The Altlantis Corridor MyCiTi System: distinctive paving guides passengers to the stations

Atlantis Corridor MyCiTi System

HIGHLY COMMENDED
Technical Excellence Category

KEY PLAYERS

Client

City of Cape Town:
IRT Infrastructure Implementation

Professional team

HHO as lead consultant to a multi-disciplinary team

OVERVIEW

Although BRT (Bus Rapid Transit) systems have been developed all over the world, the MyCiTi system in the Cape Town CBD is being designed as a pilot project for the South African environment (the other being the Rea Vaya system in Johannesburg).

The consulting engineers on this project were challenged to design and incorporate a public transport system which provides a suitable alternative to the prevailing car-dominated environment. The introduction of dedicated BRT infrastructure, the upgrading of pedestrian and cycling environments, the management of these complex interactions, and the prioritisation and safety measures implemented on the Atlantis Integrated Rapid Transit (IRT) Corridor have not only revolutionised the urban environment but also the public perception of an inclusive and sustainable roadway.

Originally a pilot project for the 2010 FIFA World Cup it has since expanded and incorporates international design elements into local circumstances.

THE BRT PROJECT

The pilot phase of the MyCiTi system comprises 16 km of dedicated Bus Rapid Transit lanes. The route includes an uninterrupted non-motorised transport (NMT) facility along its entire length, 13 raised median trunk bus stations, 16 complex signalised intersections, more than a hundred feeder bus stops and the Stables Bus Depot.

The route traverses through residential, industrial, coastal and riverine environments. The design effort was focused on developing effective, dedicated public transport infrastructure within an existing congested urban arterial corridor, whilst ensuring safety for passengers accessing the system, whatever their physical ability or disability might be.

PROJECT FEATURES AND CHALLENGES

At the outset of this project, no local authority had planned and implemented BRT infrastructure in South Africa.

It therefore fell to HHO to undertake the conceptual design for all of the infrastructure required for the system, with input from the City of Cape Town's designated officials. A large professional team was required for this project, and the HHO team coordinated up to 12 concurrent work streams, often reporting on more than 15 different simultaneous construction contracts.

Route alignment

One of the challenges was to incorporate a dedicated public transport facility within an existing urban environment. In order to retrofit two dedicated bus lanes into an urban arterial where it does not encroach on the roads owned by the local authority, portions of the route had to be constructed on private land which required extensive negotiation with the owners.

Environmental limitations on construction activities

Environmental authorisation, a six-month long process, was required for the construction activities planned within 100 m of the coastline and within proximity of other water bodies. The project also required construction work within a river due to the project's necessary rebuilding of the bridge over the Salt River Canal.

Bus priority measures and intersection treatments

Key to BRT systems is that they are reliable and arrive on time. A dedicated bus lane in each direction is therefore of paramount importance. However, in certain instances during construction the road reserve width did not permit this. Careful planning was therefore required to ensure that at least one dedicated lane was provided in locations where it provided the most travel time advantage over normal traffic. At intersections, bus priority was achieved through the use of specialised signal phasing.

Dedicated bus way colourisation

The bus axle loads exceeded the permissible axle loads on South African roads, and hence heavy asphalt and concrete pavements were considered. In addition to the pavement strength, the client requested a red finish to the pavement design to highlight the dedicated bus lanes and assist with bus lane enforcement.

To produce this finish, a continuously reinforced concrete (CRC) pavement with red oxide was chosen for its life cycle benefits, costs and ease of maintenance.

The CRC lanes have continuous longitudinal steel reinforcement. No transverse or contraction joints needed to be introduced in the design, as it was designed to show tight transverse cracks at 1 m to 2 m spacing.

Installing CRC is labour-intensive and demands strict level control and a high degree of site supervision for a finished, smooth ride quality.

The red finish to the pavement design highlights the dedicated bus lanes and assists with bus lane enforcement

Dedicated NMT facilities ensure safety for all users

BRT bus lanes serve routes between Cape Town and Table View

Tyregrip, an unusual method of colourising the asphalt portion of the bus pavement was used. The Tyregrip (an epoxy-based product) was applied to the asphalt surface and red stone chips were rolled into the Tyregrip. Although expensive, this unusual method was used to achieve the red finish.

Non-motorised transport (NMT) facilities

In addition to the 3 m wide shared NMT facility parallel to the BRT lanes, the HHO team was also responsible for various associated NMT improvements within a 500 m radius of the trunk stations to ensure the safety of passengers. This included urban elements such as improved pedestrian level street lighting, the introduction of universally accessible dropped kerbs along footways, the reconstruction of existing sub-standard pedestrian routes, the introduction of new pedestrian routes where informal routes had been created along desire lines, and the demarcation of cycle routes within existing roadways.

Directional way-finding signs were also installed along the NMT route. The directional signs mirror the branding of the MyCiTi System and include a distance indicator. Up to 14 directional way-finding signs were placed within the area around each station.

For visually impaired users, the design of tactile way-finding signs was adapted to guide such users to the stations and stops.

CONSTRUCTION INNOVATIONS

Much of the infrastructure designed for the pilot phase required a high degree of design ingenuity, originality and innovation.

Universal accessibility

The design had to be inclusive of all passengers whatever their possible disabilities might be. HHO therefore adopted universal access measures, including dropped kerbs at intersections, tactile paving, audible and tactile push buttons at signalised intersection crossings, ramps to all platforms and tactile way-finding signage.

Kassel Kerb docking system

Due to the need for universal access the design demanded a high degree of accuracy of bus docking at the stations. Kassel Kerbs were therefore used as a cost-effective way of ensuring accurate and close bus docking, thereby ensuring safe and easy passenger access. The concave-section kerbs serve low-floor buses and are the first to be used for this purpose in South Africa.

Delineators

In order to assist with bus lane enforcement, HHO investigated and designed special delineator kerbs to separate bus lanes from normal traffic. This was an indigenisation of an international concept for the local environment.

Highly Commended: the MyCiTi team with SAICE President Peter Kleynhans at the awards evening

Aesthetic design

The transition between various public areas are delineated by changes in texture or colour, including transition strips in areas where bicycles and other faster modes of non-motorised transport are brought into a pedestrian area. Bollards, low-level fences, benches and other street furniture, together with pigmented pavers or enhanced paving patterns, also delineate the different spaces.

MEETING THE CLIENT'S DEADLINES FOR READINESS

The non-negotiable deadlines for designing and implementing a sustainable public transport system ready for the 2010 FIFA World Cup required the conceptual approval, design and implementation of an interim start-up BRT service to be completed by June 2010. This was achieved within delivery dates linked to the 2010 World Cup mega-event and political implementation goals.

ENVIRONMENTAL, SOCIAL AND ECONOMIC SUSTAINABILITY

Public transport provision is a social priority in South Africa. The basic ability of an individual to access work or other opportunities is fundamental. In addition, the drive for car-competitive public transport is also an environmental priority. BRT buses are designed with low emission engines and utilise the minimum amount of fuel, as they travel at predictable speeds in dedicated bus lanes.

The initial phases of any BRT system will require operational subsidies, but in the macroeconomic context, cities need to invest in car-competitive public transport systems, from an environmental, social and economic perspective.

CONCLUSION

The MyCiTi system is world-class, innovative, functional and cost-effective infrastructure delivered on time and within budget. Derelict parts of the city were transformed into aesthetically pleasing and functional facilities – areas previously blighted by ad hoc and informal usage have been formalised and replaced by world-class public transport facilities and services.

The MyCITI System is benefiting the communities it serves by offering passengers safe, reliable, affordable and convenient public transport services. □