

# Cycleways: Historical Infrastructures for Sustainable Mobilities

Andrea Alberto Dutto and Nadine Plachta

Increasing urbanization, mobile populations, and carbon emissions demand a rethinking in the planning and design of transport infrastructures, particularly in regard to environmental issues. As an affordable and convenient alternative to car dependence and a way to reduce road congestion in European cities, cycling facilities have become essential components in the development of alternative mobility systems. Investment in bike-sharing programs and the provision of protected cycle paths that are separated from motorized traffic through signs and barriers are important for creating more livable and sustainable urban environments. Cycling has become a significant factor in street planning, and the integration of bike infrastructures has transformed public spaces in cities (Bendiks and Degros 2013; Pucher and Buehler 2017).

As city life extends beyond urban boundaries, architects, civil engineers, and urban planners are working to establish innovative networks of cycle paths that connect cities to regions. Focused on the repurposing of decommissioned railroad tracks for cycling practices across Italy, we interrogate how architectural design attends to environmental and socio-cultural concerns in the process of facilitating sustainable transport mobilities.

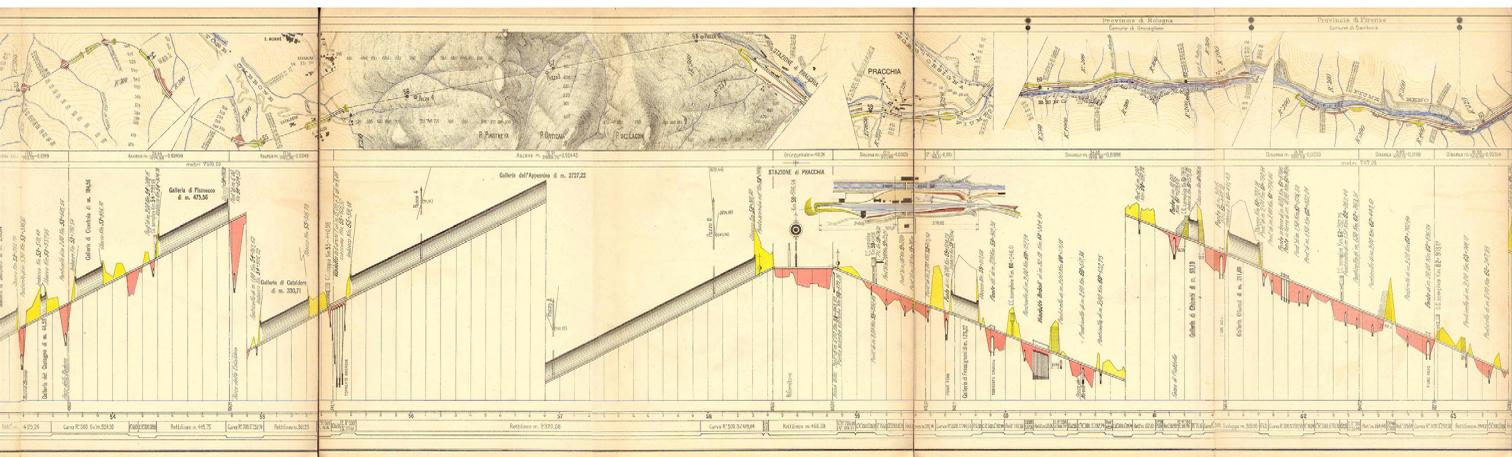
Drawing on the work of Pierre Bélanger (2010, 2017) and the Infrastructure Research Initiative at SWA (2013),<sup>1</sup> we explore cycleways as landscape infrastructure. The conceptualization of landscape as infrastructure is inspired by Gary Strang (1996) and previous calls to rethink the urban condition from an environmental perspective. Movements pushing for ecological urbanism and green infrastructure subsequently appropriated the idea of a combined ethics and aesthetics for the built environment, arguing for formulating solutions to integrate infrastructure in the development of inclusive and resilient societies (Mostafavi and Doherty 2016). “Conceiving landscape as infrastructure,” as Steffen Nijhuis and Daniel Jauslin write, is an approach by which “landscape is treated as an operative field that defines and sustains the urban development and ecological and economic processes are employed as formative design tools” (2015: 20).

A leading example of contemporary ecological landscape infrastructure is the Zeche Zollverein, a former coal mine and coking plant industrial complex in the German Ruhr Area. This heritage site features a railroad track boulevard for mixed pedestrian and cycle use, with dense vegetation emergent in between the repurposed tracks. The High Line, an elevated linear park created on a disused section of the New York Central Railroad in the west side of Manhattan, is another prominent landscape infrastructure. Regular art events, sound installations, and talk programs take place on and alongside this 2.3km-long green structure. Both the High Line and Zeche Zollverein offer global inspiration for cities to transform former industrial zones into public spaces that can thrive through sustainable communal engagement.

Following a general shift in the perception and use of infrastructure for the management and performance of contemporary cities, in 2018 the Italian government passed Law 2/2018, which identifies rules and regulations for the development of cycling mobility and the creation of a national bicycle network, Bicitalia. Law 2/2018 provides an official legal framework to devise and implement strategies for the design and operation of cycle paths across the peninsula. Different from motorable roads, which are characterized by their relatively consistent texture and form, Law 02/2018 recognizes the multiple character of cycleways. For example, it mentions specifically the repurposing of historical infrastructures, such as railroads, for recreation and to protect and restore natural environments.

Beginning in the 1860s, construction of rail, road, and water infrastructures in Italy was designed to advance the spatial and structural integration of the fragmented nation (Badenoch and Fickers 2010; Diogo and Laak 2018). Trains running on narrow-gauge railroad tracks acted as important carriers for the steel and iron industries that clustered around developing hydropower plants in the foothills of the Alps. These tracks complemented the standard-gauge network that connected the cotton and textile manufacturing cities near Milan and in the Piedmont region with shipping enterprises on the coast. Targeting economic growth and development, late nineteenth century infrastructure engineering in Italy often resulted in the disruptive transformation of natural landscapes into industrial and logistical centers. Today, very few of these historical narrow-gauge railroad tracks continue to operate. Some collapsed during landslides and floods and were not repaired, while many more were suspended following political decisions that prioritized the construction and expansion of high-speed rail lines to transport passengers and goods.

Decommissioned narrow-gauge railroad lines across Italy amount to seven thousand kilometers of abandoned tracks. Their grade of a maximum of 3.5 percent is appropriate for ascending mountain stretches, and a typical curvature of 250 meters (with some exceptions featuring an 80m radius) allows for a comfortable and smooth cycling experience. Cycle paths build on railroad tracks thus do not demand the same general level of fitness as those along roads, which have accepted inclines of 12–15 percent and 20m wide curves (Ormea 1988: 1571). According to Ferrovie dello Stato Italiane, the Italian State Railways, which published a complete list of repurposed railroad lines in its *Atlante italiano delle ferrovie in disuso* (“Atlas for traveling along disused railways”), eight hundred kilometers of tracks have so far been recovered for use as cycleways (Maggiorotti 2018: 9; see also Marcarini and Rovelli 2018).



For architects and civil engineers, deserted sections of post-industrial infrastructure are appealing because of the opportunities they present for redevelopment into ecological and recreational landscapes. Allowing for various kinds of innovative design concepts, such projects take advantage of the landform of an area while also building upon the historical significance of a particular place and its infrastructural purpose (Dighero et al. 2020). Cycleways on repurposed railroad tracks can meander through narrow gorges and renovated tunnels and galleries, as well as across viaducts and bridges. For example, the 51km-long cycleway running along the former railroad line between the towns of Spoleto and Norcia in Umbria goes through nineteen tunnels and across twenty-four bridges and viaducts. Further connecting to Assisi along the Via di Francesco, this cycle path was selected the most spectacular greenway in Italy in 2015. In cases in which former railroad lines are defunct, broken, or otherwise unusable, new connecting sections have to be planned and implemented to get around these accidental features. Cycleways can also deviate from the railroad tracks and follow other territorial lines such as canals, riverbanks, or farm tracks before reconnecting to a track in order to keep a continuous route. Flowing in and with the landscape, cycleways thus have the ability to reflect and reproduce the particular landform of a region. As Nijhuis and Jauslin explain, “landscape as such becomes the medium through which to formulate and articulate solutions for integration of infrastructure” (2015: 20). This commitment to developing new forms of landscape infrastructure follows an ecological approach that seeks to enhance and foster natural environments.

*The details of the historical Firenze–Pistoia–Bologna railroad line illustrate the gentle slope value of narrow-gauge tracks.*

Source: Società Italiana per la Strade Ferrate Meridionali (1891).



*Cycling on the Caprareccia viaduct along the decommissioned Spoleto–Norcia railroad line.*

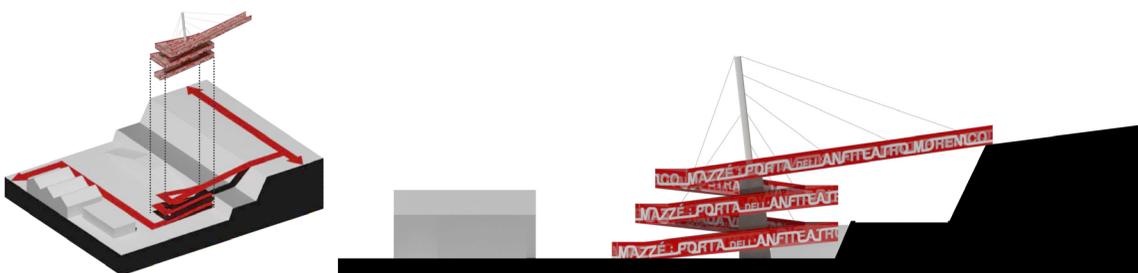
Source: <http://www.sviluppumbria.it>

Situated along deserted rail tracks are serial features, such as stations and warehouses that can be repurposed equally into museums, bike repair stations, restaurants, and shops. These facilities augment the cycleways themselves, providing educational and practical services for cyclists and work to strengthen local economies. Such action-oriented processes let people to adopt cycling infrastructures as public spaces and allow them to become part of sustainable development (Bendiks and Degros 2020). More broadly, the multiple character and diverse landforms of these new infrastructures enable the integration of cycleways into the national public transport and wider traffic grids, thereby revitalizing the connections between cities and regions (see also Senes 2018).

As linear and vibrant public spaces (Occelli and Palma 2017), cycleways that trace historical railroads facilitate passage and movement, but also allow for rest and socialization. Acknowledging the particular landforms and histories of the places they pass through, cycleway redevelopments provide sustainable mobilities. “The space of flows,” Nijhuis and Jauslin summarize, “emerges as a new field of inquiry for design disciplines and opens up opportunities for shaping architectural and urban form to establish local identity with tangible relations to the region” (2015: 23). Innovative planning and design concepts such as the repurposing of the Spoleto–Norcia railroad

*Design of a mixed-use bike and pedestrian bridge along the Via Francigena della Val d’Aosta in Mazzè, a commune in the Piedmont region. The curvature of the bridge resolves considerable differences in ground elevation.*

Drawing: Andrea Alberto Dutto, Chiara Occelli, Riccardo Palma, and Stefano Dighero, 2018.



combine functional, social, and environmental interests. In so doing, they enable integrated ecological landscape infrastructures that increase the performance of public spaces for a more sustainable world.

#### Notes:

<sup>1</sup> SWA is a landscape architecture, planning, and urban design firm that also engages in research and innovation projects.

#### References:

Badenoch, Alexander and Andreas Fickers (ed.). 2012. *Materializing Europe: Transnational Infrastructures and the Project of Europe*. London: Palgrave Macmillan.

Bélanger, Pierre. 2010. "Redefining Infrastructure." In *Ecological Urbanism*, edited by Mohsen Mostafavi and Gareth Doherty, 332–49. Baden: Lars Müller Publishers.

Bélanger, Pierre. 2017. *Landscape as Infrastructure: A Base Primer*. New York: Routledge.

Bendiks, Stefan and Aglaée Degros. 2013. *Cycle Infrastructure*. Rotterdam: nai010 Publishers.

Bendiks, Stefan and Aglaée Degros. 2020. *Traffic Space is Public Space: A Handbook for Transformation*. Zurich: Park Books.

Dighero, Stefano, Andrea Alberto Dutto, and Erika Franco Gonzales. 2020. *From Historical Railways to Cycleways: Re-functioning the Heritage of Linear Monuments*. Paper presentation at the 8th International Forum "La Vie dei Mercanti," Naples and Capri, June 11–13, 2020.

Diogo, Maria and Dirk van Laak. 2018. *Europeans Globalizing: Mapping, Exploiting, Exchanging*. London: Palgrave Macmillan.

Maggiorotti, Iliana (ed.). 2018. *Atlante di viaggio lungo le ferrovie dismesse*. Rome: Ferrovie dello Stato italiane.

Marcarini, Albano and Roberto Rovelli. 2018. *Atlante italiano delle ferrovie in disuso*. Florence: Istituto geografico militare.

Mostafavi, Mohsen and Gareth Doherty (ed.). 2016. *Ecological Urbanism*. Baden: Lars Müller Publishers.

Nijhuis, Steffen and Daniel Jauslin. 2015. "Urban Landscape Infrastructures: Designing Operative Landscape Structures for the Built Environment." *Research in Urbanism Series* 3 (1): 13–34. DOI: <https://doi.org/10.7480/rius.3.874>

Ocelli, Chiara and Riccardo Palma. 2017. "Architecture of the Landform and Settlement Identities: Cycle-Routes as New Linear Public Spaces." *The Journal of Public Space* 2 (2): 63–74. DOI: <https://doi.org/10.5204/jps.v2i2.93>

Ormea, Giovanni Battista. 1988. *Manuale pratico per l'ingegnere civile*. Rome: Kappa.

Pucher, John and Ralph Buehler. 2017. "Cycling Towards a More Sustainable Transport Future." *Transport Reviews* 37 (6): 689–94. DOI: <https://doi.org/10.1080/01441647.2017.1340234>

Senes, Giulio. 2018. "Greenways: un modo per valorizzare il patrimonio ferroviario dismesso. Una panoramica internazionale." In *Atlante di viaggio lungo le ferrovie dismesse*, edited by Iliana Maggiorotti, 7–9. Rome: Ferrovie dello Stato italiane.

Società Italiana per le Strade Ferrate Meridionali. 1891. *Linea Firenze S.M.N. – Pistoia – Bologna di lunghezza Km. 131 + 834,33: Planimetria-profilo*. Florence: Società Italiana per le Strade Ferrate Meridionali.

Strang, Gary. 1996. "Infrastructure as Landscape." *Places* 10 (3): 8–15.

SWA (ed.). 2013. *Landscape Infrastructure: Case Studies by SWA*. Basel: Birkhäuser.

#### **Acknowledgements:**

We want to thank Riccardo Palma and the members of the research group Geografia e infrastrutture territoriali nell'architettura delle Ciclovie (GITAC, Geography and Territorial Infrastructures in Cycleway Architecture) at Politecnico di Torino for their invaluable comments and expertise.

---

**Cite as:** Dutto, Andrea Alberto and Nadine Plachta. 2020. "Cycleways: Historical infrastructures for sustainable mobilities." *Roadsides* 4: 61–67. DOI: <https://doi.org/10.26034/roadsides-202000408>

---

## Authors:



**Andrea Alberto Dutto** received a dual PhD in Architecture from RWTH Aachen and Politecnico di Torino in 2017. Andrea is a practicing architect and postdoctoral researcher in the Department of Architecture and Design at Politecnico di Torino, where he works with the research group *Geografia e infrastrutture territoriali nell'architettura delle ciclovie (GITAC)*. In collaboration with Riccardo Palma, he recently published a handbook on cycle-station design called *Ponti abitati e ciclovie* (Boves: ArabaFenice, 2019).



**Nadine Plachta** is currently a visiting scholar and postdoctoral researcher in the Department of Geography at the University of Colorado Boulder, USA and lecturer in the Department of Social Sciences at the University of Fribourg, Switzerland. Trained in social anthropology and global studies, her research focuses on how ethnic belonging and citizenship are mobilized for political agency, especially after periods of rupture such as civil conflicts and natural disasters. Based on her long-time ethnographic engagement in South Asian borderlands, she is also interested to contribute to critical debates on state-making, infrastructure landscapes, architecture, and the environment. Nadine is an editorial board member of *Roadsides*.

**Roadsides** is an open access journal designated to be a forum devoted to exploring the social, cultural and political life of infrastructure.



Visit us at: **roadsides.net**  
E-Mail: **editor@roadsides.net**  
Twitter: **@road\_sides**

**Editorial Team:**

Julie Chu (University of Chicago)  
Tina Harris (University of Amsterdam)  
Agnieszka Joniak-Lüthi (University of Zurich)  
Madlen Kobi (Academy of Architecture, Mendrisio)  
Nadine Plachta (University of Colorado Boulder)  
Galen Murton (James Madison University, Harrisonburg)  
Matthäus Rest (Max-Planck-Institute for the Science of Human History, Jena)  
Alessandro Rippa (LMU Munich and Tallinn University)  
Martin Saxer (LMU Munich)  
Christina Schwenkel (University of California, Riverside)  
Max D. Woodworth (The Ohio State University)

Collection no. 004 was edited by: **Madlen Kobi** and **Nadine Plachta**  
Managing editor: **Agnieszka Joniak-Lüthi**  
Copyediting: **David Hawkins**  
Layout: **Chantal Hinni** and **Antoni Kwiatkowski**

**ISSN 2624-9081**

**Creative Commons License**

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

