

THE LIGHTLINE

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Team members:

Oscar de Castro, Civil Engineer
Patricia Hernandez-Lamas, Architect
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Miguel Aguilo Foundation

TEAM MEMBERS



Jose A. Martin-Caro, Bridge Engineer - CEO, INES Ingenieros

- PhD in Civil Engineering, UPM, Spain
 - MSc in Civil Engineering, UPM, Spain
 - CEO Miguel Aguilo Foundation
- Over his more than 25 years experience, he has combined teaching and research activities in the field of structural design, aesthetics in engineering and urban landscapes, with an unrivalled track record on engineering projects, specializing in the design, assessment, rehabilitation and adaptation of transportation structures, winning several awards. His strong research background in bridge rehabilitation and cultural heritage puts him in the best position to lead innovation in these fields in the project for the rehabilitation of Brooklyn Bridge.



Patricia Hernandez-Lamas, Architect

- PhD in Architecture, UPM, Spain
 - MSc in Urban Planning and Landscape and Gardening
- She has more than 17 years of professional experience collaborating as an architect and landscape designer in several studios, developing execution projects, researching in the fields of landscape and urban studies and teaching as assistant professor at the UPM, Spain. She has won several international awards.

Miguel Aguilo Foundation

All team members are researchers of Miguel Aguilo Foundation which main objectives are the research, innovation and publication in the fields of Heritage and Landscape in Civil Engineering, Cities, Bridge design and Aesthetics. Its long publications list include a collection in progress of books about cities, with Madrid, New York, Berlin, Sidney, London, San Francisco and Toronto at present time, that covers urban fabric, mobility, public transport, waterfront, main bridges and structures, and environmental utilities.
www.fundacionmiguelaguilo.org https://es.wikipedia.org/wiki/Miguel_Aguil%C3%B3



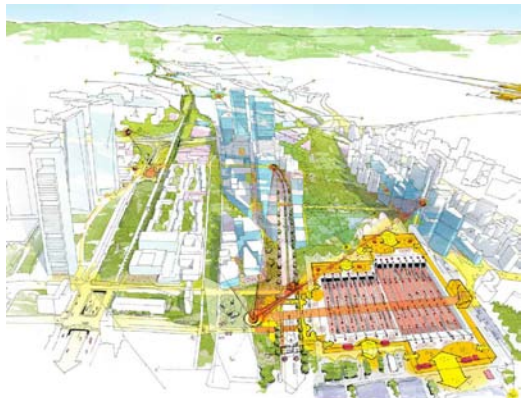
Beatriz Cabau, Architect

- MsC in Architecture, UPM, Spain
 - MsC in Urban Planning, Landscape and Gardening
- She has been working for over 17 years as an architect and urban planning, participating in national and international competitions and developing execution projects in the fields of architecture and landscaping for different uses.

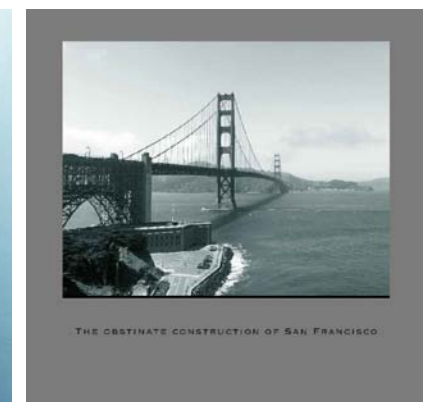
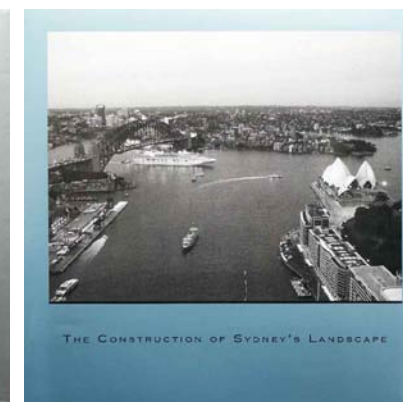
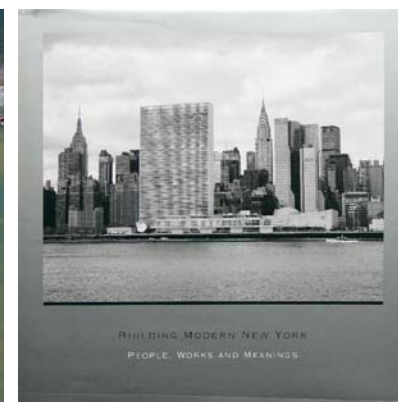


Oscar de Castro, Civil Engineer

- MSc in Civil Engineering, UPM, Spain
- He has been working for over 10 years as an engineer and as a software designer, participating in national and international competitions and projects in relation with climate change and its impact on engineering.



From left to right, top to bottom:
 Chamartin Project, largest urban regeneration scheme in Europe. Santiago Bernabeu, Real Madrid new stadium. BBVA Headquarters, largest building in Madrid. Railway masonry viaduct restoration. Santi Petri Restoration project, heritage transformation of a castle in an island. Books of New York, Sydney and San Francisco architecture and cityscape.





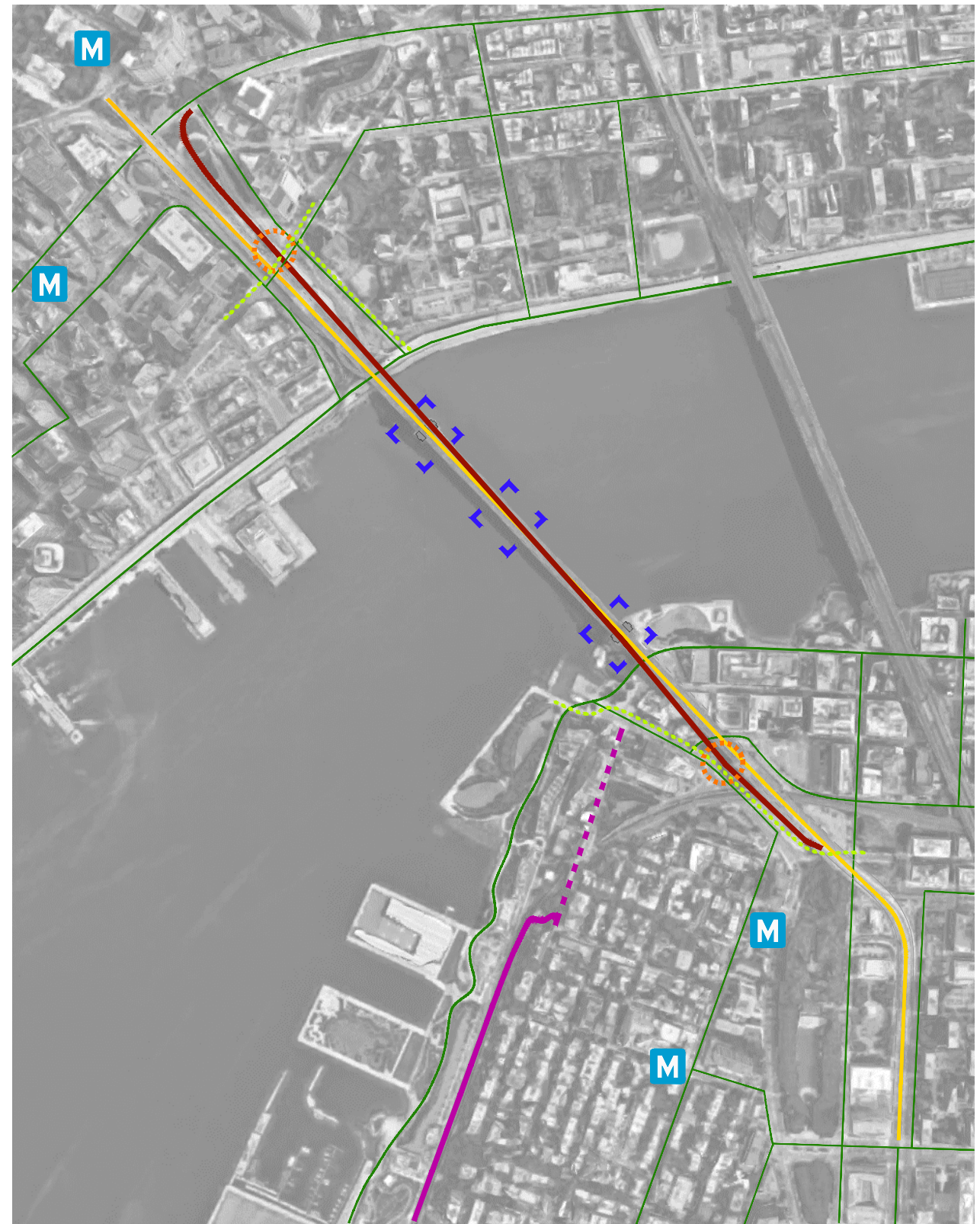
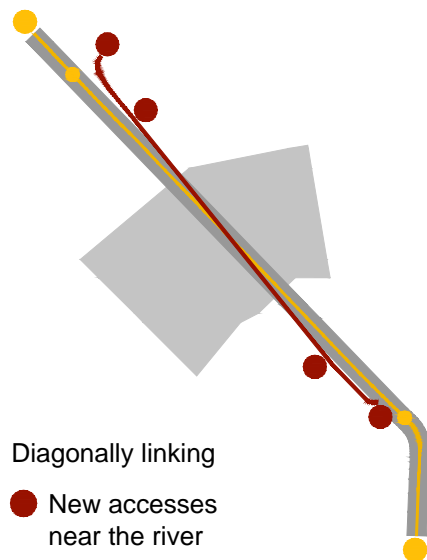
Climbing from the opposite side of both access points a new path has been created that crosses diagonally over the car decks and passes through the gothic arch of one pier and the contrary of the other, that has on top of it a straight, unbroken and dynamic line of light all along the crossing.



OVERVIEW

Construction of a new footbridge that crosses over Brooklyn Bridge diagonally and improves the users' experience by:

- Generating new itineraries and creating viewpoints, that jointly provide a new visual/perspective of the bridge and riverbanks;
- Increasing the number of access points;
- Connecting the bridge with green areas and cycling/pedestrian paths along the riverbanks;
- Improving the circulation by increasing the capacity and segregating traffic;
- Incorporating a light line as a new symbol of the bridge skyline.



- | | |
|--|---|
| — Brooklyn Promenade | ┌ ┐ Connections between the existing footbridge and the new one |
| — Proposal: The Lightline Promenade | ○ New accesses points |
| — Brooklyn Heights Promenade | — Bike paths |
| ● ● ● ● ● ● New greenway connectors | |

THE LIGHTLINE

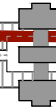
MANHATTAN

Park Row Ramp

Escalators / stairs

The Lightline

Brooklyn promenade



Brooklyn promenade

stairs

The Lightline

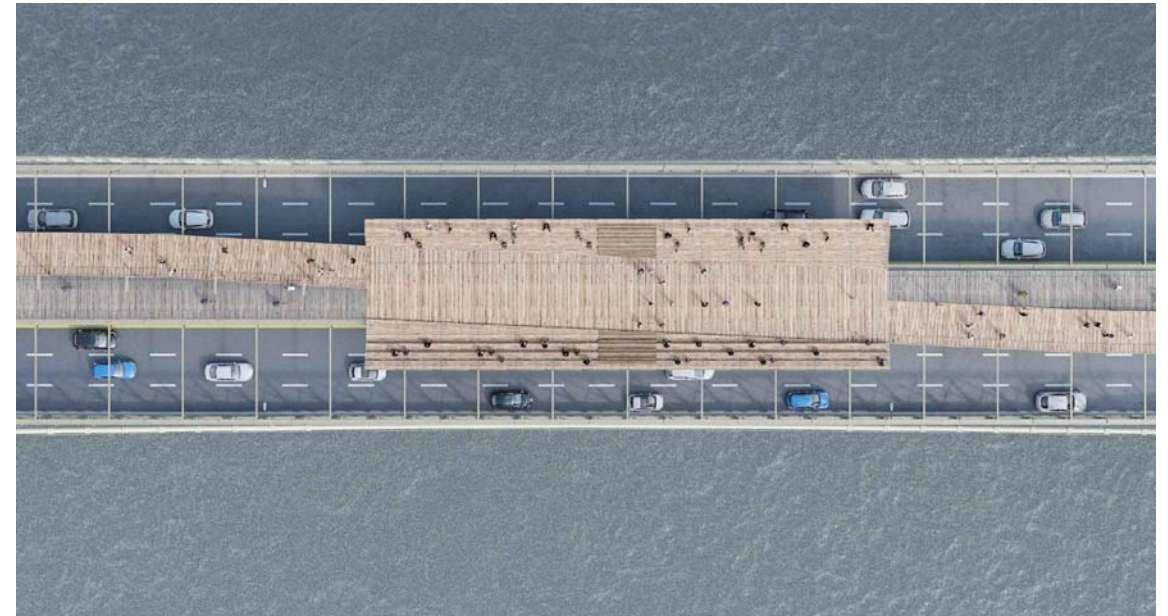
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BROOKLYN

HISTORY



Our solution must balance celebration of the bridge's rich history and iconic status as a New York landmark with the increase of its functionality for daily users. For this, a reversible solution that could be dismantled in the future is proposed; clearly identified as a new intervention, not betraying the existing construction;



and which gracefully seeks compatibility with the existing structure, being lightweight and using similar construction materials (wood in pavements or steel in structural elements). To enhance the bridge's iconicity, a new ornamental lighting is proposed (Lightline), diagonally crossing the structure and connecting both banks of Hudson River.

INSPIRATION

Our proposal produces in the users, visitors and newyorkers:

Surprise by the ever changing visual perspectives offered by the slight angle of the path.

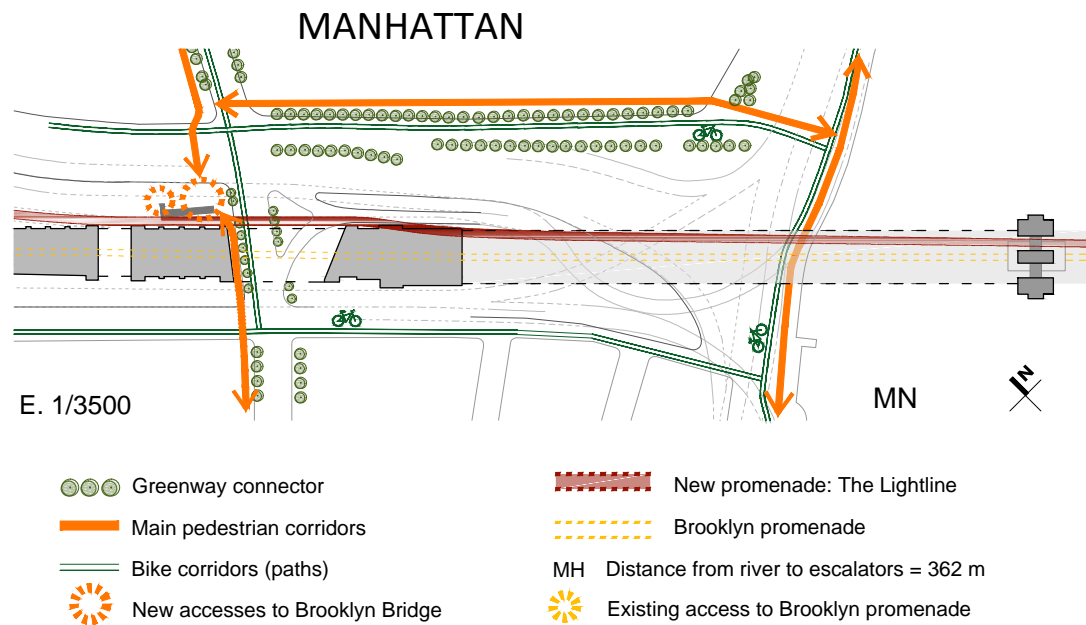
Delight, by the proximity of the new and easy to use accesses to the river.

Surprise and delight, by the iconic effect of the beam of light, like a clear shot.

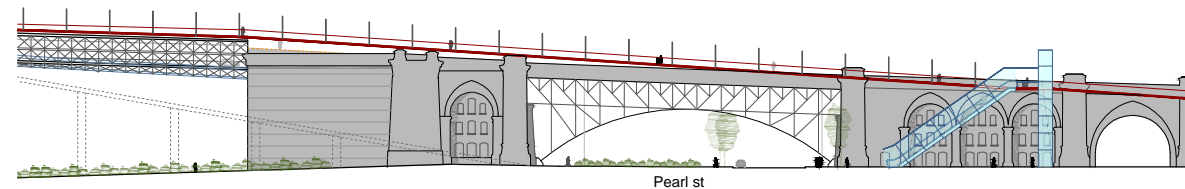
Innovation, by the careful design that respects the old bridge by just putting on top or adding at the sides small and light structures, and with the digital possibilities of rhythm and movement of the light.

Innovation in urbanscape design for the people, with classical rows of trees and shrubs to restore order and the hierarchy of the bridge-river relationship over the chaos of ramps and cars.





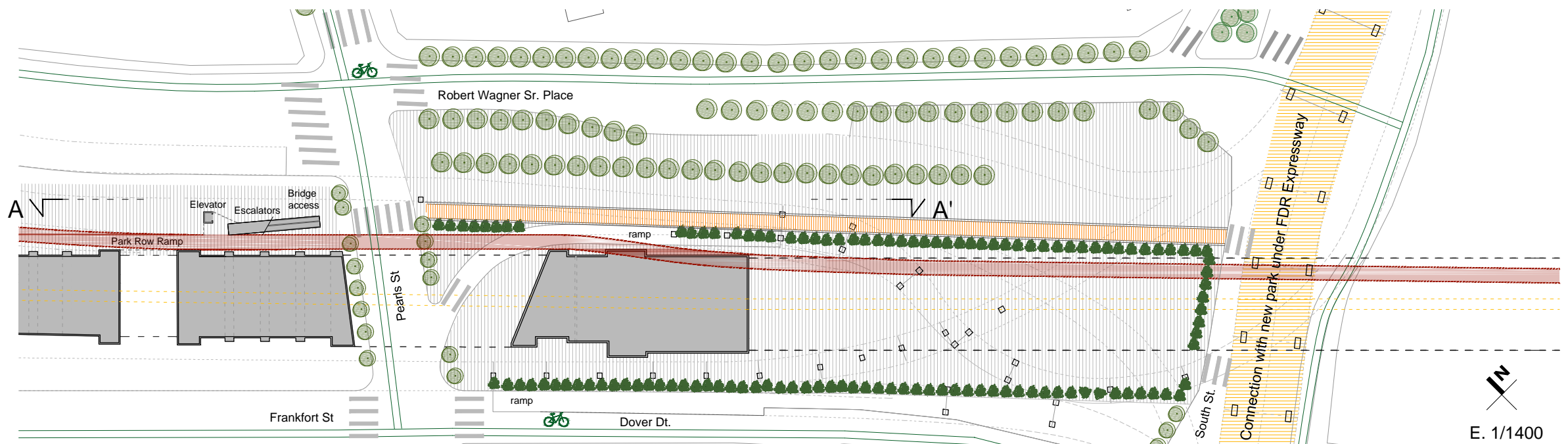
MANHATTAN GATE



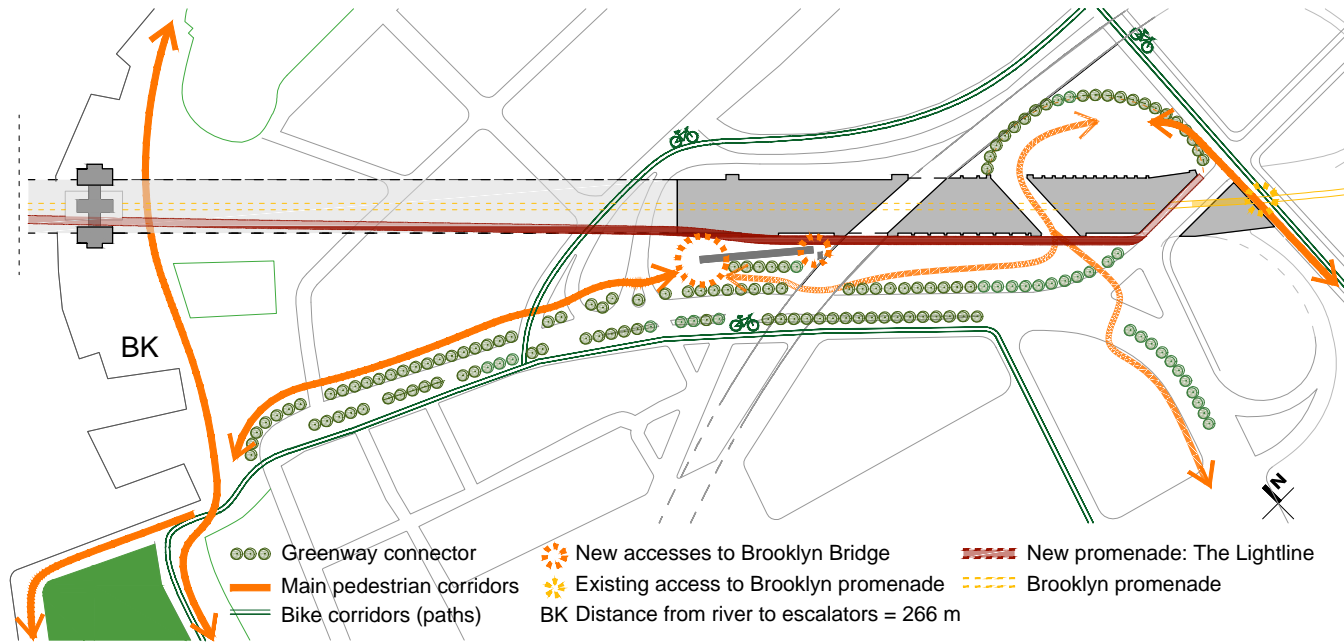
AA' - Manhattan elevation NE

ACCESS - SAFETY

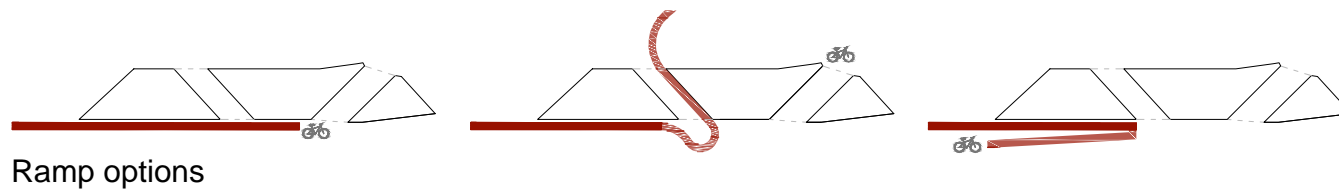
The idea of crossing over Brooklyn Bridge by a new diagonal footbridge results from an attempt to improve accessibility and to enhance non-automotive users' experience along the promenade. A diagonal layout allows creating new entrances closer to the river: north of the anchorage at the Manhattan end and south at the Brooklyn end. This new access plazas will provide new access points and new itineraries to users, will shorten the journey between banks and will ensure inclusive accessibility, not only because they will be equipped with lifts, escalators and ramps, but also because the steepest part of the existing walkway (along bridge approaches) will be avoided.



BROOKLYN

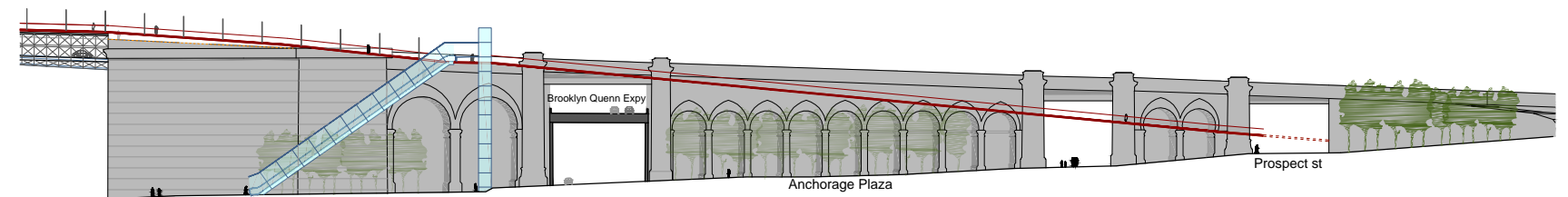
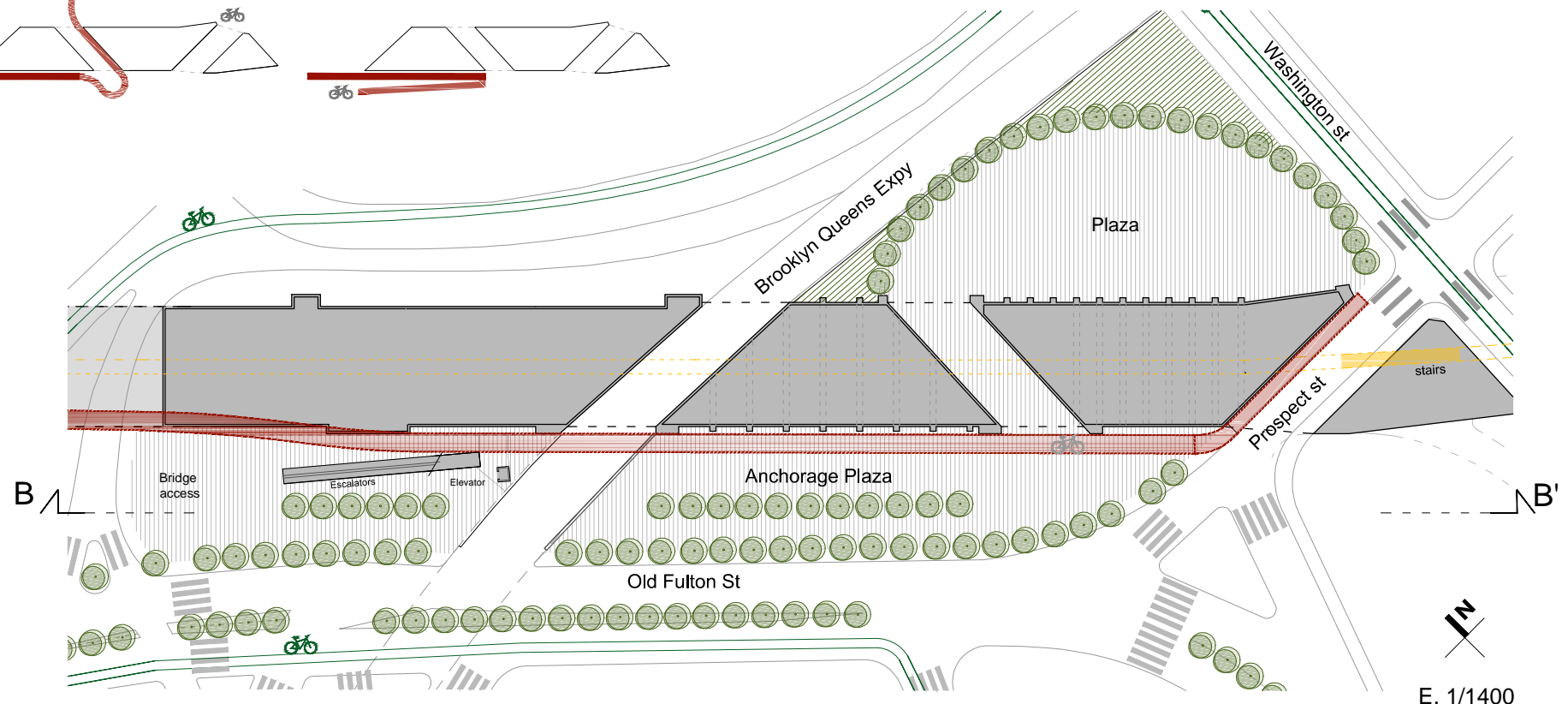


BROOKLYN GATE



ACCESS - SAFETY

Additionally, and as they will be placed closer to the riverbanks and designed as green spaces, they will connect the footbridge to existing cycling/pedestrian routes and recreational areas nearby; which together with the rehabilitation of anchorages immediate environment on both banks and the creation of an enhanced experience for all walking and cycling people along the promenade (wider and safer transit spaces; rest areas and viewpoints; new itineraries) will make the new footbridge a fundamental part of New York's pedestrian walkways, promoting sustainable mobility and acting as an enjoyable connector between Brooklyn and Manhattan.



BB' - Brooklyn elevation SO

ENVIRONMENTAL BENEFIT AND SECURITY

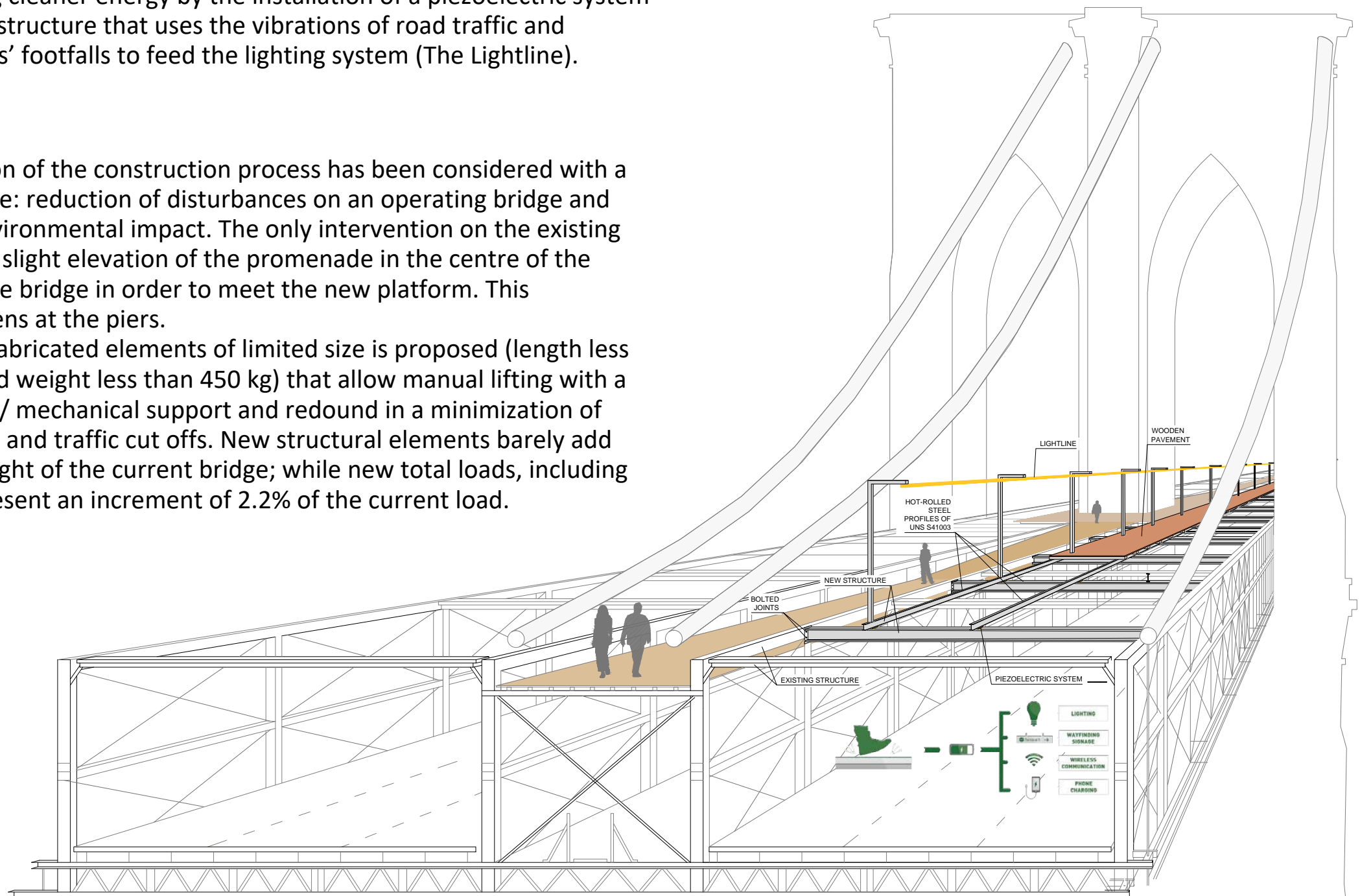
The design solution seeks to support the environment by a three-target strategy:

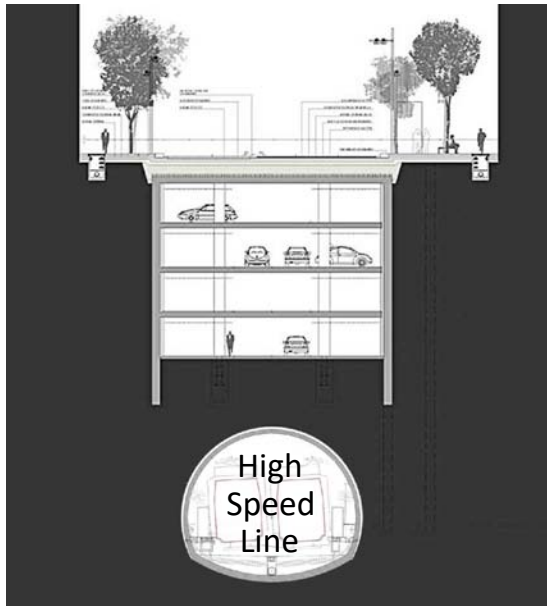
- Promoting sustainable mobility by integrating the new footbridge into existing cycling circuits and linking it to parks, recreational areas and pedestrian walkways;
- Creating a central plaza at the intersection of the two footbridges, with stands on both sides to rest and enjoy the views from an elevated perspective;
- Supporting cleaner energy by the installation of a piezoelectric system below the structure that uses the vibrations of road traffic and pedestrians' footfalls to feed the lighting system (The Lightline).

FEASIBILITY

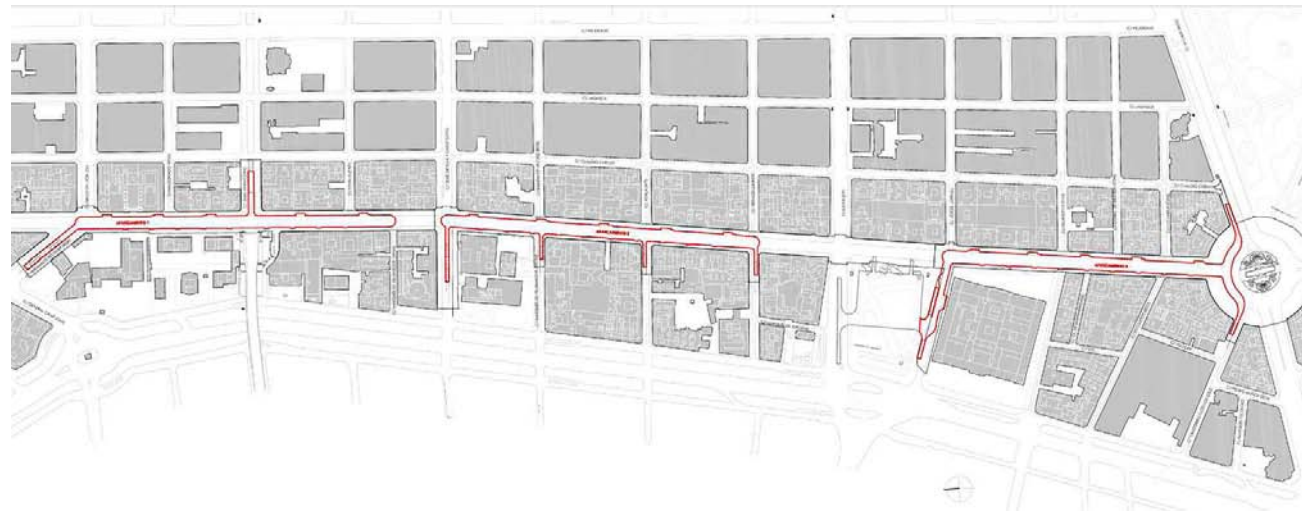
The optimization of the construction process has been considered with a double objective: reduction of disturbances on an operating bridge and decrease of environmental impact. The only intervention on the existing structure is the slight elevation of the promenade in the centre of the main span of the bridge in order to meet the new platform. This currently happens at the piers.

The use of prefabricated elements of limited size is proposed (length less than 7.50 m and weight less than 450 kg) that allow manual lifting with a small electrical / mechanical support and redound in a minimization of auxiliary means and traffic cut offs. New structural elements barely add 1.5% of the weight of the current bridge; while new total loads, including live loads, represent an increment of 2.2% of the current load.





PREVIOUS WORK



Remodeling of Serrano Street, Madrid. Spain

- **Client:** Madrid City Council
- **Construction date:** 2005-2010
- **Preliminary studies, concept and final design**

Serrano Street constitutes both an important artery for the mobility of vehicles across the city and an important pedestrian area as the heart of the designer shopping district of Madrid.

The objective of the project was to enhance the experience of citizens at three different levels: improving pedestrian spaces, smoothing traffic flow, and providing additional carpark places while minimizing disruption to pedestrians.

To accomplish those purposes, surface

parking was removed, pedestrian and access areas were redesigned, and both sidewalks were expanded. A bicycle lane was added to promote sustainable transport and street aesthetics were improved by the design and arrangement of new urban furniture. Traffic flow was rearranged, and silent paving was laid to reduce noise pollution. Three large 4 floor underground car parks were built below crossing streets.

The project faced two main challenges: the design of the underground parking areas had to consider not only the existing infrastructure (buildings and subway) but also the third tunnel connecting Atocha and Chamartin railway stations, built a few years later at 35 m depth; and the minimization of disruptions to vehicles and pedestrians during the construction, as on-site works lasted for three years during which the street remained open.

Rehabilitation of Pontedeume Bridge, La Coruña. Spain

- **Client:** Spanish Ministry of Public Works and Transportation
- **Date:** 2019 - 2020
- **Preliminary works and detail design**

Pontedeume bridge represents a historical work of notable heritage value, located within the protected Way of St. James. Of medieval origin, the bridge has undergone various transformations over time, the most important ones happening in 1874, 1889 and the 20th century.

The bridge is a granite masonry construction built over the Ares estuary, 350 m long, 7.15 m wide and constituted by 15 spans. The deck is the result of several interventions, not very

respectful with the bridge physiognomy. A comprehensive rehabilitation of the bridge was proposed which included several preventive measures as the injection of jet grouting under the footings of piles, abutments and walls to reinforce the foundations and the execution of a new deck formed by a reinforced concrete slab to achieve a widening of the roadway, an improvement of the structural behaviour and an optimization of the operating conditions and aesthetics; together with other palliative interventions for the superficial repair of the masonry, and the enhancement of the users experience by the improvement of the lighting system along the bridge. Again, one of the main challenges of the project was the construction process designed to maintain road and pedestrian traffic, minimizing disturbances and guaranteeing road safety.

