



# QUADMAP Project pilot areas in Firenze

<http://project.quadmap.eu/>

# QUADMAP – Project Objectives

Current practices about selection, assessment and management of Quiet Areas in EU Countries, though regulated by the EU Directive 49/2002/EC on Environmental Noise (END), appear to be extremely fragmented and inhomogeneous. In fact, each country during past years has adopted a set of strategies strictly related to their specific contexts.

The main aim of QUADMAP is to develop a harmonized methodology for selection, assessment (combining quantitative and qualitative parameters) and management (noise mitigation, increasing of usability of areas and user's satisfaction) of Quiet Urban Areas (QUAs).

The results of the project will facilitate urban planners to apply standard procedures for identification, delimitation and prioritization of QUAs.

## QUAs definition

Considering the **END approach**, *‘quiet area in an agglomeration’ shall mean an area, delimited by the competent authority, for instance which is not exposed to a value of  $L_{den}$  or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source.*

This definition presents a general framework but additional aspects must be taken into account!

QUADMAP has proposed the following as the **new, general definition of QUA**: *an urban area whose current or future use and function require a specific acoustic environment, which contributes to the well-being of the population.*

## Candidate QUAs selection

The variables proposed for the selection of the areas as candidate QUAs are:

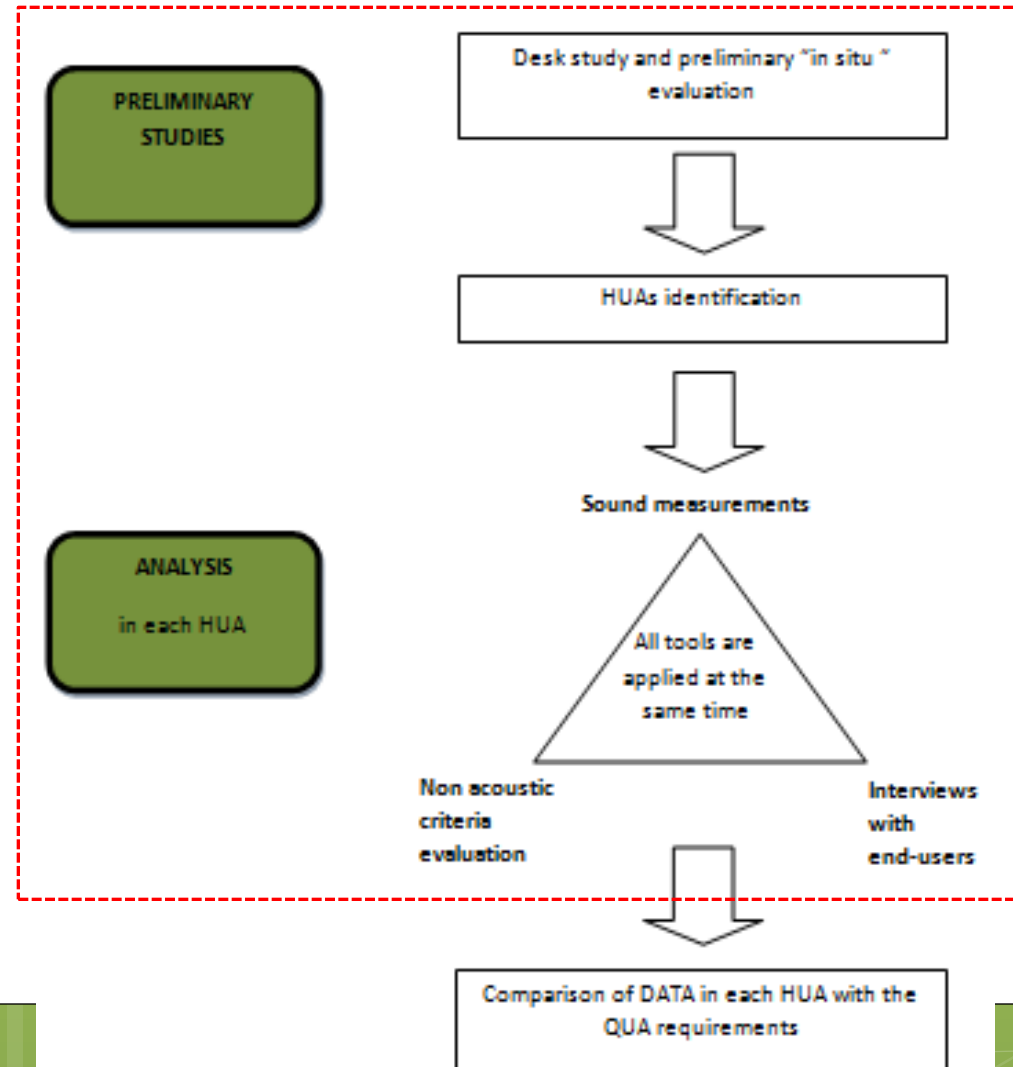
- **Use and Function**, category of land use in the general urban planning: residential, green areas, etc., or (current) function of the space: social relationship, conversation, resting, etc.
- **Noise Levels**, it refers to the definition of a noise limit or threshold according to the END definition of environmental noise and using the Lden parameter.
- **Complementary approaches** (Equity distribution, citizens' opinions, public use)

Thanks to previous criteria a pre-selected area can be considered as **already quiet** or only **potentially quiet**.

## Analysis of candidate QUAs (1/3)

The analysis phase of the QUA requires two approaches:

- a preliminary desk study
- an “in situ” surveys and noise/sound measurements in each area

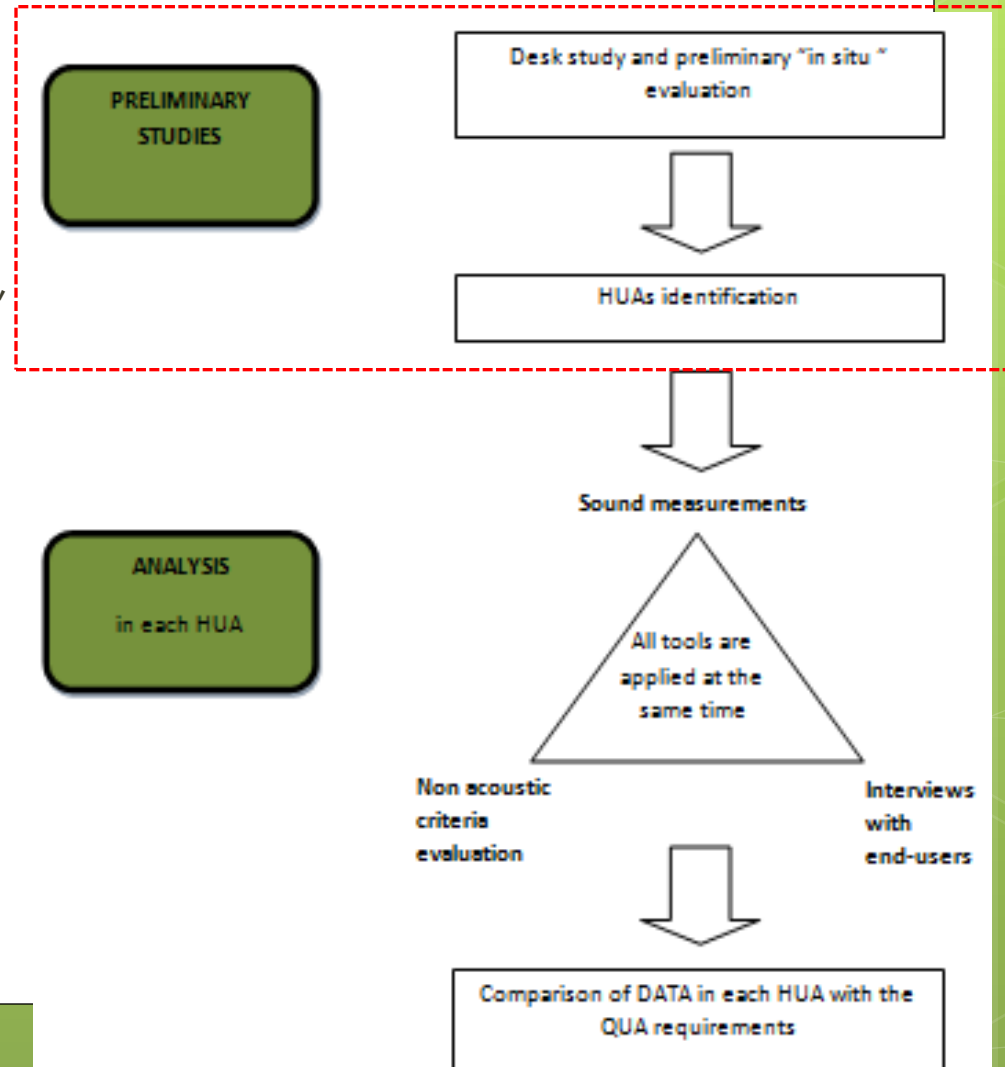


## Analysis of candidate QUAs (2/3)

The analysis of the QUA requires two approaches:

- a preliminary desk study (and a preliminary “in situ” evaluation, if considered necessary), to be developed by the municipality/agglomeration staff, based on the knowledge of the area or on the analysis of official documents

- subdivision of candidate areas into HUA, according to visual aspects, use, distance and presence of sound sources



# TOOL for EXPERT TECHNICAL CRITERIA for the delimitation of Homogeneous Units of Analysis (HUA)

The delimitation of HUAs is connected with the following Items:

Item 1 - Landscape: the area must be characterized by the same visual elements and landmarks.

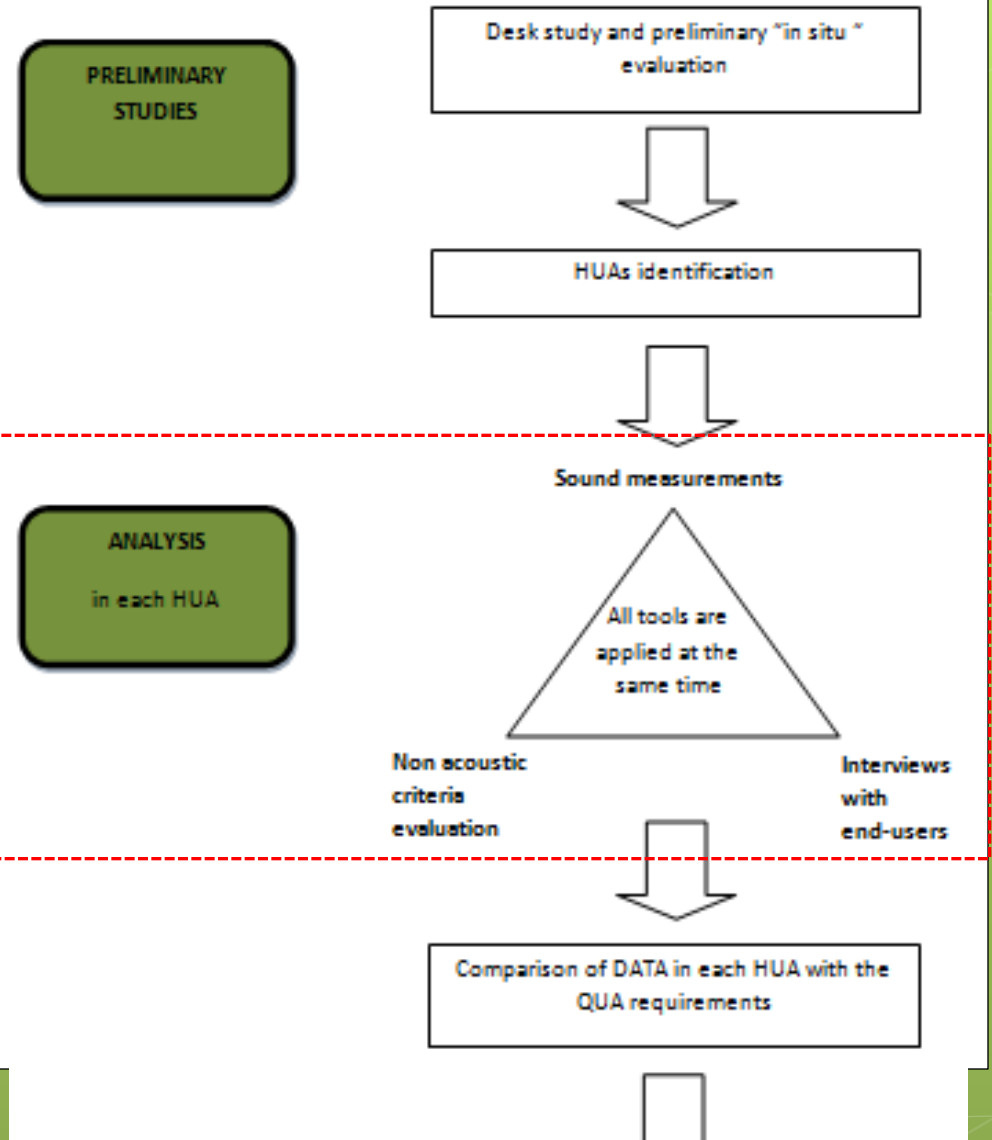
Item 2 - Use: there is only one main and specific use or function of the area. This is connected with facilities and furniture in the area. For instance, in a park, many different uses can be addressed in different areas depending on the facilities: sports areas, recreational areas, resting and relaxing areas.

Item 3 - Distance and Presence of sound sources: the influence of environmental sources (road traffic, rail traffic, air traffic or industrial activities) or other sound elements must be homogeneous in the area.



## Analysis of candidate QUAs (3/3)

“In situ” surveys in each area, to be carried out during the hours citizens are visiting the area. It includes end-users questionnaires, sound measurements and wave recordings.





# QUAs managing

Unfortunately, **indications for the managing phase are still missing** because incomplete.

For this reason proposals concerning the managing phase haven't been delivered yet; although the analysis phase includes many activities which are dedicated to obtain useful indications for possible interventions.

The formal proposal for the managing phase will be developed considering also results from the analysis of the ante-opera data collected in the **pilot areas**.

# Ongoing activities - Demonstration Phase

The project has a high level of demonstrativeness guaranteed by the fact that the methodology will be tested on a number of case study areas. In particular, the proposed methodology will be tested in a set of pilot cases in:

The Netherlands (Rotterdam)

Spain (Bilbao)

Italy (Firenze)



## PILOT CASES IN FIRENZE

In Florence six pilot cases have been selected and analyzed.

All the pilot areas in the city of Florence are scholastic gardens.

This kind of QUAs is characterized by a specific category of end-users (students, teachers, school staff and sometimes parents) and by a defined time to stay in the area, connected to time in which children attend school.

The six scholastic gardens, chosen by Municipality of Florence, are:

**Pilot area n. 01:** “E. De Filippo” school affected to road noise by Argingrosso Street and Bassi Street;

**Pilot area n. 02:** “P. Uccello” school affected to road noise by Pistoiese Street and airplane noise;

**Pilot area n. 03:** “A. Manzoni” school affected to road noise by Gemignani Street;

**Pilot area n. 04:** “F. Dionisi” school affected to road traffic by Aretina Street and Bonomi Street;

**Pilot area n. 05:** “M. Montessori/Vamba” school affected to road traffic by Giardino della Bizzarria Street and Torre degli Agli Street.

**Pilot area n. 06:** “P. Fedi” school affected to road traffic by Pio Fedi Street.

## DELIMITATION OF HUA

Pilot cases analyzed in Florence can be distinguished in nursery schools (pilot area n. 04-05-06), primary schools (pilot area n. 01-03) and secondary schools (pilot area n. 02).

The analysis phase of the QUAs for the delimitation of Homogenous Units of Analysis (HUA) has required two approaches: a preliminary desk-study and an “in situ” surveys with noise/sound measurements in each area.

The subdivision of candidate areas into HUA has been carried out according to three items: landscape, use, distance and presence of sound sources or other sound elements considered homogeneous in the area.

## PILOT AREA N. 1

### PRIMARY SCHOOL “E. DE FILIPPO”

- Noise sources: De’ Bassi Street and Argingrosso Street
- Users: 201
- Opening time period of the QUA: 8 -16

The garden of Primary School “E. De Filippo” is in De’ Bassi Street 3, Florence.

The area of the garden is about 7500 m<sup>2</sup> large. The main noise source is the traffic noise by Argingrosso Street and De Bassi Street. The area is used by students during the school time (8:00-16:00).

Argingrosso Street

Scholastic garden

De’ Bassi Street





# PILOT AREA N. 1

## PRIMARY SCHOOL "E. DE FILIPPO"



## PILOT AREA N. 1

### PRIMARY SCHOOL “E. DE FILIPPO”

It was possible to identify 2 HUAs.

The HUA codify as A is exposed to traffic noise by de' Bassi Street and Argingrosso Street.

The HUA codify as B is on the back of the school and so it is acoustically masked. This area is used only by younger pupils.





## SECONDARY SCHOOL "P. UCCELLO"

- Noise sources: Pistoiese Street and Golubovich Street and airplane noise
- Users: 287
- Opening time period of the QUA: 8 -12:30

The garden of Secondary School “P. Uccello” is in Golubovich Street 4, Florence.

The area of the garden is about 5400 m<sup>2</sup> large. The main noise sources are the traffic noise by Pistoiese Street and Golubovich Street and airplane noise.



## Scholastic garden

Golubovich Street

## Pistoiese Street





## PILOT AREA N. 2

### SECONDARY SCHOOL “P. UCCELLO”

It was possible to identify 2 HUAs.

The HUA codify as A is exposed to traffic noise by Pistoiese Street and Golubovich Street. This area isn't used because of acoustic pollution.

The HUA codify as B is on the back of the school and so it is acoustically masked. This area has sport furniture and it is used during the lessons of physical education and in recreation time by the students in the school time (8:00 - 12:30).





## PILOT AREA N. 3

### SECONDARY SCHOOL "A. MANZONI"

- Noise source: Gemignani Street
- Users: 291
- Opening time period of the QUA: 8 -14

The garden of Secondary School "A.Manzoni" is in Sgambati Street 30, Florence.

The area of the garden is about 4300 m<sup>2</sup> large. The main noise source is the traffic noise by Gemignani Street.

The area is used during the lessons of physical education and in recreation time by the students in the school time (8:00 - 14:00).

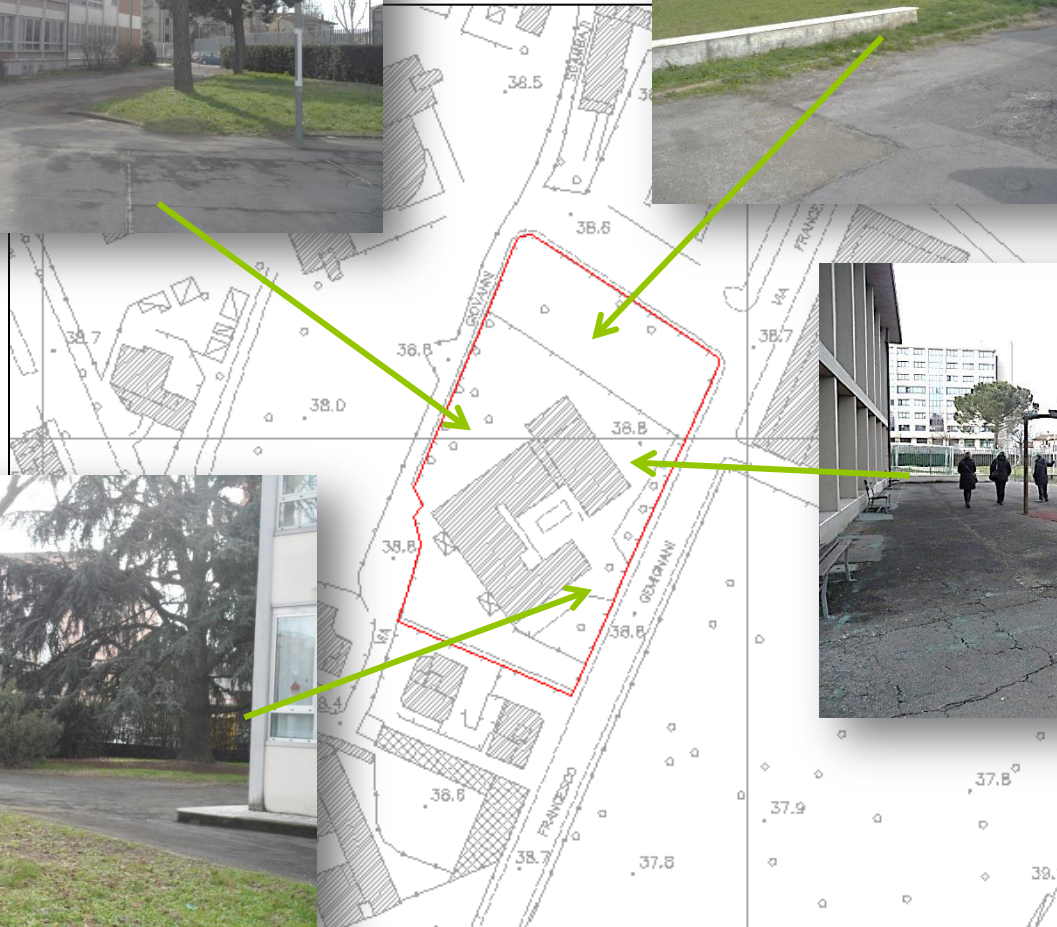
Scholastic garden

Gemignani Street



## PILOT AREA N. 3

### SECONDARY SCHOOL "A. MANZONI"





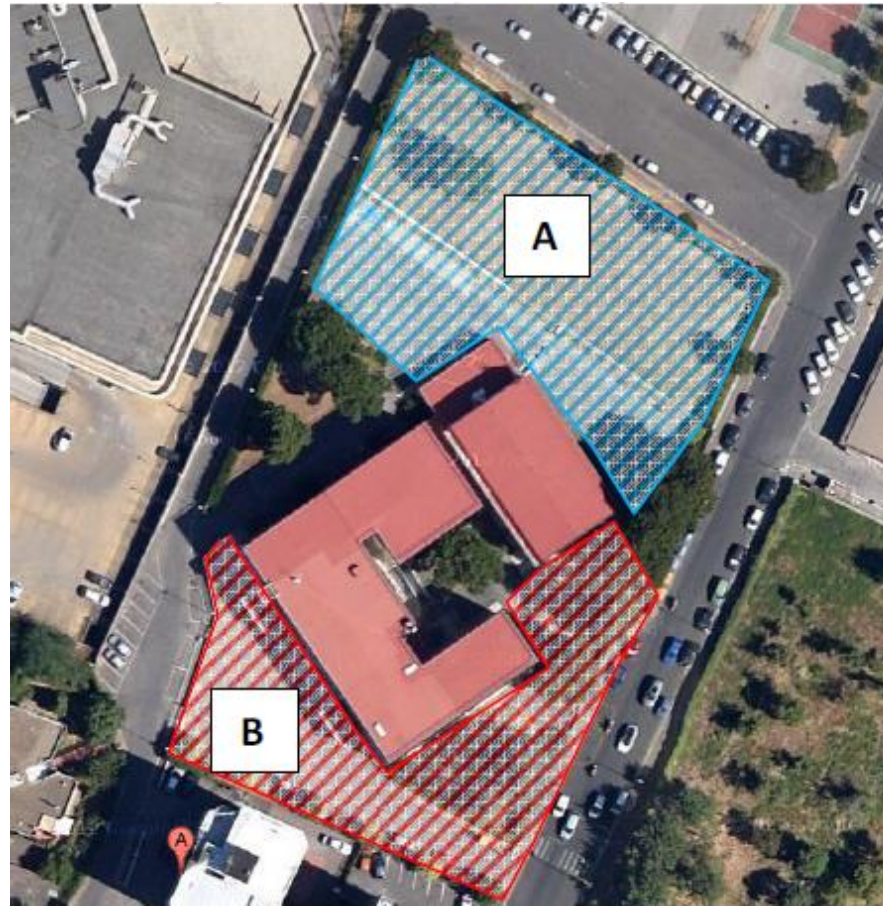
## PILOT AREA N. 3

### SECONDARY SCHOOL "A. MANZONI"

It was possible to identify 2 HUAs.

The area codify as A has a part with grass and a part paved with concret. There aren't trees and there are a few of sport equipments. In this area the noise source (Gemignani Street) is masked by an hedge.

The HUA codify as B is reserved only for the entrance to school.



## PILOT AREA N. 4

### NURSERY SCHOOL “F. DIONISI”

- Noise source: Aretina Street and Bonomi Street
- Users: 54
- Opening time period of the QUA: 8 -16

The garden of the Nursery School “F. Dionisi” is in Sgambati Street 30, Florence.

The area of the garden is about 3500 m<sup>2</sup> large. The main noise source is the traffic noise by Aretina Street and Bonomi Street. The area is used by the students during the recreation time in the school time (8:00 - 16:00).

Aretina Street

Scholastic garden

Bonomi Street





## PILOT AREA N. 4

### NURSERY SCHOOL "F. DIONISI"





## PILOT AREA N. 4

### NURSERY SCHOOL “F. DIONISI”

The green area at the entrance is used only to access to the school. All the other parts of the garden are well equipped with tables, seats and benches.

It was decided to identify only one HUA paying more attention to the space used by the pupils.



## PILOT AREA N. 5

### NURSERY SCHOOL “M. MONTESSORI/VAMBA”

- Noise source: Torre degli Agli Street and Giardini della Bizzarria Street
- Users: 460
- Opening time period of the QUA: 8 -16:30

The garden of the Nursery School “M.Montessori-Vamba” is in Giardini della Bizzarria Street 39, Florence.

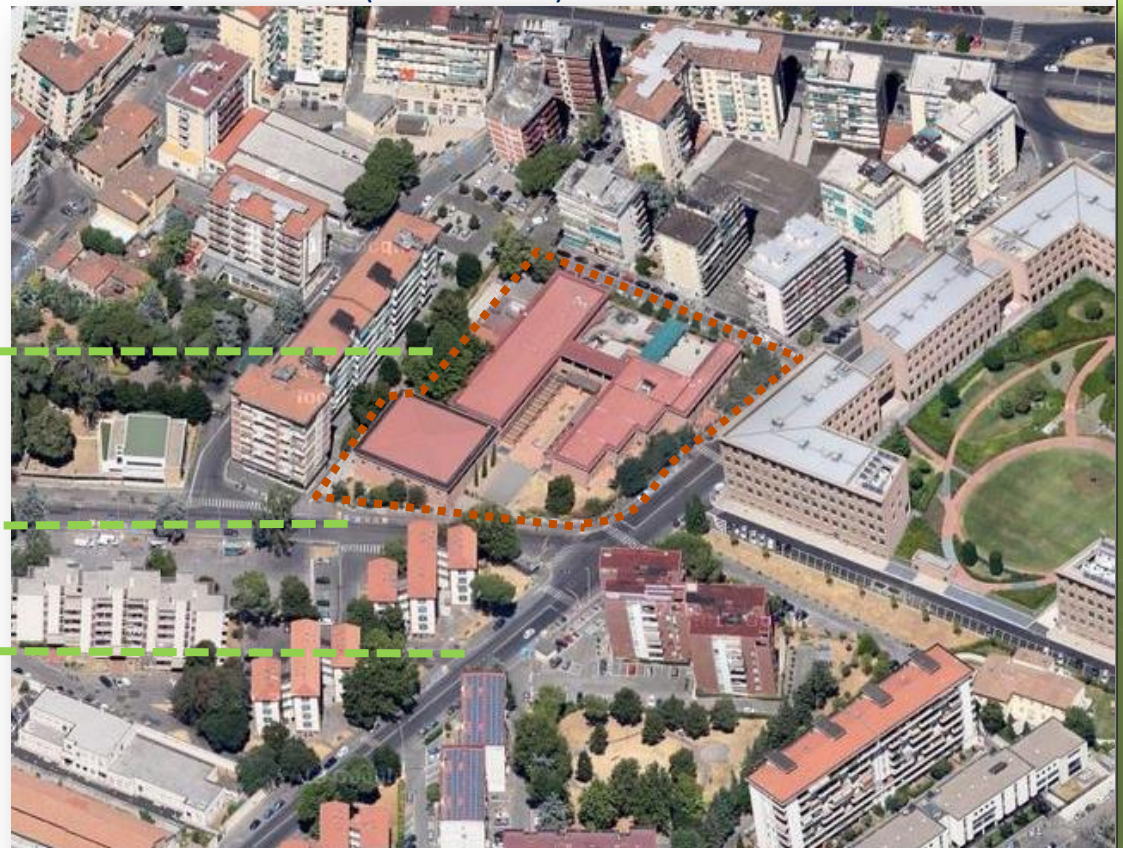
The area of the garden is about 1000 m<sup>2</sup> large. The main noise source is the traffic noise by Torre degli Agli and Giardini della Bizzarria Street.

The area is used by the students during the recreation time in the school time (8:00 - 16:30).

Scholastic garden

Giardini della  
Bizzarria Street

Torre degli Agli Street





## PILOT AREA N. 5

### NURSERY SCHOOL "M. MONTESSORI/VAMBA"



## PILOT AREA N. 5

LIFE10 ENV/IT/407



### NURSERY SCHOOL “M. MONTESSORI/VAMBA”

It was possible to identify 2 HUAs.

The area codify as A is related to Nursery School “Vamba” and it is exposed to noise from Giardini della Bizzarria Street and Torre degli Agli Street.

The area codify as B is related to Nursery School “M.Montessori” is exposed to traffic noise of Torre degli Agli Street. In both the areas there are some games.





## PILOT AREA N. 6

### NURSERY SCHOOL “P. FEDI”

- Noise source: Argingrosso Street and Pio Fedi Street
- Users: 100
- Opening time period of the QUA: 8 -16:30

The garden of the Nursery School “P.Fedi” is in Pio Fedi Street 2, Florence.

The area of the garden is about 2300 m<sup>2</sup> large. The main noise source is the traffic noise by Pio Fedi Street.

The area is used by the students during the recreation time in the school time (8:00 - 16:30).

Argingrosso Street

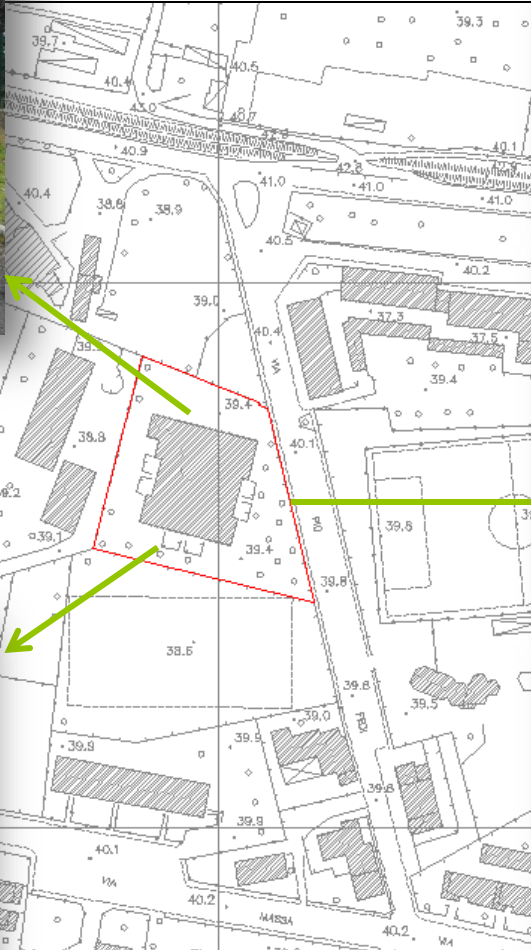
Scholastic garden

Pio Fedi Street



## PILOT AREA N. 6

### NURSERY SCHOOL "P. FEDI"





## PILOT AREA N. 6

### NURSERY SCHOOL "P. FEDI"

The area is well equipped and the traffic source is visually masked.

It was useful to identify only one HUA because the area on the back of the building is very small and its acoustic and visual characteristics are not so different from the rest of the garden.





# DATA ACQUISITION QUESTIONNAIRES

## ISSUE

1. General information
2. Place use
3. Soundscape and noise
4. Environment quality
5. Living environment

LIFE10 ENV/IT/407



	QUESTIONARIO
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### Questionario - Aree Quiete

Intervistatore:..... Telefono:.....  
 Numero del sondaggio:..... (campo riservato all'intervistatore)  
 Nome dell'area:..... (campo riservato all'intervistatore)  
 Ubicazione:..... (campo riservato all'intervistatore)  
 Data:..... (campo riservato all'intervistatore)  
 Ora di inizio:..... Ora fine.....

#### IN GENERALE

0. Tra le sub-aree mostrate di seguito, quale frequenti maggiormente?



#### LUOGO-USO

U.1. Per quale ragione sei qui oggi? (domanda aperta, nel caso in cui l'intervistato si trovasse per la prima volta in quest'area saltare le domande 2-4)

U.2. Quando frequenti quest'area?  
☐ Tutti i giorni  
☐ Una o più volte a settimana  
☐ Poche volte al mese  
☐ Una volta al mese o meno

U.3. Durante quali giorni frequenti principalmente quest'area?  
☐ Durante i giorni feriali  
☐ Durante il fine settimana  
☐ Quando mi fa comodo  
☐ Altro

U.4. In che momento della giornata frequenti principalmente quest'area?  
☐ La mattina



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U.4. In che momento della giornata frequenti principalmente quest'area?



## DATA ACQUISITION

### SHORT TERM MEASUREMENTS

The short term measurements (codified as QXX) have the aim to collect acoustic information about the present sound levels during the time of in situ analysis.

The data collected for every QUA are :

- **at least a measurement position per each HUA;**
- **1,5-1,8 m** as the microphone height above the ground (according to the supposed ear height);
- **30 minutes** as the minimal duration of the short term measurements, but always according to duration of the interview.

The short term measurements have been carried out in a time span when the HUA is typically used, in parallel to both the long term measurement and the end-users interviews

The measurement position was close to the interview location, but far enough (at least 3 m distance) not to be corrupted by the on-going interview.



## DATA ACQUISITION

### LONG TERM MEASUREMENTS

The long term measurements (codified as PC) have the aim to collect acoustic information about the variability of sound levels vs time.

The data collected for every QUA are:

- **at least a measurement position is expected per QUA** (combined to short term measurement in each HUA);
- **4,0** as the microphone height above the ground (according to END suggestions, defined in Annex I of END);
- **1 week** as the minimal duration of the long term measurements;

The measurement position was close to the interview location, but far enough (at least 3 m distance) not to be corrupted by the on-going interview.





# DATA ACQUISITION

## WAVE FILE

The WAVE file recording has the aim to collect acoustic information about the actual sounds during the time of in situ analysis strictly linked to the end-users perception.

The data collected for every QUA are:

- **at least one recording position or a “sound walk”** carried out into each HUA;
- **a binaural data acquisition system** was used;
- **the recording measurements** was carried out in a time span **when the HUA is typically used**, in parallel to both the long term measurement and the end-users interviews;
- **a WAVE file** (44.1 kHz sample rate) has been recorded.

The recording positions was close to the interview location, but far enough (at least 3 m distance) not to be corrupted by the on-going interview.

Based on the results of analysis carried out in the pilot cases, the adequate parameters and indexes will be chosen.

