

# First results of activities carried out in the pilot area of Life MONZA project

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## The Project and the beneficiaries



Project  
LIFE15 ENV/IT/000586  
with the contribution of EU  
Commission

Program  
LIFE 2014-2020

Call  
*LIFE Environment and Resource  
efficiency 2015*



**LIFE MONZA**  
(Methodologies  
for  
Noise  
low emission Zones  
introduction  
And management)



**ISPRA**

Istituto Superiore per la Protezione  
e la Ricerca Ambientale



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Ingegneria

## The background

The introduction of **Low Emission Zones**, urban areas subject to road traffic restrictions in order to **ensure compliance with the air pollutants limit values**, set by the European Directive on ambient air quality (2008/50/EC), is a common and well-established action in the administrative government of the cities and the impacts on air quality improvement are widely analyzed, whereas the **effects and benefits concerning the noise have not been addressed in a comprehensive manner**.

The definition, the criteria for analysis and the management methods of a **Noise Low Emission Zone** are not yet clearly expressed and shared.

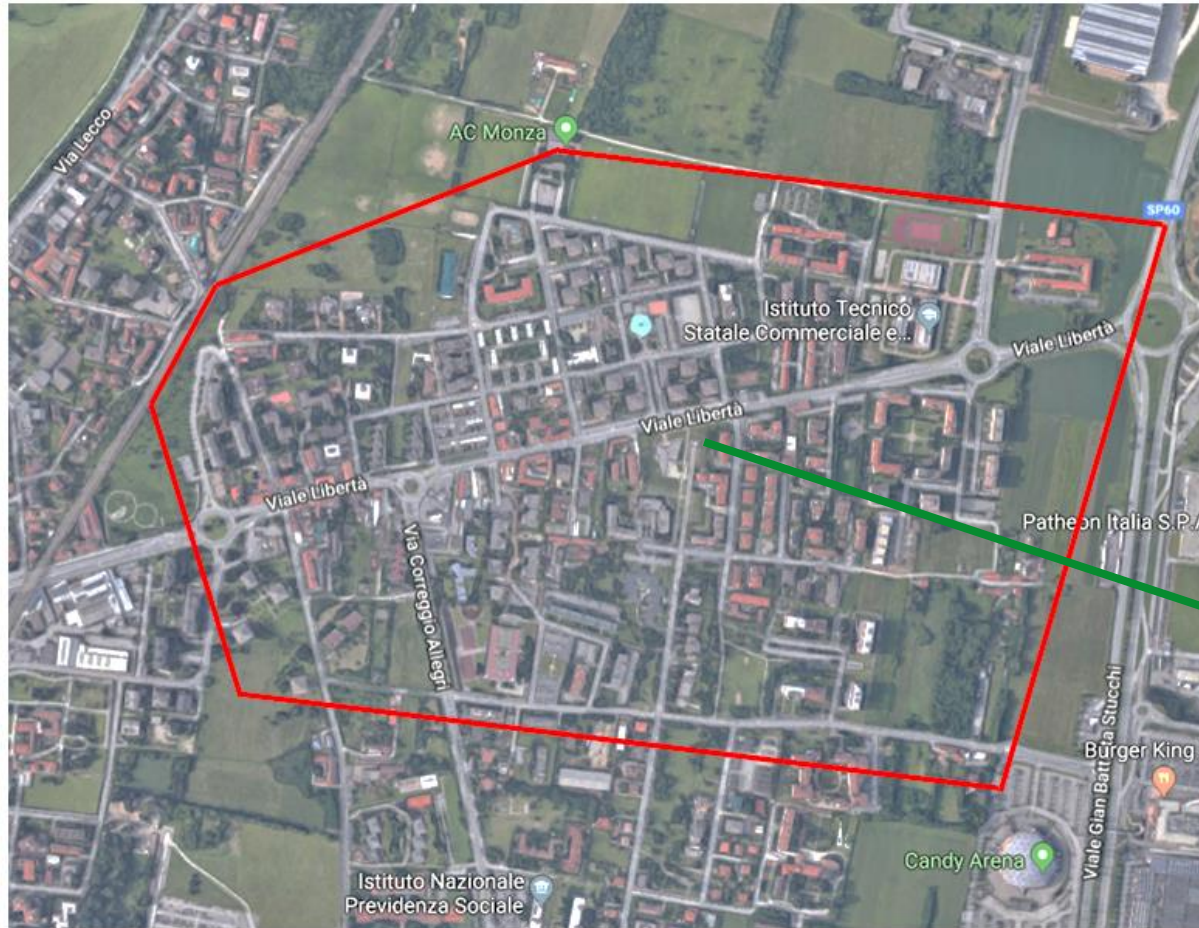
LIFE MONZA project (Methodologies fOr Noise low emission Zones introduction And management - LIFE15 ENV/ IT/000586) addresses these issues.

## The main project's objective

The **main objective** of the project is to **introduce an easy-replicable method**, and related guidelines, for the **identification and the management of a Noise Low Emission Zone**, an urban area subject to traffic restrictions, whose impacts and benefits regarding noise issues will be analyzed and tested in the pilot area of the city of Monza - **Viale della Libertà district**.



## The pilot area



The Libertà district is identified as hot spot in the Noise Action Plan of the city of Monza

In a range of 30 m from Viale Libertà about the 100% of receivers is exposed to noise levels  $\geq 65$  dB(A) Lden and  $\geq 55$  dB(A) Lnight

## Activities and Methods applied to achieve the objectives

- Specific ***top-down measures*** have been adopted by the municipality, able to turn up the urban area in a permanent Noise LEZ, concerning infrastructural interventions and aimed at reducing the **average noise levels** in the pilot area of Libertà district, with positive complementary effects also on the **air quality** and benefits on the **quality of life** of the inhabitants
- Specific activities, defined ***bottom-up measures***, have been implemented to involve the population in an active management system of lifestyle choices

## The top-down actions

The top-down actions of the project are:

- Laying of **new low-noise paving on Viale Libertà**



- **Speed reduction measures** (raised pedestrian crossing, road reshaping)



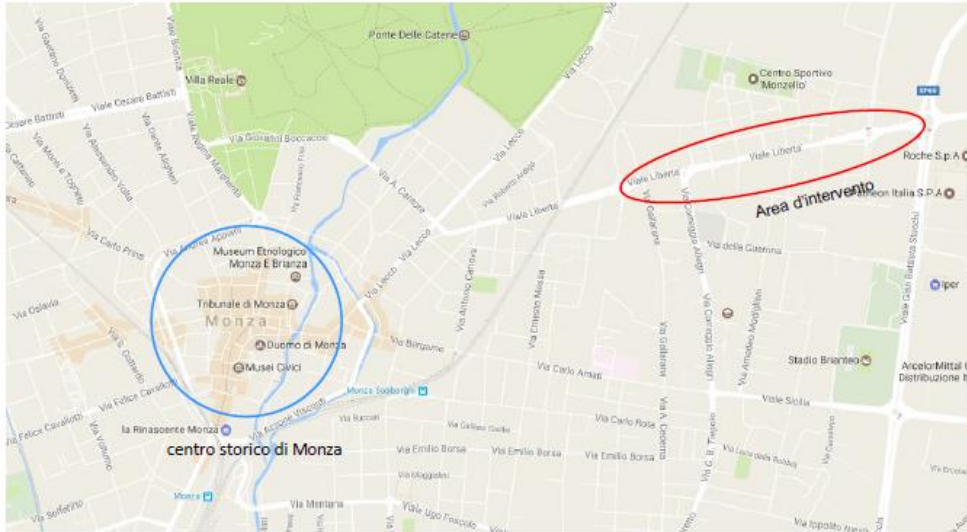
- **Restrictions to the transit of heavy vehicles** (from 21/01/2019 access to Viale Libertà restricted to vehicles over 3.5t and in the period July-October 2019 restricted to vehicles over 7.5t)







## The new asphalt 1/4



### Starting points to design the new paving:

- Street with high flow traffic
- Noise levels exceeded in night time
- Flowing traffic conditions in night time period

### State of the art:

Analysis of EU and National Projects about low noise pavings. Networking activities with other LIFE+ projects working on low noise pavings (i.e. Life+ NEREIDE)

### Designed low-noise paving:

The designed low-noise paving consists of a closed layer with optimized texture (“DENSE GRADED” – rif. Progetto Leopoldo)

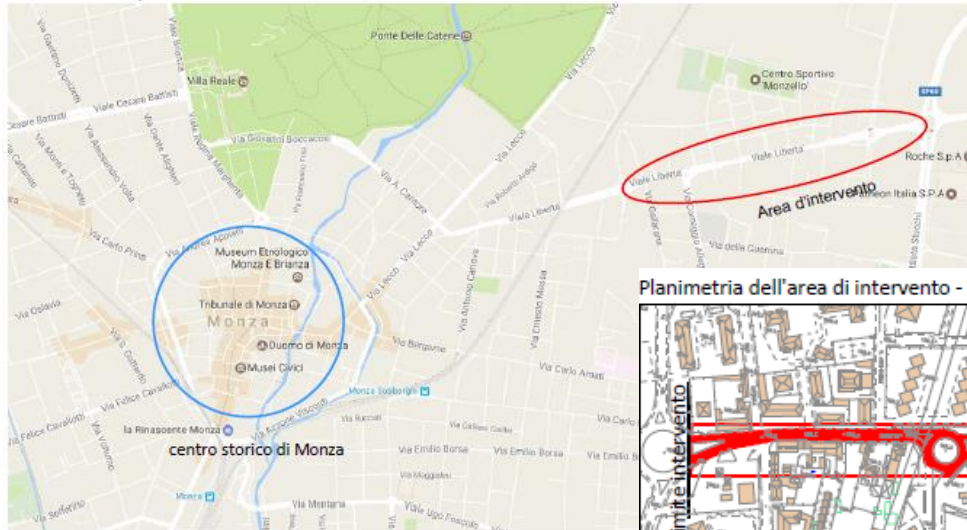
### Strengths of the selected solution:

- High performance in fluent road traffic conditions
- Maintaining performance over time





# The new asphalt 2/4

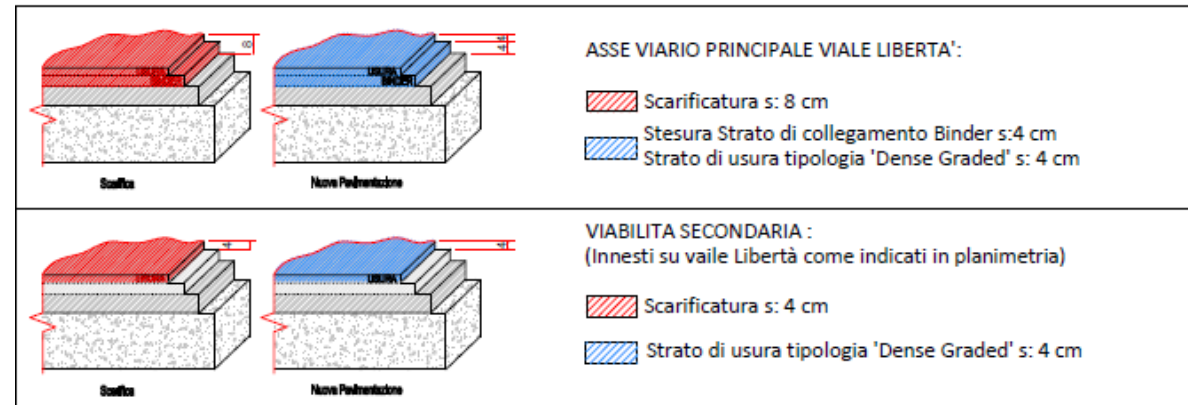


Planimetria dell'area di intervento - Viale Libertà

Scala 1:2000



Particolare nuova pavimentazione stradale



## The new asphalt 3/4

Works for the laying of new low-noise asphalt  
(Viale Libertà, September 2018)







## The new asphalt 4/4

January 2019



Condition of the pavement 4 months after the laying

May 2019



Condition of the pavement 8 months after the laying



Particular weaving of the wear layer  
**'Dense Graded'**



## The noise monitoring

Typologies of adopted  
noise monitoring



New smart and low-cost noise  
monitoring system



Class I measurement chain

## Class I measurement chain 1/2

### Class I noise measurement chain



#### **Ante and post-operam measurements:**

- noise measurement campaigns and concurrent traffic flow measurements in spring/summer and autumn/winter periods were performed

#### **Duration of measurements:**

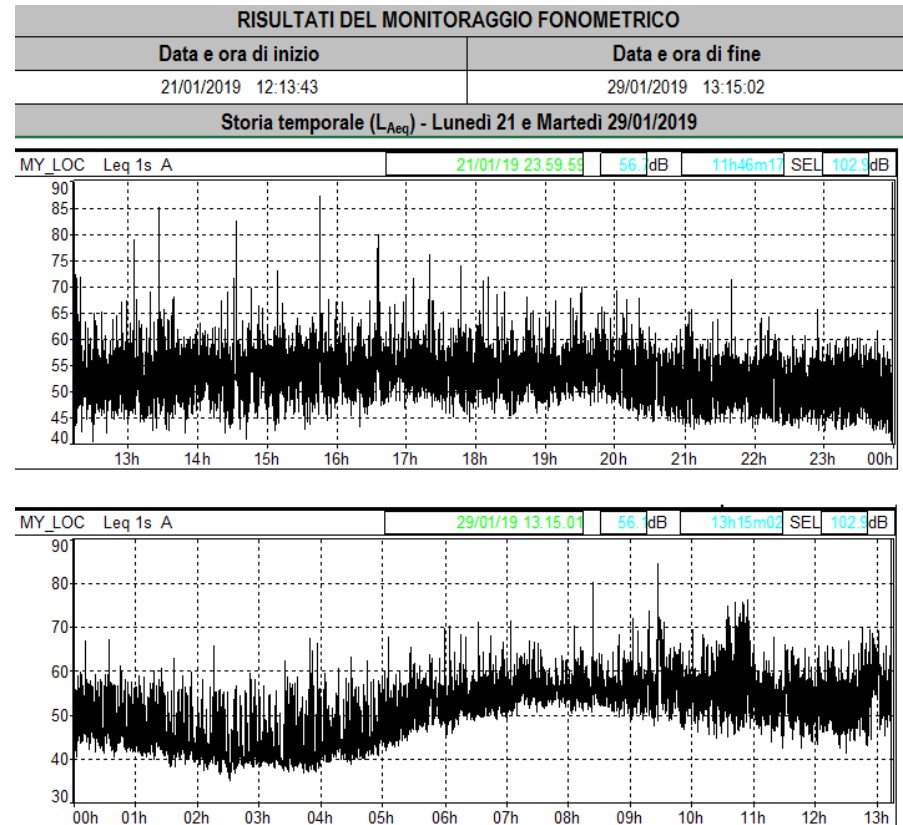
- one week-duration in 2 points
- one hour-duration in 10 points





## Class I measurement chain 2/2

Dati generali dell'infrastruttura stradale		Dati descrittivi della postazione di misura	
Codifica Postazione di misura		P01	
Descrizione		Postazione di misura sul tetto del Centro Civico di Viale Libertà	
Altezza del microfono dal piano campagna		6 m	
Distanza del microfono dall'asse stradale		38 m	
Sistema di misura utilizzato		n. 1	
Classe Acustica (secondo il P.C.C.A. di Monza)		IV	
Valori limite di immissione (D.P.C.M. 14/11/1997)		60 dB(A) TR diurno - 50 dB(A) TR notturno	
<b>Inquadramento territoriale</b>			
<b>Documentazione Fotografica</b>			





## Smart noise measurement system 1/2

The smart noise monitoring system is a prototypal method, based on the following relevant low cost monitoring system experiences:

- DREAMsys
- Smart monitoring networks designed by Ghent University
- SENSEable Pisa
- Life DYNAMAP
- Barcelona Noise Monitoring network
- Low-cost monitoring systems based on smartphone devices – Regional Environmental Agency of Piemont

..



**10 smart monitoring sensors, 3 of which on Viale Libertà**

**Homogeneous distribution**

**On going noise monitoring since June 2017**

Results: an **Abacus** on smart noise low-cost monitoring networks fully available at [www.lifemonza.eu](http://www.lifemonza.eu)



## Smart noise measurement system 2/2

### Smart sensor installed on the building's facade

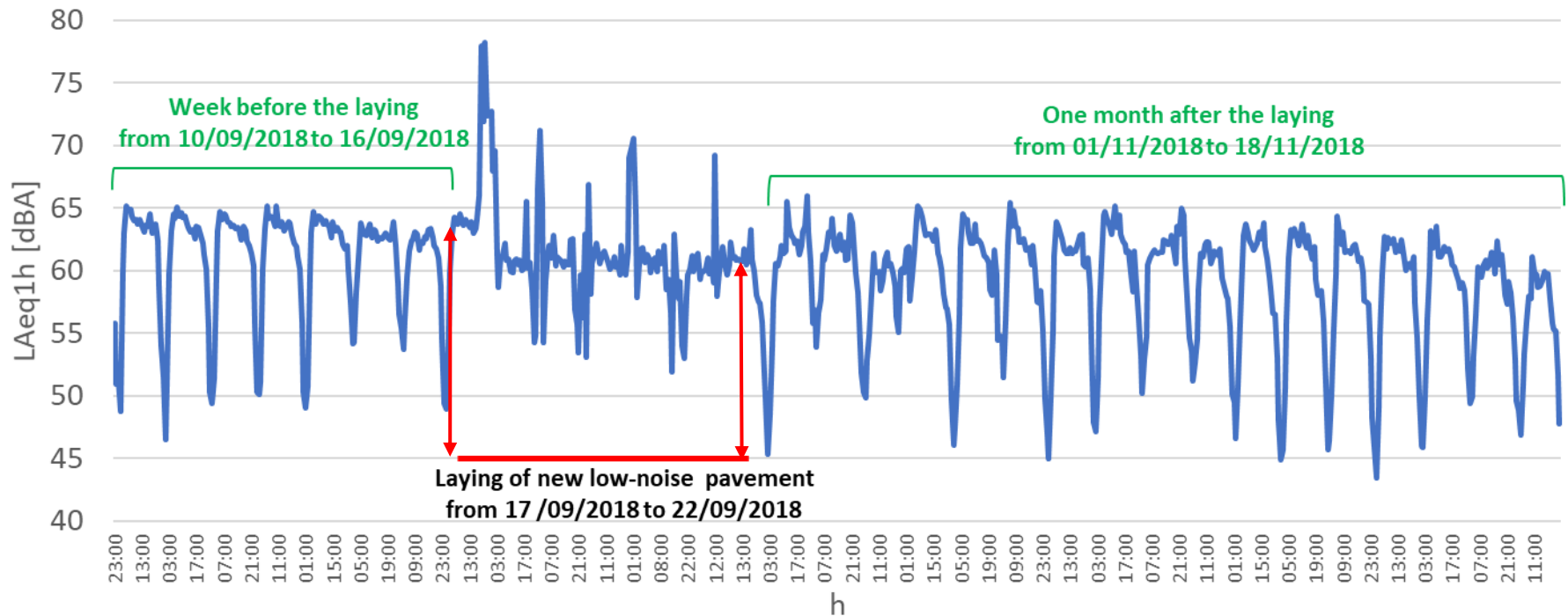


### Smart sensor installed on pole



## First results 1/6

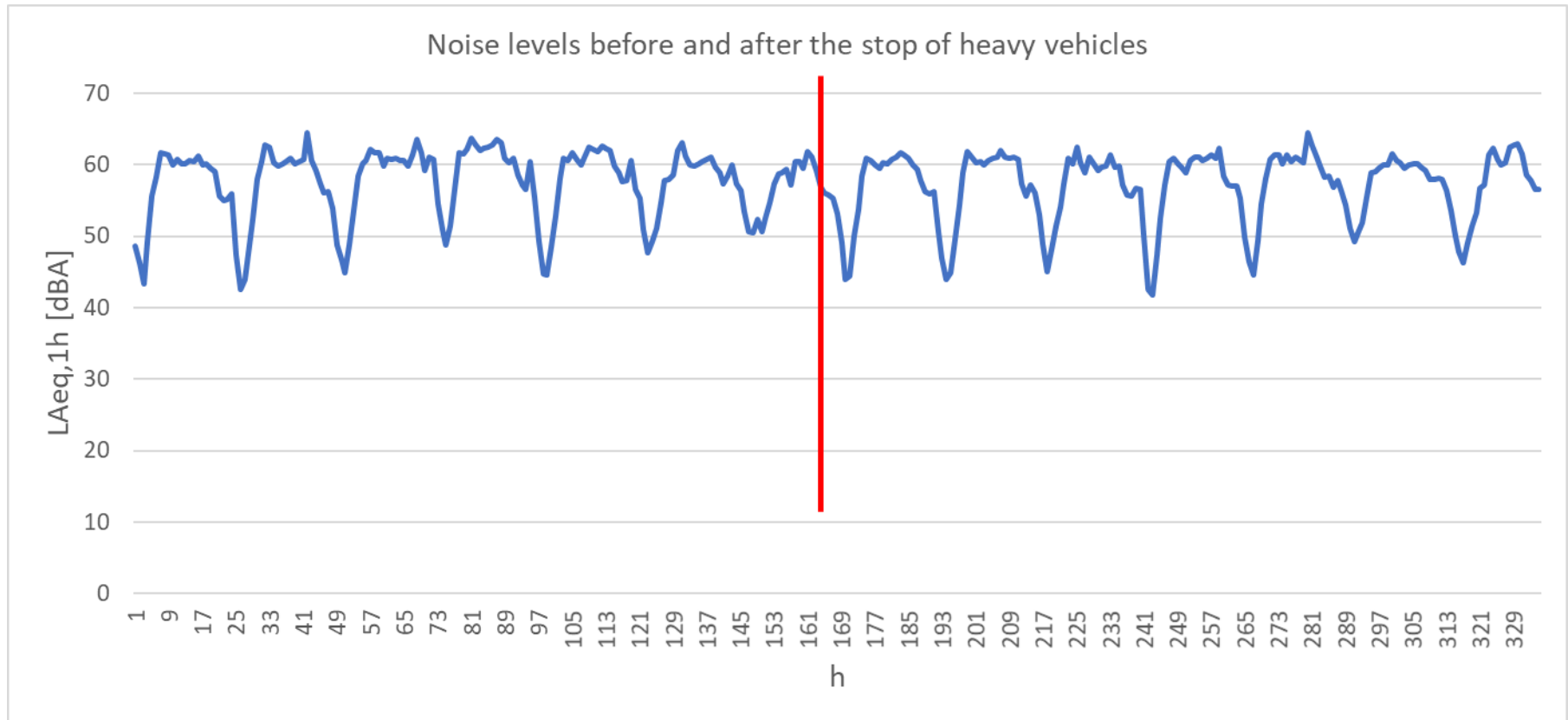
Noise levels before and after the new low-noise pavement's laying



Noise levels recorded by the HC101 sensor (placed on a building close to Viale Libertà) before, during and after the laying of the new paving >>> **visible noise reductions occur**



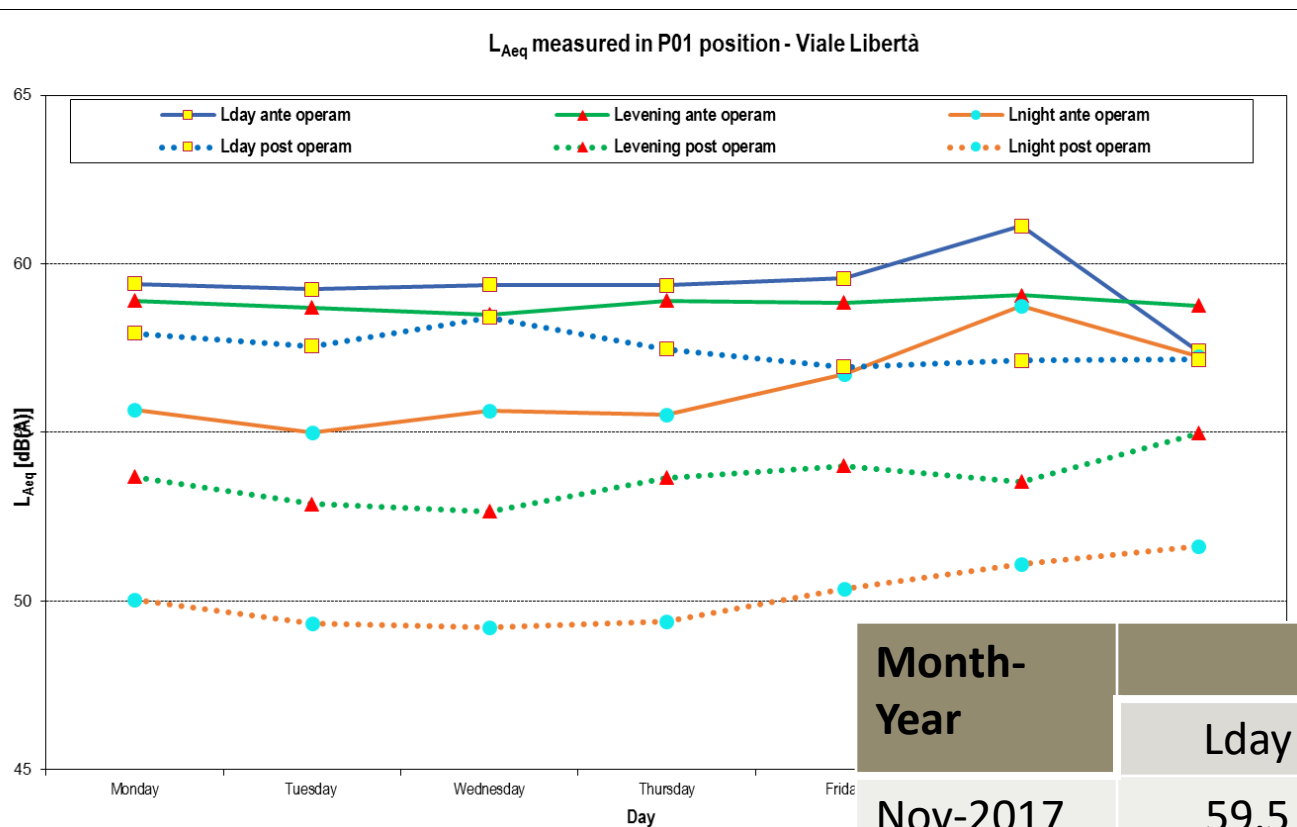
## First results 2/6



Noise levels recorded by the sensor HC101 before and after the stop of heavy vehicles >>> **no evident effects**



## First results 3/6



**Comparison between ante (November 2017) and post-operam (January 2019) results obtained with the class I chain**

Month-Year	Acoustical descriptor		
	Lday	Levening	Lnight
Nov-2017	59.5	58.8	56.5
Jan-2019	57.5	53.7	50.3
Difference	2.0	5.1	6.2

## First results 4/6

### Comments

- There is a very good alignment between the traffic flow data of the ante- and post-operam scenarios. In fact, the deviations in traffic flows between the ante- and post-operam scenarios are less than 10%.
- Starting from this consideration, the difference between ante-operam and post-operam noise levels can be assumed to be representative of the attenuation due to the top-down interventions carried out.
- In particular, **the high value of noise attenuation obtained mainly in the evening and night periods (5-6 dBA) is probably due to the presence of a fluid traffic flow present in these periods, able to maximize the performance of the intervention of low noise pavements.**
- **In the daily period**, considering the reduced traffic flow speed and the possible presence of stop and go conditions with higher noise engine contribution, **the noise attenuation is approximately 2 dBA.**



## First results 5/6

### Comparison between the class I chain and the smart system

	Period	Lday (6-20) dBA	Levening (20-22) dBA	Lnight (22-06) dBA
Class I chain	Nov-17	59.5	58.8	56.5
Low cost sensor	Nov-17	64.6	62.5	59.2
<b>Difference</b>		<b>5.1</b>	<b>3.7</b>	<b>2.7</b>
Class I chain	Jan-19	57.5	53.7	50.3
Low cost sensor	Jan-19	60.4	57.0	53.0
<b>Difference</b>		<b>2.9</b>	<b>3.3</b>	<b>2.7</b>

- **A constant difference (about 3 dB) between the levels measured by the low-cost sensor and the class I measurement system is generally present.** This difference is justified considering the different microphone's positions: low-cost sensor on the façade of the building, class I microphone on the roof of the building.

- In the measurements performed in November 2017, in the periods "Day" and "Evening" there are differences > 3 dB, probably due to the activities carried out in the proximity of the low cost sensor.

## First results 6/6

Considering the nighttime period, the Class I sensor attenuation is compared with the attenuation evaluated by using smart sensors.

Period	Class I chain Lnight (22-06) dBA	Smart snesor Lnight (22-06) dBA
Nov-17	56.5	59.2
Jan-17	50.3	53.0
Difference	6.2	6.2

**Results: there is an excellent alignment of the attenuations obtained by the two different measuring systems.**



## The bottom-up actions (1/6)

People have been involved in an active management system of a more sustainable lifestyle choices, related to noise reduction, air quality and well-being improving, in their living and working environment.

In order to strengthen the dialogue between citizens and public bodies, many activities will be carried out, as:

- meetings in primary and high schools about noise effects and awareness
- school-work alternation experiences
- Pedibus introduction, reducing number of parents accompanying children by car
- Ideas contests for Noise LEZ picture and logo
- questionnaires on perceptions of specific noise impacts, on quality of life, air quality as well social aspects



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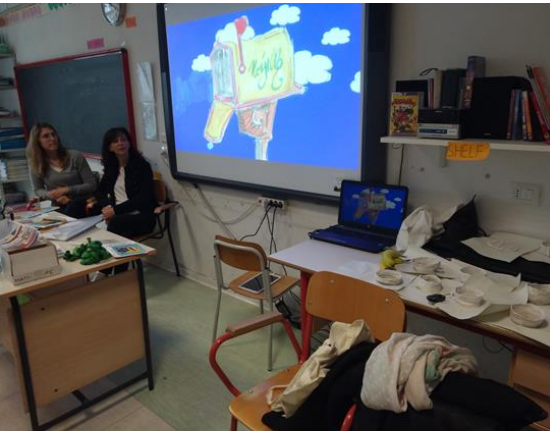
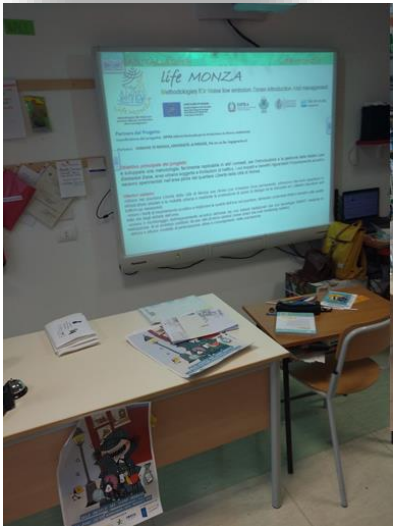
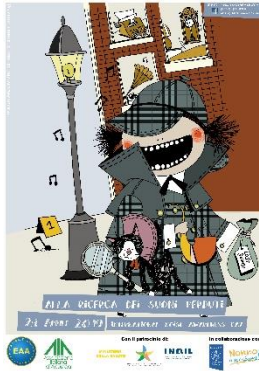
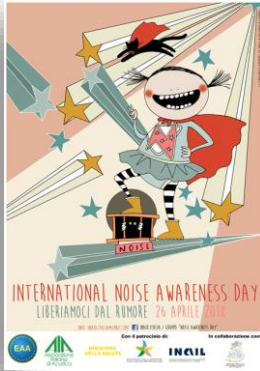
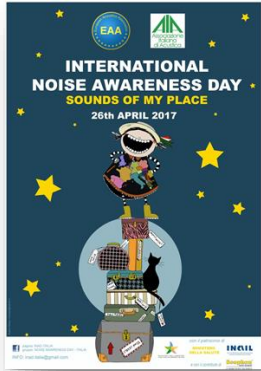
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# The bottom-up actions (2/6)

## Meetings in primary and high schools about noise effects and awareness

**NOISE AWARENESS DAY 2017: 200 students!**  
**NOISE AWARENESS DAY 2018: 80 students!**  
**NOISE AWARENESS DAY 2019: 80 students!**





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## The bottom-up actions (3/6)

### School-work alternation experiences

#### Alternating school-work Programs with Carlo Porta Institute:

- 21 students
- 15 meetings



School-work alternation is an **innovative teaching method**, which through practical experience helps to consolidate the knowledge acquired at school and test the attitudes of the students, enriching their education and orienting their study path and, in future of work, thanks to projects in line with their curriculum.

To involving local stakeholders in the project, a school-work **alternation project** was implemented through conventions of the Municipality with “Carlo Porta” and “Achille Mapelli” High Schools.





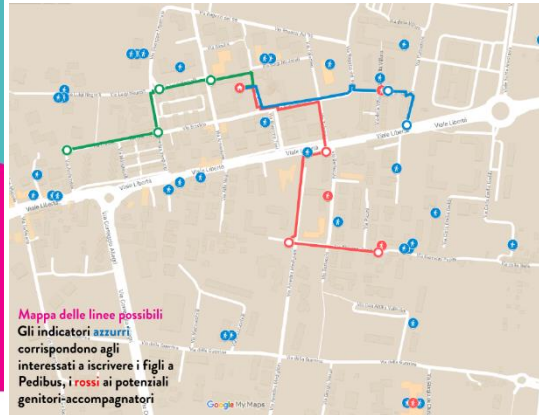
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# The bottom-up actions (4/6)

## Pedibus introduction

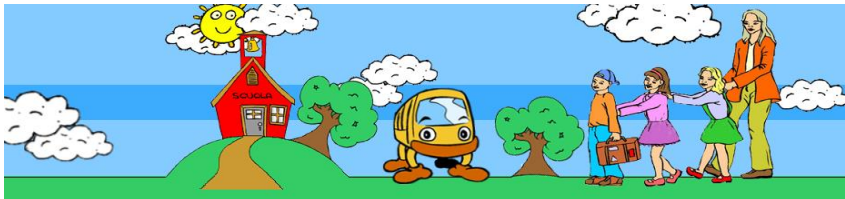


«**Pedibus**» is a walking school bus, a participatory action that **promotes mobility on foot** in the travel from home to school. The children, organized in small groups (from 5 to 10 members), are accompanied by volunteers and go from home to school following specific itineraries (lines) verified and certified by the Local Police.

Each line has own **itinerary** that starts from a terminus, follows an established route and gathers the child-passengers at the various stops set up along the way, respecting the set times.

Each line has a group of reference guides, of which one is the line's contact.

This **innovative approach** is a fun, healthy and safe alternative for children and teenagers to take the first steps towards autonomy, getting to know their neighborhood, socializing with others and concretely promoting sustainable mobility on the journey from home to school.





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# The bottom-up actions (5/6)

## Ideas contests for Noise LEZ picture and logo

An Ideas contest has been launched by Municipality of Monza and it is oriented to all students of 'Istituto Mapelli' in Monza.

Object of the competition was the creation and development of a **LOGO** and a **SLOGAN** for the communication and promotion of the **Noise LEZ** of the Libertà district in Monza. Logo and slogan scope is reflect the fundamental elements that connotations of the district such as NOISE LEZ and to sustain the environment activities, particularly against noise pollution. All students work will be exposed in Centro Civico Libertà from 19 may 2018 to 27 may 2018.

The first three classified groups are receiving as prizes a couple of city bike.





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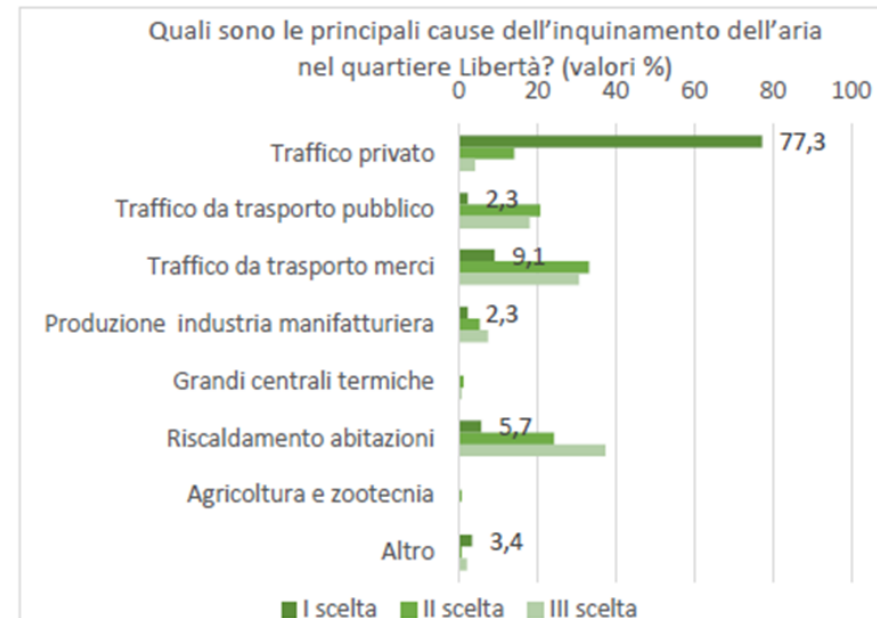
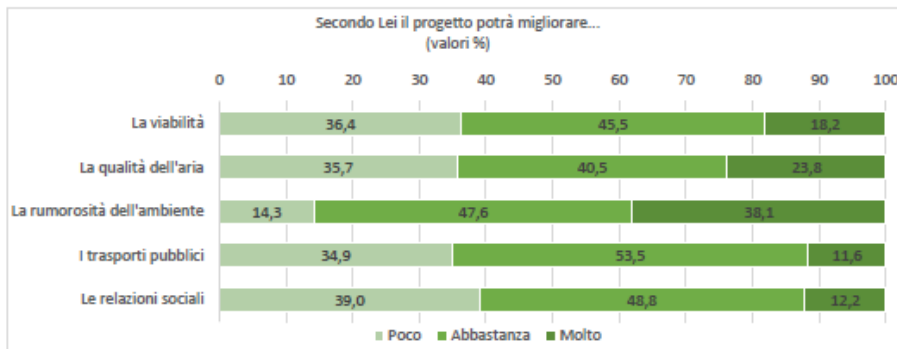
# The bottom-up actions (6/6)

## Questionnaires on perceptions of specific noise impacts, quality of life, air quality and social aspects related to the Libertà District (ante/post operam phase)

In order to establish an active **dialogue** between **public institutions** and the **citizens** of the pilot area, the project has provided a series of initiatives including the administration of **questionnaires** relating to the **ante/post-operam phase of the LIFE MONZA project** concerning the various environmental issues.

The objective of the sample survey is the analysis of the effects of the actions provided by the project through the detection and evaluation of judgments, perceptions and attitudes of the population concerned towards aspects linked to the livability of the neighborhood and the conditions of well-being environmental and social.

The questionnaires were sent by postal and telematic means with **the help of the students of the "Carlo Porta" High School as detectors.**



In this work **the first results, concerning noise, of the top-down/bottom up activities carried out in the pilot area of the LIFE Monza project are illustrated.**

**The interventions** carried out on Viale Libertà **have provided excellent results in terms of reducing road traffic noise.**

The reduction of noise levels measured **in the daytime period**, between ante and post-operam, **is equal to 2 dB(A). In the "evening" and "night" periods the noise reduction increase up to 5-6 dB(A);** an excellent alignment between the attenuations obtained with Class I instruments and the low cost sensor measurements is shown

**Bottom-up activities helped to make citizens aware of the problem of noise and to move towards more sustainable life choices,** from an environmental point of view. Over 1000 people were overall involved





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***Thanks for  
your kind attention***

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For further information, please visit the official  
Project web-site: [www.lifemonza.eu](http://www.lifemonza.eu)



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