



RTA

Enhancement of Dubai Metro Stations

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DUBAI INTERNATIONAL
PROJECT MANAGEMENT FORUM



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1. RTA Background

1.1 Brief History

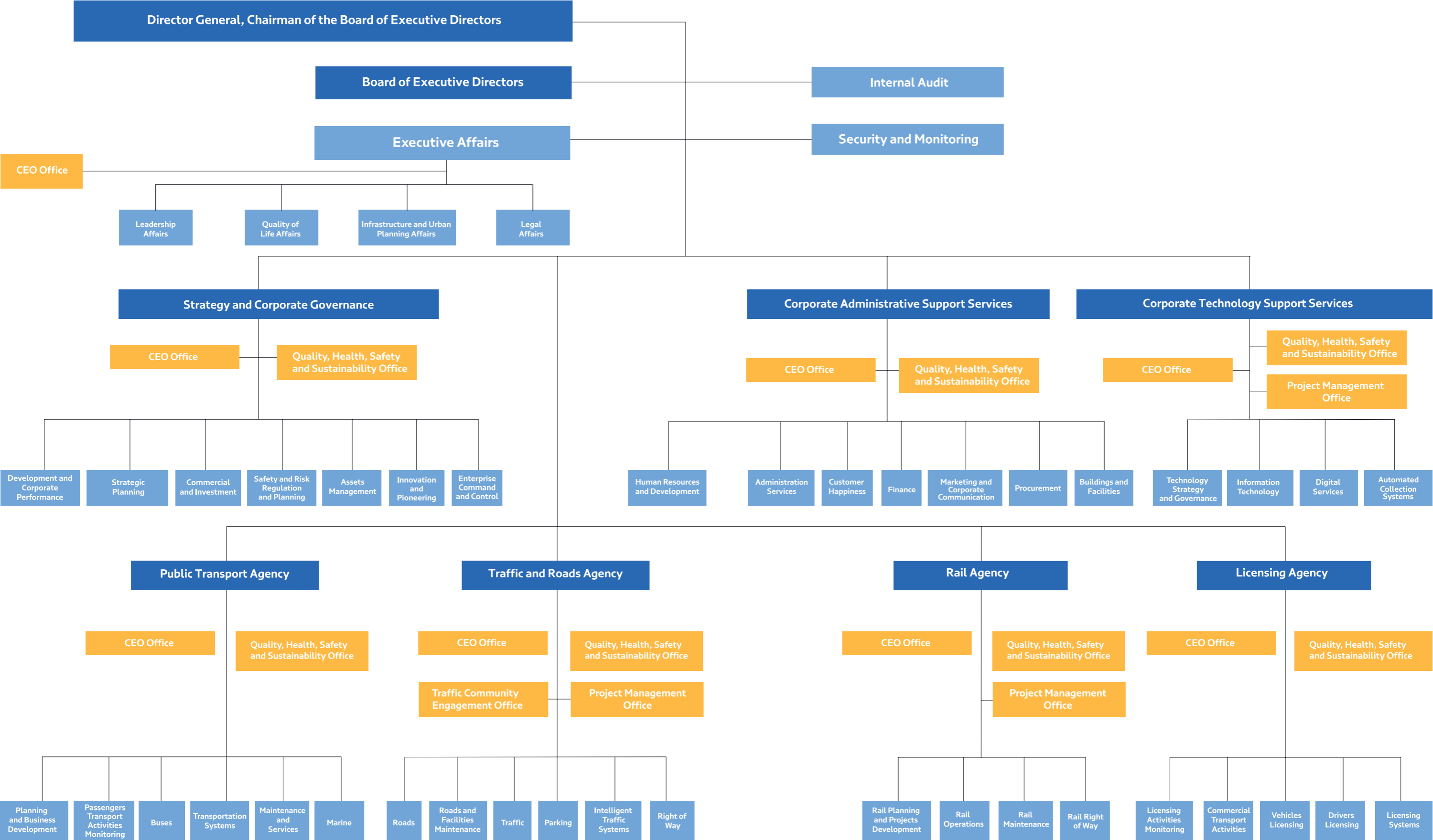
The Roads and Transport Authority (RTA) was established by decree number 17/2005 in November 2005. Accordingly, RTA is responsible for the planning, design, operation and maintenance of public transport, roads & traffic systems in the Emirate of Dubai, between Dubai and other Emirates of the UAE and the neighbouring countries.

Since RTA's establishment, it has adopted a challenging vision and mission to contribute effectively to Dubai's big vision of serving the vital interests of the Emirate. RTA works toward achieving the vision of "The World-leader In Seamless and Sustainable Mobility" and RTA's mission is "We provide seamless and safe travel with innovative, sustainable mobility solutions and services to make every journey in Dubai a world-class experience."

1.2 Organization Structure

RTA's organizational structure (Figure 1) shows that RTA adapts the "Agency Model" which aims at providing flexibility in running work and separating regulatory issues from operational issues. Each Agency/ a CEO, who is a member of RTA's Executive Board that governs the organization and takes strategic decisions, leads Sector. This Project was managed by Rail Agency in RTA.

RTA Organizational Structure



2. Enhancement of selected stations on the Dubai Metro Red Line

2.1 Introduction

The enhancement of three key Dubai Metro stations—Sobha Realty (formerly DAMAC), Dubai Internet City and UAE Exchange—represented a critical step in supporting Dubai’s Expo 2020 and advancing the Roads and Transport Authority’s (RTA) long-term urban mobility goals. Initiated in August 2019, the project was executed within a tight 13-month timeline and a budget of AED 207 million, demonstrating remarkable efficiency and precision to ensure operational readiness for Expo 2020.

The enhancements focused on improving entrance pods, enhancing modes of transport integration and ensuring greater accessibility on the Red Line. These upgrades addressed the immediate surge in transportation demand during the global event and reinforced Dubai’s commitment to developing a sustainable, efficient and world-class transportation system that will serve its growing urban population for years to come.



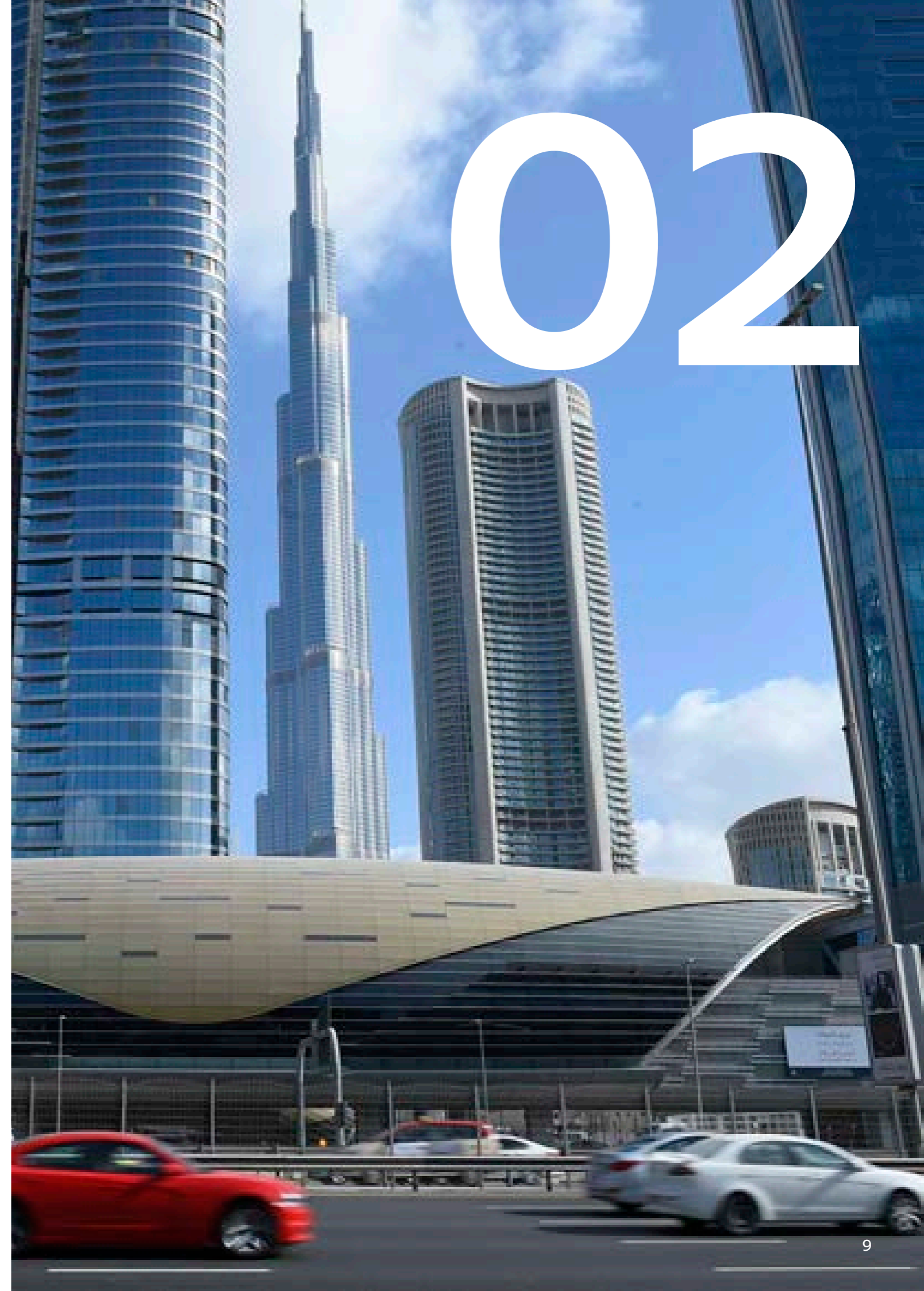
3 Stations



13 Months

The initial contract period was established for 13 months to ensure readiness for operation and public opening ahead of the Expo 2020 event, utilising a Design and Build procurement strategy. An essential requirement at the beginning of construction was to prevent any disruptions to ongoing metro operations and maintain passenger service levels, which presented significant challenges given the limited working space for stations in operation. However, the project encountered numerous unforeseen and atypical challenges that were neither anticipated nor included in the project risk register or timeline.

Consequently, project management evolved into a different approach that required skillful handling to mitigate any negative impacts on the project’s primary objectives as effectively as possible. This case study will highlight how some of these challenges were addressed, emphasising the need for agility in responding to unexpected issues within a traditionally structured waterfall project.





2.2 Project Deliverables

The project comprised enhancing entrance pods for three stations on the Dubai Metro Red Line legacy. Upgrade works were identified, which were intended to enhance and improve the metro capacity for three stations and passengers' user experience in the short term to serve Expo 2020 event Metro users and for the long term after the Expo 2020 event by achieving the following goals:

01. Accommodate increased ridership from Expo 2020 event visitors and 2030 ridership.
02. Improve the level of service and safety.
03. Station accessibility improvement and ease of vertical movement between levels.
04. Implementation of station context planning and increase comfort for passengers.
05. Enhanced connectivity and integration with all transport networks.
06. Raising revenue opportunities through the provision of additional commercial services and station amenities.

2.3 Program Scope

The Roads and Transport Authority appointed a local contractor for the design and construction of enhancements and improvements to three Dubai Metro stations on the legacy Red Line, namely DAMAC (now Sobha Realty), Dubai Internet City and UAE Exchange.

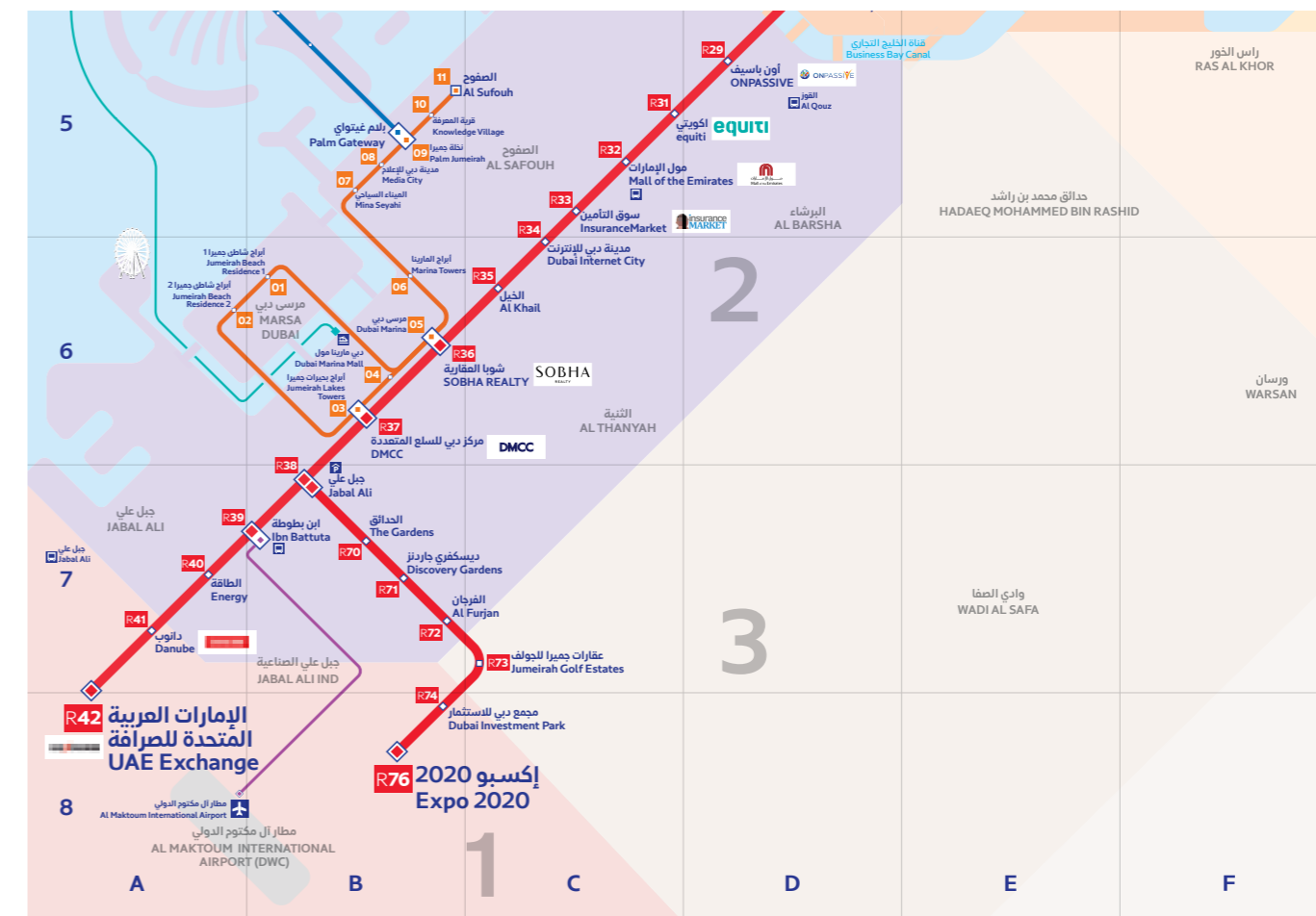


Figure (2): Single Line Diagram Stations Location.

Work activities at each station are summarised as follows:

1- DAMAC

The project scope encompassed relocating the existing elevator to facilitate the installation of a new escalator and staircase serving Al Sufouh platform of the Dubai Marina Tram station. This enhancement aims to improve passenger experience and connectivity between the Tram and Metro facilities. Dubai Transport and Integration Manual (DTIM) requirements and works at both seaside and landside pod locations include the addition of street furniture and seating and bicycle parking.

Before

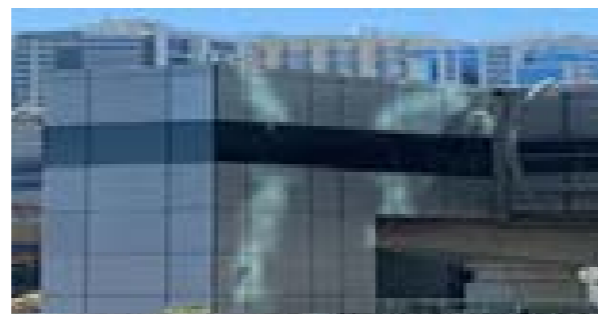


Old connection (lift) between Metro footbridge and tram station

After



A new escalator and stairs were constructed to improve connectivity between the metro footbridge and the tram station



A new lift was constructed on the opposite side of the new escalator, seamlessly connecting the metro footbridge with the tram

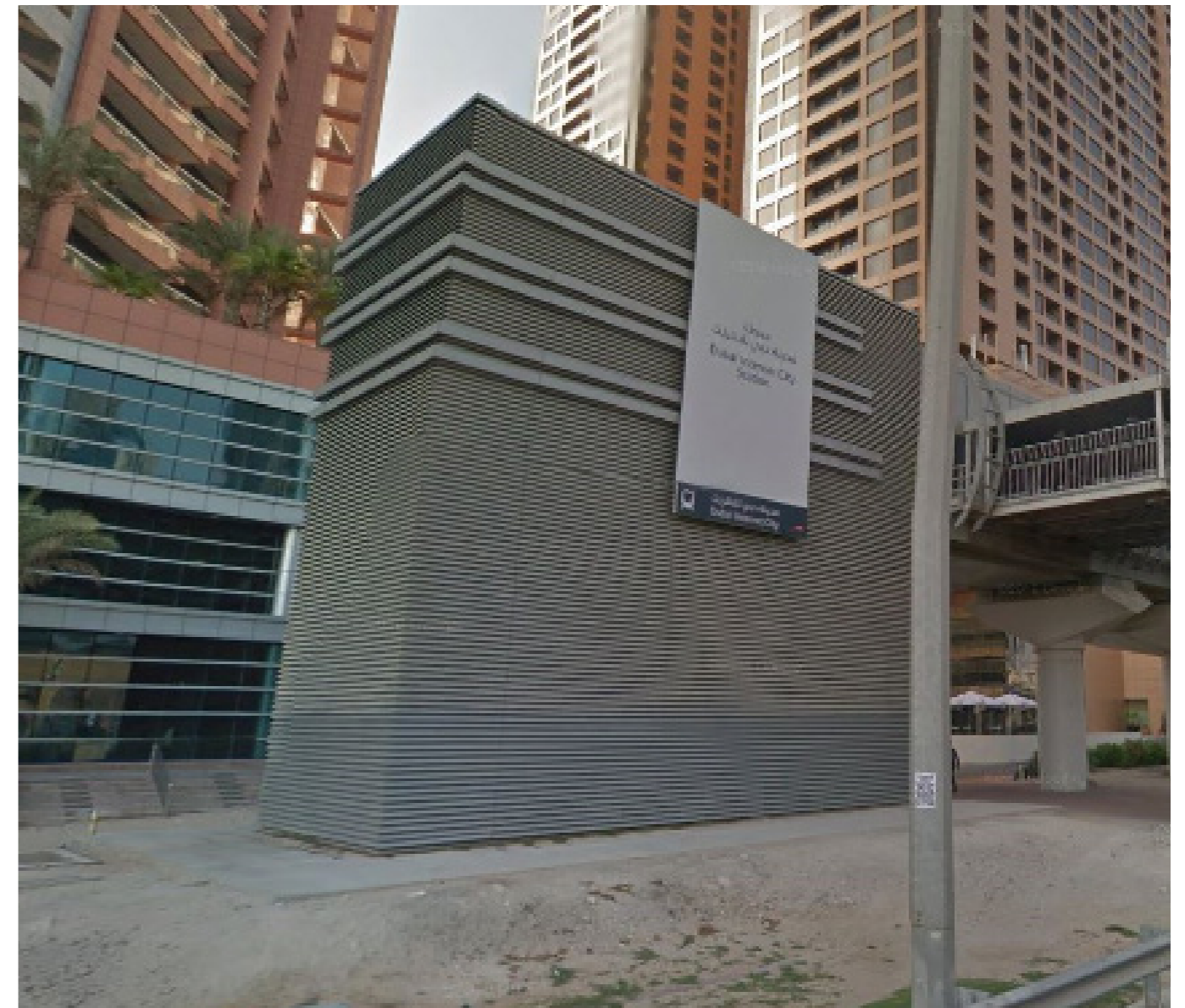
2- Dubai Internet City

A new entrance pod has been added alongside Sheikh Zayed Road, adjacent to the original temporary access. This new pod features retail space, a waiting area and passenger information services.

The access road that formerly connected to the metro and nearby hotel has been modified to include a new segment that provides designated drop-off areas for buses, taxis and private vehicles, including spaces for disabled parking. Additionally, the service road will run alongside the proposed station pod, continuing parallel to Sheikh Zayed Road and linking back to the following interchange.

The Dubai Transport Integration Manual (DTIM) enhancements were implemented at both seaside and landside pod locations, featuring the installation of street furniture, seating areas and shaded bicycle parking facilities. Additionally, wide footpaths were introduced to support the development of future cycling networks, promoting sustainable and integrated transport solutions.

Before



Old entrance pod at DIC station

After



Newly constructed entrance at DIC station

3- UAE Exchange

A new entrance pod has been constructed parallel to Sheikh Zayed Road, next to the metro station, necessitating a brief upper-level link bridge at the Concourse level. This new pod offers retail space, a waiting area and passenger information. Previously, the temporary entrance served as an emergency exit. The existing roads and footpaths have been modified to create new drop-off zones.

DTIM works at both seaside and landside pod locations, included the addition of street furniture and seating, shaded structures for bicycle parking and wide footpaths installed to allow for future cycling networks to be developed.

Before



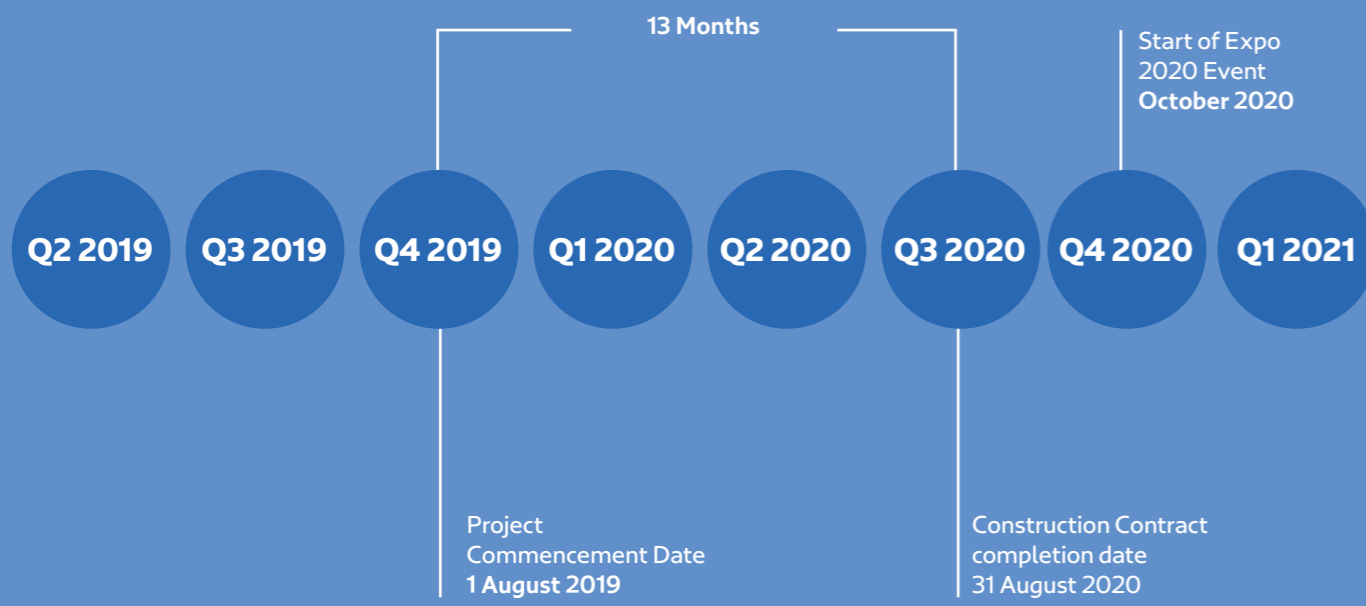
UAE Exchange station prior construction of new entrance

After



New entrance and the link with UAE Exchange station

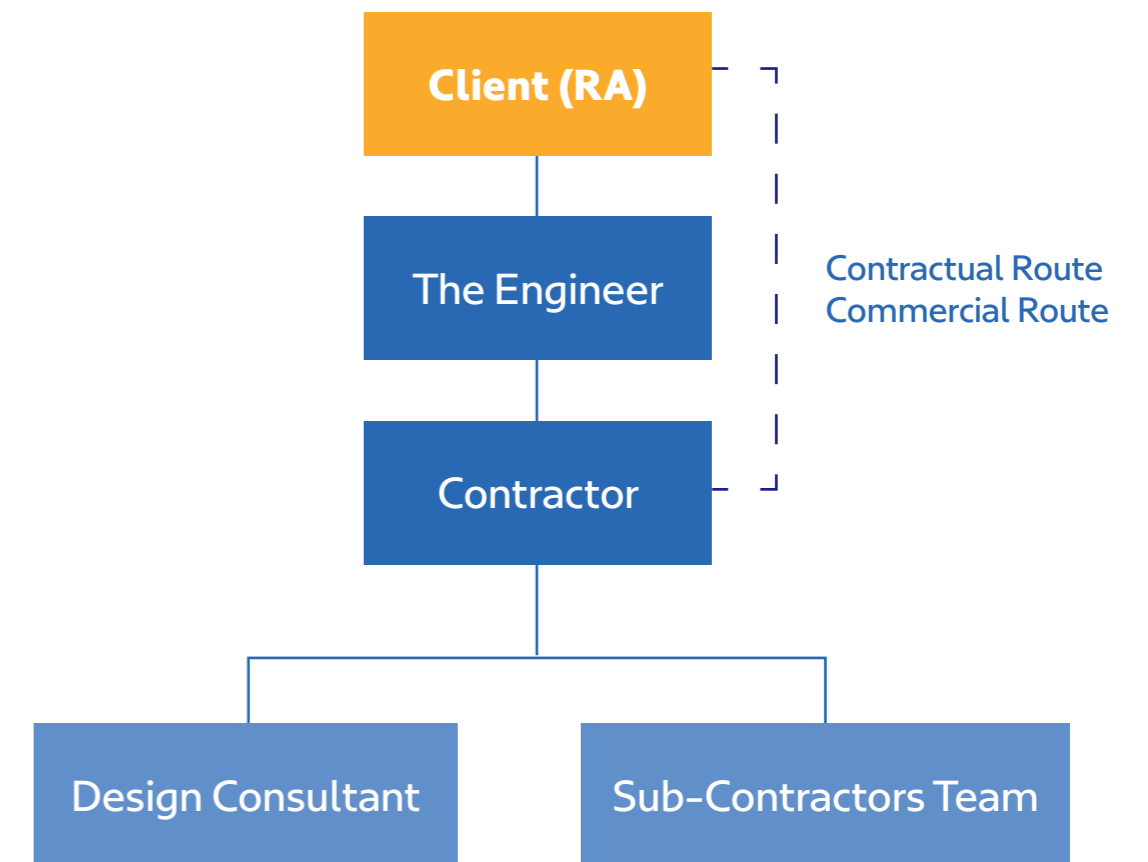
3. Project Schedule



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4. Project Team Structure



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5. Project Main Challenges

The project encountered several challenges, primarily due to tight deadlines associated with the looming EXPO 2020 event. Additionally, work was constrained to limited site areas in public spaces adjacent to one of Dubai's busiest thoroughfares, Sheikh Zayed Road. The impact of the COVID-19 pandemic further provided unforeseen and exceptional challenges. The main challenges were as follows:

5.1 The construction market was busy and quite active, with many pre-qualified contractors heavily involved in Expo construction projects while simultaneously working on this project.

The tight timeline for the project, coinciding with the opening of Expo 2020, presented numerous challenges. The tight project timelines necessitated by the upcoming opening of EXPO 2020 led to expedited decision-making from the employer to prevent any disruptions to the ongoing operations. This resulted in an unprecedented demand for rapid approvals of designs and quick initiation of material procurement for long-lead items, including structural steel sections, electromechanical vertical circulation equipment, glass and specialised systems sourced from abroad.

Restricted construction time that can only be performed within the limited Engineering hours [4 hours]. The progress rate of certain construction activities has been hindered due to restrictions from the operators, limiting work to designated engineering hours. Engineering hours refer to specific time windows, typically during off-peak or overnight hours, when construction work is permitted to minimise disruptions to existing infrastructure operations and ensure public safety. These restricted periods are enforced to maintain the smooth operation of critical transport services, such as metro and tram systems while allowing essential construction activities to proceed.

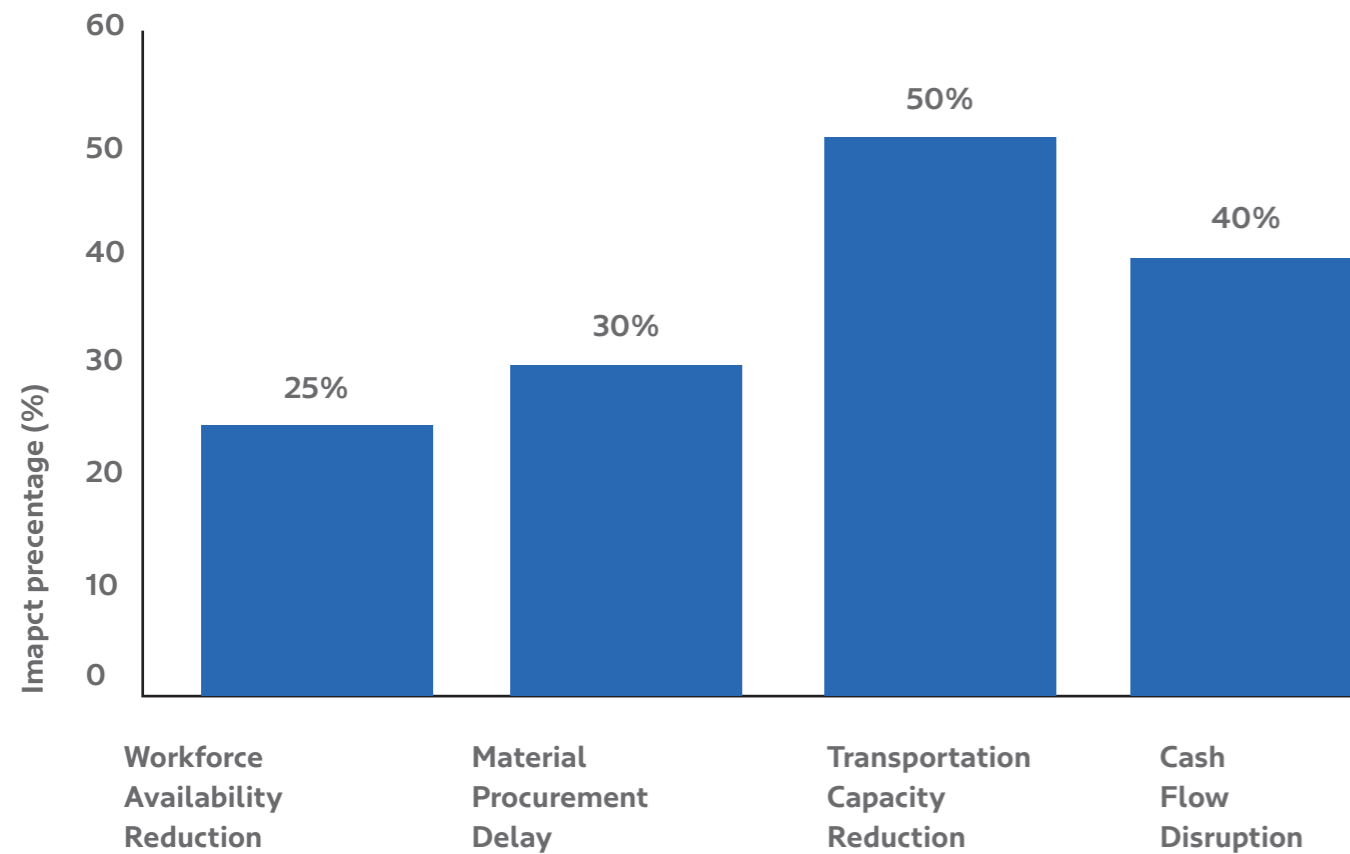
The extension and integration with existing station infrastructure and operational assets necessitate work permits and are subject to time constraints, all aimed at ensuring public access and safety. Moreover, unforeseen circumstances related to the testing of new rolling stock for Route 2020 on the Red Line track have further affected these activities by reducing available Engineering hours in preparation for the event. Short allocated and challenging duration to issue No Objection Certificates (NOC) from authorities and developers.

The process of obtaining and securing design NOCs for a design and build project involving three different site locations was significantly extended due to restrictions on meetings and face-to-face discussions imposed by authorities during the COVID-19 pandemic. This disruption impacted the usual timeline for NOC submissions and issuances, ultimately affecting the project's schedule. Furthermore, relevant stakeholders whose feedback was essential for integrating their development plans into the project were also impacted, imposing further challenges on the efforts to reach a consensus to move forward with construction work.

5.2 Market and Resource Challenges

The COVID-19 pandemic greatly affected the contractor's supply chain, hindering material procurement by 30% and reducing workforce availability by 25%, significantly influencing the project timeline. Transportation of personnel to job sites was reduced by 50% due to government regulations regarding safe distancing and limits on vehicle capacity. Additionally, cash flow was disrupted by 40% as government resources were redirected to critical areas, such as healthcare.

Covid-19 impact on construction project



Heavily involved in Expo construction projects while simultaneously working on this project, the tight project schedule resulted in only three contractors agreeing to participate in the tender out of the thirty-two companies invited. This limitation also affected the willingness of specialist supply chains to provide specific works as subcontractors or supply materials throughout the construction phase, further restricting the available alternatives for selection.

Despite the majority of the project design and construction activities being primarily civil works in nature, the main contractor had limited experience in rail systems. The integration of rail systems with other works presented challenges that became apparent later during design, construction and interface coordination activities. This hindered timely completion.

5.3 Site and Infrastructure Constraints

Restricted site areas with a high proportion of utilities within the building premises. The footprint of the pods encountered numerous utilities, necessitating multiple diversions to fit within a limited area free of services. This issue levied further challenges with the project timeline.

5.4 Stakeholder and Coordination Issues

Many stakeholders are involved in such a small project. The project requires collaboration among multiple stakeholders and developers, including government agencies, regulatory authorities, utility and service providers, private developers and those responsible for station operation and maintenance. While these collaborations were initiated at the project's outset, coordinating simultaneous approvals presented significant challenges. It ultimately became evident that a sequential, waterfall approach was essential for securing the required No Objection Certificates (NOCs), resulting in a lengthy process.



6. Mitigations

The primary challenge of the project was the limited timeline available for completing construction before the inauguration of Expo 2020 in October 2020. This challenge was compounded by the need to ensure safe and seamless access to passengers while minimising disruptions to surrounding establishments, including residential, commercial and other areas. Moreover, the stations were situated near Sheik Zayed Road, one of the busiest highways in Dubai and close to the main utility network serving Dubai and inter-Emirates.

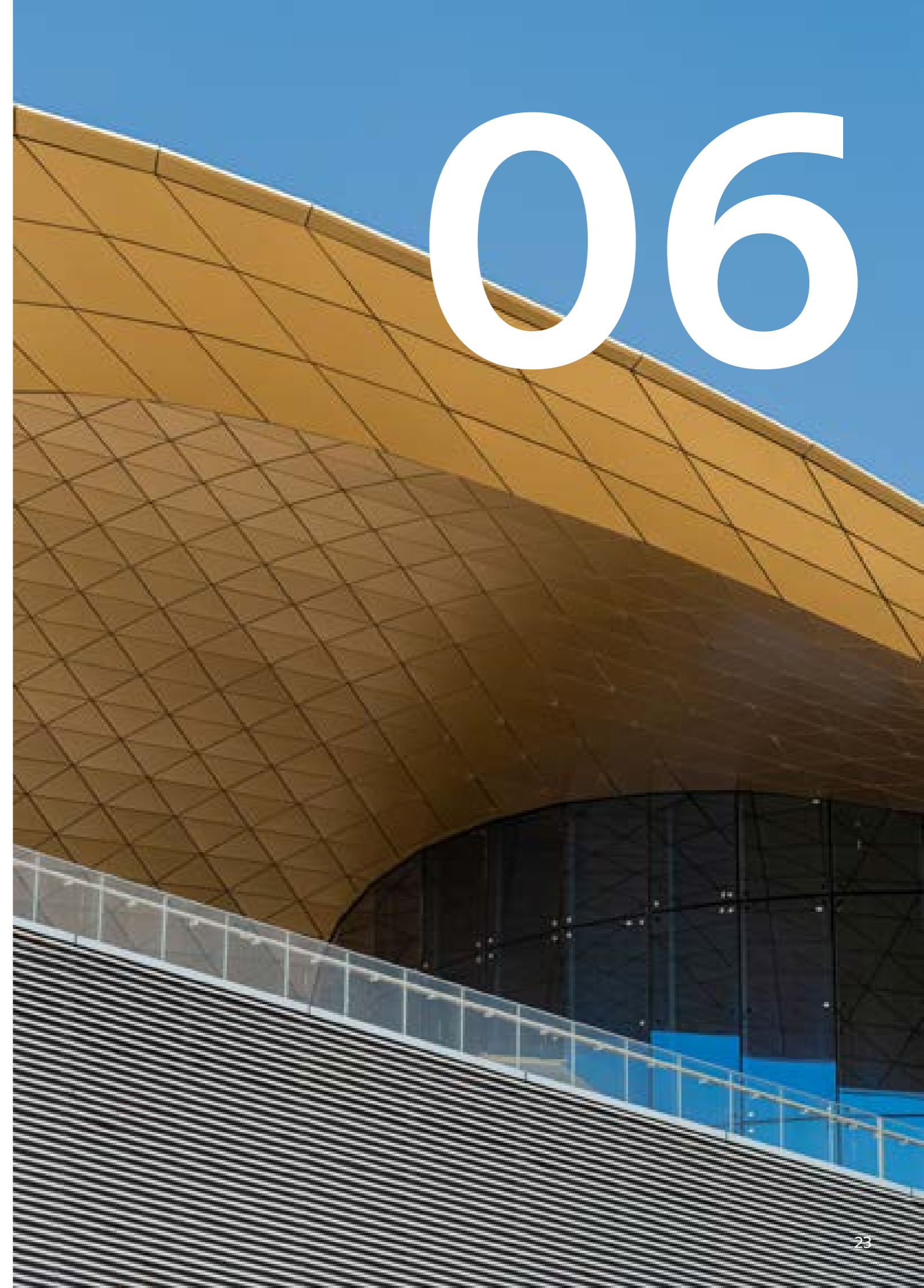
The construction site had restricted space for equipment and material storage, necessitating meticulous management and coordination with various stakeholders. The project faced additional difficulties due to changes in engineering hours for interface works and construction near existing assets or passenger routes, which were regulated by the operator. This was further complicated by the unforeseen testing and commissioning of the Route 2020 rolling stock during the engineering hours on the legacy track, which further limited any restricted works during the engineering hours. This stemmed from an inadequate coordination between the two projects. The COVID-19 pandemic also had a significant impact on working methods, material supply and workforce productivity.

The project team, consisting of the client, engineer and contractor, successfully addressed most of the identified challenges by monitoring issues from the project's inception through effective risk management. They utilised best practices and incorporated various proactive project management and agile methodologies, prioritising outcomes over rigid processes and procedures.

6.1 Re-prioritizing the main deliverables, focusing on what comes first.

All key stakeholders reached a consensus to prioritise the delivery of essential assets that would enhance user accessibility to stations in preparation for the expo 2020 event. This was accomplished through the following measures:

01. Greater emphasis was placed on completing the new pods rather than on the integration requirements, which were crucial deliverables for the expo event.
02. Early management decisions were made, such as changing the entrance pod's design to reduce the need for utility diversions, like the potable water line with a diameter of 1200 mm.
03. Additionally, by phasing the utility work, construction of the pods could continue while other utility-related works in the surrounding area progressed.



7. Conclusion of Lessons Learned

The Dubai Metro station enhancements presented how effective coordination, innovative thinking and adaptability can deliver complex infrastructure projects under challenging conditions. The following are the key success factors and lessons learned from this project:

01. **Effective Stakeholder Coordination:** Consistent collaboration, communication and proactive engagement of all stakeholders were critical success factors for this project. This project demonstrates the importance of establishing clear communication and streamlined approval processes, particularly in projects involving diverse authorities and agencies.
02. **Agile Adaptability in Traditional Projects:** Adopting an agile mindset within a traditionally structured waterfall project proved essential. This allowed the team to reprioritise deliverables, focus on critical outcomes and adapt effectively to unforeseen challenges.
03. **Proactive Risk Management:** Early identification and mitigation of risks, such as utility diversions and supply chain disruptions, were critical. Agile decision-making and scenario planning helped minimise disruptions and optimise the construction timeline.
04. **Innovative Problem-Solving:** Solutions such as consolidating NOCs, leveraging existing suppliers, and phased utility work exemplify how innovative thinking can address challenges like tight schedules, deadlines and logistical constraints.
05. **Collaboration and Capacity Building:** Close collaboration between RTA, the Engineer and the contractor addressed gaps in rail system experience. Workshops and day-to-day guidance bridged skill gaps, ensuring all parties were aligned and capable of meeting the project's specific demands.
06. **Pandemic Resilience Strategies:** Adjustments to delivery strategies during COVID-19 highlighted the need for flexibility and robust contingency planning in response to unforeseen disruptions.
07. **Focus on Sustainability and Integration:** Enhancements like improved accessibility, connectivity, and multimodal integration reflect the project's alignment with long-term urban mobility goals, ensuring its relevance beyond the immediate needs of Expo 2020.
08. **Prioritization of Core Deliverables:** Emphasizing critical deliverables over secondary objectives ensured readiness for Expo 2020 while laying the groundwork for sustained service improvement and scalability.

The successful completion of this project highlights the critical role of innovation, careful planning, stakeholder engagement, risk management and adaptability in delivering complex infrastructure within tight timelines and constrained workplaces. The lessons from this project will guide future similar initiatives in RTA, reinforcing efficient and sustainable urban mobility in Dubai.

