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ATTRAVERSO
SAN CRISTOFORO

international competition for the design of the Intermodal hub and bike-walk path connection between the Lorenteggio and Ronchetto sul Naviglio districts

Comune di Milano

Preliminary Design Document

2 **Preliminary Design Document**

ATTRAVERSO SAN CRISTOFORO

International design competition for the new cycling-pedestrian connecting path between Lorenteggio and Ronchetto sul Naviglio

December 2018

INDEX

INTRODUCTION

The International Design Competition "Attra\verso San Cristoforo" is part of the regeneration process carried out by the Administration in the city's districts in relation to the strengthening of the public and sustainable transport system. The object of the competition, in fact, is the bicycle and pedestrian connection linking Piazza Tirana, the disused railway area of San Cristoforo where the M4 subway station will be constructed, and the Ronchetto sul Naviglio district, which will host new interchange function installations. The aim is to increase the pedestrian and cycle accessibility of the M4 station and to maximize the opportunities for interchange with the transport modes that serve the surrounding districts, currently physically separated from the railway tracks and from the Naviglio.

The competition is, therefore, closely linked to the construction of the new underground line of which the company M4 Spa is the concessionaire, the Competition Authority together with the Municipality of Milan. As part of the design of a work with such strategic value, the Interministerial Committee for Economic Planning has prescribed the creation of the bicycle and walkway connection:

"Also considered to have the aim of improving the functionality of the interconnections between the different modes of transport and between these and the bordering territorial areas, it is hereby recommended to study a unique bike-walk pathway design solution for the urban areas located north and south of the S. Cristoforo station., which run between Via Lodovico il Moro and the area of Piazza Tirana, providing an intermediate connection/descent with the M4 station" (CIPE Resolution No. 10 of 3/03/2017).

The construction of a walkway that allows cross-over of the railway and the Naviglio in this part of the city is also fundamental *"taking into account the redevelopment project of the Lorenteggio district underway and in particular the need to create a new bicycle and walk connection at Piazza Tirana directed between the aforementioned district, the Alzaia del Naviglio Grande and via Ludovico il Moro, also considering the lack of construction of the bike-walk path connection at the Giordani overpass in the scope of the Via d'Acqua project* [...] " (CIPE Resolution No. 10 of 3/03/2017).

The goal is therefore to integrate the cycle-pedestrian connection with all the other infrastructural and urban transformations in progress, extending the range of influence and, therefore, the benefit for the districts involved. In fact, it was deemed appropriate to avoid considering the walkway as its own element with limits in Piazza Tirana and via Lodovico il Moro, but rather as an element of a broader system aimed at the rehabilitation of the city, with emphasis on connections with the Parco Agricolo Sud Park. Given the above, designers are required to take the entire context into consideration, with a view of integrating the works that make up the competition scope into the broader objectives of sustainable mobility and quality of life.

1. COMPETITION SCOPE

[1.1] General theme and objectives of the competition

The purpose of this competition is the rehabilitation of a particular area of south-western Milan by implementing works of re-connection that simultaneously effect local neighbourhoods and impact the urban and suburban scenario. The main scope of the competition, in fact, is the bicycle and **pedestrian connection** of the Lorenteggio / Giambellino and Ronchetto sul Naviglio districts, and the integration of this connection with the other existing transport modes, under construction and planning in the area. In particular, the cycle path of via Segneri, the San Cristoforo railway station, the future M4 station, the Alzaia del Naviglio Grande, the intermodal hub between via Lodovico il Moro and via Martinelli and the area south of via Martinelli, which will host the bus and tram terminus, a new interchange parking and a depot for electric buses.

The competition theme, therefore, is the organization of activities related to mobility that will develop on public areas. In addition to the actual connecting structure, the competitors are asked to carefully think about the shape of **the public space** that will be created around it and about the relationship between the bicycle and pedestrian connection and the urban context. Including aspects not strictly related to the infrastructural theme in the project means taking the opportunity to maximize the impact on urban quality. It is therefore necessary to consider the connection not only as a functional structure for mobility but also an ecological and sociality-impact infrastructure

At the same time, designers are required to produce an overall and integrated vision for the future of the Ronchetto aspect, which is intended to constitute a metropolitan-scale **interchange area**. Consistent with the vision expressed in the review process of the Territorial Government Plan, the Administration considers it fundamental that the competition context presents urban conditions and effectively constitutes a "piece of city", surpassing a purely functional view. The interchange area must be provided a level of complexity that makes it a "place" that enhances value beyond mere transport with new settlement possibilities, also integrating other urban functions.

[1.2] Identification of the areas of intervention

The area covered by the competition is defined by the elaborate 3.2 "Table with perimeter of the competition area" and is divided into two main areas:

1. **Red** intervention range: **technical-economic feasibility design**:

   Scope **1A**- the design of the connecting bike and walk path between the Lorenteggio and Ronchetto sul Naviglio districts, which will extend from the northern boundary of the Piazza Tirana green area to the "Ronchetto" intermodal hub, including all the ramps and vertical links, the lighting system and parapets about 450 meters long); the entrance to the subway of the M4 station and the pedestrian connection between this and the future linear park.

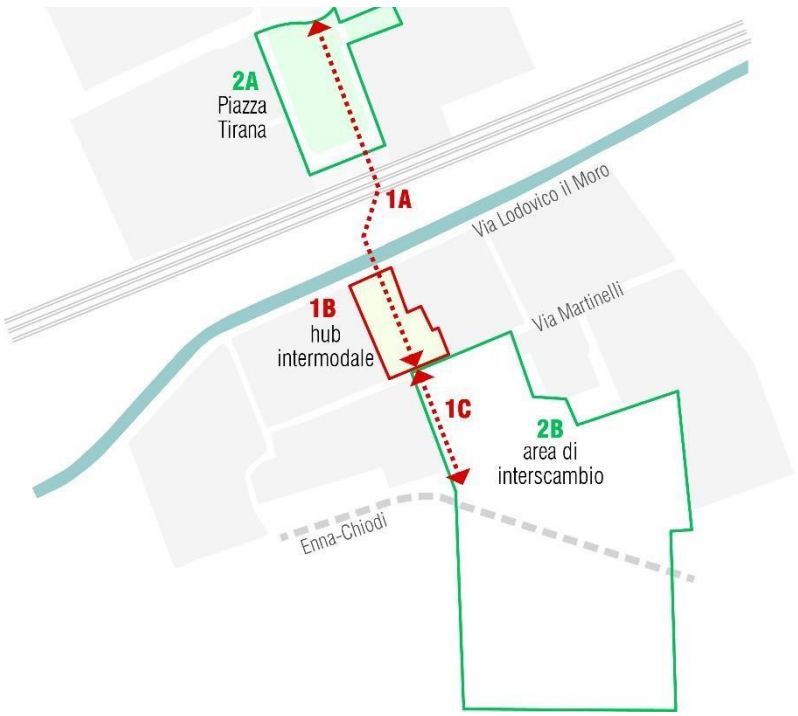
   Scope **1B**- the design of the "intermodal hub" in the area located between via Lodovico il Moro and via Guido Martinelli (about 9,300 square meters);

   Scope **1C**- the design of the bike and walk path link between via Martinelli and the southern border of the future interchange area, close to the Enna-Chiodi road network (about 159 meters long).

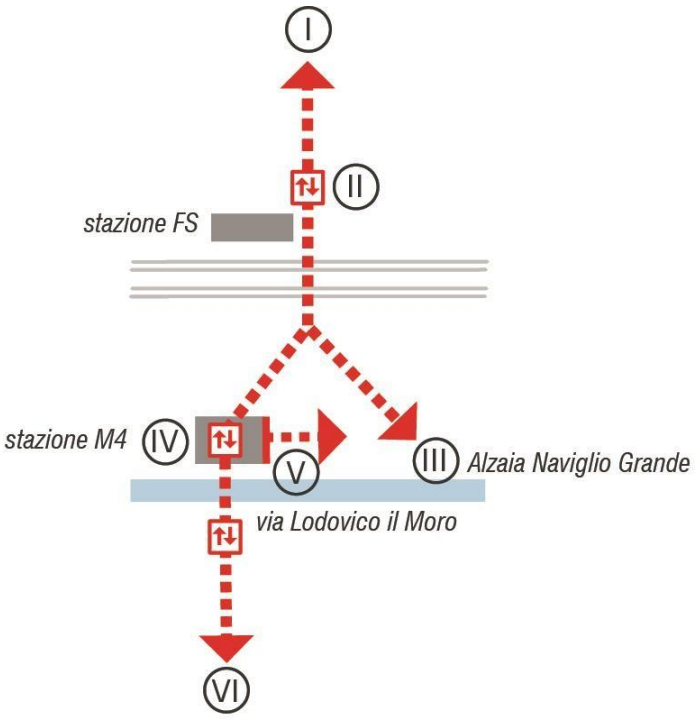
2. **Green** intervention range: **drafting of "Guidelines"**

   Scope **2A** - Guidelines, for the reconfiguration of the Piazza Tirana area in the area that extends from the San Cristoforo railway station to the northern boundary of the green area;

   Scope **2B** - Guidelines for the interchange area that will develop south of via Martinelli



[1.3] Specific objectives for each area



SCOPE 1A:

I. The building must connect to the cycle path planned at the intersection **Piazza Tirana** , via Giambellino and via Segneri;

II. The cycle pathway shall provide a fly-over the railway tracks. Before the railroad crossing, a vertical connection shall be made to the Piazza Tirana area, near the San Cristoforo **railway station**;

III. After crossing the railroad, the footbridge must be connected, via a cycle-pedestrian ramp, to the **Alzaia del Naviglio Grande**;

IV. The building shall connect directly to **the M4 station** of San Cristoforo incorporating the lift link to the station concourse. The elevators shall then connect the station atrium, the level of the future linear park in the disused railway area of San Cristoforo and the level of the walkway;

V. The connection between the M4 station and the future linear park in the disused railway area of San Cristoforo, deepening the overall design of the **entrance to the M4 station**: in addition to the descent from the ground to the level of the underpass, the entrance portal to the station (Ref. Annex 5.4) is also the subject of the competition, which will be connected to the structure of the underground station under construction, completing it;
The footbridge shall bypass the Naviglio Grande and Via Ludovico il Moro.

VI. In the area identified for the intermodal hub, the cycle-pedestrian bridge shall descend to the ground level both by means of a cycle-pedestrian ramp, that

through a direct landing by stairs and elevators to be positioned near via Lodovico il Moro.

SCOPE 1B:

To the south of the Naviglio, the scope of the competition extends to the entire perimeter of the area that stretches between via Lodovico il Moro and via Guido Martinelli, destined to become an **intermodal hub** for connection between the cycle path and a new bus and tram stop. An integrated road system must be provided for buses and trams that connect via Lodovico il Moro to via Martinelli, enhancing the public space of the entire area.

SCOPE 1C

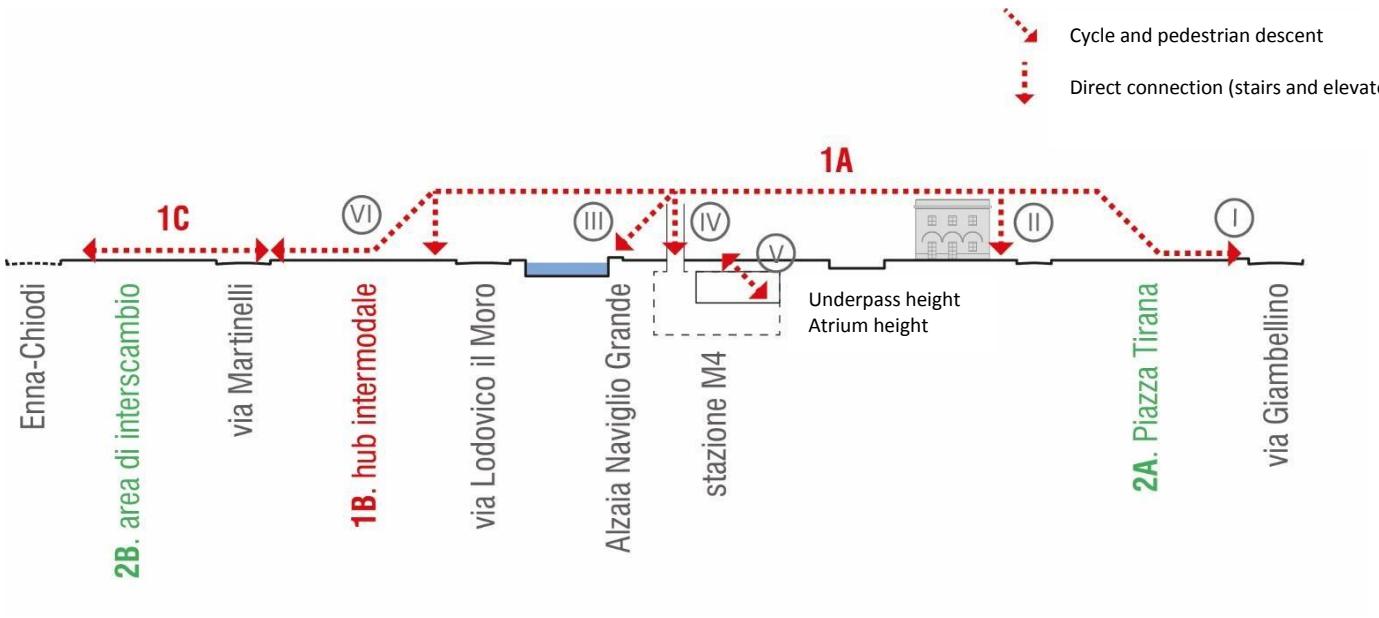
To the south of via Martinelli, the cycle-pedestrian connection at street level shall serve the new interchange area, before connecting to the cycle path in anticipation along the new Enna-Chiodi road network.

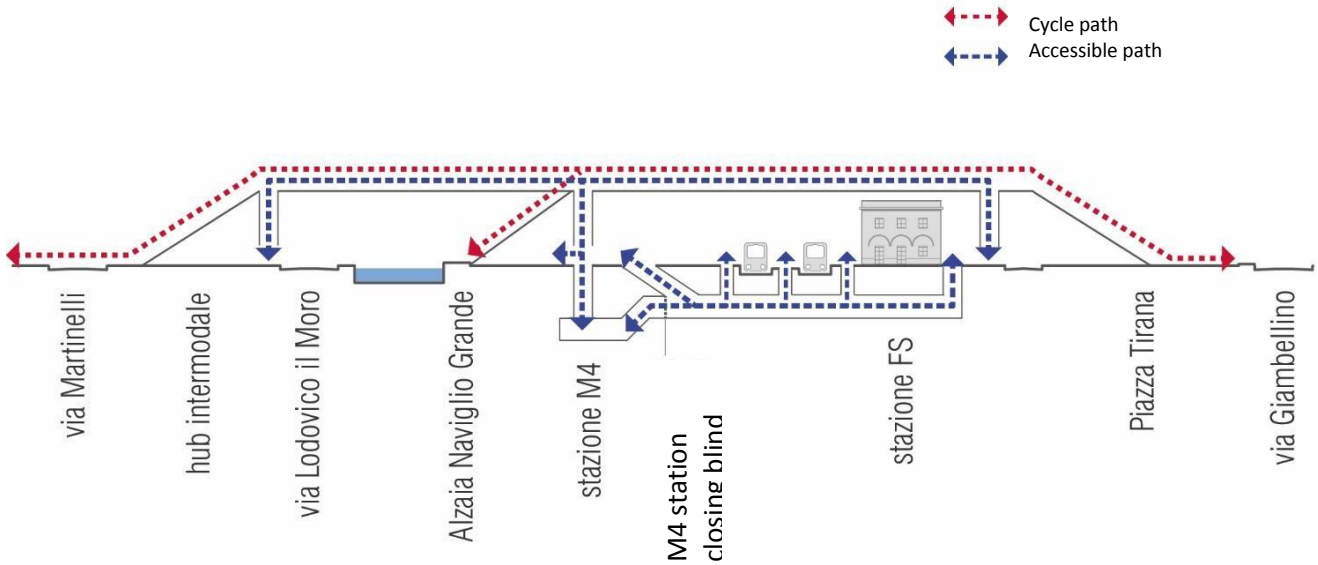
SCOPE 2A:

Revision of the configuration of Piazza Tirana, in relation to the introduction of the cycle/pedestrian path that is scope of the competition.

SCOPE 2B:

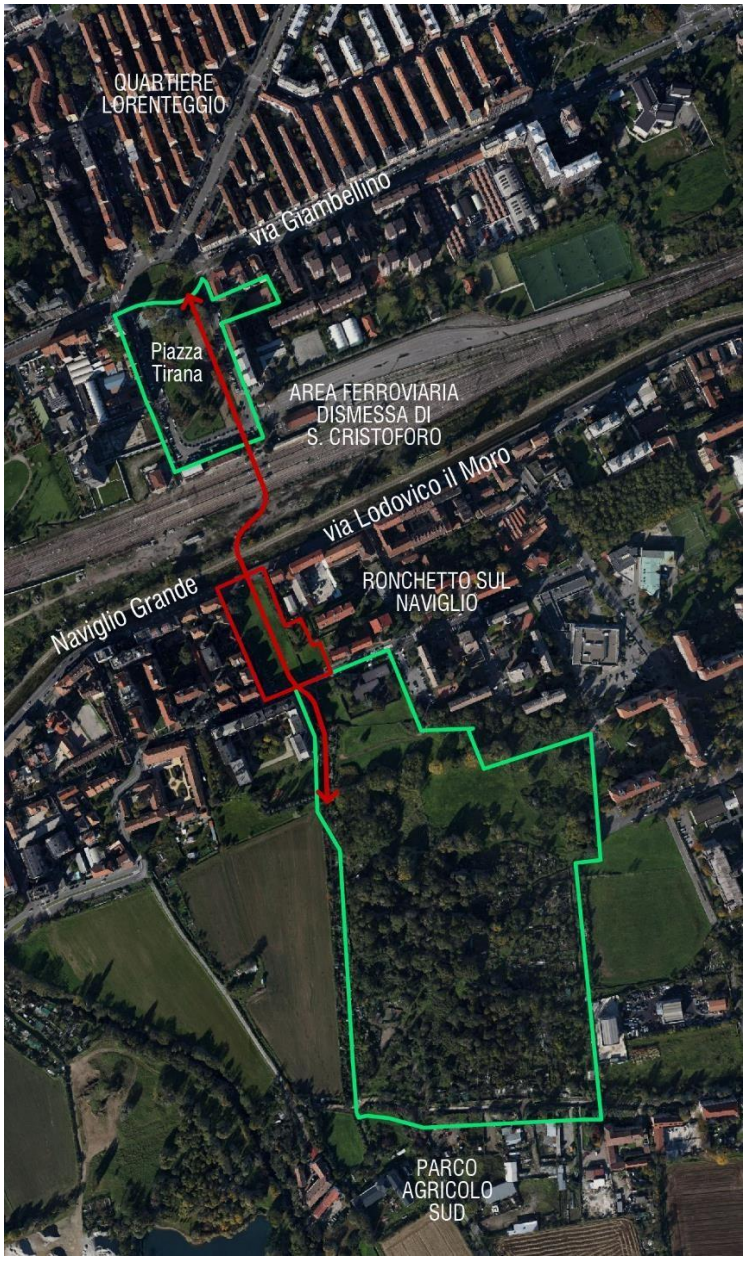
Spatial organization of the interchange, which will host the main bus **stop,** the tram **terminus** for the **park and ride,** and **ATM (Azienda Trasporti Milanesi) deposit** for electric buses, including through the integration of these with other urban functions. Designers are also required to verify the possibility of extending the cycle-pedestrian path beyond the project scope to the south, reconnecting to the inter-farm paths of the South Agricultural Park not involved in new infrastructure projects.

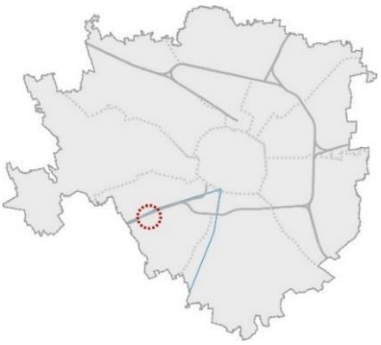

Cycle and pedestrian descent
Direct connection (stairs and elevators)
1A
1C
VI
III
IV
V
II
I
Underpass height
Atrium height
Enna-Chiodi
2B. area di interscambio
via Martinelli
1B. hub intermodale
via Lodovico il Moro
Alzaia Naviglio Grande
stazione M4
2A. Piazza Tirana
via Giambellino


Cycle path
Accessible path
via Martinelli
hub intermodale
via Lodovico il Moro
Alzaia Naviglio Grande
stazione M4
M4 station
closing blind
stazione FS
Piazza Tirana
via Giambellino

2. GENERAL OVERVIEW

The competition area is located in the south-west area of Milan, near the towns of Corsico and Buccinasco, along the Naviglio Grande. It involves the Lorenteggio and Ronchetto sul Naviglio districts, which are located respectively north and south of the Naviglio, about 5 km as the crow flies from Piazza del Duomo. The scope of the competition extends along important infrastructural axes that will be further enhanced by the construction of the new M4 metro line. These same infrastructural axes, however, involve physical constraints that currently penalize the livability of the neighbourhoods. The railway line and the Naviglio Grande, in fact, infrastructures connecting the extra-urban stop, constitute **physical barriers** to the local dimension. Limiting the physical permeability between the neighbourhoods, in fact render two sides "blind", accentuating the character marginal areas.





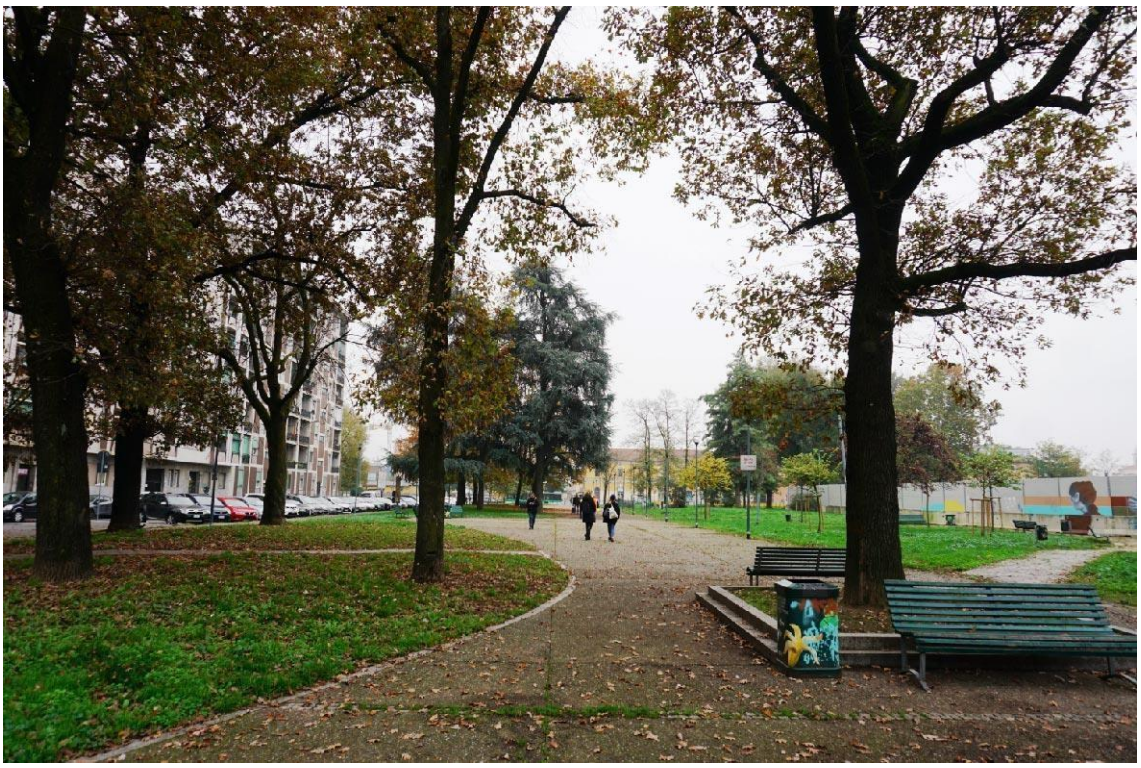
1. Aerial view of the area scope of the competition

The Lorenteggio and Giambellino neighbourhoods

The Giambellino district is characterized above all by the public residential building complex of Lorenteggio, now managed by ALER. The complex was founded between 1938 and 1944 as the IFACP district, to accommodate mainly the new working population attracted by the concentration of factories south of the district, along the Naviglio Grande. Since the 80s, the progressive disappearance of industrial activities together with the weakening of the role of aggregation centres and the concentration of social classes with low income in the suburbs of the city, have contributed to creating a situation of social isolation in this area and residential discomfort. As often happens in densely populated contexts, there is a variety of ethnic groups currently inhabiting this city space.

The scope of the Lorenteggio-Giambellino is the subject of a redevelopment plan which envisages investments worth € 85 million for the renovation of the buildings, the economic revitalization of the social fabric and the rehabilitation of public spaces. The planning of public works also includes actions to increase sustainable mobility on the axis of Via Giambellino, and a new cycle path along Via Segneri to Piazza Tirana, which will be the head of the new cycle/ pedestrian connection scope of the competition.

Piazza Tirana, a hub of mobility due to the presence of the San Cristoforo station, is at the same time an area where the urban beat expands thanks to the character of the square-garden. The current configuration of Piazza Tirana is the result of a design competition launched by the Municipality of Milan in 1999, with the aim of expanding the square's space, unifying the areas occupied by roadways and sidewalks to a single design and redesigning the crossing between the streets of Trulli, Segneri and Giambellino.The implementation of the winning project ended in 2003.



2. View of Piazz Tirana

The disused railway area

The disused railway area of San Cristoforo, which stretches between the Alzaia del Naviglio Grande and the railway tracks, is currently an urban void that actually further increases the distance between the two parts of the city. The area, together with the abandoned structure located towards the border with the Municipality of Corsico, is the relic of a never completed railway project that of the new Milan-San Cristoforo self-berth station, and is now affected by the provisions of the Agreement of Program for the urban transformation of the Milan railway stations.

3. View of the disused railway area of San Cristoforo where the future Linear Park will be positioned

The Naviglio Grande

The Naviglio Grande is a historical-cultural element of fundamental importance for the city: of medieval origins, being navigable it has carried out both irrigation and freight transport functions over the centuries. More recently there have been sports activities related to water and tourist itineraries. The restoration of the historical link between Milan and the water is one of the objectives of the feasibility study for reopening the Navigli; reference should be made to it to gain more details on the subject.

Today, the Naviglio Grande is an element of significant urban identification, both for its historical and artistic value, and for the daily role it plays for the leisure and free time of citizens. In 2015 the Darsena was redeveloped, which has once again become a point of reference for the city and new public space. This is the starting point of the pedestrian axes along the banks of the Naviglio Grande, with their commercial activities, restaurants and clubs that increase its attractiveness and make it a place for concentration of nightlife.

The Naviglio, therefore, can be considered a cycle-pedestrian axis of the urban scale and not only: the Alzaia of the Naviglio Grande, potentially connecting up to Ticino, is an important cycling route on the regional scale.

4. View of the Naviglio Grande and the Trazaia

Ronchetto sul Naviglio and the Parco Agricolo Sud

The district of Ronchetto sul Naviglio is the outermost strip of Milan before entering the towns of Corsico and Buccinasco. The boundary of the Parco Agricolo Sud runs near the town, which has remained compact between the course of the Naviglio Grande and the agricultural areas. The historic core of the district is still partly traceable here, with a predominantly residential character.

As often happens in peri-urban areas, there is a dense presence of spontaneous urban gardens, such as along the Deviatore Olona and in the area where the location of part of the functions related to transport and mobility is planned, the implementation of which will involve the movement to the free areas east of the competition area.

The area of Ronchetto sul Naviglio presents particular elements of landscape quality: in addition to the fifteenth-century Villa Corio-Durini-Beltrami, some farms have been preserved. The water element contributes to the characterization of the landscape thanks to the presence of the artificial channel Deviatore Olona and a minor water network formed by a dense network of canals and channels. This landscape is the object of the project carried out by the Parco delle Risaie Association, which aims to enhance an agricultural enclave of over 600 hectares within the Parco Agricolo Sud Milan, between the Naviglio Grande and the Naviglio Pavese.

The free area indicated in the scope of the competition with the code 2B, has been occupied in the past by a quarry: therefore, it will require specific environmental investigations that may highlight the need and the extent of a reclamation intervention.

5. View towards the Parco Agricolo Sud. In the distance to the left, the area of the disused quarry destined to the future interchange area of Ronchetto

3. FUTURE SCENARIOS: THE CONTEXT DESIGN MEDIUM

The South-West area, which extends along the axis of the Navigli Grande and Pavese, is characterized by a prestigious territory, where the ability to integrate agriculture, enhancement of the landscape and fruition is the cornerstone for development, in a delicate relationship between open and constructed spaces. The general objectives of development are articulated and specified in this area: the future development of the neighbourhood, therefore, will be driven by the objectives related to the upgrading of public transport, the redevelopment of the disused terminal of San Cristoforo and the urban and environmental regeneration.

[3.1] The vision for Milan 2030

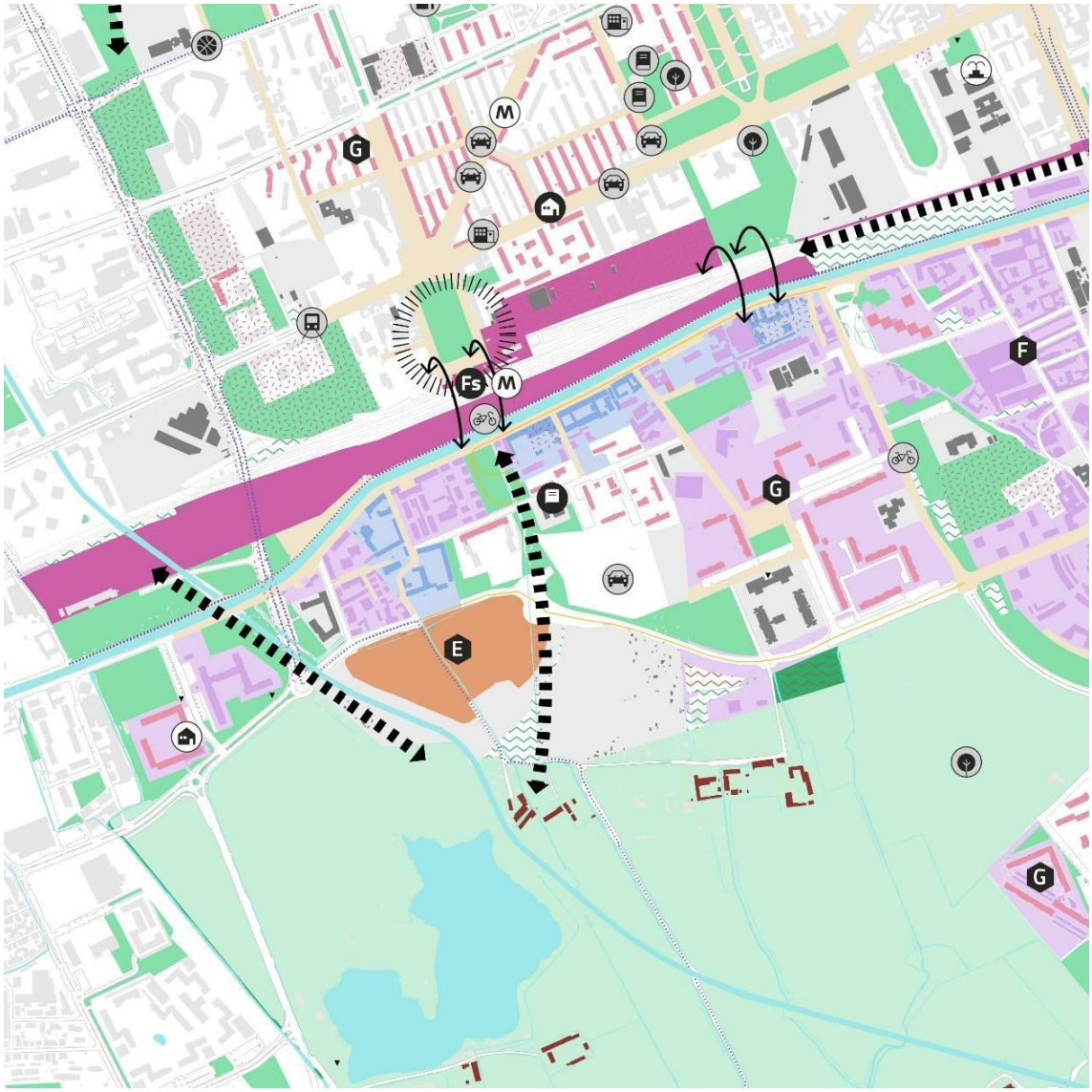
The vision for the administration of the area that is scope of the competition is linked to the strategy for Milan 2030 set by the review process of the Territorial Government Plan (PGT), which is divided into five main objectives:

1. A connected, metropolitan and global city
2. A city of opportunities, attractive and inclusive
3. A green, liveable and resilient city
4. A city of 88 neighbourhoods to call by name
5. A city that regenerates

In particular, the new PGT of Milan foreshadows a functional development relevant to accessibility, according to a logic of urban growth not widespread, but for densities on the "interchange hubs", which seeks to obtain the greatest possible number of people living and working at short distances from a train or metro stop, in order to reduce dependence on private mobility. In areas characterised by a high level of accessibility, provision shall be made for Large-scale Urban Functions (LUF), new functions of a strategic nature, of public use and / or of public or general interest. The Plan not only looks at the large-scale attractors such as "hubs" and LUF, but it also addresses the smallest scale of neighbourhoods through a strategy of widespread regeneration that commences from the reinvention of public space: this is understood as a network of squares, streets, sidewalks , porticos, stops of public transport, green equipped, which extends to the ground attack of buildings, a privileged place for the growth of the urban economy, whose quality can stimulate the vitality of the proximity trade and the development of commercial districts natural.

All these themes are part of the competition scope, destined to become a complex interchange hub between the various public transport infrastructures. The construction of the new M4 metro line - and its integration with the other modes of transport present and scheduled in the area - will help bridge the gap of the neighbourhoods of Lorenteggio and Ronchetto sul Naviglio with the rest of the city, increasing the level of **accessibility** to the urban scale. Also for this reason, the PGT decides to allocate the vast free area just south of the historic nucleus of Ronchetto sul Naviglio to the Large-Scale Urban Function, which will benefit from the many infrastructural transformations that are investing the neighbourhood - and which in turn will enhance the neighbourhood increasing the attractiveness and the endowment of amenities.

The strategy for Milan 2030 is aimed at **overcoming the mono-functional character** typical of many of the interchange area, with a view to regenerating places that today have a prevailing infrastructure character and which shall be transformed into important urban spaces. In particular, it aims at enhancing existing infrastructures, through processes of functional integration, densification, gap bridging and redevelopment of public space. The "interchange hubs" of the city will have to evolve into nerve centres in which to affirm urban conditions, combining the efficiency of intermodal systems and urban logistics with the quality of urban space and pedestrian permeability.



E **Large urban functions**

Scope of Ronchetto. New functions for public services and private functions of strategic interest. Creation of an urban park along the Lambro Meridionale and new connection between the stop of S. Cristoforo, Piazza Tirana and Parco Agricolo Sud.

F **Scopes of urban renewal**

Area between Naviglio Grande and Parco Agricolo Sud. Regeneration works of buildings, open spaces, urban forestation in relation to the transformation of via Ludovico il Moro, via W. Tobaghi and design of the San Cristoforo stop.

G **Requalification of public housing services**

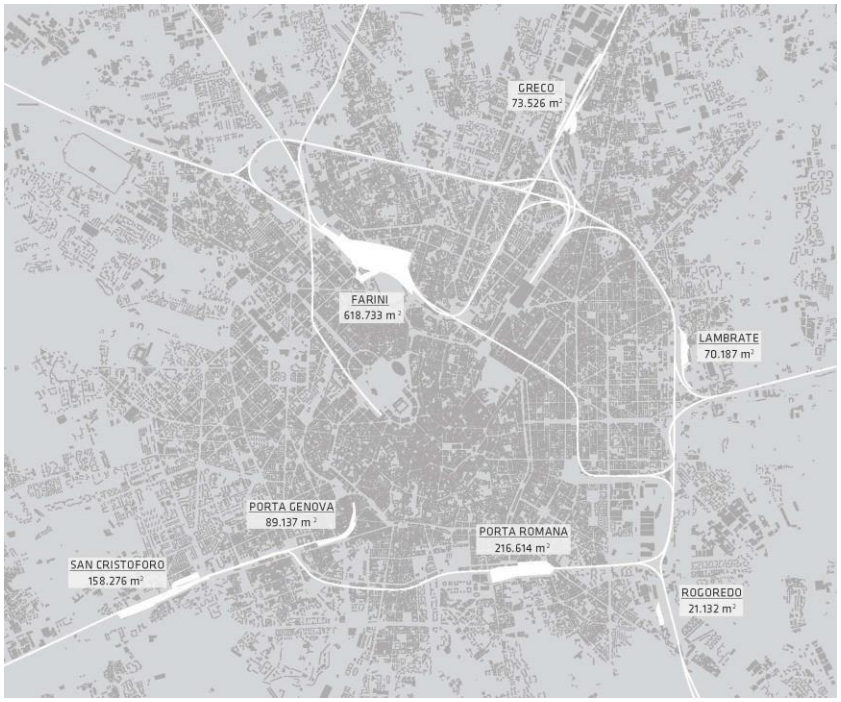
Neighbourhoods of Barona, Restocco Maroni, Giambellino and the building complexes of v.le Faenza. Regeneration works on buildings and open spaces, implementation of public spaces and services for the inhabitants.

6. Excerpt of the "Atlas" of the interventions foreseen within the contest field, as governed by the new Territorial Government Plan for Milan 2030.

[3.2] The San Cristoforo airport

The central part of the intervention area is located between the Alzaia del Naviglio Grande and the railway line, part of a larger area along the Naviglio which has remained almost entirely inedified between the municipal boundary and the Don Milani overpass. The area, also known as Scalo San Cristoforo, now owned by FS Sistemi Urbani S.r.l. of the Ferrovie dello Stato Italiane Group, constitutes the legacy of an incomplete railway project that of the new car-berth station, for trains and cars. As regards the original project by Aldo Rossi and Gianni Braghieri, the skeleton of the station, near the municipal boundary, and the Giordani overpass which, through the ramp created, would have allowed vehicular access to the station.

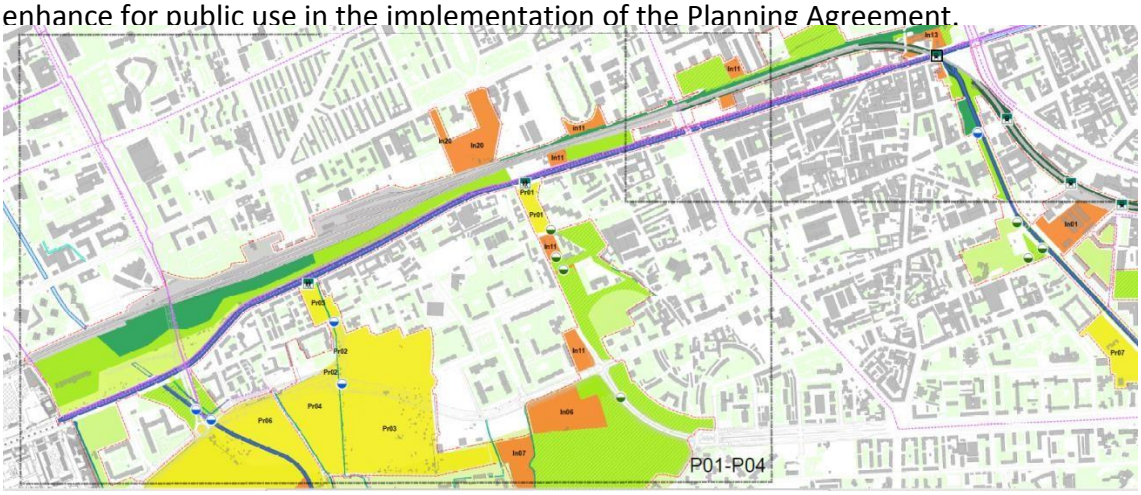
The entire area owned by FS Sistemi Urbani S.r.l. represents one of the strategic areas of the **Planning Agreement** for the urban transformation of the seven disused railway stations of Milan, related to the upgrading of the railway system in the Milan area. The Planning Agreement, signed in June 2017 and approved by Presidential Decree of the Lombardy Region in August of the same year, provides for the complete destination of this area in the park, indicating its character and strategic role in the system of ecological connections and of public space of this urban sector (for a summary of the strategic vision see the Attachment 9.3 - AdP Scali_All.U_Documento di Visione strategica (Planning Agreement_Annex U: Strategic Vision Document)).



6. Diagram of classification of the seven disused railway stations of Milan, subject of the Program Agreement

In particular, the Agreement provides for the development of a new ecological connection along the entire south-east railway track belt called "**Green Rails**" (Annex 9.4 - AdP Scali_All.F_Rotaie Verdi (Planning Agreement Stops_Annex F_Green Rails)). The "Rotaie Verdi" study proposes to increase and connect the green areas along the railway belt, trying to reduce the fragmentation of the infrastructures in order to constitute a real urban ecological connection; to this end it proposes a connected system of naturalistic oasis or *stepping stones* in the areas of construction of the future parks and proposes general guidelines for the design and management of public green areas. In particular, it identifies the disused railway area of San Cristoforo as the central hub of the ecological corridor and the occasion for the insertion of a naturalistic oasis. The area, due to its proximity to the Naviglio Grande and the Parco Agricolo Sud Milan, is an ideal link on the north-south route between the Parco delle Cave- Bosco in the city and the Parco delle Risaie, which is part of the Parco Agricolo Sud Milan, and on the east-west route as an element of continuity with the other green areas that face the Naviglio Grande territorial system. The study hopes for the area of San Cristoforo an increase in biodiversity and environmental complexity through typologically and structurally diversified interventions such as: wooded zones, naturalistic oases with wetlands and protected grassland areas, shrub vegetation buffer zones separating from the railway line and public green, characterized by greater usability on the part of citizens, naturalistic management, with a level of artificialization that is not too high.

The park shall be built with the development of the transformation of the Farini airport, for which the international competition for the overall Masterplan was recently banned from the property, the completion of which will be completed in April 2019. The realization of this important future city park (about 140,000 square meters), together with the transformation of the depot and Porta Genova station, will guarantee a new continuity of cycle paths and green areas along the Naviglio Grande, the so-called **Linear Park**. The Linear Park will in fact be formed by a supporting structure that will allow cycle-pedestrian connection - represented by the Alzaia system and the railway areas turned into green area - and by a corollary of existing green areas and future construction arranged along the axis (Giardini of via Tolstoj and via Savona, Parco ex Pozzi di Corsico , etc.) and connected with the system of green areas (Parco Baden Powell and Parco ex Sieroterapico, Parco Don Giussani, etc.) and the metropolitan areas (Parco delle Risaie, Parco sud Milan). This system of green and park areas is also complemented by the sports equipment area already belonging to the Dopo Lavoro Ferroviario (Railway Recreation) accessible from Piazza Tirana, to redevelop and enhance for public use in the implementation of the Planning Agreement.



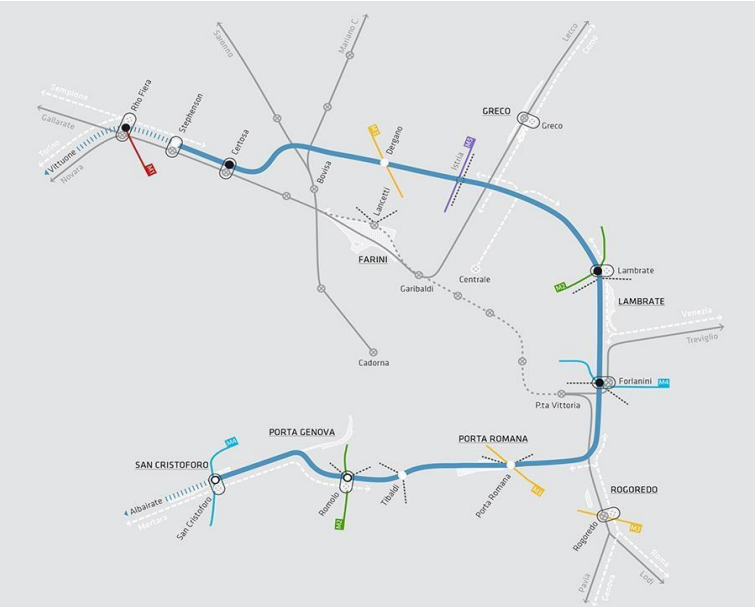
7. Excerpt from the "Rotaie Verdi (Green Rails)" feasibility study

[3.3] The Circle Line

The San Cristoforo railway station is the extreme point to the south-west of the "Circle Line", a project foreseen by the Planning Agreement for the redevelopment of the disused railway stations related to the upgrading of the Milan railway system, and the vision for Milan 2030 carried forward from the new PGT, as well as from the PUMS, the Urban Plan for Sustainable Mobility. The PUMS, in fact, fully recognizes the metropolitan territorial scale to which the Milan settlement area and economic system is reported, and therefore considers the urban transport and urban planning priority of the construction of a metropolitan railway service. The project for the "Circle Line" includes **upgrading** of the functionality and accessibility **of the railway belt**, in order to establish a complementary transport system to the subway and to the passages, through the construction of new stops, new interchanges and new railway services, and quality standards for stations and services that are increasingly close to metropolitan service standards. In addition to the general expansion of public transport, the goal is to render the "radial" structure of the city more like a network, making it possible to cross the city without going through the centre.

As concerns the station of San Cristoforo, destined to play an important interchange role, the plan foreses, in addition to the construction of a new underpass connected to the mezzanine M4 and the new pedestrian and bicycle connection (please refer to the detail in attachment 9.4 "AdP Scali_All._O_Inquadramento degli interventi trasportistici" (Planning Agreement of Stop_ Annex O_Framework of transport interventions)):

- the refurbishing of the railway track, with four tracks, two central and two lateral for the line
- adjustment of the dimension and functionality of the platforms
- modernization of the passenger building
- motorcycle-bike parking
- accommodation for entry/exit through the station
- adaptation of information systems to the public

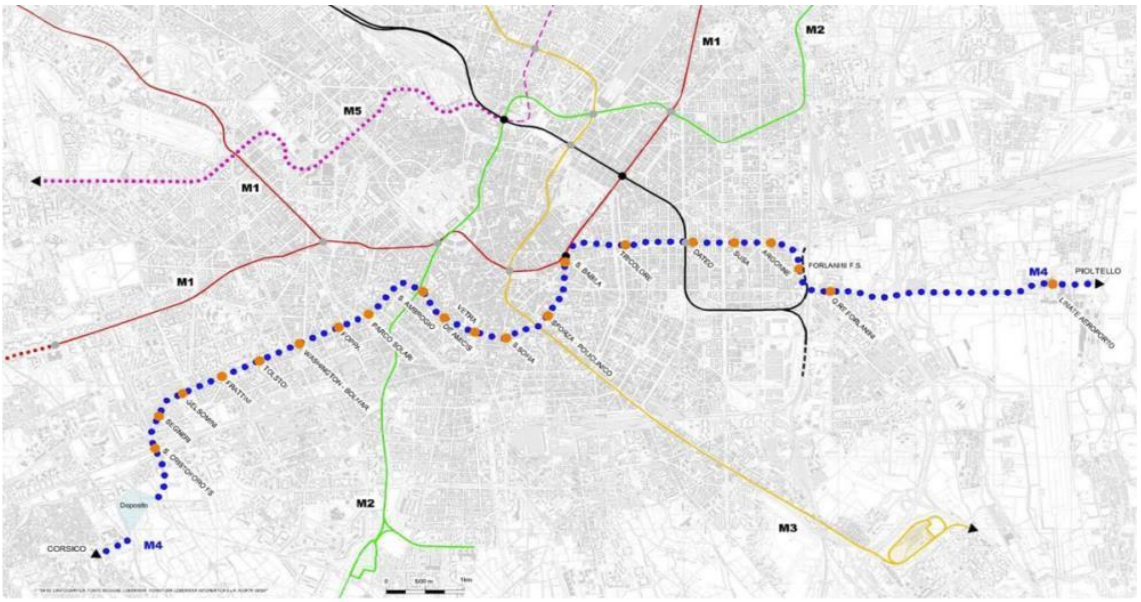


8. Circle Line diagram

[3.4] The M4 metro line

The infrastructural transformation with the greatest impact on the neighbourhood, and on the entire city, is definitely the new M4 metro line. With the construction of the M4, the Milan metro network will be the sixth most extensive in Europe. The line is currently under construction and the opening is scheduled for phases between January 2021 and July 2023. The Blue Line will connect the city from the east, with Linate Airport terminus, to the southwest, passing through the town centre. The terminus to the south-west will be the **new station of San Cristoforo**, located in the disused railway area of San Cristoforo - however the PUMS positively evaluates a possible extension of the line up to Corsico, exploiting the access tracks to the deposit located south of the Naviglio.

The Blue Line tunnels extend beyond the station of San Cristoforo so that the convoys can be collected in the new Ronchetto sul Naviglio depot. Above ground, it will occupy an area of about 50,000 square meters between the course of the Deviatore Olona, via Buccinasco and via Morandio.



9. Route of the new M4 metro line

[3.5] Interchange and interventions on mobility

The new infrastructural services of strategic importance, therefore, make the areas of Lorenteggio and Ronchetto sul Naviglio a potential intermodal hub of metropolitan relevance. Here a new **interchange hub** will be established among the different types of mobility: railway, underground, cycle and road. These conditions are combined with the objectives of the PUMS and the new PGT linked to the high levels of congestion, which have led to a different conception of the infrastructure network - with a new offer able to free up the central hub from the transit traffic - and, together, mobility policies - with new strategies for organizing public transport and forms of mobility inspired by sharing and sustainability. Part of this policy is the strategy of converting the fleet to electric vehicles, which shall be implemented by the Municipality of Milan, and which specifically concerns the scope of the competition. The hub of Ronchetto, in fact, has been identified for the location of one of the future "full electric" bus depots for the admission and recharging of vehicles.

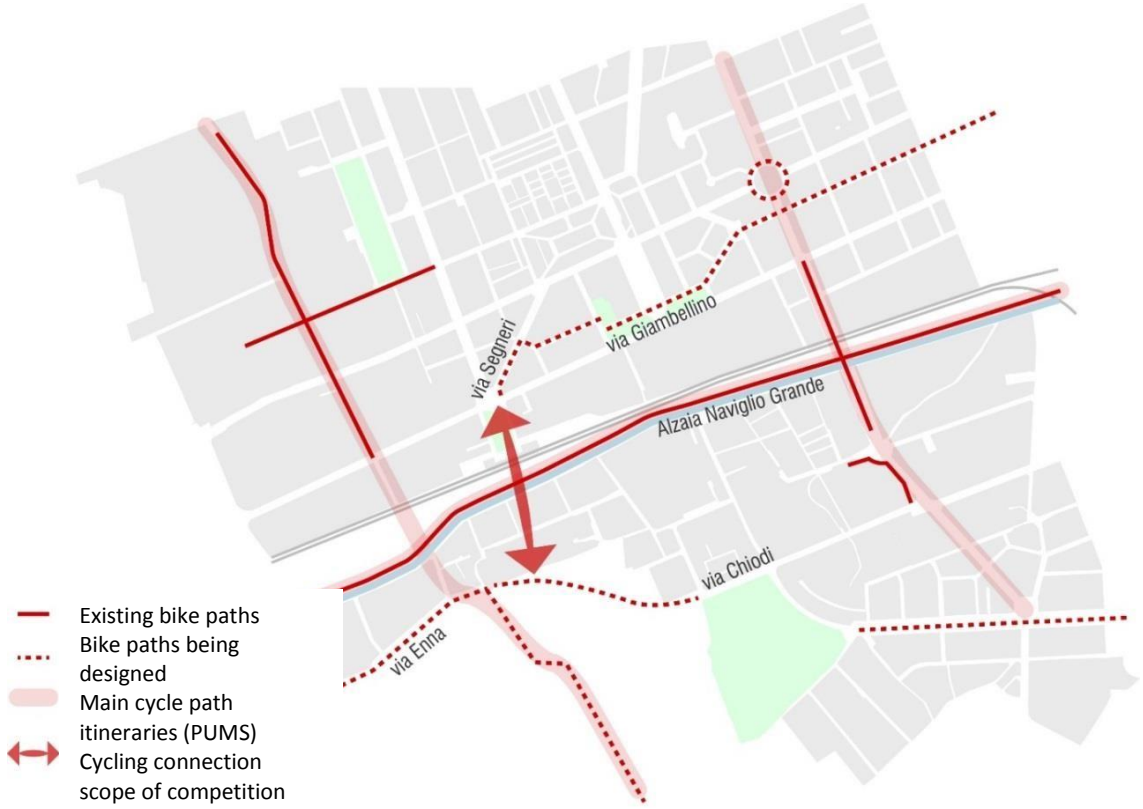
Pedestrian and cycling connections

Consistent with the role of primary importance recognized by the PUMS for active mobility (pedestrian and cycling connections), interventions in favour of light mobility networks and services are envisaged in the districts involved in the competition, through the enhancement of pedestrian systems and the definition of safe and widespread cycle networks.

Just outside the competition area, in the ERP district of Lorenteggio, important redevelopment interventions are planned for the public space connected to mobility: in particular, Via Segneri undergo complete redesign of the road section with the narrowing of the roadway, the construction of a cycle path and the enlargement of pedestrian spaces. The bike path will connect the new district library to Piazza Tirana, and will be the starting point of the connection object of competition in the north-east corner of the green area of Piazza Tirana. The square, as well as via Lodovico il Moro, is identified by the new PGT among the "**Pedestrian-oriented spaces** ". The same transformation of the disused railway area of San Cristoforo as the future Parco Lineare, will favour pedestrian and cycle mobility, reinforcing the axis already represented by the Alzaia del Naviglio Grande. In the pedestrian spaces, as well as in the **external external historical core** as the oldest knit work of Ronchetto sul Naviglio, the Administration plans protection and implementation of neighborhood enterprises, private services and administration enterprises placed on the public space . The redefinition of the relationship between the street and ground floors of the building fronts, in fact, is a central element of the promotion of pedestrian mobility.

10. Project rendering of the intervention on Via Segneri

A new cycle path shall be implemented in an east-west direction from via Enna to via Chiodi also in the district of Ronchetto, parallel to the planned motor road, which will connect to the Buccinasco cycle path. The connection scope of the competition shall connect to the above and shall constitute a new noth-south bike-pedestrian axis.



The new Enna-Chiodi road system

The interchange with private transport is supported by the provision of a new road system in the east-west direction called "Enna-Chiodi": in fact, it will connect via Enna, whose continuation to the west enters the Corsico area, via Chiodi. The new two-lane road in the direction of travel will lighten the traffic along via Lodovico il Moro and along the local roads of Ronchetto, facilitating entry into Milan for those arriving from the towns of Corsico and Buccinasco.

4. PROJECT THEMES

The project themes are mostly transversal to the various fields of competition, whether they are the subject of a technical-economic feasibility project or the drafting of Guidelines. Given the heterogeneity of the areas of competition, however, some general themes are declined and further specified according to the different project areas that are of interest.

[4.1] Relationship with the context

The intent of the designer shall provide a strong **architectural identity** to the project, which must be perceived as a unitary intervention and appear as an organic system. The new structures shall be inserted in a fluid manner into the urban landscape and be recognizable without being preponderant.

The designer is required to deal with the surroundings and build a significant relationship with the **elements of value of the context** (Naviglio, San Cristoforo station), harmoniously combining the historical elements with the contemporary ones. In this regard, a careful analysis of the context and, in particular, of the morpho-typological characters of the existing crossings along the Naviglio (see the attached study on "The Bridges of the Navigli of Milan") is essential. The CIPE Resolution No.10/17 states:

"Given the landscape interest in the area and the future construction of the Linear Park along the canal, it is essential to ensure that the new pedestrian and bicycle connection is designed with great design quality, preserving as much as possible the free space on the ground in the stretch between the railway and the Naviglio and adopting a compositional language, technical solutions and material that harmonize with the context of high environmental value and fit in with the design tradition of the historical structures on the Naviglio "

In landscape terms, the design of the new intervention shall be inserted and put in relation with the existing urban context. Materials, furnishings and plant species must be chosen in coordination with the existing, in order to guarantee **continuity** and coherence to the urban fabric. The choice of arboreal essences must be made taking into account the pre-existences in the surroundings in order to give continuity and recognition to the green areas and the avenues, and to create a "system" of public spaces.

SCOPE 1A: The design project must account for low impact and have a certain degree of momentum, considering the visual impact in all directions, as reported in the CIPE Resolution n.10/17:
"Considering the significant extension, and to avoid an excessive impact of the structure in the context, the new cycle bridge must be, to the extent possible, of low impact and of reduced height."
In order to provide a **low impact nature** to the aerial structure, the designers shall first limit the cross-section of the foot and cycle bridge as much as possible, through the choice of materials and construction details. The foot and cycle bridge shall also be imbued with a dynamism that, enriching the experience and enhancing its pleasure, is an "invitation" for citizens to walk the bridge, with the aim of increasing cycling and

walking, to the benefit of the landscape. These objectives must also be pursued by integrating the lighting element into the project. Particular attention must be paid to defining the vertical elements of connection between the parts of the work and the ground connection of the bridge.

[4.2] Urban quality

The designs shall be able to generate urban quality, proposing a clear and understandable urban design, optimal in the use of space, and identifying a hierarchy and a **strong characterization of spaces and paths**. The proposed design solutions shall guarantee the maximum liveability of the public space understood in the broadest meaning of the term, including public areas functional to mobility (stops, terminus, etc.). These too shall be designed paying particular attention to the quality of the space, with the aim of making the experience of those who use it rich, stimulating and safe.

SCOPE 1B / **SCOPE 2B**: The spaces must be designed in such a way as to allow numerous uses and methods of use. For example, participants are asked to deepen the relationship between spaces used for mobility and those used for parking, and on the concentration and expansion of the urban rhythm in relation to the liveability of the city. Specifically, alongside the functionalities related to mobility and interchange, the designs shall foresee the creation of places of “aggregation” along with those that provide opportunities for sociability. Furthermore, it is necessary to prefigure solutions that maximize the use of the spaces throughout the day, providing functions that are able to "activate" the space at different times.

SCOPE 2B: The **integration of multiple and different functions** is considered an important factor of urban quality. As already mentioned in chapter 3.1 "Vision for Milan 2030", participants can propose design concepts that enrich the functions related to transport with other urban functions. These should be chosen on the basis of the ability to create urban conditions in the area of interchange - such as density, attractiveness and liveliness of public space - and on the basis of potential synergies that can be established with interchange functions.

SCOPE 2A: When drafting the Guidelines for works in Piazza Tirana, an attempt shall be made to harmonize the functions present with the cycle-pedestrian viability of the bridge: however, the water basin on the north side of the park must be maintained, while the M4 work site area that currently hosts the dog park and playground shall be repositioned while maintaining the same dimension.

[4.3] Efficiency of the intermodal exchange

The participants shall assume as central theme that of the functionality of the intermodal exchange in the context, made of functional relationships and relationships with the landscape. The competition area south of the Naviglio, in fact, will be in effect the **"gateway" to the city** for those arriving from Corsico and Buccinasco. From this point of view, the interchange with the M4 underground station in the disused railway area of San Cristoforo is fundamental, and should be facilitated as much as possible, both through the cycle pathway and through the organization of the 2B interchange area: it should be taken into account that the main entry flows to the city will be vehicular - along the Enna-Chiodi - and those connected to the extra-urban buses. The location, therefore, of the depot areas of these flows (interchange parking on one side, and new bus stop on the other) must be considered in close relationship with the M4 terminus of San Cristoforo.

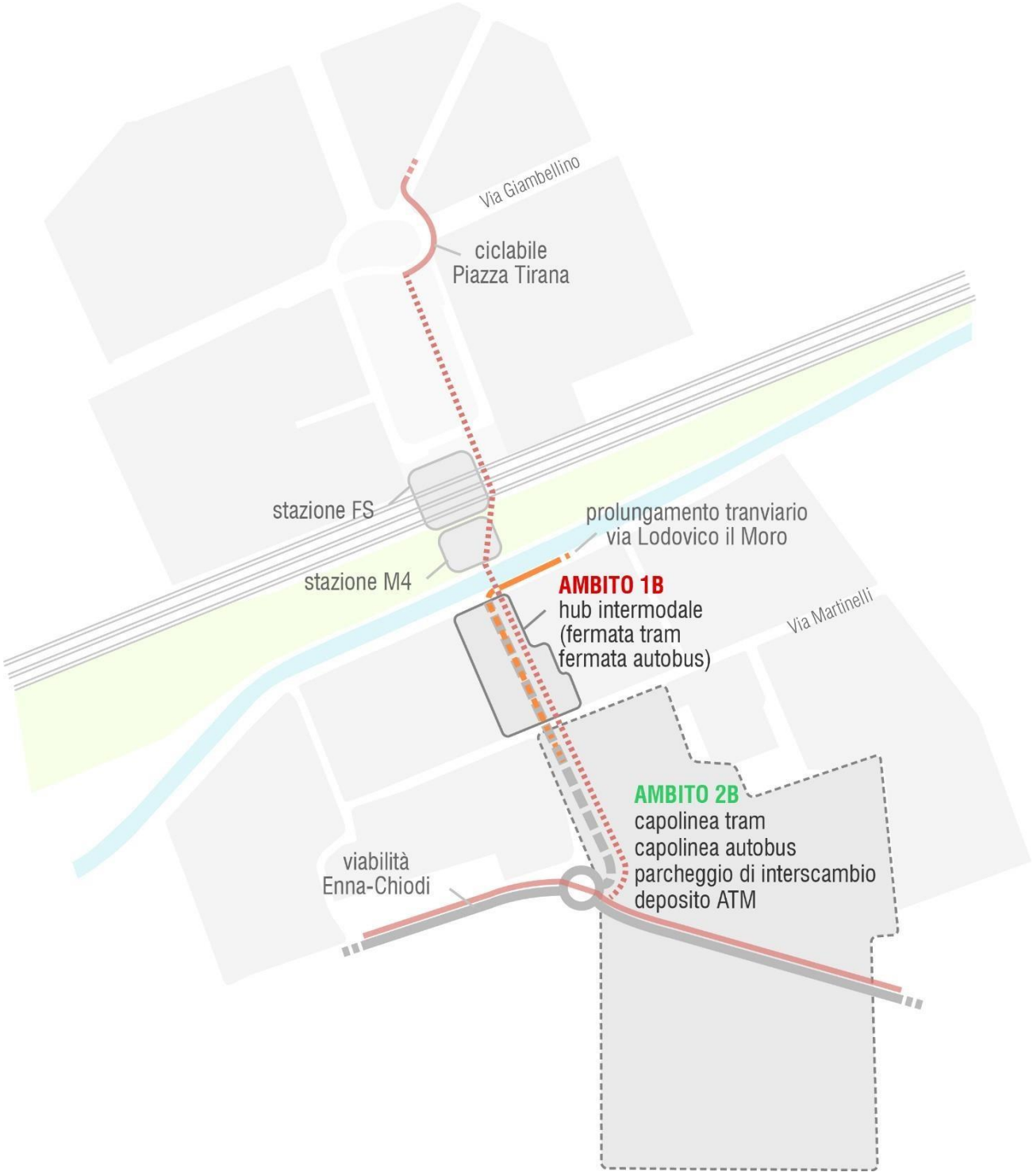
Continuity with the existing city, therefore, mainly resides in the organization of flows: instead of constituting an isolated and self-referential element, the cycle-pedestrian connection and above all the organization of the interchange area shall guarantee **streamlines movements** and maximum efficiency of interchange operations. In particular, it shall be necessary to limit the time required to change the manner of transport by shortening the distances between the access points to the amenities (terminus, stops, station entrances, landing of the ramps), in an attempt to pursue route rationalization.

> **SCOPE 1A**: The sections of the cycle-pedestrian connection at ground level must intercept the existing pedestrian and cycle paths. We recommend positioning the bicycle racks at the stairs and access elevators to the bridge in order to meet the needs of intermodal exchange of the area with the railway and underground lines.

Intermodal exchange must be able to be carried out easily and with the least number of operations (e.g. to assemble/dismount from the bicycle, etc.). The clarity and **legibility of the routes** shall be guaranteed so that users are able to orient themselves to carry out the interchange operations. Access points to transport services must be visible and perceivable from a suitable distance. Designers are also advised to organize activities in such a way as to minimize the need for road signs and signals.

> **SCOPE 2B**: The design of the interchange area shall conceive the areas related to the different modes of transport in a deeply **integrated vision**. Furthermore, in order to limit the total extension of the interchange area - with the relative consequences from the environmental-landscape point of view and on the time of interchange - the design can also implement a mix of different elements. The biggest challenge, however, is that the entire project cannot be executed simultaneously. Therefore, it will have to be designed, guaranteeing a certain level of flexibility and functional autonomy between the elements, in order to allow implementation in different phases. In this regard, we point out that the priority actions concern the functions most connected to the construction of the M4 metro line: the Enna-Chiodi road system, the interchange parking lot and the interventions connected to the suburban buses, whose

construction will end concurrently with the opening of the San Cristoforo M4 station scheduled for 2023.



San Cristoforo M4 station

SCOPE 1A: Between the railway tracks and the Naviglio, the M4 station of San Cristoforo shall be connected to the existing railway station and to its tracks by means of an underpass. Above ground, it must be connected to Piazza Tirana and via Lodovico il Moro through the cycle/pedestrian bridge that is scope of the competition (see Annex 3.5 "Flow table"). Clearly, the station must also be accessible from the linear park that will be developed in the disused railway area of San Cristoforo. As the M4 station sits at a lower height than ground level, participants are required to design a bike-walk entrance ramp, inclined such as to allow easy access while pushing bikes by hand, and which must lead from the level of the linear park to that of the underpass. The M4 station must allow ample and recognizable entrance, while not constituting an excessive element of impact and constraint for the design of the future linear park. Transition to the final and executive phase, however, requires comparison and integration of the descent to the underpass with the overall master plan of the linear park, which is scope of the competition established in parallel by the Municipality of Milan and the property of the area.

Tram stop and terminus

SCOPE 1B: The tramway route that runs along via Lodovico il Moro shall be extended and turn south in the new "intermodal hub" between via Lodovico il Moro and via Martinelli. The participants shall design a stop, which will allow exchange with the bicycle and pedestrian connection and the new bus stop [see next section].

SCOPE 2B: To the south of via Martinelli the tracks shall stretch up to the new terminus, from where the trams return to via Lodovico il Moro. A standard loop shall be implemented to change direction, an operation currently carried out in Piazza Negrelli.

- *A terminus must allow **2** trams to park at the same tim*

The possibility of inserting an overtaking track should also be verified, preferably by constructing a platform alongside each track.

Extra-urban bus stop and terminus

A new route will have to be planned, reserved only for buses and trams that connect Via Lodovico il Moro to their respective terminus.

- *The design must allow the transit of **12**- to **18**-meter buses.*

SCOPE 1B: In the area known as the "Intermodal Hub", the route shall integrate the same road network and tram layout in the same area. A stop must be planned here, to be integrated with the new tram stop in the same area: in order to

make the interchange for the user easy, the bus must be able to stop at the platform to be provided for the tram at the intersection with via Ludovico il Moro.

SCOPE 2B: A new bus terminus shall be constructed at the interchange area south of via Martinelli. Participants shall design it following the guidelines and implementing solutions that integrate functionality into complex structures.

- *The terminus design must include at least **4** bays*
- *The terminus bays shall allow parking of **two** 18m buses*

The new route for crossing the intermodal hub for buses and trams shall continue in the form of LTZ (Limited Traffic Zone) also south of Via Martinelli to serve the terminus and the interchange parking, until it reaches the project's new roundabout of the Enna-Chiodi road. It is therefore recommended to study the relationship between this – and the entire scope – with the cycle / pedestrian connection that is the scope of the technical-economic feasibility project.

Interchange parking

SCOPE 2B: Area 2B also includes the construction of a new interchange car park for private vehicles, which competitors shall design following the guidelines. The cycle/pedestrian connection that is the competition scope shall connect it directly to the M4 station of San Cristoforo, as well as to the tram and bus terminus. Parking is part of the 2018-2020 Triennial Public Works Plan.

- *The interchange parking lot shall allow parking for about **700** private vehicles.*

Participants are asked to propose solutions that take into account a potential increase in the number of car parks for vehicles in order to provide a response to a potential increase in parking demand, also through integration with other functions.

ATM electric deposit

SCOPE 2B: The infrastructural transformations in the Ronchetto area also include a new ATM depot, to be built by 2030. The deposit shall be organized in the area for the shelter of vehicles, recharge and workshop and will be "full electric", as part of the strategy of the Municipality of Milan to convert the current fleet to electric-powered vehicles.

- *The ATM depot shall allow for parking and charging of **200** buses.*

The Guidelines proposed by the participants shall pay particular attention to the relationship with the context and conceive a structure integrated with the landscape to the extent possible, exploring design solutions that innovatively handle some aspects that can contribute to this objective, such as the theme of roofing or topography (note that part of the area is located at a lower level than the constructed city).

[4.4] Connection as an environmental infrastructure

The project must occupy the least amount of free land possible, while focusing on multifunctionality, through the limitation of the overall dimensions on the ground, etc.

> **SCOPE 1A:** In particular - at the San Cristoforo stop - participants shall design the entrance to the subway underpass, in addition to the walkway with its vertical connections and supporting structures, integrated with the green areas and not excessively impacting the **future Linear Park**. The maximum permeability of open spaces shall be guaranteed, especially in the longitudinal direction, in order to safeguard the continuity of the paths, of the green spaces and of the views of the future park.

The entire project scope, developing linearly in a north-south direction, can be a connecting element between the green axis of Via Inganni-Piazza Tirana, the naturalistic oasis that may arise in the disused railway areas of San Cristoforo and the Parco Agricolo Sud, which extends south of the interchange area. The participants shall make efforts to reinforce this direct relationship between city and countryside, emphasizing the **"gateway" function of the Parco Agricolo Sud**. In general, the design hypotheses shall consider the physical and visual permeability towards the open spaces beyond the city, enhancing the views and the entrances to the Park. An entry guideline that should be enhanced by the proposals is the one that follows the course

of the Carleschina canal, which flows in a north-south direction. The canal should be considered as a possible element of valorisation of the project and above all of the cycle-pedestrian routes.

> **SCOPE 2B:** In drafting the Guidelines for the extension of the cycle-pedestrian connection south of the Enna-Chiodi, we recommend taking into account also the existing inter-estate routes and in particular the historical-landscape interest represented by via Valpolicella-via Bardolino axis, which in the south the project scope is linked to the course of the Carleschina canal and, continuing south-east, extends to connect to the Naviglio Pavese (please refer to Annex 6.1 "Il sistema del verde" (The Green System)). The projects, therefore, shall emphasize the symbolic and functional value of this guideline, accentuating its landscape value with specific design solutions.

This landscape value axis can also assume an important environmental value as it lies in a transverse direction with respect to the major existing and future barrier elements of the ecological network (railway, Naviglio, Enna-Chiodi). Especially in design

of the intermodal hub and in the drafting of the Guidelines for the interchange area, therefore, the presence of the natural element, and of the green areas with characteristics of effective filterability, shall also be maximized, also with a view to limiting the phenomenon of the islands of heat. The design of the green area, in fact, must be conceived from a multifunctional point of view typical of *nature-based solutions*. **Continuity shall also be given to the green areas** and the rows avoiding excessive fragmentation, in order to create a system that is as unitary and connected as possible. This strategy shall also be adopted by the designers in order to promote biodiversity - especially plant life, avifauna and entomofauna - which will increase with the creation of the Linear Park in the disused railway area of San Cristoforo. The projects shall provide a differentiation of the types of green areas, alternating trees, shrubs, herbaceous plants, etc., with an eye for potential benefits to biodiversity (shelter for nesting, winter trophic opportunities, etc.).

In the design of green areas and in general public spaces, the approach described in the "Green Rails" study should be taken into account, aimed at creating new integrated ecological connections, both in the east-west and north-south directions. Even the structures should be as consistent as possible with the approach described by the ecological network study, oriented towards the integration between natural and artificial elements (see the attached Green Rails Study).

> **SCOPE 2A:** In the design of the landing of the connecting bridge in Piazza Tirana, and in the definition of the guidelines for the redevelopment of the square, it shall be necessary to take into account the existing trees, safeguarding those that are especially large and of significant aesthetic quality (please refer to Annex 6.3 “Tavola unione generale del verde” (General green union table)).

[4.5] Architectural quality, materials and finishes

Architectural solutions must be durable and functional. Both **functional and aesthetic values and economic implications** shall be carefully evaluated. Competitors must pay particular attention to the constructive quality of the designed works, also through the design of innovative construction solutions, whose technical and economic feasibility must in any case be guaranteed. Furthermore, the design solutions shall be able to wisely integrate the plant equipment (lighting, drainage, etc.), with a view to integrated design.

The choice of materials and finishes must take into account the **perceptual experience** linked to the use of the new cycle paths and the interchange hub. Designers shall have an eye for the properties of materials such as colour and surface characteristics, how they react to light, the sound emitted by touch and impact or foot traffic.

In addition to the possibility of satisfying the structural requirements better specified in the "Constraints" section, the designers shall be required to evaluate the materials and construction technologies according to costs, construction time, durability and environmental sustainability, including maintenance operations. The choice of materials should be oriented according to the criterion of minimizing the environmental impact

with regard to production, transport, construction process, but also the entire useful life of manufactured goods, with a view to sustainability and circularity.

It is necessary to carefully consider the preparation of the structures to be maintained, so that they remain "as new" as long as possible, discouraging, for example, acts of vandalism. Therefore, it is necessary to evaluate the methods of ageing, resistance to abrasion and use. In particular, the public green areas, the finishes, the construction details and the types of materials proposed concerning furnishings, flooring and so on, shall comply with the provisions of the Green Area, Agriculture and Urban Furniture (see Annex 6.2), so that the **maintenance** of the same is easy to manage, with costs consistent with the standards of the Administration. In fact, in order to reduce the total cost of the work, including maintenance costs and disposal costs for end-of-life components, long-lasting, easily replaceable materials that do not pose problems of disposal or toxicity during the year are preferable and that, finally, do not require long installation times.

> **SCOPE 1A**: For the possible use of wooden components, the use of plywood and lamellar is to be avoided, to use wood suitable for outdoor use as naturally impregnated (e.g. larch, teak) as well as to limit the possible use to the sun secondary structures.

It is recommended to consider the compositional choices also according to the impacts produced by **the construction phase** on the city's functionalities, and any additional costs that these may produce. We recommend providing further details to the project proposals indicating a possible organization of the implementation phases.

The technical-economic feasibility project will have to demonstrate the compatibility of the construction time of the path with the M4 times, so the construction of this work will not last more than **18 months** taking into account the constructional complexities due to the rail crossing (with possible subjection to use) and to the presence of the Naviglio, etc..

5. CONSTRAINTS

[5.1] Environmental constraints

The section of the competition scope closest to the Naviglio is subject to **landscape constraints** , being classified among the "Complexes of immovable things that make up a characteristic appearance having aesthetic and traditional value, including the historical centres and aggregation", according to Article 136.1.c of the Code of Cultural Heritage and Landscape. In addition, the Naviglio Grande is subject to protection as it an open urban space of historical and artistic interest. Therefore, after the competition and prior to the approval of the project, an interaction with the Soprintendenza Archeologia (Archaeology Heritage Department), Belle Arti e Paesaggio per la Città Metropolitana di Milan (Art and Landscape Heritage Department for the City of Milan) and with the Commissione per il Paesaggio del Comune di Milan (Landscape Committe for the City of Milan) shall be necessary, in order to acquire the Landscape Authorization, pursuant to Article 146 of Legislative Decree 22 January 2004, n. 42 and subsequent amendments and additions.

Competitors shall take into consideration the constraints related to the hydraulic and environmental protection of the **Reticolo Idrico Minore** (Minor Water Network). In particular, a 4 m strip of respect must be considered for the Carleschina canal (Article 22.2 of the NdA of the PdR). Also along the dculverted sections, the buffer zone corresponds to 4 m to be measured from the external profile of the building (Article 22.6 of the NdA of the PdR). The buffer zones shall allow no building of any kind or earth movements. Green area, public or private, and the equipment connected to it, as long as it is removable, are allowed.

[5.2] Infrastructure and interference constraints

SCOPE 1A: *Cycle and pedestrian bridges and vertical connecting elements*

• access to the cycle and pedestrian bridges shall be via fixed staircases and 2 elevators of the dimensions suitable for transporting bicycles (lift section 2.75 x 2.55 m): in particular two elevators and a fixed staircase must be provided in the area called "intermodal hub", two elevators and fixed staircase in the area of the future "Linear Park" (the position of the two elevators is in this case fixed and binding as they are included in the works of the M4 station), two elevators and a fixed staircase in Piazza Tirana;

• access will also be via cycle ramps (or cycle paths): the first shall allow access from Piazza Tirana and will have to connect with the future cycle path of via Segneri/Tirana; the placement of the ramp in the square must safeguard the existing trees as much as possible according to the instructions contained in Annex 6.3; the second will connect the footbridge to the existing cycle path that runs along the Naviglio (Alzaia Naviglio Grande) and the third will allow access from via Martinelli.

• the work must develop entirely within the perimeter of the maximum water line (see Annex 7.1) bearing in mind that no ground support elements must be placed in the railway instrumental areas owned by the Italian Railway Network

(RFI), in correspondence with the Naviglio, the Alzaia and via Ludovico il Moro, as well as in correspondence with the outline of the more superficial M4 works.

• the M4 works indicated in the reference table (see Annex 7.1) as underground works (station and M4 buildings) and deep underground works (M4 tunnels) shall be considered as pre-existing;

• the surface constraints deriving from M4 works such as grids at the level of the countryside or torrents and emergencies that exceed the ground level as specified in the detailed drawings (see Annexes 7.2.1, 7.2.2, 7.2.3);

• in the areas identified in Annex 7.1 "Table of constraints" such as A, B, C it is not possible to place piles or support elements on the ground;

• the intrados of the overpass structure, in correspondence with the streets of via Ludovico il Moro and piazza Tirana, cannot be less than 6 m; at the RFI rails, the intrados can not be less than 7.5 m;

• the block consisting of the two elevators placed at the station M4 is fixed and shall link the atrium of the same station at an altitude of 107.87, the campaign plan of the future linear park and the share of the walkway;

• the width of the connecting bridge and its ramps must be at least 4 m; it should be noted that this width can be considered among the most efficient in relation to the relationship between cost and functionality;

• the curvature radii along the paths must be, on the inner side of the curve, no less than 15 m;

• at the branch point the ramp sections shall be connected to each other with curvature radius of at least 6 m;

• the starting point of the slope of the ramp that starts from via Martinelli must be spaced from the sidewalks with a flat section of at least 5 m;

• vertical circular joints must be guaranteed between the levels as wide as possible and in any case with a radius such that the development of the joint is not less than 4 m;

• the three starting points of the ramps shall be appropriately connected to the road network through cycle paths with a useful width of at least 4 m, a longitudinal slope equal to or less than 8% and a transversal slope of less than 1%: these geometric characteristics must be maintained also in the sections of the sloped tracks with the road level (slopes);

• the space below the ramps shall not be accessible at least up to the point where the intrados of the structure are 210 cm from the ground if in a green area, 250 cm if in a paved area;

• the paving and the decking of the ramp sections in the viaduct may be permeable to rainwater, for example by using "open" type boards; the flooring must in any case guarantee high adhesion even in case of rain (given the coexistence of the cycling function, a coefficient of 0.65 is to be measured with the chosen method), especially in the sloping and curving sections;

• the connecting bridge shall also be tested also under the vibrational aspect, both in order to avoid excessive elastic oscillations in normal conditions and to prevent the occasional and dangerous resonance phenomena that have occurred in some connecting bridges constructed abroad. "Human comfort" - the wellbeing and comfort of pedestrians - shall be guaranteed by ensuring that the possible deformations and vibrations of the structure, caused both by the dynamic excitations induced by the wind and by those transitory of the pedestrians, remain within human tolerance, i.e. frequencies sufficiently far from annoying frequencies perceived by users (4.2.4.2.4 NTC 2008).

SCOPE 1A: *Connection between the M4 station underpass and future linear park*

The transition from the ground level to that of the underpass of the M4 station had already been studied in order to comply with the Regulations and Recommendations formulated by the CIPE with Resolution 66/2013 as illustrated in attached document no. 5.4. This document illustrates the evolution of the solutions (2015 and 2016) studied for the connection between the M4 station atrium floor and the future linear park, to be considered in view of a further improvement in terms of landscape, architecture and integration of all context-relevant works.

• the entrance descent to the underpass must be accessible by people with reduced mobility.

SCOPE 1B / SCOPE 2B: *ZTL routes, trams and buses*

The connection Ludovico il Moro - Martinelli - roundabout of the Enna-Chiodi new road shall be realized in dimensions corresponding to the norm relating to the class F roads with transit of local public transport (Ministerial Decree N. 6792 dated 05/11/2001 and following amendments and implementations). The connection must be such as to have the geometric characteristics and structural arrangements to be regulated on the road reserved for public transport pursuant to Legislative Decree 30 April 1992 n. 285 and following amendments and implementations (Highway Code) with electronic access control.

The transit of the tramway line in mixed areas shall provide for tracks compatible with the aforementioned road classification and ensure the presence of stopping platforms for the ascent and descent of passengers, in compliance with the current regulations concerning tramway traffic and overcoming of architectural barriers. The stops shall all be accessible by persons with reduced mobility and/or blind people, therefore equipped with specific signs and having dimensions suitable for the exit of baby carriages from the vehicle.

As regards the planning of the tram route, the following main indications shall be observed, without prejudice to the provisions of current regulations:

- minimum radius: at least 25 m at the terminus, 30 m in line;
- mixed bus + tram platform length: 40 m;
- tramway length: 35 m, useful width: at least 2.60 m, height: 22 cm;
- length of the tramway terminus: 70 m;
- distance from the edge of the platform to the railway axis: 1.33 m;
- minimum distance between the head of the platform and the beginning of the curve: at least 5 m;
- Reference standard for distances from fixed obstacles: UNI 7156.

6. SUMMARY: DESIGN REQUIREMENTS AND CONSTRAINTS

REQUIREMENTS	MAIN CONSTRAINTS
SCOPE 1A - TECHNICAL-ECONOMIC FEASIBILITY	-Existing trees
I. PIAZZA TIRANA	- Existing water basin
- Cycle and pedestrian route on the cycle path planned in Piazza Tirana	-Cycle path design
- Ramp of Piazza Tirana-cycle-pedestrian connecting bridge	-Max. slope of 8% -Intrados height of the connecting bridge on the road: min. 6 m
II. PIAZZA TIRANA | SAN CRISTOFORO STATION	
- Vertical connection core to the catwalk (two elevators and stairway)	-Intrados height of fly-over on rail: min. 7.5 m
- Railway fly-over	
III. ALZAIA NAVIGLIO GRANDE	
- Cycle and pedestrian ramp / bike connecting bridge-Alzaia Naviglio Grande	-Max. slope of 8%
IV. STATION M4	
- Connection to existing vertical core connection (two elevators and stairs)	-Position and dimension of elevator block
V. M4 STATION | UNDERPASS ENTRANCE	
- Connection of the M4 underpass-ground level	-accessibility for physically impaired persons
- Stairs connecting M4 underpass floor-ground level	
- M4 Station entrance	-M4 station design infrastructure
- Naviglio and via Lodovico il Moro fly-over	- Bridge intrados height: min. 6 m
VI. MARTINELLI INTERMODAL HUB	-Carleschina Roggia
- Cycle and pedestrian ramp connecting the intermodal hub-connecting bridge	-Max. slope of 8%
- Vertical connection to the connecting bridge (two elevators and stairway) at via Lodovico il Moro	
SCOPE 1B - TECHNICAL-ECONOMIC FEASIBILITY	- Bus length of 18 m
- Mixed bus-tram traffic connection via Lodovico il Moro-via Martinelli	- UNI 7156 and UNI 8379 standards
- Bus stop	-Carleschina Roggia
- Tram stop	
SCOPE 1C - TECHNICAL-ECONOMIC FEASIBILITY	-Enna-Chiodi Route
- Cycle and pedestrian connection of the intermodal hub - bus terminus - tram terminus - interchange parking area - Enna - Chiodi cycle path	-Carleschina Roggia

2A SCOPE - GUIDELINES

- Works in Piazza Tirana

-Existing trees
- Existing water basin
-Cycle path design

SCOPE 2B - GUIDELINES

- Bus terminus: 8 bus parking lot
- Tram terminus: 2 tram capacity
- Interchange parking: 700 parking spaces
- Limited traffic zone connecting via Martinelli - bus terminus - interchange parking - Enna Chiodi road
- ATM electric bus depot: > 200 buses

- Bus length of 18 m
- UNI 7156 and UNI 8379 standards
-Carleschina Roggia

7. FEE CALCULATION

[7.1] Financial limits to be respected

The maximum total cost of the works relating to the Scopes 1A, 1B and 1C is set at € 13,947,000.00 divided into the following amounts:

- Scope 1A: the cost of the works shall be a maximum of € 12,000,000.00 (excluding VAT). This amount includes, in addition to the costs of the work for the construction of the work, all the costs of construction, preparation, eventual subjection to traffic (rail and road) to provide the finished and complete work. It is also considered a design constraint and is covered in the economic analysis of the M4 work. The external safety burdens and other necessary burdens will be charged separately and will also be covered by the M4 economic analysis.

- Scope 1B and 1C: the cost of realization of the works must be a maximum of **€ 1,947,000.00** (VAT excluded); external security charges and other necessary charges will be assessed separately. These amounts shall be covered by loans to be borne by the Municipality of Milan.

[7.2] Procedure adopted for the calculation of the tender starting bid

The consideration, consisting of the remuneration and the accessory expenses and charges, was determined on the basis of the professional services relating to the aforementioned services and applying the following general parameters for the determination of the remuneration (as required by Ministerial Decree 17/06/2016):

a. parameter «**V**», given by the cost of the individual categories making up the work;
b. parameter «**G**», relating to the complexity of the service;
c. parameter «**Q**», related to the specificity of the service;
d. basic parameter «**P**», which is applied to the economic cost of the individual categories making up the work.

The «**CP**» fee, with reference to the parameters indicated, is determined by the sum of the products between the cost of the individual component categories of the «**V**» work, the «**G**» parameter corresponding to the degree of complexity of the services, the «**Q**» parameter corresponding to the specificity of the service distinct according to the individual component categories of the work and the basic parameter «**P»**, according to the following expression:

$$CP = \sum(V \times G \times Q \times P)$$

The amount of expenses and ancillary charges is calculated on a flat-rate basis; for works up to € 1,000,000.00 is determined no more than 25% of the fee; for works of an amount equal to or greater than € 25,000,000.00 is determined no more than 10% of the fee; for works of an intermediate amount to a maximum percentage determined by linear interpolation.

[7.3] Economic framework and calculation parameters

WORK CATEGORIES	ID. WORKS		Degree of Complexity <<**G**>>	Cost Categories (€) <<**V**>>	Basic parameters <<**P**>>
	Code	Description			
BUILDING	E.18	*Furnishings with elements purchased from the market,* *Gardens, playgrounds, squares and public outdoor spaces* *List: connecting bridge (by analogy)*	0.95	12,000,000.00	4.473423 1900%
INFRASTRUCTURE FOR MOBILITY	V.02	*Roads, tramways, railways, railways, ordinary, excluding works of art to be offset separately - Cycle paths* *Distinct: road + sidewalks + curbs*	0.45	125,000.00	12.14610 10400%
INFRASTRUCTURE FOR MOBILITY	V.02	*Roads, tramways, railways, railways, ordinary, excluding works of art to be offset separately - Cycle paths* *Bill: loges paths*	0.45	17,000.00	20.41101 12700%
INFRASTRUCTURE FOR MOBILITY	V.02	*Roads, tramways, railways, railways, ordinary, excluding works of art to be offset separately - Cycle paths* *Bill: two TPL stops (works)*	0.45	50,000.00	16.19507 91100%
INFRASTRUCTURE FOR MOBILITY	V.02	*Roads, tramways, railways, railways, ordinary, excluding works of art to be offset separately - Cycle paths* *Bill: cycle path*	0.45	110,000.00	12.62593 50300%
BUILDING	E.17	*Green and urban furniture works marked by great simplicity, related to buildings and traffic, Campsites and the like* *Bill: bike racks*	0.65	7,000.00	20.41101 12700%
BUILDING	E.19	*Furnishings with singular elements, urban parks, equipped play parks, historic gardens and squares, landscaping and environmental redevelopment works in urban areas.* *Bill: urban area arrangement*	1.20	1,600,000.00	6.298769 7800%
INSTALLATIONS	IB.08	*Plants of lines and networks for transmissions and* *distribution of electricity, telegraphy, telephony.* *Bill: public lighting*	0.50	20,000.00	20.41101 12700%
HYDRAULIC	D.04	*Plants for supply, pipeline, water distribution, characterized by great simplicity - Urban sewages characterized by great simplicity - Underwater pipelines in general, methane pipelines and gas pipelines, of an ordinary type* *Bill: street sewers*	0.65	18,000.00	20.41101 12700%

Total cost of the work **€ 13,947,000.00**

Lump-sum percentage expenditure **16.91%**

[7.4] Economic statement of the overall service charges

1. **TECHNICAL AND ECONOMIC FEASIBILITY DESIGN** of: Scope

   1A - BIKE-FOOT CONNECTING BRIDGE

   Scope 1B - INTERMODAL HUB

   Scope 1C - BIKE-FOOT CONNECTING PATH

Professional fees normal services including expenses (Tab. Z-2 and art. 5 of the Ministerial Decree 17/06/2016)	€.	122,062.70 +
Supplementary services and services including ancillary expenses and charges (Article 6 DM 17/06/2016 by analogy, paragraph 1, or on the basis of time spent, paragraph 2)	€.	0.00 =
Total net overall charges for services	€.	**122,062.70 +**
INARCASSA contribution (4%)	€.	4,882.51 =
Taxable VAT	€.	**126,945.21 +**
VAT (22%)	€.	27,927.95 =
Total gross overall charges for services	€.	**154,873.15**

2. Assignment of ***"INTEGRATION AND COORDINATION OF THE DESIGN"*** for the development of the **DEFINITIVE** and **EXECUTIVE PROJECT** of the CONNECTING BRIDGE (Scope 1A)

Professional fees normal services including expenses (Tab. Z-2 and art. 5 of the Ministerial Decree 17/06/2016)	€.	155,011.12 +
Supplementary services and services including ancillary expenses and charges (Article 6 DM 17/06/2016 by analogy, paragraph 1, or on the basis of time spent, paragraph 2)	€.	0.00 =
Total net overall charges for services	€.	**155,011.12 +**
INARCASSA contribution (4%)	€.	6,200.44 =
Taxable VAT	€.	**161,211.56 +**
VAT (22%)	€.	35,466.54 =
Total gross overall charges for services	€.	**196,678.11**

3. Assignment of **DEFINITIVE** and **EXECUTIVE** DESIGN of the INTERMODAL HUB (Scope 1B) and of the ground BIKE-FOOT CONNECTING PATH - (Scope 1C).

Professional fees normal services including expenses (Tab. Z-2 and art. 5 of the Ministerial Decree 17/06/2016)	€.	149,313.82 +
Supplementary services and services including ancillary expenses and charges (Article 6 DM 17/06/2016 by analogy, paragraph 1, or on the basis of time spent, paragraph 2)	€.	0.00 =
Total net overall charges for services	€.	**149,313.82 +**
INARCASSA contribution (4%)	€.	5,972.55 =
Taxable VAT	€.	**155,286.37 +**
VAT (22%)	€.	34,163.00 =
Total gross overall charges for services	€.	**189,449.37**

8. REFERENCE REGULATION FRAMEWORK

Without prejudice to the designer's responsibility for complying with the applicable legislation in force, the following are only a few examples:

1) "Technical specifications for structural design - criteria and requirements" Metropolitana Milanese Spa;

2) RFI DTC INC PO SP IFS 002 A - "Specific for the design and execution of overpasses and pedestrian walkways on the railway site";

3) RFI Civil Engineering Design Manual;

4) RFI General technical contract for civil works;

5) Standard UNI 7156 fast trams and tramways minimum distances of fixed obstacles from rolling stock and space between railway tracks;

6) Standard UNI 8379 system on rails;

7) Standard UNI 7744 corridors, fixed stairs, escalators and elevators in stations;

8) Standard UNI 11168 -1 accessibility of people to mass rapid transport systems.

For all topics not covered in the above regulations or, where necessary, to supplement these, reference should be made to the provisions in the EUROCODES