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1 The methodology to be transferred

1.1 The MCDA methodology and its context

The project develops a Multicriteria Decision Analysis (MCDA) methodology to identify the most suitable low-noise pavement (LNP) for a given site. The selection is based on contextual data such as traffic composition and volume, speed, type of environment (urban or suburban), and weather conditions. Candidate pavements are evaluated through modelling software with adequate accuracy. The methodology builds on previous experiences and pilot applications in urban contexts (municipalities of Florence and Forlì) and in a suburban area (Province of Bolzano). The MCDA is designed as a decision-support tool to be applied before selecting and producing the pavement mixture, ensuring that the chosen LNP maximises efficiency and long-term effectiveness of noise mitigation.

1.2 From implementation locations to new adopting locations

The methodology is being developed and tested in two urban locations in central Italy (Florence and Forlì, with different traffic and urban settings) and in a suburban area in the Autonomous Province of Bolzano. It can be transferred to a wide range of contexts where LNP can effectively mitigate road traffic noise, including:

- Urban areas: agglomerations and urban road sections with speed limits up to 50 km/h;
- Suburban areas: high-traffic roads with speeds of 70–100 km/h and discontinuous settlements.

Potential stakeholders have been identified since the proposal stage. Several municipalities and authorities expressed their interest through letters of intent, including Rome, Verona, Rimini, Izmir, Seriate, Monza, and the Province of Torino.

Following project approval, the stakeholder register was expanded. It now includes infrastructure managers at national, regional, and local levels, as well as networks of cities supporting dissemination among road authorities. Moreover, several road technology developers have shown interest and can contribute directly to the practical implementation of the methodology during the design of noise mitigation measures.

1.3 Evaluating the outcomes of using MCDA

The adoption of the MCDA methodology can generate measurable benefits both in terms of pavement performance and in the effectiveness of noise mitigation for citizens. One of the main expected outcomes is an increase of about 20% in pavement durability and acoustic effectiveness, compared to conventional approaches. This improvement translates into longer service life of the surface, reduced need for frequent interventions, and consequently lower maintenance costs for infrastructure managers. From a societal perspective, citizens benefit from a more stable reduction of traffic noise over time, without interruptions due to premature surface renewal.

The methodology shows strong potential for replication in urban contexts, where traffic density and population exposure make noise mitigation a priority. At the same time, there are numerous opportunities in suburban areas with similar conditions to those tested in the project. For instance, many European countries in the pre-Alpine belt (France, Austria, Switzerland, Slovenia, etc.) share geographical features comparable to the Province

of Bolzano, such as valley roads, canyons, and villages built along slopes, where noise exposure is particularly critical.

In addition, the MCDA approach offers perspectives for further development in the high-speed road sector. With adequate datasets (e.g. long-term performance series of LNP pavements on motorway sections with speeds above 100 km/h), the methodology could be extended to motorway environments. This would open the way to applications in contexts where noise mitigation is usually more challenging due to higher vehicle speeds and traffic volumes.

2 The transferring process

2.1 Analysis of the MCDA methodology transferring process

The transfer of the MCDA methodology requires adapting to the specific implementation mechanisms of each context. Different approaches and stakeholders are involved depending on whether the application is suburban or urban, and whether it concerns the Italian context or international settings.

- Suburban and international contexts
  The methodology can be applied not only in Italy but also in other countries. Networks such as Eurocities facilitate the dissemination to non-Italian cities, complemented by scientific dissemination at international conferences. Despite regulatory differences between countries, the European framework of Green Public Procurement and the general need for high-performing, cost-efficient pavements create a common ground for transferability.
- Urban contexts in Italy
  Here, the methodology integrates with existing urban plans and procedures. Depending on the ownership and management of the road, two main cases emerge:

  1. Major roads crossing urban centres or suburban areas: the owner/administrator is a national or local authority (province, region, or national road manager). The municipality grants authorisation for interventions on its territory, but the decision on pavement type follows the internal procedures of the infrastructure owner. In these cases, both the “nulla osta” from the owner and specific authorisations from municipal mobility and infrastructure offices are required.
  2. Urban agglomerations with municipal ownership: when the municipality is both owner and administrator, several internal offices and plans are involved. Every municipality has a Three-year Public Works Plan (Piano triennale delle opere pubbliche), which includes road maintenance. Each year, a dedicated board coordinates needs and priorities, which may arise from different sources:
     - works on underground utilities requiring resurfacing,
     - citizens’ complaints,
     - noise action planning,

- ageing of pavements.

In both cases, laying activities are typically carried out by companies under multi-annual global service contracts. These contracts allow municipalities to intervene quickly both in emergencies and in ordinary resurfacing operations, including low-noise pavements. However, LNP often requires specific expertise not always available to contractors. Municipalities therefore play a key role in providing technical support and ensuring that the mixture meets the necessary performance requirements.

A practical example comes from Florence, where during experimental applications of low-noise surfaces, the municipality actively supported the process by identifying suitable production plants to guarantee successful implementation.

Figure 1 illustrates the planning process for new surface laying within municipalities.

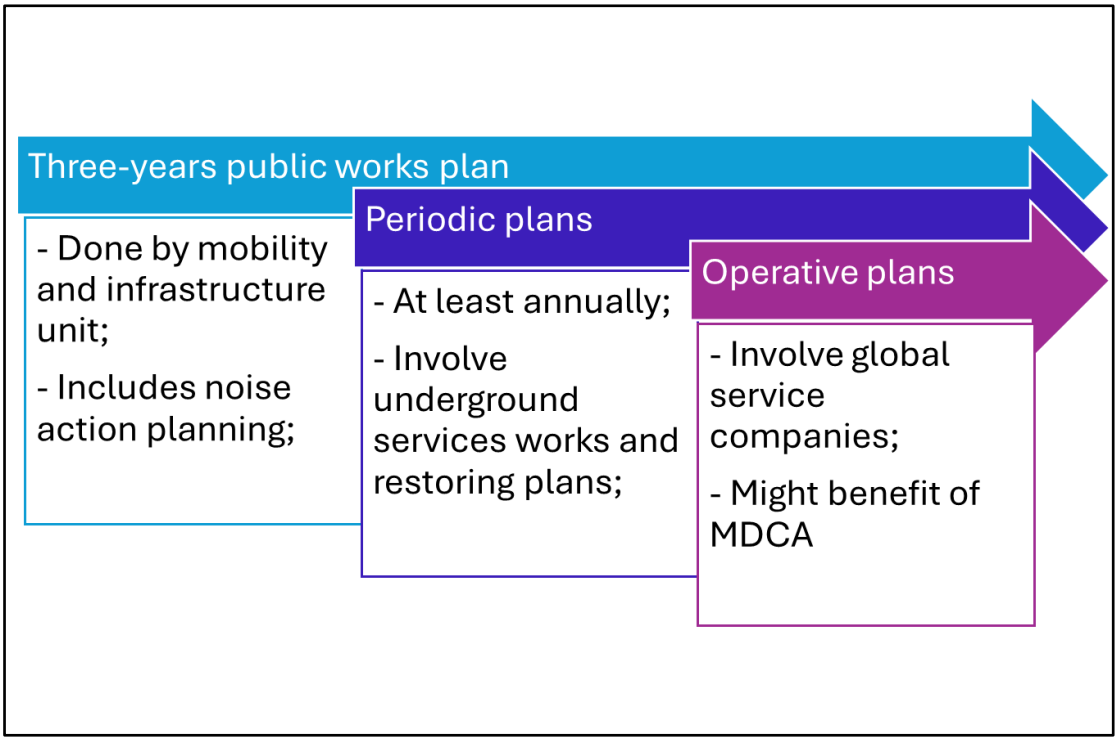

Figure 1: planning process for new surface laying within municipalities.

It is also important to note that Environmental Offices contribute to the drafting of noise mitigation action plans, but they are generally not directly involved in operational road resurfacing activities. As a result, detailed mitigation objectives are not always explicitly reflected in the operative phase of road works.

2.2 Challenges in policy and methodology transfer

The effective transfer of the MCDA methodology requires addressing several institutional and operational challenges. The main issue is ensuring that the methodology reaches the local decision-makers who are directly responsible for selecting and approving pavement solutions. Without their involvement, the methodology risks remaining a purely technical exercise without real implementation.

To overcome these barriers, the project foresees several key actions:

- Development of practical guidelines and technical specifications to enable replication of the methodology by municipalities, infrastructure managers, and contractors.
- Creation of an open-access database containing the characteristics and performance data of the pavements tested within the project. This database will support evidence-based decision-making and allow stakeholders to compare and adapt solutions.
- Training and capacity-building activities, including workshops and technical meetings, to ensure that both public authorities and private companies acquire the necessary knowledge to apply the methodology in practice.

Although the MCDA framework may appear complex, it is designed to deliver tangible benefits to infrastructure managers by optimising the cost–benefit balance of pavement investments. By increasing durability and acoustic performance, the methodology contributes to both economic savings (fewer interventions, lower lifecycle costs) and social benefits (longer-lasting noise reduction for citizens).

These elements form the basis for the dissemination and transfer strategy of the project, particularly in the urban development sector, where integration with planning and maintenance procedures is essential.

3 Planned activities for transferring the MCDA methodology to urban development sector

To ensure the effective transfer of the MCDA methodology, the project has designed a structured programme of engagement, training, and dissemination activities, involving both project beneficiaries and external stakeholders. Through this combination of technical review, stakeholder engagement, communication tools, and training events, the project ensures that the MCDA methodology will not only be disseminated but also effectively integrated into the decision-making and operational practices of urban development actors.

1. Collaboration with beneficiary offices
   The first step will be a joint review of the project guidelines and reports with COMUNE DI FORLI, COMUNE DI FIRENZE and BOZEN. In particular:
   - In Forlì, discussions will involve the offices responsible for road infrastructure maintenance (*Unità Manutenzione Infrastrutture Stradali e Autoparco*), road infrastructure design (*Unità Progettazione Infrastrutture Stradali*), and operational management of public space

interventions and authorisations (*Unità gestione operativa interventi su suolo pubblico e autorizzazioni*), all belonging to the Infrastructure, Mobility and Civil Protection Service.

- In Florence, the reference office will be the Direzione Infrastrutture di Viabilità e Mobilità. The guidelines and results will also be presented to the companies currently in charge of road laying services under municipal contracts.
- In the Province of Bolzano - Bozen, discussions will involve the offices responsible for road infrastructure maintenance such as the "Ripartizione Servizio Strade", the "Ripartizione Infrastrutture", responsible for road infrastructure design (Unità Progettazione Infrastrutture Stradali), all belonging to the Infrastructure and Mobility Service of the Autonomous Province.

2. Engagement of external stakeholders
   After validation with beneficiary cities, the final guideline will be presented through a series of online meetings with the entities that signed letters of interest. These sessions will focus on integrating the MCDA methodology into their operational and planning processes.
3. Dissemination through communication tools
   A project newsletter will periodically inform all stakeholders about the availability of the guidelines, deliverables, and datasets in the public repository. This will ensure transparency and facilitate replication.
4. Workshops and capacity building
   Dedicated workshops (to be specified according to the Grant Agreement) will be organised, targeting technicians, municipal staff, and companies involved in road surface design and maintenance. Each workshop will last approximately four hours and will cover the following key topics:
   - Minimal environmental criteria for road infrastructure in Italy (DM 05.08.2024);
   - Definition of noise sources in road traffic;
   - Low-noise pavements and their integration into noise action planning;
   - The MCDA methodology within the LIFE24-ENV-IT-LIFE OPTIMUS project (*Optimised Pavements Towards Innovative Mitigation of Urban noiSe*).

Once that the guideline will be disseminated and reviewed within beneficiaries, several online meetings with entities signing letters of interests will be planned to present the final guideline and suggest its use in their managing processes.