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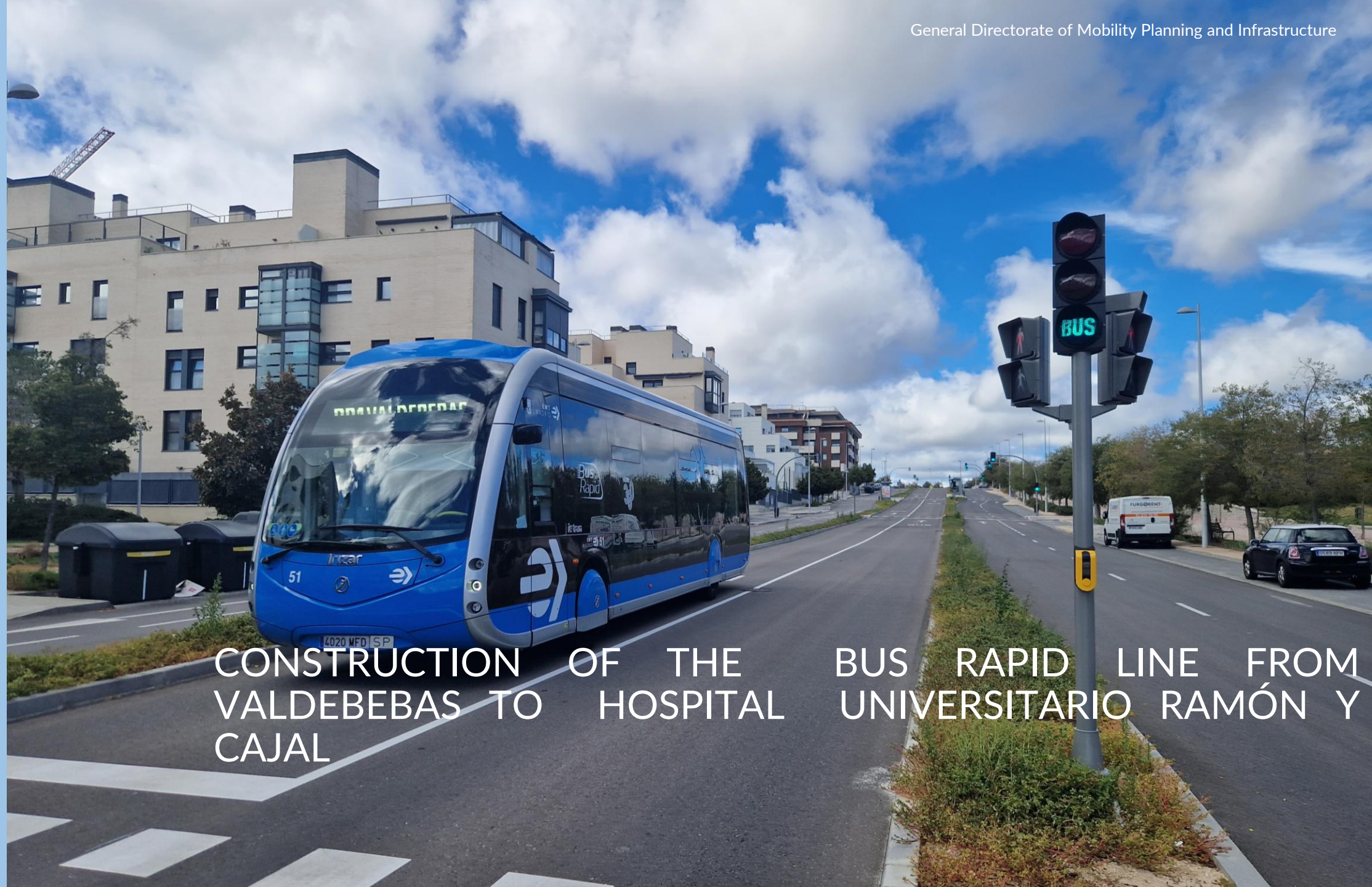

CONSTRUCTION OF THE BUS RAPID LINE FROM VALDEBEBAS TO HOSPITAL UNIVERSITARIO RAMÓN Y CAJAL

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CONSTRUCTION OF THE RAPID BUS LINE FROM VALDEBEBAS TO HOSPITAL UNIVERSITARIO RAMÓN Y CAJAL

GENERAL INFORMATION

OBJECTIVE

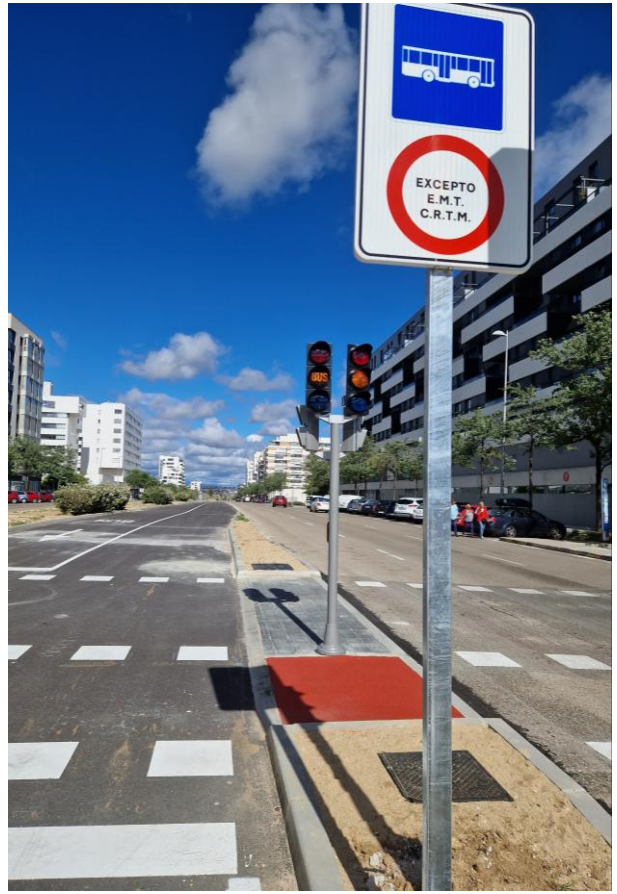
Connect the residential areas in Valdebebas and Sanchinarro directly to the Hospital Ramón y Cajal

ITINERARY

The first RAPID BUS of Madrid links Valdebebas, the Hospital Enfermera Isabel Zendal, Sanchinarro and the Hospital Ramón y Cajal in only 30 minutes

BASIC DATA OF THE CONSTRUCTION

- Start of the construction: 10/01/2023
- Implementation period: 8 months
- Allocated budget: 12.859.944,19 €



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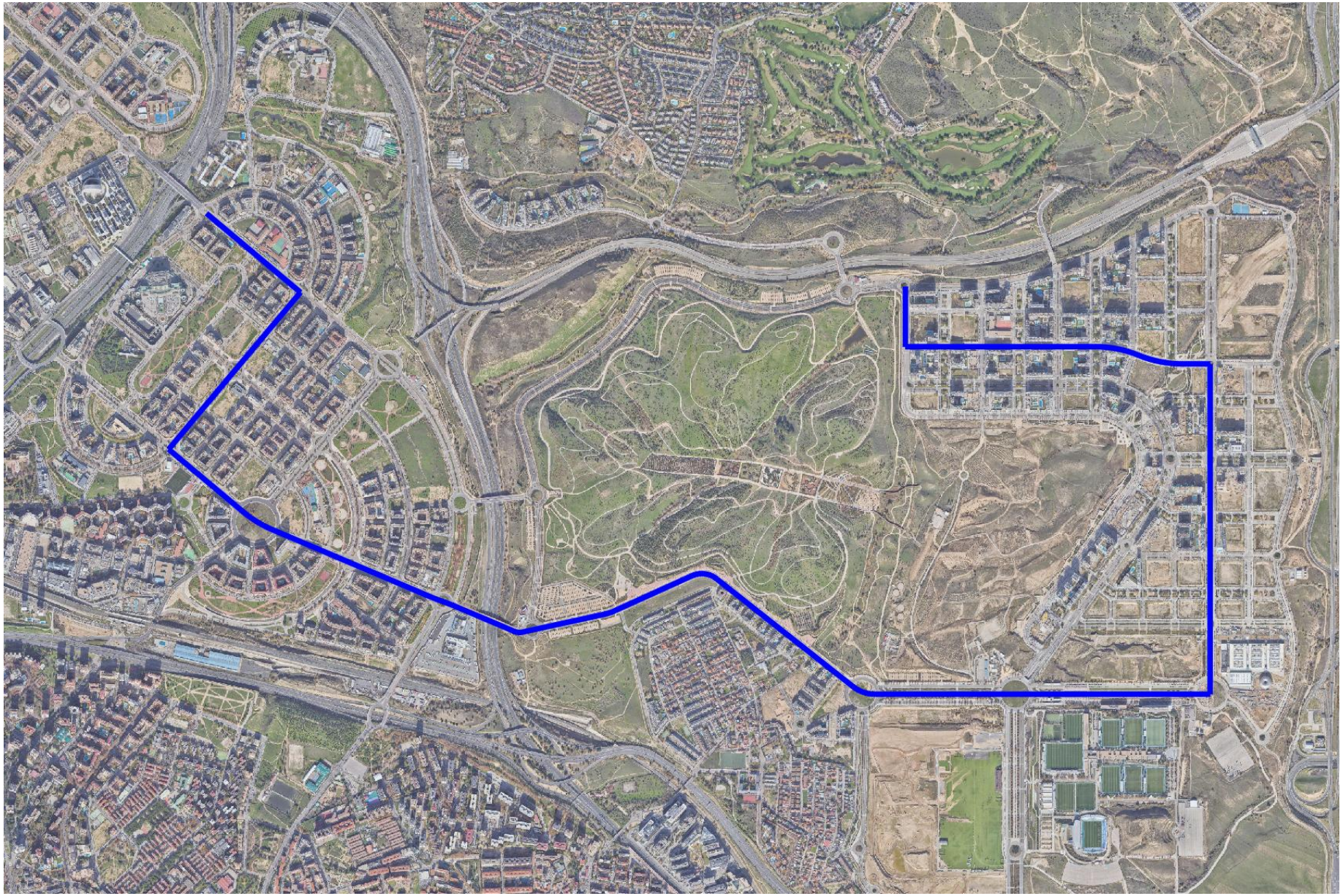
AREA OF INTERVENTION

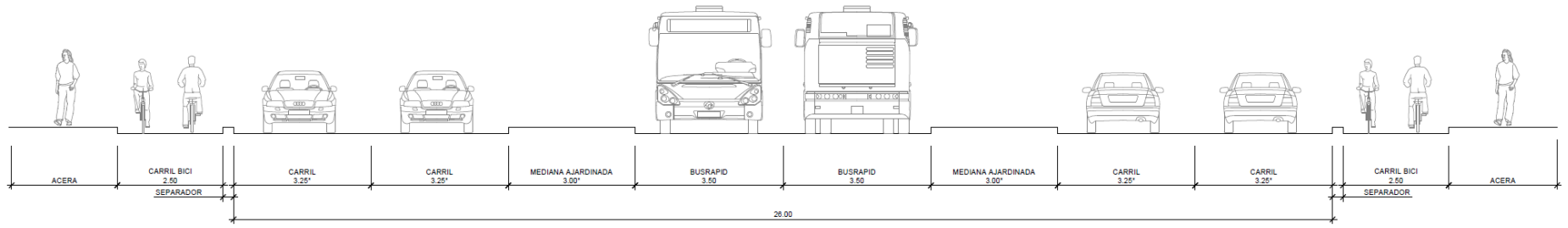


TYPE OF ROAD DESIGN

Considering the type of road section existing previous to the construction, the interventions can be summarized in one of the following groups:

- Complete construction of a new segregated platform for the bus in those roads that at the moment are made up of a vegetated central reservation area or are vegetated roundabouts where continuity could be given to the bus. Ex.: Avda. de Secundino Suazo, Avda. de Manuel Fraga e Iribarne y Avda. de las Fuerzas Armadas

TRAMO 2
SECCIÓN ACTUAL
ESCALA 1/100

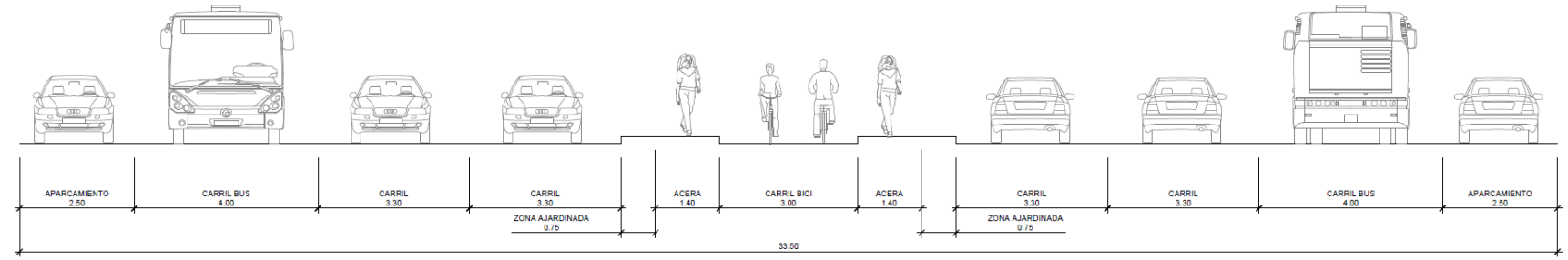


* EN LAS ZONAS EN LAS QUE SE UBIQUEN LOS ANDENES DE PARADA SE REDUCIRÁ LA ANCHURA DE LOS CARRILES A 3.20 m, CONTANDO ASÍ CON 3.10 m LIBRES EN LA MEDIANA AJARDIANADA

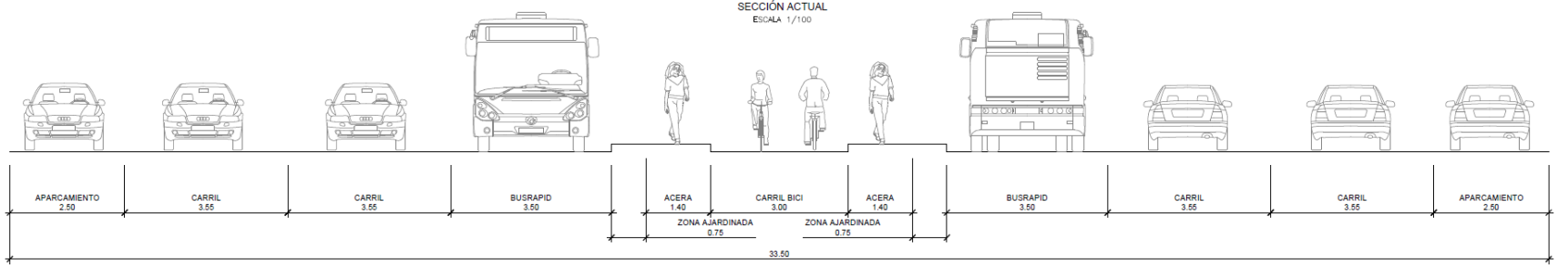
TRAMO 2
SECCIÓN PROYECTADA
ESCALA 1/100

TYPOLOGY OF THE LAYOUT

- Acommodation of the RAPID BUS platform in the existing road space through re-distribution of the lanes. Ex.: throughout Sanchinarro neighbourhood and in María de las Mercedes de Borbón Street in Valdebebas neighbourhood.



TRAMO 13
SECCIÓN ACTUAL
ESCALA 1/100



TRAMO 13
SECCIÓN PROYECTADA
ESCALA 1/100

TYPE OF ROAD DESIGN

- Segregated platform

- Platform in existing road space

TO HIGHLIGHT

- The itinerary is attributed priority in junctions managed by traffic light systems to reduce the travel time of the RAPID BUS
- The intervention touched 68 crossings and 390 sensors have been installed to manage the RAPID BUS priority. Each bus has a beacon to signal to the 167 spirals in the pavement in order to initiate the priority process.
- 40 new crossings with traffic light. Management on top of placing traffic lights at all pedestrian crossings to significantly improve road safety for pedestrians.
- Displacement of pedestrian crossings towards the centre of the road section to reduce the time needed to cross and thereby increasing the pedestrians' safety
- Programming acoustic messengers to reduce the annoyance perceived by the neighbours. Activation through an application.
- Calming traffic which results in higher road safety
- Moderate curves and ease the access to lanes in multiple locations (Ana de Austria, Pi y Margall) to facilitate the access of buses and private vehicles

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RAPID BUS LINE

BUS LINE INFORMATION

STOPS

19 intermediate stops and 2 terminal stops: one in Valdebebas and the other one in Ramón y Cajal. 13 stops have installed information panels.

LENGTH

31 kilometres
- 14,8 kilometres in direction Hospital Ramón y Cajal
- 16,1 kilometres in direction Valdebebas

INNOVATION

19 kilometres on a segregated platform (located with priority in centre of the road to prevent conflict points with other vehicles). The itinerary is attributed priority in junctions managed by traffic light systems.

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INTINERARY RAPID BUS

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BUS DOCKS

38 new docks (19 per direction) with shelters that contain the information of the RAPID BUS line, ticketing machines, night lighting, and LED service indicators.

In Sanchinarro, taking into account that the bus will circulate on the left side of the road the intervention made sure to foresee stopping platforms on the right side of this lane separating it from the rest of the traffic lanes in these sections.

BUSES

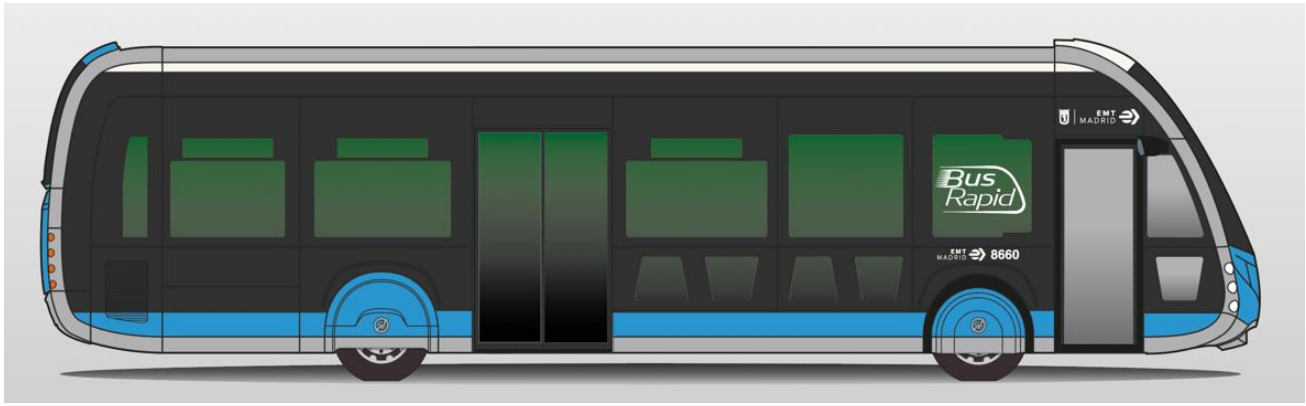
CHARACTERISTICS

100% electric – zero emissions – bus whose design shows similarities with that of a tram/light rail to give passengers a higher level of comfort.

Unique design that combines the characteristics of tram and the flexibility of a bus.

The rearview mirrors have been replaced by cameras that show the images on two screens located in the interior of the vehicle on each side of the driver.

Capacity for up to 100 passengers



P OINTS OF SALE

NEW TICKET MACHINES IN BUS STOP

With the aim of facilitating the process of getting on the bus.
The sale of tickets will be in the tickets machines, so the driver don´t waste time.
21 ticket machines have been installed at the stops.

Tickets are valid for both directions

The machines have solar panels so they are not required to be connected to the electricity network

4G Communication

Payment by credit card or cash

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TRAFFIC LIGHT SYSTEM

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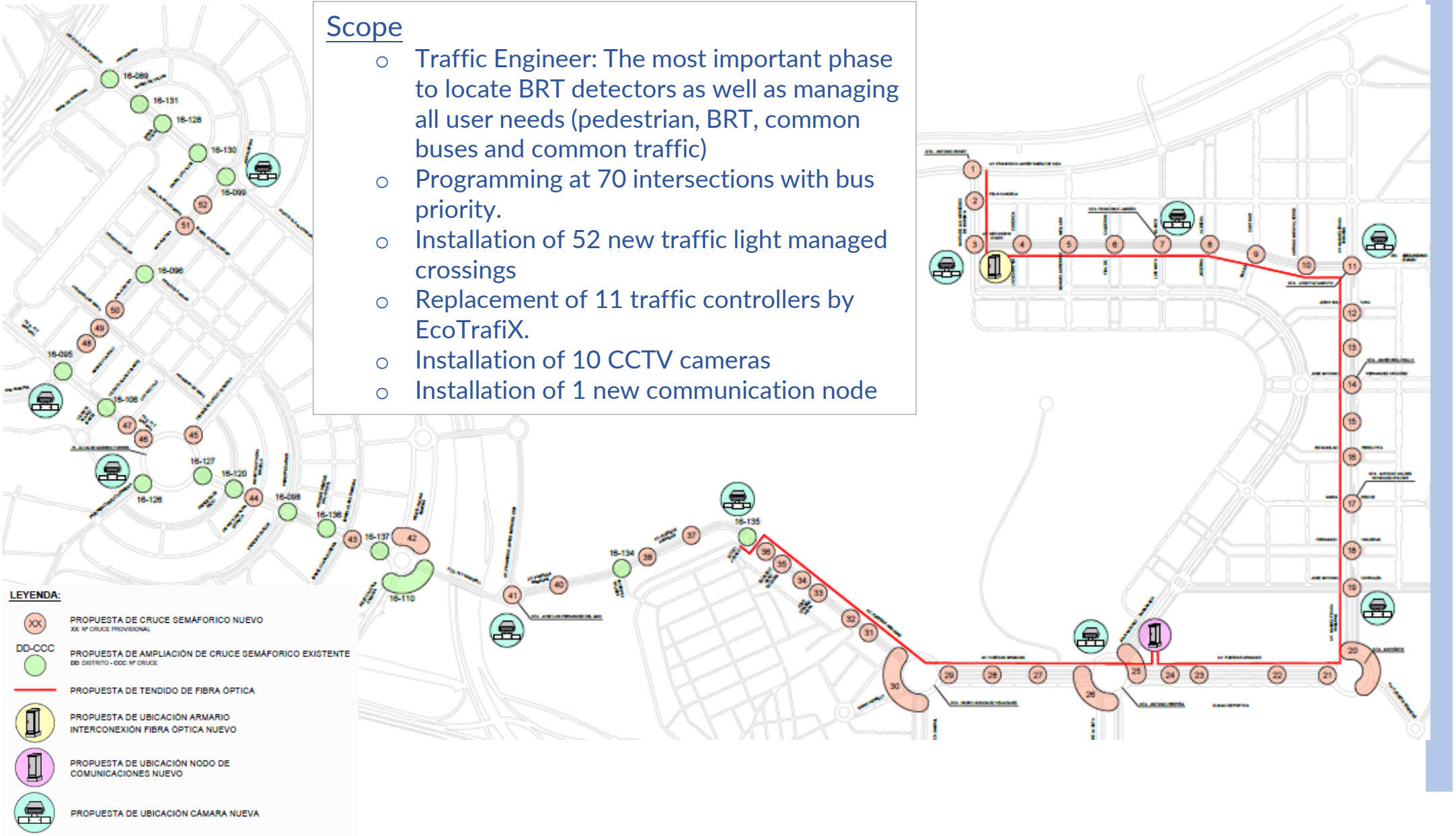
BUS PRIORITY AT TRAFFIC SIGNAL

kapsch challenging limits

Scope

- Traffic Engineer: The most important phase to locate BRT detectors as well as managing all user needs (pedestrian, BRT, common buses and common traffic)
- Programming at 70 intersections with bus priority.
- Installation of 52 new traffic light managed crossings
- Replacement of 11 traffic controllers by EcoTrafiX.
- Installation of 10 CCTV cameras
- Installation of 1 new communication node



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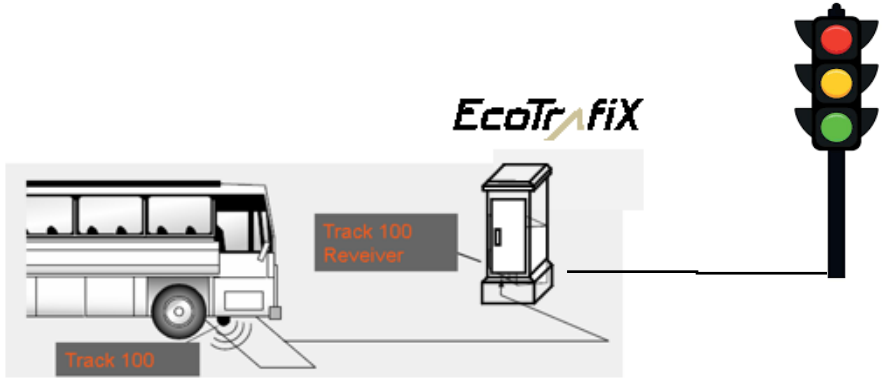
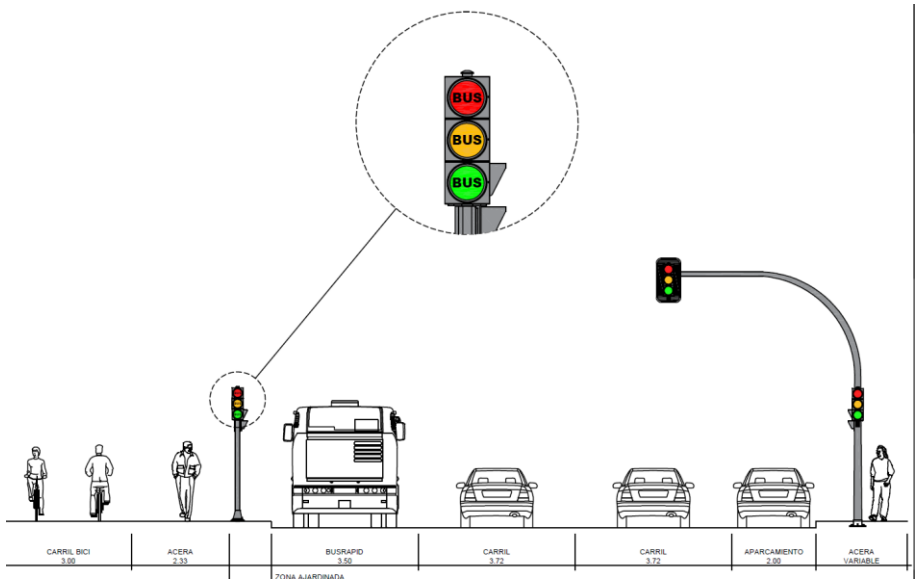
BUS PRIORITY AT TRAFFIC SIGNAL

Basic Architecture

The system made by Kapsch is composed of the following subsystems:

- Traffic light regulator: EcoTrafiX Controller
- Selective BUS RAPID Detection system
- Signalisation System: Traffic light elements





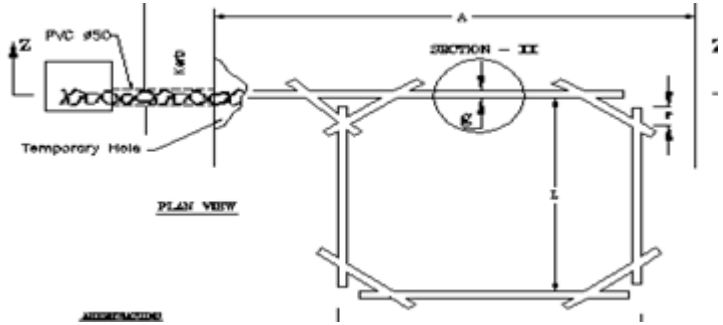
- Electrical Voltage: 42VAC
- Integrated IP Communications

RAPID BUS PRIORITY SYSTEM

Selective BRT Detection System- Supported by Traffic Engineering

Sender: On board transmitter

Spiral /Loop



Receiver: Card Detector in Traffic controller

In every crossing, absolute priority is achieved through 3 detectors in each direction, for each intersection and traffic sense as follows:

DA – Advance/Approximation Detector: It is located upstream of stop line and calculated to cross the intersection without requiring the BR to stop. Installed at a distance calculated based on the type of road design.

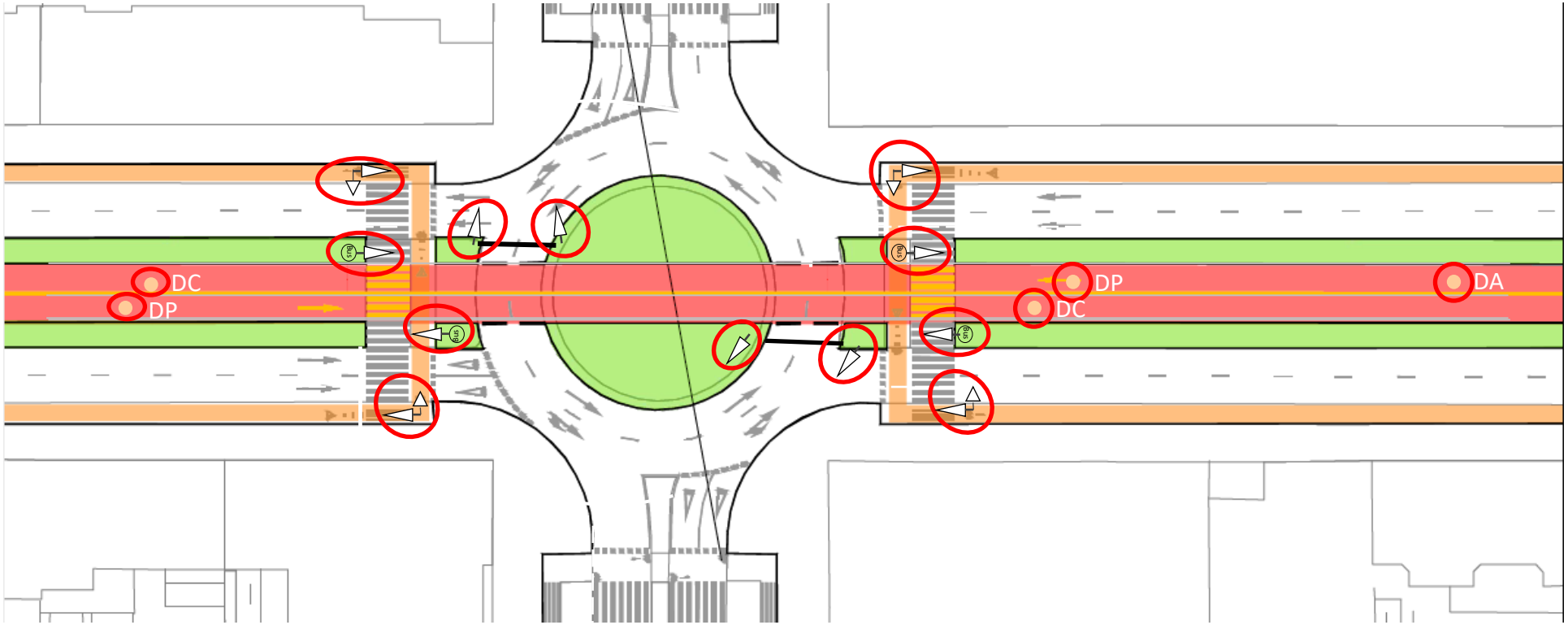
DP – Stop Line Detector: It is located about 15 metres upstream the stop line, before the crossing. It is used as BR detector if advance detector does not work and to optimize the green time of priority pase. It serves as a backup for the DA

DC – Cancel Detector: It is located about 13 metres downstream of intersection to cancel the "priority phase" once BR has cleared the intersection, after the crossing. It serves to reopen normal circulation once the RAPID BUS has passed.

RAPID BUS PRIORITY SYSTEM

Example of the Implementation: Francisco Jareño Roundabout (Valdebebas)

- Bus Detectors: DA, DP and DC in each direction
- Traffic lights with signage
- Bus lane



RAPID BUS PRIORITY SYSTEM

Special features of the RAPID BUS priority system

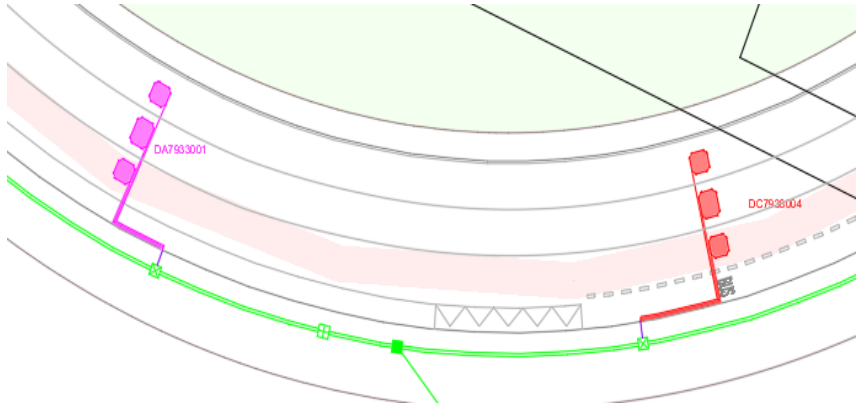
- Road layout includes some bus stops located before. upstream and near intersections and close the crossings. So, some advance detectors are located at stops near intersections.

- BR-Bus Lane is shared with other buses (without priority): For some intersections additional inductive Spirals are being installed to detect regular bus service (without priority) and activate a pase, a expecific system, for those buses to cross the junctions.

RAPID BUS PRIORITY SYSTEM

Special features of the RAPID BUS priority system

- Free circulation of the RAPID BUS in roundabouts: there are spirals installed in every lane due to free circulation /movement of the RAPID BUS
- The traffic light priority system is directly connected to the Centro de Gestión de la Movilidad (Mobility Management Centre) through a optic fiber network to controll the functioning of the system in place.
- The traffic application used for this management is Optimus.
- Controll of crossings with traffic lights.
- Compatible Adaptive control.



RAPID BUS PRIORITY SYSTEM

CONSTRUCTION OF THE RAPID BUS LINE FROM VALDEBEBAS TO HOSPITAL UNIVERSITARIO RAMÓN Y CAJAL

Passing of RAPID BUS in direction Valdebebas at Ana de Austria - Plz. Alcalde Moreno Torres

RAPID BUS PRIORITY SYSTEM

Passing of RAPID BUS in direction Valdebebas at Ana de Austria - Plz Alcalde Moreno Torres