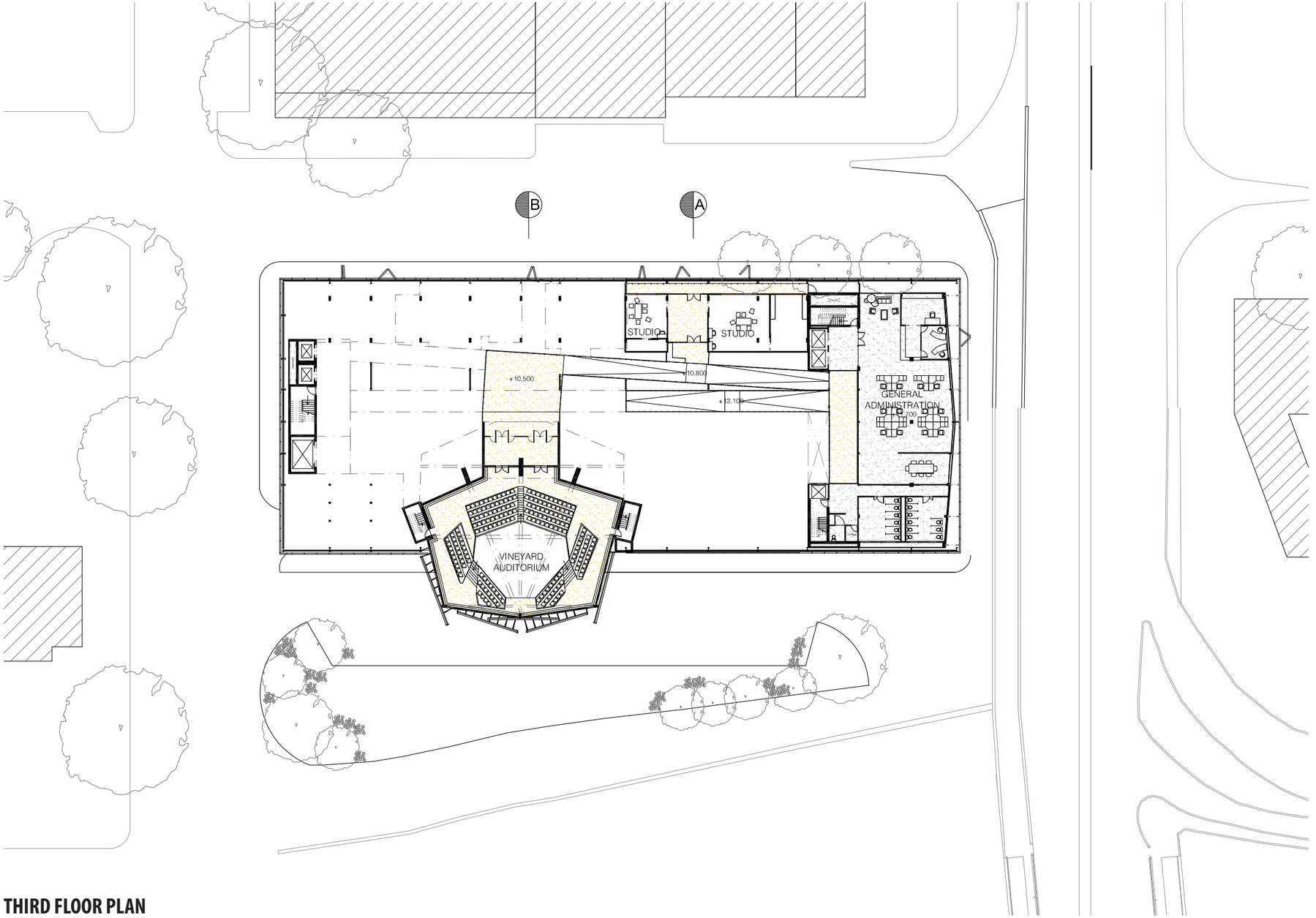
north



SECOND FLOOR PLAN

scale 1:500

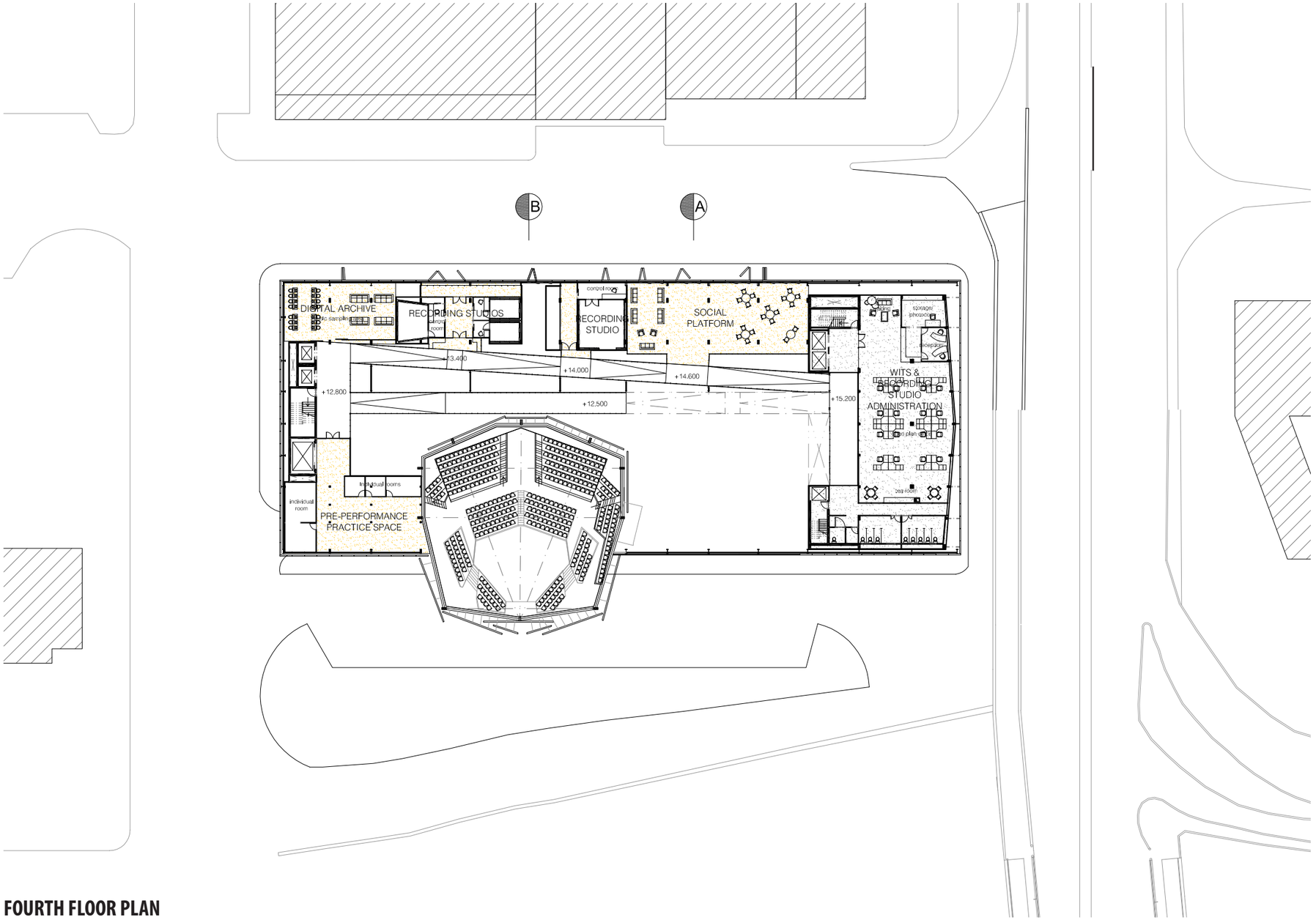
north



THIRD FLOOR PLAN

scale 1:500

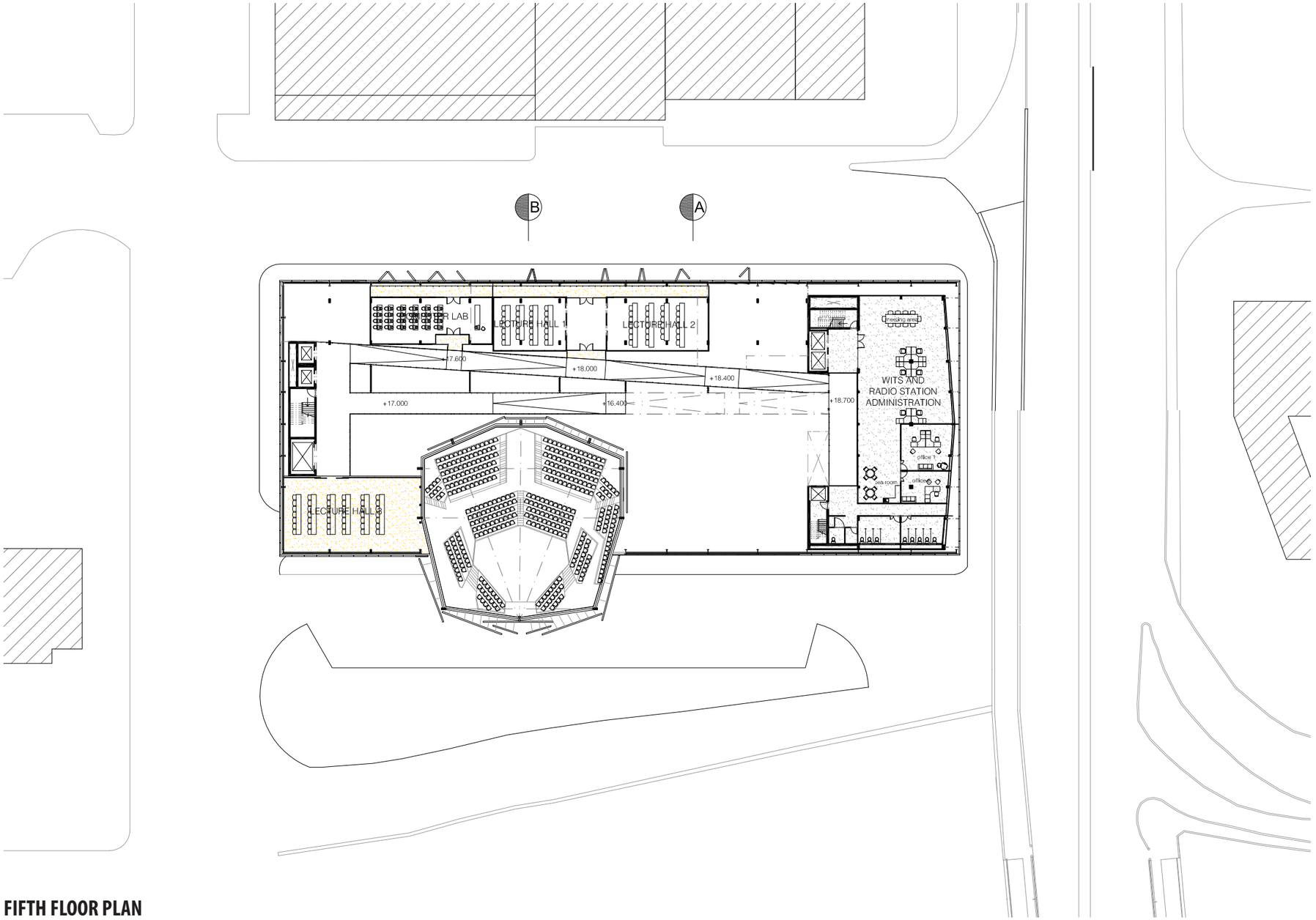
north



FOURTH FLOOR PLAN

scale 1:500

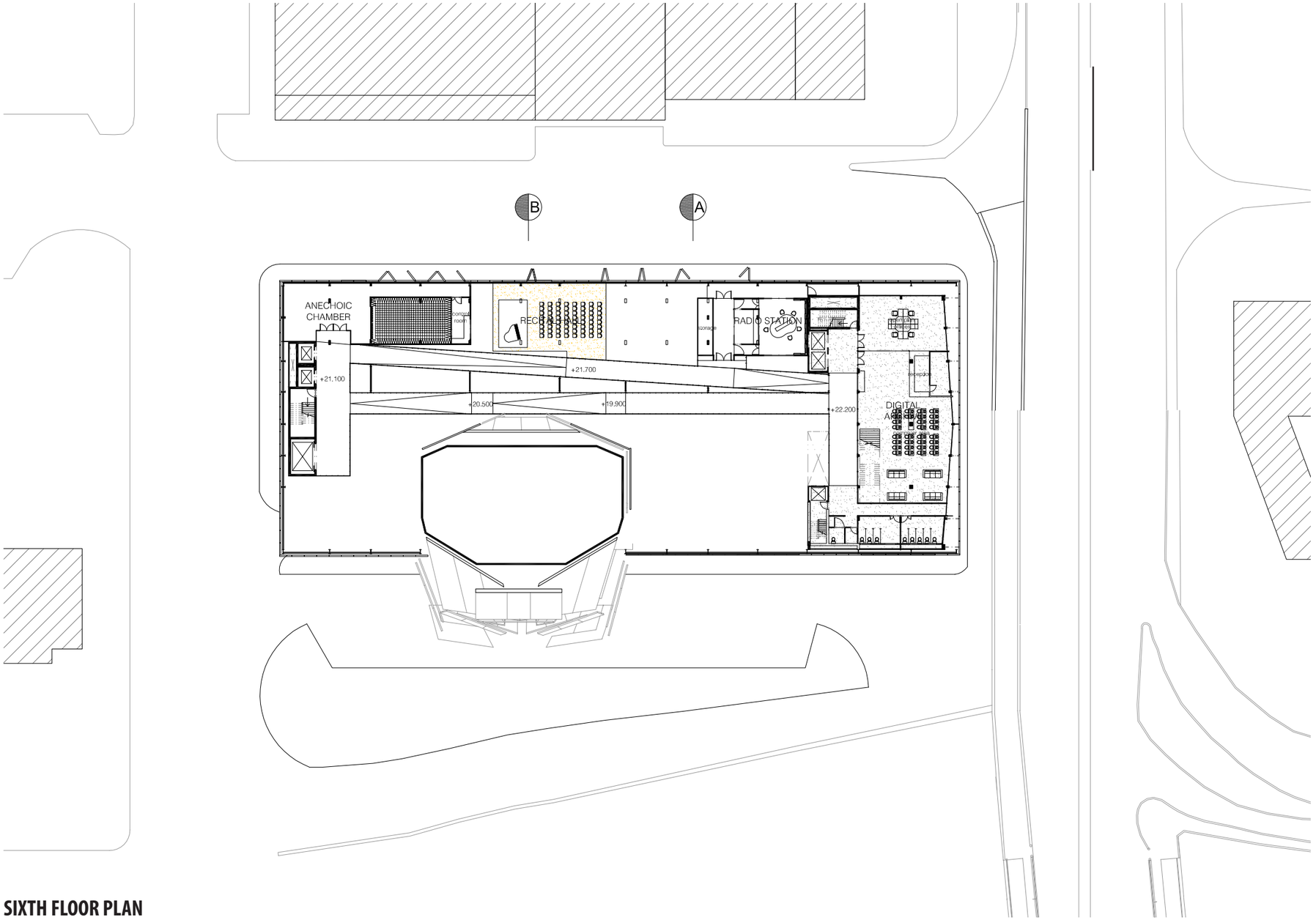
north



FIFTH FLOOR PLAN

scale 1:500

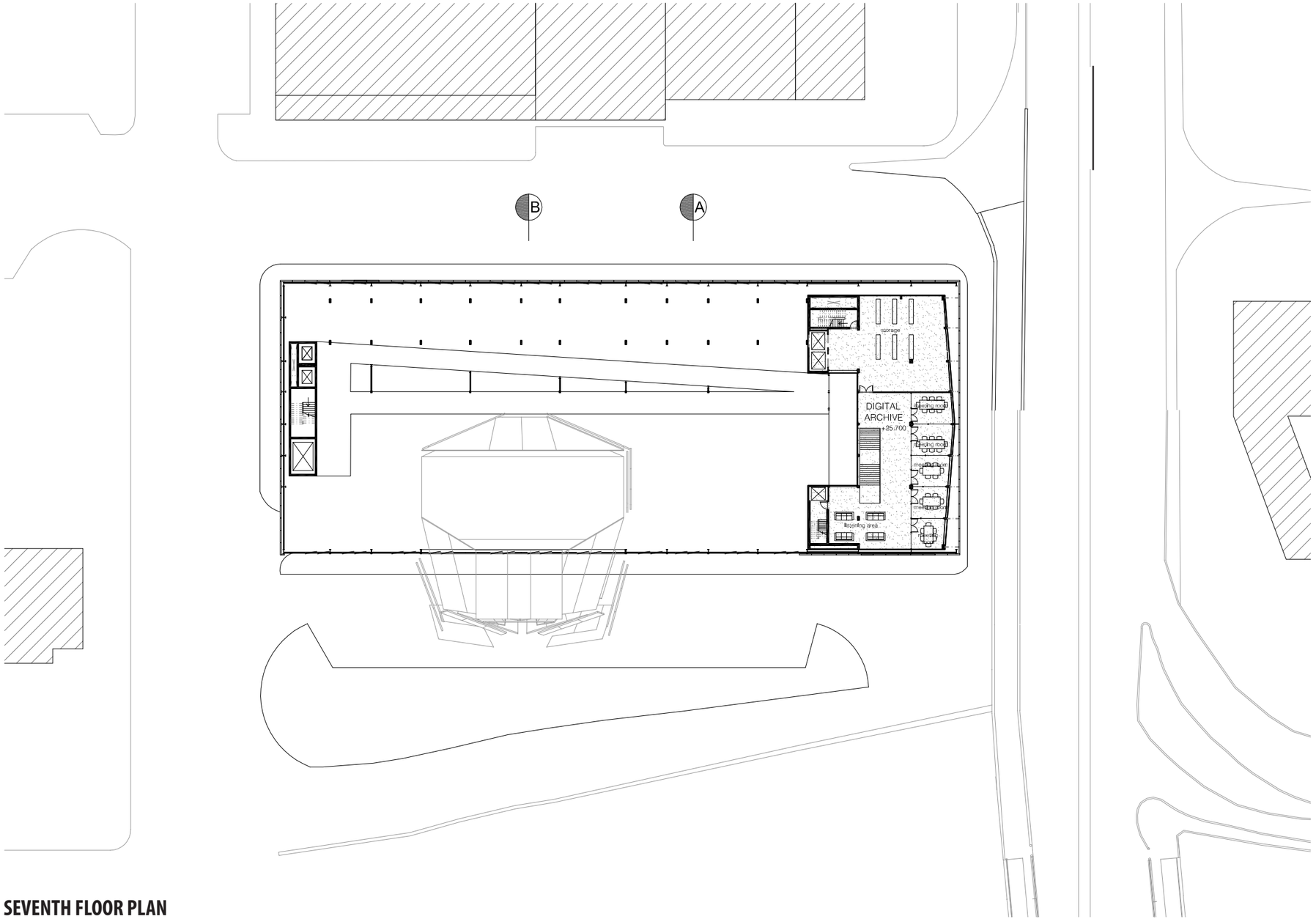
north



SIXTH FLOOR PLAN

scale 1:500

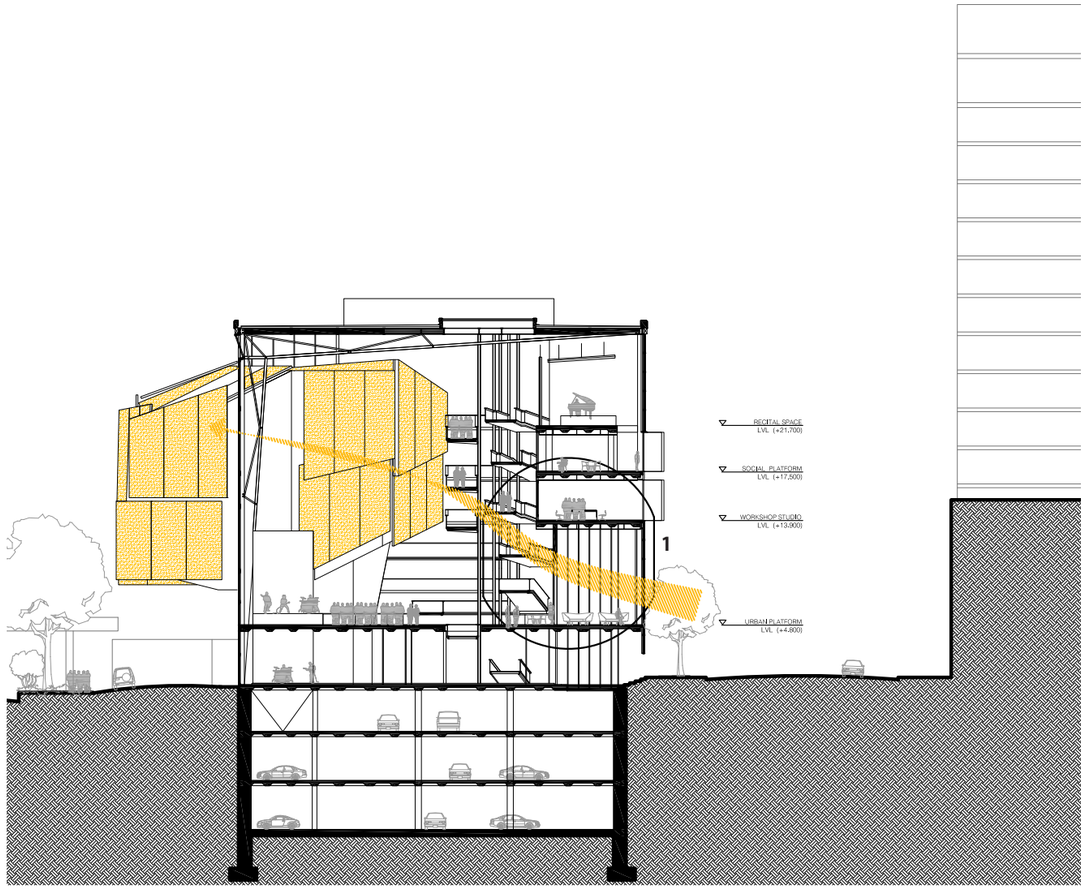
north



SEVENTH FLOOR PLAN

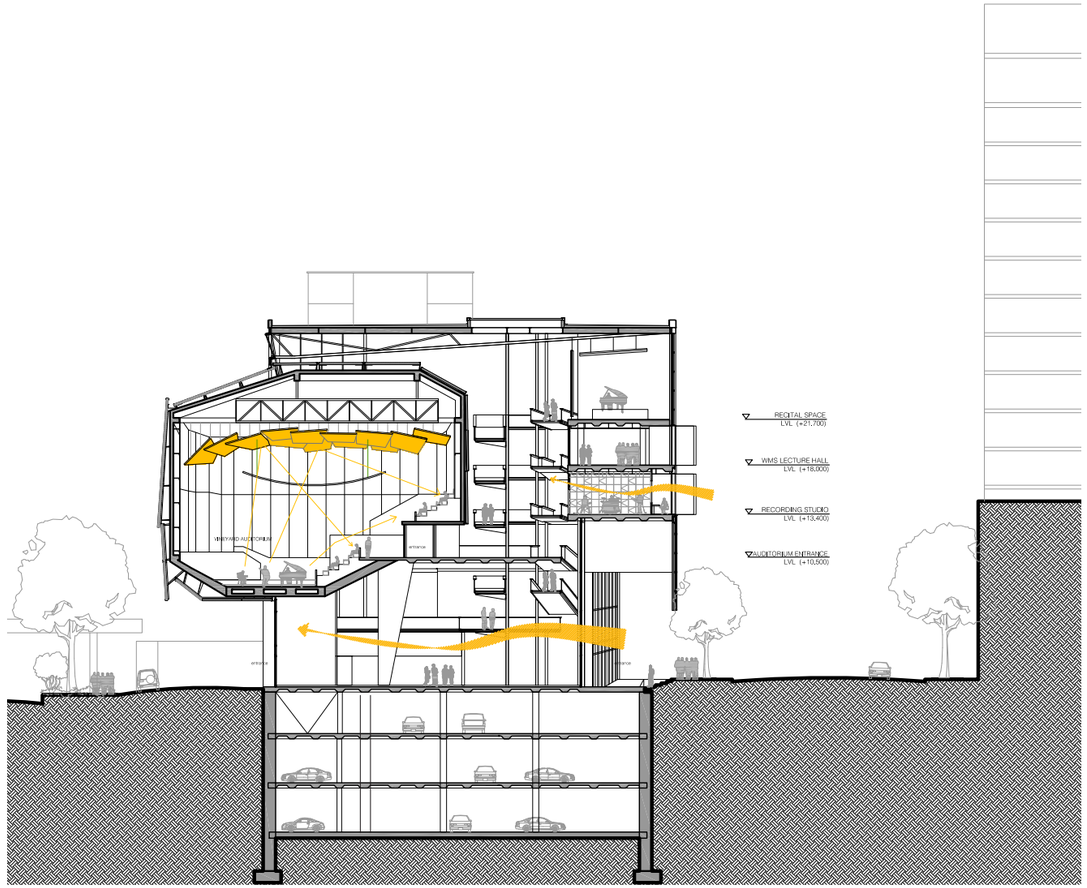
scale 1:500

north



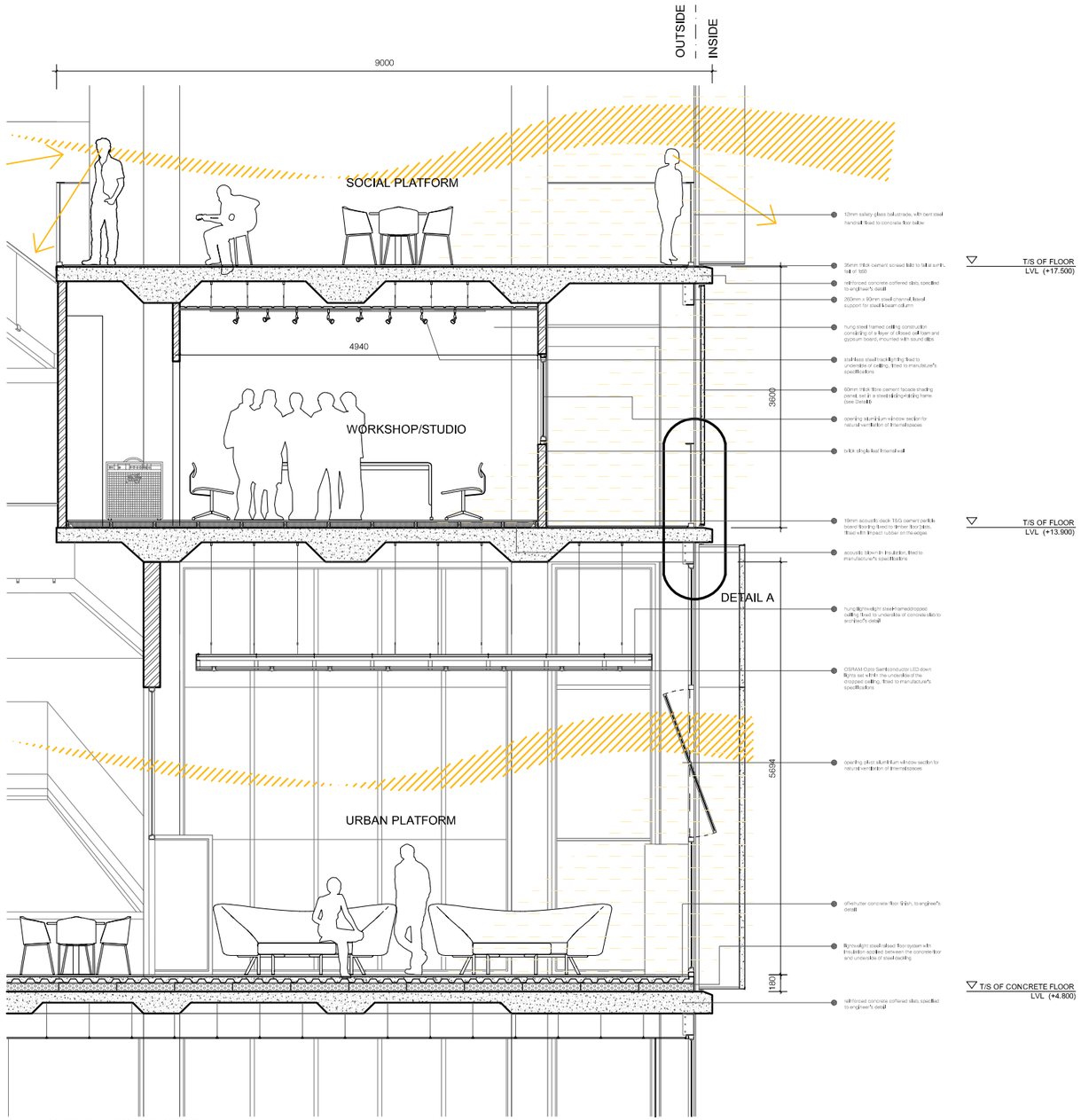
SECTION A-A

scale 1:500



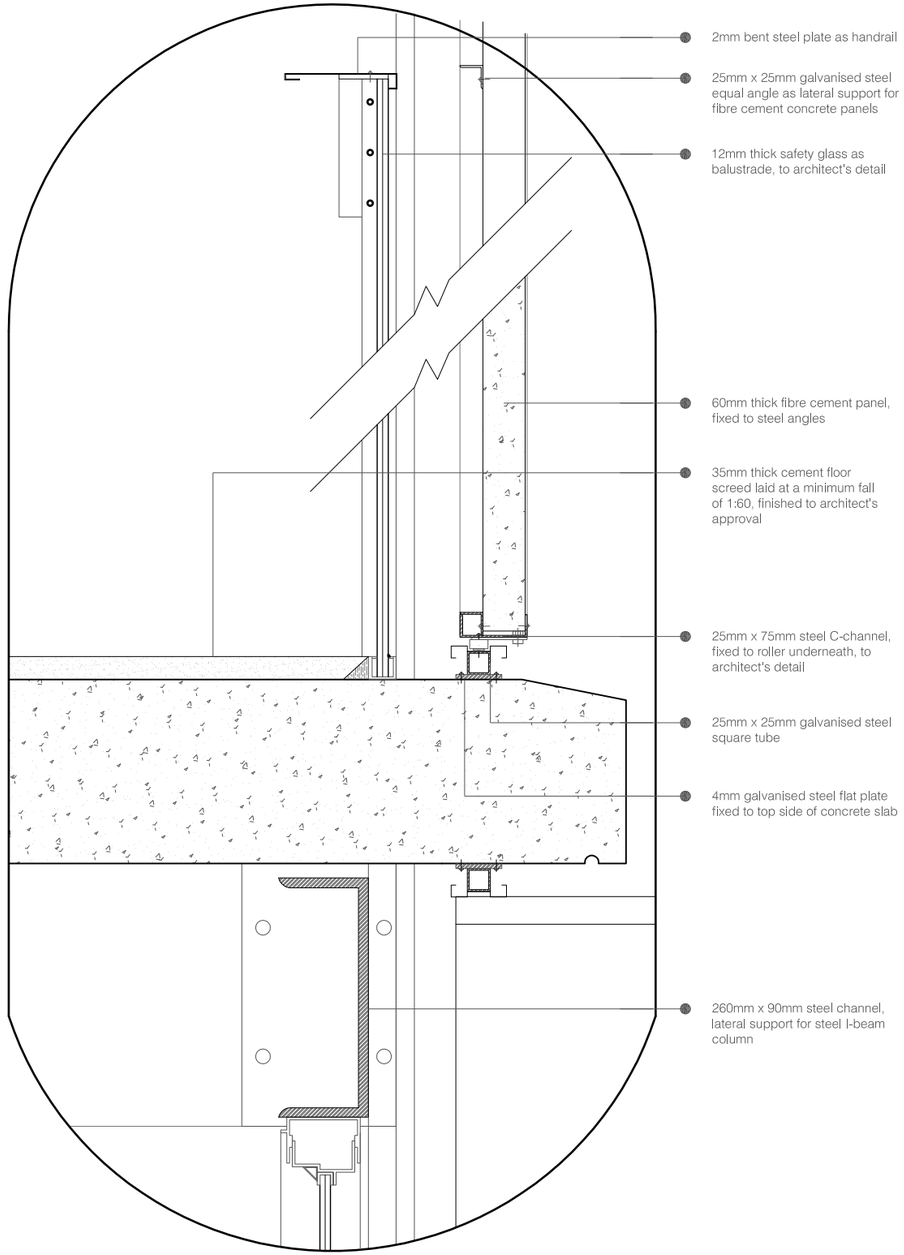
SECTION B-B

scale 1:500

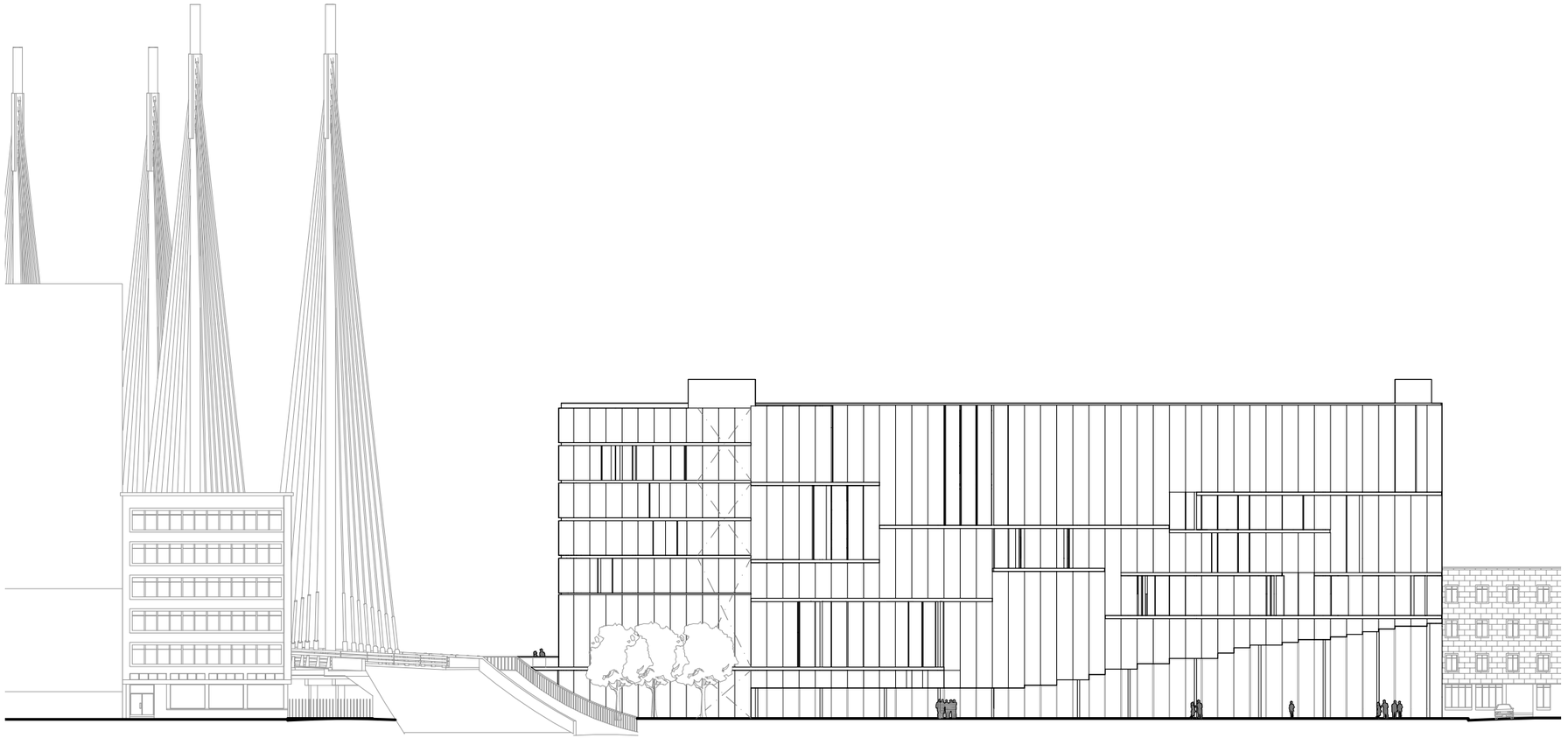


DETAILED SECTION 1

scale 1:75

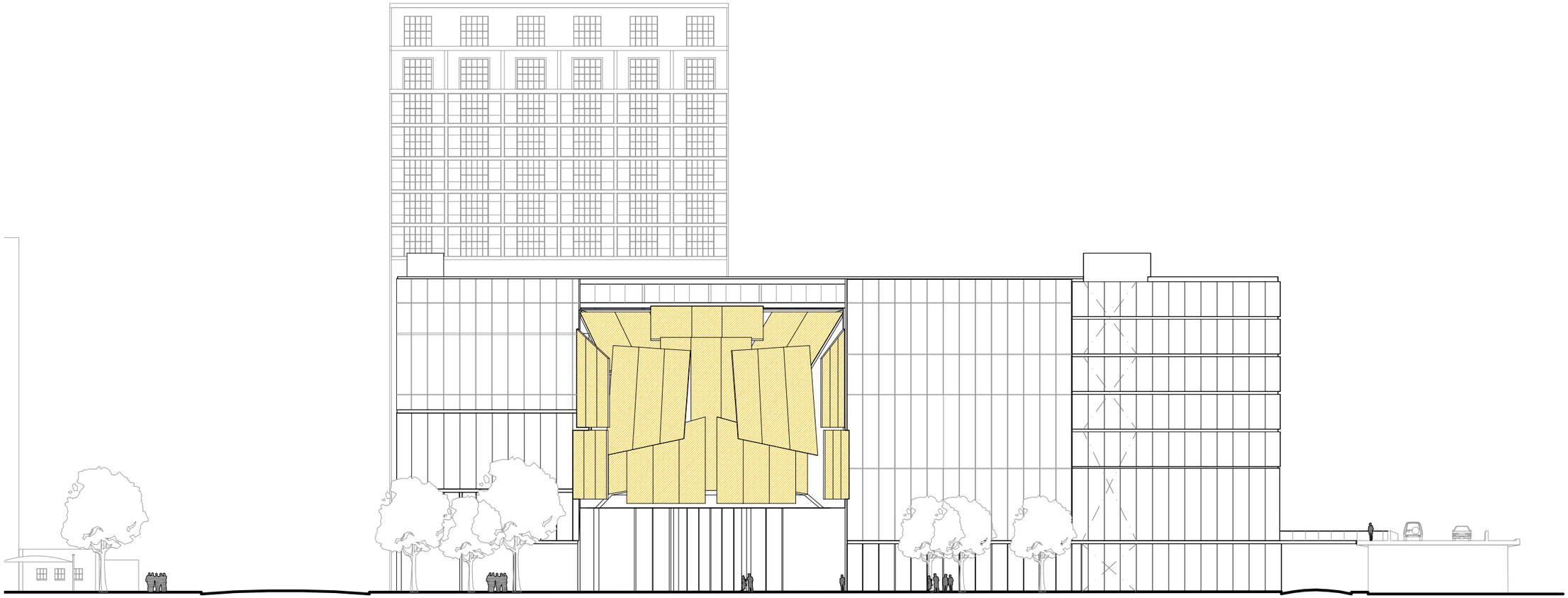


DETAIL A



NORTHERN ELEVATION

scale 1:500



SOUTHERN ELEVATION

scale 1:500



The southern entrance to the building is marked by the large protruding vineyard auditorium and has a relationship to the small park and drop off area to the south of it



A view from the ground floor foyer up towards the URBAN PLATFORM (on the right), shows the visual relationships between the northern entrance to the building, the ramping system within it, Tom's music store and the URBAN PLATFORM. This volume is open and light and encourages people to move up through the building



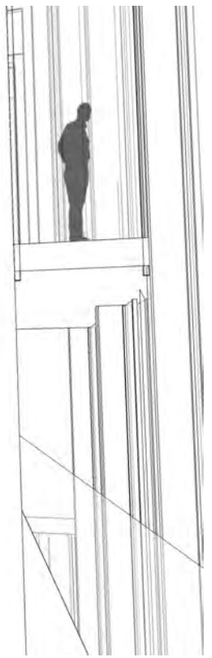
A view of the eastern entrance of the building, coming directly off the Nelson Mandela bridge. The coffee shop on this level acts as a method of drawing people into the building to experience the URBAN PLATFORM volume



The URBAN PLATFORM



The social platform overlooking the ramps and URBAN PLATFORM is a break-away space for the inhabitants of the building. It can also be used for seating overlooking performances occurring on the URBAN PLATFORM below





The entrance into the vineyard auditorium (to the left) stems off of the ramping system and has a visual relationship to all the other acoustic boxes on the varying levels surrounding it. This allows public entering the auditorium to see and experience what really happens within the building and not just its public spaces



A view from the ramps over the URBAN PLATFORM, demonstrating the visual relationship to the inner city of Johannesburg

OUTRO I Looking at architecture as a unified arrangement and interrelation of different systems and drivers of design (such as a programme or a specific physical environment, or even a proportioning system) begins to offer the opportunity for identified systems to overlap, compromise with and feed off of each other – producing a unique combination of innovative design. It has been argued that where these systems resonate with one another is of most interest to me as a designer in a contemporary and evolving city of modification. These resonances may manifest themselves as a physical space or even a programmatic interface of the building, but what stimulates the design of my intervention the most is that of their interrelationship. Our city today is made of a string of many seemingly separate systems – its people, its buildings and its functions. In many ways, because of our past, Johannesburg has seemingly dispersed enough to pull some of these systems in differing directions. Therefore, through my investigation I have identified Braamfontein as a possible scaled down and contained context with the characteristics needed for a project of social inclusion and sound as a method of socially-stimulating the city programmatically and physically. Through the process of exploration in this thesis – I have found that programme in itself can become a social stimulus of a space by bringing certain people together in a building, as well as the fact that a building is a very static object in a cityscape but it's users keep it dynamic and able to evolve over time to be used in new ways. Therefore, the physical design of a building should appreciate and excite its users and how they experience a space socially. While I'm not suggesting that architecture is as simplistic and idealistic as placing three systems together in one building, I am suggesting that overtly expressing the interrelation of these chosen systems in a building design makes for an open environment of social exchange and URBAN RESONANCE.

Architects are always able to choose the inclusive and exclusive environments that need to come together in a building, but what this thesis challenges is the fact that contemporary South African buildings do in some way have to become a matrix of multiple systems because of our developing nature and compound social needs. Therefore, as architects designing in this complex environment, it is a challenge not to focus too heavily on a single system in architecture; therefore I am suggesting that maybe there is a method to designing the interstitial space of architectural systems, and not the individual systems in themselves as a subtle method of allowing for a harmonious URBAN RESONANCE.



LIST OF REFERENCES

a base in the theory of URBAN RESONANCE

Acebillo, J., 2007. Johannesburg, from Europe. In: Bremner, L. & Subiros. (ed.), 2007. *Johannesburg: emerging/diverging metropolis*. Mendrisio: Mendrisio Academy Press, pp. 8-11.

Achtypi, C., Giamarelos, S. & Karandinou, A., 2008. Athens by sound: Introduction. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 10-18.

Albonico, M., Sack, N. & Mzumara, M., (2002) *The Braamfontein Urban Design Framework*. JDA: Johannesburg.

Allison, P., 2006. Omitting the void: An architecture of engagement. In: Allison, P., (ed.) 2006. *David Adjaye: Making public buildings*. London: Thames & Hudson, pp. 120-129.

Blesser, B. & Salter, L. R., 2007a. *Spaces speak, are you listening? Experiencing aural architecture*. [Pdf]. Cambridge: MIT Press. Available at: http://www.blesser.net/SP_downloads.html [Accessed 30 March 2010].

Blesser, B. & Salter, L. R., 2007b. *Aural architecture*. [Online] Research Design Connections. Available at: http://www.blesser.net/SP_downloads.html [Accessed 30 March 2010].

Blesser, B. & Salter, L. R., n.d. *Aural architecture and the iPod generation*. [Pdf]. MIT Press Blog. Available at: http://www.blesser.net/ downloads/IPod Generation.pdf [Accessed 30 March 2010].

Born, G., 1995. *Rationalizing Culture: IRCAM, Boulez and the institutionalization of the musical avant-garde*. Berkeley: University of California Press.

Bouman, O., 2008. Designing to socialize. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 78-82.

Bremner, L. & Subiros.P., 2007. Johannesburg: emerging/diverging metropolis. In: Bremner, L. & Subiros. (ed.), 2007. *Johannesburg: emerging/diverging metropolis*. Mendrisio: Mendrisio Academy Press, pp. 12-17.

Bremner, L., 2007. Making life public in contemporary Johannesburg. In: Bremner, L. & Subiros. (ed.), 2007. *Johannesburg: emerging/diverging metropolis*. Mendrisio: Mendrisio Academy Press, pp. 8-11.

Carew, D., 2001. The consumption of music. In: Samson, J., (ed.) 2001. *The Cambridge history of nineteenth-century music*. Cambridge: Cambridge University Press, pp. 237-259.

Castells, M., 2004b. Space of flows, space of places: Materials for a theory of urbanism in the information age. In: Braham, W. W. & Hale, J.A., (eds). 2007. *Rethinking technology: a reader in architectural theory*. New York: Routledge, pp. 440-456.

Cross, I., 2006. *Music and social being*. Musicology Australia, [pdf] 28, Available at: http://www.mus.cam.ac.uk/~ic108/PDF/Mus_Aust_paper06.pdf. [Accessed 2 March 2010].

Devroop, C. 2010. Interview with the author. [Discussion] (Personal Communication, 25 March 2010 in Fordsburg, Johannesburg).

Devroop, C., 2002. T*owards a conceptual framework for the design of a qualification in Music Technology at post-secondary institutions in South Africa*. D.Mus. Pretoria: University of Pretoria.

Dewar, D., Louw, P., & Urban Solutions., (in press). *A preliminary development and design framework for the University of the Witwatersrand*. Johannesburg.

Duckworth, W., 2005. *Virtual music: how the web got wired for sound*. New York: Routledge.

Enwezor, O., 2006. Popular sovereignty and public space: David Adjaye's architecture of imminence. In: Allison, P., (ed.) 2006. *David Adjaye: Making public buildings*. London: Thames & Hudson, pp. 8-12.

Ermanno, R., 1990. Ampliamento dell'IRCAM a Parigi: Renzo Piano Building Workshop. *Domus*, Feb (713), pp. 38-47.

Gallanti, F., 2010. Acoustic Box. *Abitare*, Feb (499), pp. 78-89.

Goulthorpe, M., 2000. Paramorph: A gateway to the South Bank, London. *Domus*, Jan. (822), pp.20-25.

Greenland, J., 1998. *Foundations of architectural science : heat, light, sound*. Sydney: University of Technology.

Harrison, P., 2005. *South Africa's top sites: Arts & culture*. Claremont: Spearhead.

Hugill, A., 2008. *The digital musician*. Routledge: New York.

Kucharek, J., 2007. Underground assets: Inspired by the RFH's original environment strategy, engineer: Max Fordham is proposing a grey water pipeline along the South Bank [London]. *RIBA Journal*, 114 (6), pp. 54-56.

Levy, A., 2010. Interview with the author. [Personal] (29 June 2010).

Liebenberg, D. 2010. Interview with the author. [Personal] (Personal communication, 14 September 2010).

Manaugh, G., 2009. *BLDG BLOG book*. San Francisco: Chronicle Books.

Mapetla, M., 2006. *The inner-city regeneration programme and its impact on the small businesses and informal traders: the case of Johannesburg*. MSc. Johannesburg: University of the Witwatersrand.

Mbembe, A. & Nuttall, S., 2007. Johannesburg: The elusive city. Writing the world from and African metropolis. In: Bremner, L. & Subiros. (ed.), 2007. *Johannesburg: emerging/diverging metropolis*. Mendrisio: Mendrisio Academy Press, pp. 8-11.

Miller, P. 2010. Interview with the author. [Telephonic] (Personal communication, 30 March 2010).

Mitchell, W. J, 1995. *City of bits: Space, place, and the Infobahn*. London: MIT Press

Mitchell, W. J., 2008. Digital porosity. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 83-90.

Mullins, C., 2007. *A festival on the river: The story of Southbank Centre*. London: Penguin.

Murray, M. J., 2008. The city in fragments: Kaleidoscopic Johannesburg after apartheid. In: Prakash, G. & Kruse, K. M., (eds.) 2008. *The spaces of the modern city: imaginaries, politics, and everyday life*. Princeton: Princeton University Press, pp. 144-174.

Oosterhuis, K. & Schueler, N. L., 2008. Fine-tuning the city. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 92-93.

Pallasmaa, J., 1996. *The eyes of the skin: Architecture and the senses*. London: Academy Editions.

Parker, M., 2008. Water does not run uphill unless it is pushed: Maxims for thinking about sound in the context of architecture, installation art and technology. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 32-33.

Powell, K., 2000. Complex solution: South Bank Centre, London. *RIBA journal*, 107 (3), pp.12-13,15.

Joshua Prince-Rasmus: Building a theatre that remakes itself. Jan 2010. [Online video] Texas: TED (Talk given by Rasmus at Southern Methodist University). Available at: www.ted.com/talks/joshua_prince_rasmus_building_a_theatre_that_remakes_itself.html. [Accessed 28 March 2010].

Reboli, M. 2007. Concert hall, Copenhagen. *Casabella: rivista di architetturae urbanistica*, 752-753 (71), pp. 90-97.

Sassen, S., 2006. Built complexity and public engagements. In: Allison, P., (ed.) 2006. *David Adjaye: Making public buildings*. London: Thames & Hudson, pp. 13-16.

Shapiro, S. 2010. Interview with the author. [Interview] (Personal communication, 31 March 2010 in Rosebank Mall).

Spiller, N., 2008. Towards a theory of the post-digital in architecture. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 32-33.

Watson, A., 2006. *City publics: The (dis)enchantments of urban encounters*. Oxon: Routledge.

Wigley, M., 2008. The architecture of atmosphere. In: Achtypi, C., Giamarelos, S. & Karandinou, A. (eds.), Athens by sound. *11th International Architecture Exhibition: La Biennale di Venezia*. Venice, Italy 14 September – 23 November 2008, s.l.: Futura, pp. 42-46.

Wilkie, G. 1997. *The studio musician's jargonbuster: A glossary of music technology and recording*. London: Musonix Publishing.

BIBLIOGRAPHY

Blesser, B. & Salter, L. R. 2009. The other half of the soundscape: Aural architecture. In: World Federation, World Federation Acoustic Ecology Conference. Mexico City, 23 March 2009. [Online] Available at: http://www.blesser.net/SP_downloads.html [Accessed 30 March 2010].

Blesser, B. & Salter, L. R., 2007c. Sound artists and scientists as complimentary partners in inquiry. *The journal of Acoustic Ecology*, [Online] 7 (1), Available at: http://www.blesser.net/SP_downloads.html [Accessed 30 March 2010].

Castells, M. (Ed). 2004a. *The network society: A cross-cultural perspective*. Cheltenham: Edward Elgar Publishing Ltd.

McCullough, M., 2004. *Digital Ground: Architecture, pervasive computing, and environment knowing*. London: MIT Press.

Pallasmaa, J., 2003. The art of reason: Utility, technique and expression in architecture. In: Hyman, R., [et al] 2003. *Gentle bridges: Architecture, art and science*. Berlin: Berkhauser, pp. 22-34.

Simone, A.M., 2004. *For the city yet to come: Changing African life in four cities*. Durham & London: Duke University Press.

West, R. 2010. Interview with the author. [Interview] (Personal communication, 24 March 2010 at City Varsity campus, Newtown, Johannesburg).

URBAN RESONANCE (SOUNDCLIPS)

track 1 (a) - *Joburg Soundlines* by Marcus Neustetter (2008)

intro - *Banna Ba Modimo* by BLK JKS (2009)

track 1 (b) - Sprite Advertisement (2010)
(Video source: http://www.youtube.com/watch?v=R6Y8KioAaSg).

This video demonstrates the idea that RESONANCE is about
many different parts held together by
one entity. It also demonstrates the idea of layers and surface in sound.

track 4 - *Take on Me* by A Ha (1983)

track 4.1 - *Herr Gansefu Frau Gansekraut* by Arnold Schoenberg (1974)

track 4.2 (a) - *Derive* by Pierre Boulez (1984)

(b) *In A Landscape For Solo Piano* by John Cage (1948)

track 4.3 - *But If* by Brian Eno (2000)

track 4.4 - *Worse* by John Oswald (1993)

track 5.1 (a) - *Mshini Wam* by Spoek Mathambo (2010)

(b) - *Enter the Ninja* by Die Antwoord (2010)

(c) - *Voices On The Wind* by Soweto Gospel Choir

(d) - *Nomali* by Hugh Masekela

track 5.2 - *The Black Box* (video) by William Kentridge (2005)
(With the music written by Philip Miller)

track 12 - *Braamfontein Soundscape* by
Raffaella Lepore (2010)

URBAN RESONANCE

SCHOOL OF ARCHITECTURE PLANNING

All unreferenced images and graphic work done by Raffaella Lepore, Bronwyn Kotzen and Jack Frenkel. All unreferenced definitions referenced from Wilkie (1997) - see essay references.

Thank you to Vera Damaso of Print-a-Point for all her patience and for taking pride in making our documents perfect.

URBAN RESONANCE: An Exploration Of Architectural Systems Modulated Through Mediums Of Digital Sound & Music