

# City Sounds

Summer observations

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Landscape Environment Advancement Foundation, LEAF

# City Sounds

Motiwalla Kauseen

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For details please write to,  
M/S. Prabhakar B. Bhagwat, 901-Panchtirth,  
Opp. Aristoville, S.M.Road,  
Ahmedabad-380 015. INDIA

T # 91 79 2692 3054  
E # [landscapeindia@usa.net](mailto:landscapeindia@usa.net)

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Kauseen, a student of landscape architecture; went out to study sounds in the city of Ahmedabad where she lives.

She has chosen five diverse areas in the city to carry out her observations. She recorded sounds and transferred them to a two dimensional map. The maps are a tool to compare the observations made.

She has made her observations in the summer. Findings for winter and monsoon will of course, be different.

Kauseen has towards the end tabulated her findings and inferences.

While her observations, raise questions about perspectives on quality of urban life; they are also geared towards smaller scale, pragmatic observations - building typology and amount of sound penetration, movement of sound across and through different materials.

Her observations are not purely technical; but convey a sense of sound its transformation and its movement through space and material.

*"The wind creates spaces within the cornfield. And this material changes every single day. In the spring the young corn is soft and velvety, it gets ever harder as the year progresses and in the fall, when the corn is ripe and dry, the field rattles and crackles like a rasp. I observed a wonderful change brought on by the rain and the drying of the natural material itself".*

Bernhard Leitner, ACOUSTIC SPACE  
A conversation between Ulrich Conrads and Bernhard Leitner; DAIDALOS 17, Berlin 1985

Anjali  
July 2011

## Introduction: All ears

Perception of environment is a multi sensory phenomena. Sight, touch, smell, and sound all together give a holistic experience of a place. While sight probably dominates consciously; the other three senses are more deeply embodied and invoke places and memories in a very strong manner.

Conventionally cities have been visualized as points and spaces; lines and connections; as streets, neighbourhoods and landmarks.

But, they are experienced as places which engage more than our eyes. While moving through a city, shaded streets invite us in; smells push us away from, or draw us towards places, crowds indicate activities and events through the buzz they create.

A vibrant, interesting city can also be called a buzzing city.

While these busy, buzzing cities have become synonymous with noise; noise itself is now deeply associated in our minds with the idea of a city. Can we even suppose for a moment a silent market, or a silent street?

A completely silent city is almost a frightening thought.

Instead, can we imagine the city like a spatial orchestra, creating a noise, a buzz, a steady hum; hitting a high crescendo at its peak and winding down towards the end of the day as a low note?

While we take this constant backdrop of human speech, moving and honking vehicles associated with streets, markets and public places for granted; do we really pay attention to what has now become an inextricable part of urban life?

How much noise does an extremely busy street actually generate? How much of it is carried in into spaces abutting it? Is it even possible to imagine a quiet, reflective island within this constant drone of human speech, moving and honking vehicles?

How does a sound generated at one point move through stone and brick of a dense city core?

How much of it penetrates houses after crossing a grove of trees and a garden?

How much of it does the wind carry across open fields?

Also, are there distinctive sounds that give places in the city an identity?

## Sound in the City

### Sound

We live in a vibrating universe and perceive the sense of the world through its many rhythmic pulses. Sounds are perceived vibrations - they are perceived as words, sonatas, buzz saws and thunder traveling in space through air, or through other mediums such as metal, water or any other substance.

Inspired and referred from "Sound Hearing Resonance" - Thomas Humphery and Marcia Tanner.

Spaces have resonance and this quality adds to its holistic perception. Conversely, space can also qualify sound. A low intensity sound can be heard in a small space while it may lose its significance in a large area. For, e.g., drop of a pin or the ticking of a clock in a quiet room can be noticed while it goes unnoticed in outdoor spaces.

Sounds are also markers of places and activities. Markets and cities are noisy; but this very 'sound' and related activities make a city feel alive.

### Sound mapping of Ahmedabad

Ahmedabad is the eighth biggest city in India by population - 5.4 million people spread over 205 sq kms, make up the urban populace. Like all other cities, activities are varied and intense; and occur in dense or spread out fabrics. Each kind of engagement creates its own sound conditions - the beat of metal work within a unit of a tight, medieval fabric; or the roar of machinery in an open shed industrial area. Similarly, every urban act generates its own characteristic sound which we are accustomed to hearing in the background of our day to day lives.

I decided to explore this phenomenon of sound for my study. I chose five different areas within Ahmedabad, based on a combination of land use and building typology - the tightly packed fabric of the old city which has both residential and commercial spaces; a slice of the University area which is open in nature with large green buffers; fields on the outskirts of the city and a part of a designated industrial estate in the southern part of Ahmedabad.

I recorded sounds in each of these places at three specific time periods of the day - morning, afternoon and evening. Based on these recordings, I have drawn 'Sound Maps' of each of these areas. The maps indicate the spread of sound over a given area at a given point in time. Observations and recordings have been made in the months of May, June and July. Observations might be slightly different for other times of the year.

Like most cities, the sound of traffic dominates; followed by the human conversation. It was possible however, to hear birds, dogs and the sound of wind in some pockets of the places that I studied. Each of the sources is indicated by a pictogram in the maps drawn. I have also drawn sections through all the places investigated to look at how sound travels vertically. These are based on point recordings. For better understanding, histograms of actual recordings have been included.

**Sites observed:**

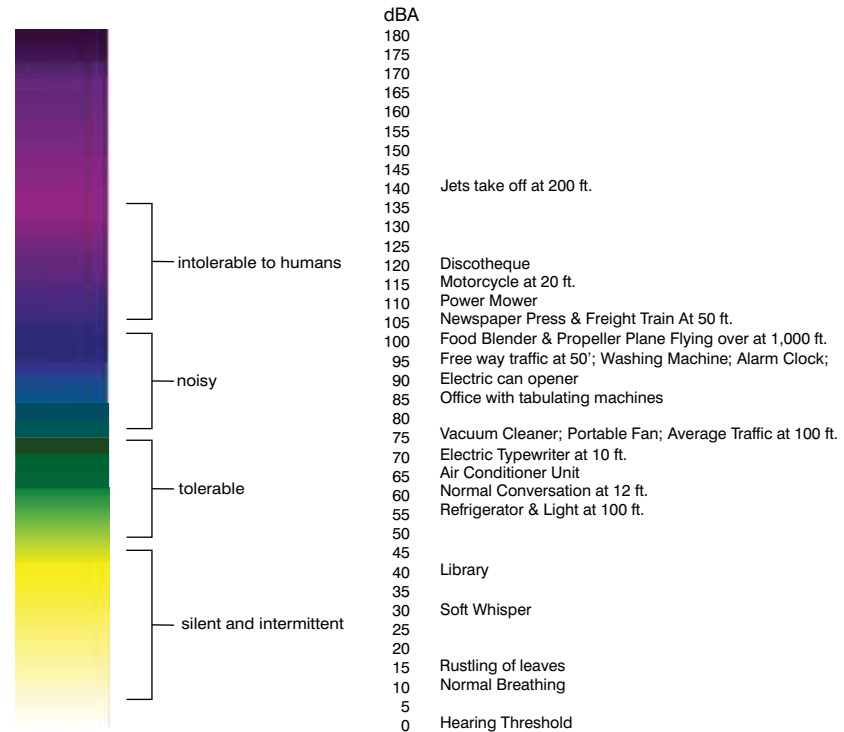
- |                     |   |
|---------------------|---|
| Core city area:     | a. <i>Jami</i> Mosque and edges - The mosque lies in the busiest area of the city, surrounded by major activity centers like market places. <i>Manek chowk</i> , famous for its eateries with constant vehicular buzz abutts one of the edges of the mosque.        |
|                     | b. The <i>pol</i> is the medieval fabric of Ahmedabad, which now functions as partially residential and partially commercial space. It is characterised by a highly packed and dense fabric.  |
| Institutional area: | c. Institutional areas such as Gujarat University have large open areas where students are engaged in various activities during college hours. Large parts of the university grounds are only partially accessed and have isolated buildings spread out over these. |
| Open fields:        | d. Agricultural fields near the edge of the city also have busy highways or roads connecting settlements running close by.  |
| Industrial area:    | e. G.I.D.C. Vatva is a designated industrial area. Most buildings here are sheds with heavy machinery inside.   |

## Decibel scale

The unit decibel is commonly used in acoustics to quantify sound levels. Human ear has a tendency to perceive a certain range of sound which is 20/15 Hz/dBA. to 20,000/140 Hz/dBA.

The diagram on the right shows the scale of sound (in decibel) represented in color, which I have used in the maps.

Pictograms below indicate the source of sound heard in each case study.



<http://www.forteriecars.org/noiseimpact.html>

## Source of sound



## Building typology and land use

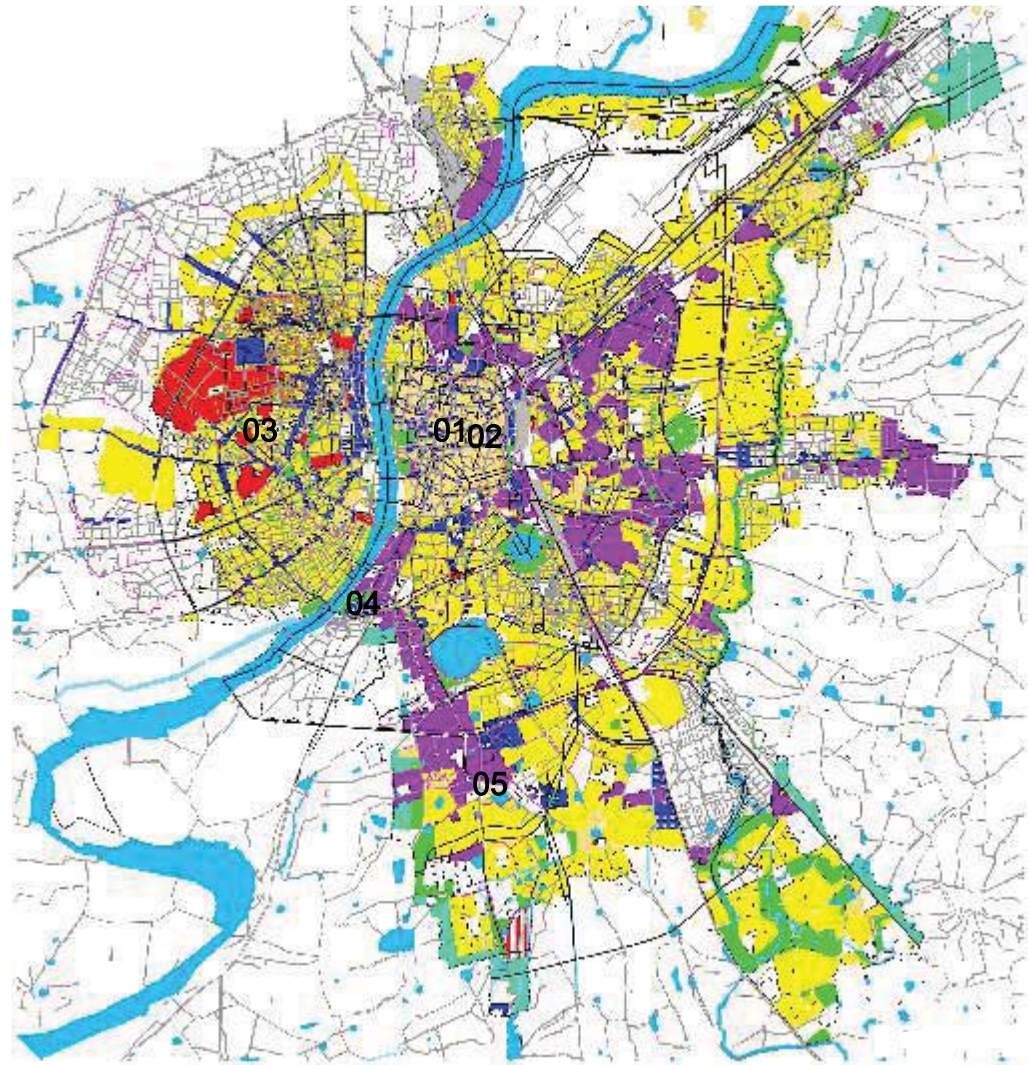
Ahmedabad displays distinct built typologies and land use. Based on a combination of the two, five case studies were selected which were very different from each other in terms of activities, built fabric and location.

- 01. Jami Mosque Edges, Teen Darwaza
- 02. Kshetrapal ni Pol, Manek Chawk
- 03. Gujarat University, University road
- 04. Agricultural fields, Pirana road
- 05. G.I.D.C., Vatva

### Legend

- Core City Area
- Residential Zone
- Institutional Zone
- Commercial Zone
- Agricultural Zone
- Industrial Zone
- Green & open Space
- Water Bodies

### Land use map of Ahmedabad



Source: Unpublished map; Batch of 2008, Urban Design Dept., CEPT



### 03. Sounds observed in Ahmedabad city

a. *Jami* Mosque edges, old city

## **Jami Mosque edges**, old city.

**Location:** Near *Teen Darwaza*, Gandhi Road.

### **Sounds in morning**

Silence in most areas, especially within the mosque. Sounds like birds flapping their wings and their chirps can be heard.

No vocal conversation heard until hawkers start setting up stalls around.

Silence is broken by occasional passing of vehicles.

### **Sounds in afternoon**

The mosque court is one of the few quiet places at this hour.

Conversations are heard on footpaths. These are the only shades spaces in this area.

Honking of vehicles is less as compared to peak hours.

### **Sounds in evening**

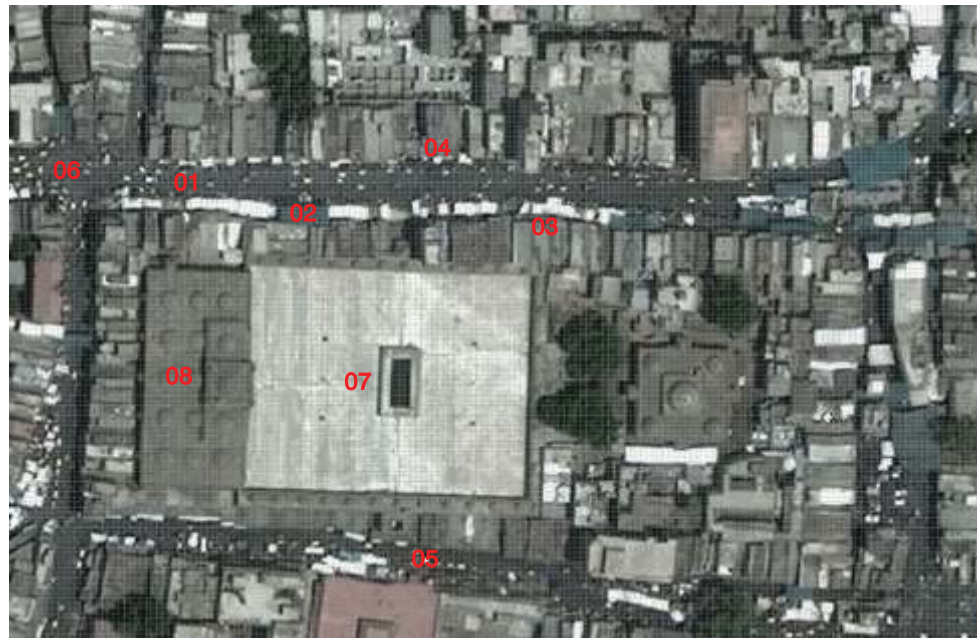
Silence within the mosque, mosque court largely silent; but and with a faint buzz of vehicles in the background.

Conversations of pedestrians on the road edges.

Roads intensively noisy with honking of vehicles.

### **Call for prayers**

During sunset, the *Azan* from the *Jami* mosque and the temple bells from *Manek Chawk* can be heard.



Map of the Area



0 20 60

## Activities



**01** Hawkers lane along the edges of Gandhi road.



**02** Conversation at road edges between buyers and sellers.



**03** Parking lane on Gandhi road edges.



**04** Various activities along the street.



**05** Traffic congestion, center of the road.



**06** Intense traffic and noise during peak hours.

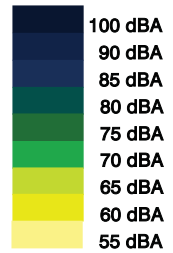


**07** Jami mosque during prayer time.

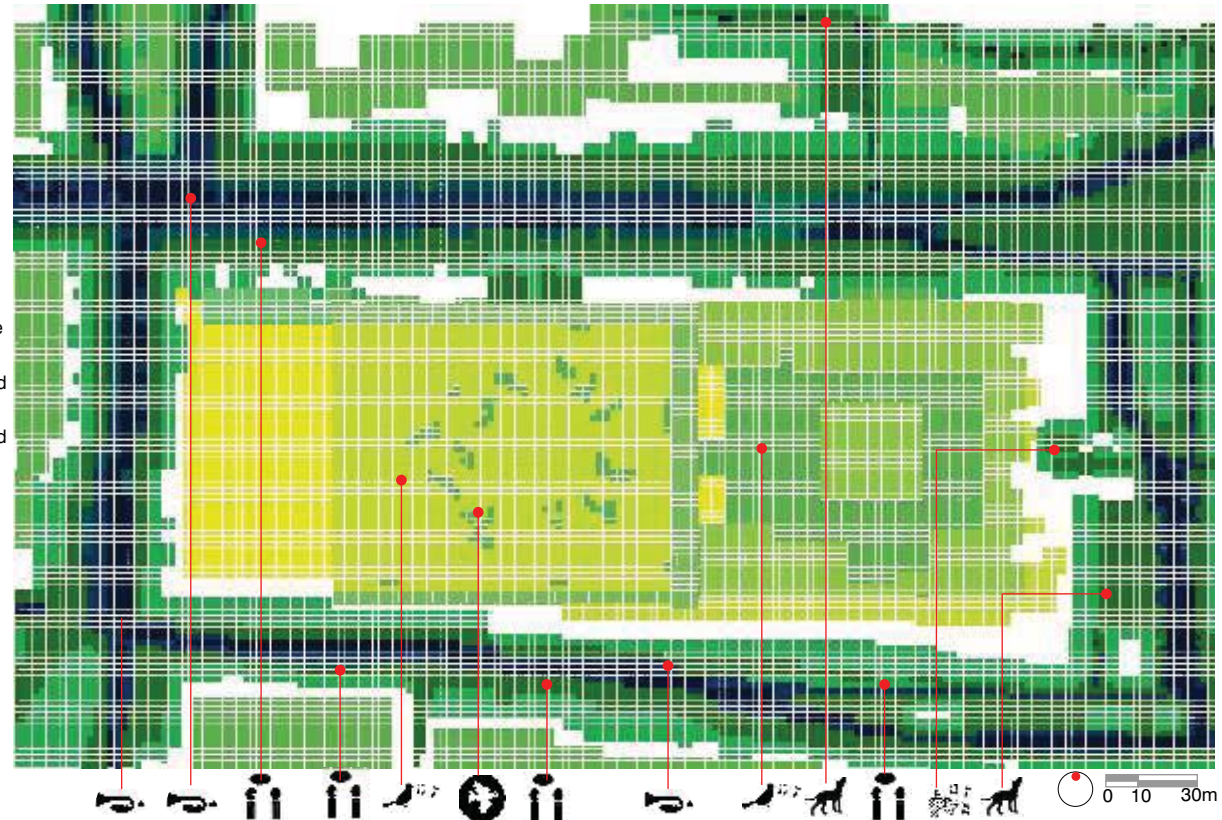


**08** Jami mosque behind an envelope of shops, shoppers and traffic.

Sound Map of area between 07:00 - 09:00 hrs.



Intensity of sound at distance from source



90-80 dBA - sound of vehicles passing , increases with honks.



80-70 dBA - sound of a single vehicle passing.



75-65 dBA - sound heard when a vehicle passes, with no hawkers .

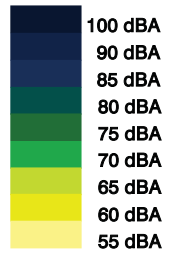


55-60 dBA - silent; chirping of birds, buzz of vehicles in background.

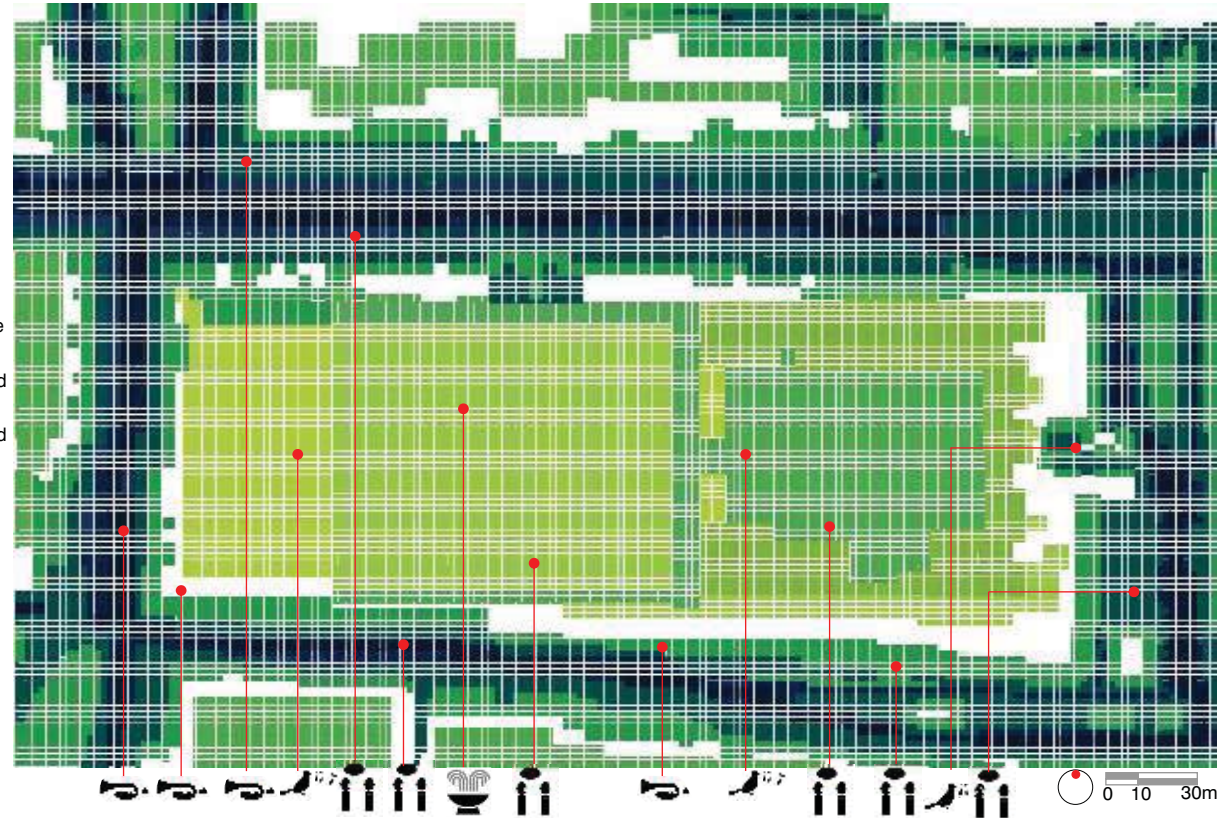


of 55-60 dBA - silent; no particular  
sound observed. 13

Sound Map of area between 18:00 - 20:00 hrs.



Intensity of sound at distance from source



100-90 dBA - sound of vehicles passing, increases with honks.



90-80 dBA - sound of conversations and vehicles in background.

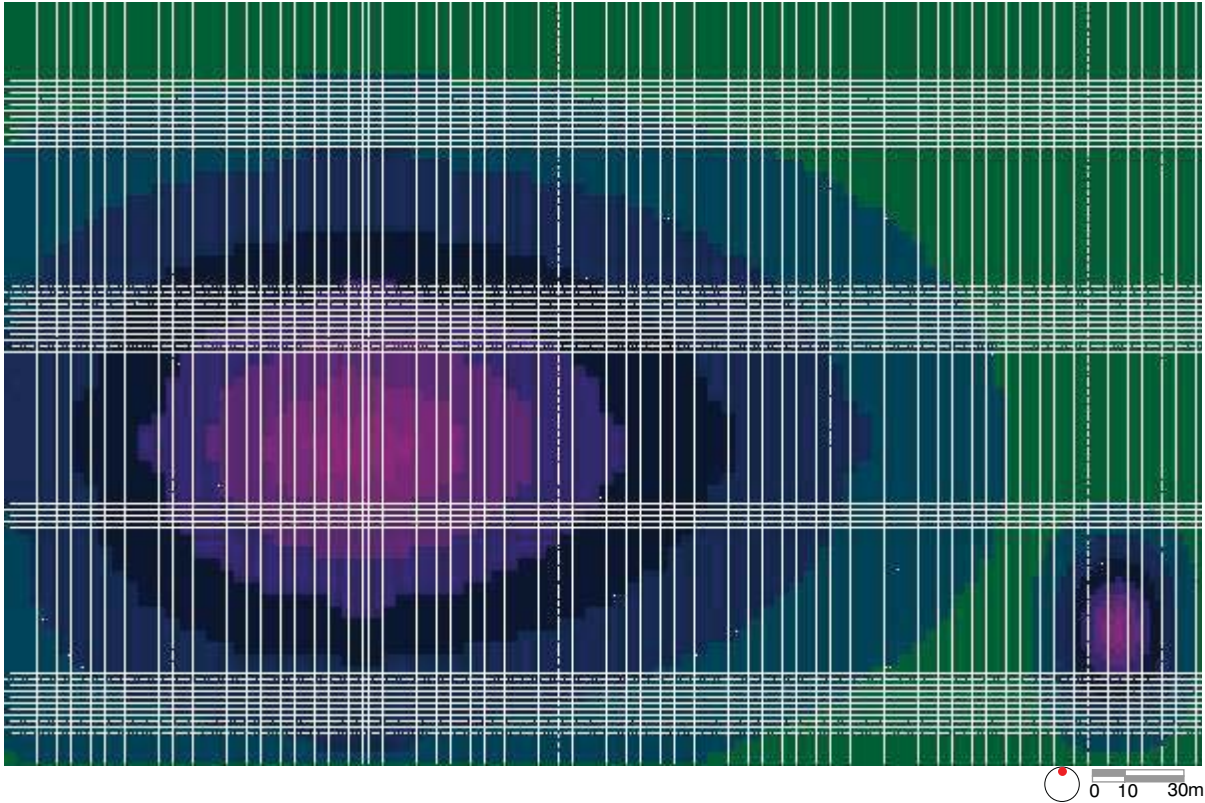


80-70 dBA - conversations of hawkers and pedestrians.



of 65-60 dBA - silent; no particular sound observed.

Sound map of area at the time of *Azan*.



People gathering for prayers.



Crowd getting ready for prayers.

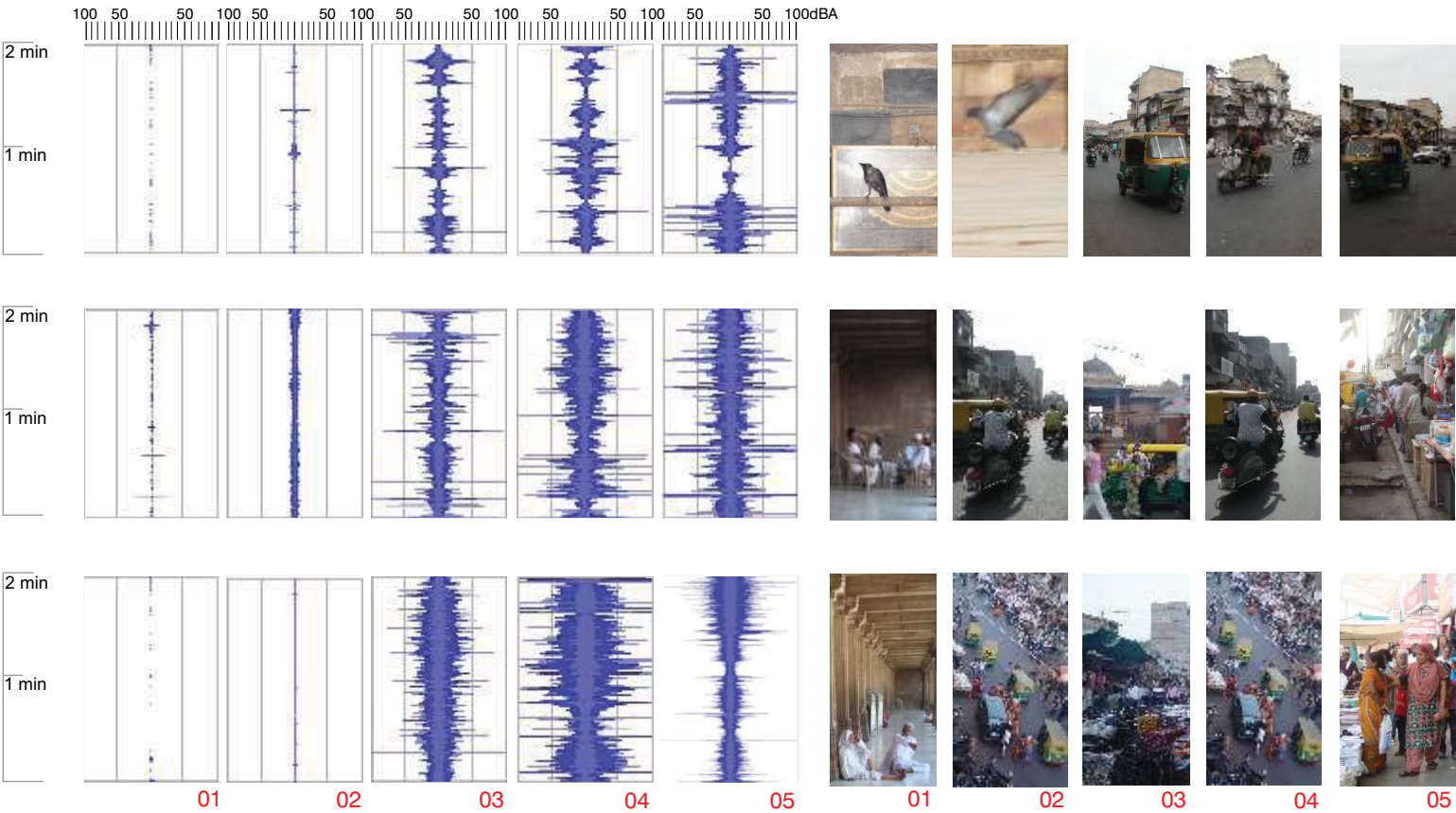


Atmosphere during prayer hours.

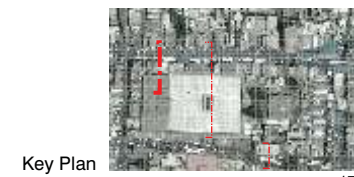
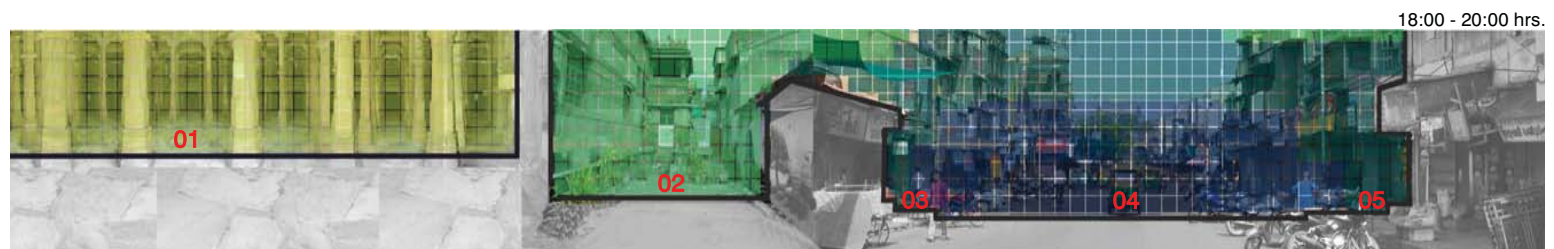


After the prayers.

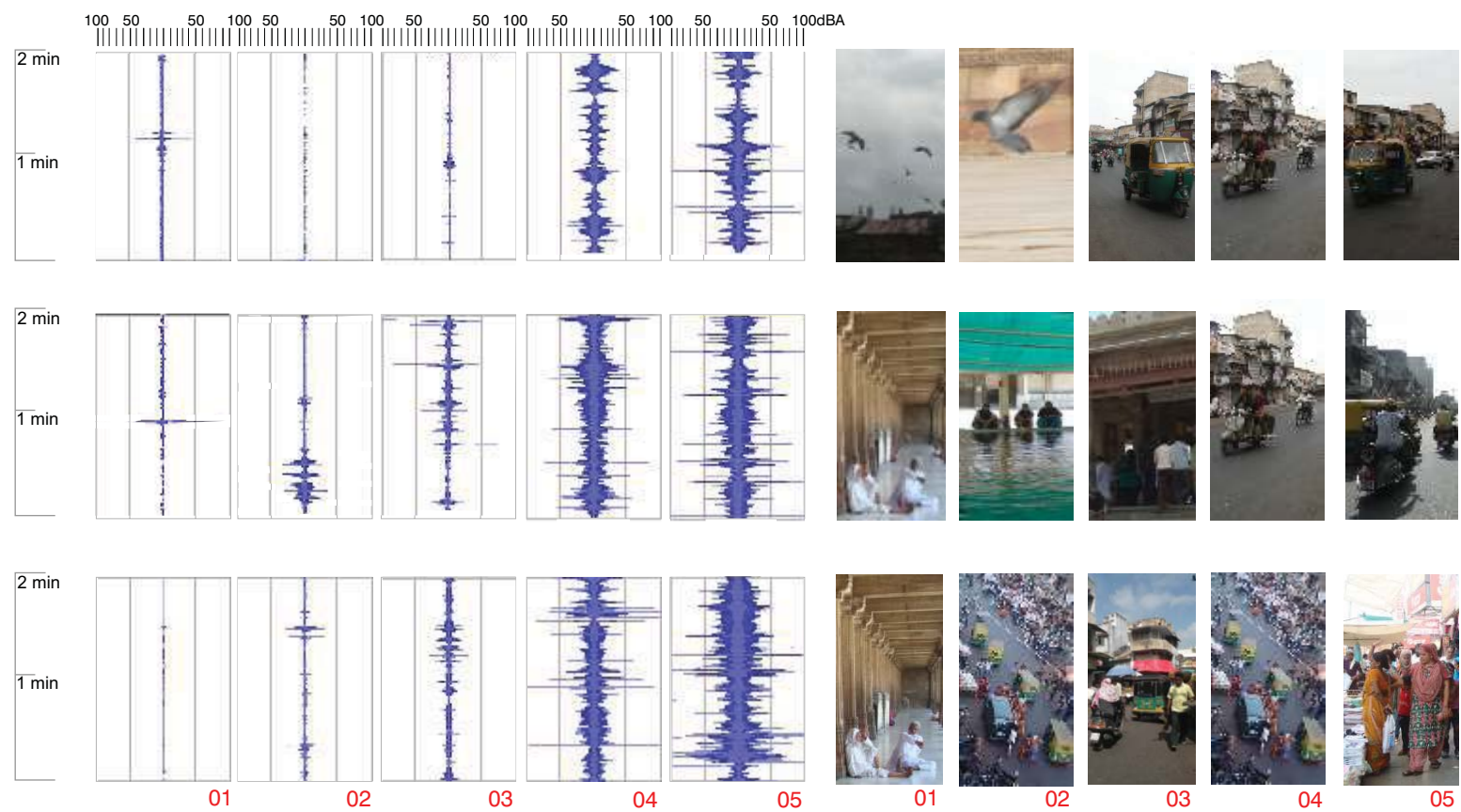
Recordings and Sources



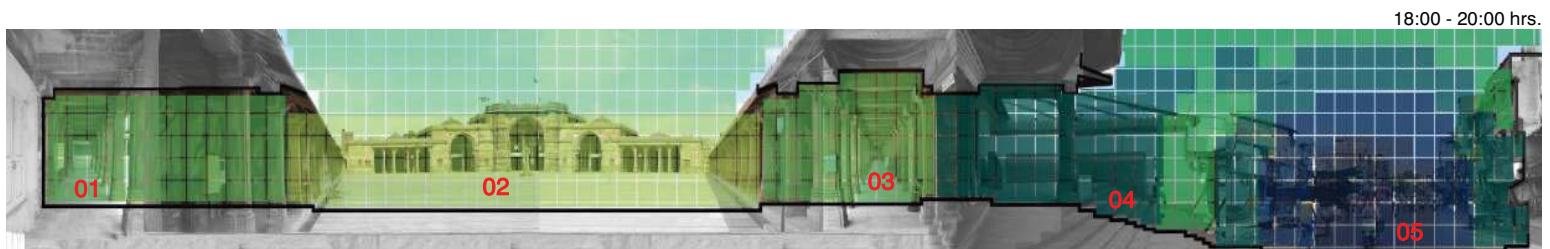
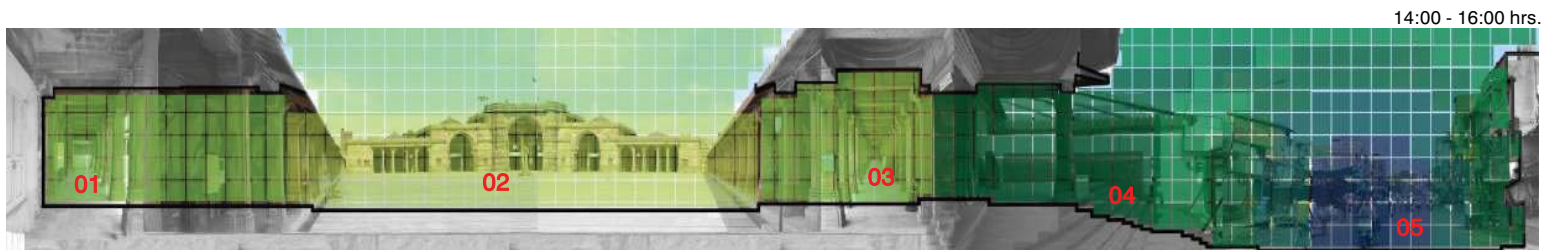
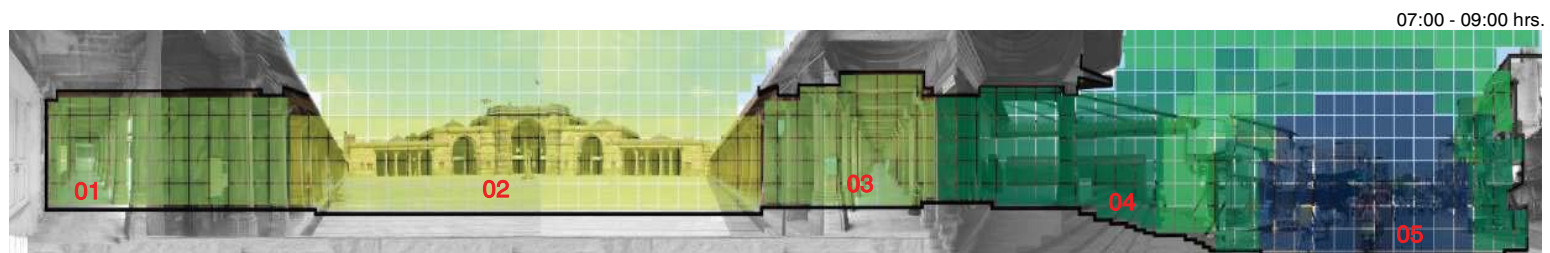
Sectional view indicating intensity of sound



## Recordings and Sources



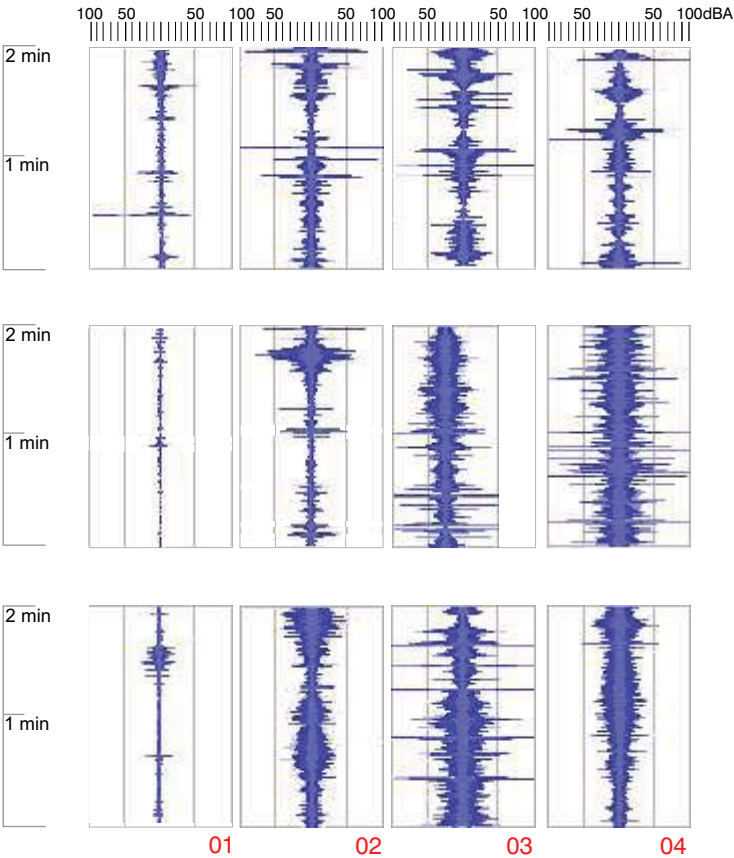
Sectional view indicating intensity of sound



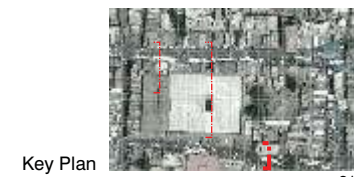
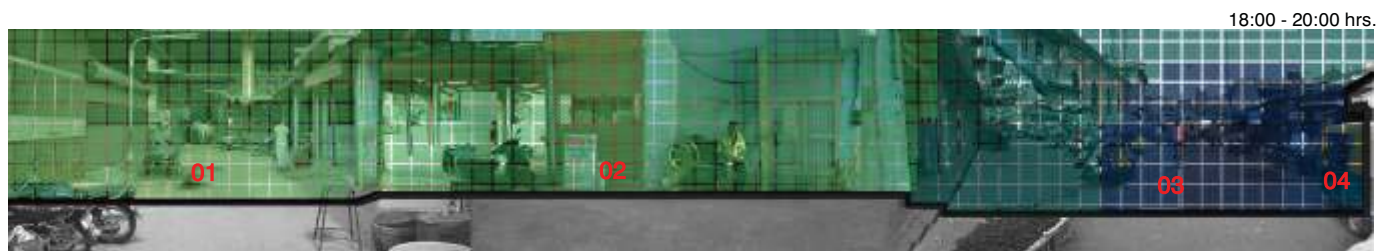
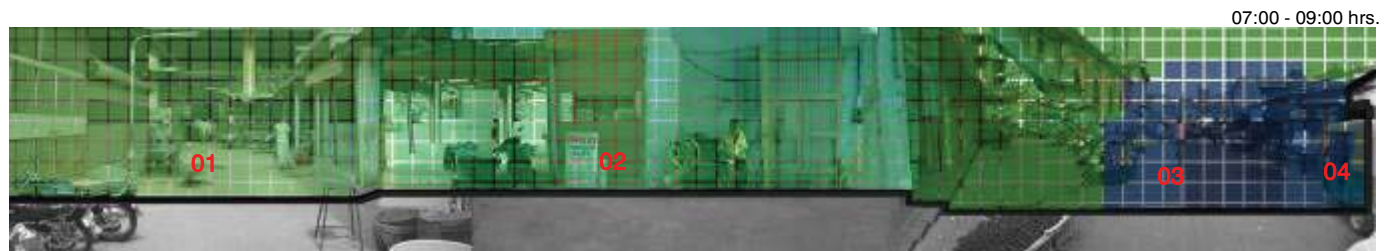
Key Plan



Recordings and Sources



Sectional view indicating intensity of sound





b. *Kshetrapal ni Pol*, old city

## ***Kshetrapal ni Pol***, old city.

**Location:** *Manek Chawk, Challa Ol*, old city.

### **Sounds in morning**

Birds chirping and squirrels squeaking can be heard in the streets of the *pol*.

Conversations and sounds of household chores are heard from houses.

Few vehicles pass through *Challa Ol* at this time.

### **Sounds in afternoon**

Silence in most of the inner areas of the *pol*.

Sounds of conversations dominate commercial areas on road edges and inside shops.

Stray dogs' bark on passers by.

### **Sounds in evening**

Conversation of people, and children playing.

Stoves roar at *chai ka galla* (neighborhood tea vendor), and can be clearly heard.

Conversation and honking of vehicles in *Challa Ol*.



Map of the Area

## Activities



**01** People chatting at *nukkad* (corner) of the *pol*.



**02** *Chai ka galla* (tea stall) inside the *pol*.



**03** Whole sale market inside *pol*/houses.



**04** Narrow spaces between buildings.



**05** *Pol*/houses allow conversation across the street.



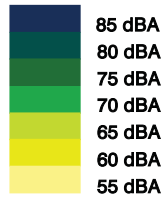
**06** Women chatting in courtyards during evening.



**07** Children playing in courtyards.



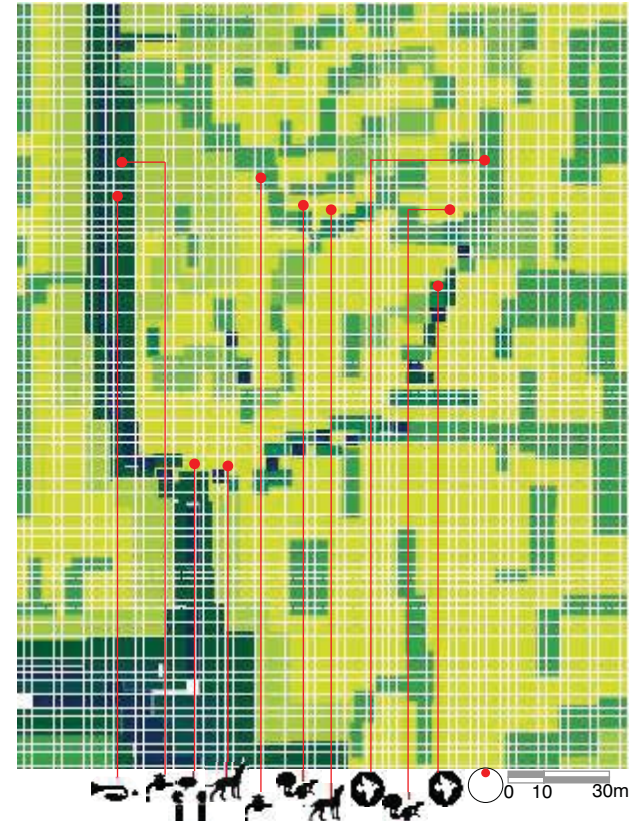
**08** Commercial street, *Challa Ol*.



Intensity of sound at distance from source



Sound Map of area between 07:00 - 09:00 hrs.



85-75 dBA - vehicular movement in the *ChallaOl*.



70-75 dBA - tap water falling, and sound of clothes being washed.

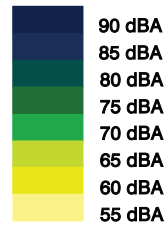


65-60 dBA - conversation.

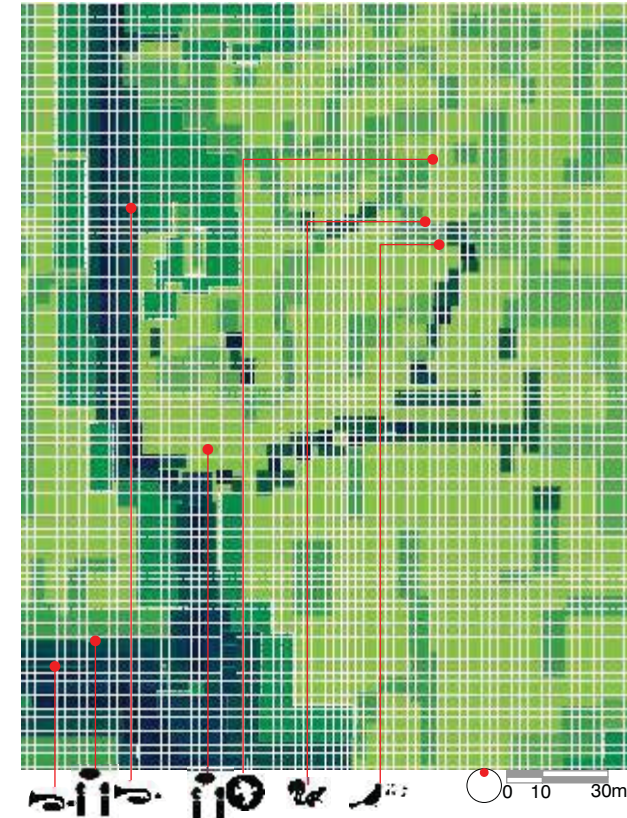


60-50 dBA - cooing of pigeons and squirrels squeaking.

Sound Map of area between 14:00 - 16:00 hrs.



Intensity of sound at distance from source



90 dBA - vehicles moving on the road, inside the *pol*.



85-75 dBA - construction as well as *chai galla's* (tea stall) stove.

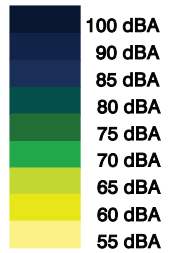


75-65 dBA - conversation in the courtyard and work area.



65-55 - squirrels & pigeons in an open space within the *pol*.

Sound Map of area between 18:00 - 20:00 hrs.



Intensity of sound at distance from source



100-85 dBA - vehicles in *Challa Ol*, pedestrians at edges of the street.



85-75 dBA - people chatting and children playing.



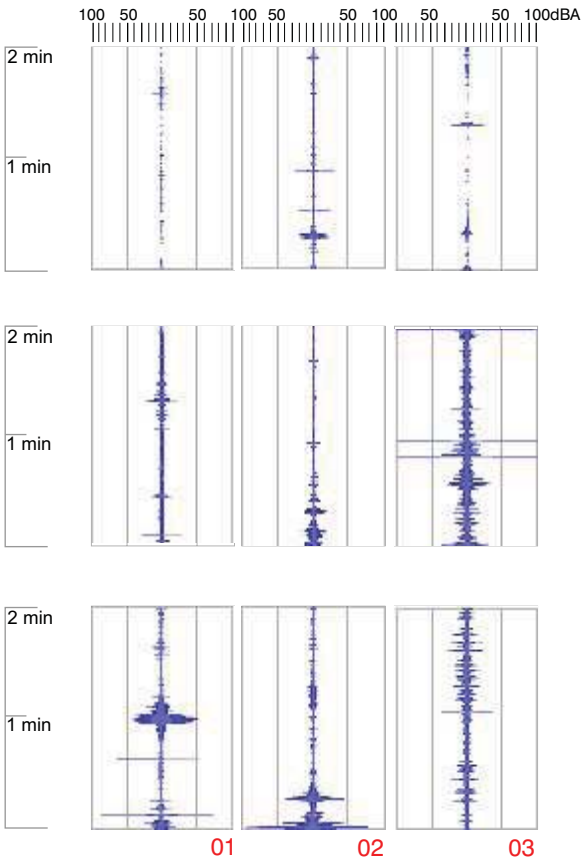
75-65 dBA - courtyards and open spaces in the interior of *pol*.



70-60 dBA - inside residences & offices in the *pol*.

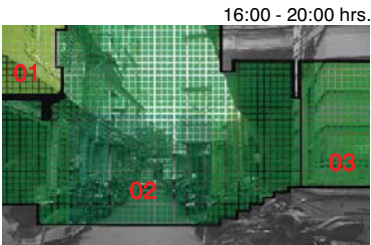
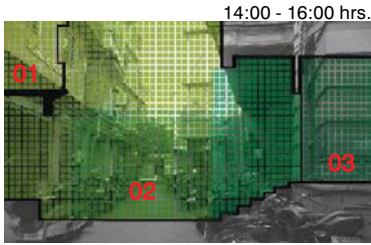
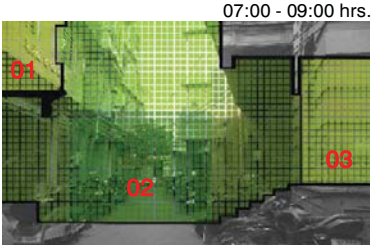


Recordings and Sources



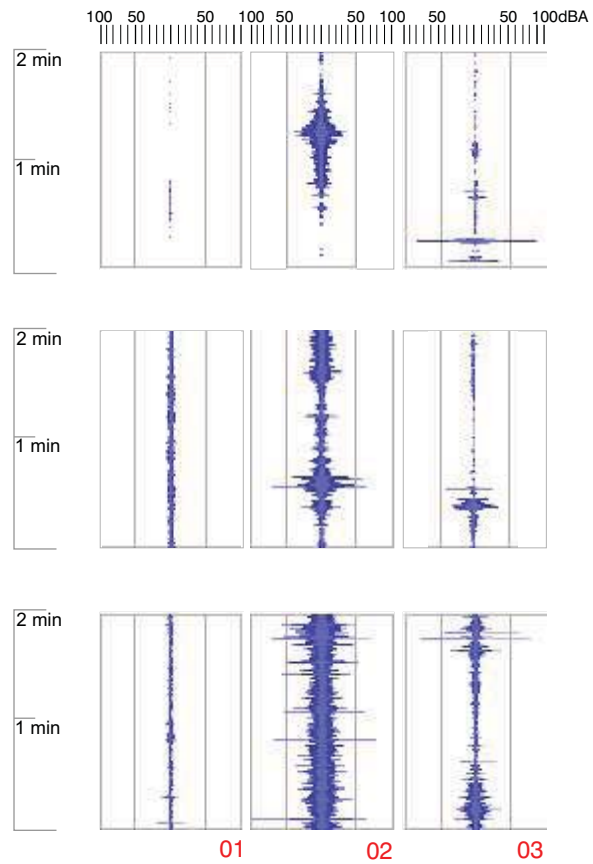
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Sectional view indicating intensity of sound

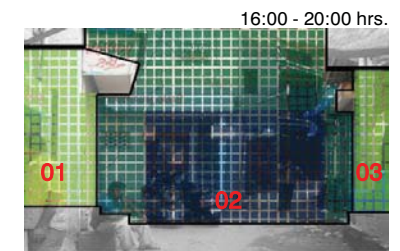
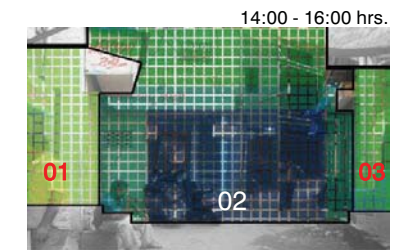
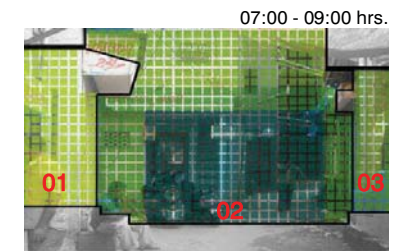


Key Plan

## Recordings and Sources



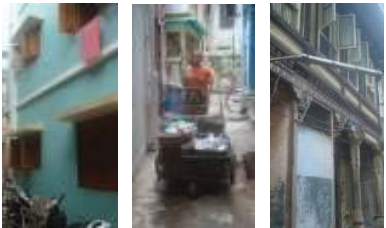
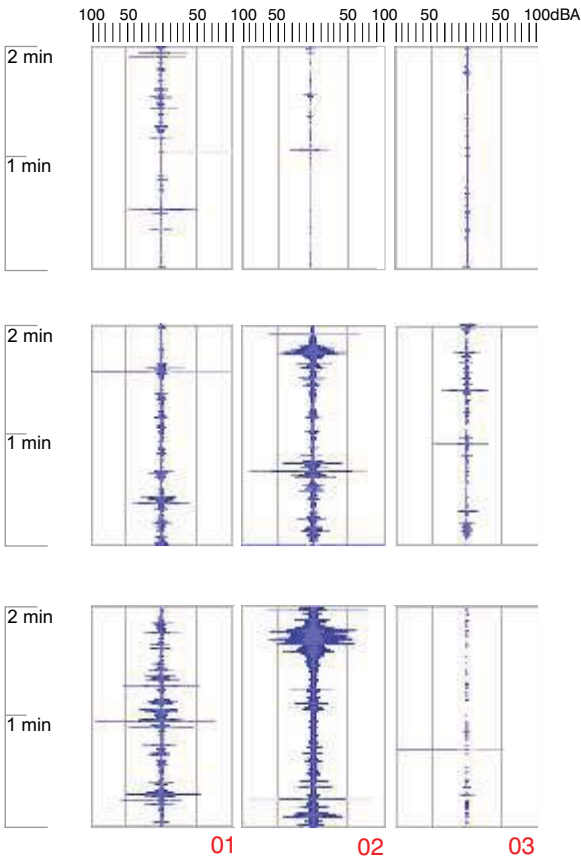
## Sectional view indicating intensity of sound



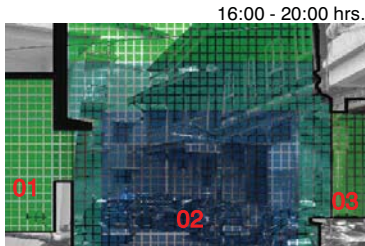
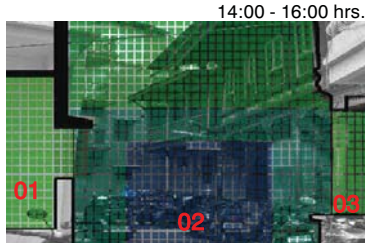
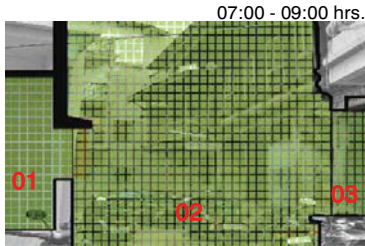
Key Plan



Recordings and Sources

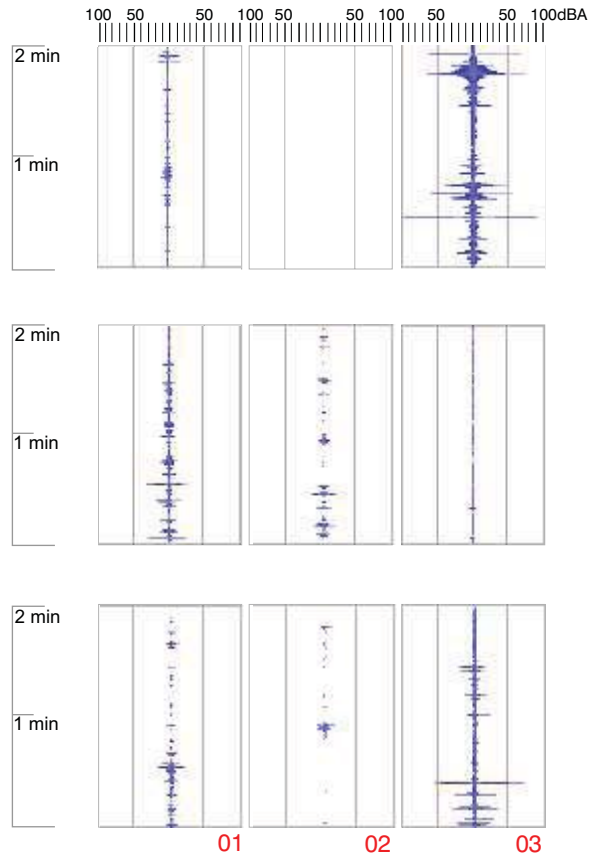


Sectional view indicating intensity of sound



Key Plan

## Recordings and Sources

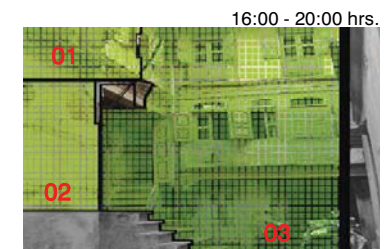
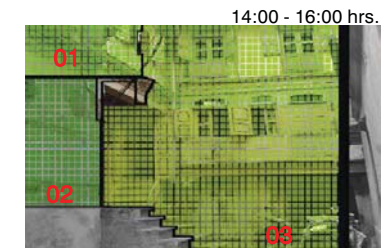
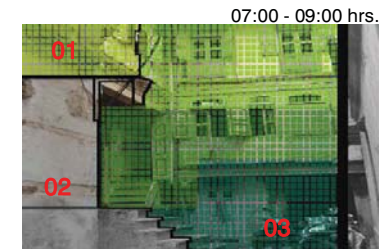


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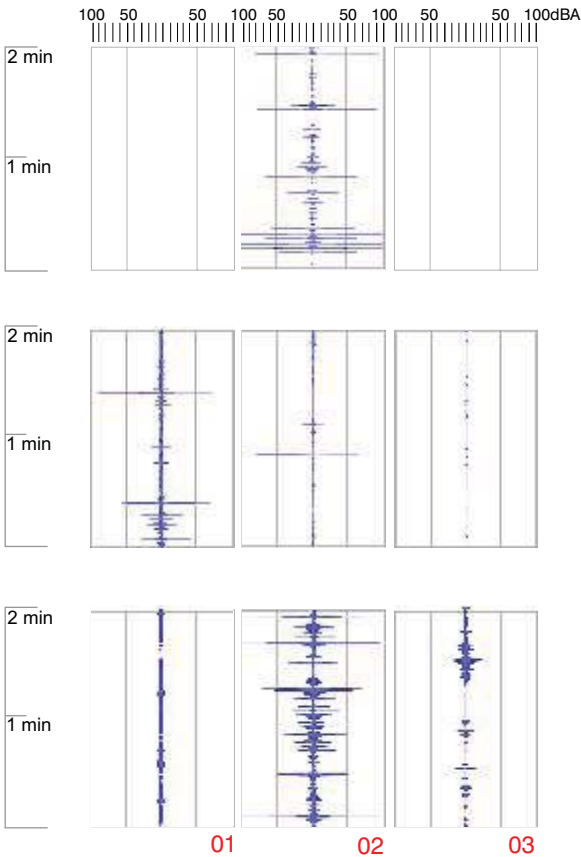
## Sectional view indicating intensity of sound



Key Plan

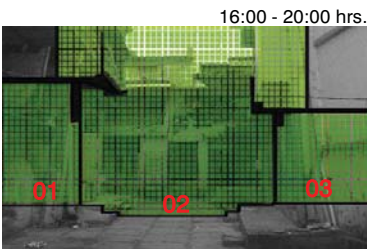
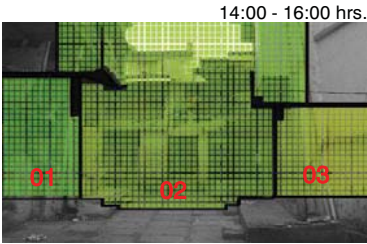
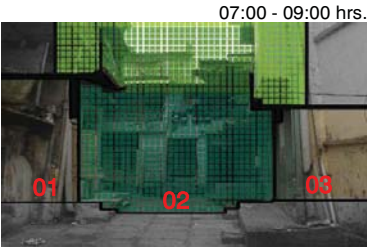


Recordings and Sources



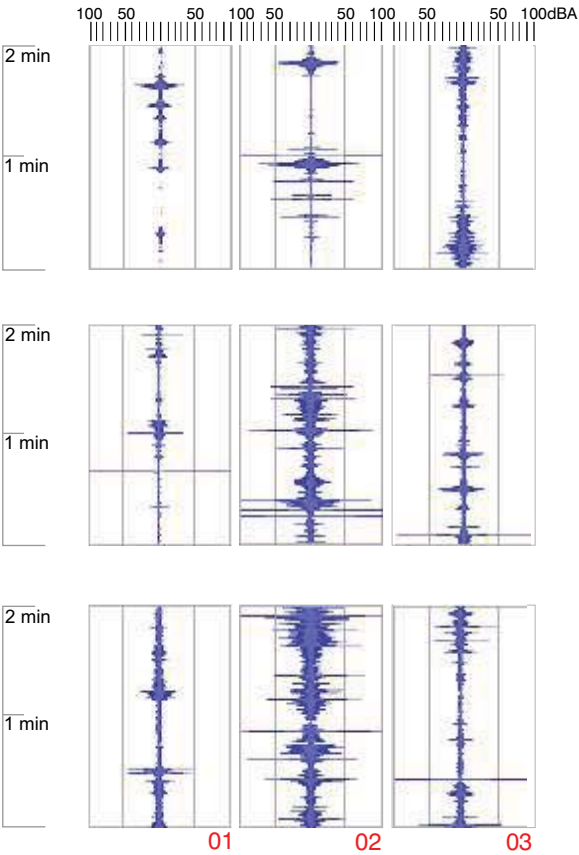
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Sectional view indicating intensity of sound

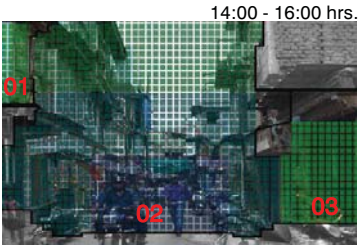
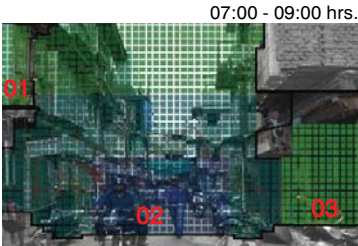


Key Plan

Recordings and Sources



Sectional view indicating intensity of sound



Key Plan





c. Gujarat University, institution

## Gujarat University, institutional.

**Location:** University Road

### **Sounds in the morning**

Sounds of peacocks, *koels*, babblers, mynas and many more birds. Occasionally, music is also heard.

Conversation of people coming for jog or walk.

### **Sounds in the afternoon**

Silence in open, bare, grounds of the campus.

Conversation of students and staff.

Sound of vehicles moving along internal streets.

### **Sounds in the evening**

Quiet and calm atmosphere with sounds of birds chirping.

Few conversations of youngsters playing.

Occasional honking of vehicles passing on the road.



Map of the Area

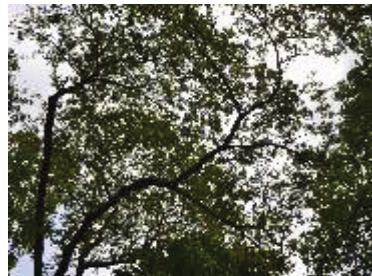
## Activities



**01** Clock tower, Gujarat University. The clock striking every hour heard in the vicinity.



**02** Youngsters playing on university playgrounds.



**03** Tree canopies shelters the birds that are heard in the campus.



**04** Quiet, internal road.



**05** Activity on grounds in the morning & evenings.



**06** Road edges that are used for occasional conversation.

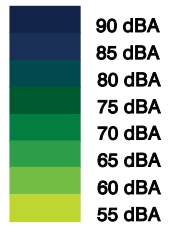


**07** Areas near hawkers are points of intense activity.

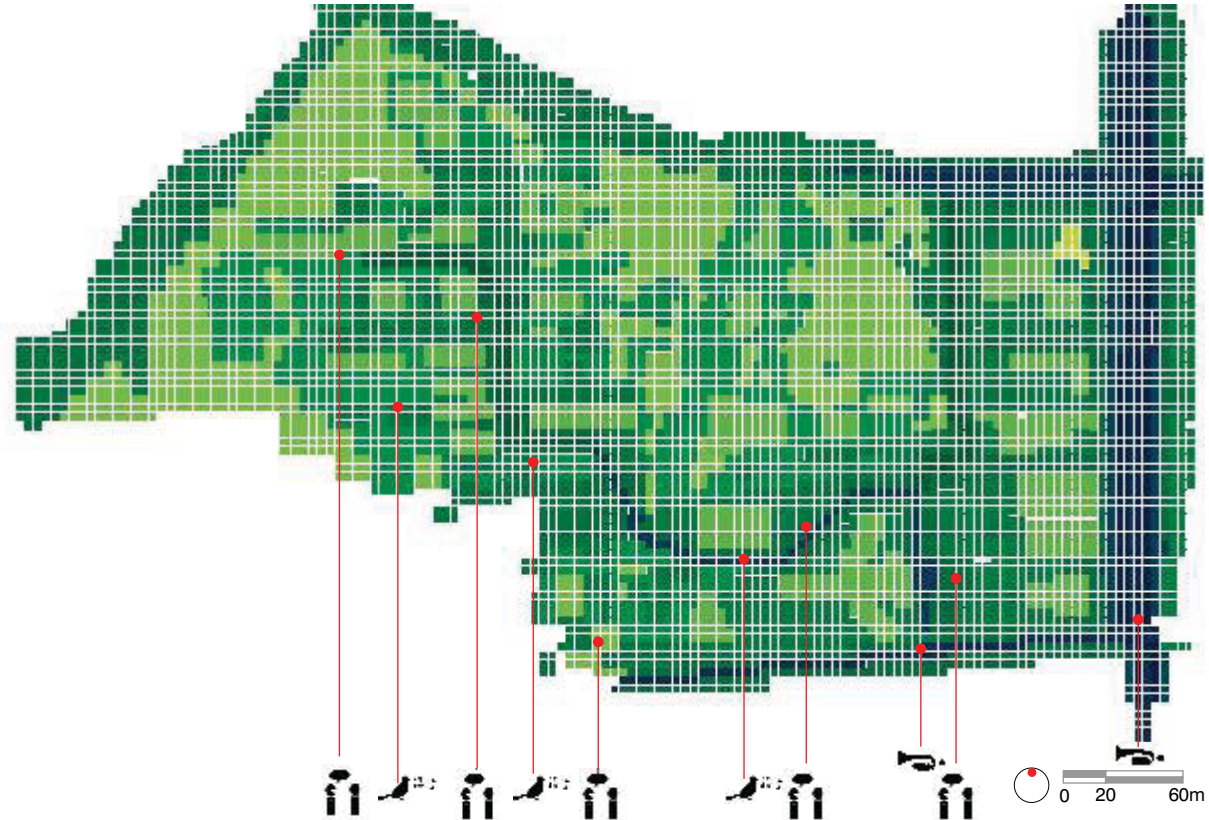


**08**

Sound Map of area between 06:00 - 08:00 hrs.



Intensity of sound at distance from source



90-80 dBA - vehicles plying on the main road.



75-70 dBA - conversation of people coming for walk.

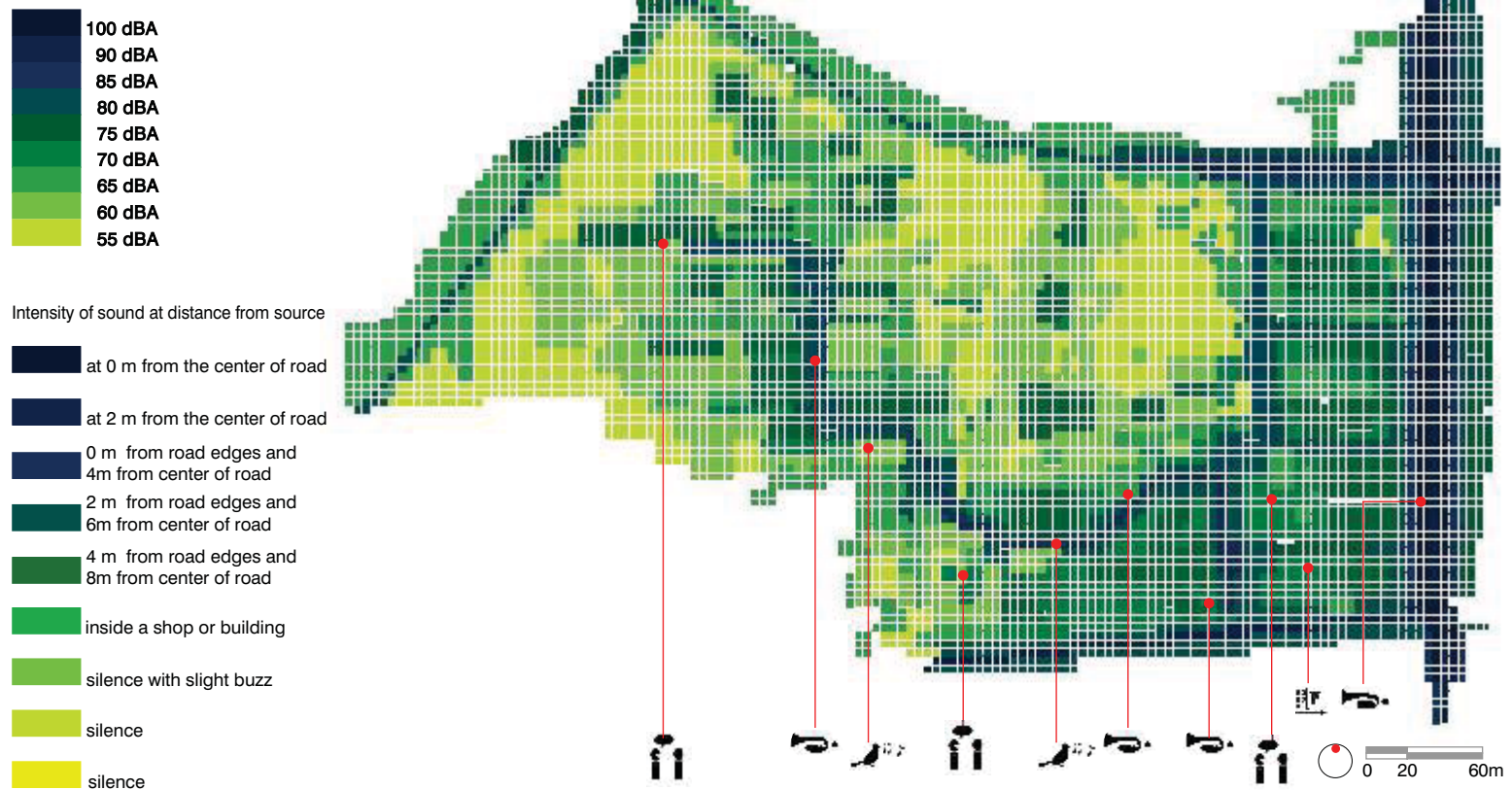


65 dBA - chirping of birds in the campus.



60 dBA - are rustling of leaves due to the wind.

Sound Map of area between 11:00 - 14:00 hrs.



100-90 dBA - vehicles plying on internal road and main road outside.



85-80 dBA - around the campus and near the built masses.

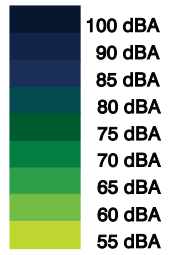


75-65 dBA - conversation of students in the campus.

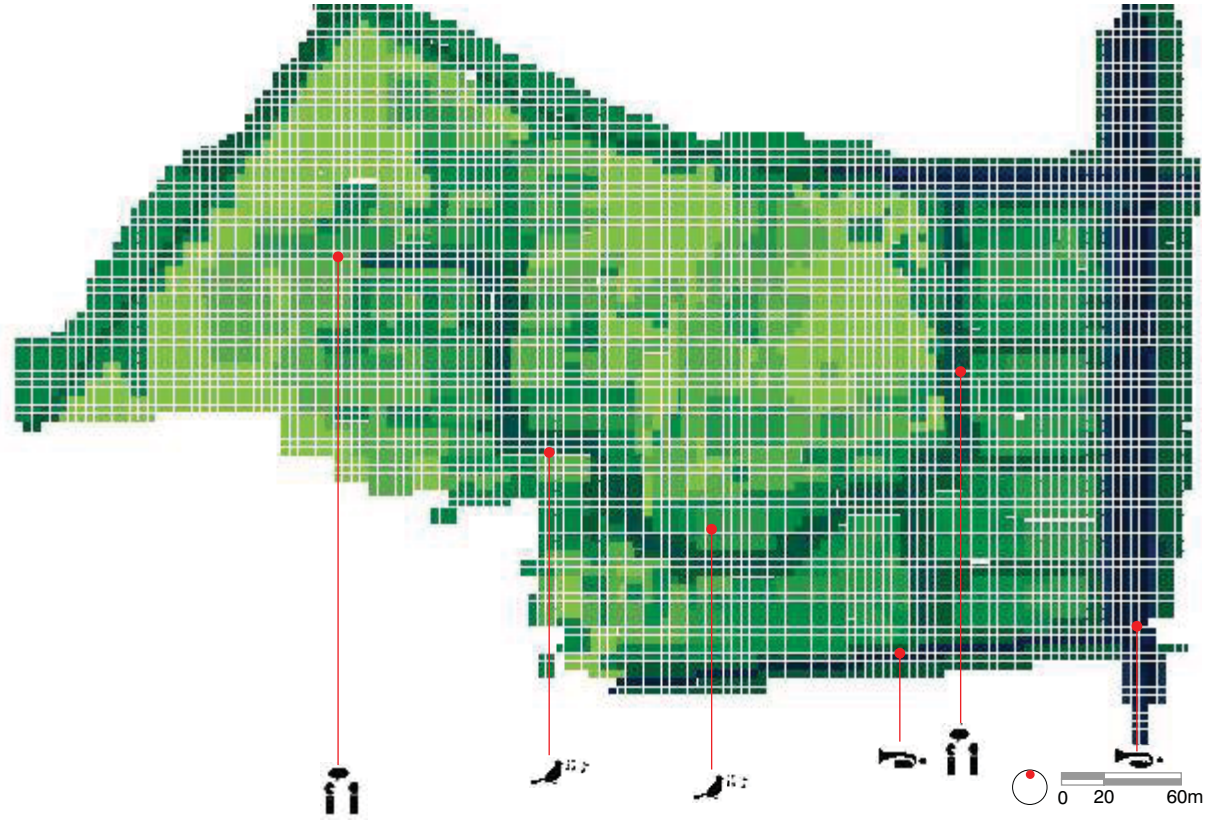


60-55 - bare open grounds of the campus.

Sound Map of area between 17:00 - 19:00 hrs.



Intensity of sound at distance from source



100-85 dBA - vehicles plying on the main road.



80 dBA - youngsters playing on playgrounds.



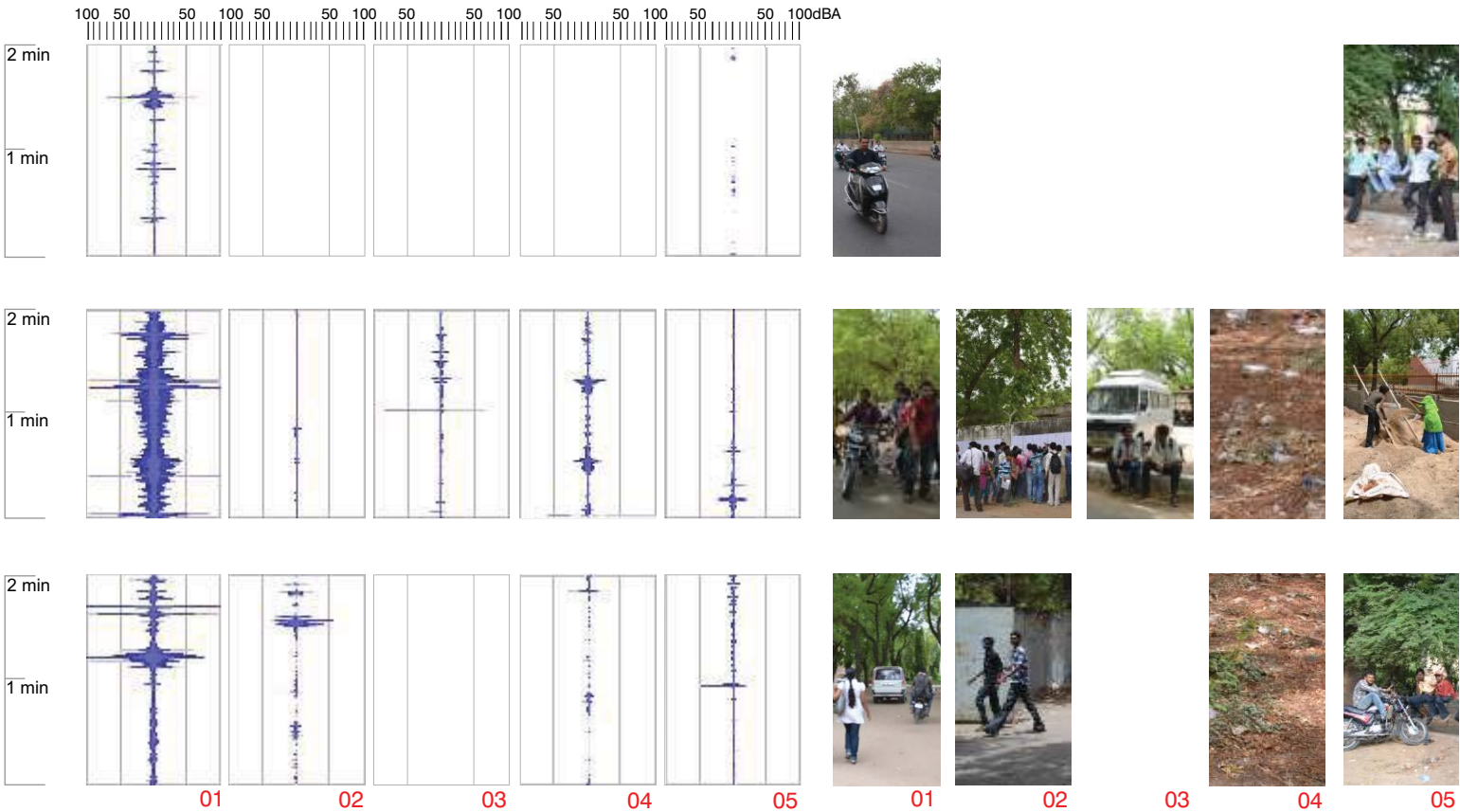
75-70 dBA - chirping of birds in the campus.



65-60 dBA - are rustling of leaves due to the wind.

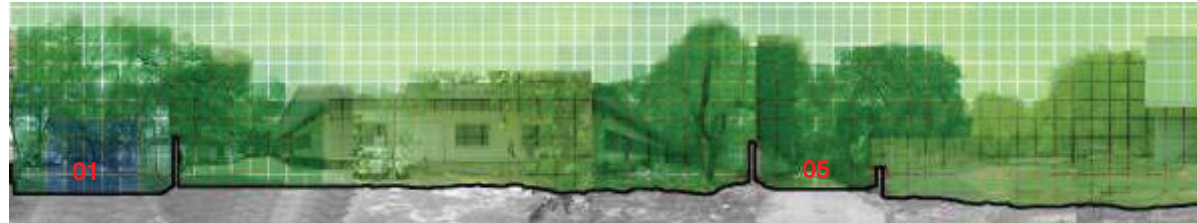


Recordings and Sources

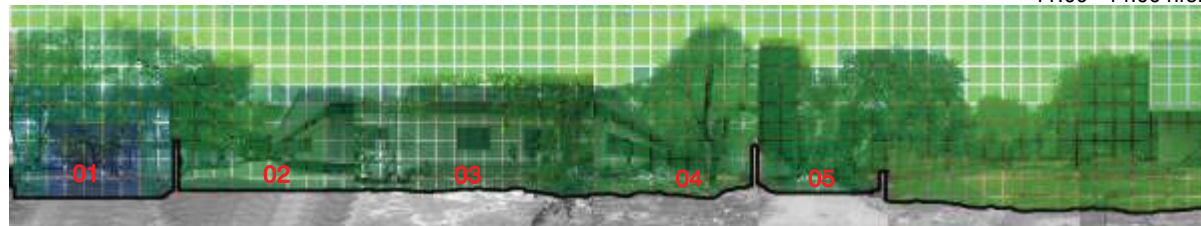


Sectional view indicating intensity of sound

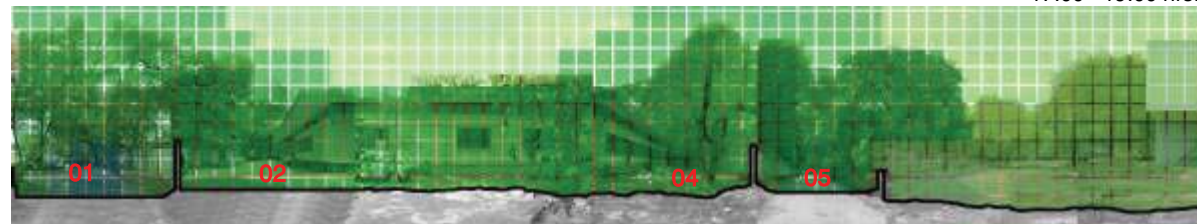
06:00 - 08:00 hrs.



11:00 - 14:00 hrs.



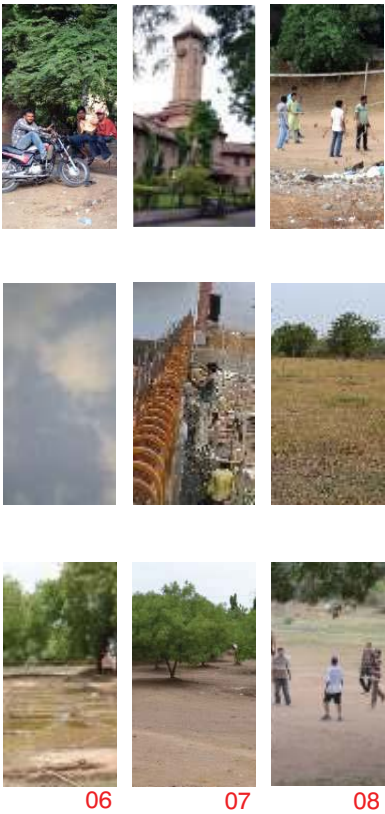
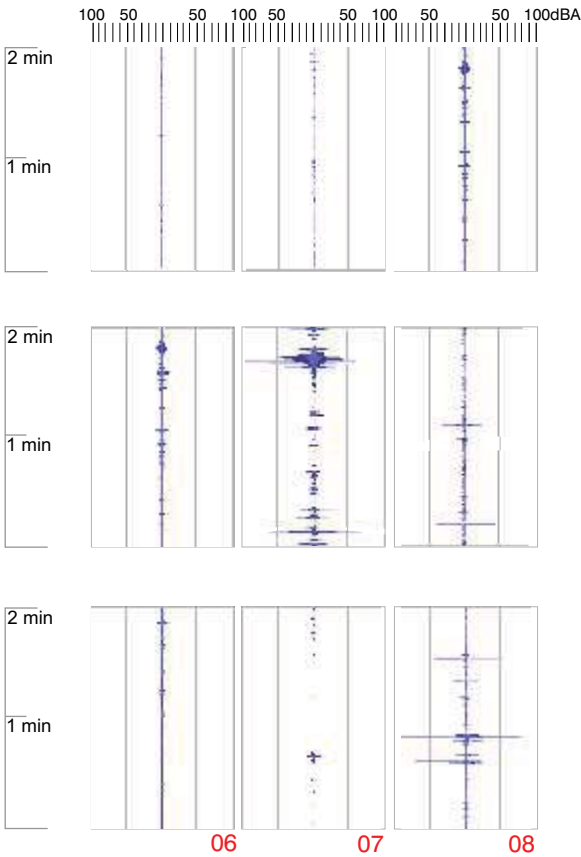
17:00 - 19:00 hrs.



Key Plan



Recordings and Sources

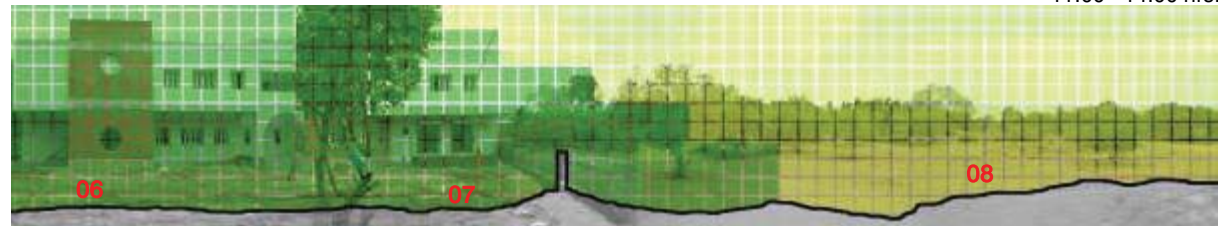


Sectional view indicating intensity of sound

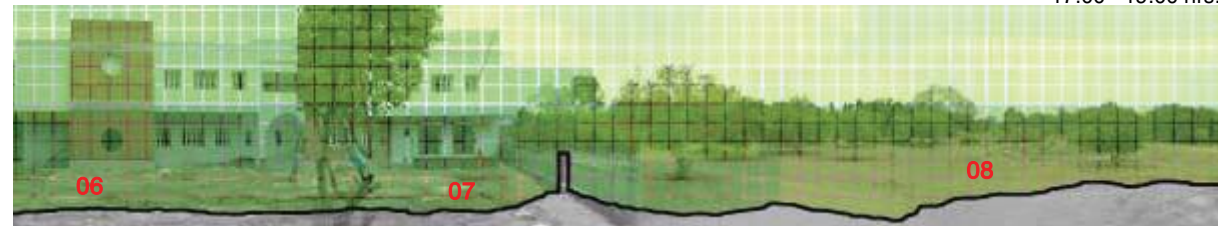
06:00 - 08:00 hrs.



11:00 - 14:00 hrs.



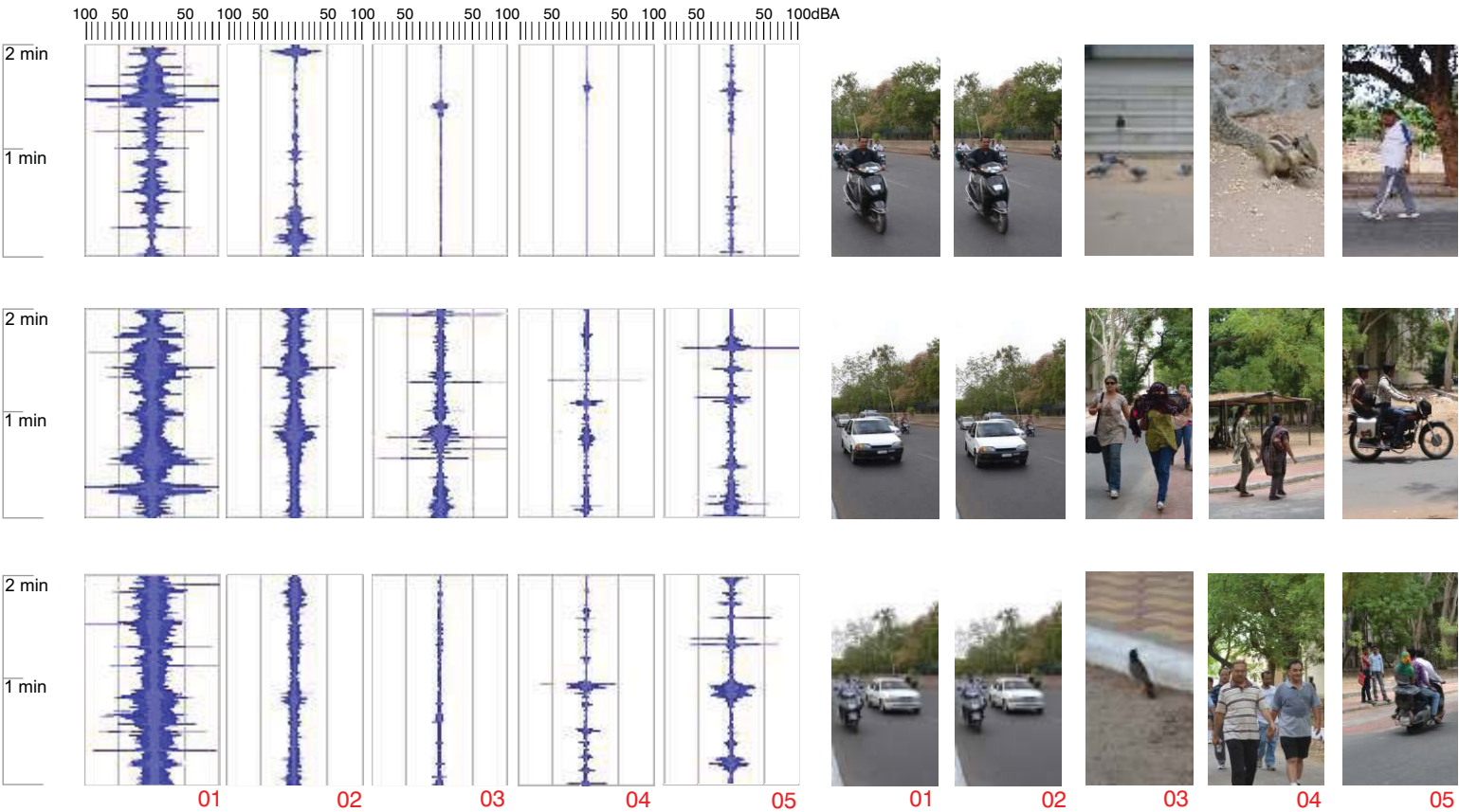
17:00 - 19:00 hrs.



Key Plan



Recordings and Sources



Sectional view indicating intensity of sound

06:00 - 08:00 hrs.



11:00 - 14:00 hrs.



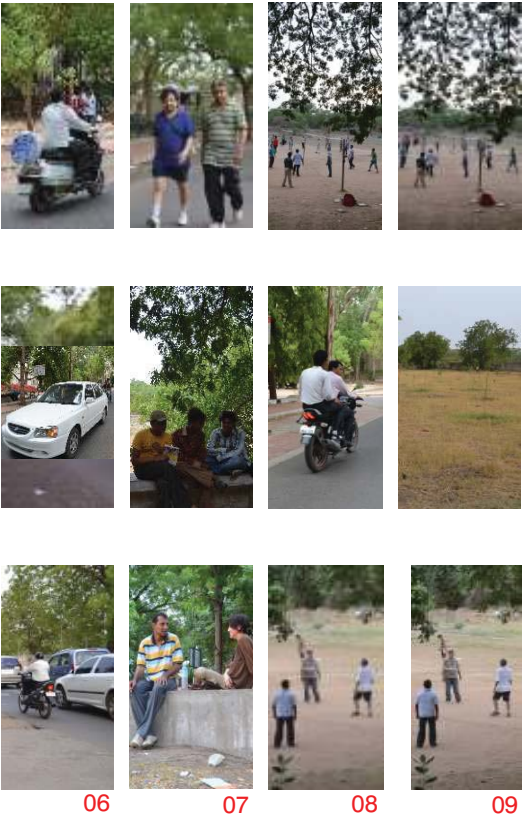
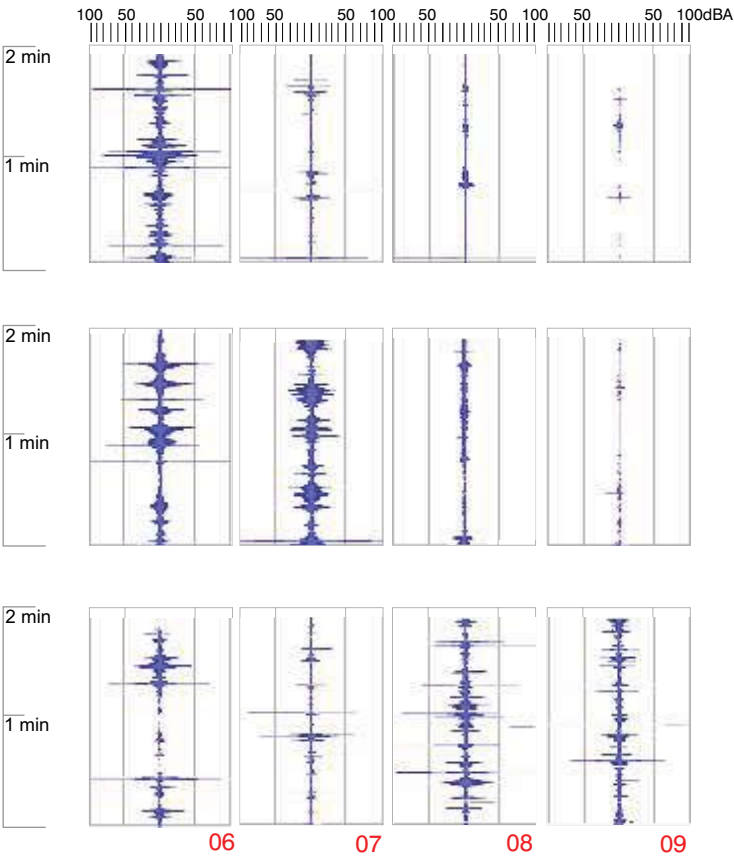
17:00 - 19:00 hrs.



Key Plan



Recordings and Sources

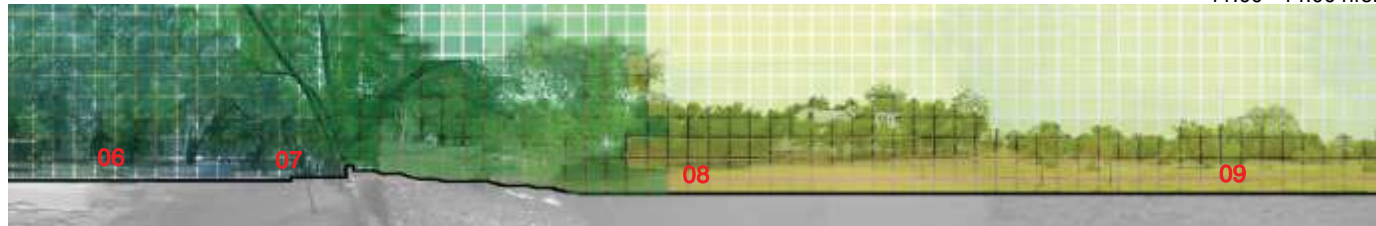


Sectional view indicating intensity of sound

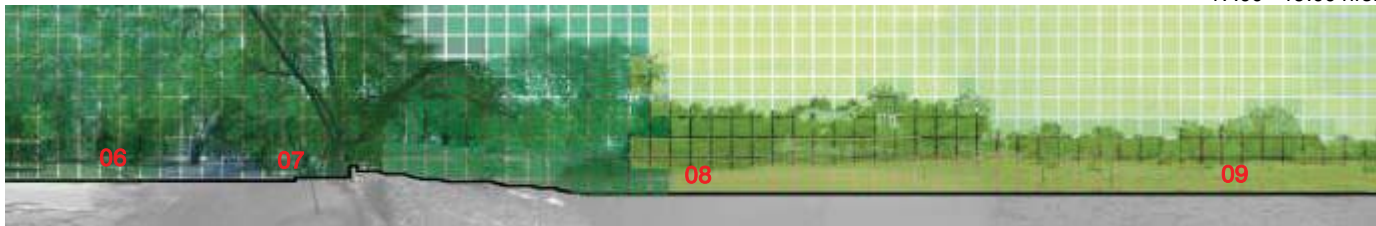
06:00 - 08:00 hrs.



11:00 - 14:00 hrs.



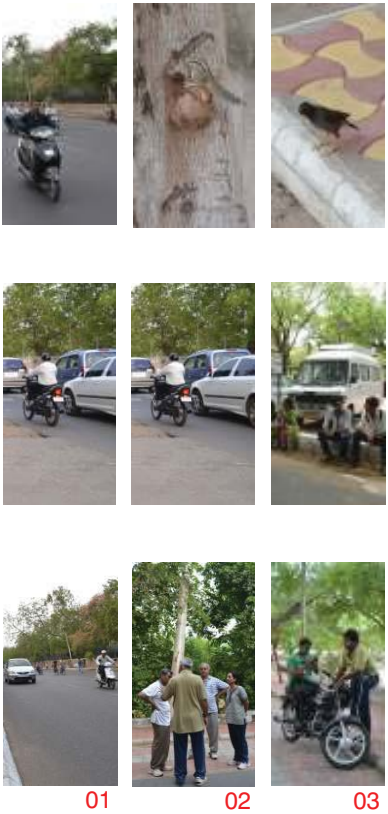
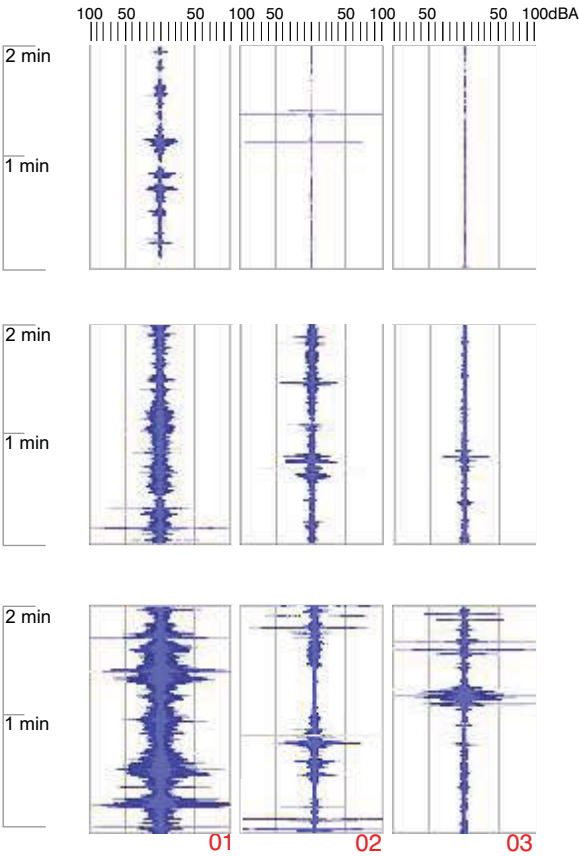
17:00 - 19:00 hrs.



Key Plan

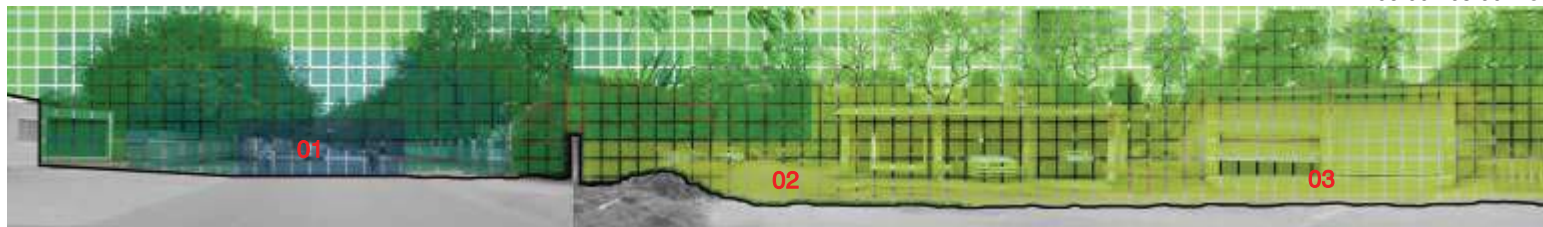


Recordings and Sources

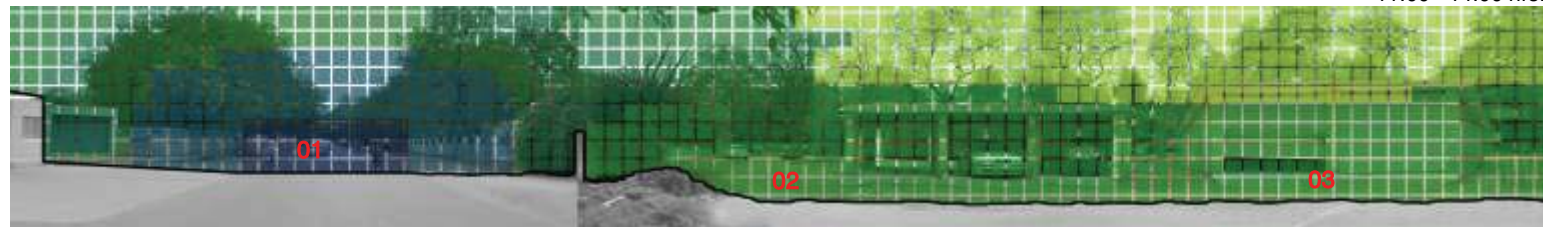


Sectional view indicating intensity of sound

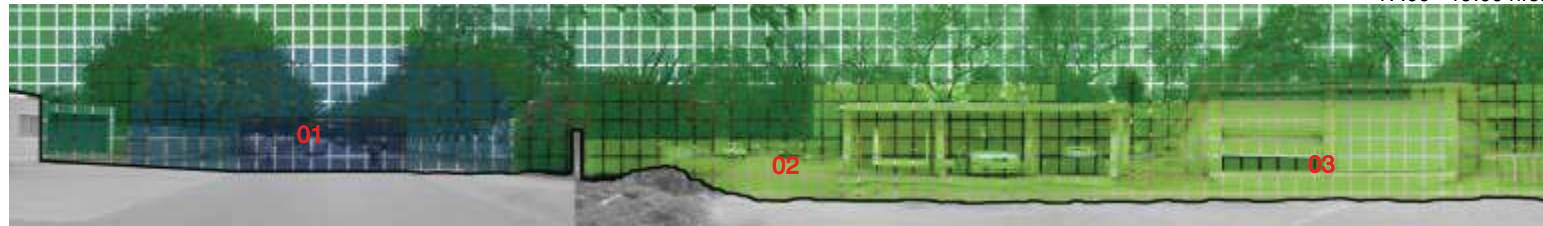
06:00 - 08:00 hrs.



11:00 - 14:00 hrs.



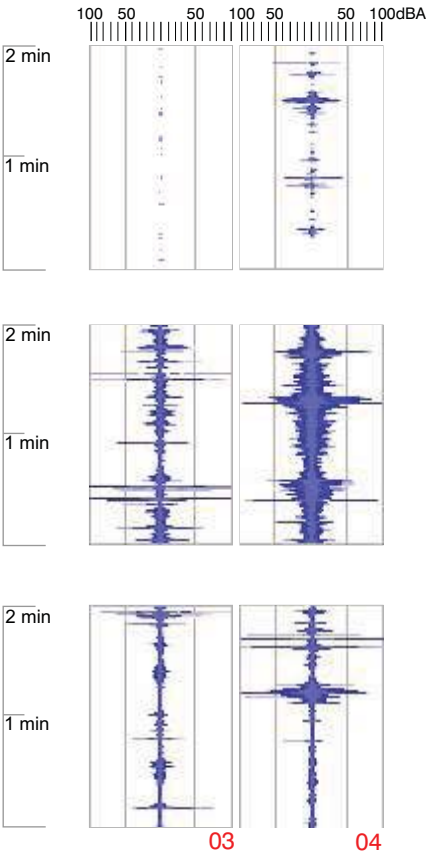
17:00 - 19:00 hrs.



Key Plan

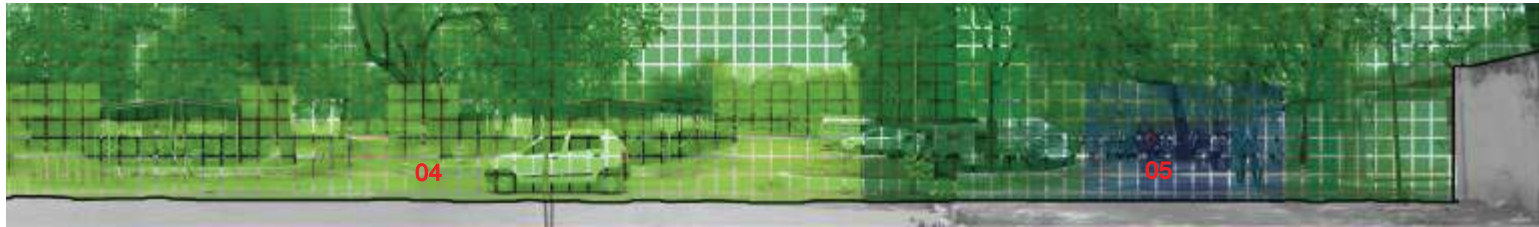


Recordings and Sources

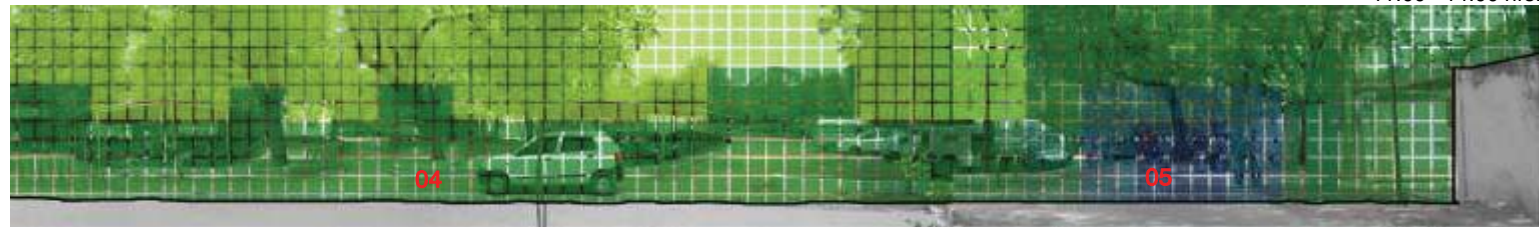


Sectional view indicating intensity of sound

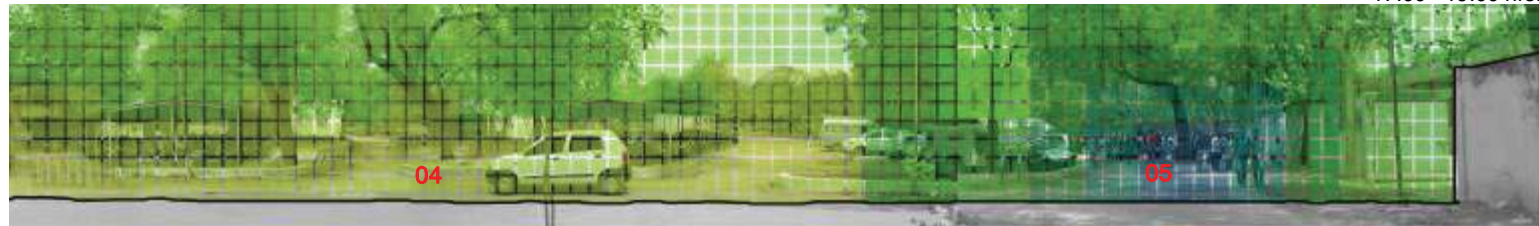
06:00 - 08:00 hrs.



11:00 - 14:00 hrs.



17:00 - 19:00 hrs.



Key Plan





d. Agricultural fields, city edge

## Agricultural fields, city edge.

**Location:** Pirana road

### Sounds in the morning

Sound of birds chirping.

Conversation near huts and inhabited areas.

### Sounds in the afternoon

Fields are calm and quite, sound of winds blowing and swaying the crops.

Conversation of workers in fields.

Occasional honking/drone of vehicles from the road.

### Sounds in the evening

Birds chirping while foraging.

Conversations of workers in fields and children playing.

Occasional honking/drone of vehicles from the road.



Map of the Area



## Activities



**01** Birds foraging in the fields.



**02** Water running through channels in fields.



**03** Watch dogs guarding fields.



**04** Fowls near huts.



**05** Gathering near the fields.



**06** Farmers in fields.

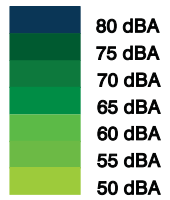


**07** Farmers in fields.

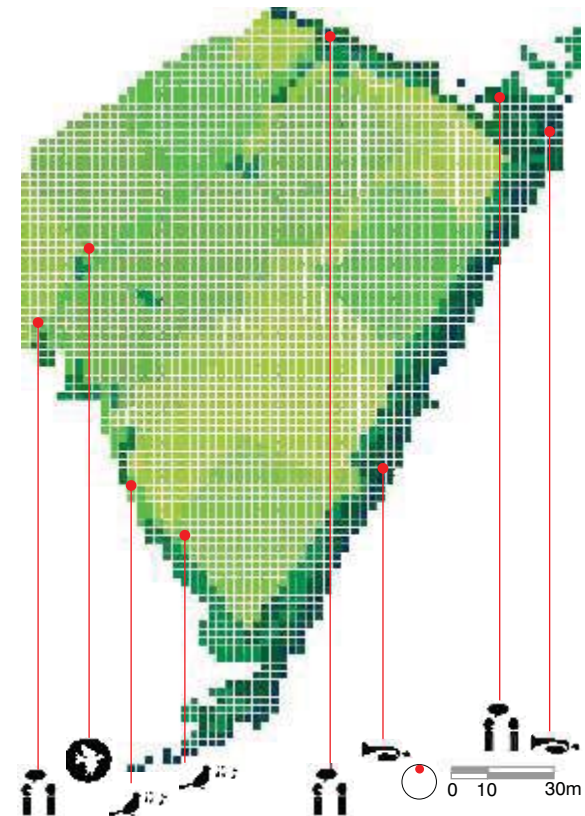
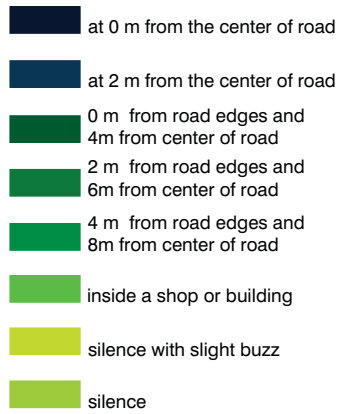


**08** Huts near fields.

Sound Map of area between 07:00 - 09:00 hrs.



Intensity of sound at distance from source



80 dBA - vehicles passing by, honking.



75-70 dBA - animals and people living in the area.

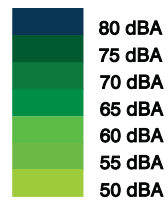


65-60 dBA sound of birds in the fields.

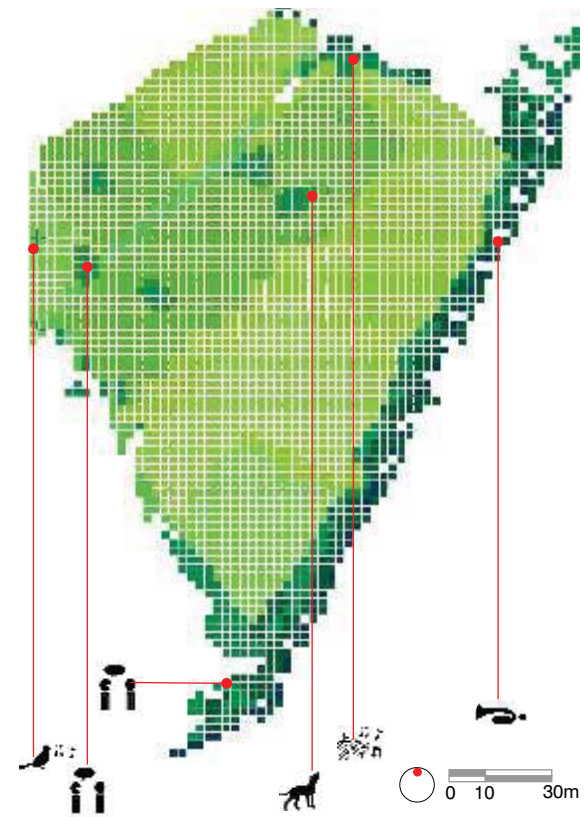
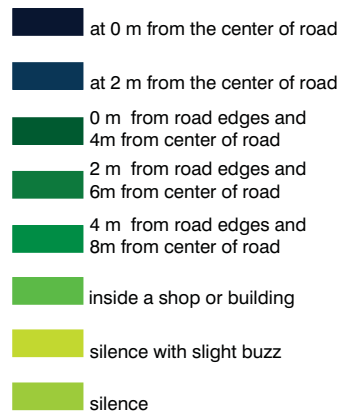


55-50 dBA - fallow land.

# Sound Map of area at 13:00 - 15:00



Intensity of sound at distance from source



80-75 dBA - water pump, vehicles passing.



70 dBA - dogs, goats and people in the fields.

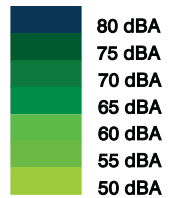


65-60 dBA - wind blowing and rustling of leaves.

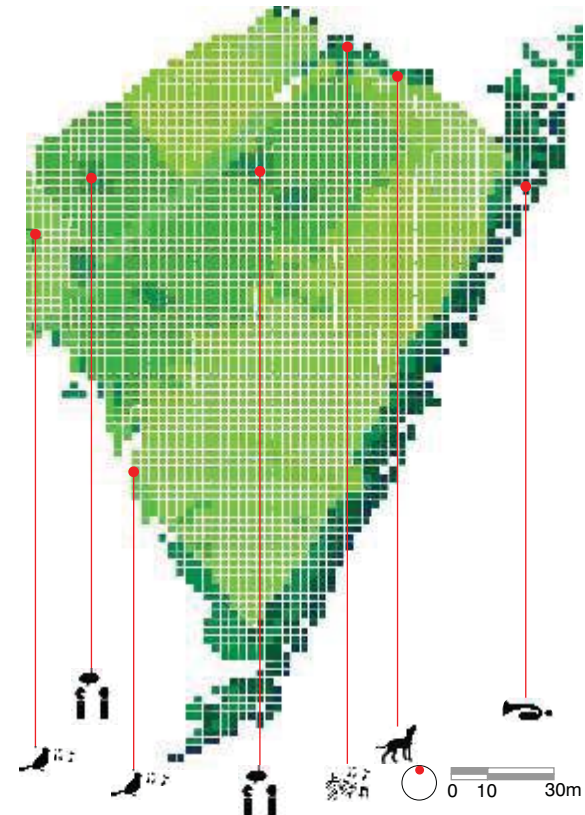
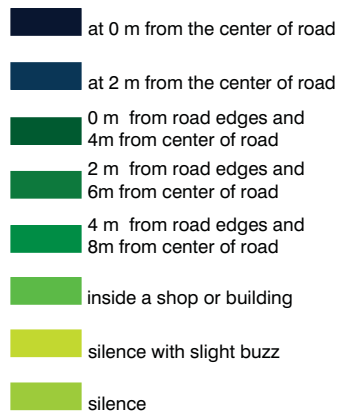


55-50 dBA - open fields with wind blowing across.

# Sound Map of area at 17:00 - 19:00



Intensity of sound at distance from source



80 dBA - water pump, vehicles passing.



75-70 dBA dogs, goats and people in the field.



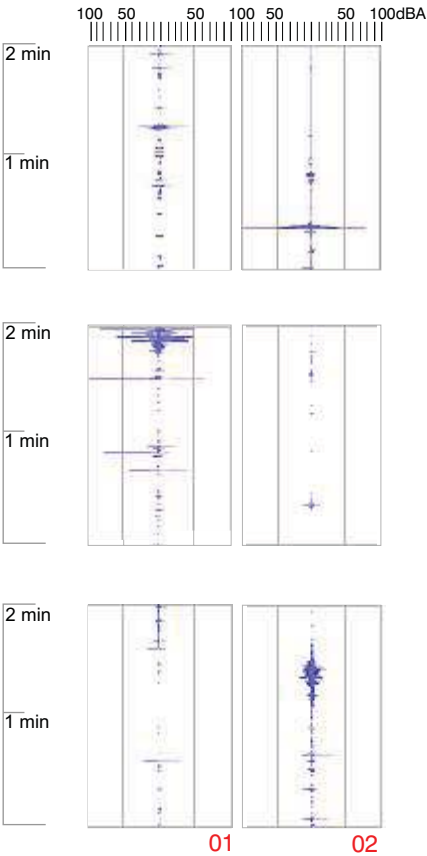
65-60 dBA - crows and egrets cawing.



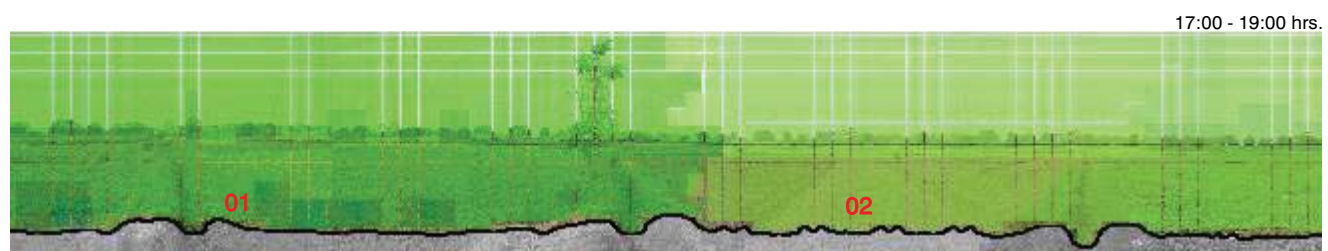
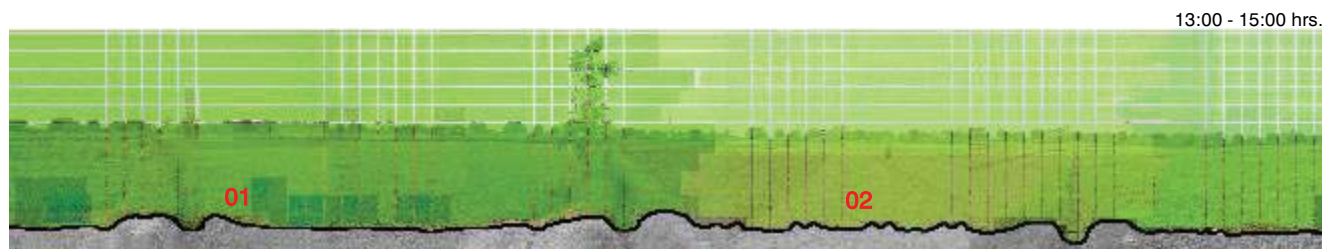
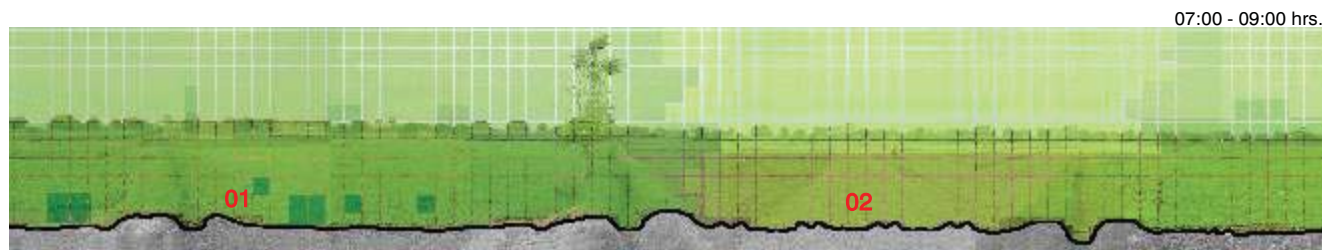
55 dBA - crops swaying with the wind.



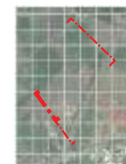
Recordings and Sources



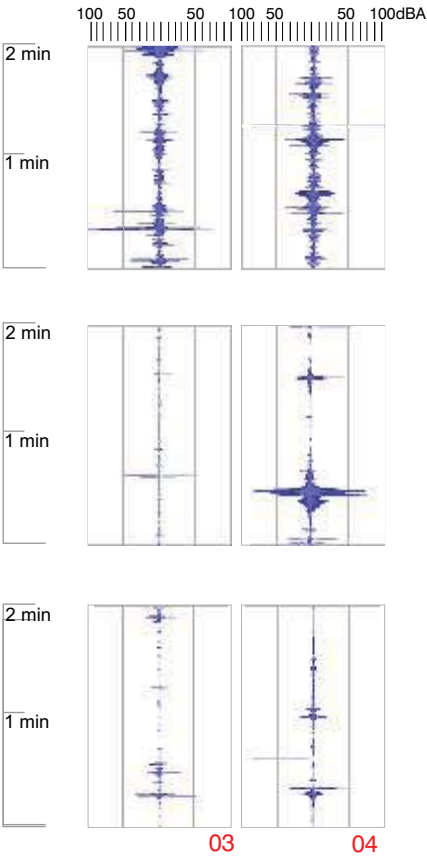
Sectional view indicating intensity of sound



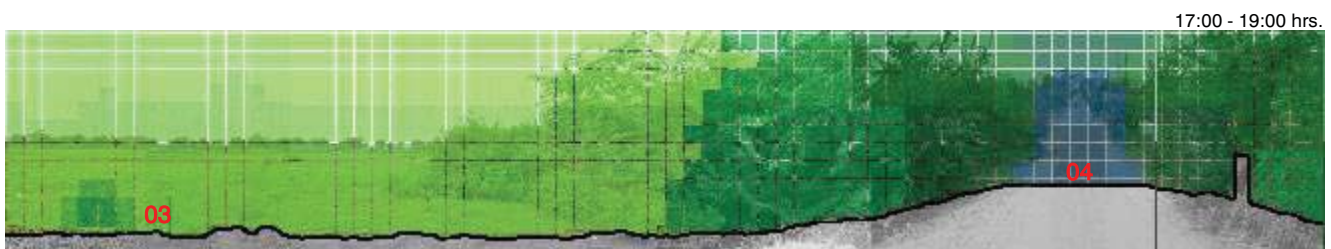
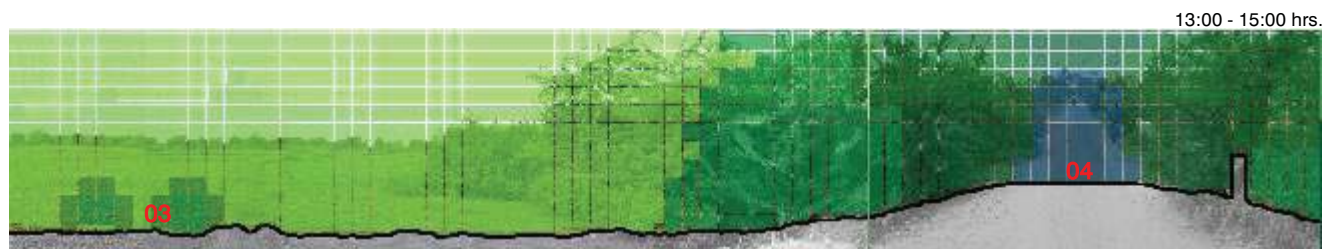
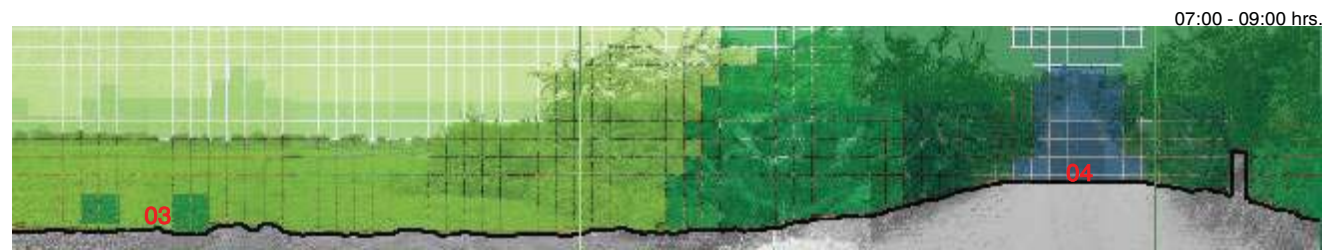
Key Plan



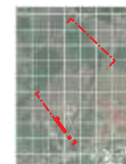
Recordings and Sources



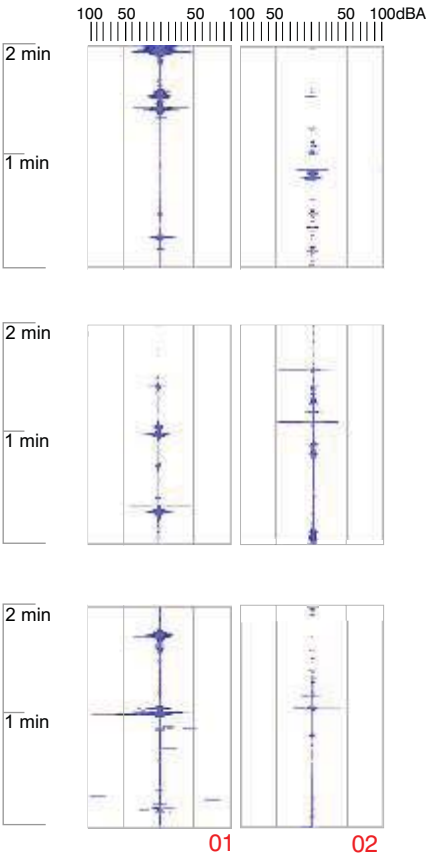
Sectional view indicating intensity of sound



Key Plan



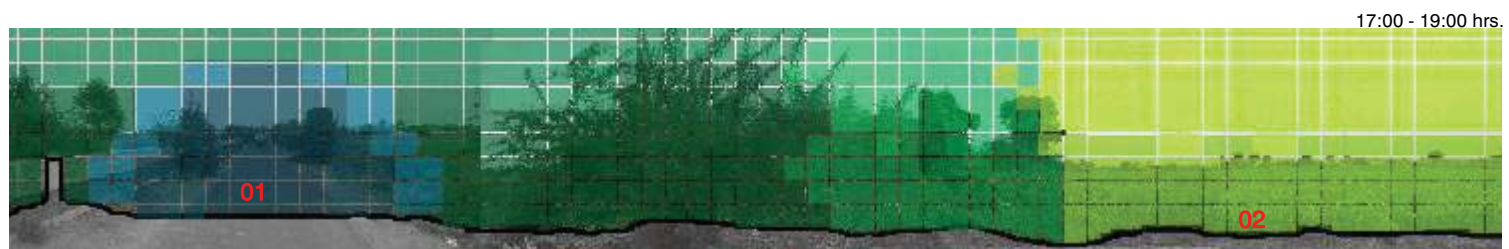
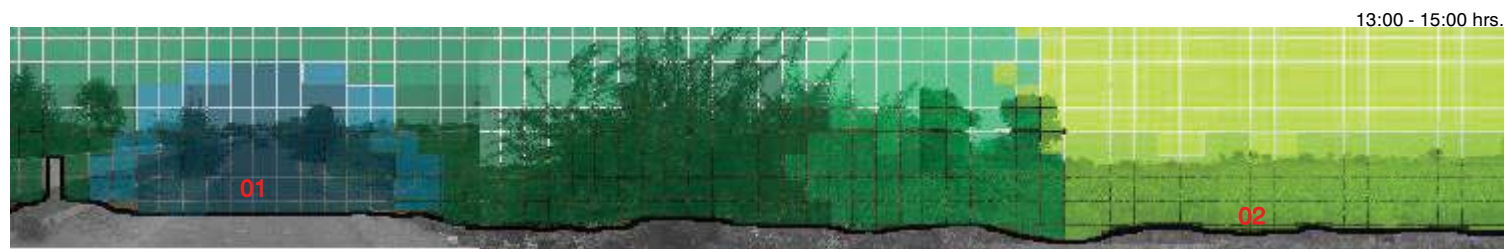
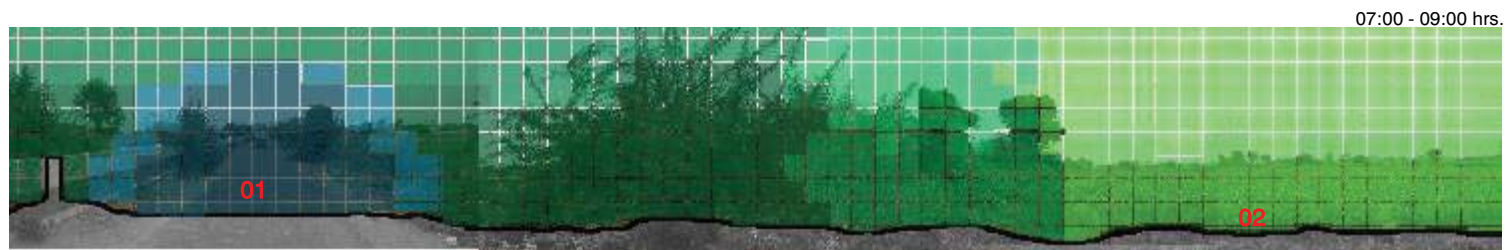
Recordings and Sources



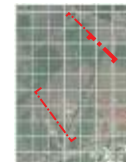
01

02

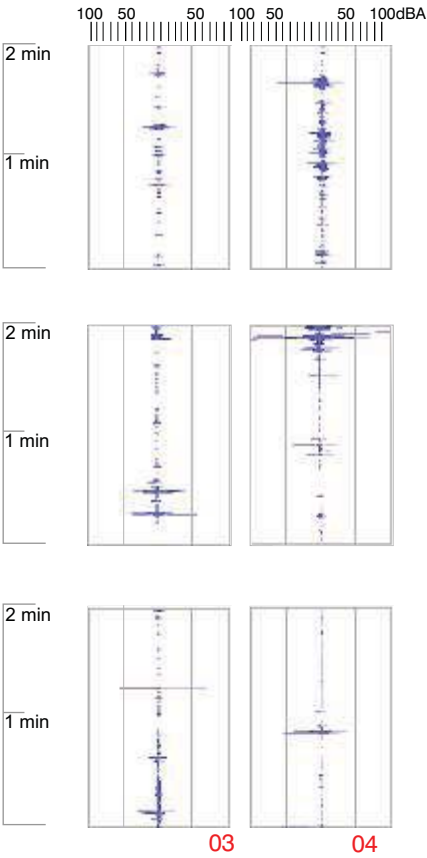
Sectional view indicating intensity of sound



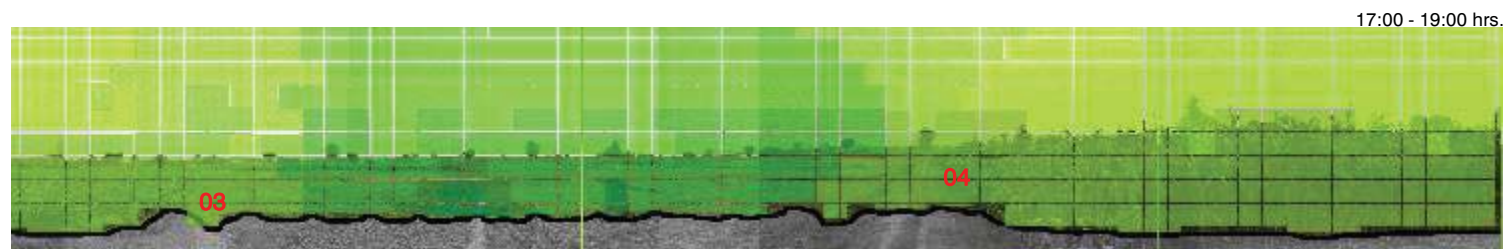
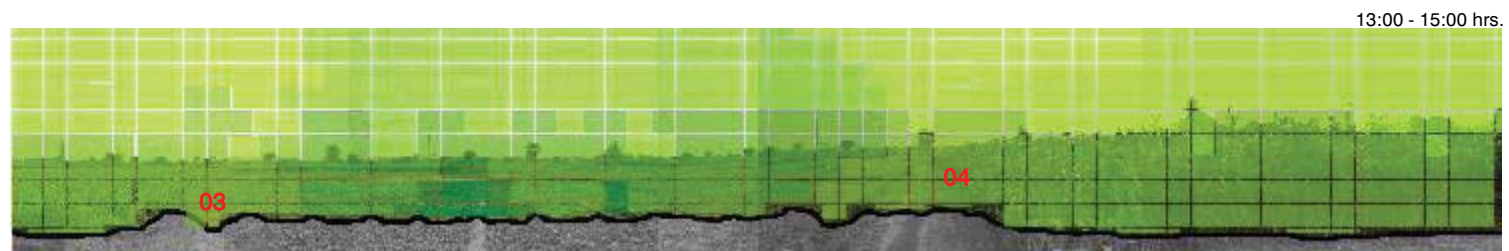
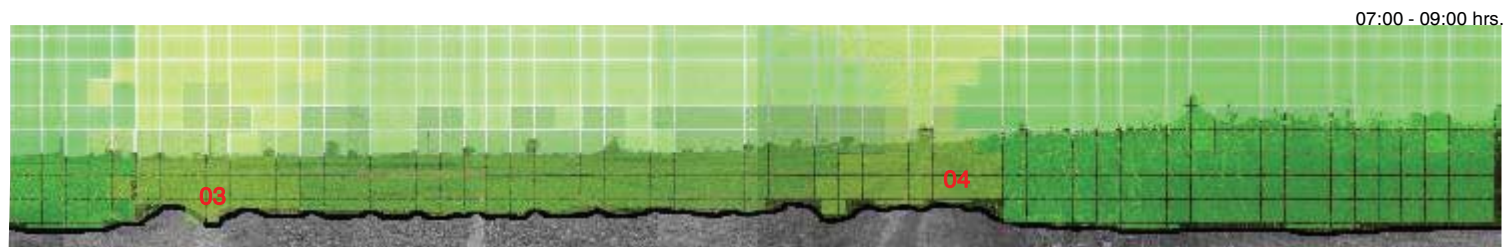
Key Plan



Recordings and Sources



Sectional view indicating intensity of sound



Key Plan





e. G.I.D.C., outskirts

**G.I.D.C., outskirts.**

**Location:** Vatva.

**Sounds in the morning**

Conversation of workers.

Drone of vehicles.

Sounds of machines from the industries.

**Sounds in the afternoon**

Some conversations of pedestrians on the road edges.

Sound of exhaust fans and drone of machines, movement of vehicles.

Loud screeching of metal cutter from factories - more than 110 dBA.

**Sounds in the evening**

Conversation of workers while dispersing.

Honking/drone of heavy vehicles.

Sound of exhaust fans and drone of machines, movement of heavy vehicles on roads.

Heavy vehicular traffic is observed all the time. Certain factories which work continuously generate same amount of sound all day long.



Map of the Area

## Activities



**01** Green buffers in the area.



**02** Crowd at road junctions



**03** Factories



**04** Chemical plant



**05** A street in the industrial area.



**06** Chai galla (tea stall)



**07** Exhaust fans



**08** Workshop sheds.



**09** Open grounds.



**10** Nukkad (corners)

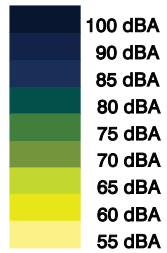


**11** Factory sheds along the main road.

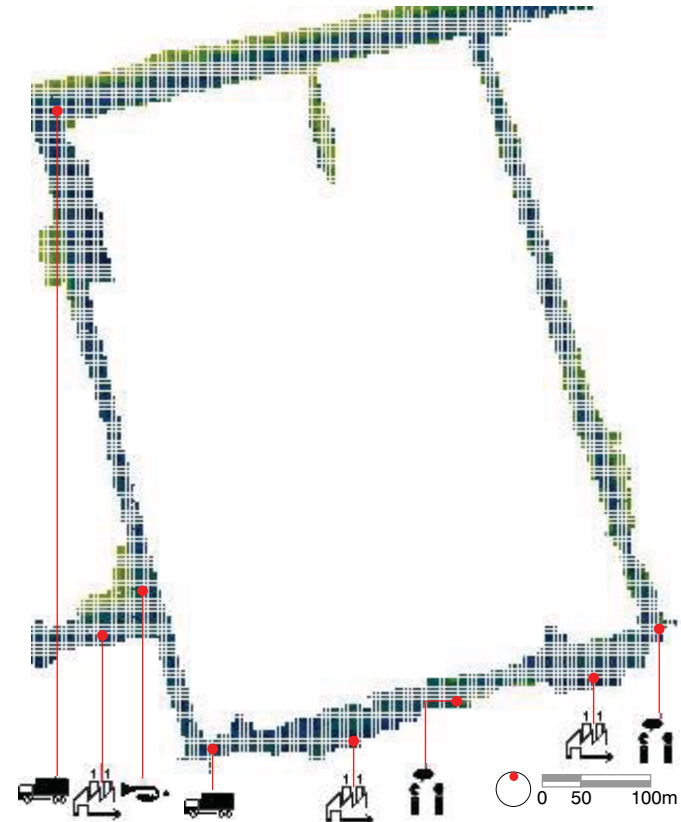


**12** Traffic along the main road.

Sound Map of area between 08:00 - 10:00hrs.



Intensity of sound at distance from source



100 dBA - vehicles passing, higher when honking.



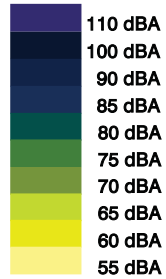
90-85 dBA - factories.



75 dBA - conversation at edges, vehicles passing.



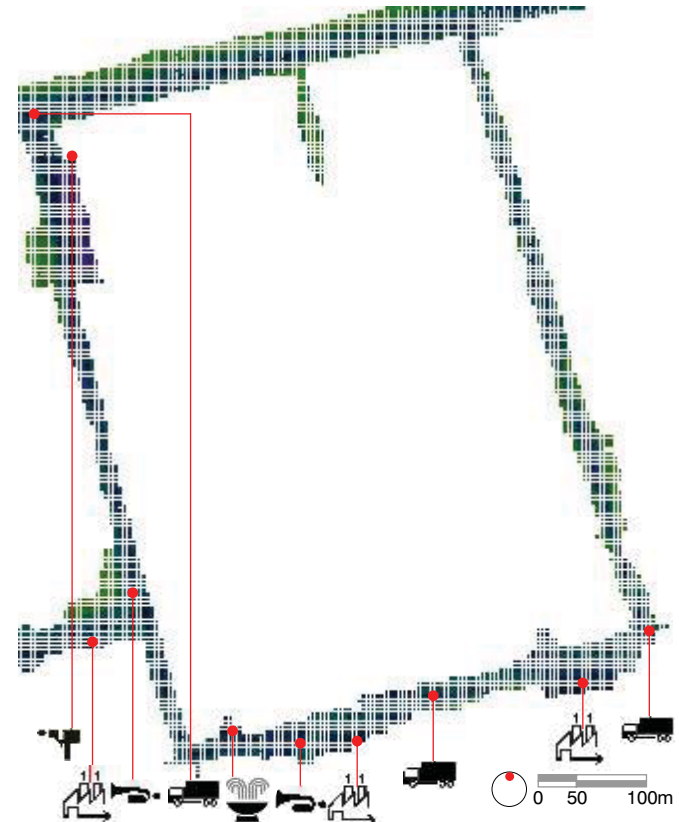
70-65 dBA constant drone from industries.



Intensity of sound at distance from source



Sound Map of area between 14:00 - 16:00hrs.



110 dBA - metal cutting and fabrication.



100-90 dBA - heavy vehicles on the internal & main roads.

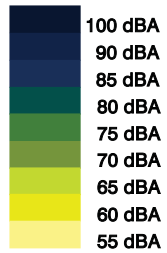


85-75 dBA - chemical plants.

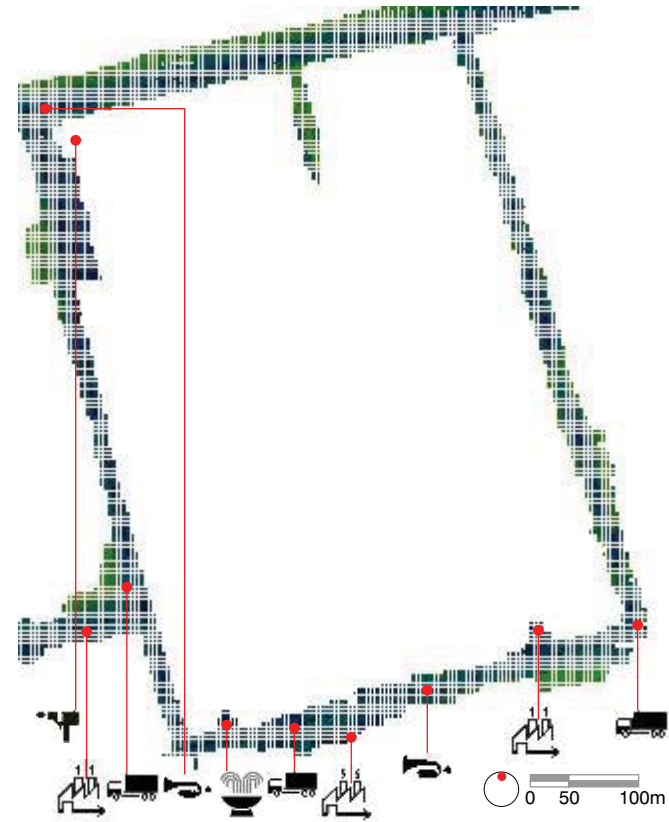


70-65 dBA constant drone from industries.

Sound Map of area between 18:00 - 19:30hrs.



Intensity of sound at distance from source



100 dBA - vehicles passing, higher when honking.



90-85 dBA - exhaust fans of factories.



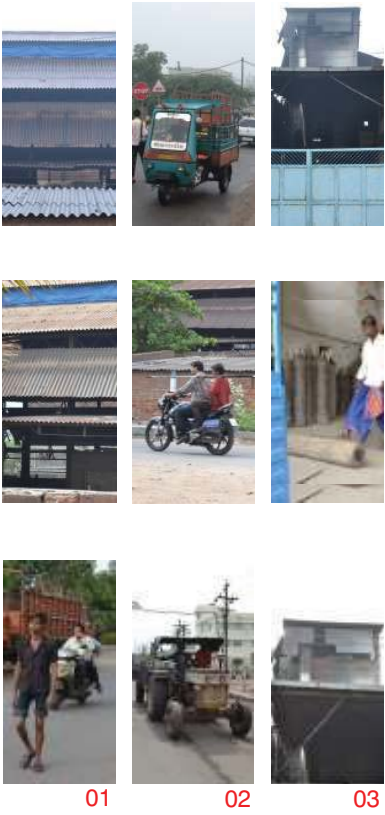
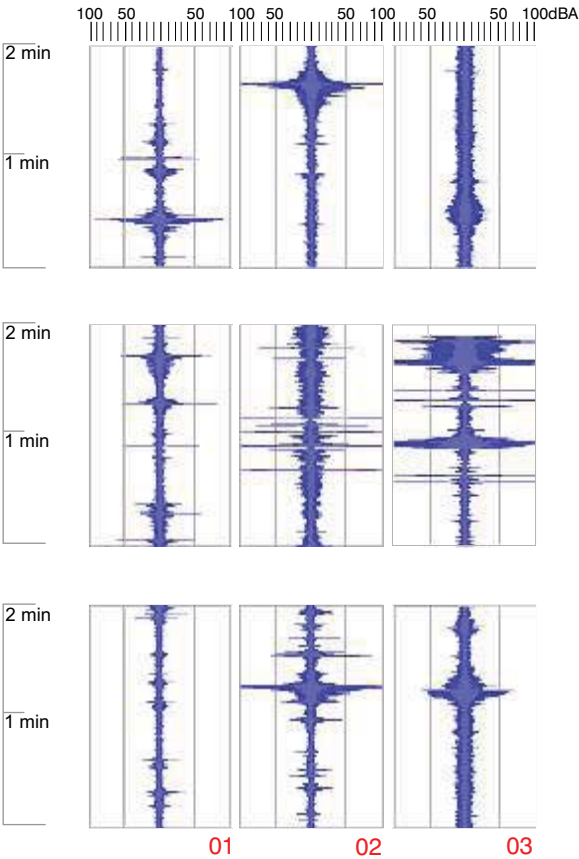
75 dBA - conversation when people return.



70-65 dBA constant drone from industries.

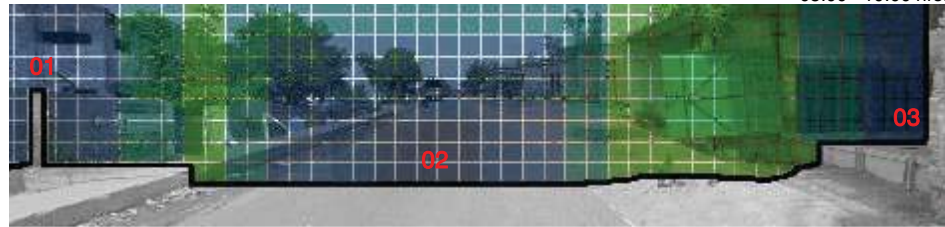


Recordings and Sources

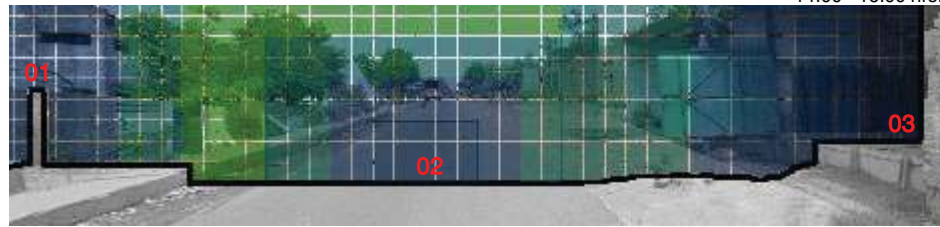


Sectional view indicating intensity of sound

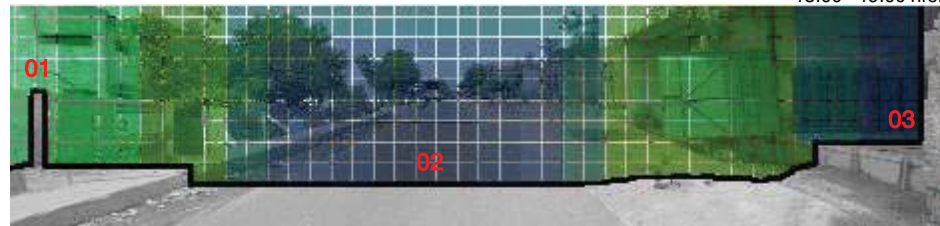
08:00 - 10:00 hrs.



14:00 - 16:00 hrs.



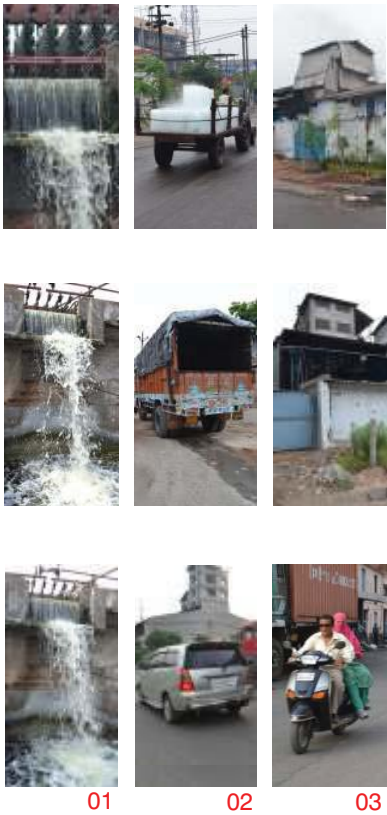
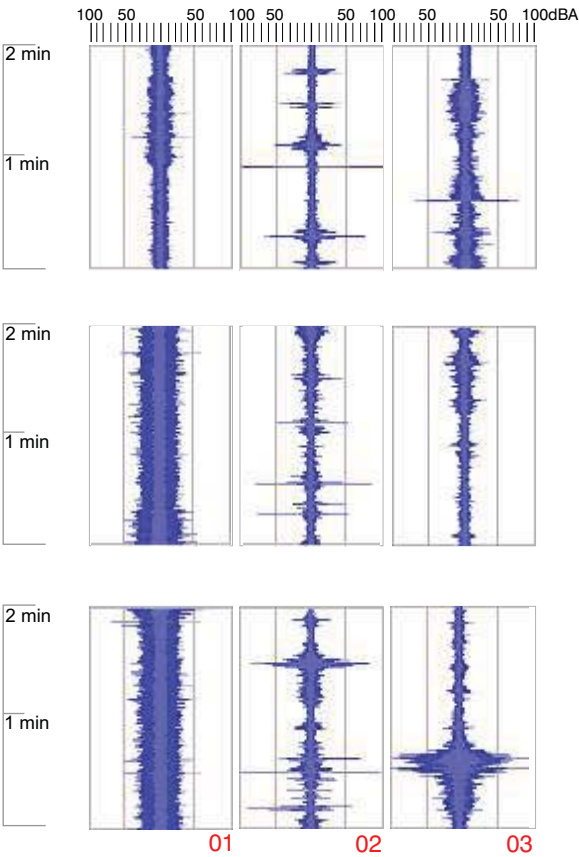
18:00 - 19:00 hrs.



Key Plan



Recordings and Sources

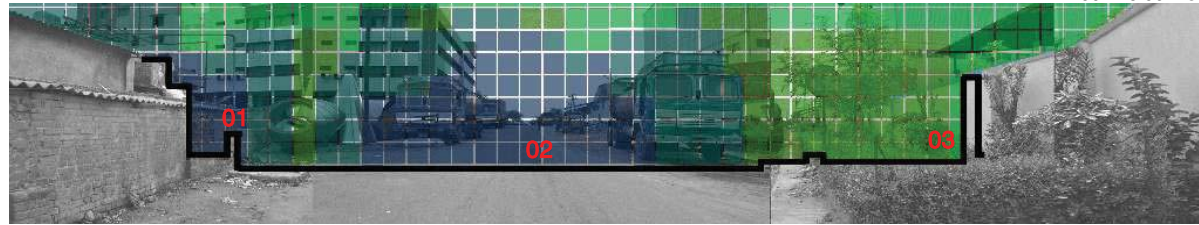


Sectional view indicating intensity of sound

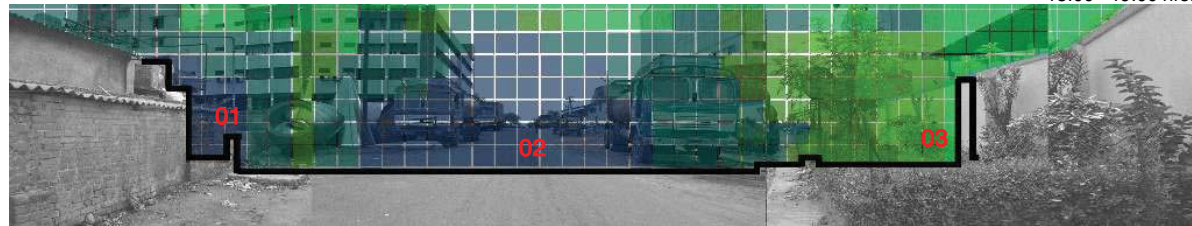
08:00 - 10:00 hrs.



14:00 - 16:00 hrs.



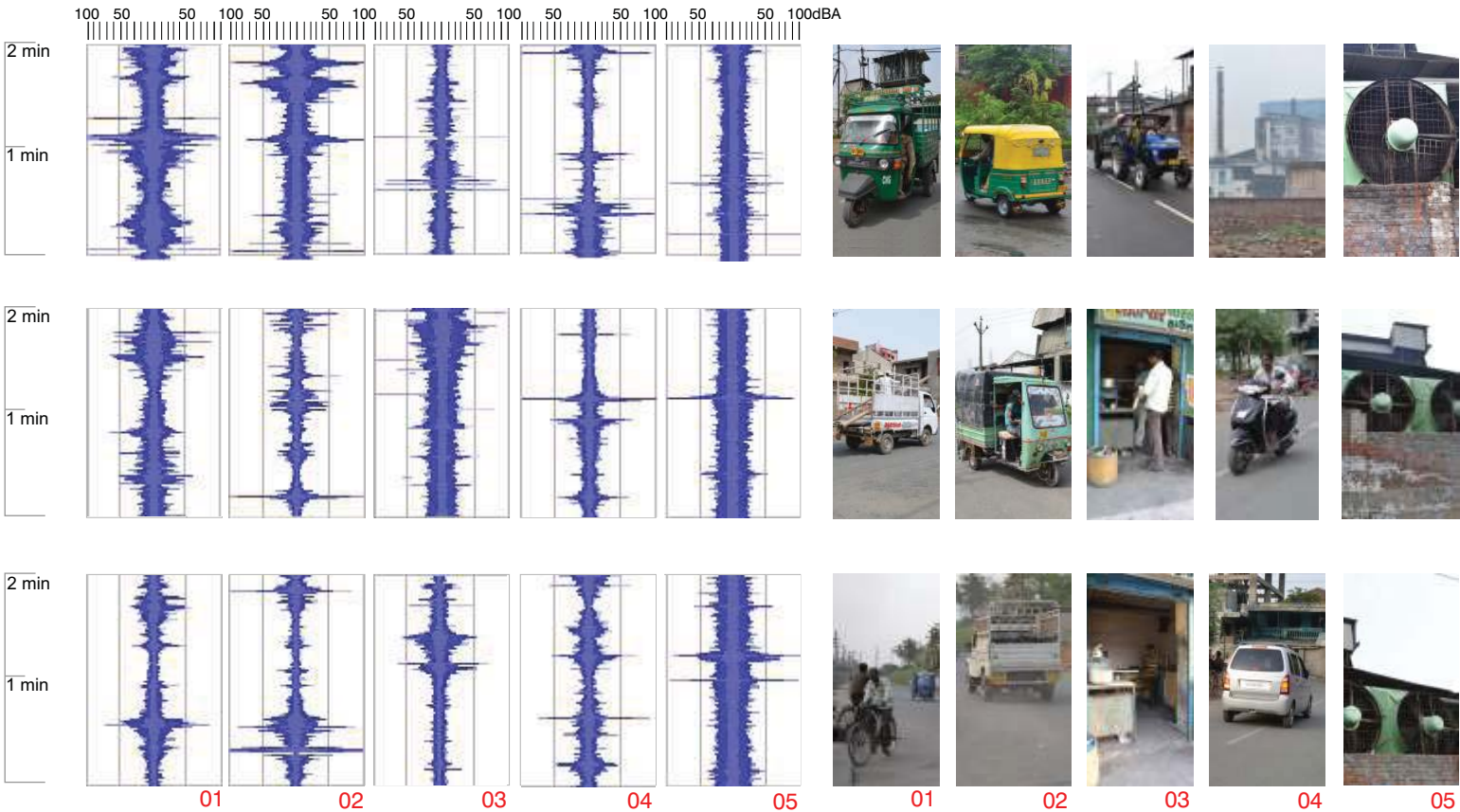
18:00 - 19:00 hrs.



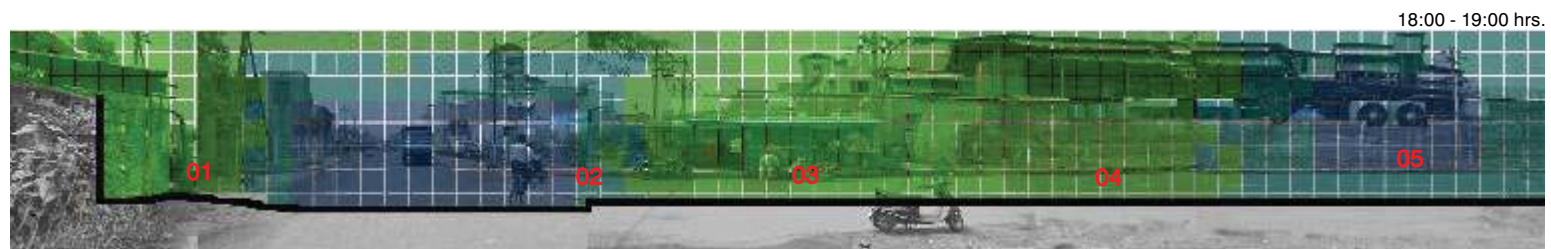
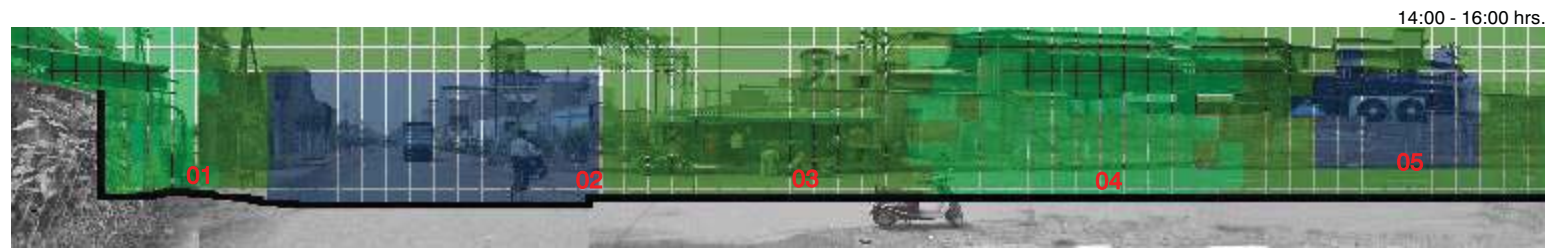
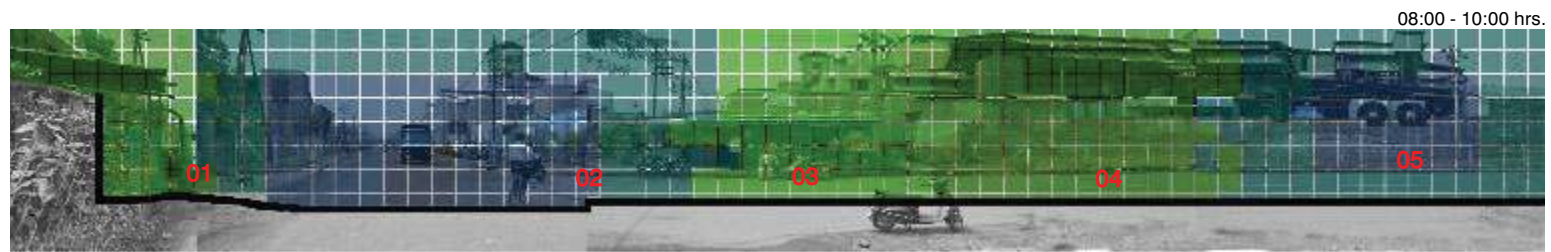
Key Plan



Recordings and Sources



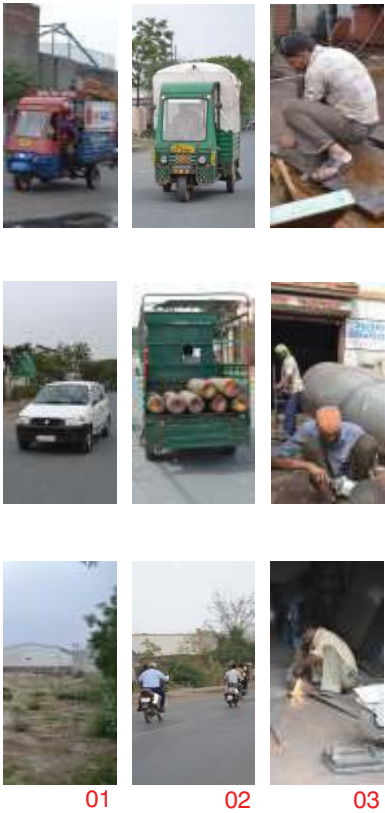
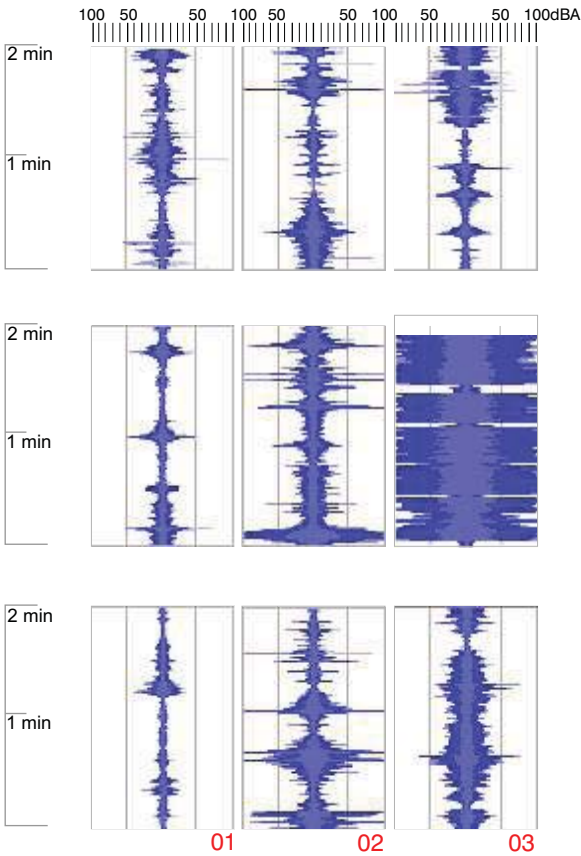
Sectional view indicating intensity of sound



Key Plan

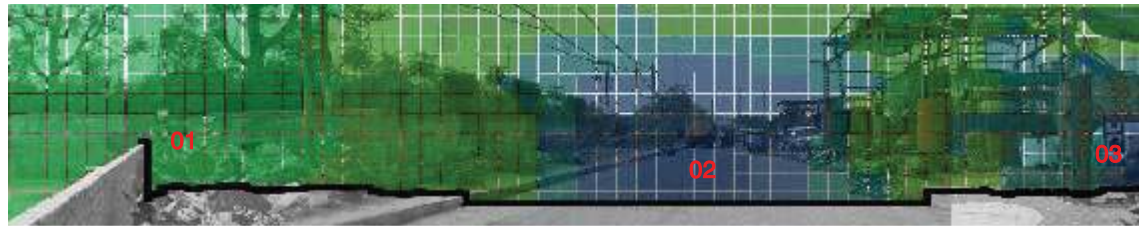


Recordings and Sources



Sectional view indicating intensity of sound

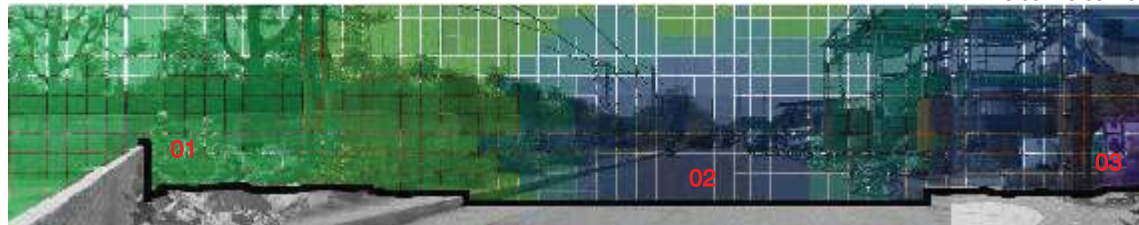
08:00 - 10:00 hrs.



14:00 - 16:00 hrs.



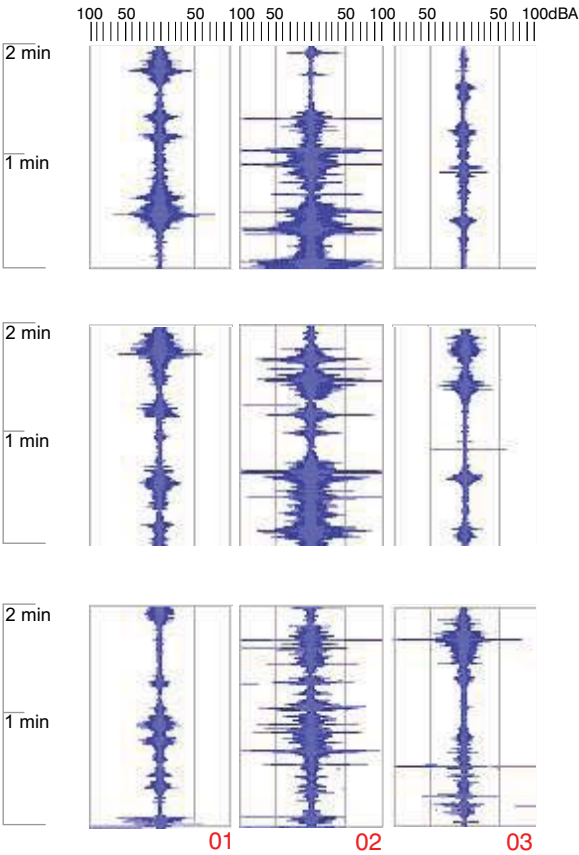
18:00 - 19:00 hrs.



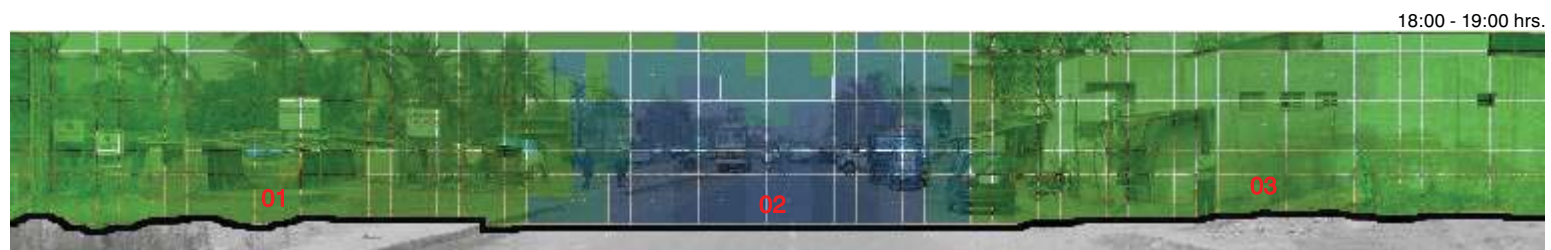
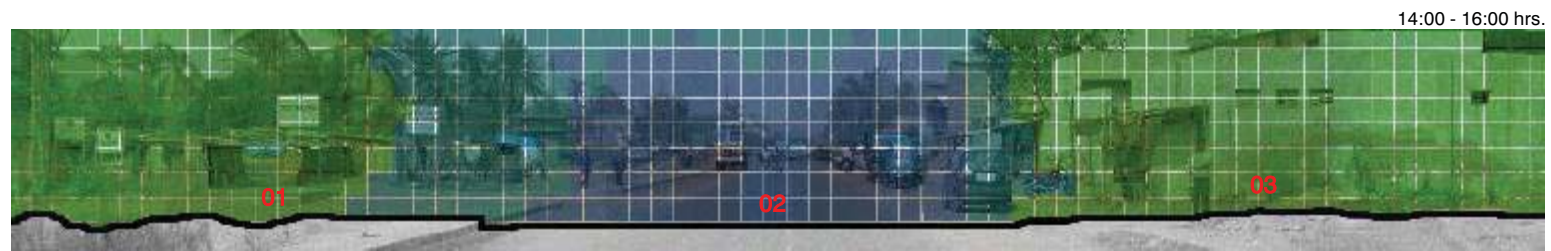
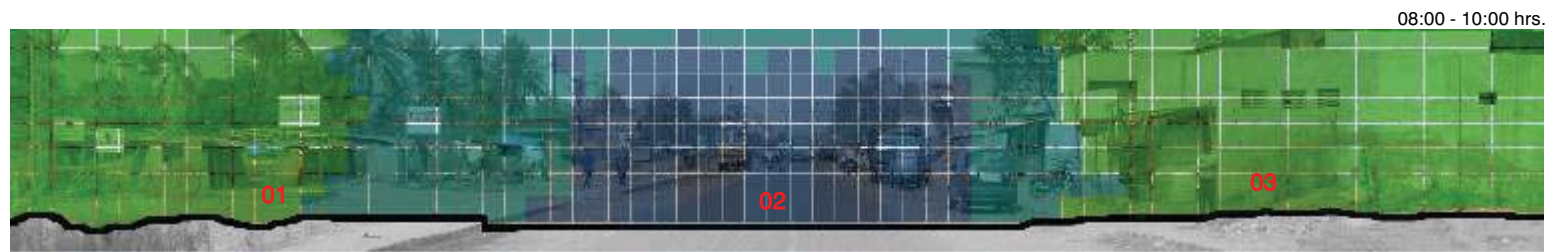
Key Plan



Recordings and Sources



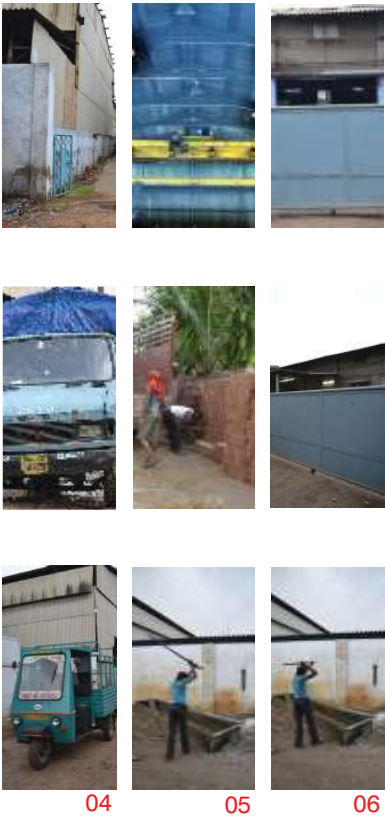
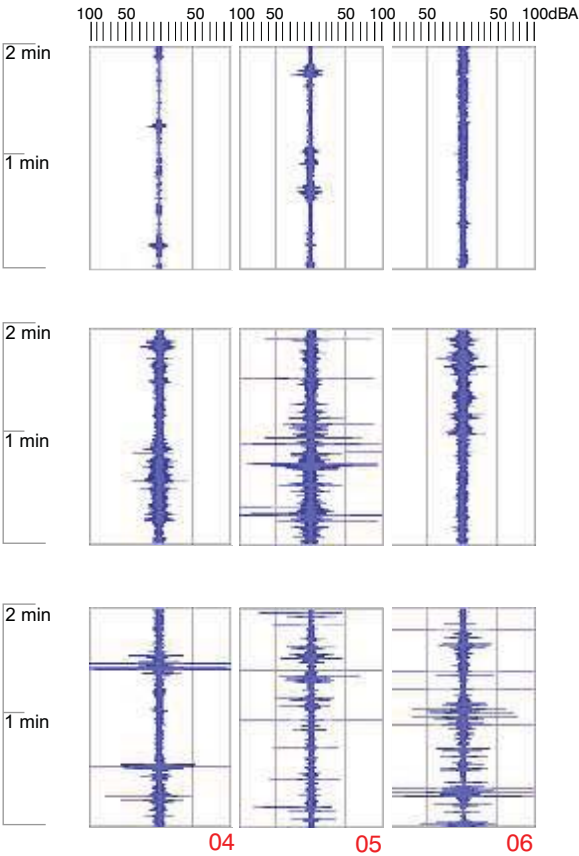
Sectional view indicating intensity of sound



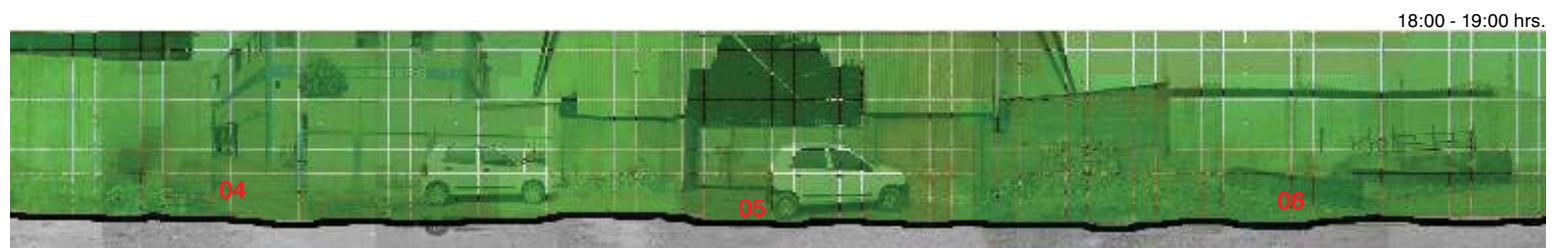
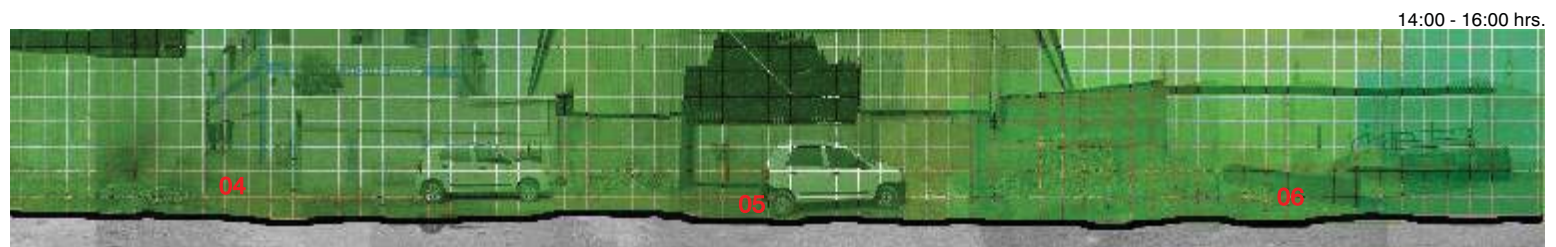
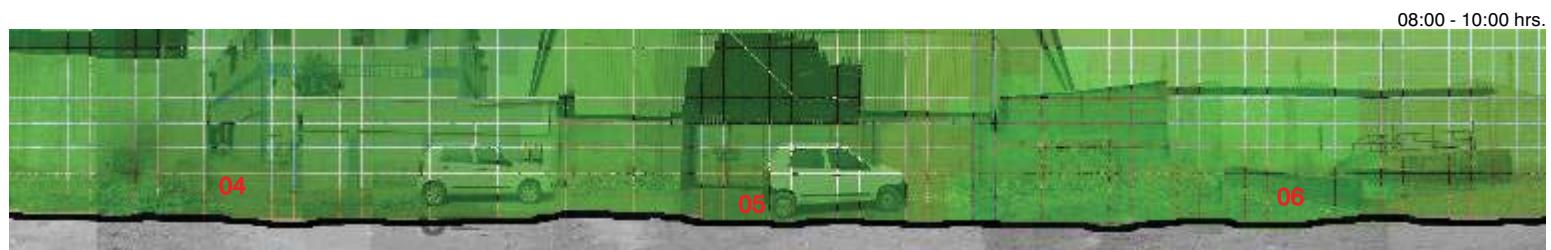
Key Plan



Recordings and Sources



Sectional view indicating intensity of sound

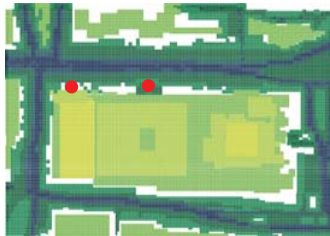


Key Plan

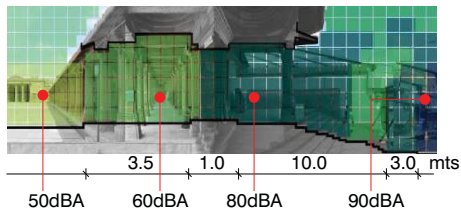
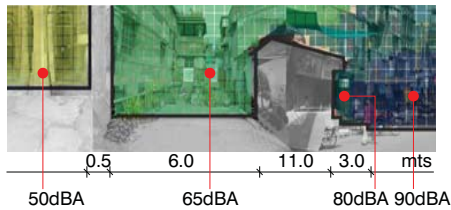




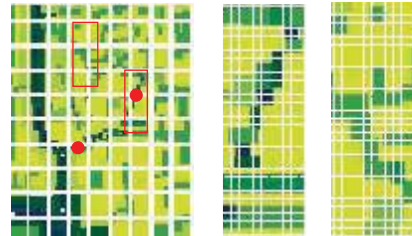
## 04. Inferences



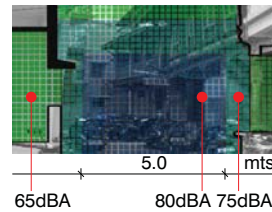
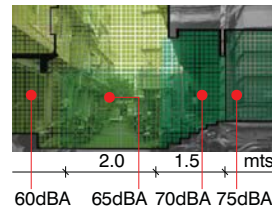
a. *Jami Mosque*, old city.



Silent court, noisy road - in between, a layer of shops, an envelope of stone walls. a colonnade. Each intermediary layer blocks the sound from the road, only bits that float in are through the small openings of the stone walls.



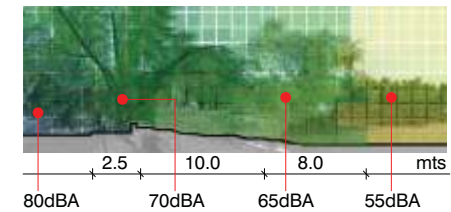
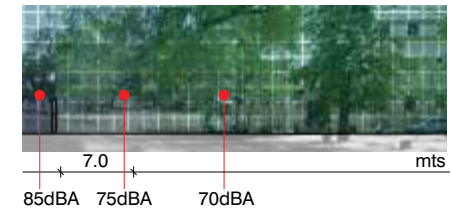
b. *Kshetrapal ni pol*, old city.



Tightly packed buildings, irregular streets, no straight line. Sounds are deflected; don't carry far; yet concentrated propagation in short distances. Houses within the fabric are quiet.



c. *Gujarat University*, institution.

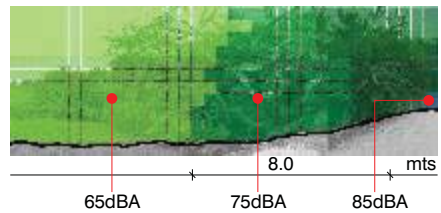
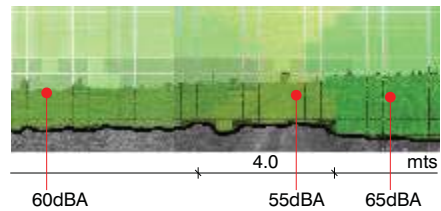


Open ground, dense planting, occasional building. Planting absorbs sounds; grounds are inaccessible and buildings remain within a silent zone.

## Typology, material, sound



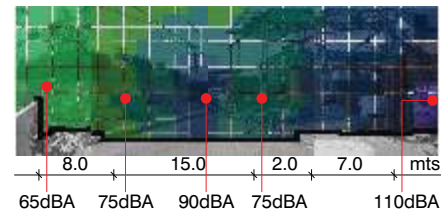
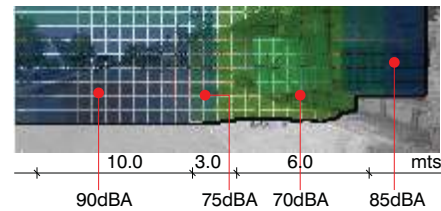
d. Agricultural fields, city edges.



Open fields at the edge of the city, constant wind movement; the wind carries the sound and diffuses it over a large area; intensity reduces; adds sound by rustling grass and carrying the sound of birds and conversation.

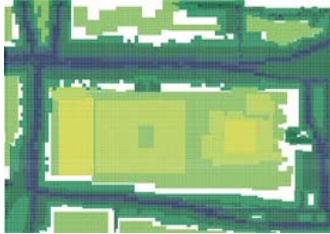


e. G.I.D.C., outskirts.



Metal shed; machinery within; heavy vehicles; sound echoes off metal roofs. Nothing to absorb; continuous high intensity buzz.

## Comparing sound intensities

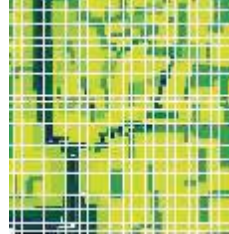


a. *Jami* Mosque

Vehicles moving  
Vehicles honking  
People talking  
Birds' chirping  
Wings flapping  
Dogs barking  
Azan & temple bells  
Water fountain

40% noisy  
20% tolerable range  
40% silent zone

100 dBA - 80 dBA Noisy Area



b. *Kshetrapal ni pol*

Vehicles moving  
Vehicles honking  
People talking  
Birds chirping  
Wings flapping  
Dogs barking  
Squirrels squeaking  
Hammer, sickle banging  
Mixture grinder churning  
Tap water running

20% noisy  
30% tolerable range  
50% silent zone



c. Gujarat University

Vehicles moving  
Vehicles honking  
People talking  
Birds chirping  
Wings flapping  
Squirrels squeaking  
Clock tower bells

30% noisy  
35% tolerable range  
35% silent zone

75 dBA - 65 dBA tolerable range



d. Agricultural fields

Vehicles moving  
People talking  
Birds chirping  
Wings flapping  
Dogs barking  
Goat grunts  
Water pump running

20% noisy  
05% tolerable range  
75% silent zone



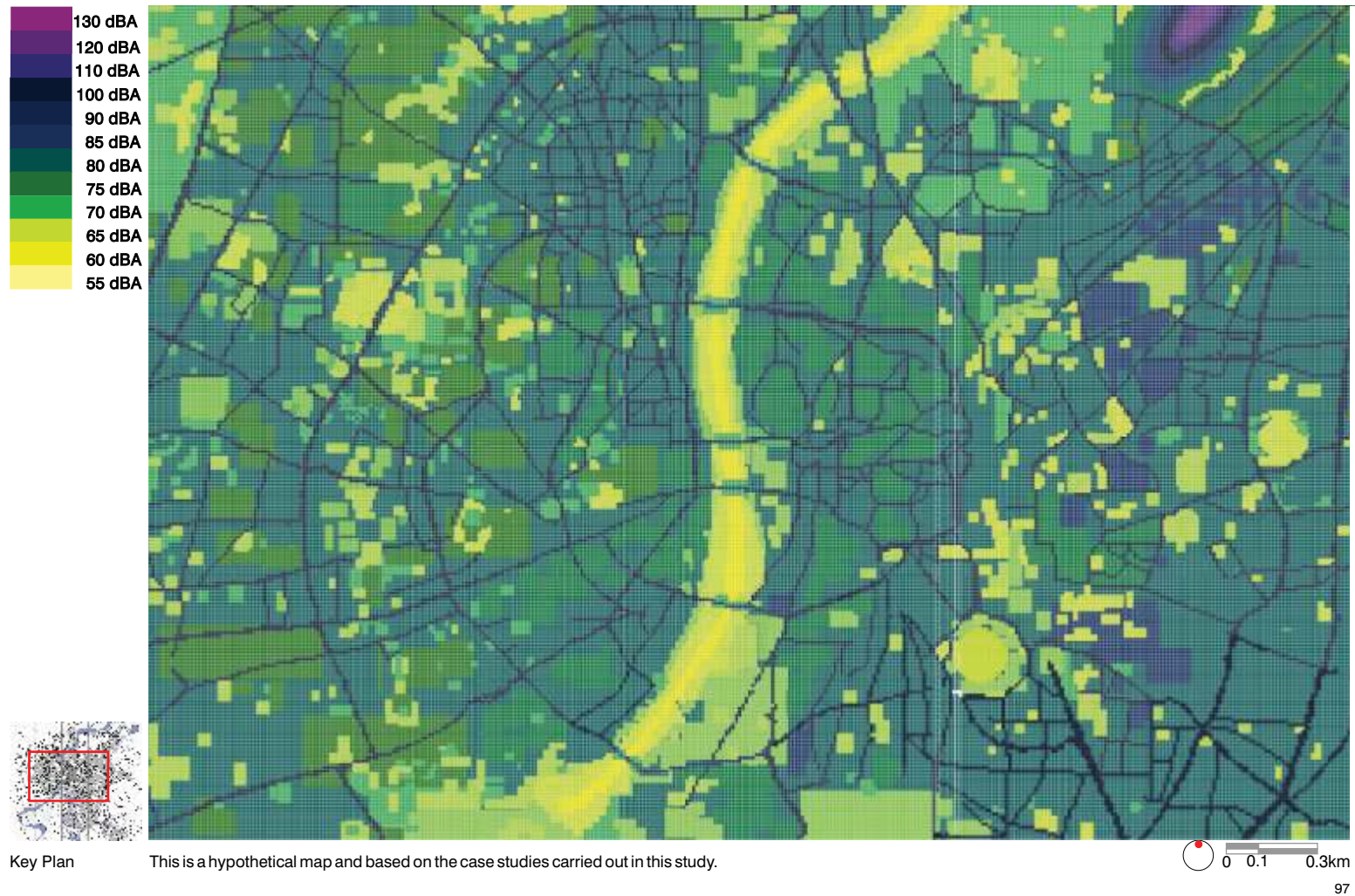
e. G.I.D.C.

Vehicles moving  
People talking  
Machines/fans running  
Metal cutter screeching  
Water falling

75% noisy  
10% tolerable range  
05-10% silent zone

60dBA- 45dBA silent zone

## Sound Map of the city



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05. [http://www.simonelvins.com/silent\\_london.html](http://www.simonelvins.com/silent_london.html)
06. <http://www.soundsurvey.org.uk/index.php/survey/grid/>
07. <http://www.forteriecars.org/noiseimpact.html>



Motiwala Kauseen is a student of the post graduate program in Landscape Architecture at CEPT University, Ahmedabad. This study is part of her summer training of 12 weeks. She graduated in architecture from Sardar Vallabhbhai Patel Institute of technology, Vasad.

E #  
kausheen851112@yahoo.co.in



Landscape Environment Advancement Foundation  
INDIA