HIGH VOLUME TRANSPORT APPLIED RESEARCH

LAMATA

SLR


# T-TRIID Inclusive Interchanges

## Report on LAMATA pilots and Inclusive Interchanges Design Brief (IIDB) Deployment Strategy

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# Abbreviations/Acronyms

| | |
|---|---|
| BRT | Bus Rapid Transit |
| FCDO | Foreign, Commonwealth & Development Office |
| HVT | High Volume Transport |
| IIDB | Inclusive Interchanges Design Brief |
| ITS | Intelligent Transport Systems |
| IWT | Inland Waterways Transit |
| LAMATA | Lagos Metropolitan Area Transport Authority |
| LRT | Light Rail Transit |
| PT | Public Transport |
| STMP | Lagos Strategic Transport Master Plan |
| TDM | Transport Demand Model |
| TOD | Transit Oriented Development |
| UITP | International Association of Public Transport |

# Executive summary

**About Inclusive Interchanges** - Public transport interchanges are vibrant focal points in city life, where transport, commerce and social interaction weave together. Getting interchange design right is central to promoting low carbon, efficient, inclusive and affordable mobility, while getting it wrong could lock in disincentives and problems for many years. As for many cities in Africa, public authorities in Lagos face the added challenge of learning how to integrate new public transport services with the existing paratransit/informal transport services that continue to play an important role. Similarly, as informal market trading activities tend to establish around interchanges, site designers and managers need to consider how their livelihoods can be supported, as an integral part of the new interchange.

In this context, the Inclusive Interchanges project team comprising of LAMATA (Lagos Metropolitan Area Transport Authority) and SLR set itself the following primary aim: to develop and pilot an **Inclusive Interchanges Design Brief (IIDB)**, for use by public transport and urban planning authorities, that enables identification and appraisal of key interchange design and management parameters, as well as communication of these to an interchange design team. The term 'inclusive' applies to both: social inclusion, delivering public transport that is accessible to all; and sectoral inclusion, with reference to the objective of enabling the formal and informal transport and retail/trading sectors to operate in a mutually beneficial manner.

**Project methodology** - In order to achieve the practical piloting and refinement of the IIDB interchange design appraisal template, the project has undertaken the following main activities: a review of existing interchange design guidance; design appraisals of two planned interchanges in Lagos (Mile 2 and Marina), which will be constructed around railway stations on the metropolitan Blue Line; site visits, combined with stakeholder meetings and a workshop; and development of an Inclusive Interchanges passenger survey questionnaire, which was then tested by LAMATA.

**IIDB structure, design categories and case study findings** - The IIDB template has been developed for use by public transport and urban planning authorities, to enable appraisal of and enhancements to both existing facilities, and those in the design and planning process.

The first section of the IIDB allows the appraiser to record some primary contextual and operational information about the site location, as well as the function of the interchange in the mobility network.

Sections 2 to 5 promote consideration of 55 design topics, which are divided into four main design categories, as set out below. For each of these categories, we summarise here some of the main observations and actions arising from the Lagos case studies.

- **Multimodal sustainable mobility** - This category covers the core role of the interchanges and is further sub-divided into subsections addressing: firstly, the layout and provision of information in multimodal interchanges; and secondly, design aspects relevant to specific transport modes. The Lagos case study appraisals showed that significant efforts are being made to enhance access to the interchanges by cycling and walking, and that terminals and layby space have been reserved for use by the informal public transport sector. Signage at the new railway stations is good, but a wider metropolitan standard would be beneficial, to aid understanding and integration of all modes and services available.
- **Comfort and safety** - here the IIDB addresses fundamental passenger requirements, including the provision of shelter, places to rest and suitable lighting. Alongside applying the IIDB, the team at LAMATA are also working to ensure SHE-CAN compliance, to ensure comfortable and safe travel for women. Provision of toilets as a public facility, as well as for passengers, is also an important theme in Lagos. The new interchanges will significantly improve the overall level of provision, including wheelchair accessible cubicles.
- **Hubs for public life** - the role of interchanges as hubs in public and cultural life are highlighted in this category, together with the potential for additional income streams to be achieved from commercial retail units. LAMATA is adopting a proactive approach to accommodating informal market traders at the interchange sites, proposing allocation of designated areas and provision of lockable stalls and storage sheds. Plans to incorporate art works at interchange sites are now also taking shape.

- **Integrated planning and design** - the final category of design topics ensure that broader planning considerations relating to Transit-Oriented Development (TOD), energy efficiency, renewable energy generation and climate resilience are taken into account. Opportunities for TOD at the Marina case study are well exploited with a proposed waterfront building, while these plans will need to be informed by a detailed flood risk assessment in this high risk area.

**Future deployment and dissemination** - During the project the IIDB appraisal process was undertaken for 2 of 14 major multi-modal hubs identified in the 2014 Transport Masterplan for the Lagos metropolitan area. As such, there is significant potential for making incremental improvements at existing facilities, as well as for informing improved designs for new interchanges in the future. Next steps for deploying the project approach will include: provision of staff training and promotion of the tool through relevant courses at universities in Lagos; application of the IIDB approach as the construction of interchanges along the blue rail line extension are taken forward; integration of IIDB principles within the forthcoming Mobility Master Plan; and disseminating the tools and lessons learned from the project with other states and transport providers in Nigeria, as well as with other cities across Sub-Saharan Africa.

# 1. Introduction

## 1.1 About Inclusive Interchanges

Public transport interchanges are vibrant focal points in city life, where transport, commerce and social interaction weave together. Getting interchange design right is key to promoting low carbon, efficient, inclusive and affordable mobility, while getting it wrong could lock in disincentives and problems for many years. As Lagos is in the process of delivering a network of new multimodal interchanges, the development of summary design guidelines, combined with an appraisal checklist, provides a means for Lagos Metropolitan Area Transport Authority (LAMATA) to steer and assess plans for interchanges as they progress through the design stages.

Like many cities in Africa, Lagos faces an additional challenge of how to integrate new formal Public Transport (PT) with the existing informal transport services that continue to play an important role. In some cases there can be direct competition along certain routes, but it is also recognised that the Danfos operating in Lagos contribute to a dense overall network of mobility. Similarly, tension could arise between commercial property and retail actors and the informal market trading activities that become established around transport hubs. For many households, the income achieved through market trading is fundamental to their livelihoods, and in inclusive interchanges, they could continue to provide convenient and affordable shopping options for passengers. The design and management of interchanges is central to addressing these matters, prompting both strategic questions for a transport authority, as well as detailed design considerations for planners and architects.

In this context, the project team comprising of LAMATA and SLR set itself the following primary aim: ***to develop and pilot an Inclusive Interchanges Design Brief (IIDB), for use by public transport and urban planning authorities, that enables identification and appraisal of key interchange design and management parameters, as well as communication of these to an interchange design team.*** The term 'inclusive' applies to both:

- **Socially inclusive –** delivering public transport that is accessible to all, for example by providing a safe option for women and families, and ensuring that people with disabilities can move through the interchanges[1].
- **Sectorally inclusive** – providing the ability for both formal and informal transport and retail/market trading stakeholders to operate at an interchange in a mutually beneficial manner[2].

As explained in further detail below, a very important aspect of the project has been to apply the IIDB template to the appraisal of two interchange designs in Lagos: Mile 2 and Marina. New railway stations have recently been constructed at these two locations, in connection with the Blue Railway Line project, and LAMATA is in the process of designing interchanges around these stations, to provide efficient connections to Bus Rapid Transit (BRT), First and Last Mile feeder bus services, as well as ferry services.

## 1.2 Project methodology

In order to achieve its aims and the practical piloting of the IIDB interchange design appraisal template, the project has undertaken the following main activities:

- **Review of interchange design guidance -** The first step involved the review of existing interchange design guidelines and related literature, in order to create an overarching framework of design categories, which were further divided into a series of design topics. This work led to the development of a first draft IIDB template.

[1] Social inclusion can be defined as the process of improving the terms on which individuals and groups can take part in society – improving the ability, opportunity and dignity of those disadvantaged. Disadvantage is often based on gender, age, location, occupation, race, ethnicity, religion, citizenship status, disability, and sexual orientation and gender identity (Source: World Bank group - https://www.worldbank.org/en/topic/social-inclusion)

[2] The International Monetary Fund (IMF) defines the informal economy as 'activities that have market value and would add to tax revenue and GDP if they were recorded'. The IMF estimates that 60% of all workers are involved in unregulated jobs, and in low-income countries, it is estimated that 39% of GDP comes from goods and services produced by informal enterprises. Policy approaches like increasing access to finance, skills training, property rights and extending legal protections can transition informal operations into the formal sector over time (Source: World Economic Forum - https://www.weforum.org/agenda/2024/06/what-is-the-informal-economy/)

- **Lagos case studies -** Once prepared as first version, the draft IIDB template was applied to the appraisal of two interchanges designs, Mile 2 and Marina, based on drawings provided by the design team.
- **Site visits and workshop -** The appraisal process was supported by the following activities undertaken in Lagos:
    - Site visits at the existing Mile 2 and Marina railway stations, involving meetings with local stakeholders (both formal and informal sector)
    - A stakeholder workshop involving presentations of LAMATA plans and the Inclusive Interchanges project, as well as presentations by stakeholders on a range of topics including: informal transport, market trading, commercial/retail development, women's safety, facility and convenience management, access for people with disabilities, art and culture at interchanges and city resilience.
- **Passenger survey** – the framework of design categories and topics developed for the IIDB has informed the preparation of an interchange-focussed questionnaire. LAMATA has undertaken an initial survey to test the survey approach and gain an impression of passenger's views in relation to existing interchanges (convenience, safety etc.) and what additional facilities they would most value.
- **Update of the IIDB template** – the process of producing the case study appraisals, together with feedback received from external stakeholders and project reviewers, has resulted in updates and additions to the design topics and guidelines provided in the IIDB template.

Alongside these core project activities, LAMATA and SLR have been involved in a series of communication activities to raise awareness of the ongoing work and availability of the IIDB for interchange appraisal. These included presentation of the project approach at the Africa Sustainable Mobility course, to the UITP Paratransit Working Group, and at a HVT side event of COP28.

## 1.3 Role and structure of this document

Following on from the IIDB development and communication activities outlined above, the main purpose of this report is to share key observations and reflections from the project activities, as well as to communicate how LAMATA intends to take the Inclusive Interchanges work forward as an element of its own sustainable mobility planning and project implementation. The report structure is summarised below:

Figure 1 - Extract from LAMATA's animation of the Marina Interchange proposals

- Section 2 sets out the main proposals of the strategic transport and mobility masterplans for the Lagos metropolitan area. This allows us to show the locations of the Mile 2 and Marina case study interchanges within the network, as well as to present the proposed scale of investment in sustainable mobility and where the IIDB appraisal process can be applied in the future.
- Section 3 presents the structure of the IIDB and the main points arising from the appraisals of the case study interchanges. These include specific aspects of the interchange design, where potential amendments and improvements to the designs were identified, as well as more strategic policy and planning process lessons that have emerged.
- Sections 4 introduces the Inclusive Interchanges passenger survey questionnaire and presents results obtained through the pilot survey undertaken by LAMATA.
- Section 5 draws together the main conclusions from the project activities and presents the deployment strategy of LAMATA, comprising proposed next steps to further promote use of the Inclusive Interchanges outputs by other cities and relevant stakeholders.

# 2. LAMATA strategic mobility plans and the role of interchanges

The provision of new interchanges, as well as the continual improvement of existing interchanges, will play a pivotal role as LAMATA leads the implementation of a sustainable mobility network fit for a rapidly growing megacity. In this section we provide some background information on the existing transport master plan, as well as the ongoing preparation of a new mobility plan. Tying in with these, it is foreseen that the Inclusive Interchanges Design Brief (IIDB) will play a role in the development of a LAMATA standard for interchanges, as well as the design review process as new high capacity public transport projects are brought forward.

## 2.1 Strategic Transport Master Plan (STMP) 2014

The Lagos State Government (LASG), through the Lagos Metropolitan Area Transport Authority (LAMATA), developed the 2014 Strategic Transport Master Plan (STMP) Extension Project and Travel Demand Model (TDM), to address the need for urgent urban and transport development planning in the Lagos Megacity Region. This initiative aims to end the current situation of continuous degradation and congestion of the public transport system, and seizes the opportunity to develop Lagos as the key economic hub in Africa.

The 2014 STMP Extension Project/TDM systematically identified integrated multimodal public transport infrastructure and services that will accommodate the rapidly growing travel demand in the Lagos Megacity Region by 2032. This comprises the following projects: Bus Rapid Transit (BRT), Light Rail Transit (LRT), Monorail, Inland Waterways Transit (IWT), Cable Car Corridors and Strategic Road Corridors. In order to help ensure the success of the Megacity's public transport proposal and road network, complementary plans on freight, non-motorized transport, road safety and climate change were also defined in the STMP Extension Project.

To provide a better impression of the scale of the proposals, integrated multimodal public transport proposals to be implemented by 2032 include the following:

- 14 BRT corridors;
- 6 LRT corridors;
- 1 Monorail;
- 14 Multimodal Interchanges;
- 36 IWT corridors;
- 5 Cable Car corridors; and
- 12 Road corridors.

To date, infrastructure for 3 BRT corridors (Ikorodu-TBS/Oshodi-Abule Egba/LBE-TBS), 2 LRT corridors (Blue Line/Red Line), and 8 Multimodal Interchanges (National Theatre /Oyingbo /Yaba /Ikeja /Falomo /Oshodi /Ikorodu/Agege), have been developed and implemented with effective private sector operations. Two further interchanges (Marina and Mile 2, the Inclusive Interchanges case studies), will be developed under the ongoing LSTMPP1 programme funded by Agence Française de Développement (AFD).

### 2.1.1 STMP proposed hubs and interchanges

The 2014 Transport Masterplan identified 14 major multi-modal transit hubs to adequately support the transport proposals designed to serve the Mega-City region. These interchanges are categorised as urban and inter-urban hubs, with the inter-urban hubs providing connections intercity transport. The 14 interchanges identified are (Inclusive Interchanges case studies are underlined), with further brief descriptions given for those visited during the study:

- **Urban hubs**
  - National theatre – a major interchange which integrates Yellow, Red Line and regulated bus routes
  - Marina – this location has served as an informal interchange between the Ikorodu–TBS Bus Rapid Transit (BRT), informal bus services, and water transport modes. With the launch of the Blue Line rail, the construction of the Marina Blue Line station, and upcoming planned development under the AFD LSTMMP 1 project, the Marina hub is on track to be transformed into a state-of-the-art facility serving multiple modes of transportation. This advanced hub is intended to integrate the Mass Rapid Transit (MRT) Blue Line, buses, unregulated public transport, and ferry modes, allowing for rapid transfers and access throughout the Mega-City.
  - Yaba - developed as a Bus Terminal housing regulated bus routes and services. Due to the proximity to the Red Line LRT station, it has been connected through a walkway.
  - Oshodi – this is located in the Oshodi area of Lagos State. The interchange is located between the Lagos-Apapa Expressway and the Agege Motor Road. The Oshodi Bus Terminal is divided into three different terminals called: Terminal 1, Terminal 2, and Terminal 3. Terminal 3 is connected to the Oshodi Red Line platform station via a skywalk, which lands on the first floor of Terminal 3.
  - Mile 2 - the Mile 2 Hub is envisioned as a focal point for transportation in the Southwest of Lagos, along the Lagos–Badagry Expressway. Strategically located at the interchange of the Expressway and the Apapa-Oshodi Expressway, the hub's main route will be the East-West Blue Line MRT. With the implementation of planned interchange improvements, the Mile 2 hub will feature high-quality connectivity to all public transport modes, ensuring efficient integration and accessibility.
  - Agege - developed as a Bus Terminal housing regulated bus routes and services. Due to the proximity to the Red Line LRT station, it has been connected through a walkway.
  - Ojo
  - Ikorodu – interchange focussed on integrating bus and water transport modes.
  - Langbasa
- **Inter-urban**
  - Otta
  - Ibafo
  - Shagamu
  - Lekki Airport
  - Badagry

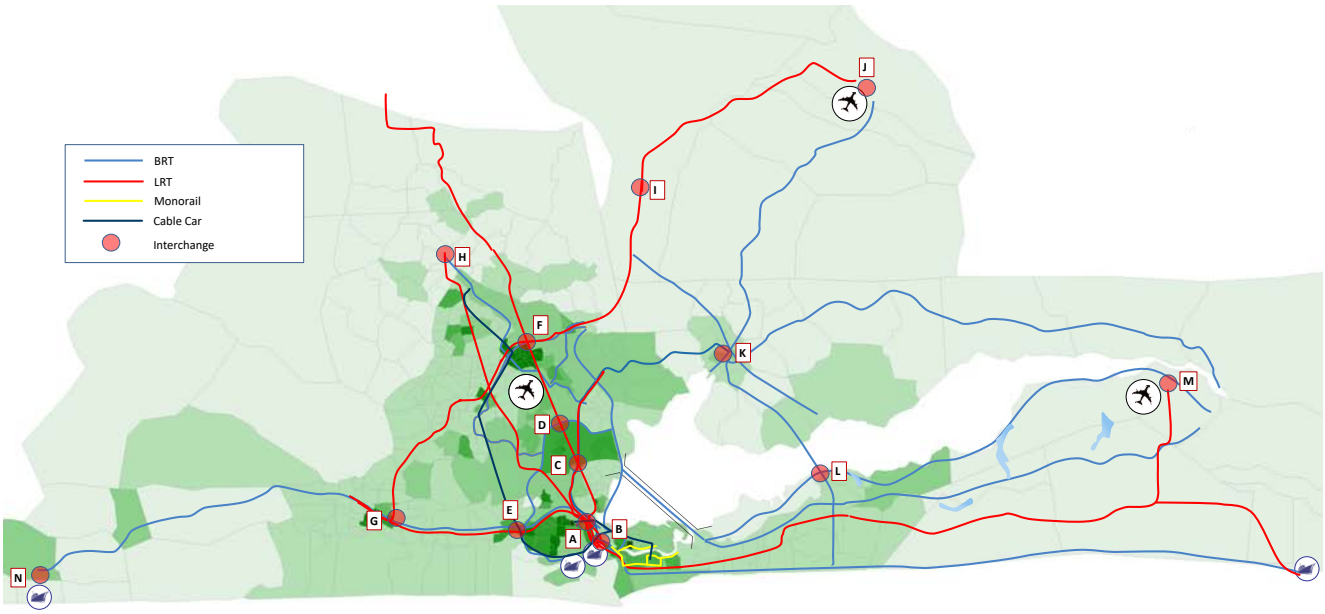


Figure 2 - Map of major projects from the Lagos Strategic Transport Master Plan 2014

Since the publication of the STMP 2014, Lagos State has made significant advances in delivering these multi-modal hubs and it is pertinent to highlight the different approaches that have been taken. For Mile 2 and Marina, the development of the rail stations has been undertaken first, and the preparation of detailed designs for the multi-modal interchange has followed on from this. For the other sites, the delivery of bus terminals has preceded that of the rail stations. This sequential development approach resulted in separate designs for each component, which were later integrated through the incorporation of sidewalks and skywalks. Notable examples of such emerging interchanges include Ikeja, Oyingbo, Yaba etc.

## 2.2 Strategic Transport and Mobility Master Plan (STMMP) to 2048

The development of an updated Strategic Transport and Mobility Master Plan (STMMP) for 2048 is currently ongoing for Lagos State. This initiative aims to review the existing transportation landscape and conduct surveys as part of the diagnostic phase. This research phase will analyze existing developments, plans, and proposals to identify sustainable solutions for enhancing Lagos's transportation ecosystem.

At this stage, it is still challenging to pinpoint specific changes that may occur to the planned network of interchanges for future transportation networks. This will follow as LAMATA brings together the findings from a range of studies, including the outputs and lessons learned from the Inclusive Interchanges project.

While specific details remain uncertain, the STMMP 2048 aims to provide a forward-looking approach to transportation planning, ensuring that Lagos benefits from an efficient, sustainable and inclusive mobility network as fitting for a future mega-city.

# 3. Findings from the case study interchanges

## 3.1 Inclusive Interchanges design categories and appraisal process

The Inclusive Interchanges Design Brief (IIDB) template has been developed for use by public transport and urban planning authorities, to enable:

- Design appraisal of existing interchanges, to understand what changes might be prioritised in the future;
- And appraisal of new interchanges during the design process, to identify whether all design topics are appropriately addressed, and to allow for the input of ideas and recommendations.

In the case of the Lagos case studies, the IIDB appraisal process was conducted for the Mile 2 and Marina interchanges, where railway stations have recently been delivered, and new multimodal interchanges are proposed for construction around these. This meant that the team could test use of the IIDB in relation to both existing and proposed facilities.

Below we provide an overview of the IIDB structure and content.

**Context and site appraisal -** The first section of the IIDB template allows the appraiser to record some primary contextual and operational information about the location and interchange function, including: mobility network connections/modes served; estimated passenger numbers and flows; the nature of the 'interchange zone', in terms of surrounding land uses, and urban form and density.

**Design categories -** In total, the IIDB promotes appraisal of 55 design topics, which have been divided into four main design categories, as follows:

- **Multimodal sustainable mobility** - This design category addresses the core role of an interchange, to facilitate efficient and comfortable changes between sustainable modes of travel, and is further sub-divided as follows:
  - **Multimodal interchanges** - Covering 12 design topics that relate to the layout of the interchange site and buildings, and related information and wayfinding measures to enable efficient and inclusive movement of passengers between transport modes.
  - **Transport mode specific** - This encompasses 14 design topics covering the prioritisation of sustainable modes, the provision of different transport options and related operational requirements, as well as future proofing for electrification and alternative fuelling.
- **Comfort and safety** - This category presents 13 design topics addressing the fundamental passenger requirements for inclusive interchanges, including gender dimensions, safety and security, as well as shelter and provision basic facilities such as seating and lighting.
- **Hubs for public life** - 9 design topics are included, covering the role of interchanges as hubs in public and cultural life, that can provide opportunities for work, shopping and leisure, while also generating income streams that can contribute to the overall maintenance and improvement of the interchange.
- **Integrated planning and design** - The final group of 7 design topics ensures that broader planning considerations relating to Transit-Oriented Development (TOD), energy efficiency and renewable energy generation, as well as climate resilience, are taken into account.

A table presenting the design categories, together with the titles of the 55 design topics, is provided at Appendix A.

**Design topic guidelines -** For each of the 3 design categories and 55 design topics, the lefthand columns of the IIDB template present brief guidelines for the appraiser, covering:

- why the topic is of importance;

- key design considerations to be taken into account; and
- further more detailed guidance and resources that can be consulted.

The intention for the IIDB was to create a relatively concise template, that provides a gateway to a much wider library of relevant information.

**Design appraisal status, comments and recommendations** – the two right-hand columns in the design category tables are for use by the interchange appraiser:

- The status column provides for use of traffic light symbols, to indicate whether a design topic is already adequately addressed, there are some aspects that could be improved, or whether there are important matters requiring priority attention. In some cases, the design topic may also be marked as not applicable (for example, for smaller interchanges, not all facilities may be provided) or more information may be required to complete the appraisal.
- Space is also provided in the template for the appraiser to add comments, drawing extracts and photos, showing to what extent the topic design guidelines are addressed. There is also the potential to include recommendations for consideration by the design team.

In the following sub-sections, we present the findings from applying the IIDB appraisal approach at the two case study interchanges.

# 3.2 Mile 2 interchange

The Mile 2 interchange design appraisal was undertaken first within the project timescale, and represents an example of a complex interchange proposal, located at a major highway interchange in the southern part of Lagos. Mile 2 is a very well established terminal for informal transport operations (both for the metropolitan area and inter-state bus services) and as a location for market trading.

**Please note**: the images of the Mile 2 interchange proposals are based on information provided in October 2022 and no longer represent current designs.

## 3.2.1 Context, site appraisal and interchange layout

### 3.2.1.1 Interchange location and network connections

Mile 2 interchange is located on the Lagos Blue Rail Line, that operates between Marina and Okokomaiko/Maintenance Depot, and serves as an important metropolitan and international interchange for both passengers and goods. Interchange is provided to:

- 3 regulated BRT routes – There is an existing BRT corridor parallel to the blue line. Which is called the Lagos Badagry Expressway (LBE). Two further BRT routes are foreseen
- LAMATA First Mile – Last Mile feeder service
- Molues – midibus services, operating both intercity and urban routes
- Danfo routes – and minibus services, operating intercity and urban routes
- Three-wheelers provide services from Durbar Road
- Shuttlers shared minibus route AKJ93
- The ferry terminal currently operates a limited service towards Marina.

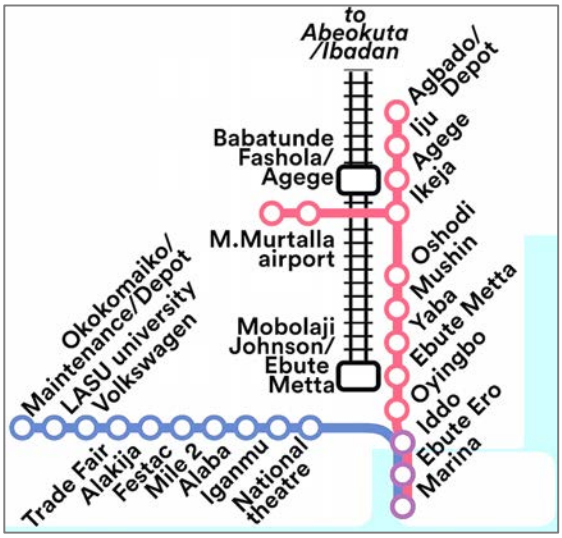

Figure 3 - Map of Lagos rail network (Red and Blue Lines)

**The interchange site** encompasses: the recently constructed rail station; and the Bus Rapid Transit, bus and Danfo stops located on the Isalu-Ijanikin-Animshaun Road; and the IWT ferry terminal, accessible via a surface level pedestrian route. The interchange site also encompasses the four loops of the cloverleaf expressway junction, which are currently used for road freight storage, and loading and unloading operations.

### 3.2.1.2 Interchange zone

Mile 2 rail station is located on the Lagos - Badagry Expressway, with the rail platforms located between the main road carriageways. Bus services and Danfo stops are located to the north and south sides of the Expressway, and the ferry terminal is located to the south-west, at a distance of around 250m.

The area north of Mile 2 is medium-density and mixed-use, including residential, small retail and food & drink outlets, as well as the larger Shoprite Festival Mall.

To the north-east, sandwiched between the expressways, there is a large industrial area.

To the south and south-east, there is a large army barracks, but also large areas dedicated to parking and industrial storage uses. A police station and the Imoye secondary school are located close to the southern perimeter of the interchange area.

Separated from the interchange area by the water channel, there are medium-density mixed-use residential and commercial areas to the south-west.

Following the Expressway west, there is the Amuwo Odofin Maternal and Child Centre, as well as the Festac City Mall.

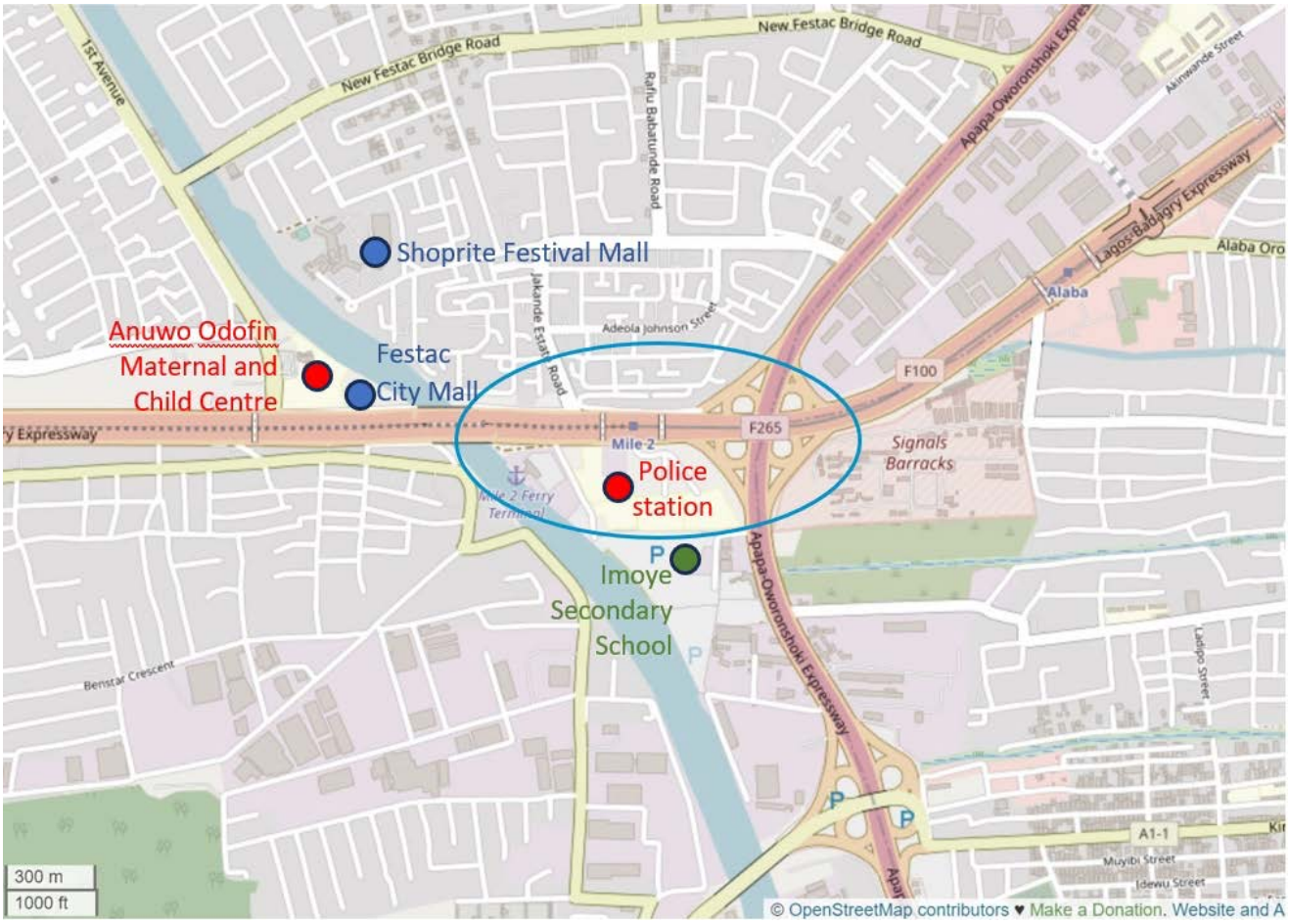


Figure 4 - Map of Mile 2 interchange zone

### 3.2.1.3 Interchange site and proposed layout

**Current proposal –** the interchange design encompasses the existing rail station and involves significant new development to provide BRT, Intercity and Interstate bus terminals within three of the expressway junction loops. Additionally, a new layout and buildings are proposed for the ferry terminal and the fourth (north-eastern) loop of the junction will be used for vehicle maintenance.

The location of Mile 2 Interchange, straddling multiple lanes of the highway, and close to the interchange of the Badagry and Apapa-Oshodi Expressways, presents significant challenges in relation to 'severance' (pedestrian access), air pollution and noise. Entry points are via Durbar Road (from the north) and the existing bus stop laybys on the Durbar and Isalu-Ijanikin-Animshaun distributor roads. Bus parking is

currently not well organised. Destinations are mostly identified by loud speakers calling out routes, as well as un-coordinated signage around the site and on vehicles windshields.

Construction of the Blue Line railway station has facilitated the provision of two pedestrian bridges (with eight ramped access points) that are open to the general public. These enable passengers to safely access bus and informal bus services on both sides of the Expressway.

Figure 5 - Photograph taken from the Mile 2 railway station, looking east to the Expressway junction

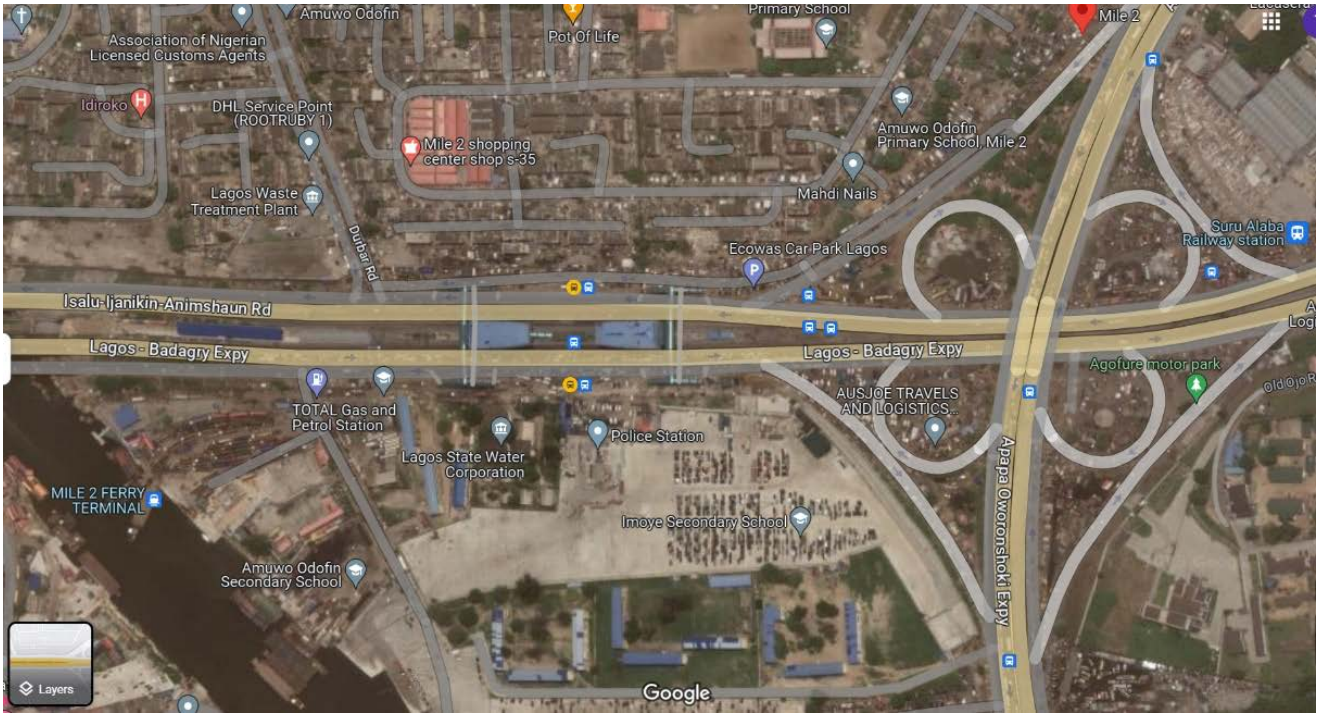


Figure 6 - Aerial photograph of the Mile 2 railway station and interchange site

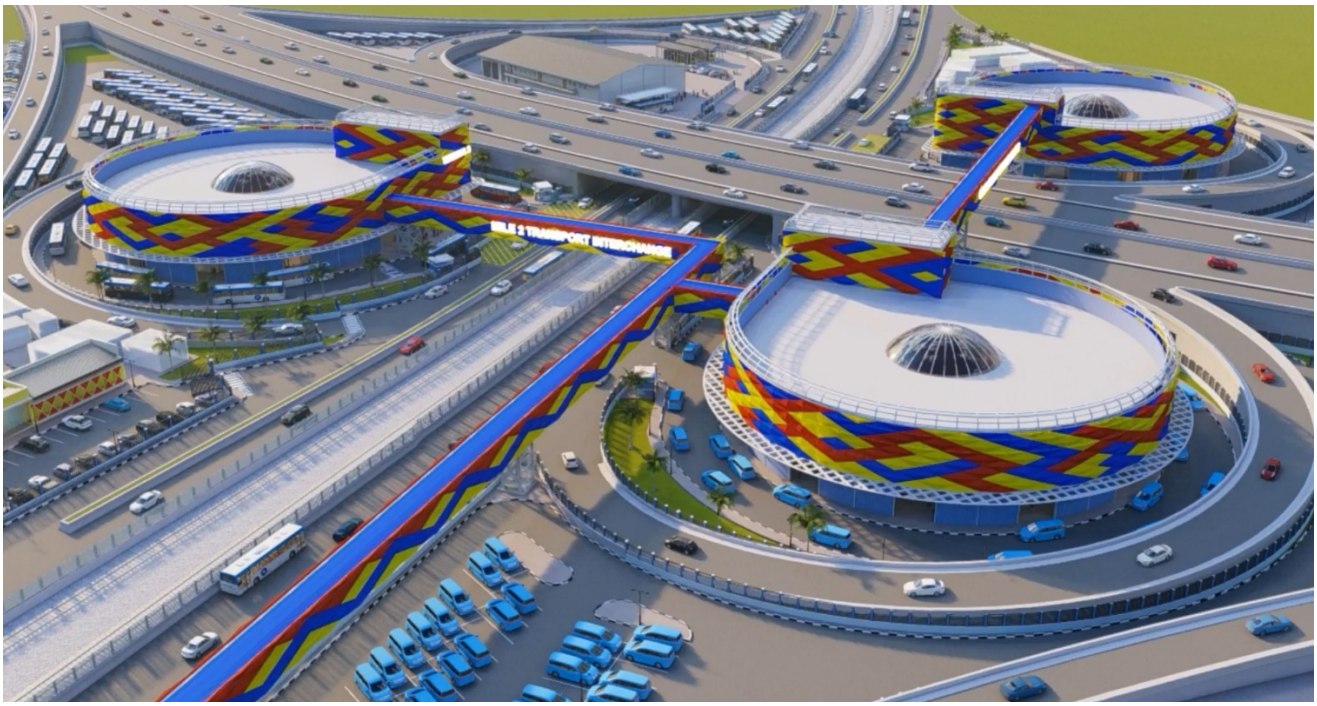

Figure 7 - Extract from LAMATA's animation of the Mile 2 interchange proposals, showing the bus terminals within the loops of the Expressway junction.

### 3.2.2 Multimodal interchanges

Key themes arising from the appraisal of the multimodal interchange design topics are summarised below:

**Modular design –** It was noted that the railway is already a prominent building within the townscape and and the two entry points are clearly indicated by the ramps and raised walkways needed to gain access. For the extended interchange proposals, the nature of the site results in a 'modular' proposal, with each mode of transport having a separate interchange building. This 'modular' design approach makes sense given the interchange site context, but raised questions about whether there would be a 'primary'/central information and facilities centre for passengers and how the entrance to this would be highlighted.

In response, LAMATA confirmed that Terminal 1(Intra-City Mini and Midi Buses), Terminal 2 (Inter-State Mini and Midi Buses) and Terminal 3 (Intra-city BRT Buses) and Loop 4 (Admin Building, Automobile Mechanical Workshop) within the interchange conduct unique operational functions and would be integrated through a central Passenger Information Display System where passengers can get real time information on schedules on all transport modes within the interchange.

**Movement corridors and transfer distances** - A network of elevated, covered walkways is proposed to connect the bus terminals with the rail station, providing direct pedestrian access across the numerous lanes of the expressways. Factors identification for further consideration were as follows:

- The distance from the centre of the rail station to the bus terminals on the west side of the expressway junction is approx. 400-450m, so at the far range of an acceptable distance. It was confirmed that BRT services already operating from platforms adjacent to the rail station would be retained (minimising transfer distances for passengers) and the new BRT terminal is located in the closest location based on land availability and proximity to residential districts.
- To reach the terminal on the east side of the highway junction is over 500m, although this is for interstate connections, hence the longer walk may be acceptable in the context of a longer journey.
- Covered and elevated walkways (as experienced at the existing railway station) provide a convenient and comfortable (shaded and breezy) walking route, especially in this location with large highways and a fenced (secured) railway line to cross. It was noted during discussions that use of elevated walkways can be controversial, due to the additional efforts required by passengers to change levels, the creation of additional difficulties for people with disabilities, as well as heightened maintenance costs and security issues. On balance, it was viewed that the walkways do provide a suitable solution in this context, providing that efforts are made to avoid

corners (that reduce sightlines) and provide for good visibility/passive surveillance. Additionally, options for surface level walking routes between the interchanges are retained.

- For the ferry terminal, a clear movement corridor (via a concourse) is indicated, although the direct route of movement 'desire line' of pedestrians is obstructed by a staff car park. Reconfiguration of the design in this area was recommended.

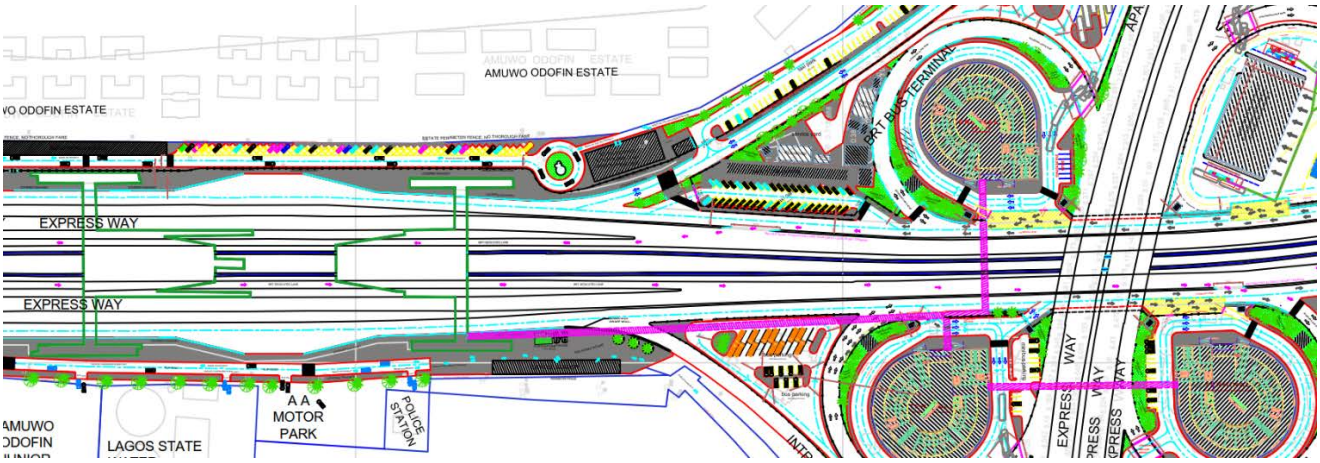


Figure 8 - Extract from masterplan drawing of the Mile 2 interchange proposals

**Accessibility for people with disabilities** – movement to the railway station necessitates level changes and it was noted that step-free access to the platforms is foreseen through the provision of lift shafts in the building design, although installation of the lifts had not yet occurred at the time of the site visit. For the proposed interchange, the provision of elevated walkways combined with lifts at the terminal buildings, would facilitate relatively smooth journeys (albeit over longer distances) through the highway dominated site context.


Figure 9 - Photograph showing signage in the new Mile 2 rail station

**Wayfinding and signage** - Signage within the new rail station was found to be clear and uniform in style, including a mixture of text and symbology for clarity. Signage for rail users was good, but signage for passengers looking for the next form of transport for onward travel was not yet in place and could be improved during the implementation of the new interchange proposals. As the network of transport modes becomes more extensive, and the interchange becomes more complex, the development of network and interchange maps, based on a standard LAMATA signage format and manual will become increasingly important.

## 3.2.3 Transport mode specific

Key themes arising from the appraisal of the transport mode specific design topics are summarised below:

**Bus Rapid Transit and bus services** – The circular design of the three bus terminals, located within the loops of the cloverleaf highway junction, provide for 'drive through platforms' and the potential for quick access back on to the road network. One of the concerns raised through the appraisal process was that the locations where buses gain access and egress to the terminals from the highway 'passing lanes' are located very close to the ascending and descending roads of the junction. These can be congestion hotspots with the cloverleaf junction design, due to the weaving of vehicles changing lanes within a limited length of road. The location of the terminal access lanes may, therefore, result in significant delays to public transport services, particularly if it is necessary for a bus to pass several of these zones before leaving the junction.

Additional points for consideration include the need to retain visibility around the loops for drivers, and the potential for vehicle – pedestrian conflicts where the surface level walking routes cross the cloverleaf loop roads and the bus terminal access roads. On this latter point, it is noted that the pedestrian routes do not follow the most direct routes, but avoid crossing the access-egress area for the buses.

These points were escalated to the design team for priority consideration, with the potential for a combination of strict speed limits, signalisation and bus priority measures to be incorporated in the design.

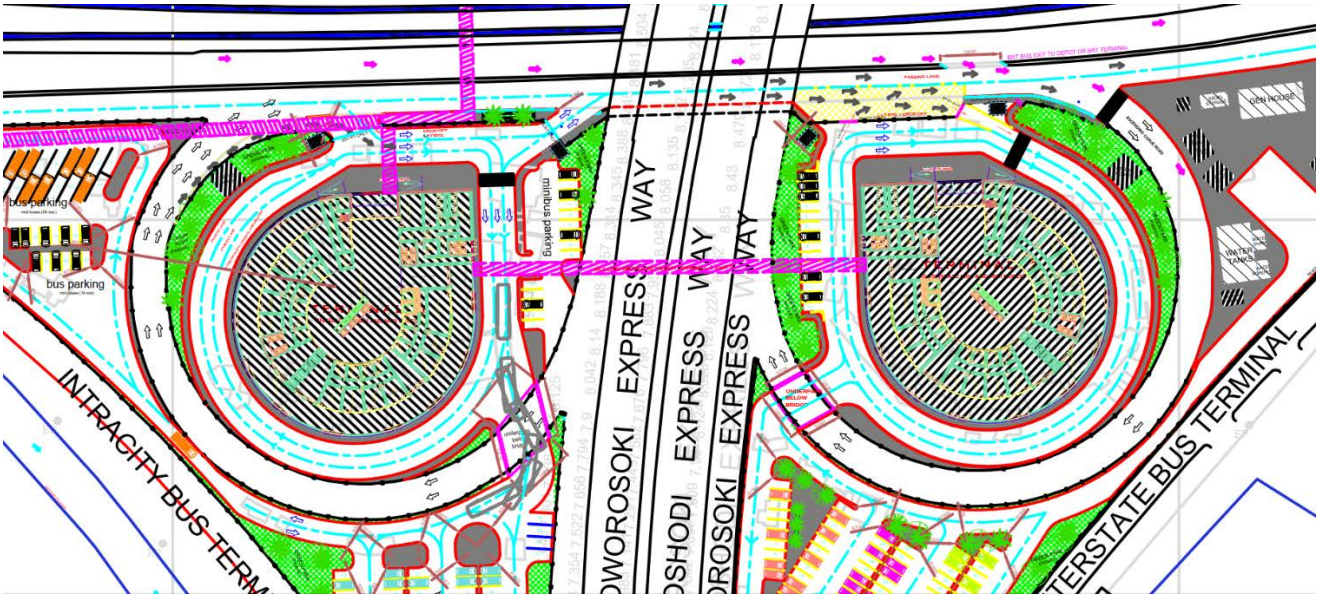


Figure 10 - Extract from Mile 2 interchange drawing showing highway layout around two bus terminals

**Walking routes to the interchange** – overall it could be seen that, through a combination of the elevated walkways, creation of walkways and pedestrian crossings, significant improvements are proposed for those crossing the site by walking, in a very challenging context. This is particularly important given the scale of the interchange and the fact that many people may need safely cross the highway junctions and railway for reasons other than to access public transport. A number of more minor recommendations were made, such as the creation of save points to cross the Express Ways at the northern, eastern and southern extents of the highway junctions.

**Cycle routes, parking and storage** – Similarly, in a context where the existing cycling modal share is very low, significant efforts are made to encourage cycling to the interchange. These include the provision of a dedicated off-street cycleway from the north-east, which then provides a route to the southern side of the expressway via an underpass, as well as the creation of sheltered cycle parking facilities in central locations on both the north and south sides of the interchange. Recommendations on further potential cycle routes were provided, noting also that it is important to ensure that both walking and cycling routes are through public (un-restricted access) parts of the site.

Figure 11 - Danfo parking area adjacent to the Mile 2 rail station

**Informal transport** – Danfo minibus services currently operate using the two lanes of the Isali-Ijanikin-Animshaun Rd to the north and south sides of the railway and expressway. The interchange proposals retain space in the same location for these services to collect and drop-off passengers, which could be considered a highly preferable position, enabling quick access to the railway station. Additionally, it is planned that one loop of the new interchange will be allocated for informal transport operations, including Danfos and the three-wheelers that currently collect passengers on Durbar Road (where a new cycle lane is planned).

The existing inter-city and inter-state bus operations are able to continue operating from the new terminal on the south-eastern loop of the cloverleaf interchange.

### 3.2.4 Comfort and safety

Key themes arising from the appraisal of the comfort and safety design topics are summarised below:

**Shelter, temperature and lighting –** Reviewing the designs of both the existing railway station and proposed interchange, it was apparent that significant effort has been made to provide shelter from the sun (along the elevated walkways and platforms) and reduce the limit the cooling demand for buildings. For example, the new railway station utilises ceiling fans, rather than a full air conditioning system. Natural lighting of buildings is also provided for, including through the inclusion of a central roof light over the atriums of the bus terminals.

**Seating** – Seating was identified as an important area for attention in the future design plans. In the case of the existing railway station, there is sufficient space to the sides of the main concourse, but no seats had been installed at the time of site visit. The designs for the new bus terminals were not yet sufficiently detailed to indicate seating areas, although it is apparent that there would be sufficient space in the large terminal buildings for a good level of provision. One aspect highlighted for consideration was the provision of seating at regular intervals along the relatively long walking routes (elevated walkways and at surface level), enabling people to rest when beneficial.

**Toilets and baby changing** – Toilet provision was also viewed as particularly important topic by LAMATA, on the basis that facilities should be accessible to the public and not only for passengers. LAMATA explained that a concession-model is planned, whereby there would be a low charge to use toilets managed and maintained by another company. At the existing Mile 2 railway station, it was found that the level of provision is low and that the layout was cramped. Additionally, there is no provision for people using wheelchairs, or provision for baby changing. The interchange proposals provide the opportunity to rectify the overall level of provision at Mile 2, and each of the bus and ferry terminal buildings provide segregated facilities for women and men, as well as a disabled access cubicle.

**Safety and security –** Overall it was found that the designs of the railways station and the proposed bus and ferry terminals provide for good sightlines and passive surveillance, through the provision of large, open concourses and stairways. In the 3D animation of the interchange proposals, the elevated walkways are shown with side panels, but it is understood that these will be not be put in place, to ensure visibility of people using these routes. Recommendations addressing specific aspects of the design included the potential provision of kiosks/booths in the bus terminals in place of some of the retail units, creating wider walkways from the atrium to the external bus stops. Further options for consideration by LAMATA include the provision of waiting areas allocated for women and children at the terminals (based on recommendations of the HVT EMPOWER project and SHE CAN tool).

The level of staffing (both station personnel and security staff) was high, also contributing to a feeling safety at the railway station.

**Emergency response –** During the visit to the railway station, it was noted that exits are clearly signposted, but further information on emergency response planning and measures to ensure emergency exit signage remains illuminated in ‘black-out’ situations will be required to complete the appraisal. Additionally, identification of safe spaces for passengers to gather should be identified as part of an emergency planning and staff training exercise.

### 3.2.5 Hubs for public life

Key themes arising from the appraisal of the hubs for public life design topics are summarised below:

Figure 12 - Area for a retail unit at the Mile 2 rail station

**Formal retail provision** – For both the existing railway station and the proposed interchange, attention has been paid to creating retail units for let. In the railway station these are located to the sides of the main concourse and movement corridors, so in convenient and highly visible locations that also provide for passive surveillance of the public areas by shop staff and customers.

In the case of the proposed interchange, each of the bus terminals provides for 26 retail units - 13 x 12sqm; 12 x 29-30sqm; and 1 x 63sqm (fast food). These provide for passive surveillance of both the central atrium and indoor waiting areas. One point raised for consideration during the appraisal was whether a proportion of the permanent retail units could be replaced with more flexible kiosks/booths. This would have three main advantages: firstly, the density of existing retail units in the plans reduce views across the terminal, with potential security implications; secondly, the width of movement corridors could be adjusted over time, based on the number of and positioning of the kiosks/booths; and thirdly, the number of booths/kiosks can also be increased in line with demand, reducing a poor perception that can occur if numerous retail units remain vacant. As a final recommendation, the permanent retail units that are retained might be designed to enable passengers to walk through from the atrium to the waiting area, improving views through the space.

**Informal market trading** – Mile 2 is a well-established location for market trading and the project team spoke with traders during the site visit. At that time, informal market traders occupied locations along the sidewalks and under the elevated ramps and walkways used to access the railway station. Additionally, more permanent stalls had been constructed along Durbar Road and along the south-eastern periphery of the site, between the railway station and the expressway junction.

Figure 13 - Informal market traders at Mile 2

The ongoing design work has resulted in public authorities and LAMATA giving further consideration to how market trading activities can be accommodated and managed within the new interchange proposals. This is expected to involve a combination of the following measures:

- The allocation of areas of the new interchange for use by market traders, where a rental agreement with the micro-enterprises would be completed. This would involve the provision of lockable stalls and storage sheds in specified locations.
- Where the existing scale of trading cannot be accommodated in the new plans, nearby premises will be identified to enable relocation.
- LAMATA is fostering collaboration with other relevant authorities in order to bring forward suitable training initiatives and management arrangements. This includes livelihood restoration planning with the Ministry of Women Affairs and Poverty Alleviation, with selected programmes covering: financial literacy, adult literacy, shoe & leather works, textile design, and catering & hotel management.

**Public performance and art** – At the time of design appraisal, there were no specific proposals regarding art and public performance at the railway station, or at other locations around the new interchange. It was identified that the design of the bus terminals could present opportunities to provide space, either in open areas (such as the atria) or on a temporary basis in vacant retail spaces, for artists to exhibit their work.

### 3.2.6 Integrated planning and design

Key themes arising from the appraisal of the integrated planning and design topics are summarised below:

**Energy efficiency and renewable energy -** The railway station design provides a good balance of utilising natural light through the smaller side windows and glazed walls at the entries (which are shadowed by the roof angle), while limiting solar gain. Additionally, the light shade of cladding helps to reflect heat. As stated above, ceiling fans are deployed for cooling purposes, rather than deploying full (more energy intensive) air conditioning. Similarly, the proposed design of the bus terminals seeks to combine natural lighting with low solar gain. A roof light helps to illuminate the atrium of the large buildings while the surrounding white roofed area will help to reflect heat. For the doors at ground level, brise soleil is shown to provide shading. It is understood that all the new buildings have been designed to meet LEED (Leadership in Energy and Environmental Design) standards, with the aim to ensure a high overall sustainability performance.

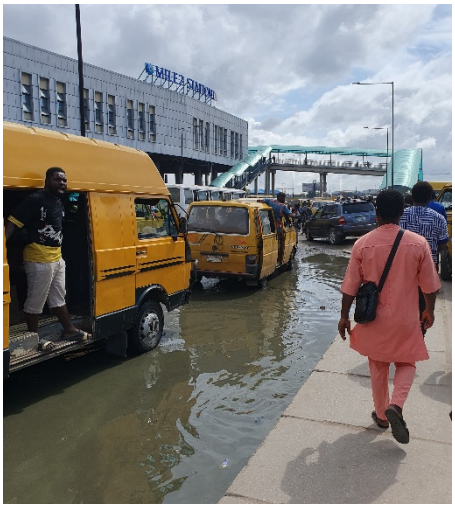

Figure 14 - Photo showing standing water in the area used by Danfos for collecting passengers

At the time of the design appraisal, no details of renewable energy installations were available, but the possibilities were being investigated. Implementation of solar power, utilising the large roof spaces of the buildings, could contribute to reducing long-term operational costs of buildings, while also providing the potential for charging of back-up battery energy storage, in case of 'black-outs' and emergency situations.

**Climate resilience – sustainable drainage and flood risk mitigation** – From the site visit, it was apparent that there are issues of water drainage around the site, with standing water occurring in one of the Danfo passenger collection areas. LAMATA confirmed that this is an issue of improving maintenance and clearing blockages occurring in the drainage system.

Given the proximity of the Mile 2 interchange to the river, a flood risk assessment is planned to inform mitigation measures in the final design, as well as emergency planning. This will be of added importance for the ferry terminal, and for the new road and cycleway linking the north and south sides of the interchange beneath the expressway, which passes very close to the river bank.

# 3.3 Marina interchange

The context of the Marina interchange is very different to that of Mile 2, for while it is located close to the Island Central Business District (CBD), the waterfront area is cut off from neighbouring streets. Other than the railway station, there are few reasons to visit the site. In contrast to Mile 2, this means that informal transport and market trading activities are currently very limited, although this situation may well be changing now that the Blue Line rail services are operating.

**Please note**: the images of the Mile 2 interchange proposals are based on information provided in October 2022 and no longer represent current designs.

## 3.3.1 Context, site appraisal and interchange layout

### 3.3.1.1 Interchange location and network connections

Marina interchange acts as the eastern terminus of the **Lagos Blue Rail Line**, serving the city's main business district on Lagos Island, which acts as a centre for commerce, finance, administration and education. LAMATA is also considering the extension of the **Red Rail Line** to Marina, which could involve construction of a second elevated rail line and station (see illustrative drawing). Interchange is provided to:

- Bus Rapid Transit – Marina is located at the southern end of the BRT corridor connecting to Mile 12 and Ikorodu.
- LAGBUS routes
- LAMATA First Mile – Last Mile feeder service
- Molues – midibus services
- Danfo routes – and minibus services, operating intercity and urban routes from nearby terminals.
- Shuttlers shared minibus – several Shuttlers route operate via Marina, providing connections towards Satellite Town (west), Ikeja (north) and Lekki (east).

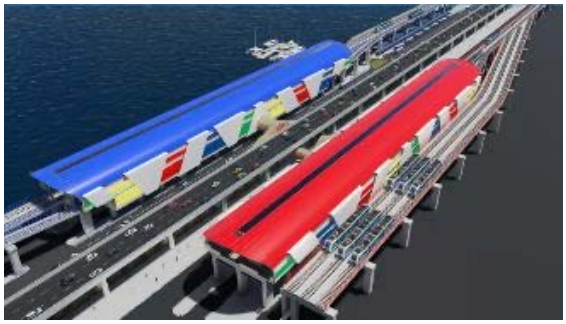

Figure 15 - Extract from LAMATA's animation of the Marina Blue and Red Line rail stations

- The rail station is located adjacent to a ferry jetty, with a currently limited operation.

**The interchange site** encompasses the recently constructed Blue Line rail station and extends to the northwest along a narrow strip of waterfront land and the E1 New Marina Road. At a distance of approximately 450m northwest of the rail station, the interchange site extends across the highway, providing a connection to Marina Road and the Central Business District (CBD).

### 3.3.1.2 Interchange zone

Marina rail station is located on the waterfront of Lagos Harbour, within a narrow strip of land dominated by the 4-6 lane New Marina Road highway. While the rail station is relatively close to the Central Business District, it is separated from commercial, office and community buildings on Marina Road by a high wall and strip of land used predominantly for car parking (approx. 100m in width). The rail lines and station itself are elevated on concrete pillars and the LAMATA First and Last Mile bus service operates from directly underneath the rail station building. Danfo services operate from stops along the Old Marina Road, such as from the junction with Odunlami Road.

The harbour waterfront area is relatively undeveloped with respect to commercial and food & drink, representing a potential opportunity.

To the north, land use on Old Marina Street is dominated by large government, port authority and finance company offices, although there are some residential apartments, as well as the General Hospital of Lagos.

Further to the north, more mixed retail, commercial and residential development patterns are found around Campbell Street.

Figure 16 - View northwest from Marina station towards the Island CBD showing the elevated rail lines

Figure 17 - A LAMATA bus parked at the Marina waterfront, underneath the Blue Line rail station


Figure 18 - Map showing Marina interchange zone

### 3.3.1.3 Interchange site and proposed layout

**Current proposal -** The proposed interchange design utilises the relatively narrow strip of land between the waterfront and New Marina Road (eastbound) carriageways and under the elevated highway westbound carriageways to deliver a series of new interchange facilities. Listed from east, adjacent to the Blue Line Rail Station, to west these are:

- a First & Last Mile feeder bus terminal;
- a BRT bus terminal, combined with a terminal building for the ferry service;
- passenger drop-off and pick-up lanes (Kiss & Ride);
- a 'Transit Building' incorporating commercial space, which enables an elevated walkway to Old Marina Road, via a Multi-level Car Park building;

- surface level improvements for Non-Motorised Transport (NMT) including cycle lanes and walkways.

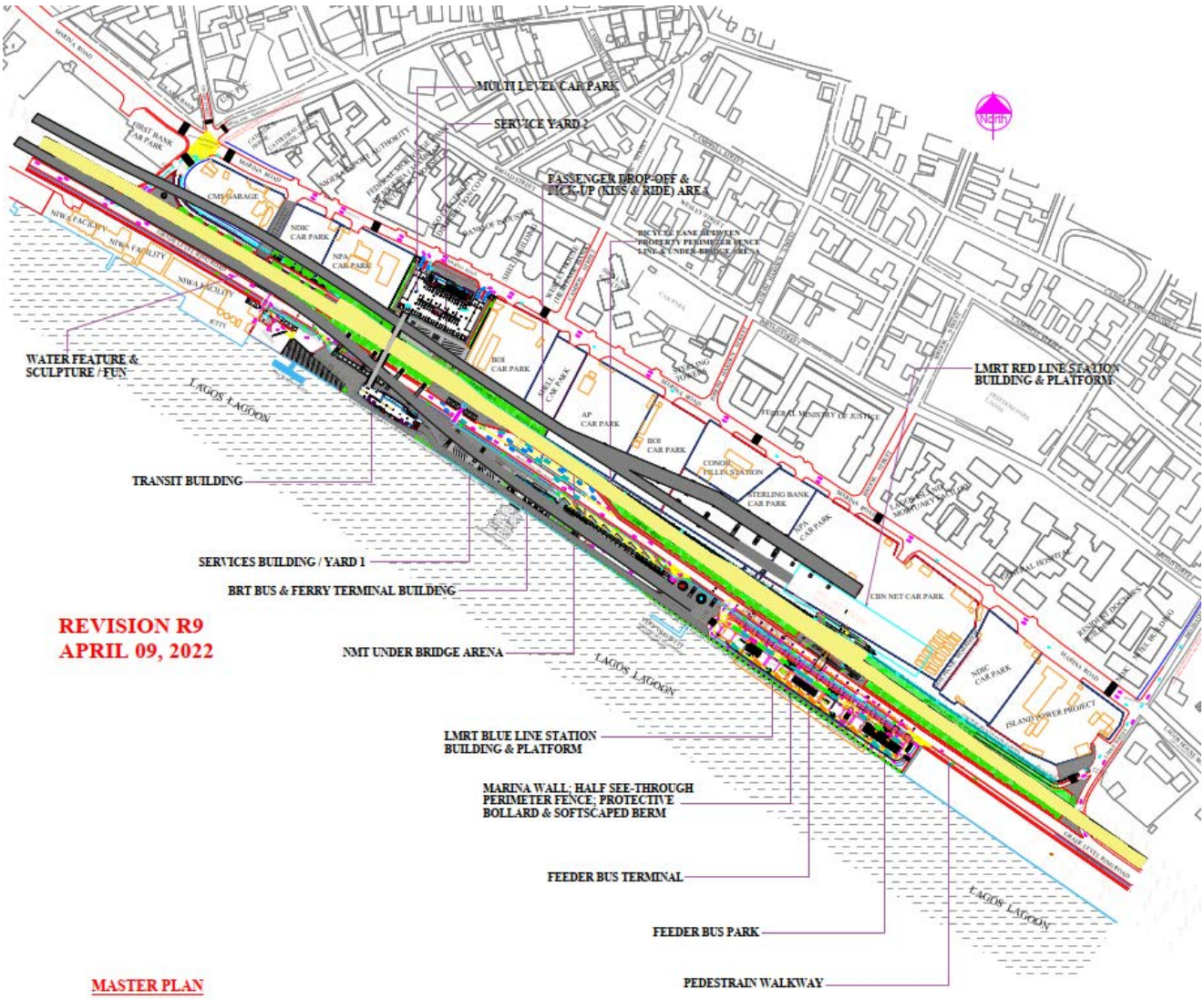


Figure 19 - Extract from the masterplan drawing of the Marina interchange proposals

Figure 20 - Extract from LAMATA's animation of the Marina Interchange proposals, showing the overall layout

### 3.3.2 Multimodal interchanges

Key themes arising from the appraisal of the multimodal interchange design topics are summarised below:

**Linear and modular design –** The existing rail station is a prominent, clearly visible building within the townscape. The same would be true for the elevated Red Lane station when constructed. As the entrance points are located under the building, provision of additional lighting and signage on the walkways either side of the concrete pillars could be beneficial, to help highlight these.

The full interchange proposals utilise the long and narrow strip of land along the waterfront, resulting in a 'modular' interchange proposal (rather than a single interchange building), with the main focal points being: the railway station; the combined ferry and BRT terminal; and the 7-storey Transit Building. The Transit Building will provide a very clear landmark and is accessed via: a large ground level entrance; an elevated walkway via the multi-level car park from Old Marina Road; and an elevated walkway linking the Transit Building with the rail station. Providing maps of the interchange on walls, including commercial facilities (e.g. food & drink; pharmacist), will help familiarise passengers with what is available on this large site. Overall, the proposals have the potential to result in substantial additional activity in this location, relating to the mobility options, but also potential commercial, retail and leisure opportunities.

**Movement corridors and transfer distances** – The means of movement to and around the interchange by walking has been one the principal design topics for ongoing assessment and updates to the proposals. First of all, the proposed interchange design makes beneficial use of the location, providing walk routes and public open space along the waterfront and north-side of Marina Road (eastbound lanes). The distances between the railway station and the BRT terminal (approx. 180m) and the ferry terminal (approx. 280m) are reasonable, taking into given the elongated nature of the site available, while the First and Last Mile buses stops are directly beneath the railway station.

Nevertheless, during the appraisal process, concerns were raised about the main means of access to the interchange from Marina Road, as well as the use of pedestrian bridges and elevated walkways within the site. Based on the plans provided for assessment, these were as follows:

- **Access from Marina Road** – Based on the original designs provided, passengers approaching from the CBD and Marina Road can walk to the interchange from the junction of Odunlami Street and Marina Road, or further east via the proposed multi-storey car park building. This latter option would involve passengers using elevators within the car park building to access an elevated walkway at the 7$^{th}$ floor. The passenger would then proceed along the walking to the Transit Building, where they could descend to a lower floor to use an elevated walkway along the waterfront, or proceed to ground level. This was identified and as a long, indirect and inefficient way for passengers to access the interchange, as well as a technical solution that would be relatively expensive to construct, maintain and to provide suitable security.
- **Elevated walkway linking the Transit Building and railway station** - The proposed elevated walkway is >300m long and duplicates the surface level walkways that are also available. It is not clear what additional benefit this bring, while additional maintenance and security costs can be anticipated. The elevated walkway includes two bends close to the Transit Building, which may result in safety concerns due to limited site lines.
- **Pedestrian bridge** – a pedestrian bridge, providing away across the highway from the Transit Building to the passenger drop-off and pick up (kiss & ride) area. A surface level crossing would be more suitable in this location, providing a more direct route for pedestrians and reducing construction, maintenance and security costs.

Related to these points, further opportunities to provide surface-level pedestrian and cycling access through from Marina Road were identified (see section 3.3.3) and it is understood that LAMATA is working on revisions to the plans that introduce several new surface-level access routes. The proposed elevated walkway from the multi-storey car park would, therefore, primarily serve those arriving by car.

**Accessibility for people with disabilities** – movement to the elevated railway station necessitates level changes and it was noted that step-free access to the platforms is foreseen through a combination of ramped access routes and bridges (incorporating resting places) and the provision of lift shafts in the building design, although installation of the lifts had not yet occurred at the time of the site visit. For the proposed interchange, the building designs also include elevators and detail is being paid to further design details, such as the provision of tactile paving and provision of kerbs and platforms at the right height to provide step-free access.

**Transport service information, wayfinding and signage** – Inside the existing railway station, rail services are displayed on a large electronic screen above the ticket office, although there was no provision of clocks evident. Detailed plans for the provision of mobility service information for the full interchange were not yet available for the appraisal, but it is understood that an integrated information services is planned. As BRT and First Mile, Last Mile bus service will be accessed from the waterfront outside the rail station, there is an opportunity to provide a screen/s displaying the timings of all services, for those moving through the open space outside.


Figure 21 - Photo of the ticket office and electronic information screen inside the Marina rail station

As noted for Mile 2, signage within the new rail station was found to be clear and uniform in style, including a mixture of text and symbology for clarity. Signage for rail users was good, but signage for passengers looking for the next form of transport for onward travel was not yet in place and could be improved during the implementation of the new interchange proposals. As the network of transport modes becomes more extensive, and the interchange becomes more complex, the development of network and interchange maps, based on a standard LAMATA signage format and manual will become increasingly important.

### 3.3.3 Transport mode specific

Key themes arising from the appraisal of the transport mode specific design topics are summarised below:

**Prioritising sustainable modes at the interchange** – There is currently no car parking at the railway station and it is clear that substantial efforts have been made to prioritise quick access between rail, BRT, First and Last Mile bus and ferry services. Significant improvements to pedestrian and cycle routes are also foreseen and under further discussion.

As referred to above, the wider interchange proposals do include the provision of a multi-storey car park on Marina Road. The appraisal highlighted that the rationale for providing additional car parking in this city centre location needs to be carefully considered, particularly when there appears to be significant further parking areas on the south side of Marina Road. Questions arising include: Is it foreseen that the car park will have a Park & Ride function at this proposed terminus of the Red Line inter-state railway? Is Marina Road an appropriate street to cater for increased levels of car movements? Will the car park encourage increased car use to arrive at the railway station, rather than the public transport services offered? And could the multi-storey car park site be better utilised for higher value land uses such as residential, hotel or office, potentially with an integrated car sharing or car rental offer? This final point relates to the consideration of TOD opportunities associated with the site (see section 3.3.6).

LAMATA have appraised the situation and identified that the Outer Marina (area around the interchange) does not have adequate parking and that the new development (such as the Transit Building) would require parking as well. In addition, a future Green metropolitan rail line would share the Blue Line terminus station. This is considered to result in demand for parking at the inner Marina (on Marina Road) and the multi-storey car park, which is integrated with the development through the provision of the elevated walkway (skywalk).

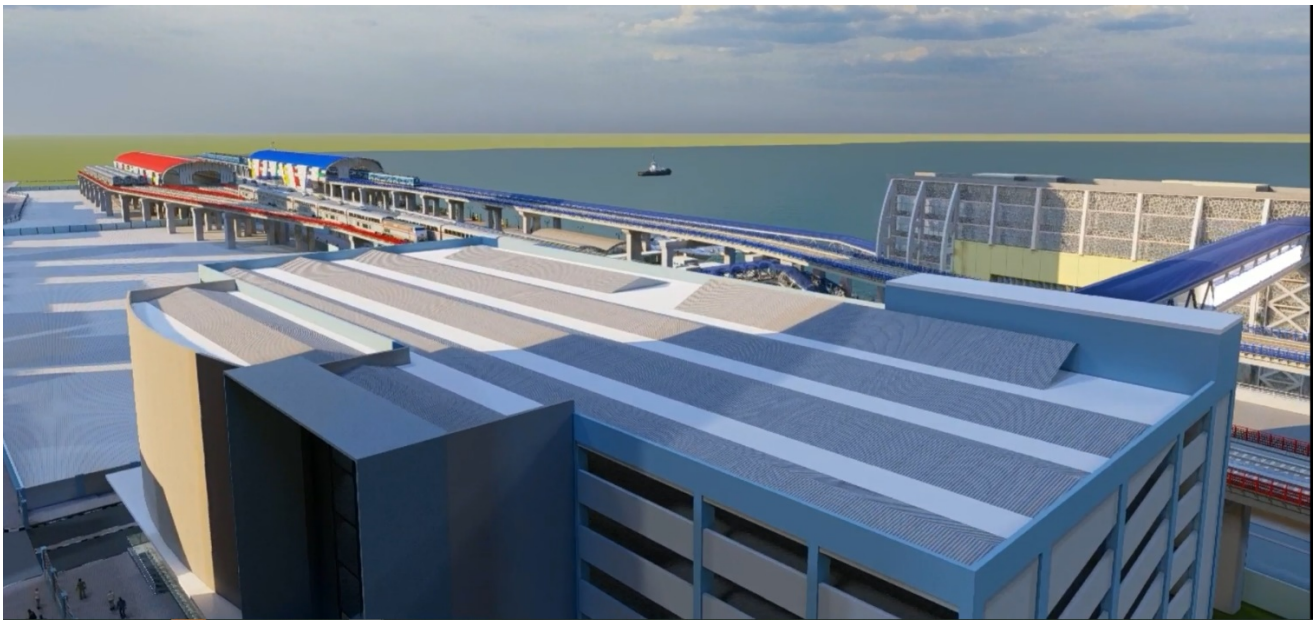

Figure 22 - Extract from the LAMATA's animation of the Marina Interchange proposals, showing the multi-storey car park and elevated walkway to the Transit Building and waterfront area

**Walking routes to the interchange -** Given the location of Marina, close to the Island CBD and residential property, it is assumed that a large number of passengers will walk to the railway station. Existing surface level routes would be from the west, from the Odunlami Street/Marina Road/Cathedral Church of Christ junction, and from the east, via Cable Street. As these access points are 1km apart along the marina waterfront, LAMATA has explored further opportunities to create access points from Marina Road.

The appraisal process identified the potential to mimic the street pattern to the north, creating improved permeability and access to the waterfront, by providing further access routes linking with Brook Street and Joseph Harden Street. Based on the most recent plans, LAMATA is seeking to provide three additional new pedestrian access routes through to the interchange from Marina Road.


Figure 23 - Aerial photograph, with annotations showing potential new pedestrian access routes

**Cycle routes, parking and storage –** There is currently no dedicated cycle infrastructure and the interchange proposal takes the opportunity to introduce a dedicated west-east bicycle path along the northern boundary of the site. Combined with the north-south access routes referred to for pedestrian access, this will provide a convenient network for walkers and cyclists to access the interchange and waterfront area.

Figure 24 - Extract from LAMATA's animation of the Marina Interchange proposals, showing the segregated cycle path and locations of cycle parking shelters

Figure 25 - Photo showing Danfos operating from the Odunlami Road/Marina Road junction

The architect's 3D animation of the proposals shows the provision of sheltered bicycle stands, between the cycle path and the passenger drop-off and collection lay-by (Kiss & Ride). As this location would have more limited passive surveillance (particularly at off-peak times), consideration should be given to relocating the cycle parking to the southern part of the site adjacent to the railway station and/or BRT stops. This would be a convenient location for people wishing to cycle to the interchange, before then taking a train or bus. If the number of cyclists increased, then there would be potential to provide more secure staffed cycle parking and storage facilities, where repair services might also be offered.

**Informal transport –** During the site visit it was apparent that Danfos and other forms of informal transport currently operate from other terminals in the Marina area. This includes, for example, a terminal at the Odunlami Street/Marina Road/Cathedral Church of Christ junction to the west of the interchange site. There were no Danfos present at the railway station during the site visit, although it could be anticipated that, as the level of rail services increase, Danfo and other informal transport operators may seek to offer services from directly outside the station.

The plans include a layby for the dropping-off of passengers, however it is uncertain if this will be sufficient for future demand. Careful consideration needs to be given as to: whether space should be provided directly at the interchange (when existing Danfo terminals are not located in sufficiently close proximity); and if so, what scale of service level should be enabled from this location. This should be based on the mapping of existing terminals and routes, and gap analysis of where Danfo services would provide beneficial additional services to those provided by LAMATA. At the time of the appraisal, LAMATA has put in measures to discourage informal transport operations as the planning work is ongoing.

### 3.3.4 Comfort and safety

Key themes arising from the appraisal of the comfort and safety design topics are summarised below:


Figure 26 - Photo of the rail station platforms and canopy

**Shelter, temperature and lighting –** With respect to the existing railway station, outdoor walkways and platforms are sheltered to provide relief from the sun. The rail station canopy and walls include rooflights and brise soleil in order to provide natural lighting, while still providing shelter and reducing glare. For the station concourse hall, ceiling fans are installed to keep air moving and provide some cooling, rather than providing full air conditioning.

Moving outside to the interchange site, then large parts of the area are sheltered through a combination of the elevated railway station and railway lines (including shelter for the First & Last Mile Buses); the elevated west-bound carriageway of the Ring Road highway; bus shelters provided at the BRT stops; and other shading structures provided within the open space along the waterfront.

Figure 27 - Extract from the LAMATA's animation of the Marina Interchange proposals, showing the provision of shelters at the BRT stops and seating on the waterfront.

**Seating** –In the case of the existing railway station, there is sufficient space to the sides of the main concourse and on the platforms, but only a limited number of seats had been installed at the time of site visit. The provision of benches along the waterfront is indicated in the animation of the interchange, which will be beneficial for those needing to rest while moving between different transport modes. Nevertheless, the appraisal also identified the need to give further attention to provision of seating at the BRT and First & Last Mile stops.

**Toilets and baby changing** – As raised in relation to Mile 2, toilet provision is viewed as a particularly important topic by LAMATA, on the basis that facilities should be accessible to the public and not only for passengers. LAMATA explained that a concession-model is planned, whereby there would be a low charge to use toilets managed and maintained by another company. At the existing Marina railway station, there was a comparatively good level of provision of gender segregated toilets (totalling 14 women's toilets; six men's toilets and 9 urinals). However, there is no provision for people using wheelchairs, or provision for baby changing. The interchange proposals provide the opportunity to provide toilet facilities at different locations across the site, including provision of disabled access toilets and space for baby changing.

**Safety and security –** Within the railway station building, the concourse is wide and open, with good sightlines from the ticket offices. The views down to the platforms are also clear and direct down the wide staircases. Equally, the proposed building layouts for the Transit Building and BRT and ferry terminal indicate open plan buildings, allowing for good sightlines and visibility of public areas.

Externally, the construction of the railway station and rail lines on wide concrete pillars means sightlines are blocked, hence a security staff presence outside the building could help to provide reassurance, particularly at nighttime and quieter times of day.

**Emergency response –** As for Mile 2, it was noted that exits in the railway station are clearly signposted, but further information on emergency response planning and measures to ensure emergency exit signage remains illuminated in 'black-out' situations will be required to complete the appraisal. Additionally, identification of safe spaces for passengers to gather should be identified as part of an emergency planning and staff training exercise.

### 3.3.5 Hubs for public life

Key themes arising from the appraisal of the hubs for public life design topics are summarised below:

**Formal retail provision** – Space within the existing railway station for provision of retail units is more limited, and therefore there is more reliance on providing space for food and drink outlets, pharmacists and other shopping opportunities in the wider surrounding area.

For the proposed interchange, plans indicate that there will be space for around 6 kiosks/retail units in the external open space between the Transit Building and the ferry and BRT terminals. This approach was supported by the appraisal, given that this provides some flexibility to upscale(or downscale) provision according to demand.

Figure 28 - Extract from the LAMATA's animation of the Marina Interchange proposals, showing the proposed retail units/kiosks In the open space along the waterfront

**Informal market trading** – At the time of the site visit, there was no informal trading activity around the railway station, although it could be assumed that trading activities will become established as rail service frequencies increase. During the finalisation of the interchange plans, there is potential for 'future-proofing' of the designs in this regard, to provide allocated external spaces for market traders. Similar to the approach at Mile 2, this is expected to involve a combination of: allocation space for use by market traders where lockable stalls and sheds would be provided, which would involve completion of a rental agreement; and bringing forward training and management initiatives for the market traders in cooperation with the Ministry of Women Affairs and Poverty Alleviation.

Figure 29 – Canoe Monument at the Ikeja bus terminal

**Public performance and art** – Within the design of the new proposed interchange, attention has been paid to providing an attractive landscape, with ornamental planting and the inclusion of a fountain. There are further opportunities to enable temporary or permanent exhibits, as well as enabling performing and musical arts performances, in this waterfront location. The image at Figure 29 shows a public art installation, based on traditional canoes, at the Ikeja Bus Terminal and new railway station.

To borrow the words of a presenter at the Inclusive Interchanges workshop, art has the potential to elevate transport to travel.

While such proposals are encouraged, it is important to give consideration to ongoing maintenance costs, as well as security.

## 3.3.6 Integrated planning and design

Key themes arising from the appraisal of the integrated planning and design topics are summarised below:

**Transit Oriented Development (TOD)** - Located close to the Island CBD, the Marina interchange is in close proximity to a wide range of commercial, governmental and educational facilities, as well as residential areas. Nevertheless, the waterfront area currently feels "cut off" from surrounding districts due to the Ring Road Expressway and under-developed land (currently used for car parking), as well as the limited pedestrian access routes through to the interchange site. In this context, the interchange presents opportunities for regeneration of this waterfront area, and TOD. The appraisal showed that these opportunities are being exploited, but that further consideration should also be given to the mix of uses of the muti-storey car park:

Figure 30 - Screenshot from LAMATA's animation of the Marina Interchange proposals, showing the elevated walkway linking the multi-storey car park and Transit Building

- **Multi-storey car park -** As raised in Section 3.3.3, the appraisal process has raised whether assessments for alternative land uses should be undertaken, replacing part or all of the proposed car parking (car sharing and/or car rental services may be retained, providing the option of car use for trips were public transport is not suitable). Residential and commercial uses may deliver higher financial returns to public authorities, while better exploiting the high transport accessibility of the site and deterring increased car use.
- **Transit Building -** The land uses proposed are not clear, but it is assumed that a combination of retail and office provision would be suitable. The Transit Building represents an opportunity to create a landmark for the public transport network, while utilising the opportunity to create highly accessible floorspace on the waterfront.

**Energy efficiency and renewable energy –** The railway station utilises brise soleil, to help minimize solar gain and the light shade of cladding helps to reflect heat. As stated above, ceiling fans are deployed for cooling purposes, rather than deploying full (more energy intensive) air conditioning. For the proposed Transit Building, extensive areas of glazing are proposed and carefully consideration will need to be given to how the cooling demand can be minimised, combined with the specification of energy efficient air conditioning systems. It is understood that all the new buildings are subject to LEED assessment, with the aim to ensure a high overall sustainability performance.

At the time of the design appraisal, no details of renewable energy installations were available, but the possibilities were being investigated. As for the Mile 2 interchange, implementation of solar power, utilising the large roof spaces of the buildings, could contribute to reducing long-term operational costs, while also providing the potential for charging of back-up battery energy storage, in case of 'black-outs' and emergency situations.

**Urban greening** – The interchange designs show the retention of an area of green open space between the highway carriageways, and introduction of decorative planting around the terminal buildings and use of potted trees along the waterfront promenade. Taking into account the dominance of concrete pillars (for the railway and Expressway carriageway), inspiration could be taken from urban greening schemes like the Via Verde project in Mexico City, which led to the installation of vertical gardens on 1,000 pillars of a busy motorway[3].

**Climate resilience – sustainable drainage and flood risk mitigation** – While the interchange proposals and the design appraisal recognise the high potential of the Island waterfront location, the related dangers must also be emphasised. The railway station and proposed interchange are sited in an area of "Very High" flood hazard[4] and severe flooding occurred in the Marina Axis area of Lagos as recently as July 2021. Specific flood risk assessments are required to inform the design of any coastal defences for the banks for the Lagos Lagoon, as well as flood resilience measures that should be incorporated in the design of buildings and infrastructure. Sustainable urban drainage systems should also feature in the design to help limit the potential for surface-water flooding in high rainfall events. LAMATA have confirmed that, in response to the climate change report and the increase in water level at Marina, the road level has been elevated to protect from flooding. Aligning with this, the Marina interchange proposals have been developed to incorporate raised floor levels, to provide an added factor of safety.

## 3.4 Reflections from the case studies

Applying the IIDB appraisal process at the two interchanges in Lagos has been tremendously valuable to refine the IIDB template itself, and to provide feedback to the design teams on the emerging plans. When combined with the site visits, workshop discussions and pilot of the passenger survey, project outputs include a range of lessons learned and broader reflections, which we are presented below:

Figure 31 - Passengers boarding a BRT bus adjacent to the Mile 2 rail station

**Complex interchanges, in highway dominated contexts** – The IIDB template has provided a well-structured means to undertake a concise appraisal of the designs of two complex interchanges designs, against a very broad range of topics. Many of the transport, building and urban design, as well as operational management aspects covered, are complex topics in their own right, necessitating detailed studies and designs by experts. The Mile 2 and Marina interchanges will serve rail, ferry and multiple forms of bus service, including those operated by the formal and informal sector. It has become apparent that the formal transport modes and infrastructure are not historically embedded within the urban fabric (as would arguably be the case in many European cities, for example). As a result, the two interchanges are being designed in the context of existing multi-lane highways, with the railways and stations elevated above ground level on concrete pillars. This makes the provision of safe and convenient access by walking and cycling a challenge and, through the appraisal process, it became apparent that significant efforts have gone into promoting non-motorised transport.

**IIDB as part of wider design and engagement process** – The IIDB appraisal process is intended to be used to inform emerging designs, and/or to provide the design brief for future improvements of an existing facility. It is therefore applied a specific point (or points) in the process, and it has not been the intention of the project to provide advance on the wider interchange planning and implementation process. In the case of Mile 2 interchange, the site visit served to highlight the extent of existing 'informal' activities occurring at this location, and the limited amount of engagement with local stakeholders that had been undertaken. So, while the funding for the interchange had been secured and the design work was well advanced, the need for public communication of the plans, and involvement of those most likely to be effected in shaping the proposals (and potential mitigation measures) was considered to be lagging behind. LAMATA

[3] See: theguardian.com (2018) *Mexico City's vertical gardens: seeds of change or cynical greenwashing?* - Mexico City's vertical gardens: seeds of change or cynical greenwashing? | Cities | The Guardian

[4] See: Higuea Roa et al. (2021/22) *Technical Report: Lagos Floods*. United Nations University - (PDF) Technical Report: Lagos Floods (researchgate.net) - siting Idowu, Dorcas and Zhou (2021) Land Use and Land Cover Change Assessment in the Context of Flood Hazard in Lagos State, Nigeria. *Water*, vol. 13, No. 8, art. 1105. DOI: 10.3390/w13081105

therefore recognise the need for much earlier and ongoing engagement in connection with sustainable mobility planning and project implementation.

**Mapping of informal sector assets, activities and networks at around the site** – During the Inclusive Interchanges project, information on existing Danfo operations was requested from a relevant association, and the site visits help to show what services are being provided by the informal sector. At Mile 2, a Danfo association was providing toilets, including two former Department of the Environment toilet blocks, and also managing the allocation of sites for informal market traders, demonstrating the strong link between transport and trading operations. These informal operations were often taking place on government-owned land, but due to a previous absence of enforcement, a form of adverse possession has occurred that supports the livelihoods of hundreds of families. Mapping of informal sector activities and assets, as well as the organisational arrangements, is recommended to inform: the interchange design process; to understand where 'win win' solutions can be found, allowing informal activities to be continued); and/or to inform mitigatory and compensatory measures.

**Interchanges as a focal point for Informal Transport professionalisation** – As highlighted by the HVT TRANSITIONS project, so-called 'informal transport' is often subject to forms of regulation (such as route or area licensing), but limited enforcement of these regulations typically leads to over-supply and problems of congestion, as well as unsafe driving in the competition to collect passengers. Gaining sufficient financial resources to undertake enforcement across an entire metropolitan area may be considered unrealistic, but focussing enforcement at interchanges could be more pragmatic. It is likely that the introduction of new formal PT services will make these locations attractive for Danfo operators, who may be given preferential locations for collecting and dropping-off passengers in return for service agreements (e.g. safety checks of vehicles, providing services at off-peak times, etc.).

Figure 32 - Security personnel at the ramped access to the Mile 2 station entry and pedestrian bridge

**Distinction between public access and passenger only access areas** – Security is a key issue to ensure that passengers feel safe, encouraging continued use of public transport, and to enable efficient transport operations from the interchange. It was apparent from the site visits to existing LAMATA bus terminals that the boundaries of these facilities are fenced and that there is a strong presence of security staff at the gates. For smaller sites this is less problematic, but for larger interchanges such as Mile 2 and Marina, then the ability for the public to cross the site by walking or cycling (who may not be accessing the transport services) becomes important. In addition, LAMATA is interested to make public toilets accessible, and the retail offer at interchanges is likely to be more successful when they are open for the general public to use. This has the implication that the physical layout of the site and installation of security fencing, as well as the approach to policing the interchange, will need to be carefully considered.

**Providing access for people with disabilities** – A very powerful presentation at the Inclusive Interchanges workshop in October reinforced the need amongst the Inclusive Interchanges team to pay special attention to the needs of people with disabilities. The appraisal process showed that key measures, such as the provision of elevators and ramps with resting places, are included in the designs. In some cases, such as the elevators at the railway stations, there has been a lag time in implementation. There is also a need to concentrate on details, such as provision of more specialised wayfinding information and services, and invest in staff training so that people with disabilities can be give any additional assistance that may be required.

**Land value capture** – During presentations of the Inclusive Interchanges project, questions about land value capture have arisen. As a general concept, then there would be potential for LAMATA and/or other public authorities to put in place mechanisms to re-capture some of the gains from the investment in rail, BRT and cable-car lines, etc. Land value capture is defined as a policy approach that enables communities to recover funds and reinvest, based on the land value increases that result from public investment and government actions[5]. For Lagos, this process might be linked with an approach to

[5] See OECD / Lincoln Institute of Land Policy 'Building a global compendium on Land Value Capture - https://www.oecd.org/cfe/cities/Flyer-Land-Value-Capture.pdf

allocating sites for Transit-Oriented Development (TOD – see section 3.3.6). For this project, a more specific question arises around the approach to cooperating with the informal sector. The principle of enabling informal transport operators and market traders to continue their activities (or at least a portion of these groups), means that they are receiving preferential access to high value sites. One possibility arising is that this could incentivise cooperation with the public authority, combined with participation in capacity building and professionalisation initiatives.

# 4. Inclusive interchanges passenger surveys

Gaining insights on the types and durations of journeys made by the residents of Lagos, as well as those of visitors, is beneficial to inform the design of interchanges. Additionally, understanding those aspects of existing interchanges that are liked or disliked, as well the types of facilities that passengers expect they would use, can help shape the proposals and prioritisation of services to be provided. LAMATA undertake regular passenger surveys, but the focus of the questionnaires has been on the transport service itself, covering scheduling, ticket cost, comfort and cleanliness, etc. In support of the overall project objectives, it was therefore decided to develop an Inclusive Interchanges passenger questionnaire, and to undertake a pilot survey to test this out and gain some preliminary feedback on LAMATA interchanges. In this section we present the survey design, as well as the results from the pilot survey.

## 4.1 Questionnaire design

Development of a concise survey was viewed as important, in order to improve response rates and survey completions, and the pilot survey was undertaken using a questionnaire with a total of 13 questions. The framework of the Inclusive Interchanges Design Brief (IIDB), comprising design categories and topics (see Section 3.1 and Appendix A), provided a good basis for designing an interchange-specific questionnaire. This was used to generate a list of factors that could be considered of direct or indirect relevance to a passenger, utilising the long list of 55 design topics. For example, ensuring that the transport authority and/or operator has a suitable 'Operations Control Centre' is important for the smooth management of the interchange, but is not a subject where passenger feedback will be most valuable. In contrast, understanding whether passengers feel safe at specific interchanges of priority concern. To produce a relatively short and simple survey, it was often necessary to cluster related design topics, and it would certainly be possible to produce a more detailed questionnaire based on the IIDB in the future.

The resulting questionnaire is available for future use by LAMATA, either for an interchange-specific survey, or for the extraction of individual questions for use in a more overarching passenger satisfaction survey. The inclusive interchanges survey comprises of two main sections:

- **About you and your journey**
    - 1. What is the purpose of your trip?
    - 2. Which forms of transport have you used to make your trip?
    - 3. How long does your trip normally take, from door to door?
    - 4. What is your age?
    - 5. Gender: how do you identify?
- **Your experience at the interchange**
    - 6. How would you rate the safety and convenience of walking routes to this interchange?
    - 7. For this interchange, how easy or difficult is it to find the transport service stops/platforms and information on departure times?
    - 8. When you change between transport services at this interchange, how easy or difficult do you find the walking routes?
    - 9. How would you rate your feeling of safety at this interchange?
    - 10. How would you rate your feeling of comfort at this interchange?
    - 11. How regularly do you think you would use the following services, where/if they are made available?
    - 12. For this interchange, are there any other suggestions or problems you would like to highlight?

Additional to these questions, LAMATA were interested to understand passengers' awareness of the emergency helplines, so the following question was included:

- 13. Do you know helplines to call in case of emergency?

When undertaking the survey, the enumerator is required to confirm the name of the interchange, as the majority of the questions are intended to be answered in relation to one location.

The survey does not include a question on whether the respondee is a person with a disability, and this could be considered a future priority for inclusion in the demographic section.

## 4.2 Results of preliminary survey

LAMATA conducted a pilot passenger survey on 27 March 2024, in order to test the questionnaire and gain some initial insights on people's perceptions of the interchanges, and what additional facilities they would value most.

A total of 158 responses were received at seven locations where LAMATA has constructed interchanges. This results in a small sample size per interchange, but some useful first indications for the transport authority. The results are presented in a different order to the questionnaire, to show the demographics of the respondents first.

### Q5. Gender: how do you identify?

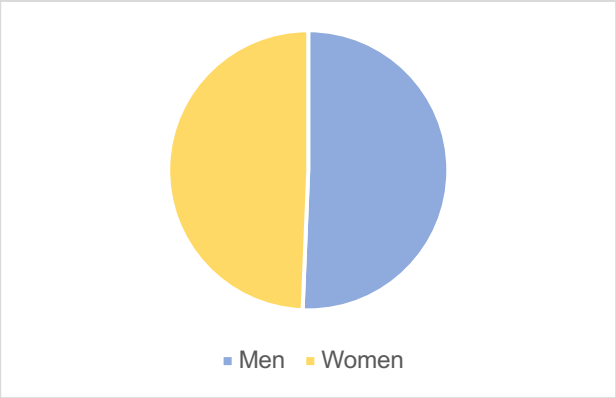


Figure 33 - Chart showing gender ratio of respondents

A close to 50/50 split between women and men respondents was achieved across the interchange sites.

### Q4. What is your age?

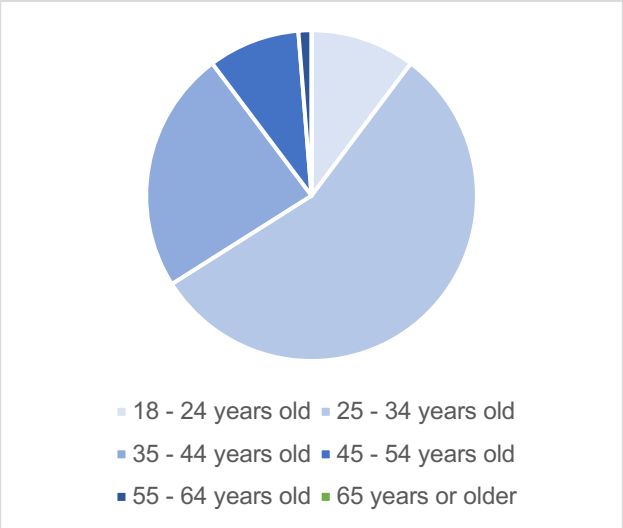


Figure 34 - Chart showing ratio of respondents by age group

The pie chart shows that over half of the respondents were in the 25-34 years old age group.

### Q1. What Is the purpose of your trip?

Close to 100 of the respondents were travelling for work purposes, with education, leisure and social visits being the next three main trip purposes (around 13 respondents for each). These results may reflect the time of day at which the survey was undertaken, and LAMATA may wish to undertake surveys at more targeted times of day in the future, to capture the views of different groups.

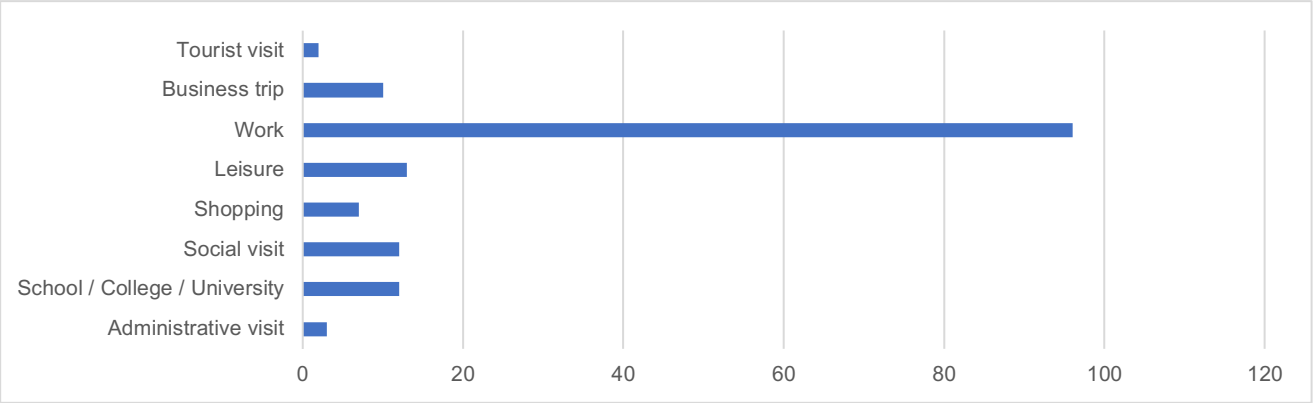


Figure 35 - Chart showing trip purposes

## Q2. Which forms of transport have you used to make your trip?

It is expected that the interchange locations selected will have heavily influenced the results for this question. 44 responses were gathered at the Mile 2 and Marina interchanges (collectively), which have railway stations, corresponding with the approximately 40 responses indicating arrival or departure using this mode. All of the interchanges surveyed are located on Bus Rapid Transit lines, helping to explain the large number of arrivals and departures by this mode. It is interesting to see that the numbers of respondents using LAMATA First & Last Mile services is close to 80% of the numbers for Danfos, given that both services may be utilised as feeder services to the BRT and rail lines. At the current time, it is apparent that cycling has a very low modal share and it will be very helpful to observe how the figures change as new infrastructure is provided in connection with the interchange proposals at Mile 2 and Marina.

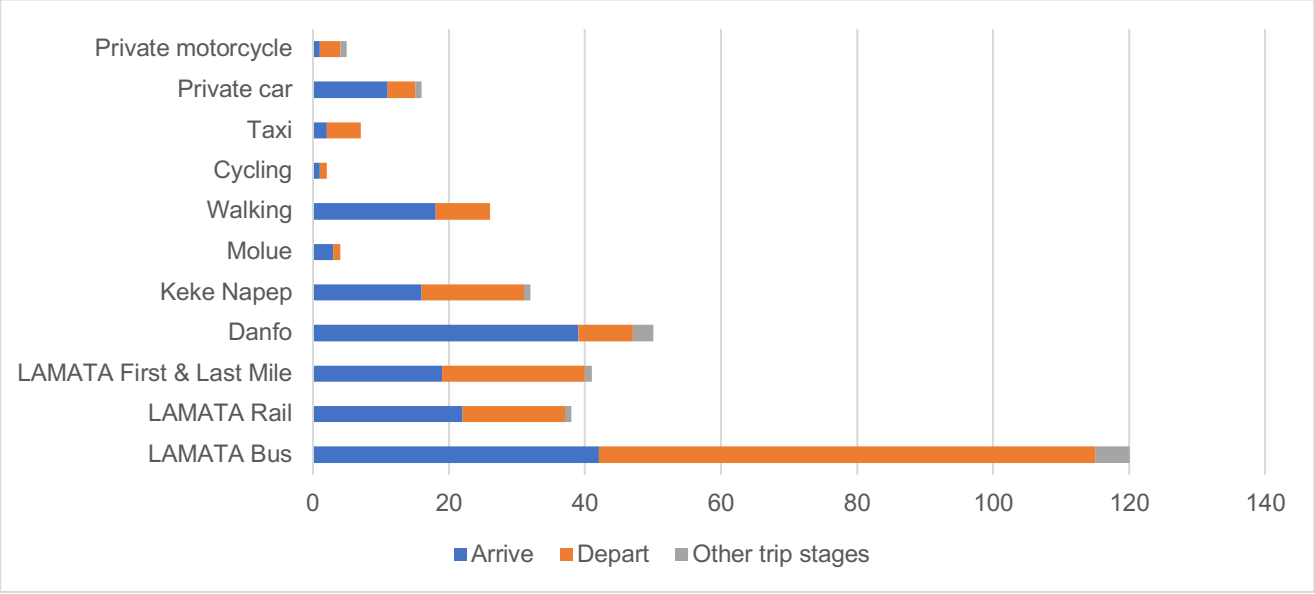


Figure 36 - Chart showing transport modes used to arrive at / depart from the interchanges and for other journey stages

When the results are reviewed for a single interchange they become more insightful. In the case of Mile 2, it is possible to see that the LAMATA BRT and rail services are well utilised, but that Danfos also serve an important function, bringing passengers to the site. The “arrive” and “depart” figures may be a function of the timing of the survey, reflecting the flows of people to and from centres of employment during the morning and afternoon.

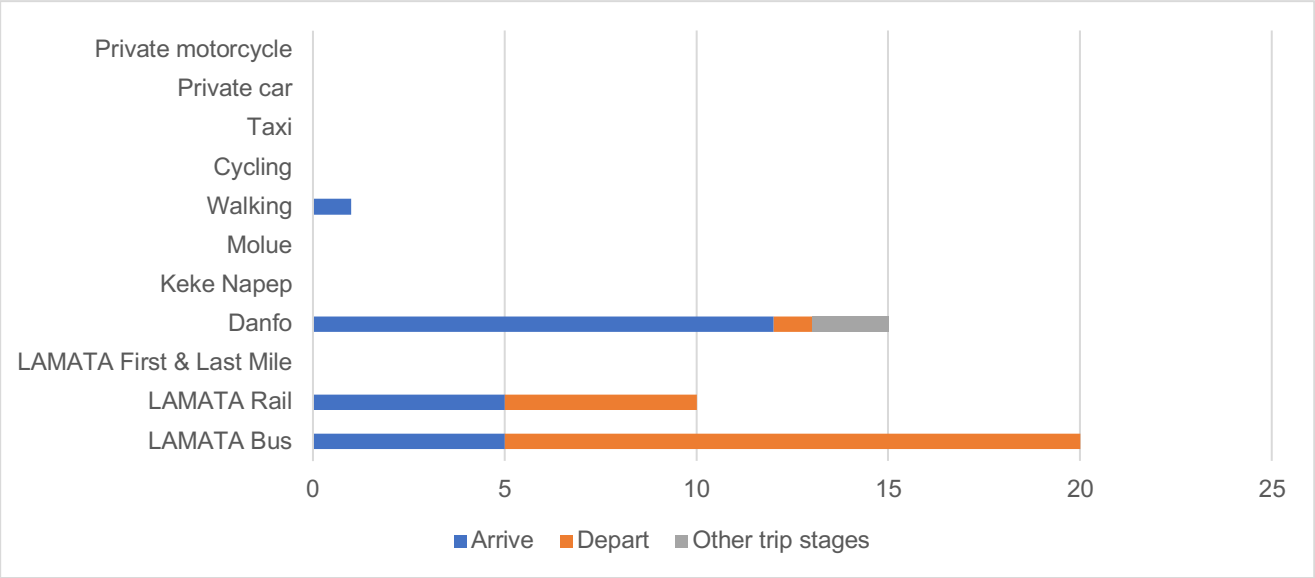


Figure 37 - Chart showing transport modes used to arrive at / depart from Mile 2 interchange and for other journey stages

## Q3. How long does your trip normally take, from door to door?

Average trip durations are of relevance for the provision of facilities at interchanges, such as the availability of food and drinks, as well as toilets. The survey results show that door to door trips of 45-60 minutes is common, and even trips of up to 90 minutes represent a significant proportion of the survey respondents (see Figure 38). This is not unexpected, given the very large scale of the Lagos metropolitan area and relatively high congestion levels. To provide a comparator, a Eurostat study undertaken in 2019 found that, on average, workers living in cities had a longer commuter time than those living in smaller towns or more rural areas (see Figure 39). Around 40 of the Eurostat respondents had a commuting time of 30 minutes or more[6].

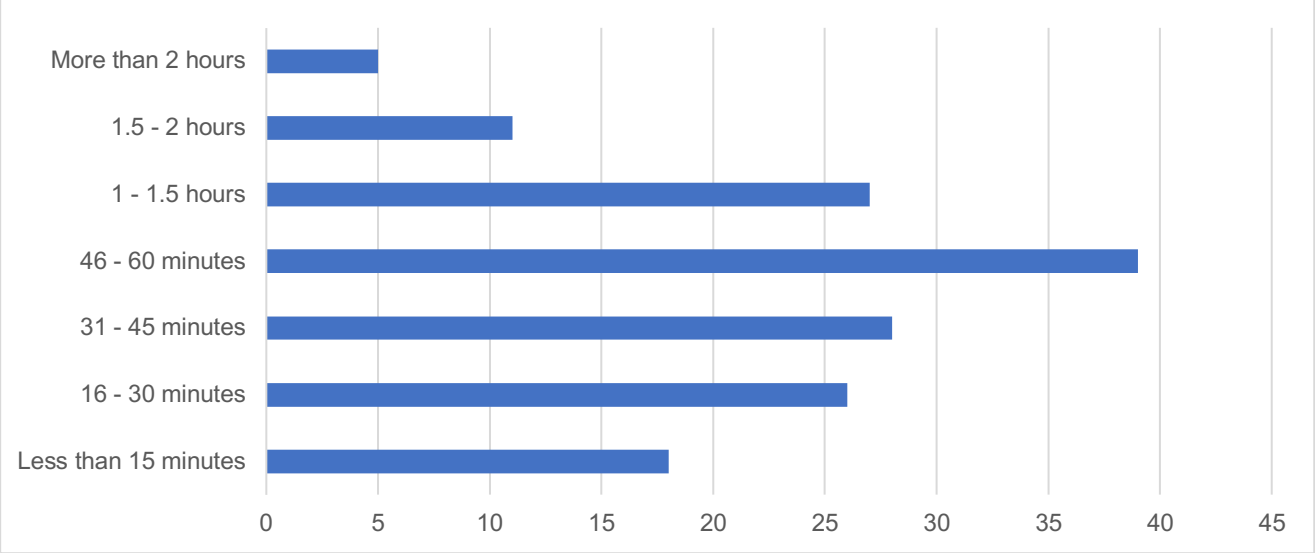


Figure 38 - Chart showing trip durations (door to door)

[6] Source: Eurostat (2019) *Main place of work and commuting time – statistics* - https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Main_place_of_work_and_commuting_time_-_statistics#Commuting_time_for_majority_of_European_workers_is_less_than_30_minutes

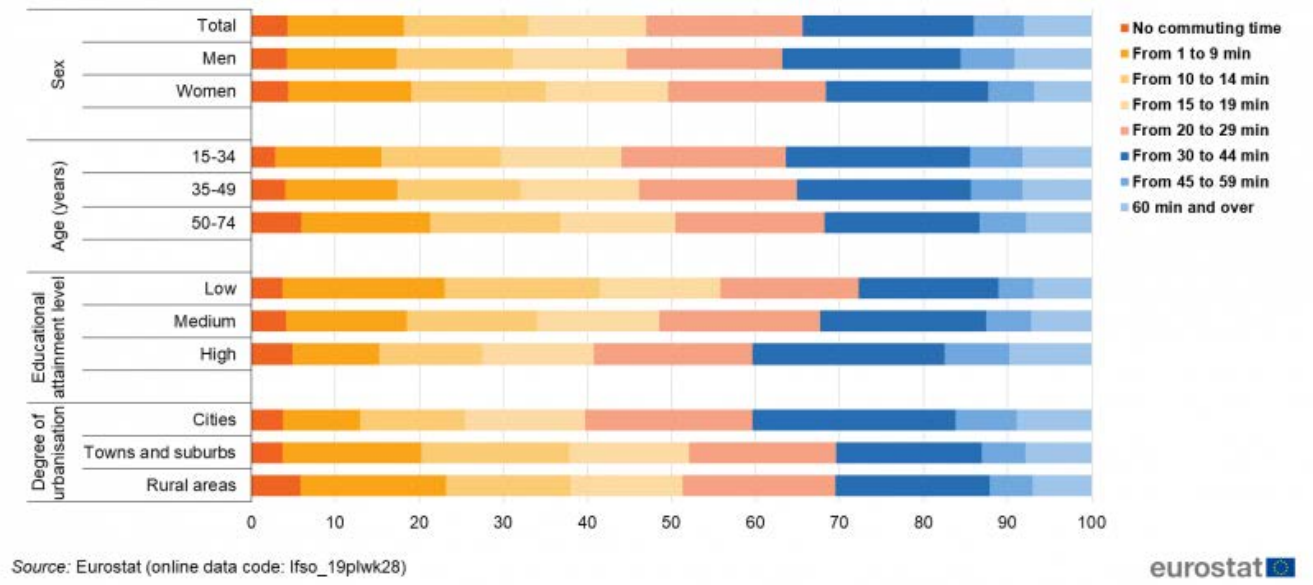


Figure 39 - Chart showing employed persons by commuting time and population groups In EU member states (%), 2019

## Q6. How would you rate the safety and convenience of walking routes to this interchange?

The overall response in relation to the safety and convenience of walking routes was towards positive ratings in the Likert scale, which was also reflected in the responses for the Mile 2 and Marina interchanges. While this can be viewed as a good result, it does also raise whether the survey question is suitably worded and what the comparators are for those responding (i.e. what is their typical experience and what should they expect in terms of provision of safe crossing points etc.). There has been investment in the ramps and elevated walkways across the railway at Mile 2, but the dominance of busy highways in that location may explain the higher numbers of 3 (medium) responses.

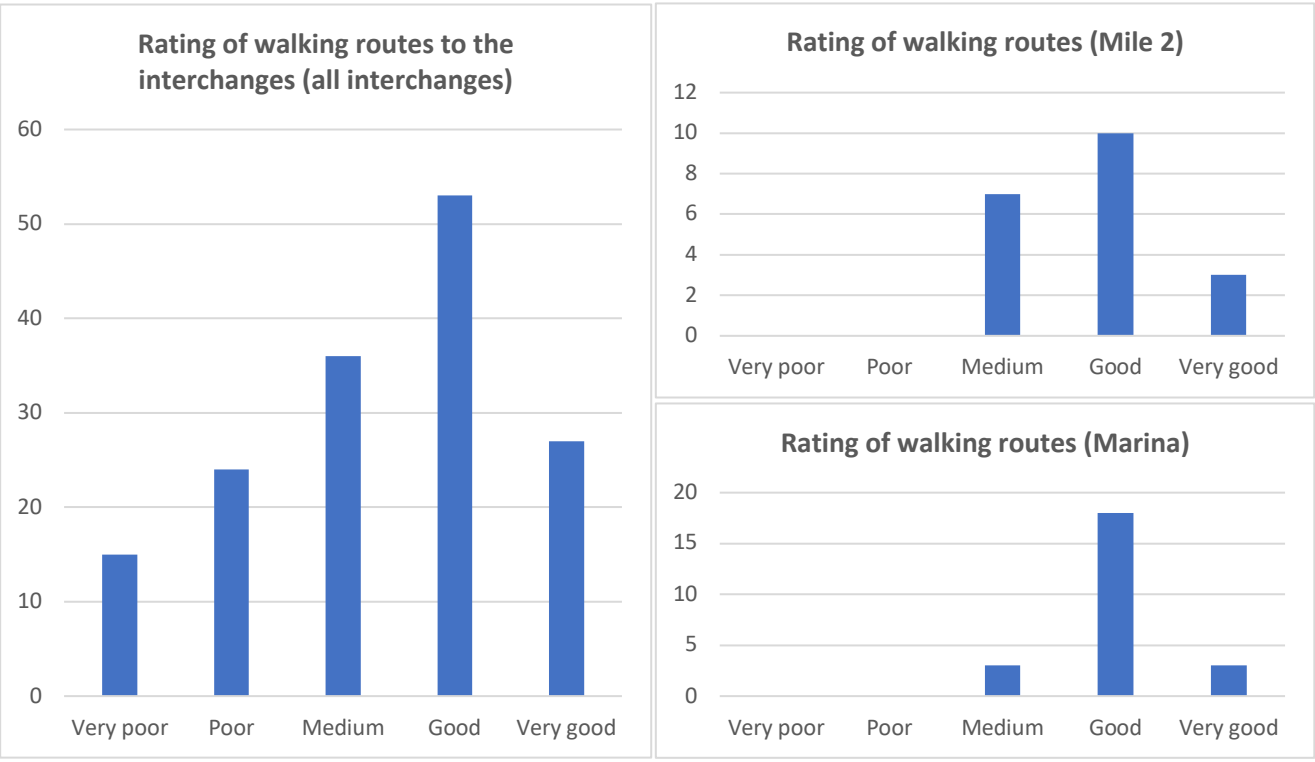


Figure 40 - Charts showing ratings of the safety and convenience of walking routes to the interchanges (all Interchanges, Mile 2, Marina)

## Q7. For this interchange, how easy or difficult is it to find the transport service stops / platforms and information on departure times?

In relation to the ability of passengers to find transport service information, and the correct stops or platforms, then results were more mixed. Of the two case study interchanges, Marina achieved the most positive results, potentially due to a combination of the investment in signage and electronic rail service information boards at the new station. For Mile 2, the majority of results were still medium to positive, but there were also a number of 'poor' ratings. This may be explained by the more complex nature of the interchange, where there is also a BRT terminal and a large number of Danfo route served. Further analysis of the results show that the large number of 'very poor' ratings related to the bus terminals, such as Ikeja, Ikorodu and Yaba, where passengers may require more clear service information and assistance.


Figure 41 - Charts showing ratings of the ease or difficult of finding transport service stops / platforms and information on departure times (all interchanges, Mile 2, Marina)

## Q8. When you change between transport services at this interchange, how easy or difficult do you find the walking routes?

As for the walking routes to the interchange, the majority of respondents expressed a medium through to positive view of the walking routes between transport services at the station, in terms of distance, complexity and level changes. Checking the responses in more detail, those respondents that selected 'poor' and 'very poor' ratings completed the questionnaire at the Abula Egba, Ikorodu and Yaba interchanges, so further research work should be undertaken to understand the reasons for this.

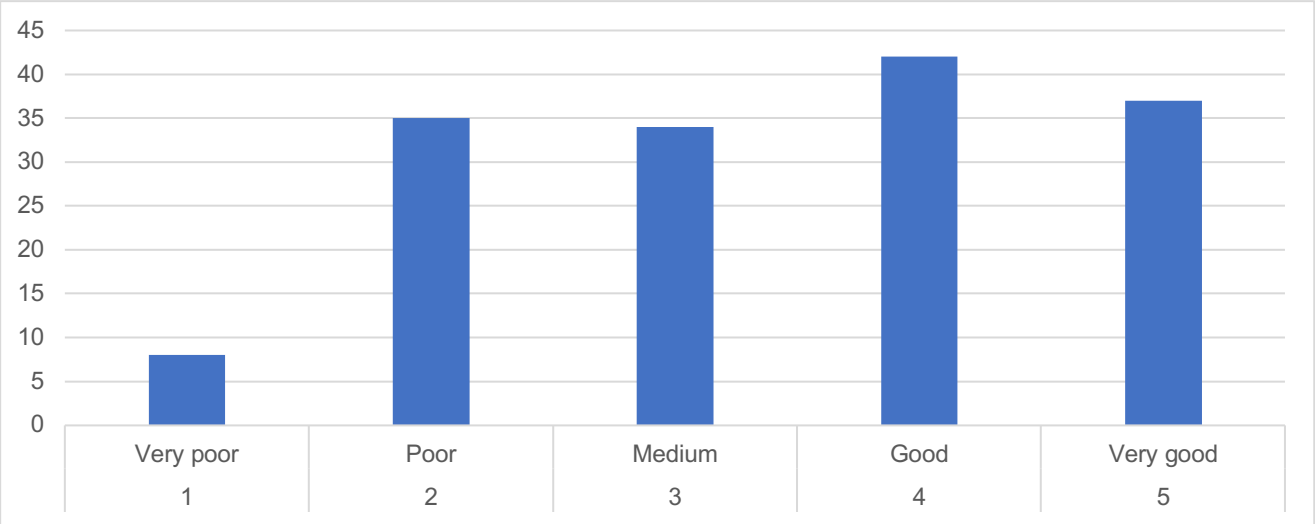


Figure 42 - Chart showing ratings of the ease or difficulty of walking between transport services at the interchanges

## Q9. How would you rate your feeling of safety at this interchange?

The interchanges that are dedicated for LAMATA public transport services tend to have a perimeter fence and a clear presence of security staff, which are likely to contribute to the overall positive results. As shown in Figure 43, the majority of passengers feel either 'Safe' or 'Very safe'. It is interesting to note that the responses between women and men respondents do not differ very significantly. A consideration for the future is also to collect feedback on how passengers feeling of safety change in the immediate surroundings of the interchange, when they leave the protected area.

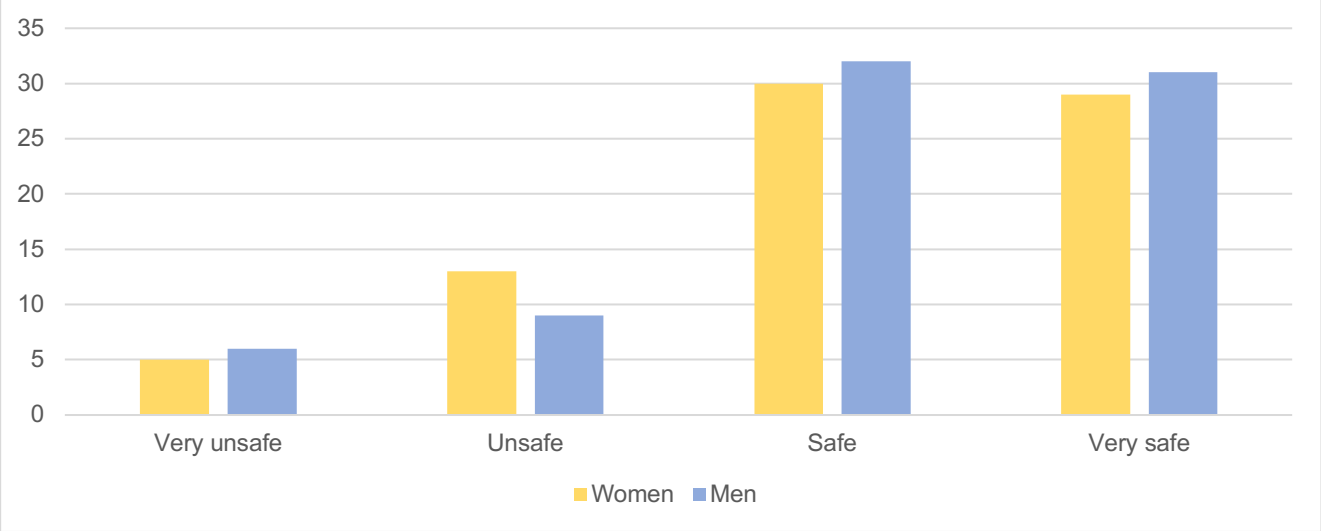


Figure 43 - Chart showing ratings of the feeling of safety at the interchanges

## Q10. How would you rate your feeling of comfort at this interchange?

Respondents were asked to consider factors such temperature, ventilation, seating and cleanliness when rating an interchange. Contrasting with the generally high feeling of safety, the question about comfort resulted in a large number of 'Poor' and 'Very poor' ratings. Taking into account the small sample size, then the difference between the ratings given by women and men were not substantially different (see Figure 44). There was not a focus of negative ratings for a specific interchange, but rather a spread of views for each interchange. Interestingly, the new Marina rail station received several negative ratings, but this was not the case for Mile 2. The question covers a range of potential comfort factors, so more specific survey questions or focus group discussions would be required to understand those aspects that people find of greatest discomfort.

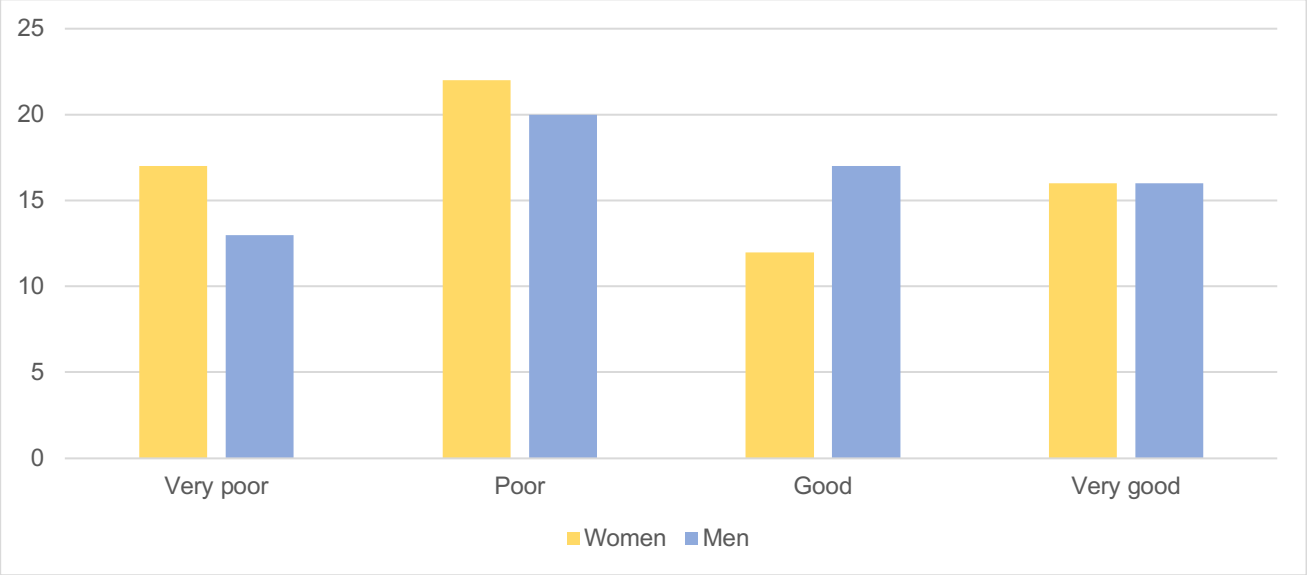


Figure 44 - Chart showing ratings of the feeling of comfort at the interchanges

### Q11. How regularly do you think you would use the following services, where/if they are made available?

This question sought to understand the potential demand for facilities, which except for toilets, are not yet available at LAMATA interchanges. With respect to those facilities that respondents indicated they would use most frequently (at least 1 or more times a week), then the ranking is as follows:

- Purchases from market traders (31)
- Toilets (26)
- Business lounge or workspace (25)
- Waiting area for women or families only (14)
- Car sharing or rental services (13)

The highest rank position of the purchases from market traders helps to demonstrate the benefit of providing space within the proposed interchange for traders. These results also show that LAMATA should give strong consideration to the provision of waiting areas for women or families only, given that this facility was ranked fourth, based predominantly on the votes of women respondents only (around 50% of the sample). It is also interesting to see that there is interest amongst respondents to undertake work at interchange locations, with no clear preference for a specific interchange. The appeal of access to car sharing or rental services at interchanges is notable and, if made available, could help to foster a culture of car sharing in Lagos, rather than outright ownership.

### Q12. For this interchange, are there any other suggestions or problems you would like to highlight?

This open question enabled collection of further valuable and more specific feedback for LAMATA. A large number of responses referred to the bus network (frequency, routes etc.), but several comments were of more direct relevance to interchange design. Summarised based on theme, this included:

- Provision of more sheltered spaces (from rain and sun) and seating was frequently highlighted
- Signage needs to be improved to help passengers easily locate buses going to their destinations
- Improved walkways are required outside the terminal
- Safety and security should be a priority, and more uniformed security personnel are required
- More sheltered spaces and seating are required for commuters, particularly as waiting times are sometime very long
- Toilets should be provided and ideally free (paying 100 Naira is expensive)

- Staff (including drivers) should be better trained and show more empathy towards commuters

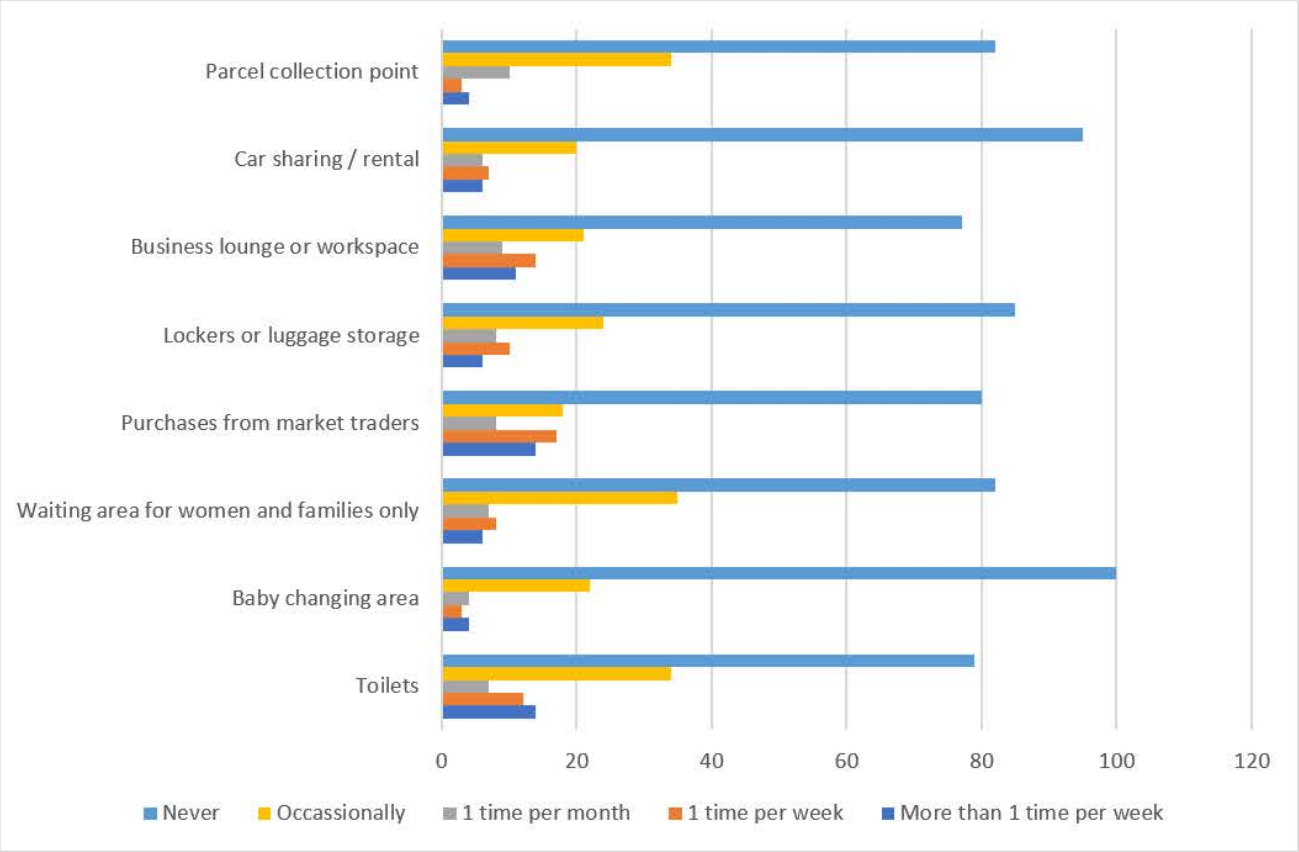


Figure 45 - Chart showing interchange facility options and expected/potential frequency of use

# 5. Conclusions and deployment strategy

## 5.1 Conclusions from the case study pilots

The T-TRIID project has enabled LAMATA and SLR to develop the Inclusive Interchanges Design Brief (IIDB) template and apply this to two case study locations, Mile 2 and Marina, both of which have a recently constructed railway station and are the subject of ongoing design work to provide a multi-modal interchange. This has meant that the Inclusive Interchanges appraisal could be undertaken for existing facilities, as well as being used to inform the design of these major projects. This work has been supported through site visits, meetings with local stakeholders, as well as a workshop inviting inputs to the project from a wide range of Lagos associations, academics and government departments.

Alongside this core work, the IIDB framework was utilised to prepare an interchange-specific passenger survey questionnaire. A pilot survey, involving 150 respondents, was conducted in March 2024, providing insights to passengers current views about the interchanges, and what additional facilities they would expect to use.

Throughout this process, the IIDB has provided a very beneficial and well-structured framework for the review of two complex interchanges. The four design categories, together with summary findings and themes from the work, are outlined below:

**Multimodal sustainability** – this design category includes aspects relating to the layout of the interchange itself and the requirements of specific transport modes.

- Due to their urban context and sequence of development, the interchanges have modular design with different terminals for different modes (rather than a single interchange building). This means additional attention needs to be paid to providing good wayfinding and integrated information on different services (departure times etc.)
- Signage at the new railway stations is clear and uniform in style, but signage for onward means of travel is required and will need to be included at the new interchanges. It is recommended that LAMATA develops a clear signage format and manual to be applied in all locations.
- Significant efforts have been made to provide safe and convenient access to the interchanges by walking and cycling. In some cases, the highway dominated contexts of the sites justify the elevated walkways (skywalks) proposed, while in others the rationale for these has been questioned and LAMATA have investigated provision of additional surface-level routes.
- A large number of Danfo (informal public transport) routes currently operate from Mile 2 and the new interchange design reserves space for services to continue operating, with convenient access to both the rail and BRT services.

**Comfort and safety** – this design category seeks to ensure that the fundamental requirements of passengers are considered.

- The passenger survey (pilot) revealed the importance to passengers of providing shelter from sun and rain at the interchanges, as well as seating.
- Provision of toilets as a public facility (as well as for passengers) is an important theme for LAMATA. The new interchange designs include wheelchair accessible cubicles, as part of enhanced overall levels of provision.
- Safety and security aspects are generally well addressed, through the design of open-plan buildings and strong presence of security personnel. Alongside applying the IIDB, the team at LAMATA are working to ensure SHE-CAN compliance for women's mobility. Design points to check for specific locations within the interchanges, such as right-angle turns on walkways, were identified through the appraisal process.
- The case for providing waiting areas for women and families only should be investigated further, given that survey responses indicated demand for this (although based on a small sample size).
- Preparing plans for emergency situations, such fires or flooding will be of vital importance, supported by provision of emergency signage (with back-up power supply) and other associated infrastructure.

**Hubs for public life** – this design category covers the potential for retail space, food & drink outlets and art to be integrated in the designs:

- LAMATA is adopting a proactive approach to accommodating market traders at the interchange sites, proposing allocation of designated areas and provision of lockable stalls and storage sheds.

The completion of rental agreements would be supported with training for the currently informal market traders.
- The railway stations and interchange designs incorporate retail units and in the case of the Mile 2 terminals, it was recommended that use of kiosks and retail booths would help open-up sightlines and enable more flexibility in response to demand.
- Plans for art installations and specific performing arts are to be developed for the interchanges, we might involve use of vacant retail units on a temporary basis.

**Integrated planning and design** – this design category promotes consideration of wider Transit-Oriented Development (TOD), sustainable building design and climate resilience design aspects.

- Opportunities for TOD at the Marina waterfront location are well exploited with a proposed Transit Building and the potential for further floorspace to be created on Marina Road should be investigated.
- The terminal buildings are designed to utilise natural lighting, while limiting solar gain, and are the subject of LEED (Leadership in Energy and Environmental Design) assessments. Opportunities for renewable energy generation, primarily roof-top solar, should be assessed.
- Flood risk assessments for the interchanges have (or are) informing the designs, with the Marina interchange being located in a very high-risk area, and parts of the Mile 2 interchange close to the river being very vulnerable.

Additional to these design considerations arising from the Inclusive Interchanges appraisals, a number of broader observations and themes have arisen from the work. These include:

- The IIDB appraisal process forms one element of a wider major scheme planning and implementation process, within which a continual process of informing and engaging with local stakeholders (including existing informal transport sector operators and market traders) should be carried out.
- Mapping of informal sector activities and assets, as well as understanding the organisational arrangements, should form part of the initial site analysis.
- Where the integration of formal and informal transport operations are planned, interchanges may form a focal point for capacity building and professionalisation of informal transport associations, as well for improved enforcement of route licensing, vehicle inspections, etc.
- Interchange design should be informed by the mapping of public and semi-public (i.e. ticket-holders) zones, to ensure that access to pedestrian and cycle routes are maintained, as well to beneficial retail and toilet facilities, etc.
- Planning interchanges with minimal distances and level changes between modes is of great importance to ensure efficient and convenient multi-modal travel, and this is of even greater significance for people with disabilities, and for families and older people that may need to rest while changing from one form of transport to another.

## 5.2 Inclusive Interchanges deployment strategy

### 5.2.1 Next steps for LAMATA

Through the T-TRIID project, LAMATA and SLR have been able to pilot the IIDB appraisal process at 2 of the 14 major multi-modal hubs identified in the 2014 Transport Masterplan (see Section 2). In each of these locations LAMATA is already achieving significant improvements to the sustainable mobility network of the metropolitan area. Undertaking the IIDB appraisal and conducting further Inclusive Interchanges surveys will assist LAMATA in making further incremental improvements to those facilities that have recently been constructed, and provide a design checklist for those sites where more comprehensive redevelopment is planned.

Next steps for deploying the IIDB at the Lagos Metropolitan area will include:

- **Staff training and higher education –** the IIDB has been developed through cooperation with a team of mobility planners, architects and engineers at LAMATA, but there is a need to communicate the project approach and results much more widely within the organisation. The training module produced will be beneficial to support awareness raising and to promote practical application of project outputs. LAMATA also intend to share the IIDB approach with academics a

local university institutions, such as the University of Lagos (UNILAG) and Lagos State University (LASU) in order that it can be incorporated within teaching materials.

- **IIDB appraisal of existing and planned interchanges** - The list of interchanges from the 2014 Transport Masterplan comprised 9 urban hubs (including Mile 2 and Marina), as well as 5 inter-urban hubs that will serve as gateways to the city for national and international business travellers and tourists. Current work and priorities for application of the IIDB are:
    - **Ikeja Red Line station and bus terminal**– Major construction work on this station, which also services as a multi-modal hub for BRT, has recently been concluded. Inspired by the Inclusive Interchanges workshop and Design Brief, the design team are investigating further enhancements that can be brought forward, including the provision of information centres, integration of car rental facilities within a planned Park & Ride, commissioning of muralists and installation of CCTV.
    - **Blue Line extension** – The first stage of operation of the blue railway line has involved services between Marina and Mile 2. A planned extension will result in trains stopping at a further six stations to the west, terminating at Okokomaiko. Each of these stations will become a multi-modal interchange, for which the IIDB can be applied at the design stage. In addition, the Blue Line follows the alignment of the West African Corridor, a critical route that is intended to eventually also serve citizens of neighbouring countries. Adopting inclusive interchange design principles during the development of interchanges along this corridor could set a precedent influencing city planners in neighbouring countries.
- **Integration in the Mobility Master Plan** - Through the current work to develop a new Strategic Transport and Mobility Master Plan (STMMP) for 2048, LAMATA has the opportunity to further apply the IIDB appraisal approach and lessons learned from the two case studies. This could involve, for example:
    - Reviewing and updating policies on key themes arising from Inclusive Interchanges: such as the approach to integrating formal and informal public transport modes; identification of opportunities for TOD; and development of comprehensive climate resilience and emergency response plans.
    - Utilising IIDB guidelines to set key criteria and parameters for the design of future interchanges, which could include a much larger number of district-level multi-modal interchanges and mobility hubs.

With a longer-term perspective, LAMATA will seek to share the IIDB approach and learnings with representatives of the Lagos State Ferry Services Corporation and Nigerian Shippers Council, as well as the Nigeria Railway Corporation, with the aim that the objectives, values and knowledge contained within Inclusive Interchanges will be taken up by additional transport organisations in Nigeria.

### 5.2.2 Dissemination to other cities

During the Inclusive Interchanges project duration, the project team have given introductory presentations on the Design Brief framework and appraisal approach to a range of organisations and networks that could act as multipliers for dissemination. These have included: the Africa Sustainable Mobility Courses held in Lagos (organised by LAMATA) and Edo State; UITP (International Association of Public Transport) Paratransit Working Group; the C40 Cities Public Transport Network; and a presentation at the HVT side event at COP28. Additionally, representatives of Kumasi Metropolitan Assembly (Ghana) attended the Inclusive Interchanges workshop in Lagos in October 2023, in order to learn about the project.

As the project reaches a conclusion and Version 1.1 of the IIDB template is made available on the HVT website, further communication activities to raise awareness of this resource and the findings from the Lagos case studies will be undertaken. Both LAMATA and Vectos/SLR are committed to disseminating the outputs of the Inclusive Interchanges project, with the first activities to include: dissemination via LinkedIn; the inclusion of IIDB training within the 2024 National Sustainable Urban Mobility Conference (Sep 2024); further activities to raise awareness of the work with neighbouring state authorities in Nigeria; and sharing of the outputs with the network of cities and organisations established through the HVT EMPOWER and TRANSITIONS.

# **APPENDIX A:** INCLUSIVE INTERCHANGES DESIGN CATEGORIES AND TOPICS

Table of Design Categories and Topics from Version 1.1 of the Inclusive Interchanges Design Brief (IIDB) template

| 2. Multimodal sustainable mobility | | | | Interchange appraisal contents and quick links | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2.1** | **Multi-modal interchanges** | **2.2** | **Transport mode specific** | **3.** | **Comfort and safety** | **4.** | **Hubs for public life** | **5.** | **Integrated planning and design** |
| 2.1.1 | Interchange entrance | 2.2.1 | Prioritising sustainable modes | 3.1 | Temperature and ventilation | 4.1 | Formal retail | 5.1 | Transit Oriented Development (TOD) |
| 2.1.2 | Interchange decision space | 2.2.2 | Intelligent Transport Systems | 3.2 | Shelter at waiting areas | 4.2 | Informal market trading | 5.2 | Renewable energy generation and storage |
| 2.1.3 | Movement corridors | 2.2.3 | Walking routes | 3.3 | Seating | 4.3 | Cashpoints | 5.3 | Energy efficiency of buildings and infrastructure |
| 2.1.4 | Movement for people with disabilities | 2.2.4 | Cycling routes | 3.4 | Lighting | 4.4 | Advertising | | |
| 2.1.5 | Opportunity space | 2.2.5 | Cycle parking and storage | 3.5 | Noise | 4.5 | Business lounge | 5.4 | Construction materials and sourcing |
| 2.1.6 | Mobility service information & wifi | 2.2.6 | Cycle sharing and rental | 3.6 | Toilets and baby changing areas | 4.6 | Provision for families and children | 5.5 | Urban greening |
| 2.1.7 | Wayfinding and signage | 2.2.7 | Rail platforms | 3.7 | Drinking water | 4.7 | Lockers and luggage storage | 5.6 | Climate resilience – temperature and heatwaves |
| 2.1.8 | Mobility service info and wayfinding for people with disabilities | 2.2.8 | BRT and bus services | 3.8 | Passenger safety through design | 4.8 | Public open space | 5.7 | Climate resilience – sustainable drainage and flood risk mitigation |
| | | 2.2.9 | Informal public transport | 3.9 | Security staff | 4.9 | Public performance & art | | |
| 2.1.9 | Access/egress and integrated ticketing | 2.2.10 | Electric vehicle charging infrastructure | 3.10 | CCTV | | | | |
| 2.1.10 | Operations control centre | 2.2.11 | Taxi services | 3.11 | Gender dimensions and safety | | | | |
| 2.1.11 | Staff rooms | 2.2.12 | Car sharing | 3.12 | Waste management | | | | |
| 2.1.12 | Vehicle maintenance | 2.2.13 | Private car and motorcycle | 3.13 | Emergency response | | | | |
| | | 2.2.14 | Parcel collection | | | | | | |

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