

Slow Mobility, Greenways, and Landscape Regeneration. Reusing Milan's Parco Sud Decommissioned Rail Line as a Landscape Cycle Path, 2019



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Abstract This study is part of the EU-GUGLE project FP7 and aims at integrating a demonstration pilot case for the improvement of the efficiency of buildings with experiences of mitigating urban connection system and cycling lines on a district scale along with peri-urban landscape recovery. This is achieved through the correct management of the distributed green areas in order to improve the overall efficiency and the optimization of slow mobility pathways (cycle and pedestrian) in order to reduce the use of cars, while guaranteeing the best conditions of usage (mitigation, shading, resting points and services, safety, etc.), and coherent insertion within the public transport network. The study explores a peri-urban connection system in Milan integrating different kinds of green infrastructure while also analyzing them through specific design solutions. The recovery of a dismissed railway is explored through design for its landscape potential, thus proving the resilience of the city's urban palimpsest.

Keywords Slow mobility · Mitigation paths · Green infrastructure · Decommissioned railway recovery

1 The District's Scale

The research is part of the EU-GUGLE FP7 project for improving existent districts' and buildings' energy efficiency through retrofitting and develops the integration of mitigated urban paths and spaces, reusing existing railway lines and roads while connecting to major district facilities. The scale of the analyzed area allows to reconsider the relationships with public space and territorial transport networks to optimize the transport system by establishing a hierarchy between the different types of paths

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S. Della Torre et al. (eds.), *Regeneration of the Built Environment
from a Circular Economy Perspective*, Research for Development,
https://doi.org/10.1007/978-3-030-33256-3_15

(pedestrian, cycling, driveways, etc.) and levels of roads (highway, crossing, local, zone 30 km/h, etc.), to realize an effective connection with the public urban mobility systems, and thus to reduce the use of cars in favor of slow mobility systems designed as greenways. Furthermore, slow mobility and greenways aim at ensuring the interconnection of both urban and local services in order to avoid peripheral conditions and guarantee the presence of green and collective urban spaces.

The intervention at district scale is also decisive in ensuring the economic sustainability of existing buildings' energy retrofit interventions. On the other hand, the district scale is also appropriate to explore interventions that reaffirm the urban identity of peri-urban places. The need to ensure the optimization of the existing buildings thus involves the relationship with the city, taking into account both functional integrations (the complementarity between housing and facilities, schools, leisure and commercial activities), urban-scale facilities, and accessibility.

A city is 'smart' if the sustainable renewal of the whole promotes a vision of urban, architectural, and environmental quality that impacts positively on the life quality of its inhabitants, their sense of belonging, and the resulting urban and civil behaviors (ISPRA 2015; XI Rapporto ISPRA 2013; UNHS 2009; RETICULA 2013).

2 The Demonstration Areas and Their Historical Transformation

The demonstration areas of EU-GUGLE belong to a wide urban–rural system in the southeastern region of Milan, between two strategic areas for urban transformation (ATU), Porto di Mare and Rogoredo. The areas are endowed with mixed features ranging from high environmental, heritage and landscape quality, to a segregated district near a new development area.

The municipality of Milan has identified three buildings on which to apply retrofitting initiatives with regard to the research project. These are two residential buildings and a school located in two neighboring but clearly distinct areas: a residential building and a kindergarten in the Rogoredo area, near the transformation site of the Santa Giulia District and two residential buildings belonging to a single unit in the Chiaravalle area.

Although the two areas are relatively close, their characteristics and history show almost opposite developments, transformations, and conditions. The two sites are now separated by several major infrastructures, such as the southern railway that also includes the high-speed line and the junction to the east expressway. They are almost insurmountable infrastructures that highlight the historical division and the factor of isolation from the center and 'consolidated city.' They have developed according to different logics: Chiaravalle preserved its agricultural characteristics, while Rogoredo-Santa Giulia became an industrial site.

The historical transformations of the site explain the present characteristics while providing valuable indications concerning the main criticalities and the possible points of intervention.

The Chiaravalle District, thanks to its isolation, limited development, agricultural nature, many green areas, and the Vettabia Park, does not require significant mitigation issues but lacks adequate and equipped social spaces. The few existing paths are not shaded and do not provide any kind of additional service. Due to the proximity to the ancient Abbey and the agricultural land, the Chiaravalle hamlet is not affected by expansion projects. The north part of district, instead, is part of the ATU Porto di Mare's redevelopment project.

In the perception of its inhabitants, the district suffers from isolation with respect to other parts of the city, laying beyond the railway and lacking urban connection to the road network and public transport system.

The Rogoredo station (suburban railway, high-speed railway line, and underground yellow line) although relatively close is separated by the presence of the expressway that makes the access to the station difficult, limited to a one-lane road. The area has a tourism potential due to the presence of the historical Chiaravalle Abbey and the potential connection to cycling trails and paths leading to the countryside and the Abbeys of the territory (Valle dei Monaci).

Between the village and the Abbey is the abandoned Rogoredo-Poasco railroad track. The project demonstrates the potential of this infrastructure that has been thus far considered as a barrier. At present, the first effect of its dismantling is the elimination of the crossing between the Abbey and the hamlet, which re-establishes better connections and favors the tourism relaunch of the site (Fig. 1).



Fig. 1 Areas of the EU research with the exiting and designed cycle paths

The Rogoredo-Santa Giulia area faces an opposite situation: is an industrial brownfield that has lost the identity of the nucleus that developed around it. It is fenced in by the road interchange system and the railway, which represents a potential but also a problem. The area has captured the interest of an ambitious project for the construction of the new Santa Giulia District (in the area of the former Montedison steelwork company Redaelli, PII 2005, Project N. Foster, P. Caputo partnership), which, left unfinished, failed to renew the identity of the area. A new project is now ongoing.

Urban and social segregation, disorder, heterogeneity, and lack of social spaces and facilities characterize this part of the city, although it enjoys both rail and metropolitan connections (underground yellow line).

3 Integration of Green and Cycling Paths in Milano's Smart Districts

Mitigated and cycling paths form the support structure for 'slow mobility' intercepting and directing consistently the localization of district facilities while assuring new uses of the city and urban relationships. Advanced communities have started to rethink their own development processes, leading to new open strategic options in view of a change in their overall behavior. One of the benefits is a new rising sensibility toward 'slow mobility (Croce et al. 2017).'

The part of the city in which the EU-GUGLE interventions are carried out has therefore emphasized the need to rethink and reorient the slow and cycling mobility not only in a radial direction, connecting the suburbs to the downtown, but also in a circular direction to reconnect districts which are isolated from infrastructures, enhancing their proximity to peri-urban parks and their access to connection hubs (FS Rogoredo station, subways), opening green lines and finding a new use for neglected infrastructures, such as disused railways, provides an opportunity for low carbon travel experiences since reconversion policies promote new uses, arrest decay processes, and re-establish continuity in the environmental system, using existing linear infrastructures. Consequently, the decommissioned railroad recovery has become a focus of redevelopment projects in many European countries. Green lines implementation and Rogoredo-Poasco decommissioned railroad recovery has been assumed by the research and Milan Municipality as a major opportunity to connect with the many ATU (urban transformation areas) and peri-urban projects that so far were not considered in a comprehensive frame of the smart city and low-carbon city concept.

Pedestrian and cycle connections are also means to trigger sustainability processes relating not only to mobility and transportation but also to the subject of a 0-km production chain. The project may connect to other existing projects such as OpenAgri, the 'Open Innovation Hub on Peri-Urban Agriculture,' Sharing Cities, and Lighthouse, which are located in the area.

The project also reconnects the EU-GUGLE-renovated buildings to the new ongoing masterplan of Santa Giulia, extending the connection of mitigated cycling and pedestrian paths to the surrounding areas and the intermodal Rogoredo station. Mitigated and cycling paths form the support structure for ‘slow mobility’ intercepting and directing consistently the localization of district facilities while assuring new uses of the city and urban relationships (Figs. 2 and 3).

4 The Plan: New ‘Green Lines’ Combined with Smart City Concepts

The PUM (Milan’s Mobility Plan, Osservatorio PUMS—Piano Urbano della Mobilità Sostenibile) establishes the general network and defines priorities. It is developed on a large urban scale, so it is not consistently related to urban transformation projects nor specifically defined on a district scale.

It has been analyzed and integrated by the project concerning the green and cycling paths, introducing a number of modifications in order to connect it consistently to the opportunities emerging from site-specific conditions and smart district concepts. The new cycling paths aim to be innovative green infrastructures, identifying different levels of complexity and smart city concept integration according to each specific urban situation (ISPRA 2010).

The project has provided a set of principles capable of combining holistically the issues relating to ‘slow mobility,’ to ‘green infrastructures’ (GI), and to ‘urban forestation’ (UF), while enhancing their role as ‘green social streets’ within urban and landscape redevelopment projects. The goal of these principles is to reduce the ecological impacts of urban space fragmentation and support the multifunctional potential of green trails in organizing urban connections and heat island abatement.

In order to achieve these goals, greenways, ecological corridors, and ecological networks need to be planned and constructed within the concept of ‘connectivity.’

On the other hand, the aim of the greenway strategy has been related to three ecosystemic services: cutting air pollutants, cutting risks of water outflow, and reducing temperatures.

The masterplan identifies a set of cycling and pedestrian lanes that are connected in a unique network with already existing and planned paths in the new Santa Giulia District. The green streets system consists of a network of shaded streets that connect residential and public buildings in the two parts of the district that are still suffering from isolation and a lack of services and are the focus of *urban oases* that link mitigated parking areas within a 300-m radius and district facilities (especially schools). These lanes are intended as ‘green social streets,’ intercepting a number of social places, and are endowed with urban oases where different facilities are provided according to their hierarchy (level of the street) and specific urban situation: shade, seating, bio-ponds, water and electricity supply, bike sharing or car sharing,

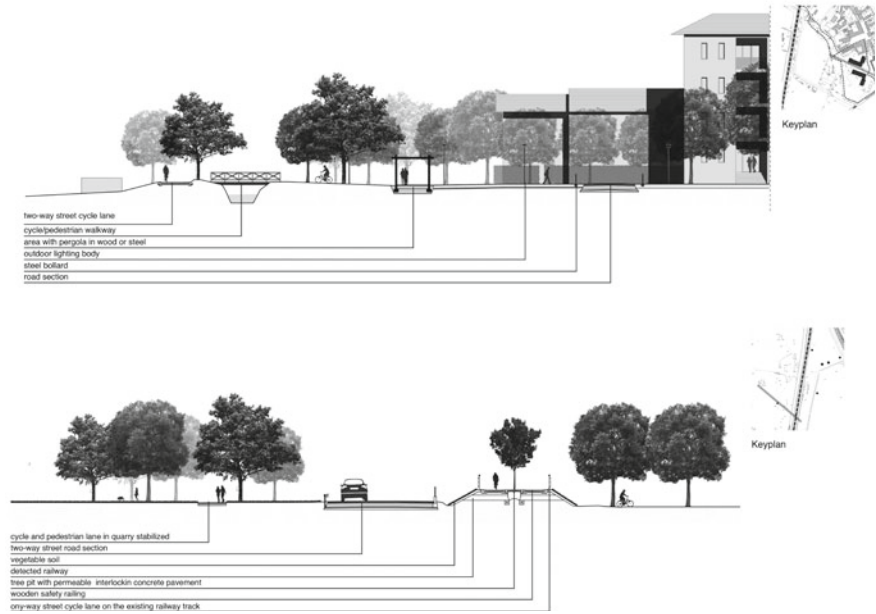


Fig. 2 Chiaravalle area: plan and sections of the cycle paths

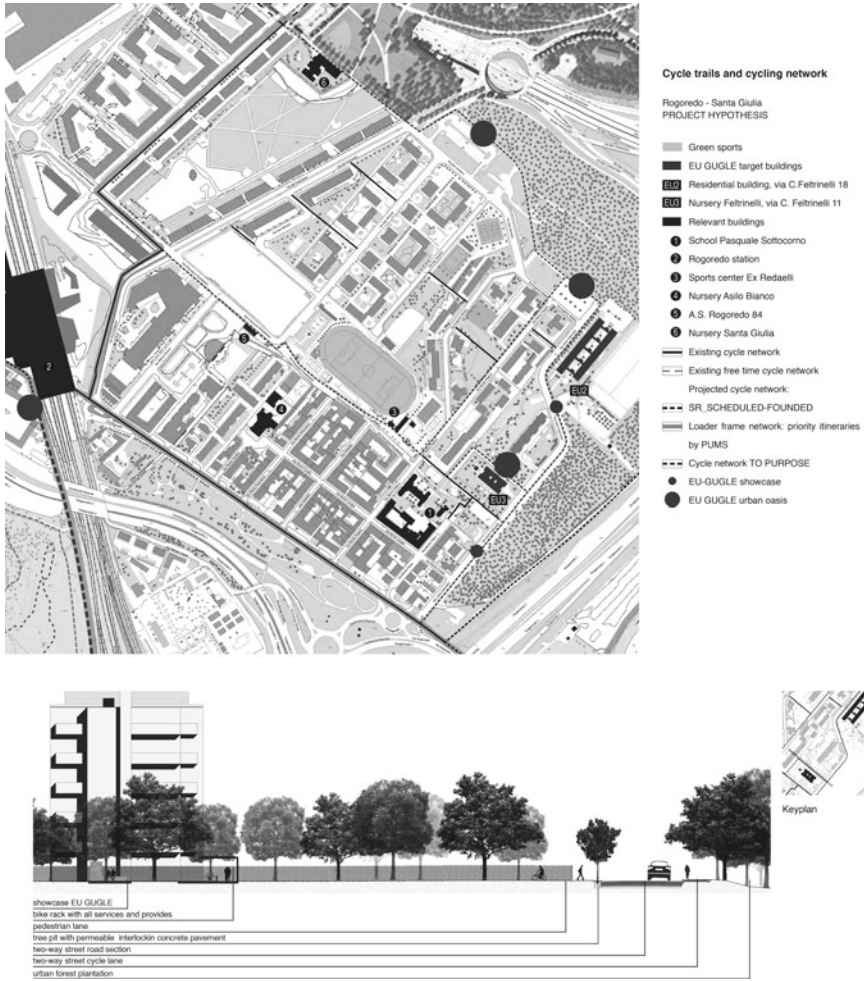


Fig. 3 Rogoredo—Santa Giulia area: plan and cycle paths

interchange with subways and railroads, LED public lighting, ICT platforms, smart parking control, and ‘zone 30’ areas.

The insertion of new collective places guarantees livability and safety to the routes, privileging green-planted spaces, reorganized and rehabilitated, strengthening the retrofit projects applied to the individual buildings and improving environmental quality and well-being.

In addition to the sequestration of CO₂ by the tree cover, which, however, to be significant cannot be separated from the reduction in its production, the tree structures provide shading and cooling. They also bring social, psychological, hygienic-sanitary, environmental, and energy-related benefits, along with induced labor-related benefits (Bonafè 2006; Morabito et al. 2015).

In addition to mitigating routes and providing shade for resting places, the planned trees provide green bands with the purpose of cooling and mitigating the noise pollution that is present in this area. Specifically, the cycling lanes and the break areas take on different meanings:

- the connection between the different parts and the Rogoredo station, which represents the closest metropolitan public transport hub. As it is significantly close to both areas, yet perceived as distant (especially from Chiaravalle due to the difficulty of access), the protected cycling lane represents the possibility of reconnecting to the center and to other parts of the city;
- the connection of the new routes to a system existing and planned urban cycling lanes, still fragmentary. In this way, the network would allow users to reach central parts of the city of Milan through a safe, secure, and relatively short cycling path, equipped with services and rest areas;
- the connection with external routes on a territorial scale, which concerns leisure activities, the relation with the agricultural countryside to the south and with the historical heritage, Abbeys, farms, hydraulic works, etc. The connection involves also the Forlanini and Lambro Parks. This would favor the development of slow and sustainable tourism, especially at Chiaravalle.

The planned continuity of green areas provided by the green lines and cycling paths allows for better air circulation within the urban and peri-urban districts. In addition to the implementation of the new planned green connections, the ecosystemic complexity of the areas will also be enhanced through a reforestation initiative along the northern tracks of the railroad (Porto di Mare southern area).

In cities, including Milan, the function of rows of trees is usually reduced to the mere shading of the streets. The mitigation of pedestrian areas, cycle paths, and neighborhoods' living spaces becomes a goal to guarantee conditions of thermo-environmental well-being in the urbanized space, a need induced by the urban heat island (UHI) phenomenon. Enhancing the cooling capability through vegetation along green lines and selecting vegetation with a high density of foliage and resistant to water scarcity will help to provide shade for the soil, which will stay moist and fresh for longer. This means to integrate this new conception of infrastructures in the regeneration or development projects for public spaces and an appropriate synergy with the location of district facilities (Comune di Firenze, no date).

5 The Recovery and Landscape Resilience of the Rogoredo-Poasco Decommissioned Railroad

A new crucial role is emerging for the reuse of disused rail lines worldwide. Italy has also proposed a law for the realization of a national network of slow mobility, based on intermodality between biking, walking, leisure trails, and local railways, which promotes green mobility, landscape resilience, physical activity of people, recreation, tourism, and safeguarding of the diffused territorial assets.

The recovery of a 4-km decommissioned railroad as a connection route and landscaping cycling appears to be a priority. It would assure a connection not only between districts, but also to a regional and national cycling system, stitching up a multitude of itineraries that are still fragmented.

The route would join the underground station and the interchange node of Rogoredo, intercepting the crux of the two major areas: the Abbey with the town of Chiaravalle and the large school and sports grounds, i.e., the very civic core of Rogoredo. The systemic potential of this short stretch extend, on the one hand, to the landscape enhancement of the system of the Vettabia valley, Abbeys, farms, parks, and paths to which the neighborhood of Rogoredo, which is today confined to an infrastructural enclave, would connect (Forlanini Park, Vettabia, and South Park).

The ‘landscape cycling’ project here developed looks to two strategies that are economically sustainable and focus on the resilience of the railway track: its reuse through special bicycles hooked on the rails, along the scenic stretch (from Chiaravalle as far as Nosedo); a cycling path flanked by a system of multipurpose mobile elements (pergolas, pedestals, chairs, small pavilions) along the flat stretch of the urban cycling route (from Chiaravalle to Rogoredo), so as to constitute an equipment in support of multiple initiatives that can take place throughout the year.

At the same time, the green railroad would constitute an effective permanent ‘showcase’ path of Milan’s sustainability agenda, aiming to promote education in sustainable behavior along the cycling path itself. Along the paths, a number of meaningful urban locations are identified that relate to the presence of existing facilities. The design proposes two kinds of showcase components: the larger ones are more complex and integrate panels disseminating EU-GUGLE’s good practices to be implemented in a smart city, seating, water supply; the smaller ones are simple as they consist only of replaceable panels. Together they give rhythm and continuity to the ‘sustainability’ landscape path (Fig. 4).



Fig. 4 Reuse of the decommissioned Poasco-Rogoredo railroad as a cycling trail passing through Chiaravalle

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