قطر Qatar 2050
الخطة الشاملة للنقل
Transportation Master Plan

وزارة المواصلات
MINISTRY OF TRANSPORT

2050

Updating Transportation Master Plan For Qatar TMPQ

VOLUME 1
Updated TMPQ Executive Summary

نقل متكامل ومستدام للجميع
INTEGRATED & SUSTAINABLE TRANSPORT FOR ALL

2050

نقـل متكامـل ومسـتدام للجميـع

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ملاحظة:

يرجى العلم أن أي إشارة أو ذكر لـ "وزارة المواصلات والاتصالات" واختصارها "MOTC" في هذا التقرير، أصبحت تشير حالياً إلى "وزارة المواصلات" و اختصارها "MOT".

Note:

Please note that any reference or mention of the "Ministry of Transport and Communications" and its abbreviation "MOTC" in this report, now refers to the "Ministry of Transport" and its abbreviation "MOT".

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مقدمة

يعتبر قطاع النقل البري أحد القطاعات الرئيسية في تطوير مختلف جوانب الحياة وضمان لنقل السلع والخدمات للأفراد والمجتمعات، كما يدعم نمو القطاعات الأخرى، مثل الزراعة والصناعة والتعدين والتجارة ويدفع التنمية المستدامة للمدن والمجتمعات والاقتصاد لتحقيق أهداف رؤية قطر الوطنية 2030.

ومن هذا المنطلق والتزاماً بمسؤولياتها قامت وزارة المواصلات بإعداد خطة النقل الشاملة لدولة قطر حتى عام 2050م بمشاركة ومساهمة العديد من الجهات الحكومية والخاصة والمختصين بهذا المجال.

توفر خطة النقل الشاملة لدولة قطر إطارًا شاملاً لمستقبل النقل البري فضلاً عن مجموعة متكاملة من المبادرات والمشاريع لخدمة جميع مستخدمي أنظمة وشبكات النقل البري، وذلك لتطوير مستوى خدمات النقل بما يتواكب مع النمو السكاني المتزايد في جميع أنحاء دولة قطر والتنمية الاقتصادية على مدار الثلاثين عامًا القادمة حتى عام 2050م. وهذه الخطة بعيدة المدى ستضع دولة قطر في المقدمة كأحد أكثر دول العالم استدامة من خلال توفير حلول نقل مبتكرة ومستدامة لدعم الاقتصاد، وتحسين جودة الحياة للمواطنين والمقيمين في دولة قطر مع الحفاظ على هويتها الوطنية.

واستمدت هذه الخطة مبادراتها وسياساتها وأدلتها من ركائز رؤية قطر الوطنية 2030، والتي تطمح إلى أن تكون دولة قطر في طليعة الدول المتقدمة، في ظل القيادة الرشيدة لحضرة صاحب السمو الشيخ تميم بن حمد آل ثاني أمير البلاد المفدى.

كما قدمت العديد من الجهات مساهمات وتعاوناً كبيراً في إعداد هذه الخطة الطموحة. ولمواصلة تطوير هذه الخطة وضمان تنفيذها بنجاح تحث وزارة المواصلات جميع الجهات الأخرى للاطلاع على هذه الخطة، والعمل معًا مسترشدين بها لتطوير أنظمة نقل بري متكاملة تلتزم بالأهداف الوطنية لمستقبل مزدهر ومستدام.

كما تؤكد وزارة المواصلات على التزامها بالعمل الجاد والدؤوب من خلال المشاريع والبرامج المستقبلية التي تهدف إلى بناء نظام نقل بري قائم على أحدث التقنيات وأفضل الممارسات في هذا القطاع.

FOREWORD

Land transportation is one of the key sectors that tremendously helps improve all aspects of life and ensures the delivery of goods and services to individuals and communities. It also underpins the growth of other sectors, such as agriculture, industry, mining, and trade and drives the sustainable development of cities, societies, and the economy in step with the objectives of the Qatar National Vision 2030.

It is with this understanding that the Ministry of Transport (MOT), in compliance with its responsibilities, has developed the Updated Transportation Master Plan for the State of Qatar (Updated TMPQ) with collaboration and input from multiple government and private entities and other relevant stakeholders and organizations.

The Updated TMPQ provides an overarching framework for the future of land transportation that recommends an integrated set of transportation initiatives and projects for all users of land transportation systems, which will accommodate the population growth and a growing development momentum across Qatar over the next 30 years until 2050. This far-reaching master plan can eventually bring Qatar to the forefront of the world's most sustainable nations by providing innovative and sustainable transportation solutions that further boost the economy, improve the quality of life for citizens and residents, while preserving the national identity of Qatar.

The transportation schemes, initiatives, policies, and manuals within the Updated TMPQ have been derived from the pillars of the Qatar National Vision 2030, which strive to place Qatar in the forefront of the most advanced nations, under the leadership of the Emir of Qatar, His Highness Sheikh Tamim Bin Hamad Al Thani.

A multitude of stakeholders played key roles and made very significant contributions to this ambitious plan. To continue that development and for successful implementation, MOT encourages all other entities to familiarize themselves with the Updated TMPQ and work together, guided by this plan, to develop integrated transportation systems that focus on the national objectives for a prosperous and sustainable future.

MOT further stresses its commitment to working relentlessly on many future projects and programs and aims to deliver a land transportation system that is based on the latest technologies and best practices in the transportation field.

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تنويه

قامت وزارة المواصلات بإعداد هذا التقرير ضمن اختصاصاتها وصلاحياتها وفقاً لأحدث الممارسات العالمية في هذا المجال وبناءً على المعلومات، والإحصائيات والبيانات المتوفرة عند إعداد هذا التقرير. لذا إن استخدام هذا التقرير لأي عمل، لا يعفي المستخدمين من استخدام أحدث الممارسات العالمية، واتباع الأساليب الهندسية الصحيحة وفقاً لأحدث التقنيات العالمية المتبعة.

وعليه وجب التأكيد على أن وزارة المواصلات لا تتحمل أي مسؤولية مالية أو قانونية يمكن أن تُعزى إلى هذا الاستخدام، كما أنه لا يحق للمستخدمين المطالبة أو استلام أي نوع من التعويض عن أية أضرار أو خسائر.

وللحصول على نسخة من هذا التقرير، يجب التقدم بطلب رسمي إلى وزارة المواصلات في دولة قطر والذي يعد موافقة على ماورد في هذا التنويه. ويجوز للمستخدمين عرض محتويات التقرير ونسخها وطباعتها للاستخدام الخاص فقط، شريطة أن تحمل جميع النسخ والمطبوعات الخاصة بالمحتويات حقوق النشر وإشعارات الملكية وإخلاء المسؤولية الأخرى المعروضة على التقرير. كما لا يجوز للمستخدمين الإعلان أو النشر أو الإفصاح عن البيانات و / أو الكشف عن أي معلومات مدرجة في هذا التقرير على الإطلاق دون موافقة كتابية مسبقة من قبل وزارة المواصلات.

وفيما يخص التغييرات أو الإصدارات المستقبلية، ستقوم الوزارة بتوفيرها ويمكن الحصول عليها من خلال الاتصال بالإدارة المخولة في الوزارة، وعليه يتوجب على المستخدمين التحقق بشكل متواصل بأن لديهم أحدث إصدار من هذا التقرير.

ملاحظة: ستقوم وزارة المواصلات بمواصلة تحديث وتعديل هذا التقرير مع الأخذ بعين الاعتبار النظريات الجديدة وأحدث الأساليب التكنولوجية والمواضيع المُستجدة التي تتعلق بتخطيط وتحليل وتصميم أنظمة النقل والمرور. إن وزارة المواصلات تشجع المستخدمين على تقديم الملاحظات والاقتراحات والتعليقات وردود الأفعال وذلك من خلال قنوات الاتصال الخاصة بالوزارة، وسيتم مراجعة هذه الملاحظات والاقتراحات ومن ثم تقييمها للنظر في إمكانية إدراجها ضمن الإصدار القادم من التقرير.

DISCLAIMER

The Ministry of Transport (MOT) of Qatar has developed this document with utmost due diligence, using information, statistics and survey data available at the time of writing and following international best practices.

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Note: New findings, technologies, and topics related to the planning, designing, operating, and maintaining of transportation and traffic systems will regularly be used by MOT to keep this report up-to-date. Users are encouraged to provide feedback through MOT communication channels. Feedback will be reviewed, assessed, and possibly included in the next version.

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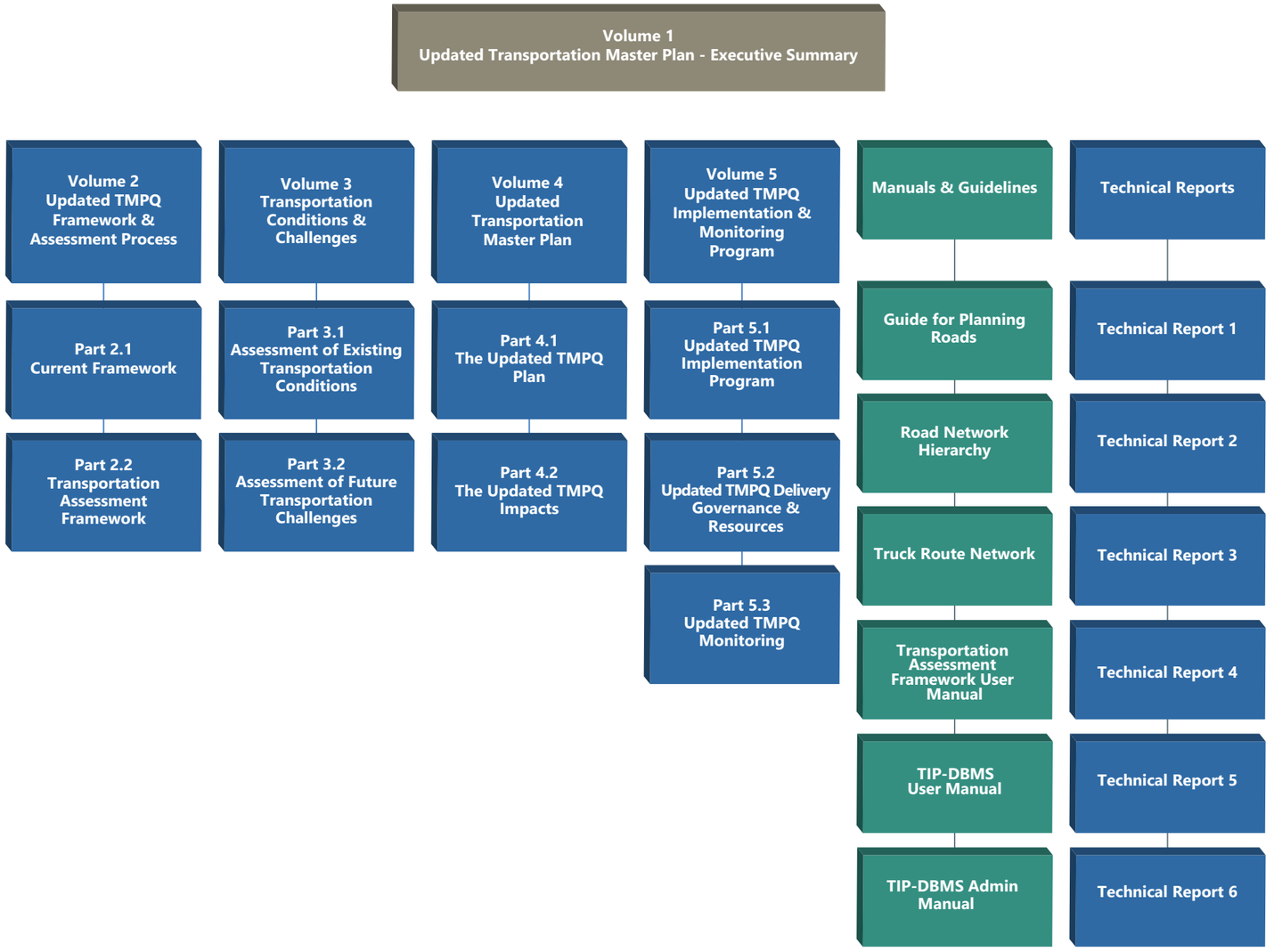
THE UPDATED TMPQ REPORT STRUCTURE

In order to present the components of the Updated TMPQ more effectively, and to a wider, and possibly less technical audience, an abridged content of the study Technical Reports is being given in the Updated TMPQ Plan Reports. The final Updated TMPQ report is divided into five volumes, as detailed below. Each Volume contains an overview and summary of the work carried out during the study and identifies the components of the final Updated TMPQ. Interested parties are still able to refer to the more detailed Technical Reports if desired, and can focus in more detail on selected aspects, analysis, or areas of interest. The next figure shows the structure of the deliverables of the Updated TMPQ.



Updated TMPQ Report Structure

In more detail, the contents of the five Volumes, and their constituent Parts, is as follows:

- **Volume 1: Updated TMPQ – Executive Summary** – This Volume is a summary of the overall Updated TMPQ development process and a focus on the approved Master Plan and its implementation program.
- **Volume 2: Updated TMPQ Framework & Assessment Process –** This Volume comprises two parts:
  - **Part 2.1 – Current Framework**

    This part of Volume 2 provides context and scene-setting, outlining the current framework for Qatar including history, geography, political, cultural, institutional, legal, education, trade, economy, and investment in the country. It provides a backdrop for the analysis of the current transportation framework and the development of the Updated TMPQ.
  - **Part 2.2 – Transportation Assessment Framework**

    This part of Volume 2 describes the detailed methodology developed for the Transportation Assessment Framework (TAF), which will be used as a supporting tool in the decision-making process during the appraisal of schemes and scenarios considering the context of the Updated TMPQ.
- **Volume 3: Transportation Conditions and Challenges** – This Volume comprises two parts:
  - **Part 3.1 – Assessment of Existing Transportation Conditions**

    This part of Volume 3 presents the Current Conditions, assesses the existing transportation system, and provides an overview of the existing supply along with the analysis of the transportation demand in the base year (2018), followed by the assessment of the existing transportation system.
  - **Part 3.2 – Assessment of Future Transportation Challenges**

    This part of Volume 3 provides an assessment of the future transportation systems for Horizon Years 2025 (Reference Case), 2030, 2035, and 2050. It provides an overview of the supply along with the analysis of the transportation demand in the future years, followed by the assessment of the performance of the transportation system in each horizon year, and finally emphasizes the expected future mobility challenges.
- **Volume 4: Updated Transportation Master Plan** – This Volume lists all proposed schemes included in the Updated TMPQ. Volume 4 is also in two parts:
  - **Part 4.1 – The Updated TMPQ Plan**

    This part of Volume 4 summarizes the schemes included in the final composition of projects of the Updated TMPQ for each mode. These schemes are selected based on the analyses undertaken in Technical Report 6 of the Updated TMPQ. It represents a definitive description with details of the various components of the plan.
  - **Part 4.2 – The Updated TMPQ Impacts**

    This part includes the expected impact of the Updated TMPQ by presenting selected results from the Qatar Strategic Transportation Model (QSTM), the Transportation Assessment Framework (TAF), and Cost-Benefit Analysis (CBA) for the Updated TMPQ:
    - Updated TMPQ Long Term Impact
    - Updated TMPQ Costs and Benefits
- **Volume 5: Updated TMPQ Implementation and Monitoring Program** – This Volume is in three parts:
  - **Part 5.1 – Updated TMPQ Implementation Program**

    This part of Volume 5 explains how schemes in Volume 4 have been allocated into each horizon year for each mode based on their performance, design/construction duration, and addressing gaps in the networks. A program of studies for each HY is also provided along with success factors, policies, and regulations.
  - **Part 5.2: Updated TMPQ Delivery Governance & Resources**

    This part of Volume 5 includes details of the proposed governance structure to implement the Master Plan and details of required financial resources.
  - **Part 5.3: Updated TMPQ Monitoring**

    This part of Volume 5 states how scheme implementation should be monitored and when the master plan will need updating. It has the following three Sections:
    - Updated TMPQ Implementation Monitoring
    - Transportation Performance Monitoring
    - Requirements for TMPQ Major Update
- **Manuals and Guidelines**

  There are several manuals and guidelines which have also been produced as part of the overall Updated TMPQ. These manuals and guidelines are:
  - Guide for Planning Roads
  - Road Network Hierarchy
  - Truck Route Network
  - Transportation Assessment Framework User Manual
  - Transportation Implementation Program (TIP)-Database Management System (DBMS) User Manual
  - TIP-DBMS Administrative Manual
- **Technical reports**

  There are also several technical reports which have also been produced during the TMPQ Update that provide technical details on the tasks undertaken to arrive at the overall Updated TMPQ. These reports are:
  - Technical Report 1 - Current Framework
  - Technical Report 2 - Transportation Assessment Framework
  - Technical Report 3 - Assessment of Existing Transportation System
  - Technical Report 4 - Assessment of Future Transportation Conditions
  - Technical Report 5 - Schemes Development
  - Technical Report 6 - Scenarios Development

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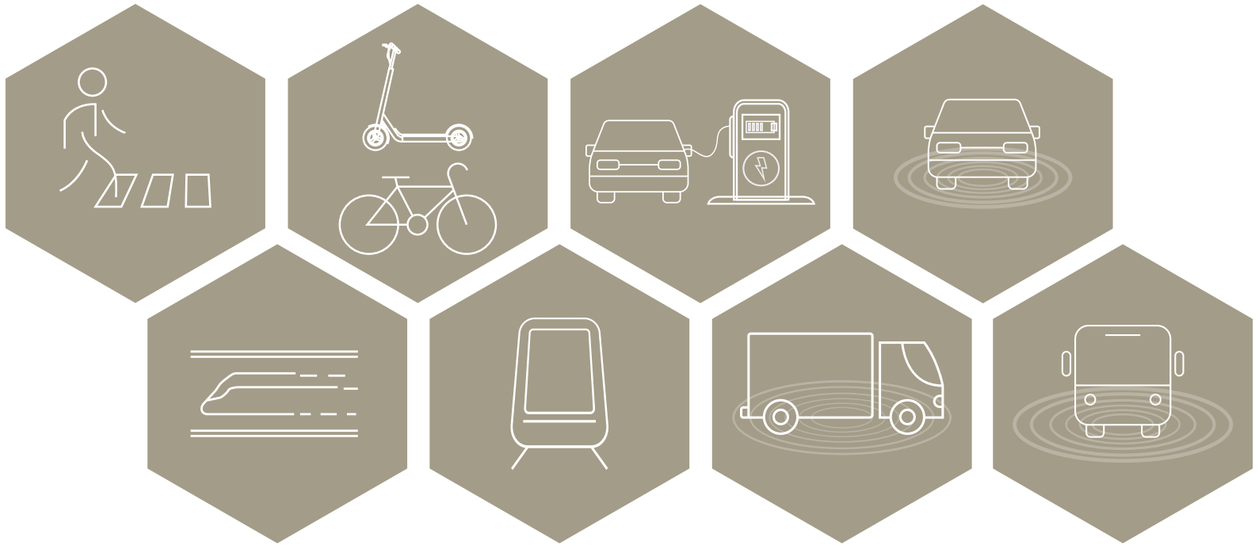
LIST OF ABBREVIATIONS AND DEFINITIONS

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LIST OF ABBREVIATIONS AND DEFINITIONS

AM	Ante Meridiem (before midday)
APM	Automated People Mover
BCR	Benefit-Cost Ratio
BOT	Build Operate Transfer
BRT	Bus Rapid Transit
BU	Bus
CB	Company Bus
CBA	Cost Benefit Analysis
CY	Cycling
DBFO	Design Build Finance Operate
DBMS	Database Management System
DCP	Development Contribution Plan
DM	Demand Management
DMA	Doha Metropolitan Area
DRT	Demand Responsive Transport
ECA	Export Credit Agencies
EIA	Environmental Impact Assessment
FIFA	Fédération Internationale de Football Association
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Geographic Positioning System
GV	Governance
HE	His Excellency
HGV	Heavy Goods Vehicles
HIA	Hamad International Airport
HSR	High Speed Rail
HW	Highway
HWY	Highway
HY	Horizon Year
ID	Identification
IRR	Internal Rate of Return
ITS	Intelligent Transport Systems
KM	Kilometer
KPI	Key Performance Indicators
LNG	Liquefied Natural Gas
LoS	Levels of Service
LRDP	Local Roads and Drainage Program
LRT	Light Rail Transit
LTPD	Land Transport Planning Department
MD	Midday period
MDB	Multilateral Development Bank
MDPS	Ministry of Development Planning and Statistics
ME	Metro
MME	Ministry of Municipality and Environment
MMUP	Ministry of Municipality and Urban Planning
MOEHE	Ministry of Education and Higher Education
MOI	Ministry of Interior
MOT	Ministry of Transport
MSDP	Municipal Spatial Development Plan
NA	Not Applicable
NDB	National Development Bank
NPV	Net Present Value
O-D	Origin - Destination
O&M	Operation and Maintenance
PM	Post Meridiem (after midday)
PM	Particulate Matter
P&R	Park & Ride
PP	Position Paper
PPP	Private Public Partnership
PT	Public Transport
PVB	Present Value of Benefits

PVC	Present Value of Costs
QAR	Qatari Riyals
QEZ	Qatar Economic Zone
QNDF	Qatar National Development Framework
QNMP	Qatar National Master Plan
QNRSS	Qatar National Road Safety Strategy
QNV	Qatar National Vision
QPCMP	Qatar Pedestrian Crossings Master Plan
QRail	Qatar Rail
QR	Qatar Rail
QSTM2.0	Qatar Strategic Transport Model (Version 2.0)
RA	Rail
SAF	Safety
SOE	State-Owned-Enterprise
SPV	Special Purpose Vehicle
TA	Taxi
TAF	Transportation Appraisal Framework
TDM	Transportation Demand Management
TI	Technology & Integration
TIA	Transport Impact Assessment
TIP	Transportation Implementation Program
TMPQ	Transportation Master Plan for Qatar
TOD	Transit Oriented Development
TR	Truck
TRN	Tournament Route Network
TTI	Travel Time Index
UAE	United Arab Emirates
WT	Water Transport

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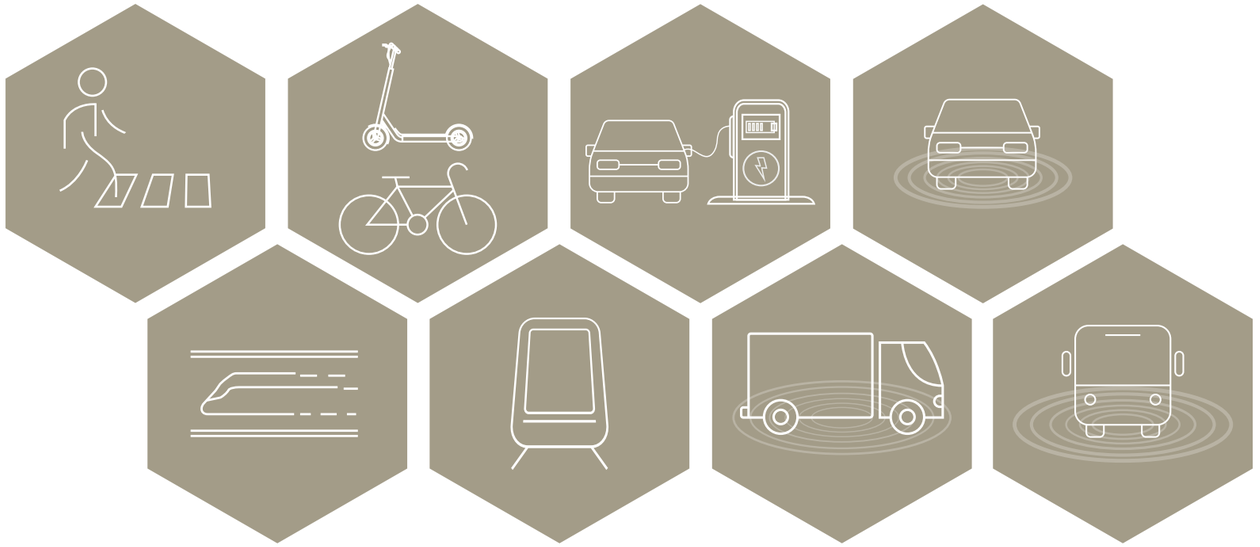
GLOSSARY



GLOSSARY

Accessibility: The degree to which a product, service, or environment is available to as many people as possible

AM Peak: A period in the morning, between one and three hours in which the greatest travel of people occurs. The majority of travel is from home to work/school

Arterial Road: A high capacity urban road that sits below Expressways in the road hierarchy. Arterial roads are intended to support medium distance trips and connect precincts and neighborhoods to the expressway network. They should form an interconnected grid that provides for a high level of movement across the urban area and balanced distribution of vehicle trips to maintain a high level of service for all users.

At-Grade Intersection: A junction at which two or more roads cross at the same level or grade

Average Journey Time: The average time taken for all vehicles, or a specific vehicle class, over a length of roadway between two specific points. It can comprise both running time and stopped delay time.

Average Travel Speed: The average speed of all vehicles, or a specific vehicle class, over a length of roadway between two specific points.

Average Weekday Demand: The total traffic volume passing a point (or segment) of a road in one or both directions for a typical weekday

Base Year: Developed for the Transport Model, normally the year of most recent survey and count data. Base year data is used to calibrate the Transport Model and validate that it can accurately simulate current conditions and transport demand levels. Ion the Updated TMPQ, the Base Year is 2018

Behavioral Change: In the context of transportation, this is how people can change their travel choice and selected mobility options, in response to other changes in transportation around them

Benefit Cost Ratio: is a ratio used in a cost-benefit analysis to summarize the overall relationship between the relative costs and benefits of a proposed project. In general terms, if a project has a ratio greater than 1.0, the project is expected to deliver a positive net present value in the long run

Bicycle Lane: A narrow traffic lane set aside on a road for the use of cyclists

Bicycle Path: A Bicycle Path (or Cycle Path) is a track, path, or lane designated for use by cyclists from which motorized traffic is generally excluded

Bus Depot: Is the bus system's operating base. It provides parking accommodation, servicing and maintenance facilities for vehicles, an administrative function, and facilities for staff.

Bus Fleet: The total number of buses used to provide bus services to the public. The fleet includes both vehicles in service, and spare vehicles at the depot.

Bus Lane: A lane of roadway intended primarily for use by buses, either all day or during specified periods. Also known as a transit priority lane or bus priority lane

Bus Network: A coordinated system of bus routes at various frequencies, having interchanges between routes at certain bus stations, stops and terminals

Bus Priority: Relatively low-cost traffic management measures designed to give priority to buses over other vehicles, including bus lanes, traffic signal priority, bus only streets, parking restrictions and enforcement

Bus Rapid Transit: A bus-based mass transit system. A true BRT system generally has specialized design, services, and infrastructure to improve system quality and remove the typical causes of delay

Bus Route: A fixed route followed by a public bus between start and end points, along one or more roads, to a fixed schedule, and in accordance with public information

Bus Route Frequency: The scheduled interval each hour that a bus departs from the origin point. In Qatar, this is normally every 15 or 20 minutes

Bus Shelter: A place to wait for buses, that normally has a roof and at least three sides, to protect passengers from wind, rain and sun. Some closed shelters are air-conditioned, and most include basic route information

Bus Station: Is normally the point where a bus route starts or ends, where vehicles stop and wait before departing on their return journeys. It is also where passengers board and alight from vehicles. It is normally off-road, with at least basic facilities for passengers

Bus Stop: A location along the highway where bus passengers may board or alight from buses in service

Capital Cost: Fixed, one-time costs incurred on the purchase of land, buildings, infrastructure, construction and equipment used in transportation projects or services. In other words, it is the total cost needed to bring a project to a commercially operable status

Car Dependency: The dependence on, and dominant usage of the car as the main mode of transport, said to be caused by the configuration of a city's transportation system favoring the car, over other forms of transport

Committed Transportation Project: Projects with design, approved budget and identified in Programs of Ministry of Transport (MOT), Public Works Authority (PWA Ashghal), Mowasalat and Qatar Rail before 2025

Congestion Charging: A Congestion Charge is a daily tariff and payment which enables motorists to drive around, leave and re-enter an inner city charging zone.

Connectivity: The number of connecting routes within a particular area, often measured by counting the number of intersection equivalents per unit of area. An area may be measured for its 'connectivity' for different travel modes – vehicle, cyclist or pedestrian. An area with high connectivity has an open street network that provides multiple routes to and from destinations

Contract Bus: Private bus for labor and school travel. Labor buses are used to transport staff from their homes to specific work locations. School buses cater for the commuting of younger students and pupils. Contract buses are effective, privately run and are not public transport in the conventional sense, as they are not open to the general public.

Cost Benefit Analysis: A process used to analyze decisions, whereby costs and benefits of an option are converted into the same monetary basis and added up to reflect the overall impact, highlighting the overall balance between costs and benefits.

Cross-Modal Integration: Includes schemes which cut across different transportation modes to the benefit of the travelling public, in terms of increased travel opportunities, or enhancing travel experience by combining different ways of travel and making it more attractive. Cross-Modal schemes include policies, pricing strategies, land use, technology, marketing, human resources and consultation

Cycling Network: an interconnected set of safe and direct cycling routes covering a given area or city, and supported by associated infrastructure such as signing, and cycle parking

Dangerous Truck Route: A selected and published route, comprising one or more roads, along which trucks may transport certain types of hazardous goods, sometimes with additional time restrictions. Routes are selected to minimize risk to sensitive residential, environmental and other land uses

Database Management System: a software package designed to define, manipulate, retrieve and manage data in a database. A DBMS generally manipulates the data itself, the data format, field names, record structure and file structure. It also defines rules to validate and manipulate this data

Debt Financing: A way to raise capital through means of borrowing. This funding will need to be repaid at an arranged later date, usually through regular repayments with added interest.

Delivery Phasing Plan: The Implementation outline and phasing plan for delivery of the Updated TMPQ, considering priority of projects and allocations of projects and budget estimates to each Horizon Year

Design Speed: The target speed at which drivers are intended to travel on a road, and not, as often misused, the maximum operating speed. It is also a reference speed which is used to select other geometric design elements for a road, such as curvature (both horizontal and vertical) and superelevation

Development Contribution Plan: A plan outlining payments or works-in-kind towards the provision of infrastructure made by the proponent of a new development. A DCP sets the plan for future infrastructure required to service the forecast population within a designated spatial area. A new development is required to contribute towards the planned infrastructure based on the provisions of the DCP.

Doha Metropolitan Area: The central area in Doha including the greater Doha area.

Economic Development: A process by which the economic well-being and quality of life of a nation, region, or community, are improved according to targeted goals and objectives. Generally, this is indicated by increases in market productivity and Gross Domestic Product

Economic Zone: An area in a country that is subject to different economic regulations than other regions within the same country. The economic regulations of economic zones tend to be conducive to—and attract—foreign direct investment

Emergency Vehicle: A vehicle that is designated and authorized to respond to an emergency in a life-threatening situation.

Expressway: A high-speed divided highway for through traffic with access partially or fully controlled. Expressways are designed to enable free flowing traffic to move at high speeds over long distances. Radial

expressways cater for trips toward the central city, and orbital expressways carry trips across the city.

Geographic Information System: A system that creates, manages, analyzes, and maps all types of data. GIS connects data to a map, integrating location data with all types of descriptive information. This provides a foundation for mapping and analysis that is used in transportation planning

Governance: The institutional, legislative, regulatory, and policy frameworks in which transportation schemes are designed, implemented and managed, not only to support program implementation, but also to respond to the forthcoming changes shaping the transportation sector

Grade Separation: The method of aligning a junction of two or more road axes at different heights (grades) so that they will not disrupt the traffic flow on other transit routes when they cross each other

Gross Domestic Product: A monetary measure of the market value of all the final goods and services produced in a specific time period. It is often used as a metric for international comparisons as well as a broad measure of economic progress.

Highway: Any public or private road or other public way on land. It is used for major roads, but also includes other public roads and public tracks. This can include all types and classifications of roads

Horizon Year: A fixed year in the future at which point certain processes will be evaluated or assumed to end. It is necessary to assign such a fixed horizon year so that alternatives can be evaluated for performance over the same period of time. Transport planners typically use a 20- to 30-year horizon for long-range transportation planning purposes. Intermediate forecast years are usually considered, which chosen normally to correspond to future planning horizons such as land use forecasts

Integrated Public Transport Fare System: allows a person to make a journey that involves transfers between different public transport modes (such as bus, Metro and Water Taxi) with a single ticket that is valid for the complete journey. The purpose of integrated ticketing is to encourage people to use public transport by simplifying switching between transport modes and by increasing the efficiency of the services

Interchange: A system of interconnecting roadways in conjunction with one or more grade separations, providing for the movement of traffic between two or more roadways on different levels

Internal Rate of Return: The percentage return that the master plan is expected to create, and the breakeven cash flow level. In general terms, if the internal rate of return on a project or investment is greater than the minimum required rate of return, typically the cost of capital, then the project or investment can be pursued.

International Best Practice: A best practice is a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means or because it has become a standard way of doing things, e.g., a standard way of complying with legal or ethical requirements. Development of a master plan normally includes an assessment of international best practice in transportation planning solutions

International Gateway: A transportation access or boundary point between nations, where goods or people may transfer across boundaries by any transportation mode

Intersection: An at-grade road junction of two or more roads either meeting or Crossing

Key Performance Indicator: A quantifiable measure of performance over time for a specific objective. KPIs provide targets, milestones to gauge progress, and insights that help better decision-making

Land Transport Strategy: An approach to develop a set of policies and strategies that meet the transportation vison and objectives of the nation

Lane: A strip of roadway used for a single line of vehicles

Level of Service: A metric for measuring vehicle delay and traffic flow. The use of this metric has been discontinued, replaced by newer metrics such as Average Daily Traffic (ADT)

Link: A specific segment of a road corridor

Light Rail Transit: Typically, an urban form of public transport using the same rolling stock as a tramway, but operates primarily along exclusive rights-of-way and has vehicles capable of operating as a single train or as multiple units coupled together

Local Roads and Drainage Program: A nationwide program carried out by Ashghal, that aims to develop the roads, drainage networks and overall infrastructure in all areas of Qatar to raise the standard of living for all citizens and residents. The program provides a comprehensive infrastructure for new areas that lack infrastructure facilities, in addition to developing and enhancing the existing infrastructure in central and sub-urban areas.

Logistics Zone: Logistic zones are a grouping of activities related to freight distribution such as distribution centers, transportation, and supporting services within a defined and often planned area.

Metro: A type of high-capacity rail-based public transport system generally found in medium size and large cities. Metro systems are electric railways that operate on an exclusive right of way, often grade-separated in tunnels or on elevated sections.

Midday Peak: A period in the middle of the day, when off-peak travel of people occurs

Mixed Use Development: A range of complementary uses within the same building, site or precinct. The different uses may be arranged floor by floor, or side by side. The uses may be residential, commercial, retail or institutional

Mode Share: is the percentage of travelers using a particular type of transportation (car, bus, rail, walk etc.)

Motorized Transport: Any form of transport using a fuel for propulsion, including petrol, LNG, hydrogen, or electricity

Multi-Modal: The combination of two or more modes of transport

Net Present Value: Used to determine the current value of all future cash flows generated by a master plan or project, including the initial capital investment. It is widely used to establish which projects are likely to turn the greatest profit. NPV, is used to calculate today's value of a future stream of payments. If the NPV of a project or investment is positive, it means that the discounted present value of all future cash flows related to that project or investment will be positive, and therefore attractive

Non-Motorized Transport: Any form of transport not using a fuel for propulsion, including walking, cycling, and small-wheeled transport such as skateboards and push scooters

Operating Cost: The ongoing expenses incurred from the normal day-to-day of running of a transportation vehicle or system. These include staff costs, fuel, maintenance, parts replacement, licensing, taxes, depreciation and other upkeep costs

Park and Ride: A form of integrated transport that allows private transport users to park their vehicles at a large car park and travel into the city center using a public transport mode

Peak Crowding: Exceeding the design capacity of a transportation mode during peak travel times, particularly public transport modes, evidenced by over-crowding and higher than normal levels of standing

Pedestrian Crossing: A designated place for pedestrians to cross a road

Pedestrian Network: An interconnected set of safe and direct pedestrian paths and sidewalks connected to pedestrian crossings

Parking Lane: A curbside lane on the roadway utilized primarily for the parking of vehicles

Peak Traffic Flow: Maximum traffic flow under given circumstances

Pedestrian Zone: An area where vehicular traffic is prohibited during certain periods, so it functions as a pedestrian area during business hours, but permits vehicular traffic at other times

PM Peak: A period in the evening, when the greatest travel of people occurs, mainly in the reverse direction of the AM Peak

Preferred Scenario: A package of policies, strategies and projects assessed to be the best overall package when compared with other transportation scenarios

Present Value of Benefits: A term used in cost-benefit analysis and project appraisal that refers to the discounted sum, or Present Value, of a stream of benefits associated with a project or master plan

Present Value of Costs: A term used in cost-benefit analysis and project appraisal that refers to the discounted sum, or Present Value, of a stream of costs associated with a project or master plan

Private Sector Participation: A process that occurs when a private company or investor engages in a project along with a public sector entity. This participation allows major risks to be spread among several different parties to ensure one group does not have full financial responsibility.

Public Private Partnership: Collaboration between a government agency and a private-sector company that can be used to finance, build, and operate projects, such as public transportation networks, highway infrastructure, parking systems etc.

Public Realm: Any space that is free and open to the public, normally streets, squares, parks and open spaces

Public Transport: is a system of transport for groups of passengers available for use by the general public, typically managed on a schedule, operated on fixed routes, and for a charge for each trip

Rail Network: A system of intersecting rail routes, associated passenger stations, and supporting facilities such as signaling, tracks and maintenance depots

Real-Time Information System: Real-time information systems for public transport provide passengers with estimated arrival times for different public transport modes across a range of different platforms. The information is driven by location-based systems, for example, GPS tracking devices on vehicles, increasingly utilized by bus operators. Systems for private transport include highway variable message signs, incident and route diversion messaging systems

Reference Case: The scenario in which existing transportation networks and systems are maintained, with no new projects implemented. This enables comparison with and evaluation of potential scenarios with new proposed projects

Right-of-Way: A type of easement or safeguarding granted or reserved over land or a land corridor for transportation purposes, such as a highway, railway, public footpath or utility. This normally includes the entire area between property lines or private land boundaries

Road Capacity: The maximum hourly rate at which vehicles can reasonably be expected to traverse a point (intersection) or section of a lane/roadway during a given period of time

Road Class: Classification as defined under the road hierarchy, including expressways, arterial roads, collector roads and local roads

Road Functional Classification: Distinct "functional" categories based on the amount of travel a street is intended to accommodate

Road Hierarchy: Categorization of roads according to their functions and capacities. The basic hierarchy comprises expressways, above arterials, above collectors, above local roads

Road Tolling: A toll road is a highway, or section of highway, where the user pays a fee for the road's upkeep and maintenance as they drive on it. Often, toll roads tend to be the faster and less congested routes

Roundabout: An intersection at which traffic circulates counter-clockwise around a central traffic island; traffic entering the intersection is required to yield to vehicles on the circulatory roadway

Shared Path: An off-road path for cycling and walking

Shared Zone: A street where pedestrians, cyclists and vehicles share the roadway

Sidewalk: The portion of the roadway primarily for the use of pedestrians

Smart Parking Management and Control: Intelligent transport system that enables the user to find vacant. parking spaces through information technology and by using appropriate sensors. Among the most used types in smart parking, systems are data routing systems, smart payment systems, and. electronic car parks.

Stakeholder: A party that has an interest in a transportation master plan and can either affect or be affected by it. They include Government agencies, public transport operators, private developers, policy makers, trade and community bodies and the general public

Sustainability: Identifies a concept and attitude in development that considers a site's natural land, water, and energy resources as integral aspects of the development

Sustainable Development: An approach to development that seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs. It has economic, social and environmental dimensions.

Sustainable Transport: Transport by modes other than single-occupancy cars. Includes walking, cycling, bus, tram, train and carpooling

Synchronized Timing: A method of timing groups of traffic signals along an arterial street to provide for smooth movement of traffic with minimal stops, thereby reducing delays which result in a better flow of traffic and minimizes gas consumption and pollutant emissions

Traffic Signal Cycle: The total time to complete one sequence of all movements around a signalized intersection

Transit-Oriented Development: Compact, walkable, mixed-use communities centered on high-quality public transport systems. Transit-oriented development assists in addressing the growing problems of climate change and global energy security by creating dense, walkable communities that greatly reduce the need for driving and energy consumption

Transport Assessment Framework: Sets out the methodology, approach, criteria, tools and parameters for the assessment of transportation plans, projects or schemes. It is a comprehensive, systematic, objective and transparent process, enabling unbiased decisions to be made on the basis of the analysis of a comprehensive set of trade-offs of positive and adverse impacts. The ultimate aim of the TAF process is to establish a consistent basis which enables the selection of schemes (or a combined set of schemes), based on the comparative assessment of alternative options, resulting in an optimized solution which provides the greatest amount of benefits for the Qatari society as a whole.

Transport Operations Control Center: A single central control building or room, from where transport network operations and services are monitored, evaluated, recorded, analyzed and influenced

Transportation Implementation Plan: A project management tool that facilitates the execution of a strategic transportation master plan, by breaking down the implementation process into smaller steps, while defining the timeline, the budgets and the resources that will be needed

Transportation Infrastructure: The underlying system of public works designed to facilitate movement. This includes the fixed installations of highways, railways, water ways, stations and terminals, pipelines, seaports, refueling depots, trucking terminals, warehouses, bus stations, railway stations, and airports.

Transportation Master Plan:

Transportation Mobility: Access through readily available transportation options to destinations, activities, services and goods, minimizing time, and maximizing affordability and safety

Transportation Mode: Different ways by which goods or people are transported from one place to the other through land, air or sea

Transportation Objectives: Specific objectives grouped under general objectives of efficiency and integration, mobility and accessibility, safety and security, environmental and sustainable development, quality of life, and Qatari values. They have been used as assessment criteria in the Transport Assessment Framework, to demonstrate the extent to which the alternative scheme packages proposed can meet the strategic objectives of the plan and contribute to achieving its vision.

Transportation Policy: A set of constructs, propositions, and transport initiatives, that are established to achieve specific objectives relating to social, economic and environmental conditions, and the functioning, effectiveness and performance of the transport system

Transportation Regulation: Embodied in laws, legislation, and the legal framework that supports wider transportation schemes and policies, to ensure that transportation services are provided adequately, under acceptable levels of service, and that users of these services operate safely, controlled and protected from excessive prices or unfair practices.

Transportation Vision Statement: The guiding principles providing the direction for the various elements of the Updated TMPQ to achieve a prosperous and sustainable future for quality of life in Qatar

Travel Demand Management: A set of measures, policies, strategies aimed at reducing or controlling the demand for travel. This includes decreasing congestion or peak crowding, optimizing existing infrastructure or service capacity, promoting efficiency within the transportation system, or encouraging choices which are safer, less polluting or more sustainable.

Travel Time Index: The ratio of the total travel time during the peak period over the time required to make the same trip at free-flow speed conditions. It is a measure of average conditions that represents how much longer, on average, travel times are during congestion compared to during uncongested conditions

Truck Facility: Facilities for managing the movement and control of trucks including truck holding areas, parking areas, rest areas, over-weight stations and over-height monitoring stations.

Truck Lane: A specific lane on a highway designated for use by heavy goods vehicles, sometimes with time restrictions

Truck Restrictions: A range of measures to restrict the passage of heavy goods vehicles on certain highways, through certain sensitive land use areas or city zones, or at certain times of days. Also includes weight, height, length and load restrictions

Truck Route: A selected and published route, comprising one or more roads, along which trucks may transport goods, sometimes with additional time restrictions. Routes are selected to minimize risk to sensitive residential, environmental and other land uses

Truck Route Network: A network of specified routes for heavy truck traffic

Underpass: A bridge, road, railway or similar structure that crosses under another road or railway

Value of Time: A notional value of time of drivers and passengers, used in the cost benefit analysis to represent a value of time savings

Vehicle Operating Costs: The ongoing expenses incurred from the normal day-to-day of running of a vehicle. These include fuel, maintenance, parts replacement, licensing, taxes, depreciation and other upkeep costs

Volume/Capacity Ratio: It measures the level of congestion on a highway by dividing the volume of traffic by the capacity of the highway**.** As a rule of thumb, a ratio greater than 1.0 is severe congestion, 0.75 to 1.0 is heavy congestion, and below 0.75 is moderate to low congestion

Walkability: The degree to which an environment supports walking as a transportation mode, for instance by providing frequent, safe and attractive paths

Water Taxi: A watercraft used to provide public or private transport, usually, but not always, in an urban environment. Service may be scheduled with multiple stops, operating in a similar manner to a bus, or on demand to many locations, operating in a similar manner to a taxi

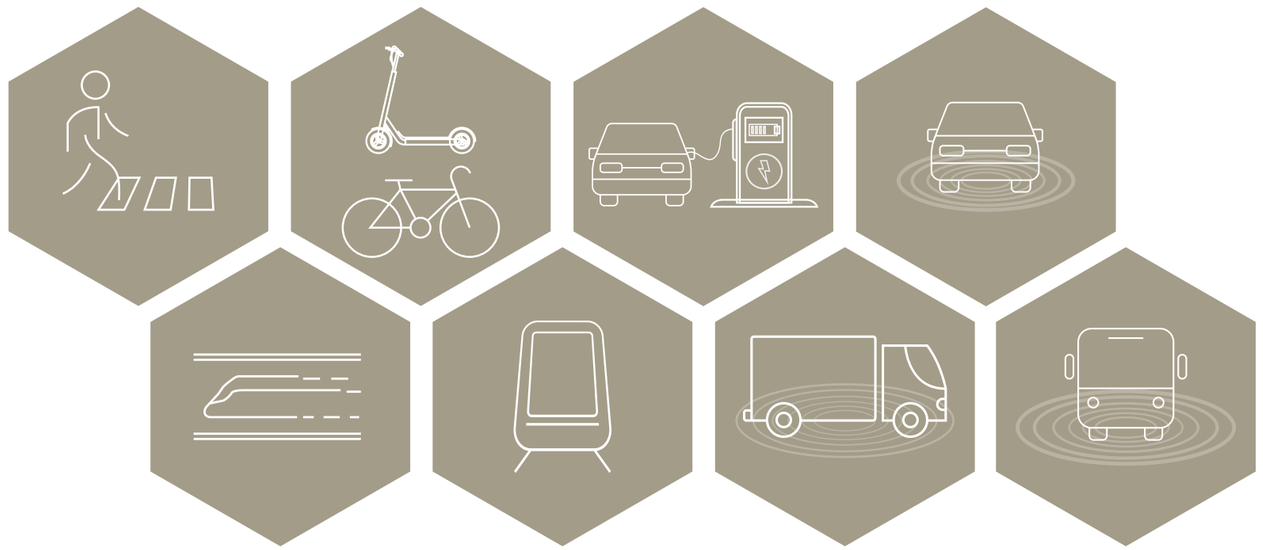
2050

نقـل متكامـل ومسـتدام للجميـع

INTEGRATED & SUSTAINABLE TRANSPORT FOR ALL

SECTION - 01

THE NEED FOR AN UPDATED TMPQ




Qatar
Qatar

1 THE NEED FOR AN UPDATED TMPQ

The future development of Qatar is being guided by the four pillars of the Qatar National Vision (QNV) 2030 launched by His Highness the Emir Sheikh Hamad bin Khalifa Al-Thani in 2009 and carried forward under the leadership of the Emir of Qatar, His Highness Sheikh Tamim Bin Hamad Al Thani, namely human, social, economic and environmental development.

Transportation is one of the fundamental ingredients that will underpin the pillars of the QNV 2030. It supports the economic competitiveness of Qatar and provides facilities and services to meet the needs of the public and the needs of commerce. Land transportation is one of the key sectors that tremendously helps improve all aspects of life and ensures the delivery of goods and services to individuals and communities. It also underpins the growth of other sectors, such as agriculture, industry, mining and trade and drives the sustainable development of cities, societies and the economy in step with the objectives of the Qatar National Vision 2030.

Sustainability forms a key corner stone of the Updated Transportation Master plan for Qatar (TMPQ), as it is one of the QNV 2030 pillars which has a significant impact on transportation. The Updated TMPQ develops a future transport network that balances the requirements of future economic growth with protection of the environment.

Qatar has hosted a number of major international events, with preparations ongoing to host the 2022 FIFA World Cup (Qatar 2022) and plans to hold other major international events in the future. The Updated TMPQ ensures that the future transport network in Qatar facilitates these events by providing safe, efficient and sustainable transport solutions.

1.1 THE ROLE OF TRANSPORTATION MASTER PLANS

Transportation master plans serve as a strategic map for short, medium and long-range transportation infrastructure investment, normally covering a period of 20 to 30 years. They set out how a state or city develops its transportation networks, and how it coordinates infrastructure improvements with land uses, and responds to future growth and demands. The goals and polices identified in these plans typically include strategies to improve safety, minimize congestion, and protect the environment. They cover all aspects of transportation, including highways, public transport, non-motorised transport, parking, travel demand management and cross-modal integration.

Successful master plans take into account the needs of all users of the highways and transportation systems and include strategies that enhance safety and mobility for drivers, public transport riders, cyclists, and pedestrians. The development of a master plan typically consists of an evaluation of existing conditions, identification of infrastructure needs and financing requirements, development of evaluation criteria to prioritize the needs, and an action plan to implement the recommended infrastructure investments or improvements.

It is customary to update national or regional master plans at regular intervals, normally every ten years, especially when the country or region goes through major economic, social and demographic changes.

1.2 THE 2008 TRANSPORT MASTER PLAN FOR QATAR

The first Transportation Master Plan for Qatar was launched in 2008. The TMPQ 2008 provided an overarching framework for the past and future of land transportation including an integrated set of transportation initiatives and projects for all users of land transportation systems. Given the elapsed time since its previous update and pursuant to achieving the goals of the QNV 2030, the Ministry of Transport (MOT) in 2017 commissioned a major update to the TMPQ 2008 to align the country's development with new challenges and opportunities.

The TMPQ 2008 consisted of a plan for improving transport infrastructure across the country. There were separate improvement plans for each transportation mode based on high rates of growth in population, which have so far been accommodated through a number of key developments. The Transportation Master Plan for Qatar reports provided a Short, Medium and Long-Term plan for each of the modes, and looked as far as 2026. Many of the recommendations have since been successfully implemented. The percentage of main road projects implemented according to the TMPQ 2008 reached about 75% of the freeway roads and 100% of the main roads (expressways and arterial roads). While 30% of public transport schemes have been implemented and the remainder are still underway.

1.3 KEY ACHIEVEMENTS SINCE 2008

Since completion of the TMPQ 2008, Qatar has invested heavily to improve transportation across Qatar. Below are some of the key transport achievements made since 2008:

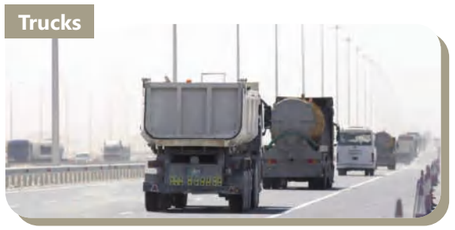
Key Transport Achievement Since 2008

Roads

Qatar has significantly expanded the Expressway network, which now provides access between major population centers, international gateways and industrial and economic zones.

Many local roads have been upgraded throughout Qatar as part of the Local Roads and Drainage Program.

Trucks

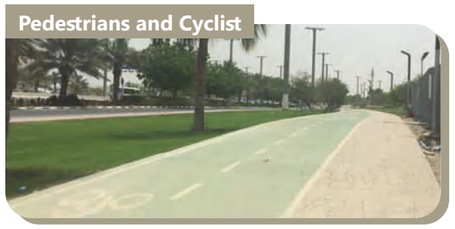


Qatar has implemented a number of truck facilities to improve safety and facilities for trucks, such as dedicated truck lanes on the orbital highway, and truck parking areas.

Public Transport

Public transport in Qatar has drastically changed since 2008 with construction of the Doha Metro and improved bus services and facilities. Many key centers in Doha are now accessible by public transport.

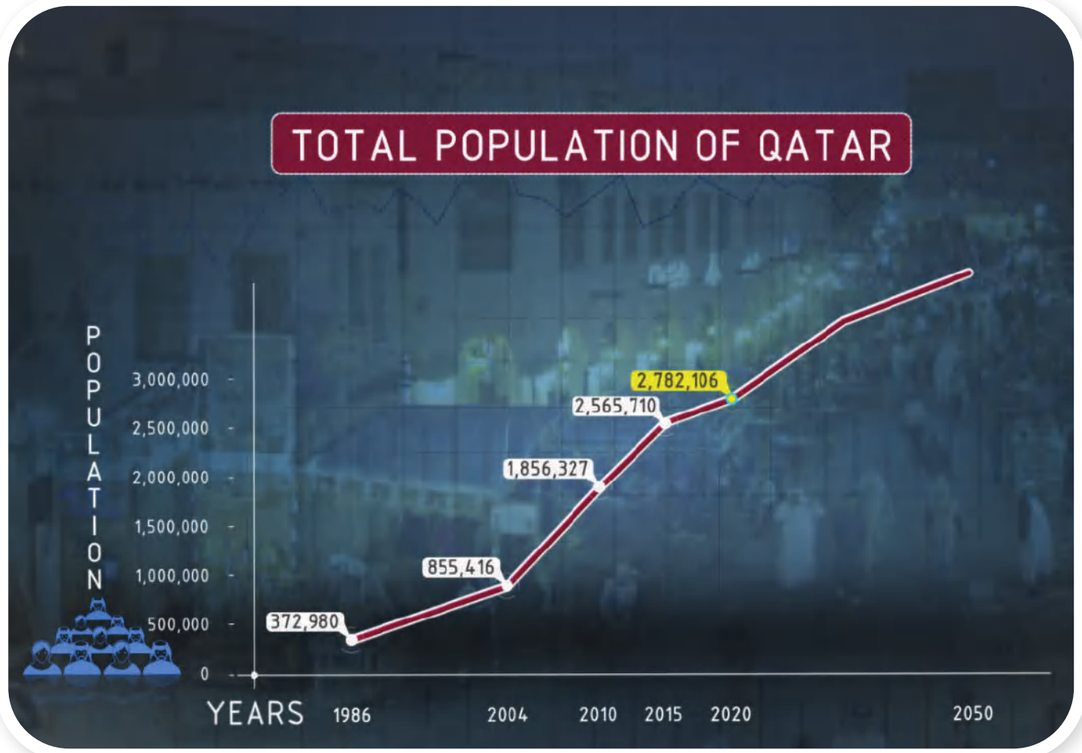
Pedestrians and Cyclist



Qatar has recently completed a Pedestrian Crossing Master Plan, which aims to improve pedestrian facilities in Qatar, such as new grade separated crossings. The Doha Central Development and Beautification Project is an ongoing project to improve the pedestrian and cycle environment in the Downtown and West Bay areas of Doha, through improved public realm.

There have also been a number of segregated cycle facilities constructed alongside major routes such as Expressways and key Arterial Roads.

1.4 ECONOMIC AND POPULATION GROWTH



The unprecedented economic and population growth in Qatar over recent years has posed challenges to service providers in terms of maintaining economic prosperity and high living standards. Since 2008 the population of Qatar has grown from 1.7 million to more than 2.7 million by 2017, mostly in Greater Doha. New development areas are emerging outside Doha, such as Lusail City, Al Wakra City, and Al Khor City, as well as new Economic and Logistic Zones. Over the same period, economic growth has been continuous. More recently Gross Domestic Product (GDP) has grown at around 3% per year, and is anticipated to rise further, retaining Qatar's first place in the world ranking for highest GDP per Capita (World Bank).

To sustain both the population and economic growth, the State of Qatar is investing in the improvement of the transportation system. It is investing in the construction of a network of expressways and freeways, to improve the existing road network, a country-wide rail network (freight and passenger), and a comprehensive public transport system that includes metro, Light Rail Transit (LRT), and bus network enhancements.

1.5 KEY EXISTING TRANSPORTATION CHALLENGES

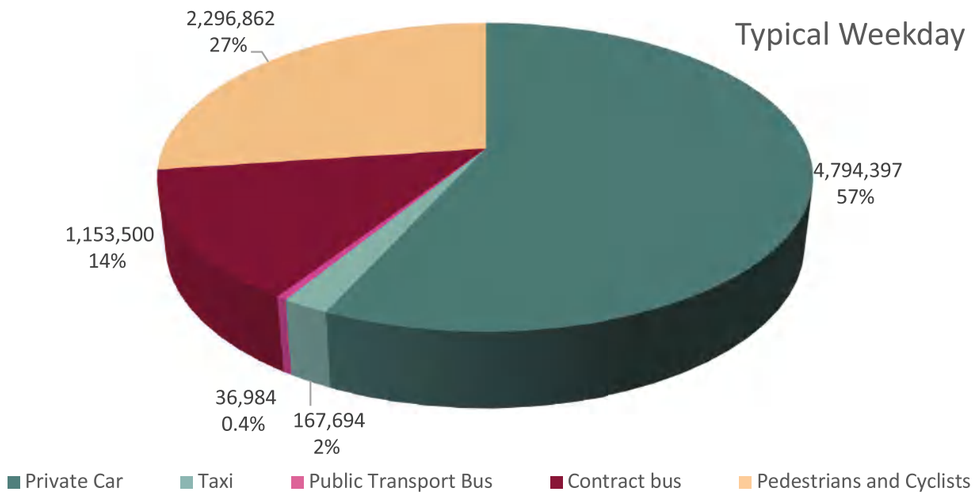
Transportation in Qatar is dominated by the Doha Metropolitan Area (DMA), where some 2 million of the population reside and/or work. Doha is the national powerhouse of government, business, banking, retail, leisure and tourism, however there is considerable development in the rest of the country following the government's diversification strategy.

An assessment has been made of the base year (2018) transportation system, by individual mode and overall, to identify both positive and negative aspects of existing transportation within Qatar. The supply and demand features have been assessed to determine problems and issues and provide conclusions. It is useful to understand the aggregate travel demand, mode split and journey purpose.

1.5.1 TYPICAL DAILY TRANSPORT DEMAND PER MODE AND TIME PERIOD (2018)

Across the whole network in Qatar, approximately 8.4 million person-trips per day were made in 2018, of which around 4.8 million were private car trips. The total car mode share of trips is around 57% for the typical weekday. Pedestrian and cycle trips amount to 27%, and contract buses 14%. Public bus use is very low, at around 0.4% mode share it is one of the lowest for any city in the World.

Existing (2018) made share of trips



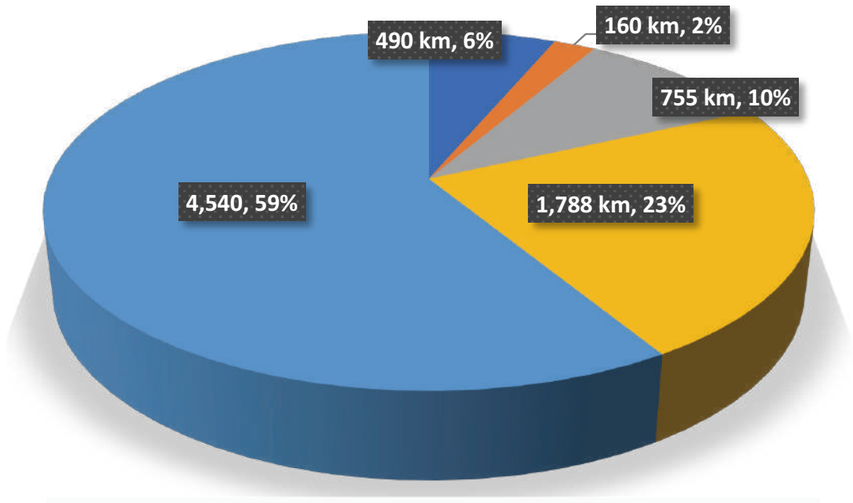
An assessment has been made of each of the existing main transportation modes, in terms of supply/ provision, demand and the network performance. As regards the reasons for travelling, other key points are:

1.5.2 EXISTING HIGHWAY NETWORK (2018)

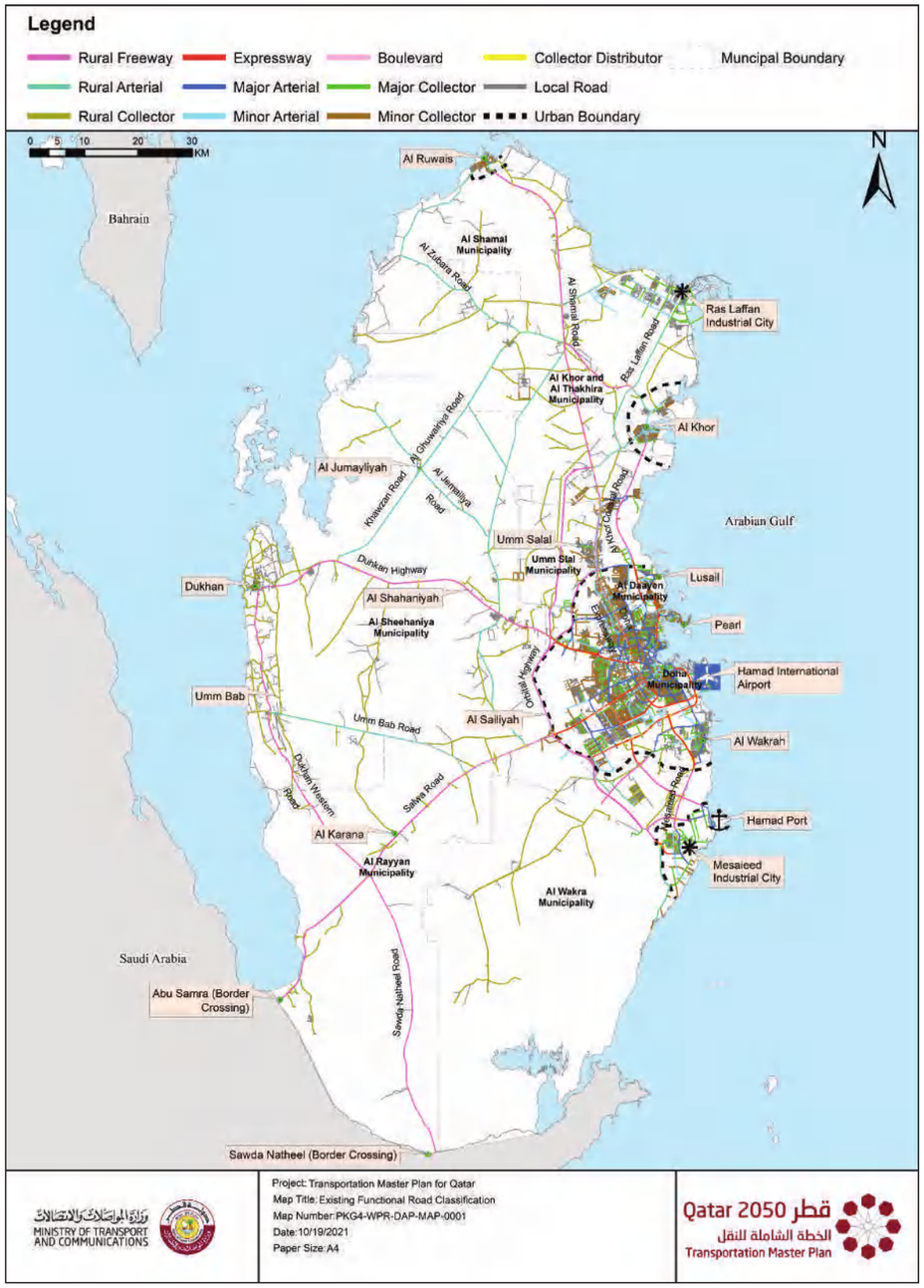
The existing primary highway network within the State of Qatar is illustrated in the figure below. This road network provides links between main population centers and cities within Qatar and provides connections to strategic assets such as, ports, airports, industrial cities and resources.

Qatar's road network consists of over 7,733 kilometers of public roadways, there are 100 grade separated interchanges, 300 signalized intersections and 500 roundabouts. The distribution of the total road length per road class is shown in the figure below.

Existing (2018) Road Length by Road Class



Existing (2018) Road Network



Many of the existing main roads within Doha Metropolitan Area (DMA) are congested during peak periods due to unbalanced mode share, preference of people to use their own car over public transport, and uncompleted expressway network. The most congested links which operate at Levels of Service D to F are listed below:

- Doha Expressway
- Salwa Expressway
- Al Rayyan Road
- Al Luqta Street
- Al Furousiya Street - Al Matar Street
- Najma Street
- Mohammed Bin Thani Street
- Majlis Al Taawon
- Corniche Street B-Ring Road
- C-Ring Road
- Khalifa Street
- Roads in Industrial Area
- Al Istiqlal Street

Network wide, average time lost due to congestion during peak hours is very high: 64% and 62% in the morning (AM) and midday (MD) peak respectively

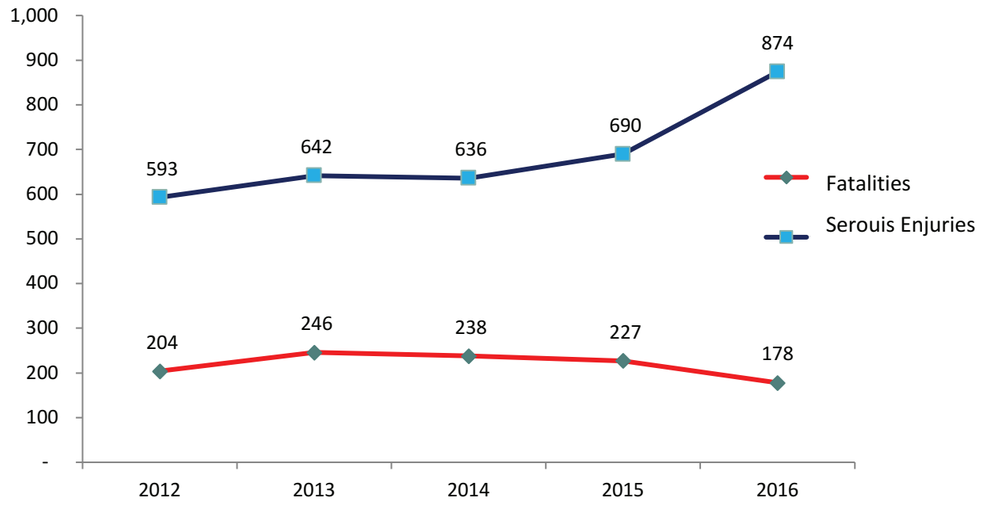
Inadequate spacing of junctions on Arterial roads causes high congestion. E.g B-Ring, and C-Ring Road

The number of severe and light injuries on Qatar's road network have been increasing in recent years

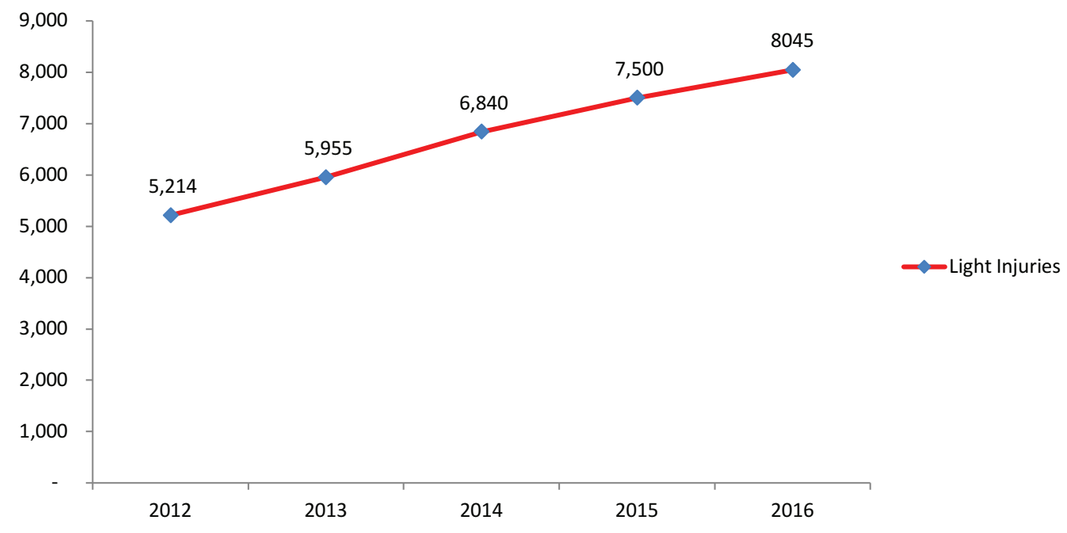
Existing Congestion Levels on Main Roads Within DMA during Morning Peak Hour

The road crash data for 2012 to 2016 years shows the number of road crash fatalities has declined from 2013 to 2016. On the other hand, it is observed that the number of severe injuries increased from the 2015 to 2016, whereas it was almost constant in the years 2012, 2013, 2014 and 2015. The number of road crash fatalities and severe injuries with years is presented below.

Fatal and Severe Injuries in Road Crashes

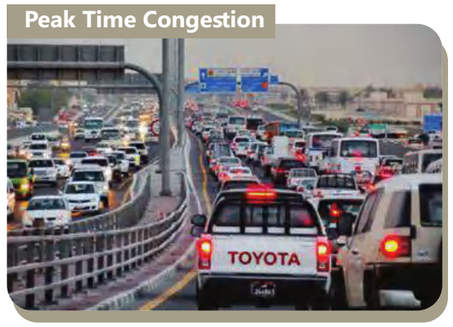


Light Injuries in Road Crashes



Below is a summary of challenges with Qatar's existing road network.

Peak Time Congestion

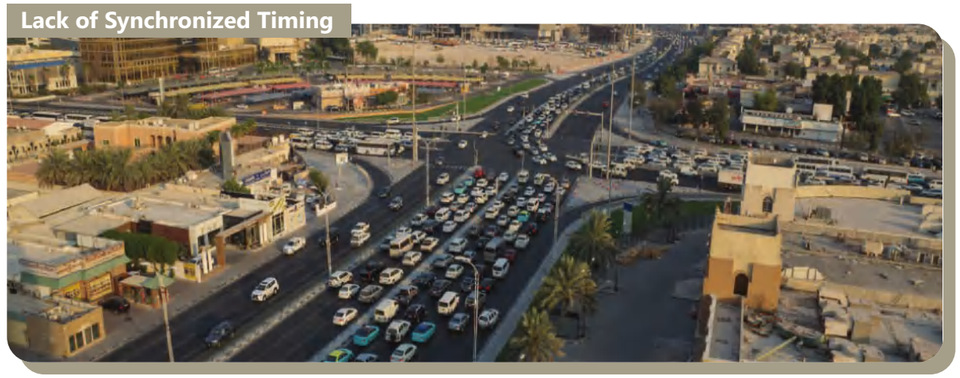


As shown above, key strategic routes within the Doha Metropolitan Area experience peak time congestion, which leads to increased journey times and unreliable journey times.

Parking on Major Arterials

In some places on-street parking is provided on Major Arterial Roads and Collector Distributor Roads, where parking should be prohibited. On-street parking can cause congestion and safety issues.

Lack of Synchronized Timing



There is a lack of synchronized timings at traffic signals and long signal cycle times exacerbate delays.

1.5.3 EXISTING TRUCK ROUTE NETWORK (2018)

SUPPLY HIGHLIGHTS	Key truck generators at Hamad International Airport, Hamad Port, Ras Laffan Industrial City, Umm Bab, Dukhan City, Al Khor, Industrial Area;
	Logistics Parks to store goods at intermediate points at Al Ruwais, Al Khor, Jery al Samur, Al Wakra, Abu Saleel, Birkat Al Awamer;
	A key urban distribution center exists at Qatar Logistics Village to the south-west of Doha;
	132km of truck routes are in place (Orbital Expressways C2, C3 and C4) with dedicated truck lanes;
	Other truck routes link Doha to Abu Samra; Mesaieed and Al Khor;
	Ashghal have identified a number of over-height vehicle routes without height constraints;
	Truck parking facilities are provided at Shamal and a new one is being implemented at Mesaieed;
	Facilities for managing the movement of trucks include truck holding areas, parking areas, rest areas, over-weight stations and over-height monitoring stations.
DEMAND HIGHLIGHTS	Trucks comprise around 8% of registered vehicles in Qatar;
	There are around 288,000 truck trips across the typical weekday in Qatar on the whole network;
	166,000 Light Goods Vehicle (LGV) trips are on the network per day (around 11,000 in each peak);
	121,553 Permitted truck trips are made on the overall network per day (around 6,000 in each peak);
	83% of truck movements originate within the central Doha zones;
	60% of road traffic crashes in Qatar are at night. In 70% of those accidents, drivers of Heavy Goods Vehicles (HGVs) were recorded by police as being to blame.

Below is a summary of challenges with Qatar's existing Truck Route network:

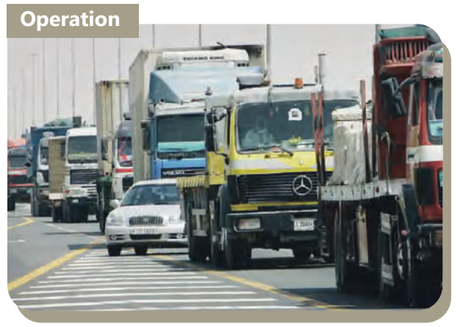
Accessibility and Mobility

Lack of good access from main truck routes to local destinations.

Certain routes are congested by trucks at certain times of day.

Impact on other traffic due to arbitrary truck parking on verge.

Operation



Over-height, over-weight issues.

Restrictions have negative impact on alternative routes operation.

Details of truck restrictions are not always publicized widely and signage.

Lack of dedicated truck parking.

Enforcement

Enforcement of truck restrictions is not always widespread.

Truck operators often pay the fines as it is cheaper than adhering to the restrictions.

Training for truck driving is limited.

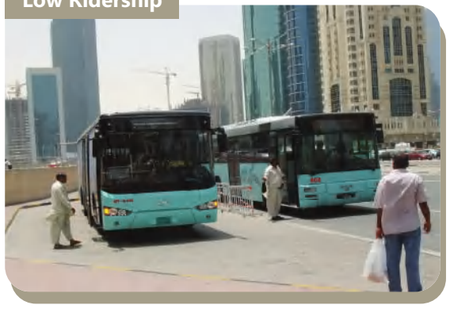
Lack of Routes were designated as Dangerous Truck Routes.

1.5.4 EXISTING PUBLIC TRANSPORT (2018)

SUPPLY HIGHLIGHTS	Mowasalat operates the public bus system, the only mainstream public transport service in Qatar;
	The service is operated with 609 vehicles. Average vehicle age is 4.5 years, 12% are non-diesel buses;
	1,305 bus stops in Qatar (83% inside DMA), covering 65% of the population in DMA and 19% of the population outside DMA (56% of total coverage), who are within 400m of a bus stop;
	Only 100 bus stops have shelters, only two are air-conditioned;
	12 interurban routes with a total length of 2,447 km and 34 urban routes with a length of 1,505 km;
	Frequencies of urban routes range from 15 to 120 minutes (30 minutes is typical). Interurban lines run from every 30 minutes to every 4 hours; all have identified a number of over-height vehicle routes without height constraints;
	Al Ghanim Bus Station is the main hub of a mainly radial network (37 routes end/ begin there;
	Of the fleet of 609 vehicles, only 50% are running on the network at any given time.
DEMAND HIGHLIGHTS	Average weekday demand is just under 37,000 person-trips. Volumes increase 24% on Fridays and main peak-hour period is Friday PM;
	Modal share of public buses is very low (0.4%), reaching 2.0% in certain areas and periods;
	Bus user profile: 98% male, around 50% with a monthly income below 3,000 QAR, around 95% expatriate, around 75% between 25 and 44 years old;
	There are bus-to-bus transfers in some 38% of trips in the AM peak hour (31% in MD and 19% in PM);
	Yearly demand for 2018 is estimated at 12.9 million passengers, an increase since 2012 of 28%;
	Work-related trips account for 38% of the trips on a weekday, with 20% shopping, 27% religion and 15% other). Work purpose reduces in the PM peak-hour and falls to 18% (shopping 26%; religion 41%).

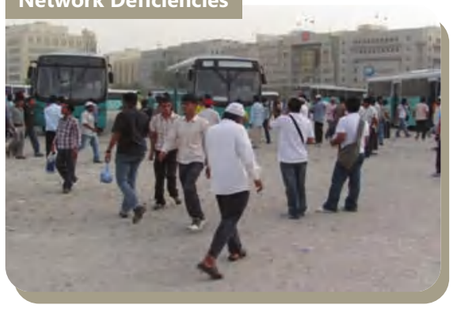
Below is a summary of challenges with Qatar's existing Bus network:

Low Ridership



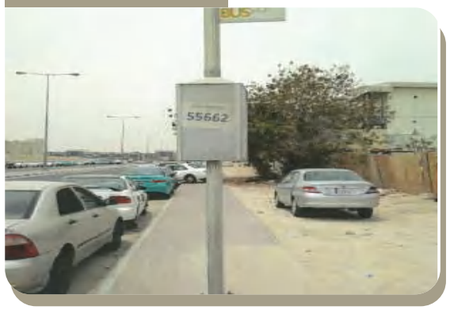
Preference by many to use the car, poor level of service, inadequate network coverage, poor infrastructure, lack of information, poor reliability, use mainly by lower income groups.

Network Deficiencies



Many areas not served, low frequencies, dependence on a single city center terminal, and lack of coordination between timetables of different routes.

Poor Infrastructure



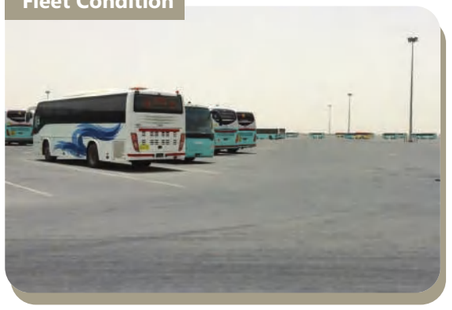
Non-optimal; bus stops and lack of information, very few bus shelters and virtually no air-conditioning. Only one overcrowded depot, inadequate fleet numbers.

1.5.5 EXISTING CONTRACT BUSES (2018)

SUPPLY HIGHLIGHTS	Student transport is provided by Mowasalat (2,500 vehicles, almost 70% of Mowasalat's fleet) and other operators.
	Contract buses can only be used by certain groups of people, for example, company staff and students;
	Labor buses are the main form of transportation used to move thousands of foreign construction workers building new infrastructure in Qatar. Company buses are provided by the company for which the traveling employees work;
	60,000 students are transported by Mowasalat every day to and from 184 education centers, making around 4,300 trips/day.
DEMAND HIGHLIGHTS	There were 1.2 million person-trips by Contract bus on the average weekday of the base year (2018);
	Contract bus is the second most used motorized mode in Qatar, accounting for 14% of the total person trips;
	50% of the trips by contract bus are for work, 20% for education and 30% for other purposes;
	The demand in the AM and MD peak hours is about 10% of demand on the average weekday, whereas it drops to 7% during the PM peak;
	Trips within DMA account for about 60-70% in each time period, with trips within Outer Doha accounting for 40%;
	Regarding the flow split by direction, Doha inbound flows prevail in the AM peak, whereas Doha outbound flows prevail in the MD and PM peaks.

Below is a summary of challenges with Qatar's existing Contract Bus network:

Fleet Condition

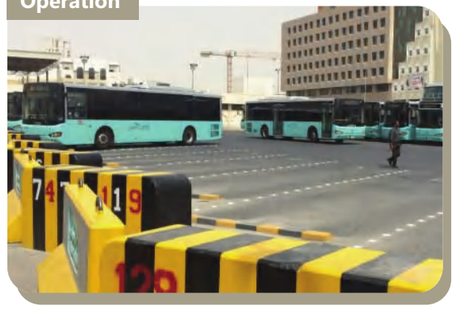


Many buses transporting workers to their workplaces are old and in poor condition.

School bus fleet generally high quality.

Labor buses generally older.

Operation



Mowasalat provides the majority of school bus services.

Lack of designated parking for Labor Buses

Regulation of labor buses requires strengthening to improve quality service and safety.

Technology

Good level of technology, and high standards for safety, security and comfort on school buses.

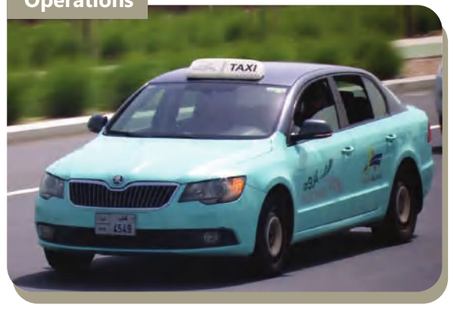
Limited technology on labor buses, some still non-airconditioned.

1.5.6 EXISTING TAXIS (2018)

SUPPLY HIGHLIGHTS	There are around 4,000 conventional Karwa taxis operating in Qatar, excluding app-based specialists such as Uber and Careem (numbers unknown);
	Taxi ranks are sited at main trip generators/attractors, such as HIA, shopping malls, hotels;
	Apart from on-street taxi hailing and taxi ranks, Mowasalat offers a call center and an app for booking in advance;
	In addition to the taxi fleet, Mowasalat offers a limousine service (100 vehicles). Apart from Mowasalat, other companies offer limousine services, such as "Sidney limousine".
DEMAND HIGHLIGHTS	Taxi accounts for 2.0% of person trips in Qatar. It is the transport mode with the second lowest share in the modal split, just after the public bus;
	The demand in the three peak hours is very similar, at around 15,000 person-trips/hr (9% of demand on an average weekday);
	Work is the main source of demand (around 80% in the AM and MD peak hours). However, other purposes (shopping, religious and leisure purposes) account for 60% of the demand in the PM peak;

Below is a summary of challenges with Qatar's existing Taxi network:

Operations



Mowasalat (Karwa) operates a franchise model.

Four companies have franchises.

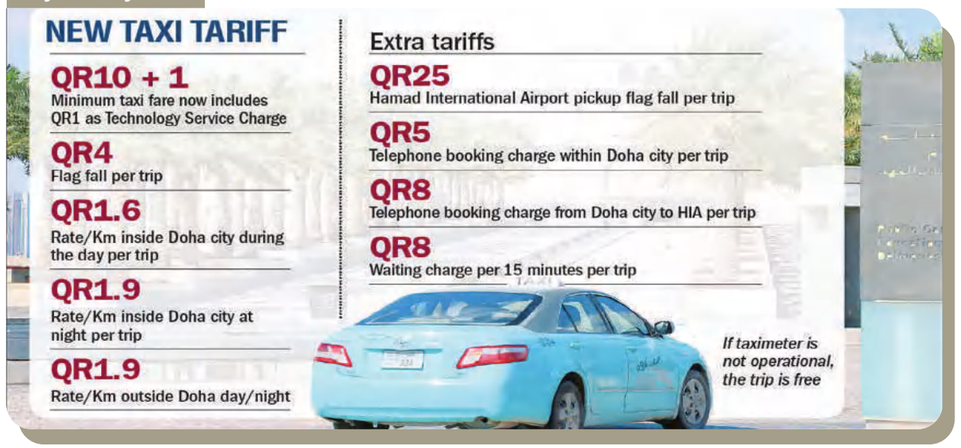
Vehicles in the fleet are all the same, and different color roofs denote the different franchises.

Infrastructure

There are few taxi ranks except at major trip generators like shopping malls.

There is a lack of signage to taxi facilities.

Payment Systems



Conventional taxis tend to be more expensive than app-based services.

Karwa taxis cannot be paid for by credit card.

The Karwa App is based on historical data rather than real time traffic conditions.

1.5.7 EXISTING PEDESTRIANS AND CYCLISTS (2018)

SUPPLY HIGHLIGHTS	There is a lack of sidewalk connectivity, maintenance and parking enforcement, and poor design standards are evident in places;
	There are 263 km of dedicated off-road pedestrian footpaths; and 124 km of off-road cycle tracks;
	There are 53 km of shared-use pedestrian/ cyclist off-road routes;
	There are cycle hire schemes, including some bicycles with electric motors, but their use is currently restricted to certain areas;
	Most of the existing cycle tracks are in Doha's outskirts or interurban areas except for the bicycle lane along Salwa Road up to the intersection with F Ring Road.
DEMAND HIGHLIGHTS	Walking is more important during the PM peak due to cooler weather, and recreational activities like going to the mosque, shopping or sports, different from work or study purposes;
	Most pedestrian trips are short. Trip length varies through the year with weather conditions;
	There are higher proportions of walking trips in older parts of Doha and in industrial areas;er purposes;
	More than 90% of total pedestrian trips take place in the DMA;
	There appears to be little regular cycling activity for routine purposes. It could be considered primarily leisure activity.

Below is a summary of challenges with Qatar's existing pedestrian and cyclist network:

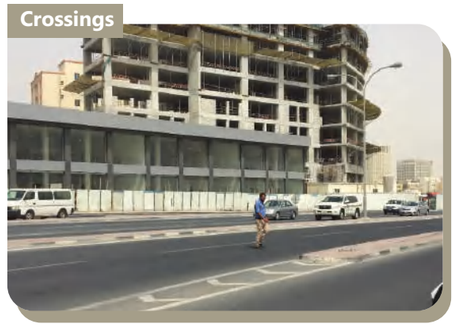
Network Infrastructure

Discontinuous footway network and lack of connectivity.

Discontinuous cycle tracks, not connected to all parts of the DMA.

Lack of provision of cycle parking facilities.

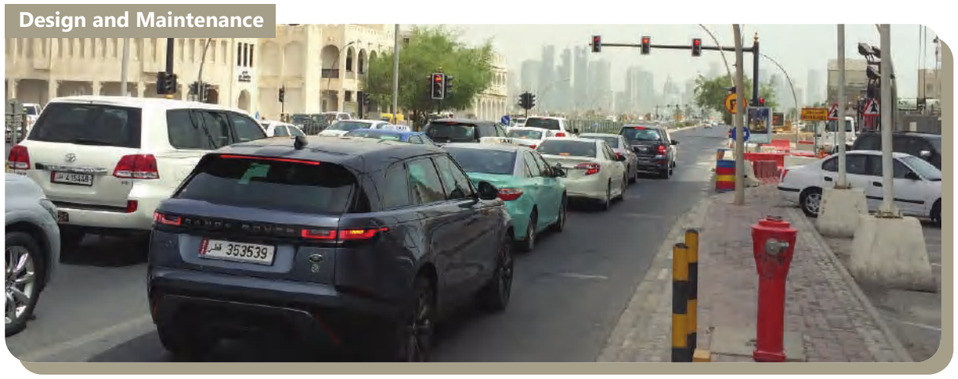
Crossings



Difficulties in crossing roads at grade.

Inadequate pedestrian crossing times, leading to long waiting times on some major crossings.

Design and Maintenance



Design, construction and maintenance standards seem to vary. Poor design of sidewalks can make them unusable for many users.

1.6 KEY FUTURE TRANSPORTATION CHALLENGES

An assessment has been made of the future planned transportation system in the Horizon Years (HYs) 2025, 2030, 2035 and 2050. This transportation system includes only committed projects, and also considers the additional pressures imposed by a growing population and changed patterns of land use. Committed schemes are defined as:

> **"Projects with design, approved budget and identified in Programs of Ministry of Transport (MOT), Public Works Authority (PWA Ashghal), Mowasalat and Qatar Rail before 2025".**

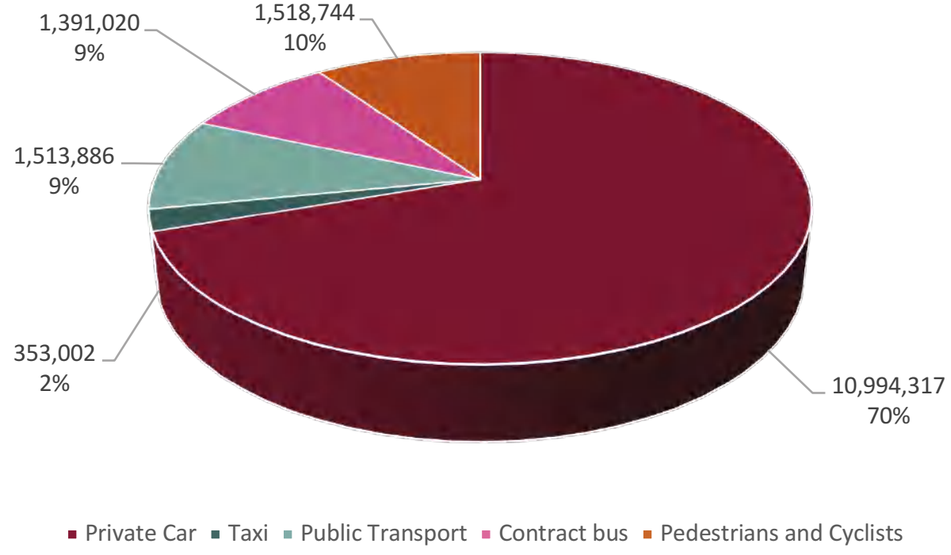
This is called the Reference Case and represents the future transportation conditions without the Updated TMPQ.

This analysis provides an understanding of the future problems, gaps and shortcomings, if nothing other than currently committed projects were to take place. As with the existing base year, an assessment has been made of each of the existing main modes, in terms of supply/provision, demand and the network performance.

1.6.1 TYPICAL DAILY TRANSPORT DEMAND PER MODE AND TIME PERIOD (2050)

Across the whole network in Qatar, the 8.4 million person-trips per day made in 2018, increase to 12.6 million in 2025, and to almost 15.8 million in 2050. By 2050, around 11 million were private car trips. The total car mode share of trips increases from around 57% for the typical weekday in 2018, to 70% by 2050, emphasizing the continued and increased reliance on the private car in the Reference Case. Pedestrian and cycle trips fall from 27% in 2018 to 9.6% in 2050, and contract buses from 14% to 9%. Public transport mode share increases from 0.4% in 2018 to 9.6% in 2050, reflecting the opening of three metro lines and enhancement of bus networks before 2025.

Typical Weekday Mode Split (2050)



An assessment has been made of each of the existing main transportation modes, in terms of supply/provision, demand and the network performance. As regards the reasons for travelling, other key points are:

1.6.2 FUTURE HIGHWAY NETWORK

The existing primary highway network within the State of Qatar is illustrated in the figure below. This road network provides links between main population centers and cities within Qatar and provides connections to strategic assets such as, ports, airports, industrial cities and resources.

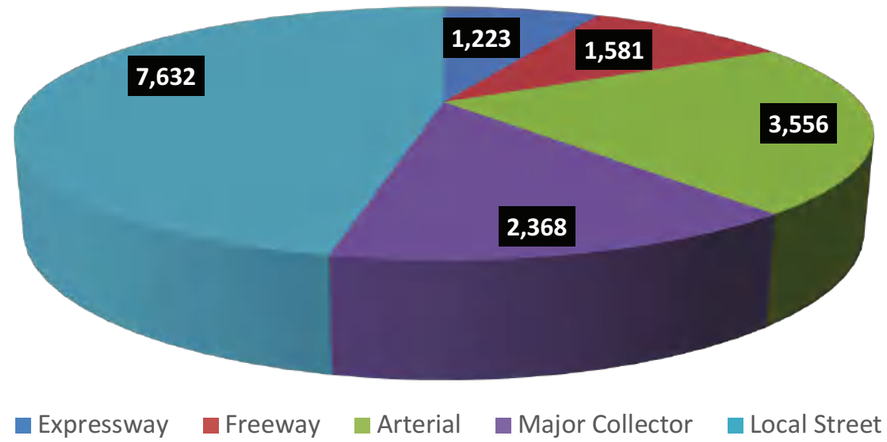
Total journey delays by private vehicles increase over the years, doubling in 2050 in relation to 2025.

Total journey delays by Goods vehicles increase constantly across the HYs, contributing to network congestion.

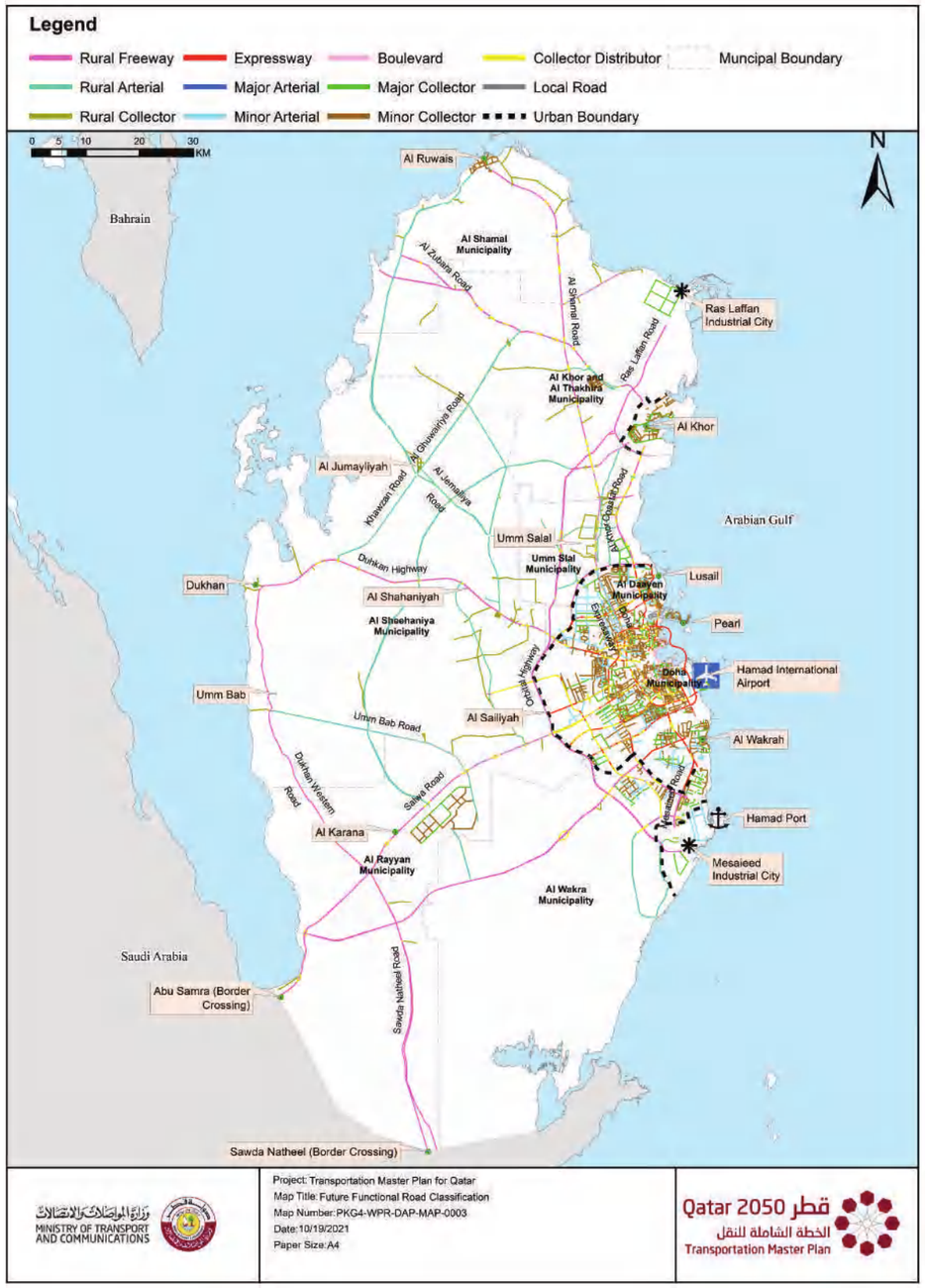
Fatalities from road crashes fall continuously over the HY's but serious and minor accidents increase by up to 10% by 2050

Qatar's road network in Year 2050 will consists of over 16,360 kilometers of public roadways with distribution of the total road length per road class is shown in the figure below.

Road Length by Road Class



Many of the main roads within Doha Metropolitan Area (DMA) are congested during peak periods due to unbalanced mode share, preference of people to use their own car over public transport, and the lack of highway schemes after 2025 in the Reference Case. The most congested links which operate at Levels of Service D to F are listed below:



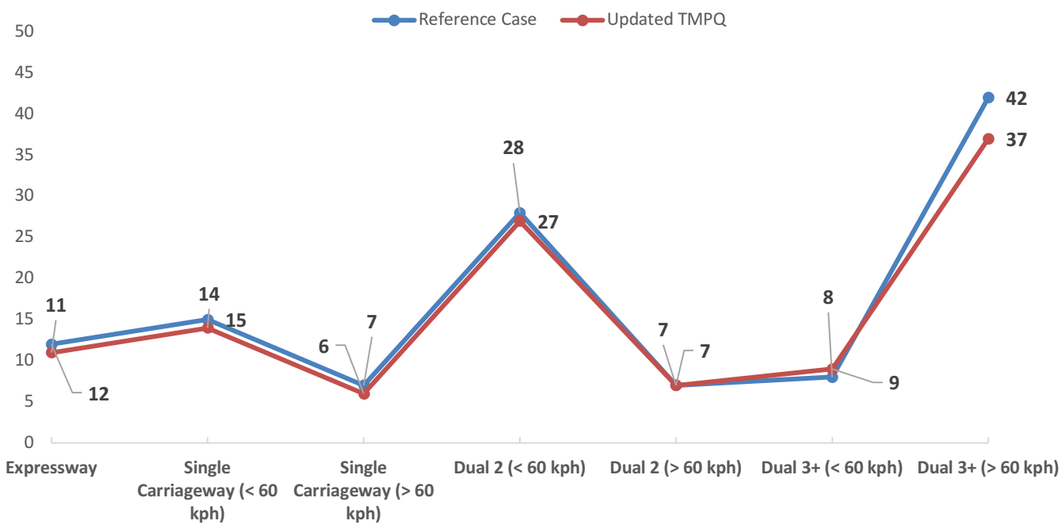
Doha Expressway | Salwa Expressway | Al Rayyan Road | Sharq Crossing | Al Furousiya Street

Hamad Port Road | Mohammed Bin Thani Street | Sabah Al Ahmad Corridor | Corniche Street B-Ring | C-Ring

Lusail Expressway | Roads in Industrial Area | Al Istiqlal Street | Ras Abboud Expressway

The below graph shows the expected fatalities in Year 2050 for reference case and updated TMPQ. It can be observed that there is improvement in safety in the updated TMPQ although the average travel speeds increase for all road-based modes, by around 19% for private vehicles to 37% for freight vehicles in the Updated TMPQ.

Number of Expected Fatalities by Road Type in 2050

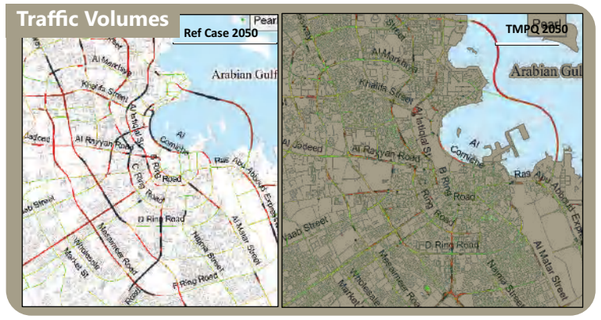


Congestion Levels on Main Roads Within DMA during Morning Peak Hour (2050 Reference Case)

SUPPLY HIGHLIGHTS	Extensive program of highway improvements across the network;
	Expressway improvements on nine routes (including Al Bustan, Mesaimeer, E Ring (Sabah Al Ahmad Corridor), Al Gharafa, Furousiya Street, East Industrial Road, Al Khor);
	Major arterial upgrades on three routes (Al Khufous Street, Al Jamina Street, Al Wakrah);
	Local Roads and Drainage Program – upgrades in suburban areas not currently well served by highways (Doha Expressway, Mesaieed Road, Al Waab Street, East Industrial Road).
	Sharq Crossing connecting Doha Industrial Area (DIA) with West Bay.
DEMAND HIGHLIGHTS	Typical weekday private car person trips increase from 4.8 million in 2018 to 8.2 million in 2025, to 11 million in 2050;
	Other highway based modes retain fairly constant mode share - taxi 3%, contract bus 11-12%, and goods vehicles 3%;
	214,000 Light Goods Vehicle (LGV) trips are on the network per day (around 14-15,000 in each peak);
	158,000 Heavy Goods Vehicle (HGV) trips are on the network per day (around 10,000 in each peak);
	73% of person trips originate within the central Doha zones;

Below is a summary of challenges with Qatar's future road network.

Traffic Volumes



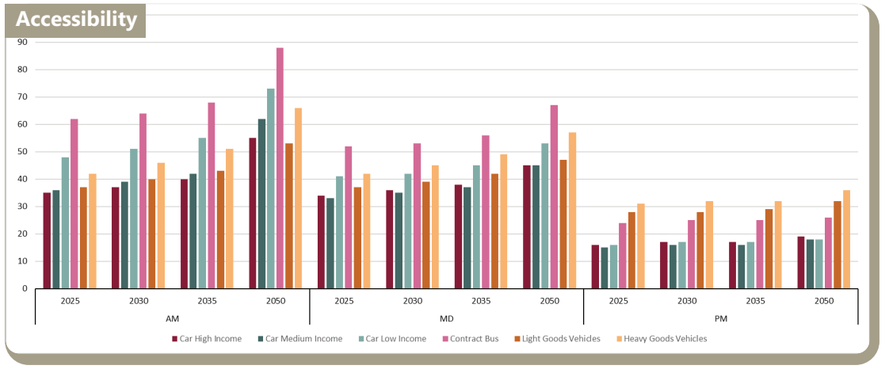
In general, higher volumes of traffic on most routes in Ref. case 2050, then in HY 2050 of the TMPQ;
V/C analysis shows several the same trend.

Peak Time Congestion

Congestion is relieved in the TMPQ 2050 in comparison to Ref. case 2050.

Levels of Service for roads	Reference Case		Updated TMPQ	
	Length of Highway Network (km)	%	Length of Highway Network (km)	%
Level of Service A	6,780	85%	7,954	91%
Level of Service B	390	5%	280	3%
Level of Service C	295	4%	243	3%
Level of Service D	224	3%	116	1%
Level of Service E	154	2%	72	1%
Level of Service F	154	2%	65	1%
Total	**7,996**	**100%**	**8,728**	**100%**
Level of Service A-D	7,689	96.2%	8,592	98.4%
Level of Service E-F	308	3.8%	136	1.6%

Accessibility



Accessibility will be improved significantly in the TMPQ in comparison to Ref. case 2050;

Total journey delays by all vehicles show the considerable improvements in the travel time index.

1.6.3 FUTURE PUBLIC TRANSPORT NETWORK

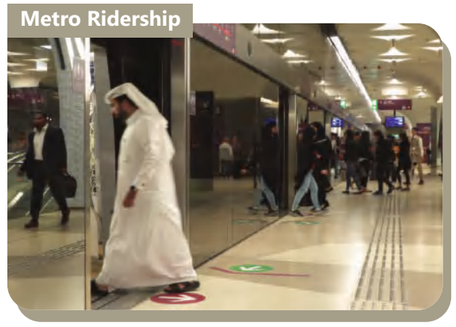
SUPPLY HIGHLIGHTS	The committed public transport network consists of three Metro lines, four LRT lines, 84 one-way bus feeder routes and a Water Taxi service. This network is additional to the existing bus routes (80 routes), contract buses and taxis;
	The Metro system consists of 72 km of track and 37 stations. LRT lines comprise 31.8 km of track and 61 stops;
	The bus fleet increases from 609 buses in 2018 to 1330 (including spares) by 2025;
	Four new bus depots and seven bus stations enter service before 2025. Al Ghanim bus station is decommissioned;
	Four park and ride facilities are in operation adjacent to Al Wakra, Al Qassar, Lusail and Education City metro stations.
DEMAND HIGHLIGHTS	The combined share of public transportation modes (including contract bus and taxi) of the modal split declines slightly from 22.0% in in HY 2025 to 21.0% in HY 2050. This is due to the increased modal share of car trips;
	Bus is the most important public transport mode, accounting for 81% of all single-leg public transport trips in 2050, whereas Metro accounts for 9%, LRT for 9 %, and less than 1 % for Water Transport;
	Mode share for Regular Public Transport (without contract bus and taxi) accounts for 10.2% in 2025, falling to 9.5% in 2050;
	Total number of trips per weekday increases from 2.8 million in 2025 to 3.2 million in 2050;
	94% of person trips originate within the DMA;

Below is a summary of challenges with Qatar's future public transport network:

Network Coverage

The population catchment covered by the public transport network is estimated at around 34% in HY 2025 but decreases to 32% in HY 2050, as a result of the increase in population and the lack of committed transportation schemes beyond 2025.

Metro Ridership



Low ridership estimated for the Gold and Green Metro Lines, as well as for all LRT lines, especially the Boulevard Line.

Ridership near to capacity on the Red Metro Line in 2050, but it could be solved by using six-car trains.

Bus Ridership

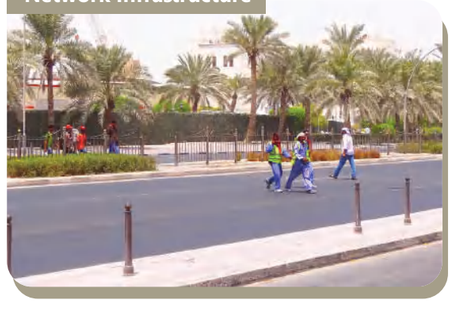
Capacity problems on most interurban and regional bus routes and in almost half of urban bus routes. This problem could be solved by increasing number of services or the size of the vehicles (e.g. double deck buses).

1.6.4 FUTURE PEDESTRIAN AND CYCLING NETWORK

SUPPLY HIGHLIGHTS	The measures contained in the Qatar Pedestrian Crossings Master Plan (QPCMP) will provide extensive improvement for pedestrian mobility and safety;
	Schemes to improve the public realm for pedestrian and cyclist users are committed for implementation focusing on the central urban areas of Doha and West Bay;
	Important new developments such as Lusail and Msheireb Downtown Doha will be designed with pedestrian and cycling facilities given high priority;
	Municipal development plans across Qatar will focus on incorporating pedestrian and cycling friendly environments;
	The Expressway Program will include many grade-separated road crossings usable by pedestrians and cyclists. It will also include an expansion of segregated cycling paths;
	The Local Roads and Drainage Program (LRDP) will incorporate an expansion of the cycling network.;
DEMAND HIGHLIGHTS	Pedestrian trips will not change significantly between HY 2025 (1.6 million in a typical weekday) and HY 2050 (1.5 million);
	The distribution of the pedestrian trips across different trip purposes follows similar patterns across the HYs, and a large proportion of them are performed during the PM peak hour;
	Flows within the DMA account for over 88% of the total pedestrian trips in Qatar. Outside the DMA (12%) the majority of the demand is concentrated within Al Khor and Mesaieed.

Below is a summary of challenges with Qatar's future pedestrian and cyclist network:

Network Infrastructure



A continued lack of connectivity and continuity of footways, cycleways and greenery in residential developments, urban centers and outskirt municipalities.

Crossings

The QPCMP will improve some key pedestrian crossings near major trip generator/attractor sites but there will still be difficulties in crossing roads at grade. There is no information about adapting pedestrian crossing/ waiting times.

Design and Maintenance

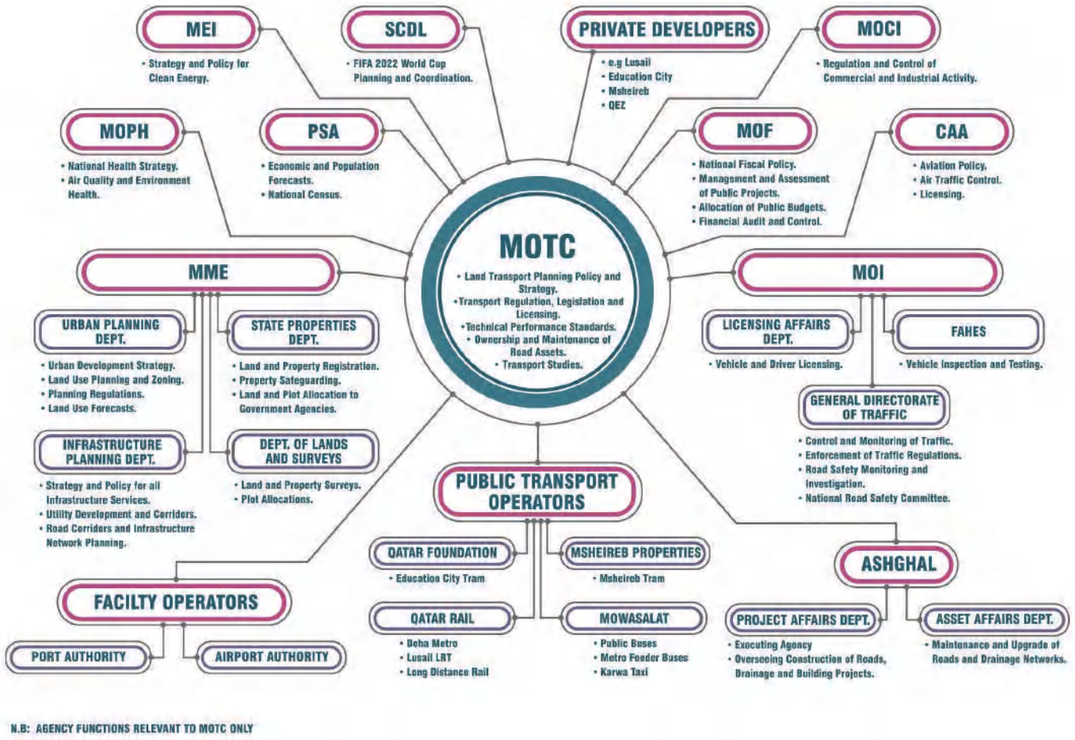
There may still be a lack of consistent application of design standards or maintenance regime. Better design of cycleways, footways and sidewalks would improve levels of accessibility.

1.7 STAKEHOLDER CONSULTATION

The success of the Updated TMPQ will be influenced by the interaction with many and varied stakeholders, including government agencies and private developers, leisure facility providers, employers, businesses and others.

A long list of stakeholders has been engaged, which included those with an interaction with transport, either as policy maker engaging in transport planning and implementation, as operators of transport services or facilities, as developers of transport infrastructure, or simply as users of the transport network.

Key stakeholders included more than 60 main stakeholders, including 18 Government agencies and transport operators, as well as 30 other private stakeholders.



1.7.1 OBJECTIVES OF CONSULTATION

The objectives of the stakeholder engagement process were:

- To understand stakeholders' perceived shortcomings of the current transportation system in Qatar;
- To understand the needs of each stakeholder regarding transportation in Qatar;
- To understand the vision, objectives, targets, policies and KPI's of the key stakeholders;
- To encourage stakeholders in defining and contributing towards the development of the Updated TMPQ;
- To collect pertinent stakeholders' current and future projects, policies and strategies;
- To seek endorsement and support from stakeholders who would play a key role in the Updated TMPQ implementation.

1.7.2 RELATED ENGAGEMENT ACTIVITIES

Stakeholder inputs have been captured throughout the Updated TMPQ, including direct consultation, public participation through surveys and interviews, and workshops. carried out through interviews and questionnaires in 2017-2019. Sample of main workshops throughout the Updated TMPQ is given below.

No.	Subject	Date of Workshop	No. of Days
1	MOT Strategic Workshop, TMPQ Project kick off	11-12 December 2017	2
2	2nd Consultant's Workshop -Progress Update of TMPQ to Stakeholders	6-7 February 2018	2
3	TAF Workshop	27 February 2018	1
4	3rd Consultant's Workshop - Progress Update of TMPQ	20-21 March 2018	2
5	4th Consultant's Workshop - Progress update to stakeholders	7-8 May 2018	2
6	Progress Workshop Transportation Master Plan for Qatar	10 June 2018	1
7	5th Consultant's Technical Workshop	16-17 July 2018	2
8	Technical Workshop	21 March 2019	1
9	6th Workshop - Presenting existing conditions and option/solutions to address them	17 June 2019	1
10	Presenting Final Schemes and Scenarios Lists Workshop	27 November 2019	1

1.7.3 STAKEHOLDER FEEDBACK

A selection of key themes which were identified from the consultation included the following:

Accessibility	Adequate access to major developments like the Pearl was needed, improved access for trucks to logistics parks.
Safety	Key issues included improved pedestrian and cycle crossings, improved vehicle safety, and overall accident reduction.
Integration	Better integration between Metro, LRT, ferries and buses, development of Transit-Oriented Developments (TOD).
Walking and Cycling	Development of a comprehensive network.
Economic	Measures to enhance transportation services for tourist and airport passengers.
Effective Laws and Regulations	New regulations to cover existing gaps, clearer regulations to support enforcement, clarity of agency responsibilities.
Government Approvals	Clarity on agency responsibilities, quicker and smoother approvals, reduction in government agencies involved.

2050

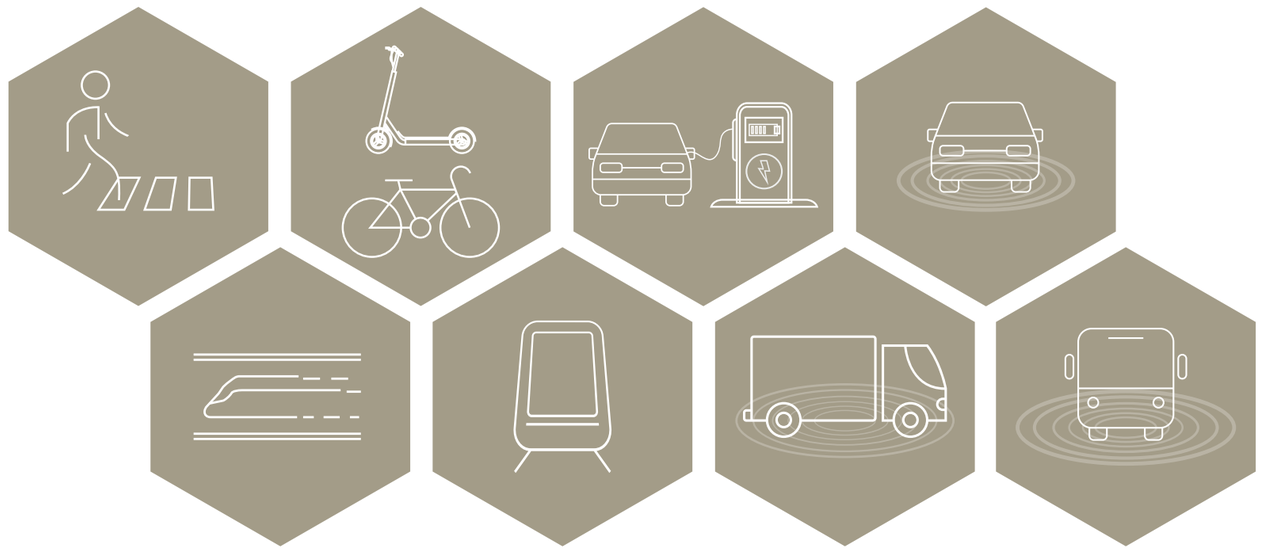
نقـل متكامـل ومسـتدام للجميـع

INTEGRATED & SUSTAINABLE TRANSPORT FOR ALL

02

SECTION - 02

THE DEVELOPMENT OF THE UPDATED TMPQ



2 THE DEVELOPMENT OF THE UPDATED TMPQ

2.1 NATIONAL TRANSPORT - RELATED STRATEGIES AND POLICIES

There are a number of key policy documents that set out the transport-related policy framework within Qatar. These are:

- Qatar National Vision (QNV) 2030
- Qatar National Master Plan (QNMP)
- Qatar National Development Framework (QNDF)
- Municipal Spatial Development Plans (MSDP's) and Action Plans
- Transport Master Plan for Qatar 2008 (TMPQ 2008)
- 2016 Strategic Plan for MOT
- Qatar National Road Safety Strategy (QNRSS) 2013-2022
- Population Policy for the State of Qatar 2017 – 2022.
- Sustainable Development Goals 2030

All the key policy documents have been reviewed, from the National Policy at the top of the hierarchy (QNV 2030) through to QNDF, the MSDPs, and through to specific policies within the Strategic Plan for MOT and the QNRSS.

TMPQ Policy Hierarchy

Qatar National Vision 2030
- Five Key Challenges
- Four Pillars of Sustainable Development

Qatar National Development Strategy
- Moulding modernization around the preservation of Qatari culture and traditions.
- Balancing the needs of this generation and those of future generations.
- matching the size and quality of the expatriate labour force to the selected path of development.

Qatar National Development Framework
- 6 Guiding Principles
- 17 Strategic Planning Objectives
- 60 Policies
- 211 Policy Actions

Other Master Plans
- Municipal Spatial Development Plans
- Urban Design Compendium
- Integrated Transport Plan, Integrated Coastal Zone Management Plan, National Heritage Strategy

This set of strategic documents defines a comprehensive strategic framework, encompassing and aligning multiple different facets, such as society, mobility, urbanism, environment, economy, work, industry. They encompass the four pillars of the QNV 2030 and provide a sound basis for development of subsequent Strategic Plans as part of the Updated TMPQ.

2.2 LAND TRANSPORT VISION

At the beginning of the Updated TMPQ, the vision and objectives were defined, to provide a framework for the development of the plan, both at the strategic level and at project level. This ensured that the plan delivers on its core vision, recognizes the benefits of major infrastructure investment, and supports the overall goals of the country:

- The Updated TMPQ **Vision Statement** states the guiding principles providing the direction for the various elements of the Updated TMPQ to achieve a prosperous and sustainable future for quality of life in Qatar.
- The Updated TMPQ **Objectives** have been used as assessment criteria in the Transport Assessment Framework (TAF), to demonstrate the extent to which the alternative scheme packages proposed can meet the strategic objectives of the plan and contribute to achieving its vision.

The development of the Updated TMPQ vision and Objectives was based on consideration of national strategic documents outlined previously, international best practice, and existing and future challenges.

The final agreed Updated TMPQ Vision Statement is as follows:

Land Transport Vision

An Integrated and Sustainable Transport System that Supports the Economy and better Quality of Life while Preserving National Identity

SECTION 2

2.3 GENERAL AND SPECIFIC OBJECTIVES

The set of general and specific objectives for the Updated TMPQ is summarized below.

Effeciency and Integration — Provide an Efficient Integrated and Sustainable Transportation System

- Improve operational efficiency of the transportation system
- Reduce the amount of time spent by passengers traveling
- Seek reliable movement of travelers and goods
- Improve integration between services and modes

Mobility and Accessibility — Promote Transportation Mobility and Accessibility

- Increase the availability and attractiveness of public transport
- Improve access to essential destinations
- Provide an affordable transportation experience
- Improve non-motorized mobility options
- Ensure acceptable travel conditions by all modes for all travelers

Safety and Security — Ensure a Safe and Secure Transportation System

- Reduce number and severity of accidents
- Ensure safe and secure transportation system

Environment and Sustainable Development — Protect the Environment and Ensure Sustainable Development

- Reduce transportation-related local and global emissions
- Enhance transportation energy and fuel efficiency
- Protect the streetscape and urban realm
- Ensure sustainable development

Quality of Life — Support Economic Development

- Improve access to the workforce
- Improve access to international markets
- Improve the travel experience for tourists
- Imrpove integration between transportation and land use planning

Qatari Values — Maximise Quality of Life and Preserve Qatari Values

- Promote transportation systems that enhance quality of life
- Promote transportation systems that preserve Qatari norms and culture

2.4 UPDATED LAND TRANSPORTATION POLICIES

All existing transportation and other related policies have been identified. Then, these policies have been screened by examining a number of key aspects, including policy content, objectives, policy owner and document source, alignment with Updated TMPQ vision, alignment with best international practices, implementation status, and relevance of policy actions.

Any continuing relevance to the Updated TMPQ has been considered, and any gaps in the existing policy regime identified, prior to formulating a set of definitive new policies to be taken forward in the Updated TMPQ. The definitive list now comprises 60 policies, of which 13 are new.

Summary of Recommended Policies and Policy Actions

Policy Topic	Number of Policies	Policy Actions
Governance and coordination	5	31
Freight movement	4	20
Transport and land use planning	6	23
Transport demand management	7	45
Safety and security	7	29
Technology	4	15
Highways	5	24
Public transport	8	46
Non-motorized transport	4	20
Environmental	4	13
Multi-modal	6	21
Total	**60**	**287**

Governance and Coordination policies are designed to introduce more efficient procedures for coordination between different government agencies and departments involved in transportation planning and policy at all levels (local to national). The assessment of existing policies concluded that there are three existing relevant policies, and some of the policy actions are retained or covered in the set of final policies.

Below is a summary of the recommended policies for each policy topic:

Freight Movement - These policies cover the movement of goods to/from/within Qatar, including heavy and light goods, perishables, dangerous goods, etc., which includes development of a truck route network to serve key truck generators and attractors. There are also policies in respect to regulations which covers vehicle ownership, and unsafe and overloaded vehicles

Transport and Land Use – These policies relate to the orderly control and planning of new developments. They are designed to improve coordination between agencies and promote integration of transportation and land use planning, particularly for major developments, and to establish mechanisms for developer contributions to transportation infrastructure.

Safety and Security – These policies relate to improvement in the overall safety and security of Qatar's transportation system, including laws related to seatbelt usage, mobile phone usage, vehicle import controls, de-registering ageing vehicles, etc.

Technology – Policies relating to technology are designed to integrate Qatar's transportation system of Intelligent Transport ITS technology, 'smart' cards, intelligent sensors and detection equipment, traveler information systems, variable message signage, etc., and include a comparison with ITS initiatives in other Gulf Cooperation Council (GCC) countries.

Highway - Policies developed for highways are designed to optimize usage of the existing highway network and capacity, to maintain the assets, to adapt them for a wider usage by public transport and other sustainable modes, and to safeguard the introduction of future technologies.

Public Transport – These policies are designed to enhance existing public transport services and network coverage, in turn to encourage mode shift from the private car, and the offering of alternative travel options. Also covered is improving service quality and frequency on the public bus network, performance monitoring, improving cost recovery, and public transport priority.

Non-Motorized Transport – Non-motorized policies aim to encourage non-motorized transport, including walking, cycling and small-wheeled transport, in order to reduce congestion, reduce pollution levels, promote physical activity and health and environmental benefits. This includes policies to shift travelers to more sustainable short trip and last mile solutions.

Environmental – These policies are designed to produce environmental improvement and decrease climatic impact, by cutting vehicle emissions of carbon monoxide, carbon dioxide, other noxious gases and particulates, reducing noise pollution and improving air quality and the health of residents, by the promotion of clean technologies.

Multi-Modal – These policies cover connections between various modes (public transport, private vehicle, walking and cycling), employing such measures as planning and design of interchanges from the viewpoint of integration of all modes, promotion of integrated ticketing, inclusion of multi-modal accessibility at major developments and a national control center to coordinate all modal operations.


ELECTRIC

2.5 PROCESS OF TRANSPORTATION PLAN DEVELOPMENT

Development of the Updated TMPQ was based on a review of existing conditions, relevant literature and planning aspects, data collection, an assessment of future transportation demand, an assessment of transportation policies, and the potential for congestion charging, park and ride sites and transport demand management measures. The scale of the Updated TMPQ covers National Level, Municipality Level, and Action Area Plan Level.

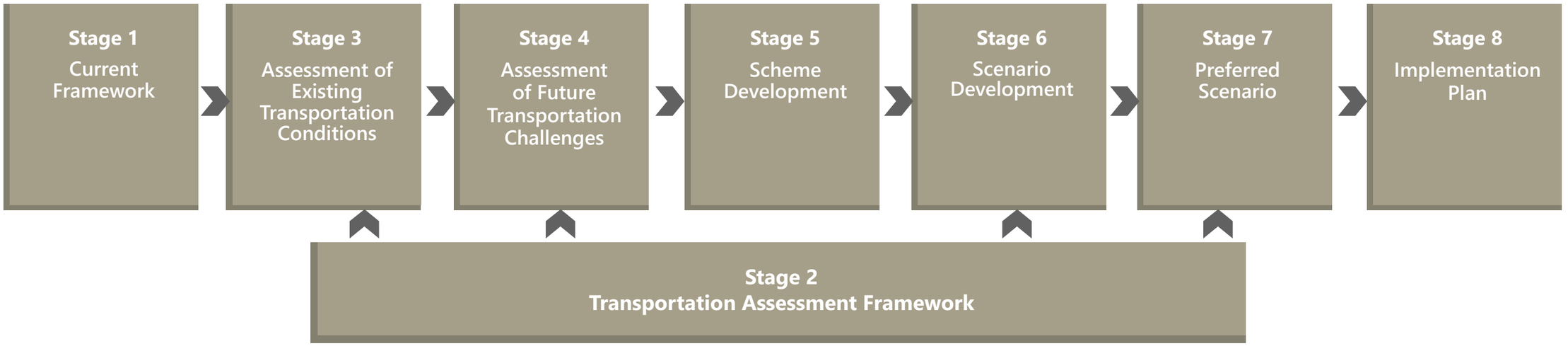
Updated TMPQ Scale

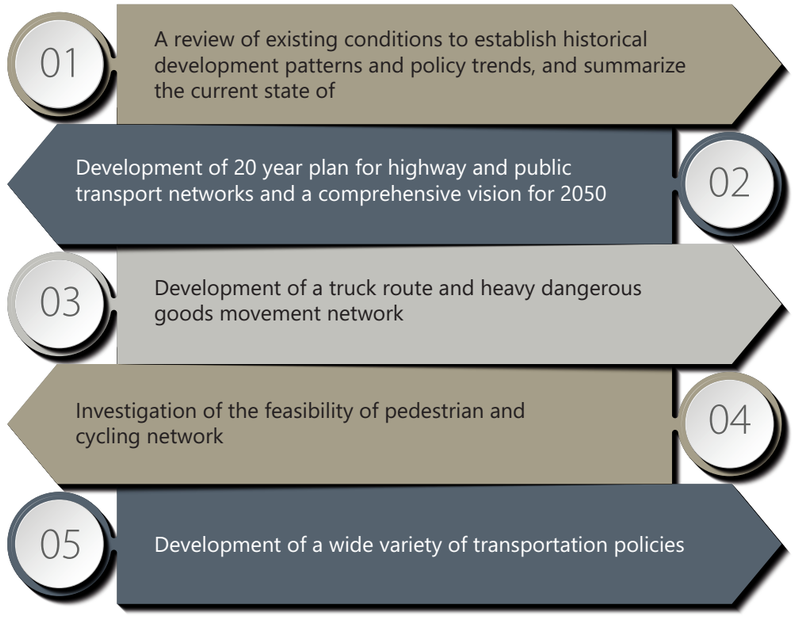
National Level
The Updated TMPQ covers connectivity at a national level with cities, municipalities and international gateways across Qatar

Municipality Level
The Updated TMPQ covers regional connectivity by providing corridors between key origins and destinations with Qatar's municipalties

Area Plan Level
The Updated TMPQ covers movement at a local level by ensuring travellers have the options to use a range of tranport modes in a convinient, safe and efficient manner

The Updated TMPQ has been delivered in the following eight sub-stages:





Common International Best Practice Measures and Strategies

Establishment of integrated Transport Operations Control Center	Smart parking management and control systems (subject of assessment already by the Qatar Parking Master Plan)	Development of real-time information systems (under way in Qatar)
Development of Travel Demand Management (TDM) measures and implementation strategy	Additional rail and bus public transport lines and services	Integrated public transport fare system including concessions (under way in Qatar)
Measures to promote greater usage of public transport and switch from cars	Development and implementation of bus priority measures	Extension and upgrading of pedestrian and cycling networks and facilities
Introduction of road tolling, congestion charging and emission zone charging systems	Introduction of bike and car sharing schemes	Promotion of electric vehicles and charging point network

A literature review of international best practice transportation master plans for five cities was carried out. The selected countries/cities included five countries from international and middle east countries. Significant and exceptional features of the master plans were identified, and an assessment made of their applicability to Qatar. In reviewing the lessons learned for each city, it was considered that the Updated TMPQ focus for policy and scheme development should be on (but not limited to) the following common measures and strategies:

Network development commenced with a comprehensive review of the road network in Qatar, and how it was represented in the geographic Information System (GIS) Database and Traffic GIS Portal, and any updates and modifications carried out as required. These applications were improved to help manage and track road design projects, collate all project information, and link it to other reporting mechanisms, such as the Annual Transportation System Status Report.

One of the key elements for the Updated TMPQ, was the identification and development of a road functional classification hierarchy to guide the development of a transportation network that can cope with demands and pressures placed upon it. A *Guide to Planning Roads in Qatar* has been produced as a project deliverable, and will be used by engineers and planners to design roads to a concept design stage.

A detailed Truck Route Network Plan has been produced based on a clear understanding of current and future truck origin-destination patterns and road network plans. Factors taken into account included locations of truck generating areas and land uses, dangerous goods, restrictions/requirements on bridge loadings, signage, enforcement and penalties, emergency vehicle routes, truck parking locations, local exceptions and restrictions. A *Truck Route Network Report* has been produced as a project deliverable.

Details of the existing and future public transport networks and facilities have been updated and coded into the Qatar Strategic Transport Model (QSTM). The existing and proposed pedestrian and cycle networks have been examined, including proposals in the Qatar Pedestrian Crossings Master Plan, to assess the potential for accommodating demands, and improving safety. Conceptual network design parameters and implementation policies have been developed for pedestrian and cycle crossings.

A detailed Implementation Program has been prepared, listing goals, objectives and recommendations. This consists of a phasing plan for each phase, comprising short and long-term goals and contingency-based options. The Implementation Program highlights high, medium and low priority goals and the agency responsible to implement each goal.

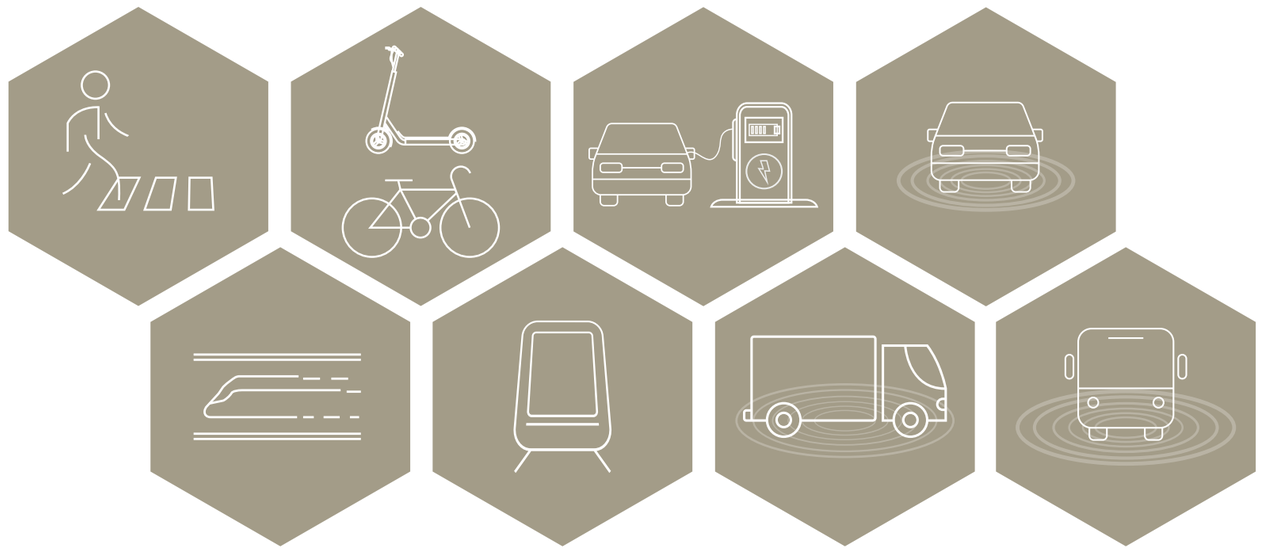
2050

نقـل متكامـل ومسـتدام للجميـع

INTEGRATED & SUSTAINABLE TRANSPORT FOR ALL

SECTION - 03

THE LAND TRANSPORT PLAN



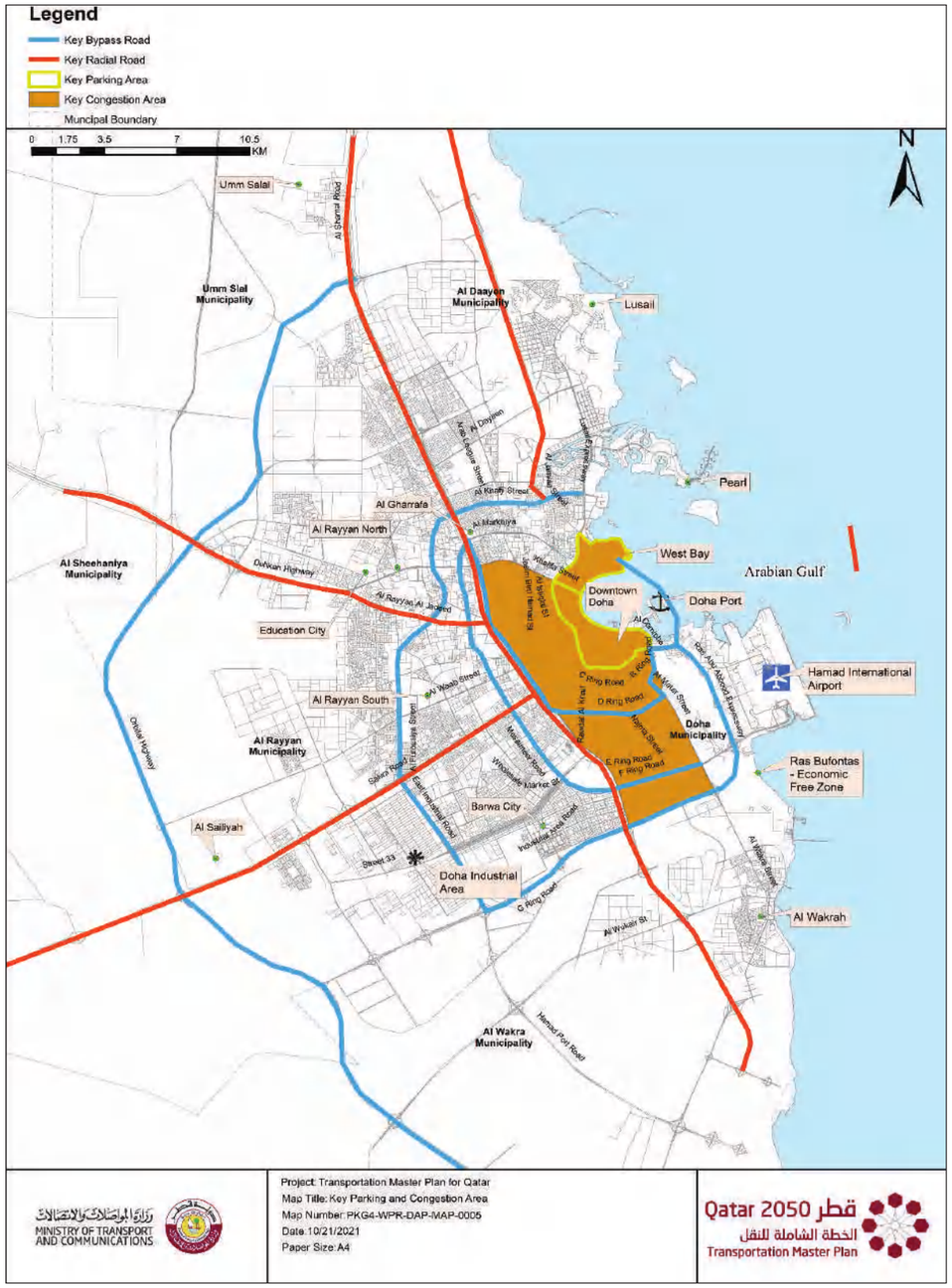
أنت في الطابق
You are on Level
-2
خروج
Way Out
-1
إلى القطارات
To Trains
-2

3 THE LAND TRANSPORT PLAN

3.1 LAND TRANSPORT STRATEGY

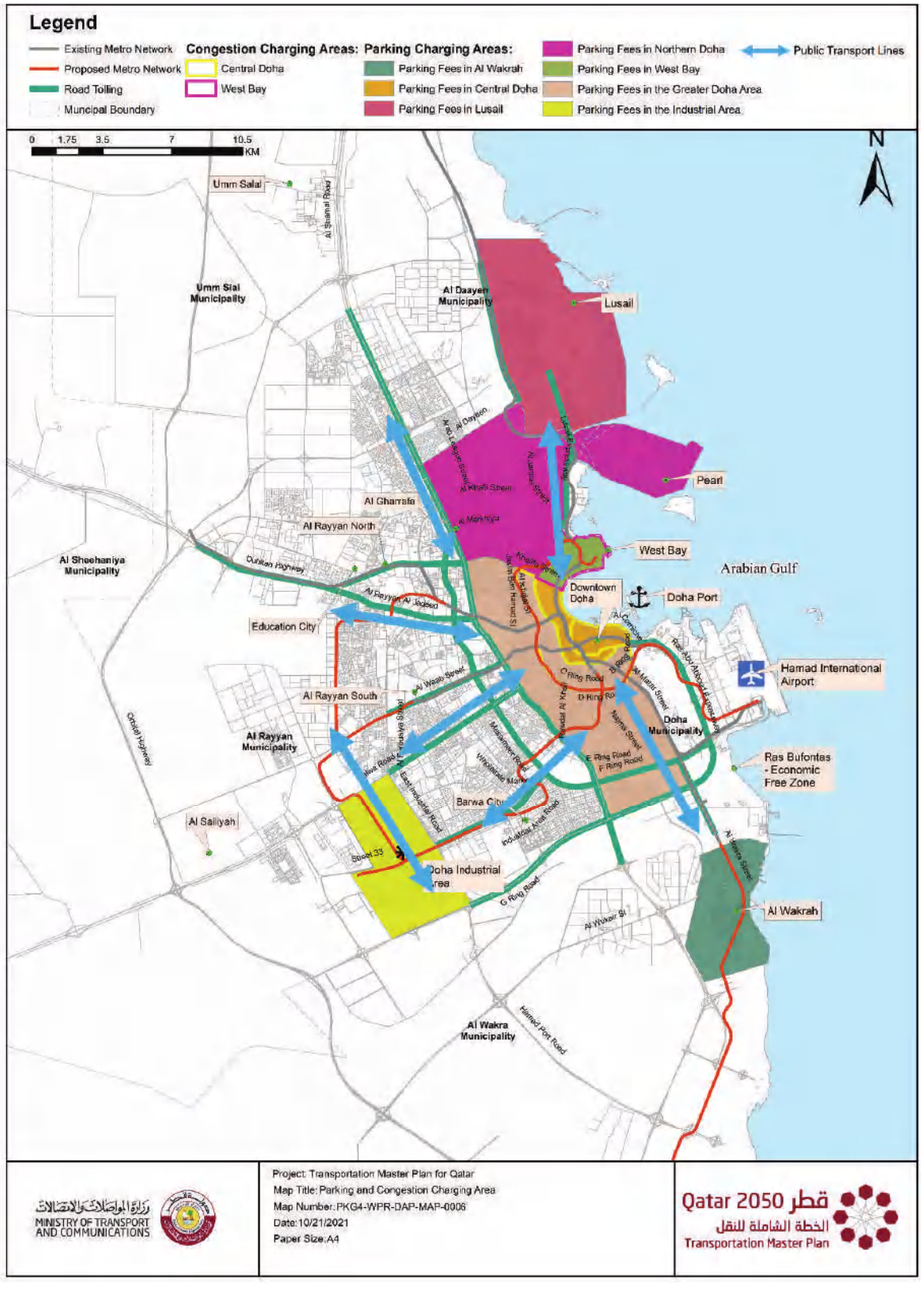
The assessment of the current transportation system conditions, strategic documents and policies review along with transport systems performance evaluation has provided the insight that assisted in developing the Updated TMPQ schemes. These will not only address the current challenges but will also provide a robust master plan to meet foreseeable future transportation needs. The vision and strategic objectives of the Updated TMPQ were derived to meet the objectives of the QNV 2030 and other strategic plans. The TMPQ schemes were therefore developed with the intention to meet the strategic objectives of the Updated TMPQ, which will lead towards an advanced, efficient and sustainable transportation system.

The Updated TMPQ Strategy is to utilize ring roads, including Sharq crossing, to move car traffic across within the DMA and discourage traffic on radial roads as shown in the figure. Furthermore, to encourage truck traffic to use dedicated outer corridors. Within the DMA the focus is to manage traffic through Travel Demand Management measures such as pricing and to improve the environment for pedestrians, cyclists and public transport users.



SECTION 3

The Updated TMPQ Strategy aims to reduce car dependency and to increase public transport ridership. In order to achieve a major shift from private vehicles to public transport, viable travel options are proposed along with implementation of demand management strategies.



The adopted strategy for the updated TMPQ is summarized in the table below which is based on accomplishing the purpose of each TMPQ objective.

Adopted TMPQ Strategy for each TMPQ Objective

TMPQ Objective	Adopted Strategy
Efficient and Integrated Transport	• Optimizing existing infrastructure and encourage sustainable modes and mass transport through TDM measures such as Congestion Charging in high-dense areas and business centers such as center of Doha and West Bay, Parking Charges, and Road Tolls for congested expressways. • Integrating international gateways (land borders ports and airports) to the overall transport network through road and rail connectivity. • Improving co-ordination between land use plan and transport planning to facilitate Transport Oriented Developments. • Use advance technology to integrate public transport fares and ticketing. • Improving integration between PT modes and accessibility through first/last mile connectivity.
Transportation Mobility and Accessibility	• Provision Ring roads to move traffic across within Doha Metropolitan Area (DMA) and reduce reliance on radial roads to enter the DMA • Improving parallel roads to the existing congested roads outside DMA. • New roads to improve accessibility in rural areas and complete the remaining parts of the highway network inside DMA to ensure mobility continuity • Within DMA the focus is on improving public transport connectivity through increased PT provision and enhance pedestrian and cyclist provision.
Safe and Secure Transportation System	• Improved pedestrian and cycle safety through introducing pedestrian only street, priority crossings for non-motorized users. • Restriction to truck movements within DMA during peak periods. • Reviewing and strict application of laws, legislation, and regulation for improving safety and security
Environmental and Sustainable Development	• Improving public transport usage through increased PT provision and TDM measures to reduce private vehicle usage • Enhance public transport facilities to increase convenience and attractiveness for users. • Reducing fuel consumption and emission through schemes such as electric bus fleet. • Promoting financial sustainability for transportation system by encouraging private sector participation. • Applying advance technologies and innovations development in transportation project
Economic Development	• Improvements to overall transport network to reduce congestion and improves network reliability. • Improve access to key commercial and industrial centres • Rail freight lines to serve key freight routes such as KSA international border, Hamad Port and Ras Laffan Industrial City
Quality of Life and Preserve Qatari Values	• Improving accessibility to cultural heritage sites and ensure they are accessible to all Qatari citizens, residents and visitors. • Creating a culture of walking to encourage members of the public to integrate exercise as part of their daily routine. • Improvement to public realm and green space to ensure streets are a place for social interaction and not just for movement

3.2 KEY TRANSPORT PLAN COMPONENTS

All assessments included in the Updated TMPQ were made for the complete set of projects, and not individually. Most projects proposed in the Updated TMPQ will require feasibility, pre-feasibility or design studies to be undertaken, so that the details and specifications for these schemes can be examined further and in isolation from all other projects. In other words, the impact of each project needs to be assessed on its own merits for feasibility to be determined. These specific studies should address issues such as safety, pricing, regulation, licensing, monitoring, environmental impacts and logistics.

In some cases, Transport Impact Assessments (TIAs) and/or Environmental Impact Assessments (EIAs) will be required. In other cases, pilot projects may be recommended for testing before full and permanent implementation, so they can be rolled out to other areas if deemed appropriate. Studies and infrastructure projects requiring design are detailed in the following sections by implementation phase. However, the description for each scheme can be found within Volume 4, while more details about the implementation phasing plan can be found in Volume 5.

The table to the right summarizes the number of schemes which are comprised in the Updated TMPQ. Schemes under the last three classifications (demand management, policy/regulation/governance and technology & innovation) can also be classified by mode. The first Pie Chart to the right illustrates the distribution of the schemes in the Updated TMPQ according to mode. It can be seen that:

- A considerable proportion of schemes considered in the Updated TMPQ (30%) are for the improvement of the Highway network, but the majority of the proposed schemes (70%) relate to other modes. This shows a shift away from investment in road projects, towards a more balanced integrated transportation system;
- Public Transport (excluding taxis) accounts for 19% of the total number of schemes;
- Walking and Cycling schemes account for 17% of the total.

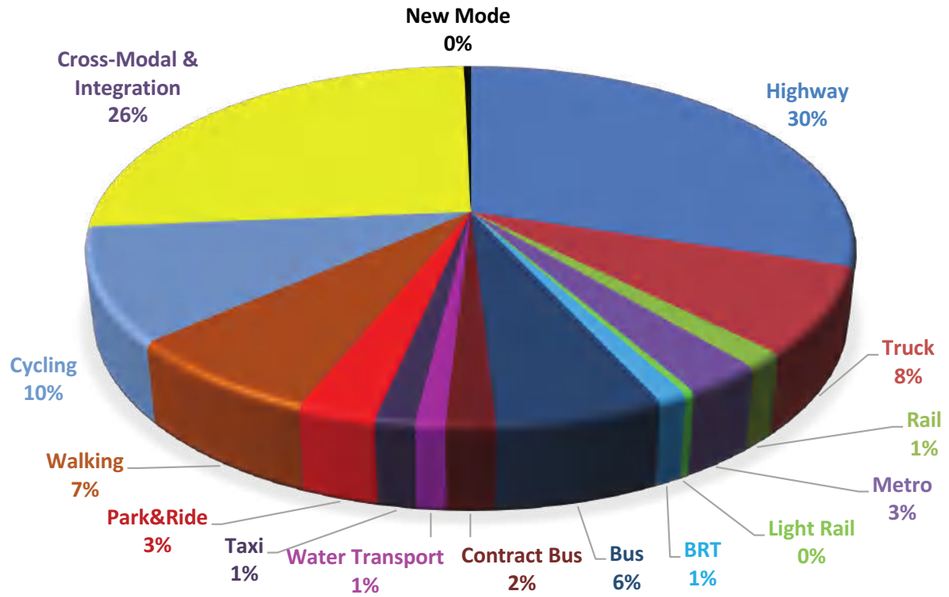
The second Pie Chart to the right illustrates the distribution of the schemes in the Updated TMPQ according to option type. It can be seen that:

- A considerable proportion of schemes considered in the Updated TMPQ (30%) are for the improvement of the Highway network, but the majority of the proposed schemes (70%) relate to other modes. This shows a shift away from investment in road projects, towards a more balanced integrated transportation system;
- Public Transport (excluding taxis) accounts for 19% of the total number of schemes;
- Walking and Cycling schemes account for 17% of the total.

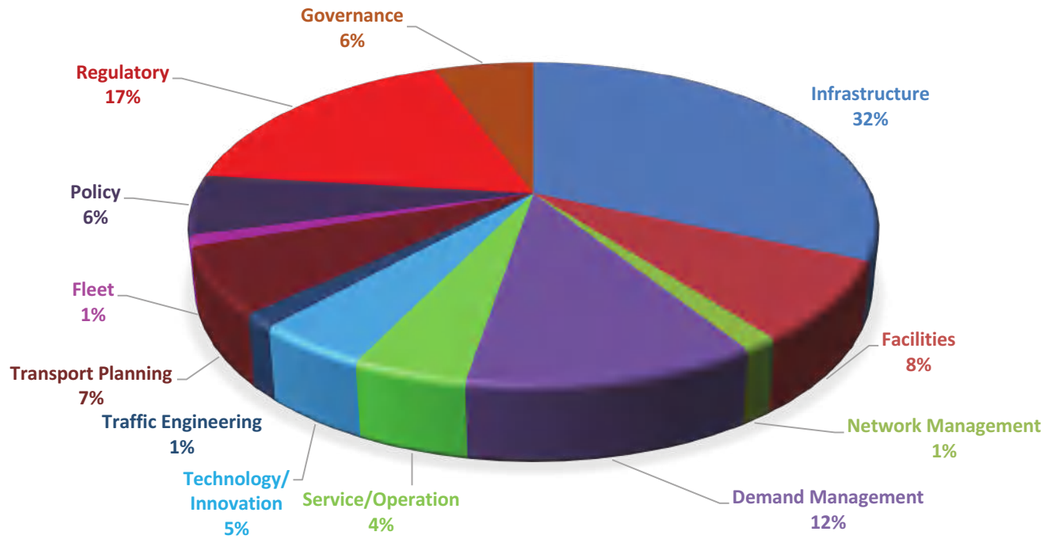
Number of Schemes Comprised in the Final Configuration of the Updated TMPQ

Mode	Infrastructure/ Facilities	Service/ Operation/ Management	Policy/ Regulation/ Governance	Planning/ Technology/ Fleet	N. Schemes
Highways	39	28	9	10	**86**
Truck	10	1	5	6	**22**
Public Transport	29	12	6	7	**54**
Walking	13	0	6	2	**21**
Cycling	20	0	7	2	**29**
Cross-Modal & Integration	3	9	49	13	**74**
TOTAL	**114**	**50**	**82**	**40**	**286**

Modal Distribution of Schemes in the Updated TMPQ



Option Type Distribution of Schemes in the Updated TMPQ



3.2.1 STRATEGIC HIGHWAY NETWORK

Highway schemes have been conceived to increase capacity and reduce congestion, considering the underlying trends for demand growth in the future. An effective and efficient road network is crucial for promoting economic prosperity, high living standards and social well-being of Qatar and its people, while facilitating the movement of people and goods across the country.

The highway network also carries freight in Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs), with the heavier vehicles mostly dependent on expressways and arterial links, and LGVs dependent on all the road network for the distribution of goods to businesses, shopping malls, medical establishments, hotels, places of sport and leisure and private homes.

The proposed highway schemes have aimed to:

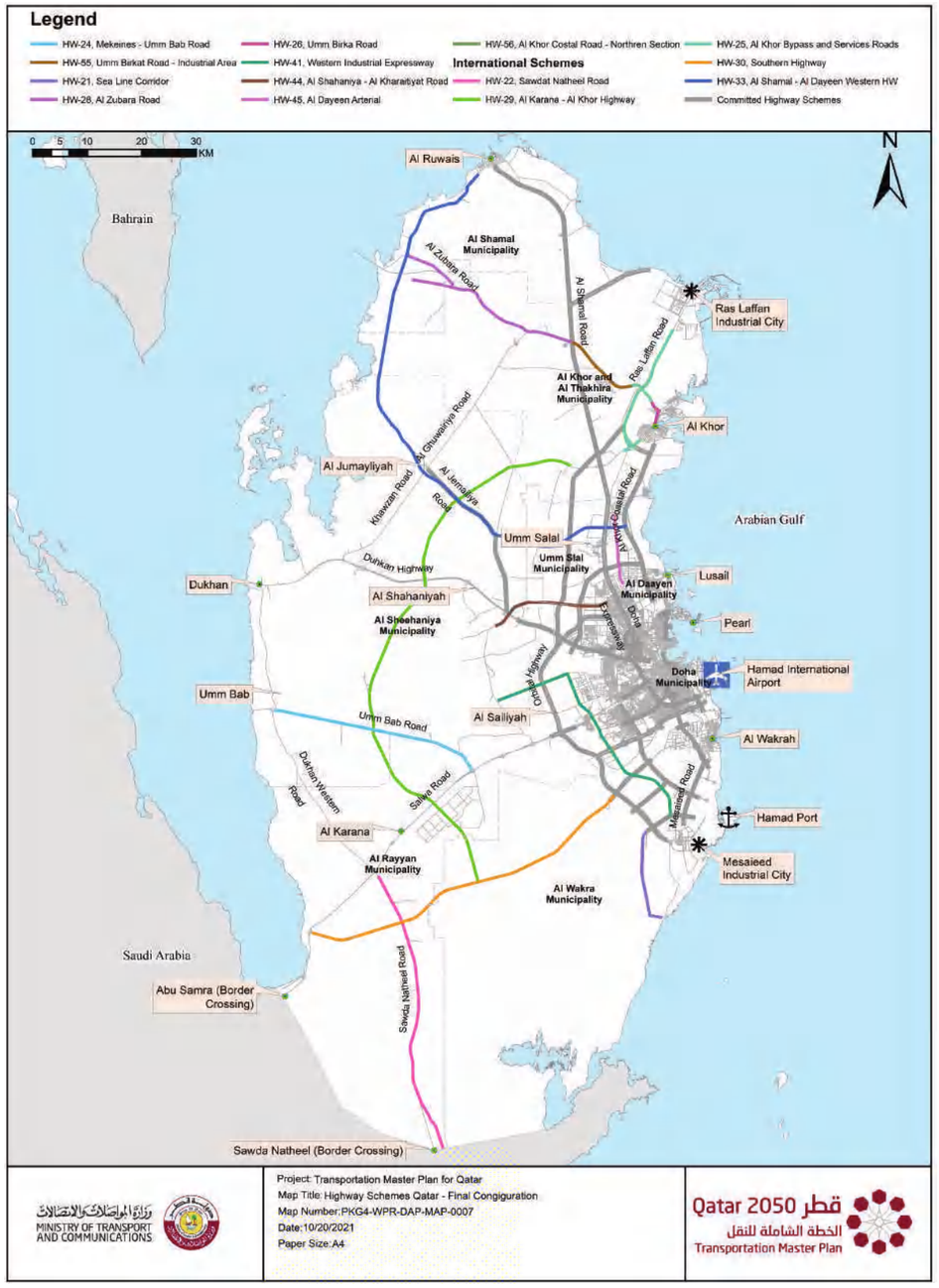
- Rely on ring roads to move traffic across within Doha Metropolitan Area (DMA) and reduce reliance on radial roads to enter the DMA;
- Improve parallel roads to the existing congested roads outside DMA; and
- Prioritize the completion of the remaining parts of highways to have a connected functional highway network within and outside DMA.

There are a total of 86 highway schemes, which include 39 highway infrastructure and facility schemes, 28 service and operation schemes, 9 policies and regulations schemes and 10 planning and technology schemes.

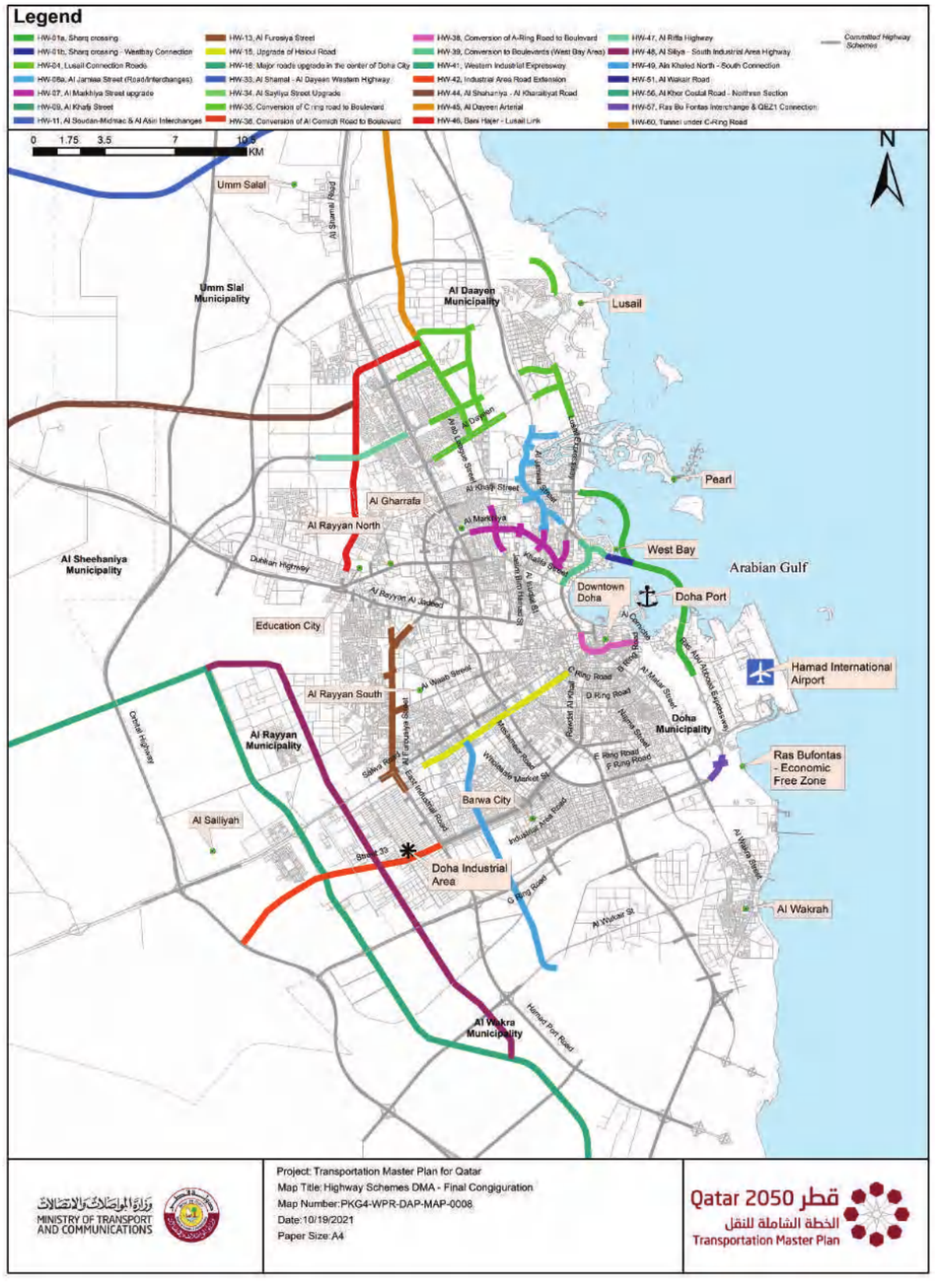
Not all highway schemes conceived by Ashghal have been included in the Updated TMPQ. This might have been because other schemes from all modes of transport considered as part of the coordinated and integrated strategy have precluded their need. Eleven highway schemes have been deferred beyond 2050, the ultimate horizon year of the Updated TMPQ.

The highway schemes comprising the final configuration of the Updated TMPQ are shown below for Qatar and Doha.

Final Configuration of the Updated TMPQ – Highway Schemes in Qatar



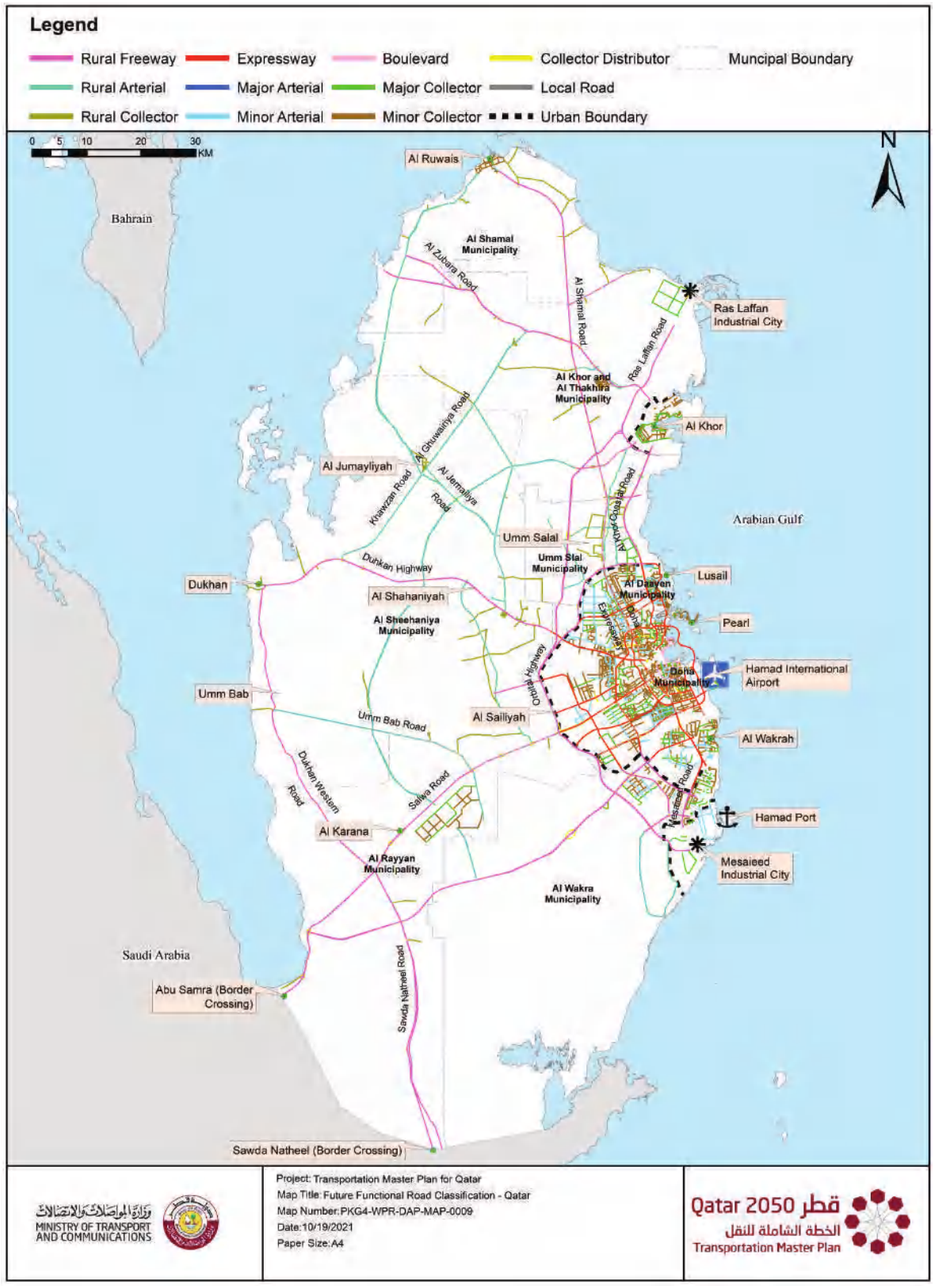
Final Configuration of the Updated TMPQ – Highway Schemes in Doha Metropolitan Area



A proposed road functional classification for the future road network in the updated TMPQ has been developed for the whole of Qatar and Greater Doha respectively. The road hierarchy is established for existing roads and planned future schemes in the Updated TMPQ in accordance with the classifications below shown in the maps below.

The road hierarchy maps do not include classification of roads within the Ashghal Local Roads and Drainage Program which shall be updated according to its transportation studies. The network was created based on the output of the Qatar Strategic Transport Model (QSTM2) for the Base Year 2018 and ultimate Horizon Year 2050 of the Updated TMPQ.

Existing and Future Road Network Hierarchy in Qatar



Existing and Future Road Network Hierarchy in Greater DMA

SECTION 3

3.2.2 LONG DISTANCE AND REGIONAL RAIL NETWORK

Public transport is a system designed to cater for groups of passengers, and available for use by the general public. Public transport in Qatar is at an important stage in its development, with the opening of several lines of the Qatar Metro and LRT, as well as a number of new or expanded bus services.

The Updated TMPQ includes further infrastructure and service provision initiatives, which promote an increased efficiency of the transportation system as a whole, forming an integrated network of services which can meet future travel demand. In addition, collective travel can contribute to reducing road congestion while providing social and environmental benefits, especially where the available capacity is restricted at certain times, faced against an ever-increasing demand.

The proposed public transport schemes have aimed to:

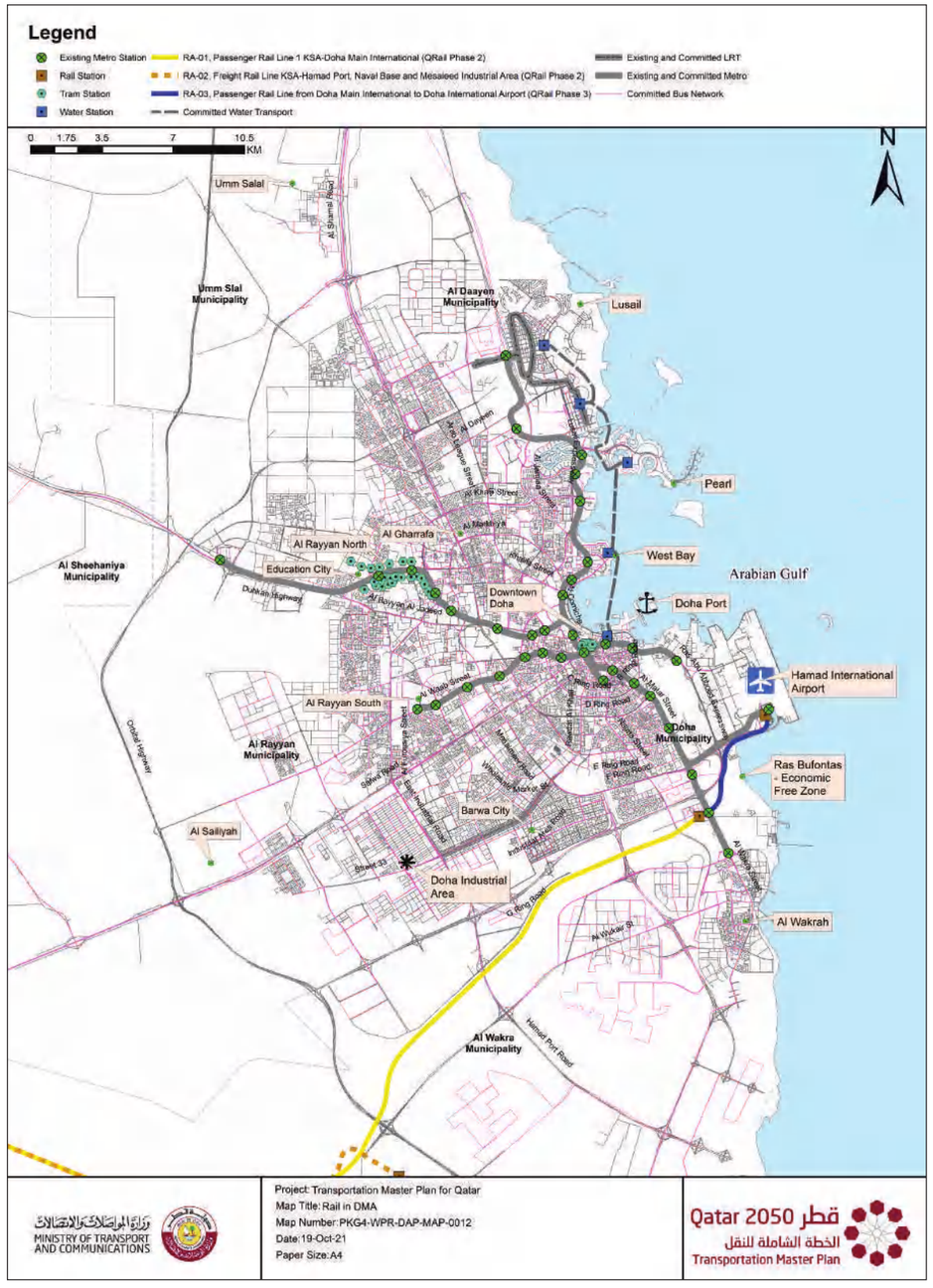
- Encourage the use of public transport in the central Doha area through policy implementation;
- Execute public transport projects to improve connectivity with the existing metro network; and
- Expand the public transport network in areas with high population and employment densities.

The long-distance rail network proposed for Qatar will support the transportation of passengers and freight, hence promoting economic and social development. There are four schemes in the final list of rail schemes comprised in the Updated TMPQ. Three of these are infrastructure schemes, and one is regulatory. The infrastructure schemes comprise of a passenger rail line connecting Qatar with Saudi Arabia, as well as a new Doha Main International Terminal connecting with HIA. There is also a freight rail line connecting Saudi Arabia with Hamad Port and Mesaieed Industrial City.

Five rail schemes have been deferred beyond 2050, due to lack of demand to justify them. These included two passenger rail lines, two commuter rail, and one freight rail line.

Updated TMPQ – Rail Schemes in Qatar

Updated TMPQ – Rail Schemes in DMA



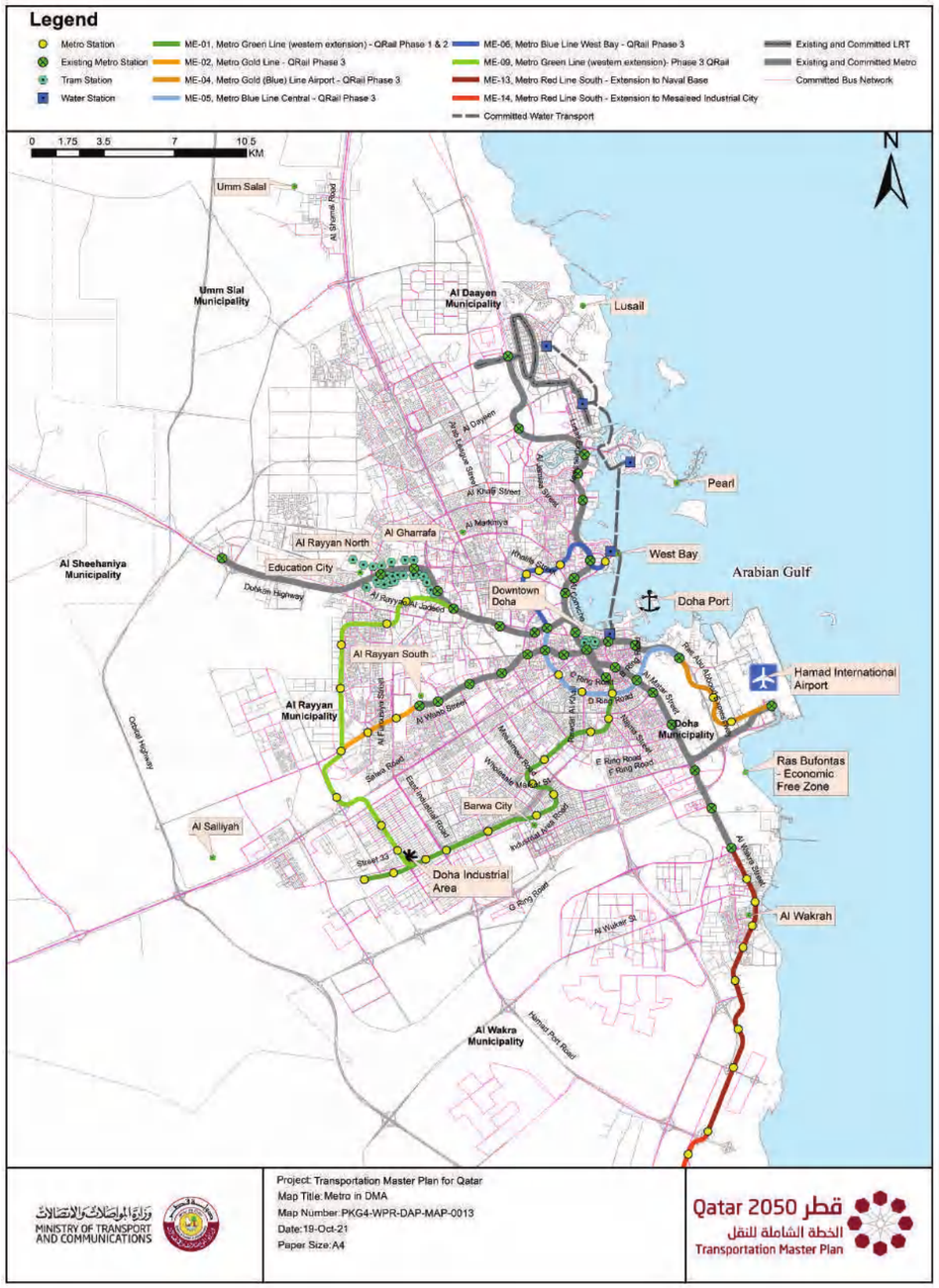
3.2.3 METRO AND LIGHT RAIL NETWORK

The proposed Qatar Metro network is quite extensive, with Phase 1 already implemented and several other phases in the planning phase. However, some potential gaps in future extension coverage or interconnectivity warranted the consideration of additional routes and further connectivity with other transportation modes. The final list of Metro schemes comprises eight infrastructure schemes, with Phase 3 extensions of the Green, Red and Gold lines, a new Blue Line, and southward extensions of the Red Line to the Naval base and Mesaieed Industrial City.

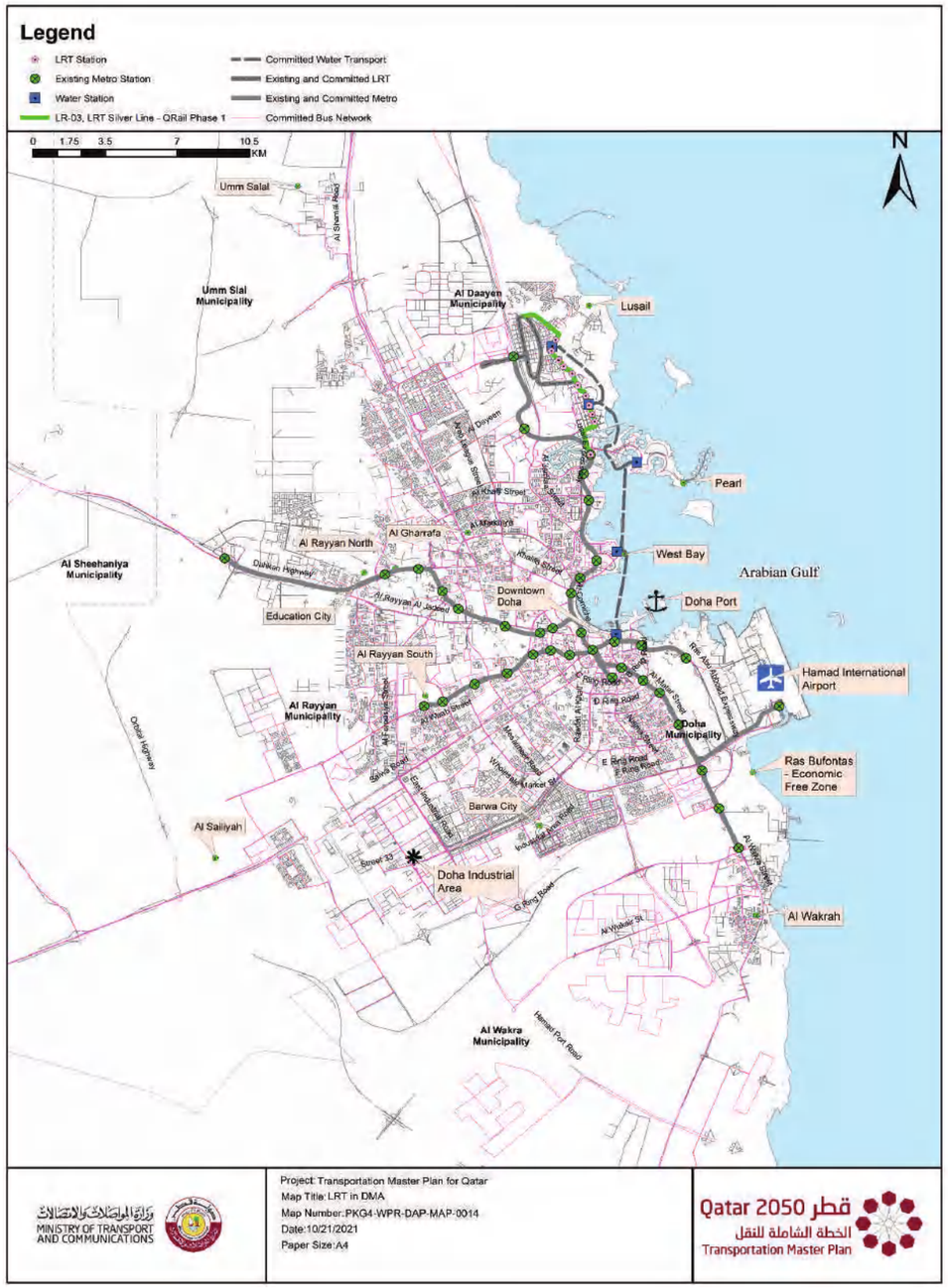
Six Metro schemes have been deferred beyond 2050, including northern Red Line extensions to Al khor and Ras Laffan, as the projected demands are insufficient to justify the schemes.

One Light Rail scheme is proposed, called the Silver Line, with connection within and to Lusail New Town. The previously proposed Pink and Purple Lines in the same area, are deferred beyond 2050 due to lack of demand justification.

Updated TMPQ – Metro Schemes in DMA



Updated TMPQ – Light Rail Transit Schemes in DMA



3.2.4 PARK AND RIDE FACILITIES

Park-and-Ride is an important method of encouraging trips by car drivers to switch onto public transport, which would otherwise be taken by car for the full length of the journey, often into heavily congested central areas. This switching can be onto any form of public transport, but the type of provision which is most likely to encourage the greatest shift from car to public transport is encouraging drivers to access the Metro system.

All proposed Park-and-Ride facilities are at Metro stations to support an increase in public transport mode share. The stations proposed for these Park-and-Ride sites will meet the Updated TMPQ objectives and are key locations that people will tend to arrive at by car off the main trunk road network, before the network becomes more constrained and congested further into the center of Doha.

3.2.5 BUS RAPID TRANSIT (BRT) AND KEY BUS LINES

Existing bus services in Qatar form a fairly extensive network both in Doha and nationally. Implementation of additional services and supporting infrastructure is currently under way, and will provide further coverage in most areas in Doha. In addition, improvements of bus services to support the Metro are raising standards and making services more attractive.

Once rail-based mass transit radial routes have been developed, bus-based services have a vital role in connecting those radial links and complementing the network. In the context of the Updated TMPQ, the proposed strategy for bus service improvements hinges on the creation of key BRT routes which either provide an alternative (lower cost) mode for key corridors (such as Doha Expressway) compared to Metro, provide local accessibility to employment, or discourage car traffic in areas where pedestrians need to be prioritized (such as along the Corniche).

Other complementary bus schemes are proposed to address specific issues or improve geographical coverage in areas where demand can justify scheduled services. In total there are 20 BRT and Bus Schemes including nine infrastructure/facility schemes, eight new services/operations and one each of regulatory, fleet and transportation planning schemes.

BRT and Bus Schemes in Doha

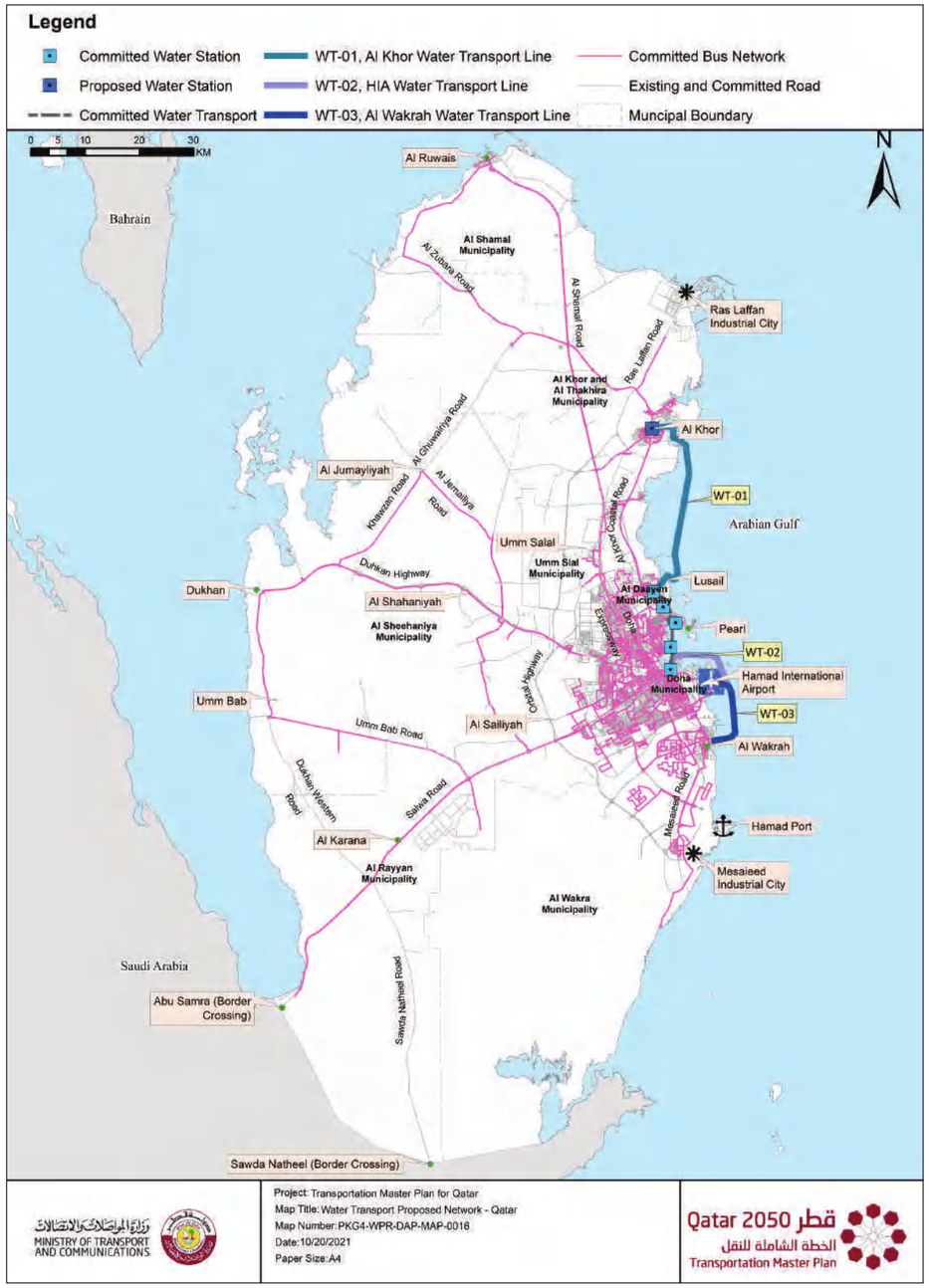
3.2.6 WATER TRANSPORT LINES

Consideration has been taken of the need and scope for ferry services where residential, commercial or leisure areas have easy access to Doha or the West Bay, along the coastal line.

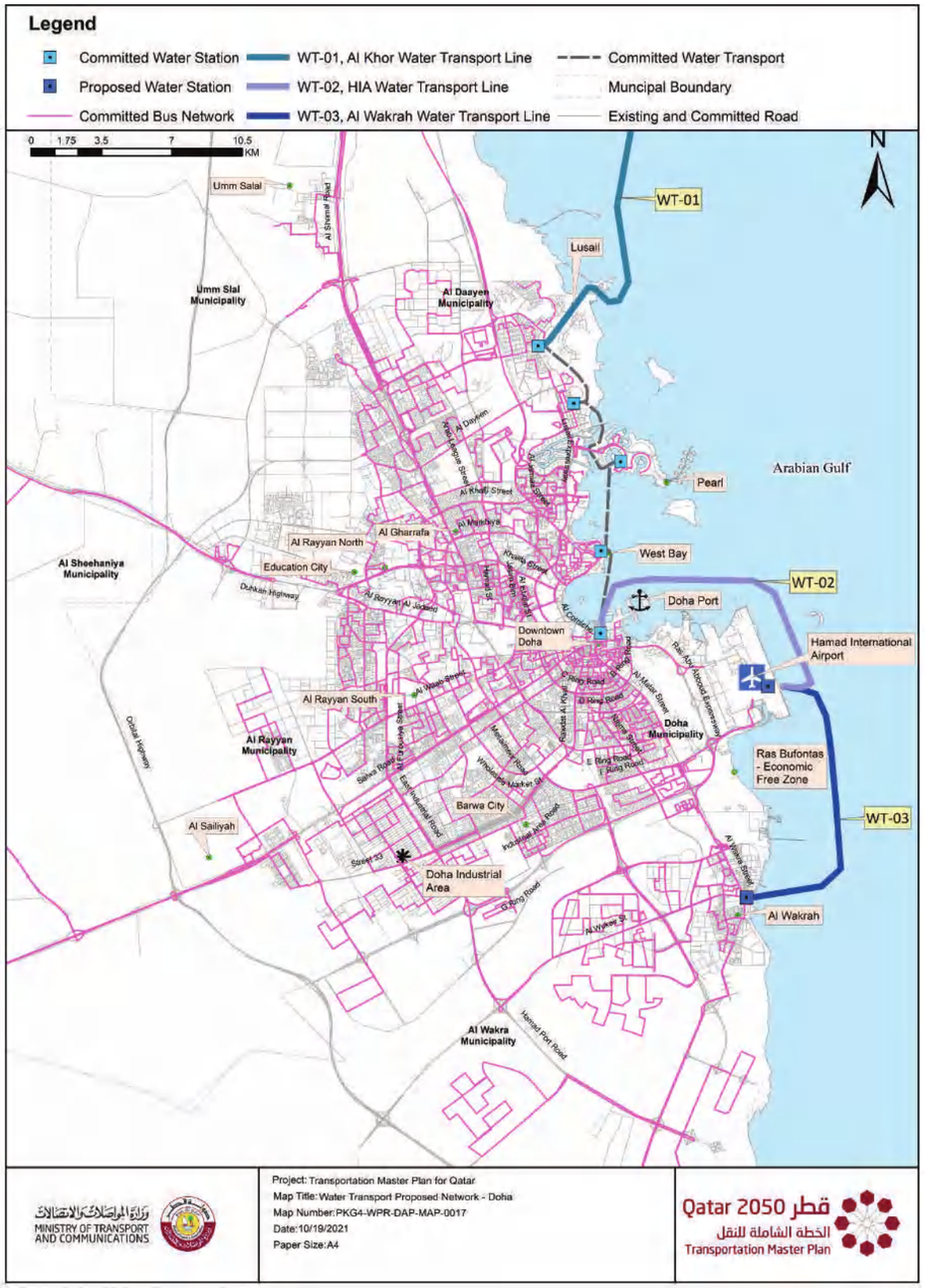
An original proposal was for a continuous passenger ferry service between Hamad Port and Doha Port, with intermediate new stations at HIA, Al Wakrah and QEZ 3. Building on these proposals and the committed route between Doha Port and Lusail, the additional proposal in the context of the Updated TMPQ is to extend water transport services all the way to Al Khor.

SECTION 3

Updated TMPQ – Water Transport Schemes in Qatar



Updated TMPQ – Water Transport Schemes in Doha



3.2.7 CONTRACT BUSES AND TAXIS STRATEGIES

Contract buses comprise labor and school travel. Labor buses are used to transport staff from their homes to specific work locations and are a common sight in Qatar (and in the other Gulf countries). School buses cater for the commuting of younger students and pupils. Contract buses play an important role in the overall public transport system. They are effective, privately run and are not public transport in the conventional sense, as they are not open to the general public.

There are six contract bus schemes in total - two involve central coordination of services/operations, two policy measures, one transportation planning and one fleet renewal scheme.

Taxis are expected to retain their importance despite the introduction of the Metro and improving bus services, although their role could change. This is because:

- The combination of traditional taxis for on-street hailing and at taxi ranks, plus the rise of phone and app-based services, means that there could be more total supply to meet increasing demand;
- Accessing taxis from homes, workplaces and more remote areas in Doha and of the rest of the country by phone and app is becoming easier and should increase demand; and
- Metro stations and bus stations would be expected to provide taxi patronage as public transport customers use taxis for the 'first/last mile' to or from the bus and Metro stations and hubs.

There are a total of four taxi schemes – one involving new facilities, and three being regulatory.

3.2.8 TRUCK ROUTES AND STRATEGIES

A designated Truck Route Network (TRN) is crucial for supporting the local, regional and national economic activity and development within Qatar. It can efficiently serve the haulage industry by facilitating truck operations and decreasing freight costs.

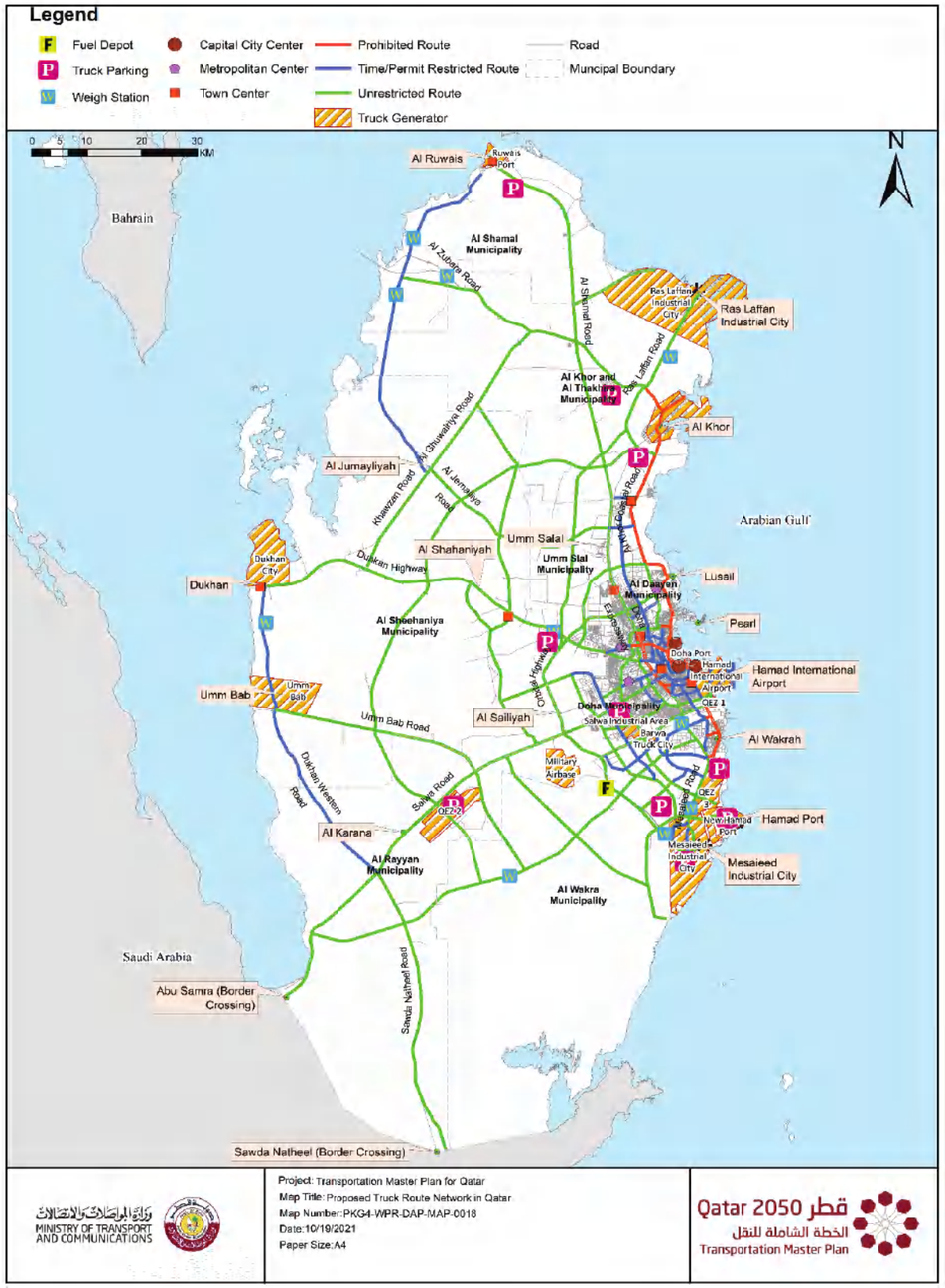
If not provided with a designated and effective TRN, freight can have an even greater adverse impact on the environment, safety and public health and amenity, for example if freely circulating in residential or other sensitive areas less suitable for sizable and more polluting vehicles.

A TRN aims at addressing future truck route requirements, increasing the nationwide truck operational efficiency, safety, and wellbeing of drivers, improving the quality of living for the wider community, and achieving improvements in infrastructure, facilities, operations and fleet, as well as to implement supportive regulation or policy actions.

There are a total of 22 truck schemes – 10 are infrastructure/facilities schemes, five regulatory, six transportation planning and one service/operation type. The proposed TRN which has been developed as part of the Updated TMPQ is shown below for Qatar and for Doha.

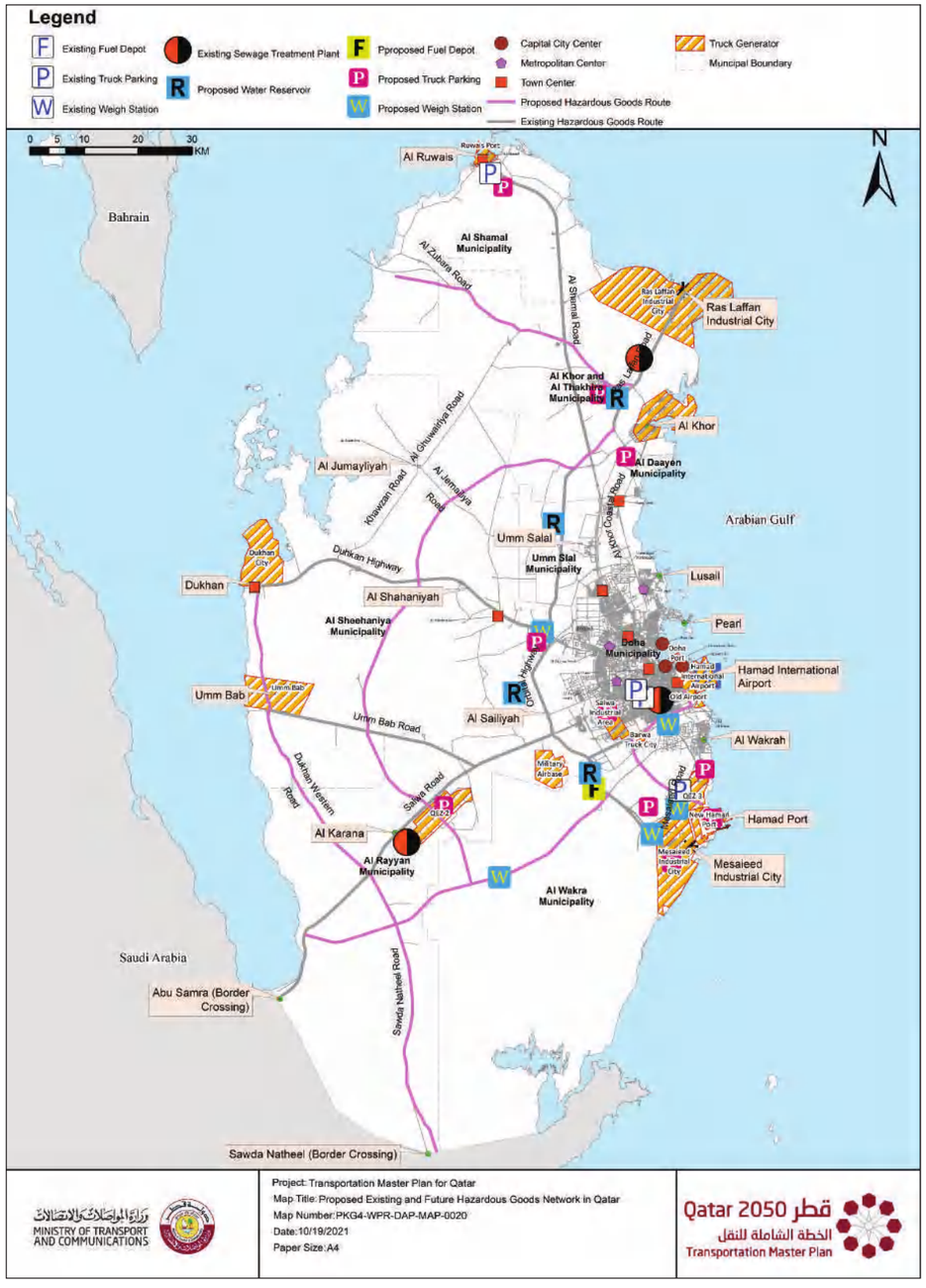
The existing and proposed truck routes, hazardous routes and oversized routes network are provided in the maps below:

Proposed Truck Route Network in Qatar

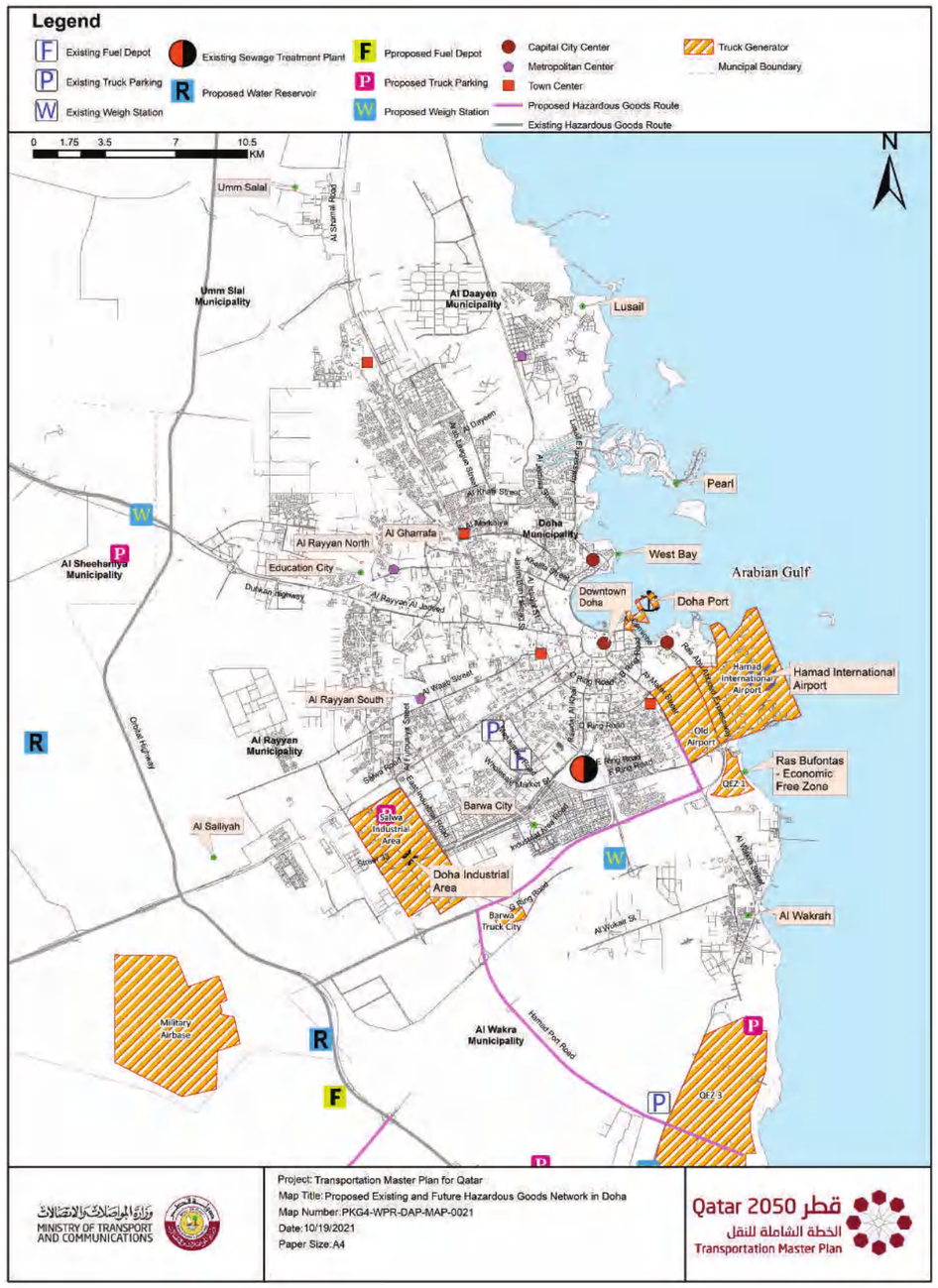


Truck Route Network in the DMA

Proposed Existing and Future Hazardous Goods Network in Qatar

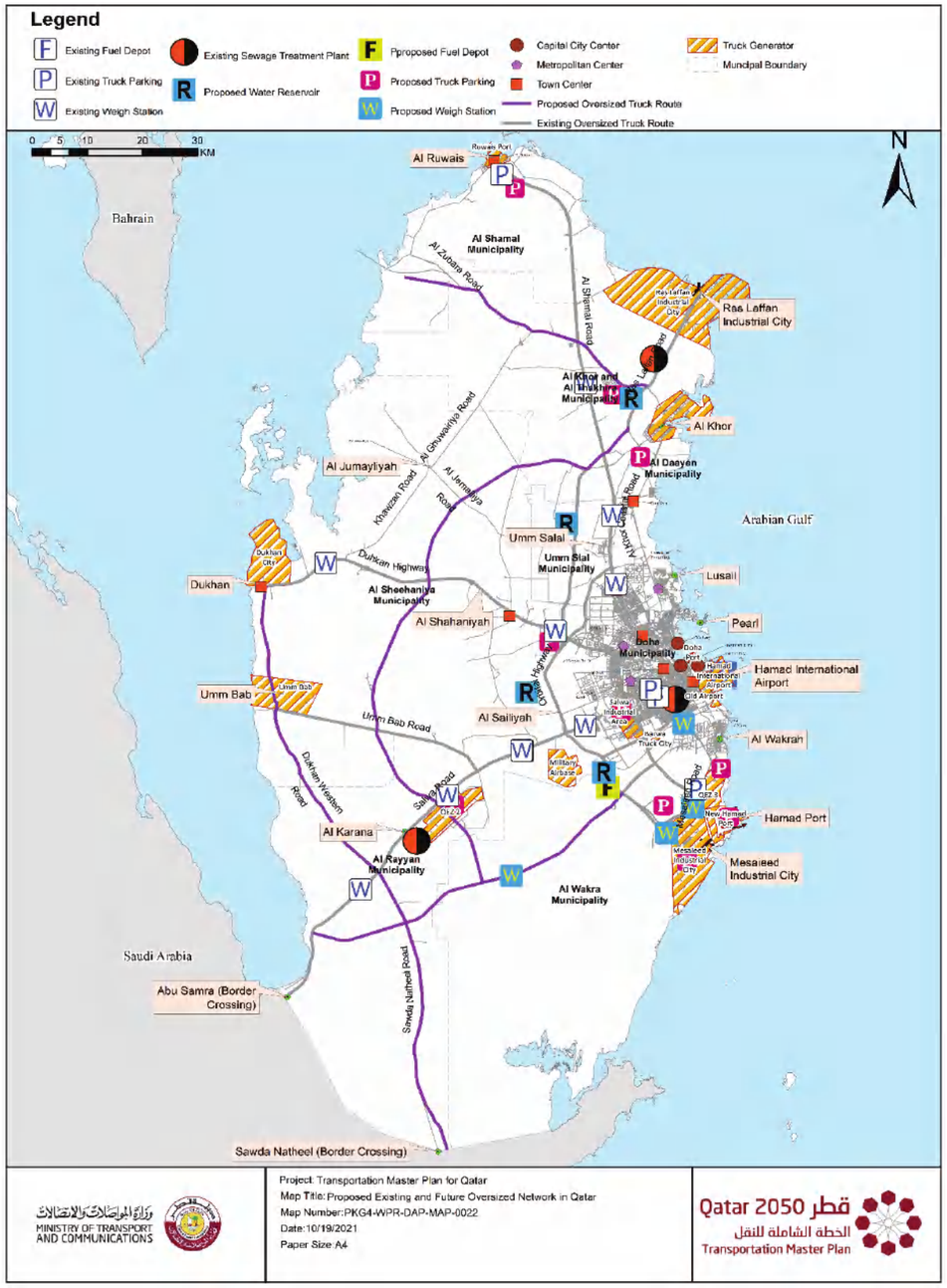


Proposed Existing and Future Hazardous Goods Network in DMA

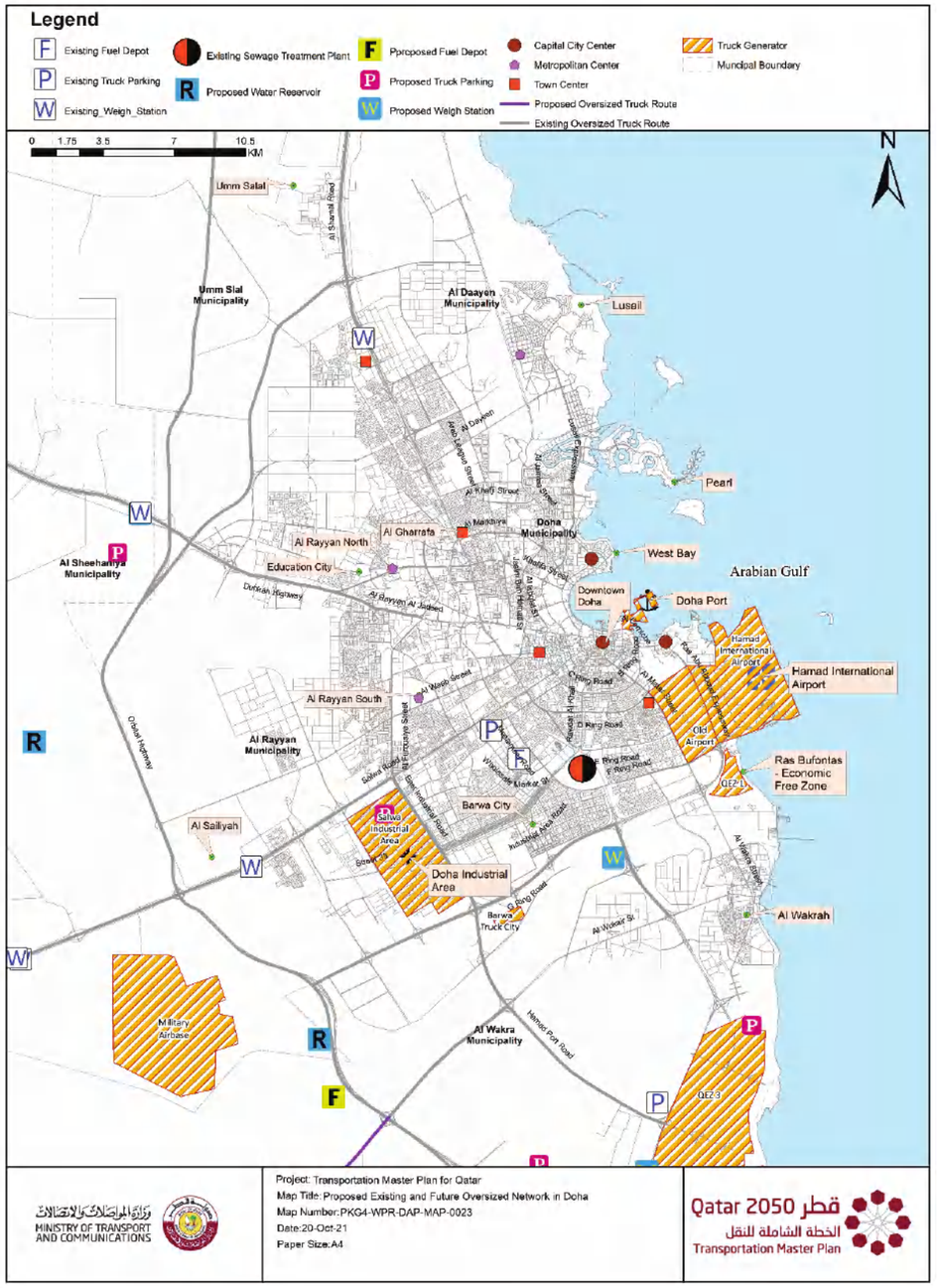


SECTION 3

Proposed Existing and Future Over Sized Vehicles Network in Qatar



Proposed Existing and Over Sized Vehicles Network in DMA - 2050



3.2.9 PEDESTRIAN NETWORK

Walking is an effective form of exercise which offers benefits affecting the whole of society. Physical activity is regarded by the World Health Organization as one of the key preventative measures for stress management of many of the costliest and most disabling conditions ranging from childhood and adult obesity to cardiovascular diseases, cancer, diabetes and chronic respiratory diseases.

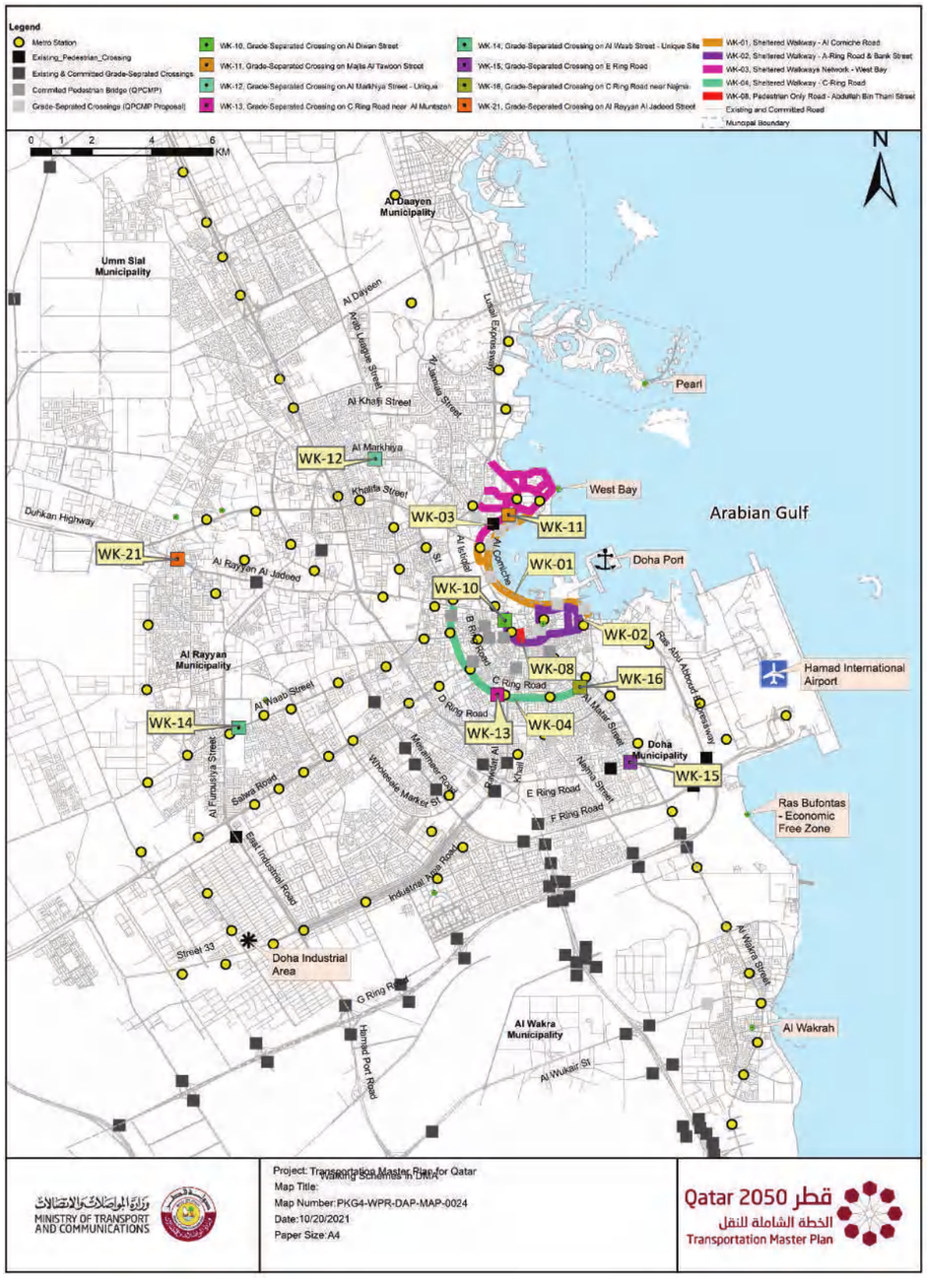
Creating a public walking culture will encourage members of the public to integrate exercise into their daily travel routine. This will also reduce the long-term burden and health care demands of these chronic conditions. This is consistent with the objectives and vision of the Updated TMPQ and ultimately the Qatar National Vision (QNV) 2030.

Pedestrian schemes fall into the following categories:

- Infrastructure, including sheltered walkways, pedestrian-only streets and grade-separated crossings.
- Traffic engineering, to promote pedestrian network connectivity and improve signalized pedestrian crossings.
- Policy framework, to support the development of the pedestrian network, including First/ Last Mile access and general improvements to walkway infrastructure.

There are a total of 21 pedestrian schemes, including 13 with new infrastructure, six policy and regulatory schemes, and two traffic engineering schemes. There are no schemes outside the DMA.

Walking Schemes in Doha



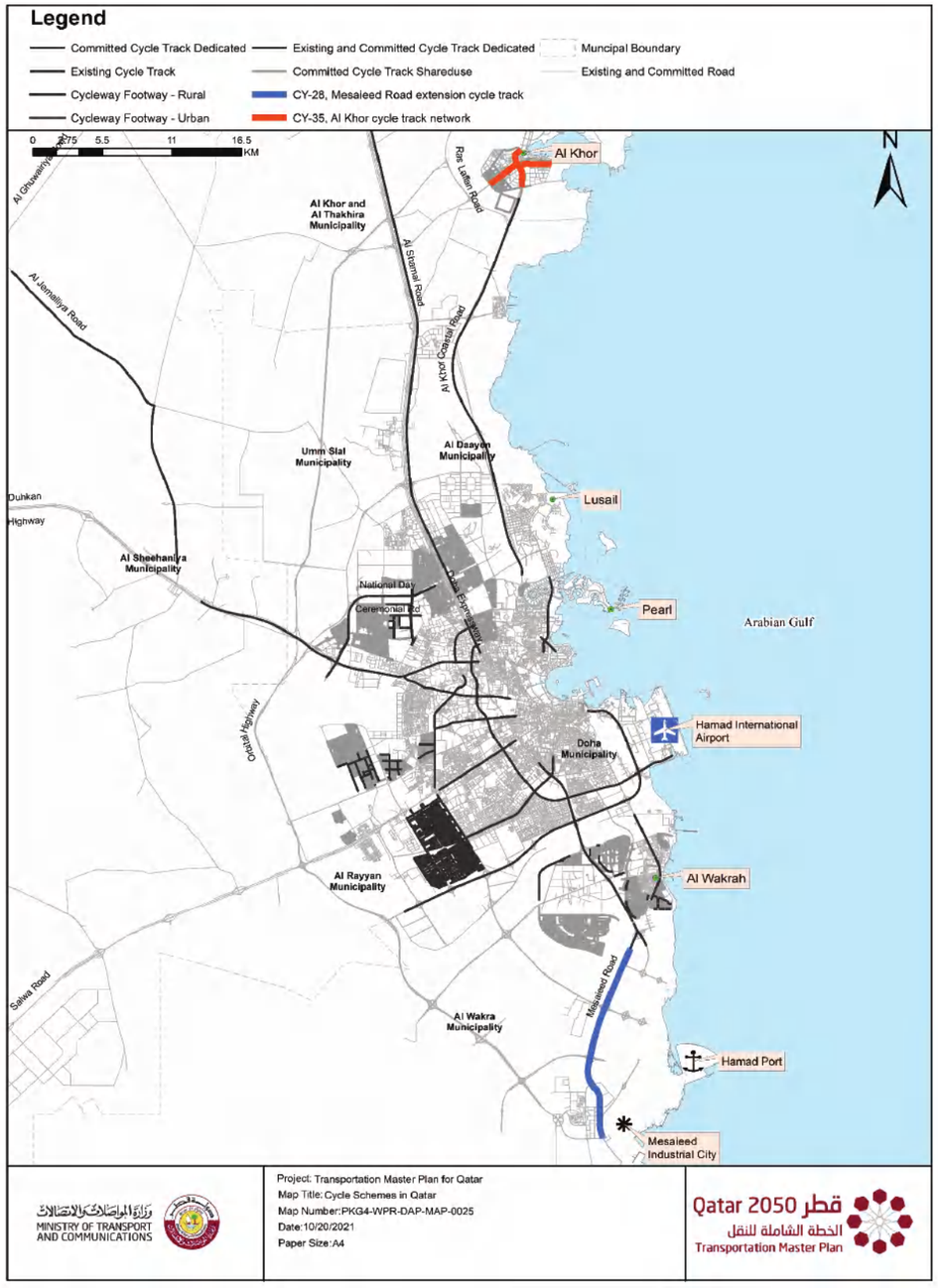
3.2.10 CYCLING NETWORK

Cycling movements share many of the characteristics of pedestrian flows. As a non-motorized mode of transport, cycling has at least the same health benefits as walking (and possibly greater benefits for longer distance journeys). The greater range and higher speed of cycling compared to walking come at the expense of requiring a more extensive dedicated infrastructure. The proposed cycling schemes in the Updated TMPQ address many of the identified issues in Qatar and complement the planned cycling network. A great deal of the solutions to effectively address the issues with cycling are conceived by non-infrastructure schemes. There are a total of 29 cycling schemes proposed. Of these, 20 are infrastructure and facilities, seven are policy/regulatory, and two are transport planning/traffic engineering.

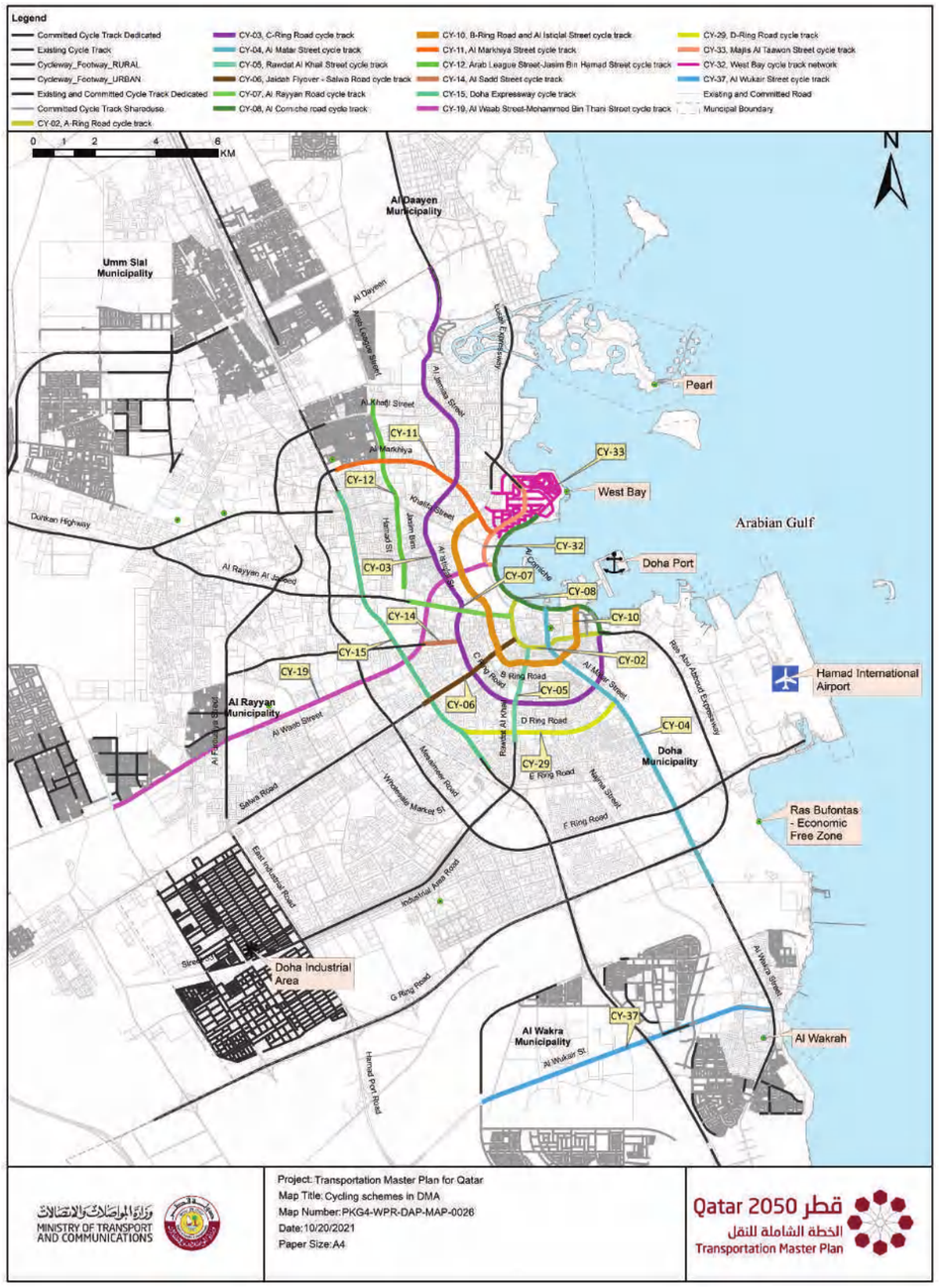
The proposed cycling schemes fall into two broad categories:

- Schemes comprised by infrastructure and facilities for the cycling network of interconnected segregated cycleways along the main roads; and
- Policy framework schemes related to cycling accessibility to public transport, bicycle docking facilities, integrated cycle lanes, shared-use with cars and safe-route signage.

Cycling Schemes in Qatar



Cycling Schemes in Doha



3.2.11 CROSS-MODAL AND INTEGRATION STRATEGIES

Cross-modal and integration schemes cut across different transportation modes to the benefit of the travelling public, in terms of increased travel opportunities, or enhancing travel experience by combining different ways of travel and making it more attractive.

This group of schemes involves more than one transportation mode, for example bus-metro, bus-car, metro-car, metro-bicycle/motor-bike. Schemes are also wide-ranging and diverse as they cover a sweep of factors affecting multi-modal travel, including for instance policies, pricing strategies, land use, technology, marketing, human resources and consultation.

These schemes can affect operations and service delivery across different transportation modes, or through coordination between transportation planning and land use planning, for example, by:

- Development of integration facilities between public transportation modes;
- Improving the road network to connect with international ports, major cities and major attractions, especially surface freight routes;
- Integration with the Gulf Cooperation Council railway network by establishing joint stations to transfer between the lines.

There are a total of 49 schemes proposed in the Updated TMPQ. 38 of these include policy/regulatory measures, 8 are transport planning schemes, and three involve new infrastructure and facilities.

Integration of Public Transport Services in Qatar

3.2.12 TRANSPORT DEMAND MANAGEMENT STRATEGIES

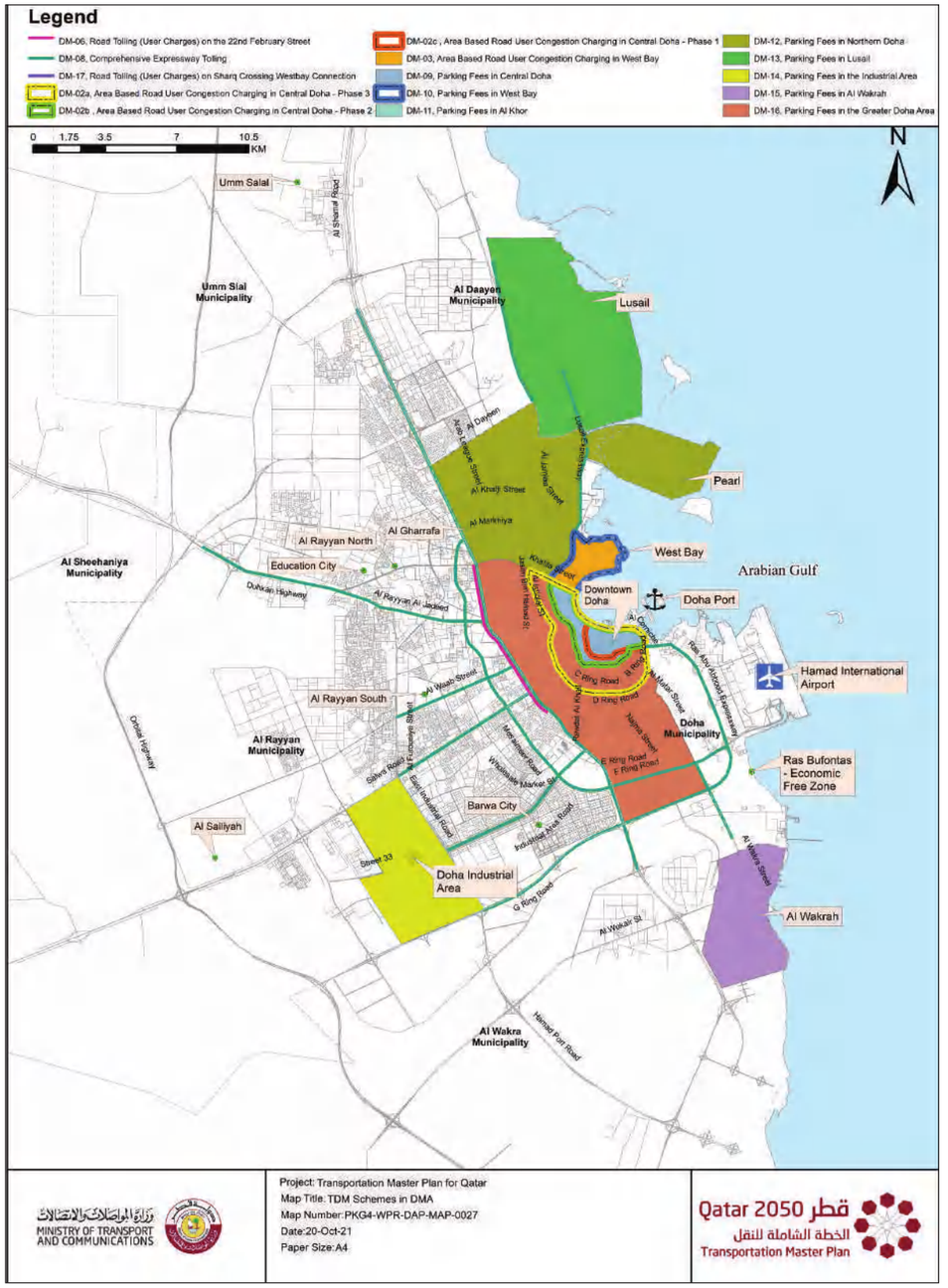
TDM schemes comprise a set of measures, policies, strategies aimed at reducing or controlling the demand for travel. This includes decreasing congestion or peak crowding, optimizing existing infrastructure or service capacity, promoting efficiency within the transportation system, or encouraging choices which are safer, less polluting or more sustainable. Such behavioral change away from private car usage can typically be achieved by suppressing travel demand, with pricing mechanisms, regulatory penalties, or with the reduction of the need for travel through land use planning, or by shifting demand to different routes, modes, times or locations of travel which can better cater for demand surpluses.

The TDM schemes considered in the Updated TMPQ will complement the provision of public transport to make Qatar's transportation more efficient and effective.

There are a total of 33 TDM schemes proposed in the Updated TMPQ. These include:

- Four Highway schemes involving congestion charging, four involving road tolling, 13 parking schemes, and four other TDM measures: and
- Eight Cross-Modal & Integration schemes.

TDM Schemes in Doha Metropolitan Area



SECTION 3

3.2.13 TECHNOLOGY AND INNOVATION STRATEGIES

New technologies are transforming the way transportation systems are planned, designed, built and operated. Innovation in the digitalization, electrification, automation and the sharing economy are fast transforming transportation services. These changes have the potential to make roads and public transport systems more efficient, safer and less polluting.

Hence, some of these initiatives have been considered in the Updated TMPQ, ranging from topics on the leading edge of technology, many still being tested, to others which have been developed for a long time but can still be considered as innovative in the sense that they are being used to address current urban mobility challenges. There are many technical challenges posed by the latest technologies in transportation, and a number of issues such as risks, privacy concerns, regulation and liability that still need to be resolved before implementation in Qatar.

There are a total of 15 Technology and Innovation Schemes. Two cover new modes, four cover highways, two are for bus, and seven are Cross Modal and Integration Schemes.

3.2.14 POLICY, REGULATION AND GOVERNANCE

Transport policy deals with developing a set of constructs and propositions, and streamlining transport initiatives, that are established to achieve specific objectives relating to social, economic and environmental conditions, and the functioning, effectiveness and performance of the transport system.

Transportation regulations normally cover economic, safety and environmental conditions, to ensure that transportation services are provided adequately, under acceptable levels of service and that users of these services operate safely, controlled and protected from excessive prices or unfair practices.

Governance, or the responsibilities and relationships through which decisions are made and actioned, reflects how transportation is delivered and managed and can be targeted towards improving the efficiency, safety, sustainability and overall effectiveness / acceptability of the future transport system.

These schemes introduce laws, legislation, regulations and the legal framework that support wider transportation schemes and policies. They are important, wide-ranging, and could have a significant positive impact on transportation planning in Qatar. As they are very different in type from infrastructure and service delivery measures associated directly with one or more modes, these parallel initiatives should be treated outside of the main thrust of a project-driven or delivery-driven Updated TMPQ.

There are a total of 18 Governance schemes. 16 of these are Cross Modal and Integration policies or regulations, one covers cycling, and one covers highways.

3.3 STRATEGIC PLANNING POLICIES AND STUDIES

Many of the schemes reported in the previous sections have been combined into packages of policies and studies for implementation by the same organization and with the participation of the same group of stakeholders.

The planning packages of policies and studies which are combined for joint implementation are summarized in Table 244. This table also presents the main stakeholders, implementation mandate (organization responsible), department, alignment with QNV objectives and MOT strategy, and the total estimated costs.

Combined Schemes into Policy Packages of Studies

Policy/Study	N.	Schemes in each Wider Policy																Main Stakeholders	Implementation mandate	Department	QNV 2030 Objectives	MOT Strategy
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Al Waab Street Full Corridor Study	1	HW-61																	Ashghal, MOI, MME	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enhance mobility and reduce journey time for passengers
Implementation of Road Network Assets Management Systems	3	HW-63	HW-64	HW-84															MOT, Q-Rail, Mowasalat	Ashghal	Assets Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Optimize government spending in the transport sector
Road Network Safety Improvements Study	3	HW-69	HW-77	HW-78															MOT, Ashghal, MOI	MOI	Traffic Engineering and Road Safety Department	Achieve security and stability, and maintain public safety	Strive to reduce transport accidents and fatalities
Vehicles Speed and Parking Enforcement Study using Technology	5	HW-71	HW-72	HW-74	HW-76	DM-01													MOT, Ashghal, NTSO	MOI	General Administration of Traffic	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enable state-of-the-art smart transport sector as part of a smart nation
Study on Improvements of Public Bus Service and Operation	12	BU-06	BU-10	BU-11	BU-14	BU-18	BU-21	BU-22	BU-07	CI-37	CI-39	CI-42	TA-03						Ashghal, MOI, Mowasalat, Q-Rail	MOT	Sustainable Transport Department/ Technical Affairs Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote modal shift from private to Public Transport and non-motorized modes (i.e., walking and cycling)
Implementing Public Bus Infrastructure and Services Improvements	3	HW-73	BU-08	CI-40															Ashghal, Mowasalat, Q-Rail, NTSO	Ashghal	Projects Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Provide a world class integrated transport system
Qatar Access Management Study	1	HW-79																	MOT, MME, Ashghal, Q-Rail, Mowasalat, MOI	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote an affordable and accessible transport system for all
Case Studies for Access Management (Al Majd Highway, New Major Development)	2	HW-88	CI-48																Ashghal, MOI, MME	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote an affordable and accessible transport system for all
Study for Land Transport Governance in Qatar	8	HW-81	RA-12	GV-01	GV-02	GV-06	GV-11	GV-15	GV-16										MME, Ashghal, MOI, Q-Rail, Mowasalat, PSA, MOF, ADLSA	MOT	Land Transport Sector Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Optimize government spending in the transport sector

Combined Schemes into Policy Packages of Studies

Policy/Study	N.	Schemes in each Wider Policy																Main Stakeholders	Implementation mandate	Department	QNV 2030 Objectives	MOT Strategy
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Improving Transportation Engineering Capacity, Capabilities, and stakeholder engagement	3	GV-05	GV-10	GV-17															Ashghal, MOI, Q-Rail, Mowasalat	MOT	Land Transport Sector Affairs	Develop a competitive labor market that enables citizens' participation in development, build a prosperous society and meet the needs of the current generation without compromising those of future generations, maintain high labor productivity, develop highly skilled labor capable of competing in the global market, and establish a modern and transparent information system that provides data on both the supply and demand sides of recruitment and training	Build a pipeline of talented manpower in the transport sector
Study on Improvements Cross Modal Integration and Seamless connectivity between transport modes	12	CI-38	CI-41	CI-15	CI-46	TA-02	CI-49	TI-13	CI-04	CI-05	CI-06	CI-47	TI-15						MME, Ashghal, MOI, Q-Rail, Mowasalat, Mawani, HIA, QTA, MOT	MOT	Sustainable Transport Department/ Technical Affairs Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Harness technology to maximize asset utilization and automate services
Update Manuals, Develop Regulations, and Plan Corridors for Sustainable Transport based on the Guide for Planning Roads	3	HW-82	HW-87	HW-89															MME, Ashghal, MOI, Q-Rail, Mowasalat	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote clean and energy efficient transport sector that protects the environment and human well-being
Road Network efficiency and Optimization using Technology	4	HW-83	HW-85	TI-16	TI-20														MME, MOT, MOI, Q-Rail, Mowasalat, Kahramaa, Ashghal	Ashghal	Assets Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Harness technology to maximize asset utilization and automate services
Implement Freight Transport Strategy and Enforcement (Truck Routes, Parking, Drivers Licencing Requirements and Training, Enforcement)	17	TR-01	TR-04	TR-06	TR-07	TR-10	TR-13	TR-14	TR-15	TR-16	TR-17	TR-18	TR-19	TR-20	TR-21	TR-25	TR-26	TR-28	MOI, MOT, Manateq, Fee Zone Authority, Mawani, HIA, Hamad Port, Qatar Petroleum, Woqod, MME	Ashghal	Projects Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enhance mobility and reduce journey time for passengers and freight
Qatar Freight Master Plan Study	5	TR-24	TR-02	TR-03	TR-08	TR-11													MOT, private haulage companies, MOI	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enhance mobility and reduce journey time for passengers and freight
Implementing Vehicles Electrification Strategy	4	BU-23	CI-45	CI-13	TI-10														MME, Kahramaa, Mowasalat, Ashghal, Q-Rail, Mowasalat	MOT	Sustainable Transport Department/ Technical Affairs Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote clean and energy efficient transport sector that protects the environment and human well-being
School Transport Study	2	CB-01	DM-38																MME, Ashghal, MOE&HE, MOI	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Harness technology to maximize asset utilization and automate services

Combined Schemes into Policy Packages of Studies

Policy/Study	N.	Schemes in each Wider Policy																Main Stakeholders	Implementation mandate	Department	QNV 2030 Objectives	MOT Strategy
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Driving and Vehicle Standards, Licensing Regulation, Operation, and Enforcement Study	6	CB-02	CB-03	CB-04	CB-05	CI-31	CI-32												MOT, MME, Mowasalat, MOE&HE	MOI	General Administration of Traffic	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Ensure effective legislative and regulatory frameworks
Study on Taxi Service Licensing and Fares Regulations Improvement and Enforcement	3	CI-24	TA-04	TA-05															Q-Rail, Mowasalat, Ashghal, MOI	MOT	Land Transport Licensing Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Ensure effective legislative and regulatory frameworks
Implementing Non-Motorized Network Enhancement Project	8	WK-23	WK-24	WK-26	WK-27	WK-28	WK-29	WK-30	CI-18										MOT, MME, MOI, Ashghal, legislative action	Ashghal	Projects Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote modal shift form private to Public Transport and non-motorized modes (i.e., walking and cycling)
Qatar Non-Motorized Transport and Cross-Modal Integration Master Plan Study	12	CY-38	CY-39	CY-40	CY-41	CY-42	CY-43	CY-44	CY-45	CY-46	CY-47	WK-31	CI-33						MOT, MME, Mowasalat, Q-Rail, Ashghal	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote modal shift from private to Public Transport and non-motorized modes (i.e., walking and cycling)
TOD and Land Use - Transport Integration Study	4	CI-02	CI-03	CI-25	CI-27														MOT, Q-Rail, Ashghal, Mowasalat	MME	Urban Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Harness technology to maximize asset utilization and automate services
Updating and Maintenance of Transportation Model Study	1	CI-07																	MOT, Ashghal, Q-Rail, Mowasalat, MME, PSA, MOF, MOI	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enhance mobility and reduce journey time for passengers and freight
Qatar Public Transport Master Plan Study	9	CI-08	CI-09	CI-10	CI-12	CI-14	CI-20	CI-26	DM-39	CI-36									MOT, Ashghal, Q-Rail, Mowasalat, MME, PSA, MOF, MOI	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Promote modal shift from private to Public Transport and non-motorized modes (i.e., walking and cycling)
Study on Transportation Impacts on Environment and Health with Mitigation Measures	4	CI-23	CI-43	CI-44	DM-29														MOT, MOI, MME, Ashghal, Q-Rail, Mowasalat, QP, Karwa	MOT	Land Transport Planning Department	Promote optimal exploitation and sustainability of natural resources for the people of Qatar	Promote clean and energy efficient transport sector that protects the environment and human well-being
Study on Developers Contribution Plans	3	CI-28	CI-29	CI-22															MOT, MOI, MME	Ashghal	Projects Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Optimize government spending in the transport sector
Development of Parking Standards and Rates for Developments to Support Sustainable Transportation	1	CI-30																	MOT, MOI, Ashghal	MME	Urban Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Optimize government spending in the transport sector

Combined Schemes into Policy Packages of Studies

Policy/Study	N.	Schemes in each Wider Policy																	Main Stakeholders	Implementation mandate	Department	QNV 2030 Objectives	MOT Strategy
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17					
Improvements of Overall Safety Related to Road Transport	2	CI-34	CI-35																MOT, MOI, MME, Q-Rail, Ashghal, Mowasalat	MOI	General Administration of Traffic	Achieve security and stability, and maintain public safety	Strive to reduce transport accidents and fatalities
Transport Command Center in Qatar	2	CI-50	TI-17																MME, Ashghal, Q-Rail, Mowasalat, MOI	MOT	Sustainable Transport Department/ Technical Affairs Department	Achieve security and stability, and maintain public safety	Enable state-of-the-art smart transport sector as part of a smart nation
Study on PPP/ Liberalization of the Transport Market	3	CI-51	GV-20	TI-18															MOCI, Ashghal, Q-Rail, MOF, MOT	MOT	Sustainable Transport Department/ Technical Affairs Department	Promote a more competitive, productive and diversified economy and a more dynamic private sector with greater contribution to the national economy	Promote sector liberalization and PSP to drive service levels and performance
TAF Implementation, funding Transportation Projects, and Transport Performance Monitoring	2	GV-03	GV-14																MOF, Ashghal, Q-Rail, Mowasalat, MOI	MOT	Land Transport Planning Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Optimize government spending in the transport sector
Development of Regulations for new Transport Technologies/ Modes (Electric Vehicles, MaaS, Electric Scooter, etc.)	2	GV-04	TI-19																MME, Ashghal, Q-Rail, Mowasalat, MOI	MOT	Legal Affairs Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enable state-of-the-art smart transport sector as part of a smart nation
Monitoring of Public Transport Improvements	2	GV-08	GV-09																Q-Rail, Mowasalat, Karwa	MOT	Sustainable Transport Department/ Technical Affairs Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Aim for a world-class performance monitoring system
Comprehensive TDM Study	13	DM-18	DM-22	DM-23	DM-25	DM-26	DM-30	DM-31	DM-32	DM-33	DM-34	DM-35	DM-36	DM-37					MOT, MOI, MME, MOE&HE, Q-Rail, Mowasalat	MOT	Traffic Engineering and Road Safety Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enhance mobility and reduce journey time for passengers and freight
Study for Effectiveness of TDM in Special Events	1	DM-40																	MOT, Mowasalat, SCDL, Q-Rail	Ashghal	Assets Affairs	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enhance mobility and reduce journey time for passengers
Feasibility Study for Implementing West Bay Automated People Mover (APM)	1	TI-01																	Q-Rail, Ashghal, Mowasalat, Private Sector	MOT	Sustainable Transport Department/ Technical Affairs Department	Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enable state-of-the-art smart transport sector as part of a smart nation
AV Transportation Feasibility Study and Demonstration Project	2	TI-11	TI-12																MOT, Ashghal, MOI	Mowasalat		Develop a sustainable and high-quality infrastructure that supports the national economy and keeps abreast of the latest smart technologies	Enable state-of-the-art smart transport sector as part of a smart nation
Total	169																						

3.4 INTEGRATION WITH REGIONAL AND INTERNATIONAL GATEWAYS

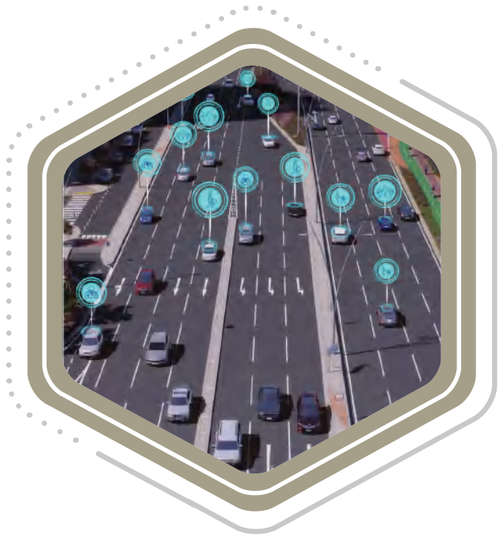
International Gateways comprise of land borders, seaports and the airport, which form important economic links for trade, commerce and international travel, it is therefore vital for International Gateways to be well connected and integrated into the strategic national transport network within Qatar.

The Updated TMPQ recognizes this need, as it includes strategic connections to existing International Gateways such as Hamad International Airport, Ras Laffan Port, Doha Port, Hamad Port and the Abu Samra land border with Kingdom of Saudi Arabia (KSA). There is also a strategic connection proposed to KSA which lead to a shorter travel and more direct linkage to United Arab Emirates (UAE), through reopening of the Qatar / KSA land border crossing, which creates an additional International Gateway.

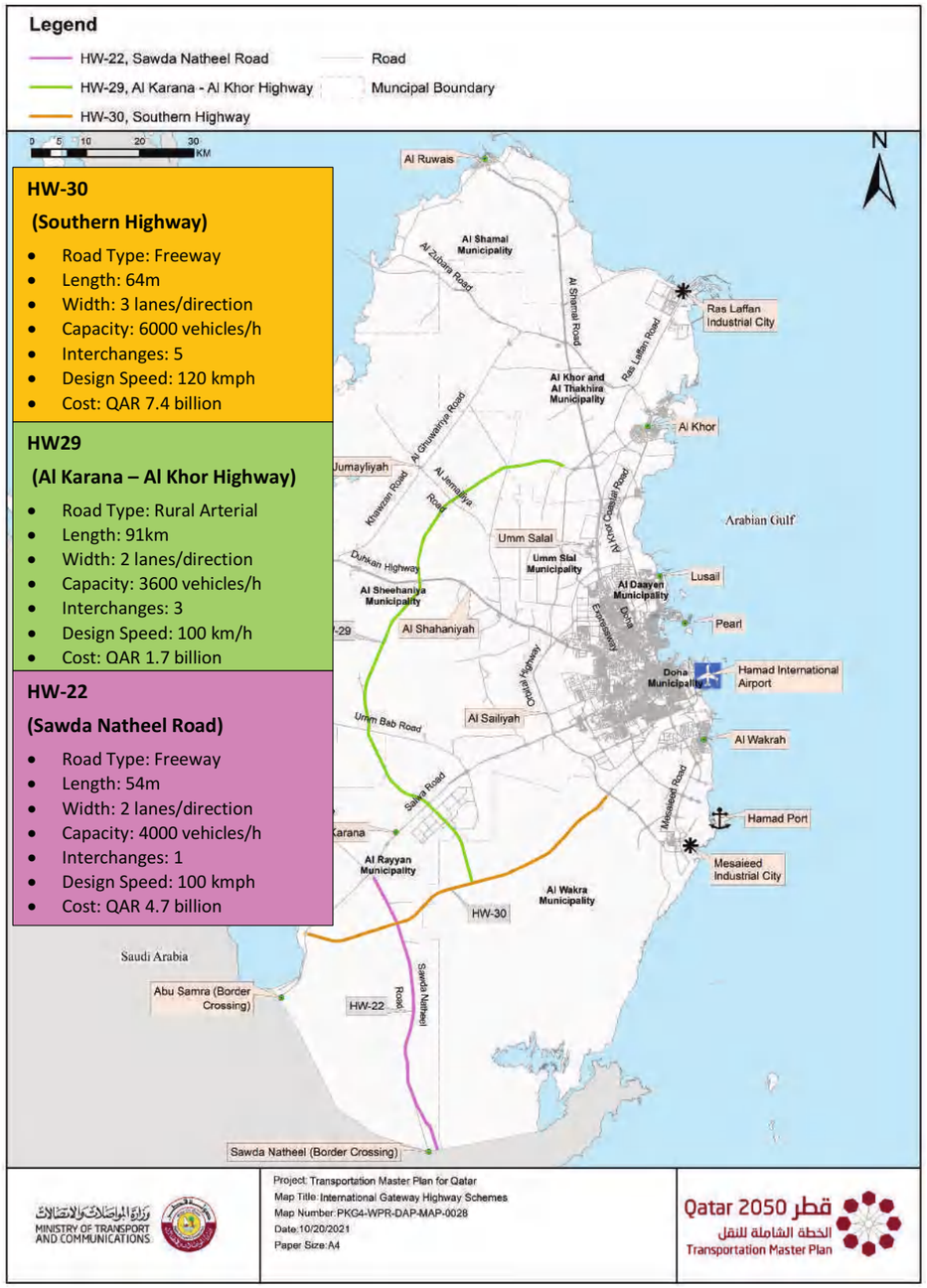
3.4.1 HIGHWAY PROJECTS

The key highway schemes in the Updated TMPQ to integrate International Gateways are listed below:

- **Southern Highway** – New rural freeway proposed to provide an additional connection to the Abu Samra Kingdom of Saudi Arabia (KSA) land border to serve areas to the south of Doha (e.g Measieed and Al Wakrah).
- **Sawdat Natheel Road** – A rural freeway to serve the KSA / UAE land border, which will provide an additional International Gateway. The new road will provide a new strategic connection towards UAE and will integrate with the new Southern Highway and Salwa Road.
- **Al Karana–Al Khor Highway** – New rural road which connects the southern land borders (Abu Samra -KSA / Qatar-KSA/UAE land border) with central and western rural regions of Qatar (Dukhan, Al Khor, Ras Laffan)



Updated TMPQ International Connecting Roads



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3.4.2 RAIL AND METRO PROJECTS

The key metro and rail schemes in the Updated TMPQ to integrate International Gateways are listed below:

- **Metro blue line to Hamad International Airport** – This scheme provides an additional metro connection to Hamad International Airport. The scheme improves public transport accessibility to the airport from a wider catchment area within the Doha Metropolitan Area compared with existing services.
- **Passenger Line from Doha Main International Station to KSA** – This scheme provides a new passenger rail service from Doha Main International Station to KSA.
- **Freight line from Hamad Port to KSA** – This scheme provides a new freight freight connection between Hamad Port and KSA. It also serves the Naval Base and Mesaieed Industrial Area.
- **Passenger rail line from Hamad International Airport to Doha Main International Station** - This scheme provides a link between the International Airport and the long-distance international rail network to KSA.

Updated TMPQ International Rail Connections

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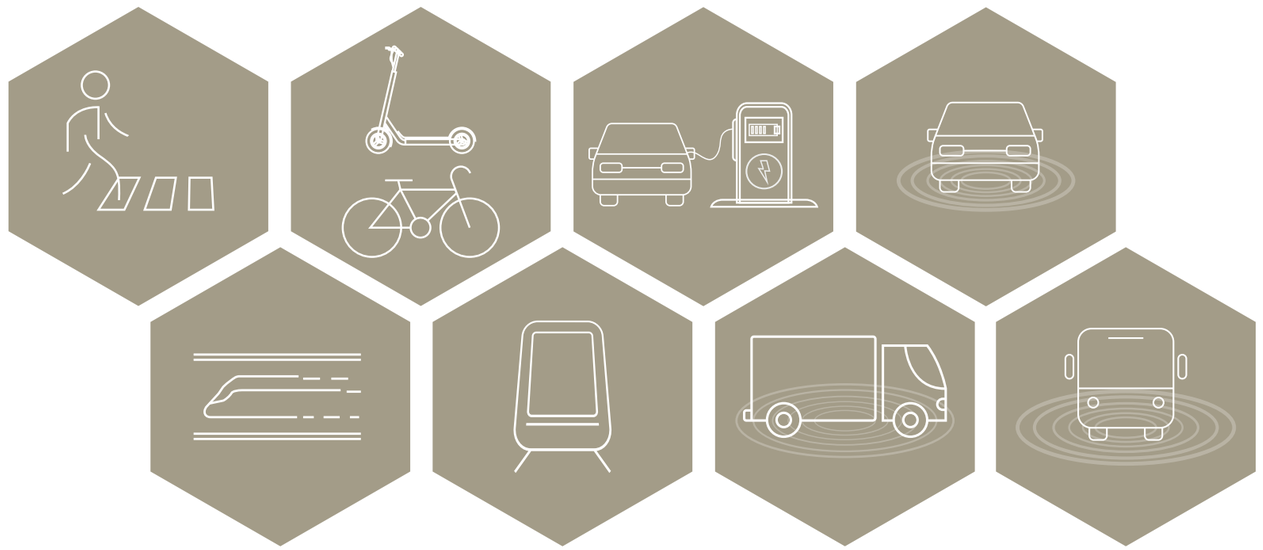
SECTION - 04

THE PERFORMANCE AND TARGETS



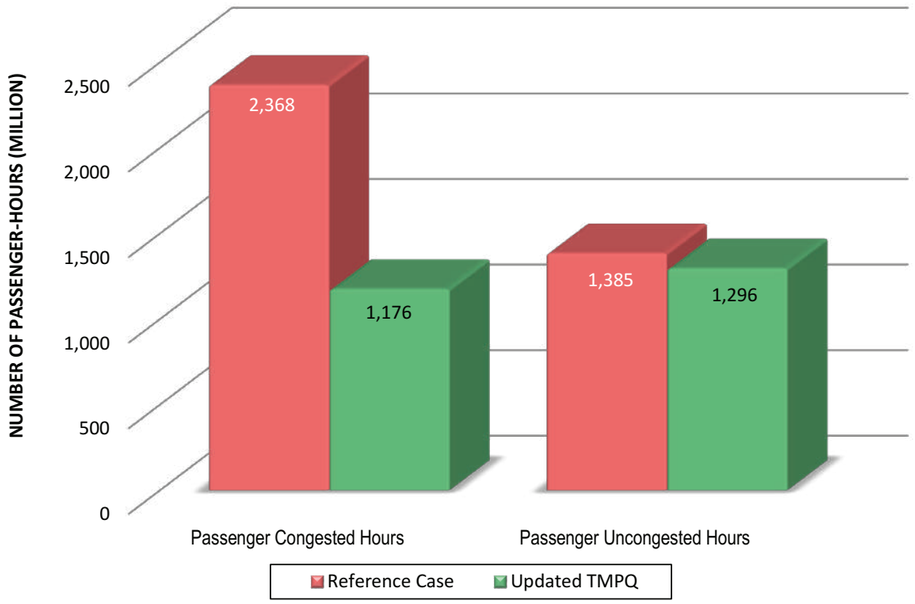
4 THE PERFORMANCE AND TARGETS

4.1 EXPECTED PERFORMANCE

The expected performance of transport network after implementing the updated TMPQ in comparison to the reference case is presented in the following graphs and maps.

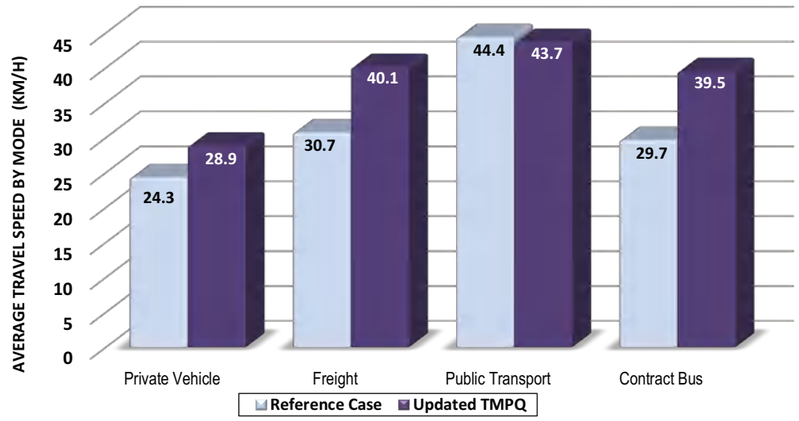
It is expected that the number of congested and uncongested passenger-hours for road vehicles in 2050 for the Updated TMPQ reduces by over 40%, in relation to the Reference Case. The number of congested hours will reduce dramatically with the package of schemes in the Updated TMPQ.

Number of Congested and Uncongested Passenger-Hours (2050)



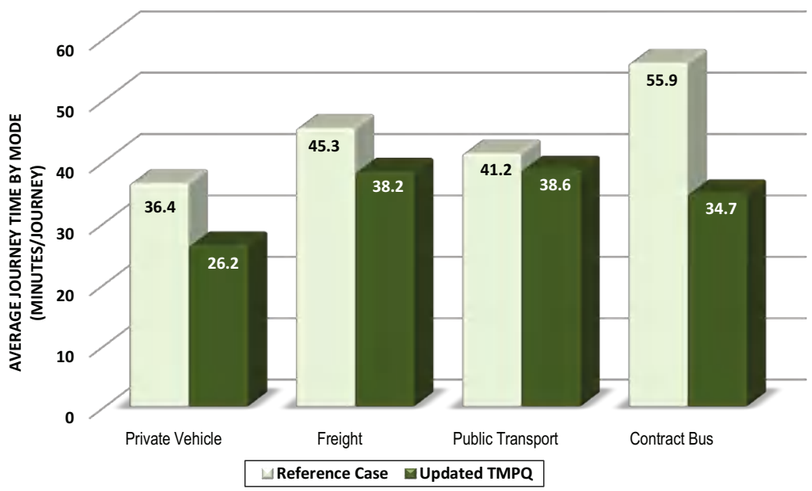
As a result of updated TMPQ, it is expected traffic congestion decrease, average travel speeds increase for all road-based modes, by around 19% for private vehicles to 37% for freight vehicles.

Average Travel Speed by Mode (Km/h) (2050)



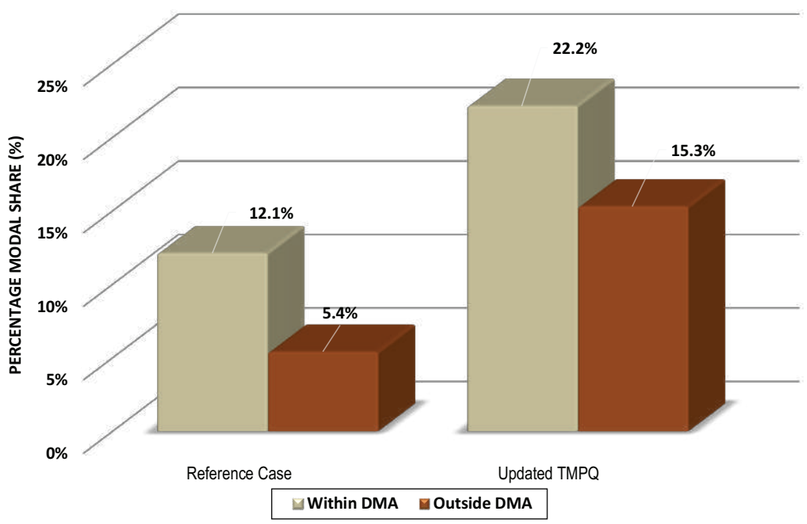
As a result of updated TMPQ, it is expected travel speeds increase, journey times reduce for all road-based modes, by around 34% for private vehicles and 42% for contract buses.

Average Journey Time by Mode (Minutes/Journey) (2050)

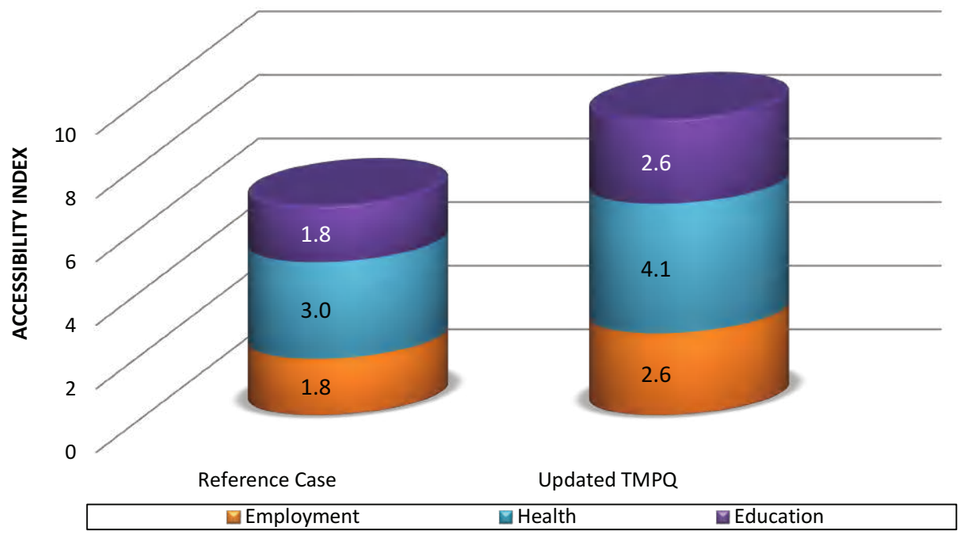


The share of public transport travel within the DMA increases significantly in the Updated TMPQ to 23% compared to 12.2% in the Reference Case.

Public Transport Market Share (%) (2050)



Public Transport Accessibility Index to Employment, Health and Education Locations (2050)



The below graph shows the results of the assessment of the accessibility indices for public transport to employment, health and education locations in 2050 for the Updated TMPQ. These range from 0 (least accessible) to 10 (most accessible). The Updated TMPQ achieves higher scores for all types of destinations, reflecting higher levels of public transport provision.

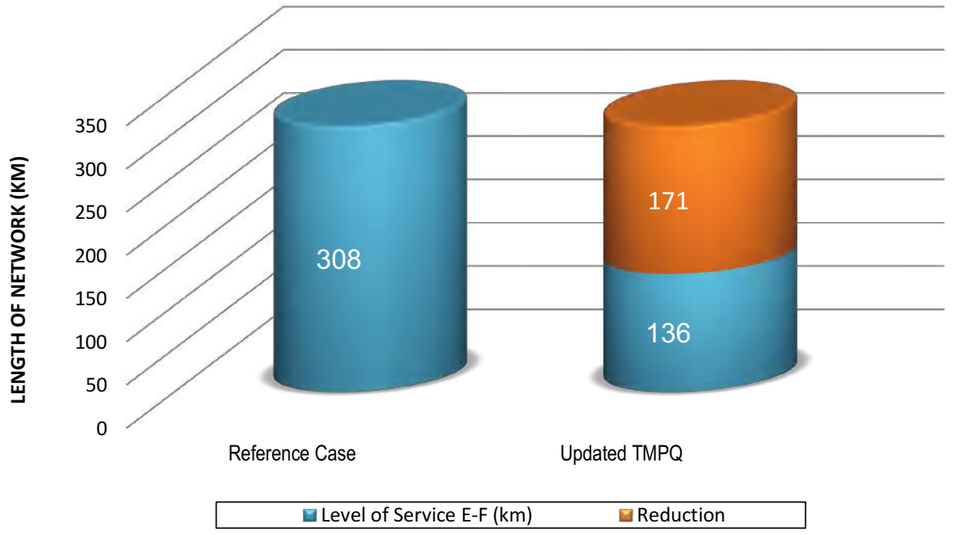
The maps below show the comparisons of the Levels of Service (as measured by the Volume/Capacity ratio) between the Reference Case and the Updated TMPQ, for the AM peak in Doha. As shown in the maps below, there is significant improvements to Level of Service on the major radial routes and ring roads within Doha, therefore these routes will operate with significantly reduced levels of congestion compared to the Reference Case.

The Travel Time Index (TTI) is the ratio of the total travel time during the peak period over the time required to make the same trip at free-flow speed conditions. It is a measure of average conditions that represents how much longer, on average, travel times are during congestion compared to during uncongested conditions. The maps below illustrate the highway TTI for the AM peak, considering the Reference Case and the Updated TMPQ, both for Qatar and focusing on Doha.

The plans below show public transport ridership (No. of trips) during the AM Peak for the Reference Case and the Updated TMPQ both for Qatar and Doha. As shown in the plans below public transport ridership significantly increases both across Doha and Qatar due to the increase in public transport provision proposed as part of the Updated TMPQ

The graph shows the length (in Km) of the strategic road network in Qatar (including main arterials and expressways, but excluding urban roads) operating under failing Levels of Service (LoS), which comprise LoS E and F, in 2050. The Updated TMPQ would achieve a 55% reduction in the length of the failing road network.

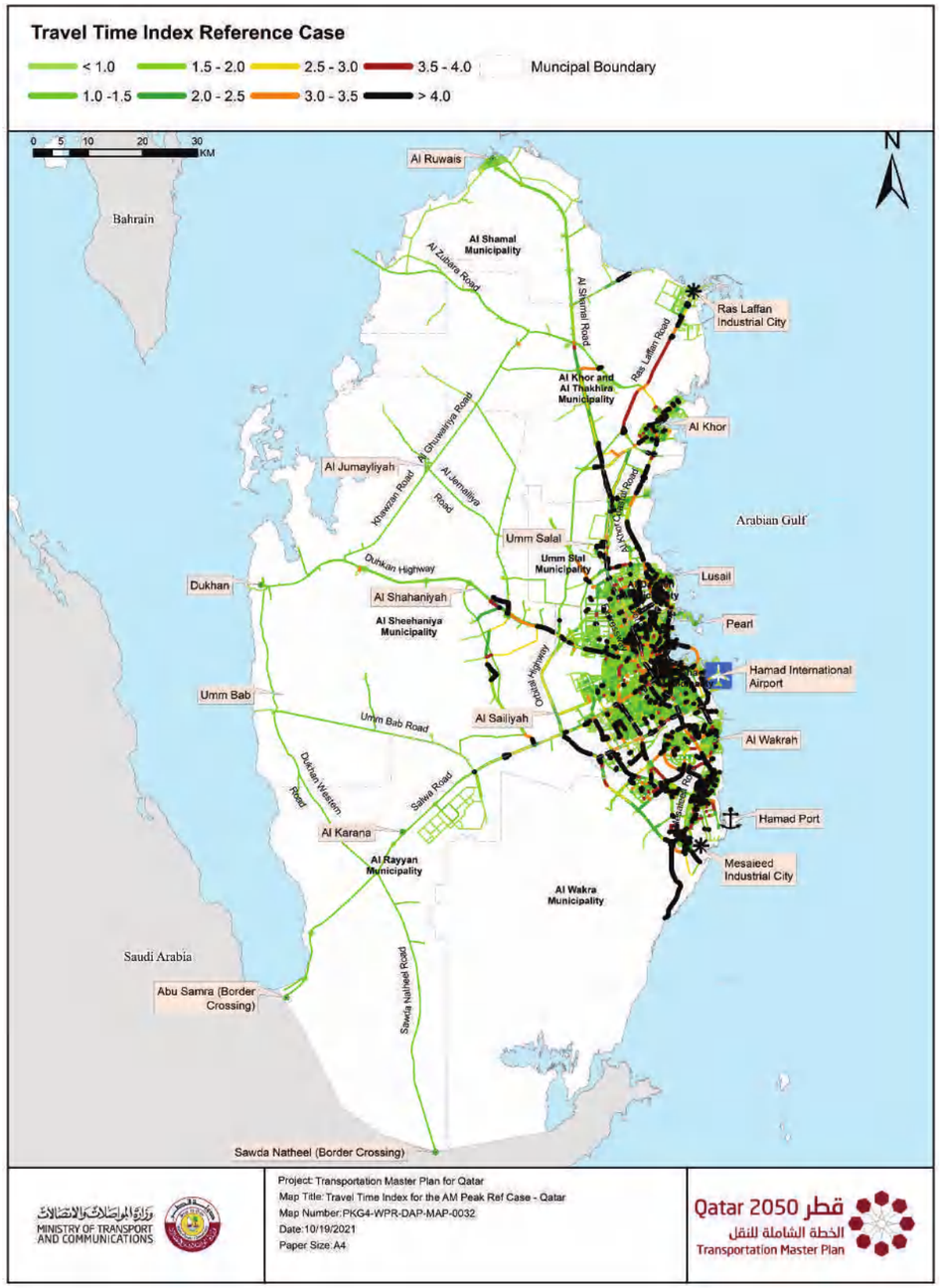
Levels of Service: Length of the Failing Strategic Road Network in the AM Peak (2050)



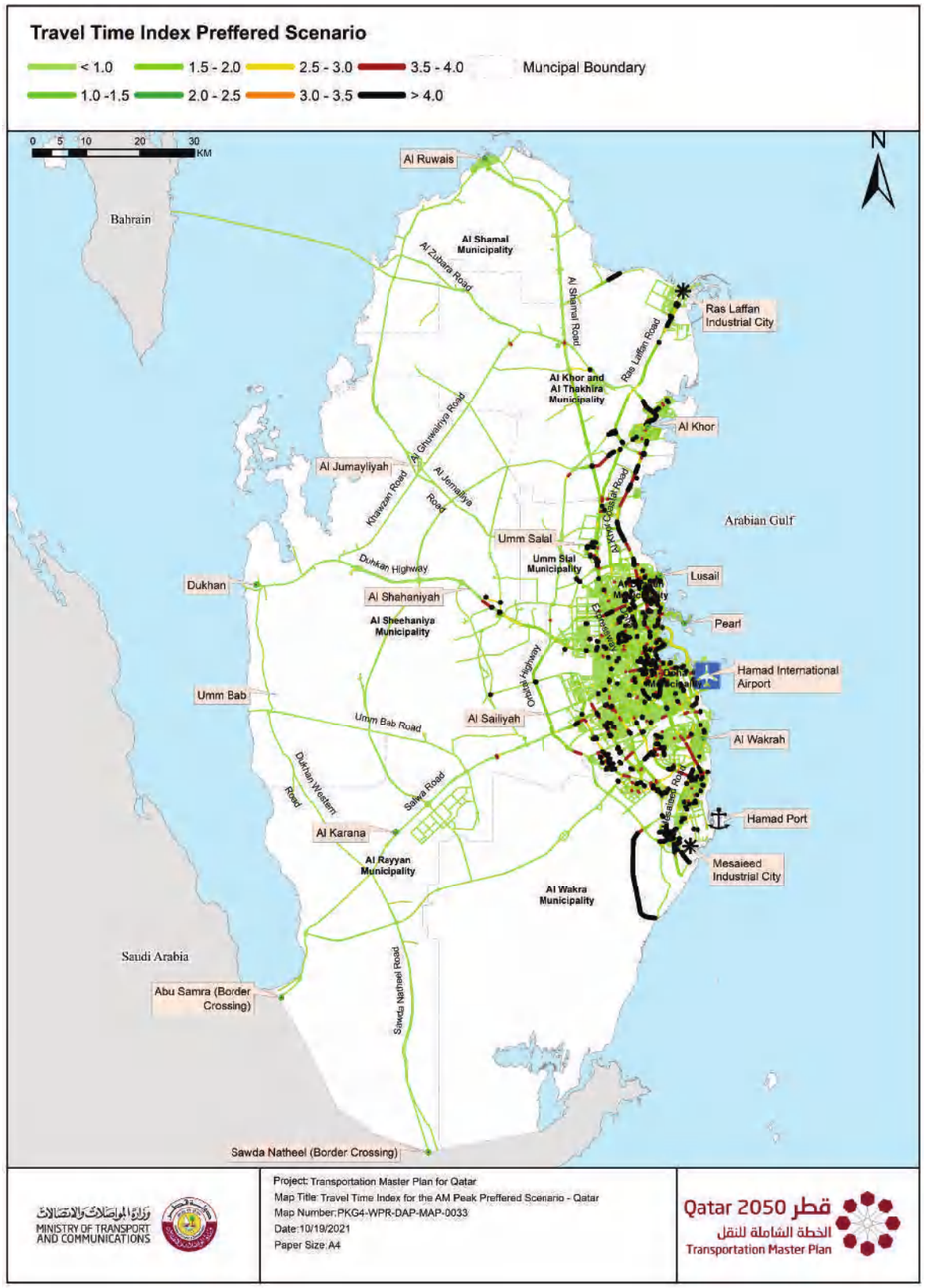
Levels of Service (V/C) for the AM Peak in the Reference Case, Doha (2050)

Levels of Service (V/C) for the AM Peak in the Updated TMPQ, Doha (2050)

Travel Time Index for the AM Peak in the Reference Case, Qatar (2050)



Travel Time Index for the AM Peak in the Updated TMPQ, Qatar (2050)



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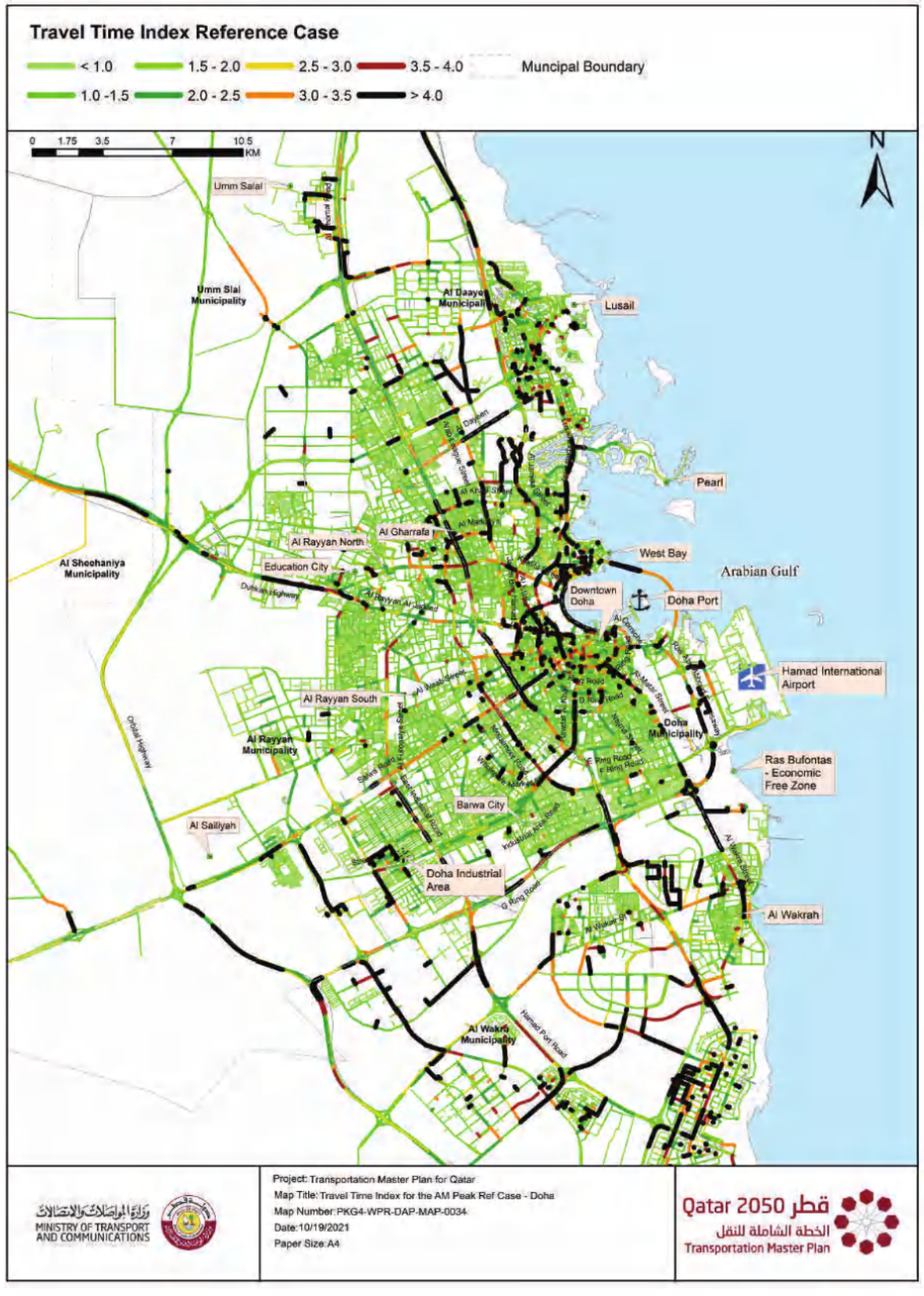
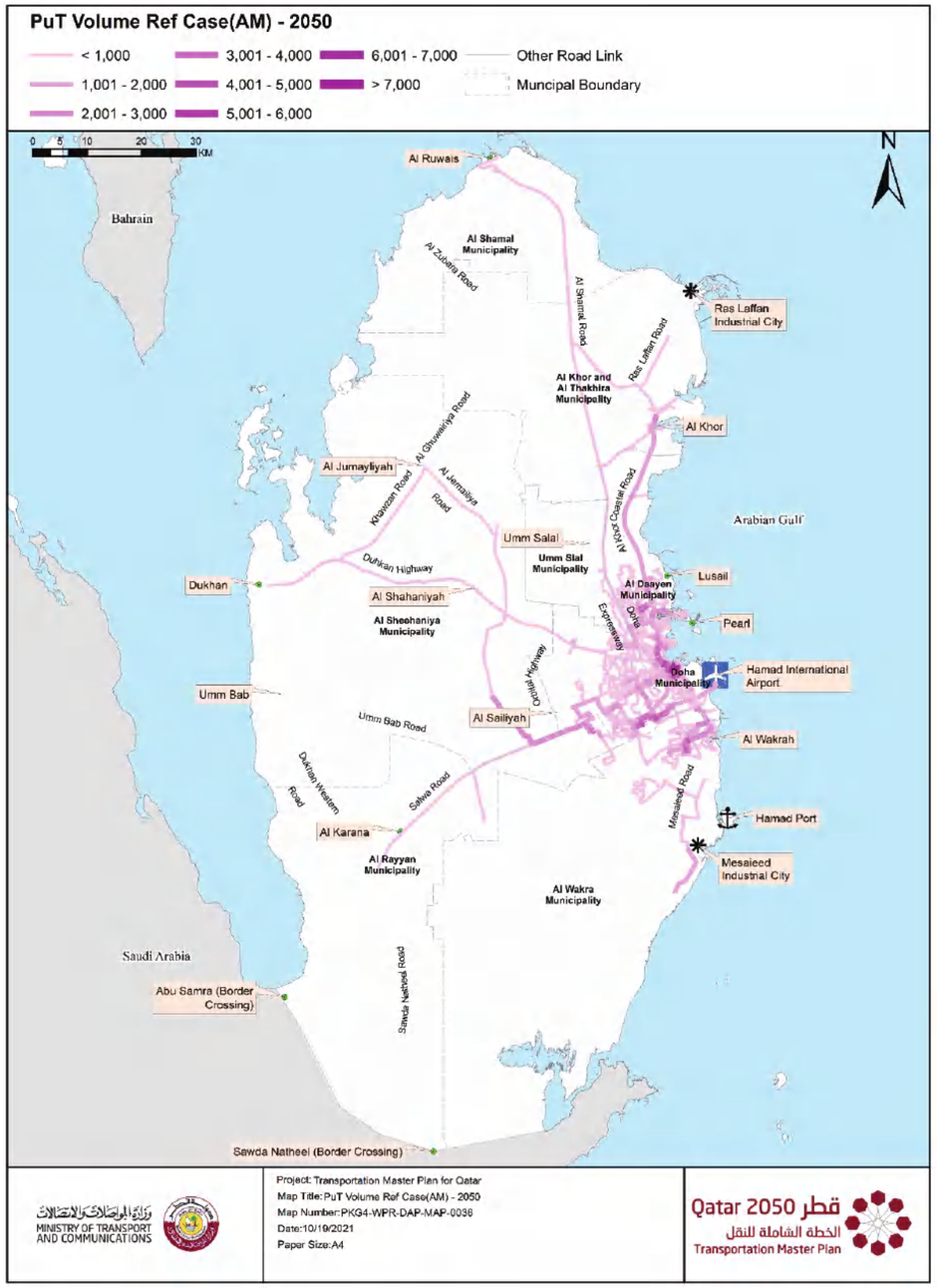
Travel Time Index for the AM Peak in the Reference Case, Doha (2050)

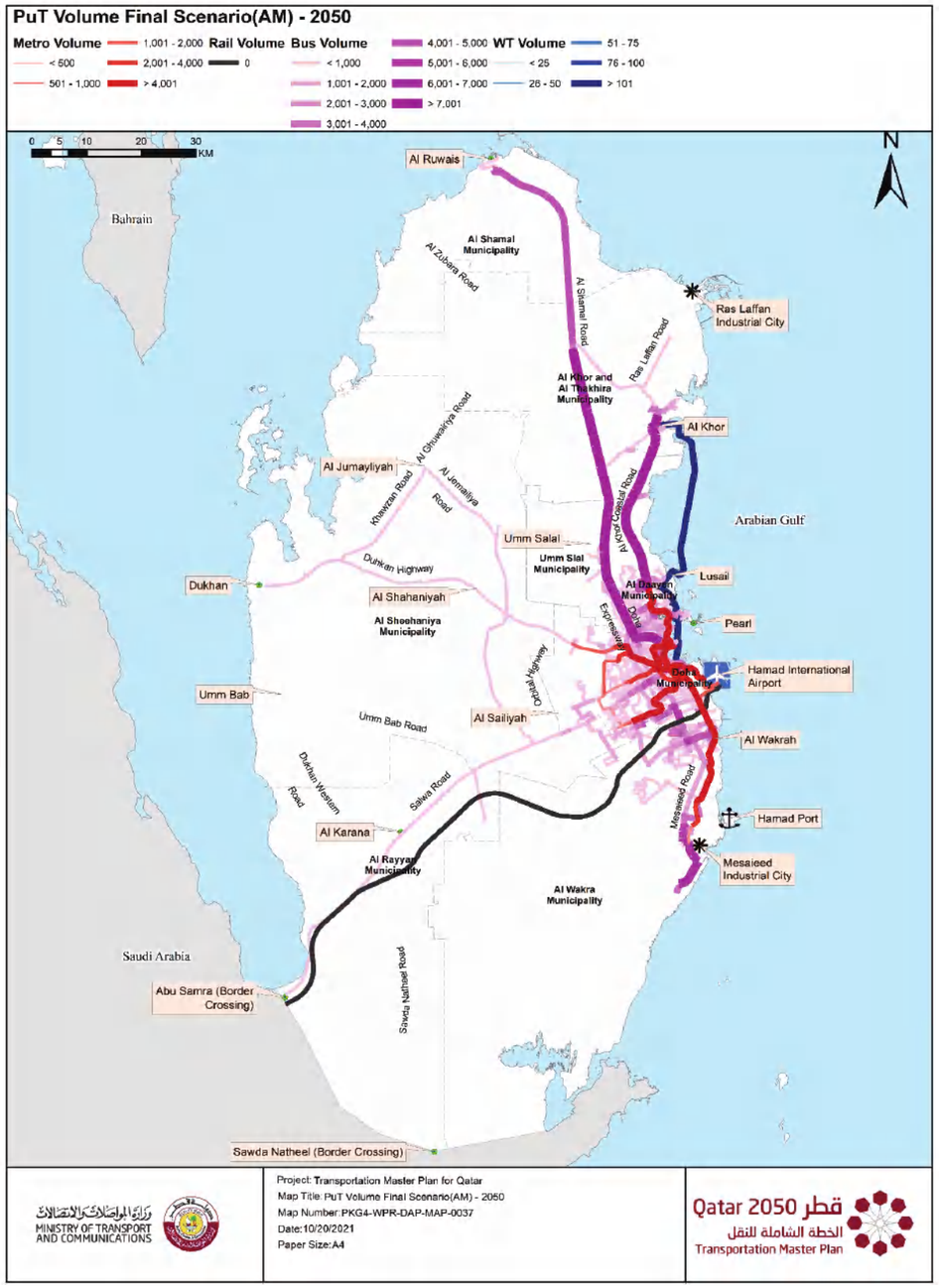


Travel Time Index for the AM Peak in the Updated TMPQ, Doha (2050)

Public Transport Ridership (Trips) for the AM Peak in the Reference Case, Qatar (2050)



Public Transport Ridership (Trips) for the AM Peak in the Updated TMPQ, Qatar (2050)



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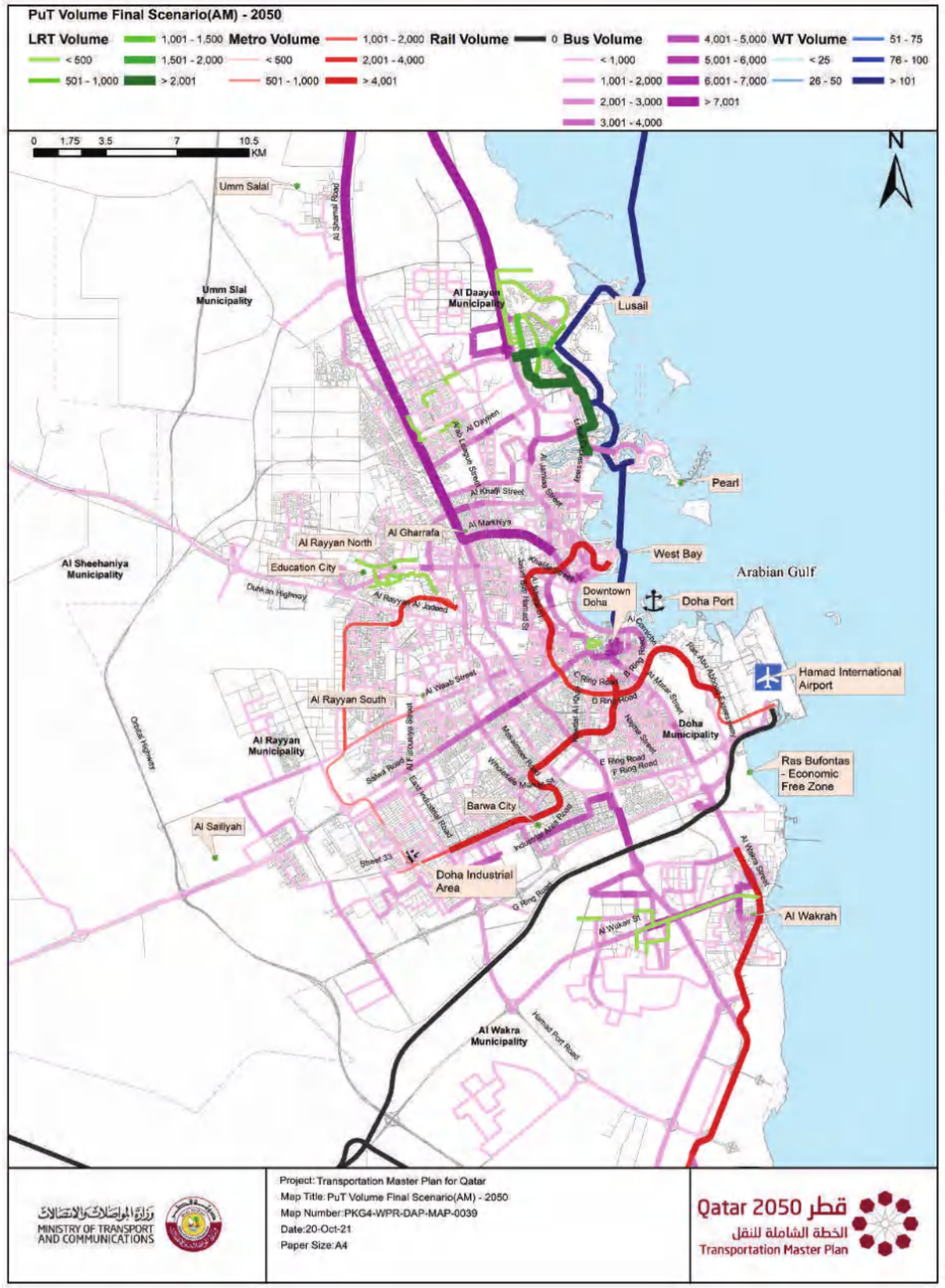
Public Transport Ridership (Trips) for the AM Peak in the Reference Case, Doha (2050)

Public Transport Ridership (Trips) for the AM Peak in the Updated TMPQ, Doha (2050)



4.2 ECONOMIC IMPACT

Cost-benefit analysis (CBA) is a process used to analyze decisions, whereby costs and benefits of an option are converted into the same monetary basis and added up to reflect the overall impact, highlighting the overall balance between costs and benefits. Such normalization of impacts measured in monetary units allows for better informed decision-making.

4.2.1 COST ESTIMATES

An estimation of capital costs for the schemes considered in the Updated TMPQ has been developed to provide supplementary information to scheme description and eventually to the overall TMPQ budget. These costs were developed using the unit rates in Technical Report 2 (TAF) for the different types of schemes, which were applied to the relevant units to provide an overall estimate of scheme costs. The unit rates include all elements (project management, contingency, design, implementation, etc.) so are designed to indicate a broad estimate to aid future budgeting and funding requirement needs from governments, rather than providing a definitive and final cost.

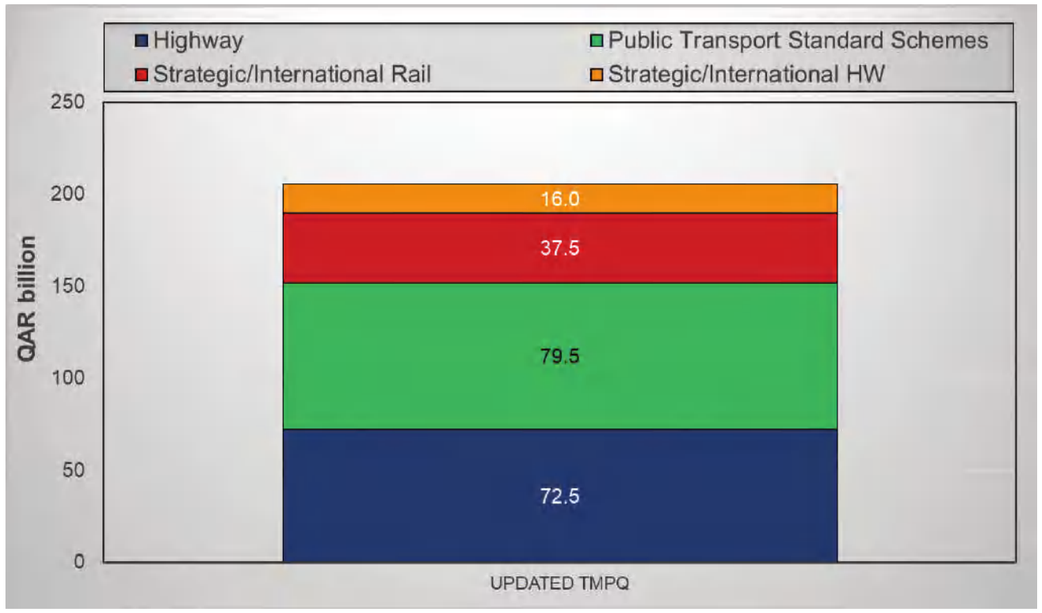
Cost estimates include capital expenditures and the annual operating and maintenance costs. The estimate of capital costs for the Updated TMPQ is summarized in the two figures below, split between the costs for highway and public transport schemes. The second figure shows the estimates of the annual operating and maintenance costs for highway and public transport schemes.

These figures also show the capital and operating costs for the strategic/international highway and railway connections, which represent a very significant proportion of the total costs. These costs, however, do not feature in the CBA, because:

- These projects are not directly attributed to the Updated TMPQ and are due for implementation irrespective of the plan; and
- The QSTM2.0 doesn't represent well international movements, especially because these have also not been taking place recently due to the impacts of the blockade and pandemic, hence benefits for these movements have not been estimated.

The total capital cost for the Updated TMPQ has been estimated at QAR 205.6 billion, of which QAR 152 billion relate to regular highway and public transport schemes (i.e. excluding the strategic/international ones). The total annual operating cost has been estimated at QAR 4.2 billion/year, of which QAR 2.7 billion/year are for regular highway and public transport schemes.

Estimates of Capital Costs for the Updated TMPQ

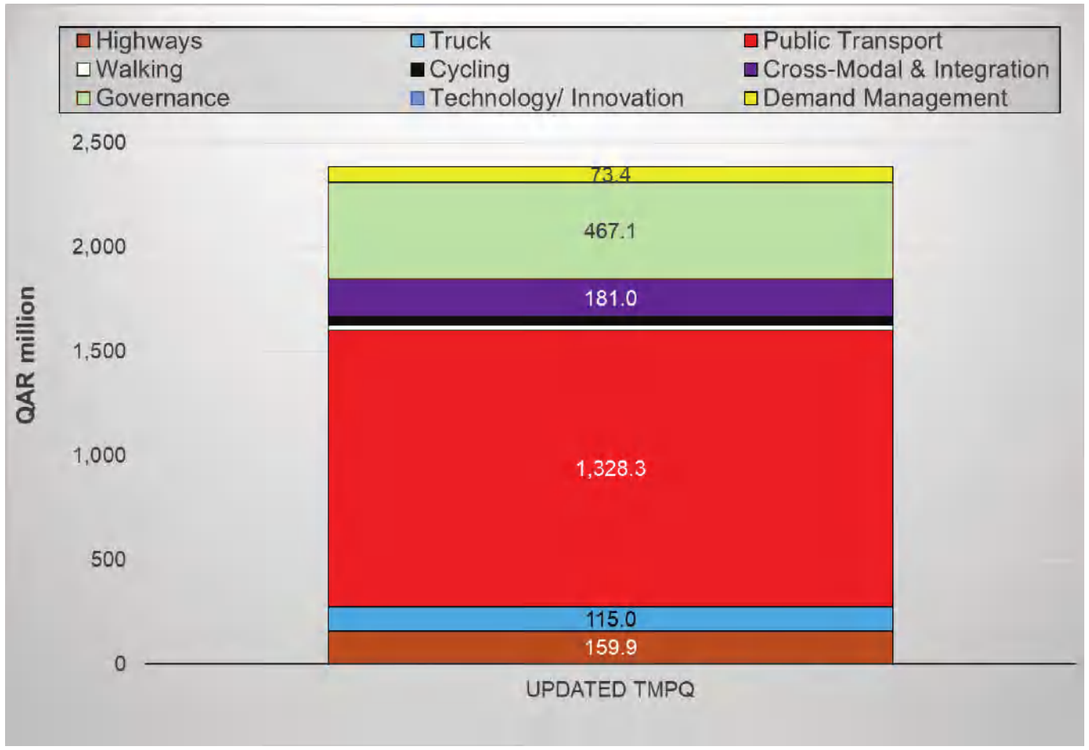


Estimates of Annual Operating and Maintenance Costs for the Updated TMPQ

SECTION 4

Cost estimates have also been made for a range of studies and strategies proposed in the Updated TMPQ, to be commissioned at a later stage, and these are summarized in Figure 41, by mode or type of project. These amount to QAR 2.4 billion, 56% of which relating to public transport projects.

Figure 41: Estimates of Costs for Studies and Strategies Recommended by the Updated TMPQ



4.2.2 BENEFIT & REVENUE ESTIMATES

An estimate of the benefits includes direct calculations of vehicle operating cost (VOC) savings, revenues, energy consumption and fuel consumption, together with a monetized valuation of the social impacts accrued to users and non-users of the transportation system, such as journey time savings, emissions and traffic accidents.

Economic Benefit Estimation for the Updated TMPQ

Benefit Component	Annual Benefits 2050 (QAR million)			NPV Benefits QAR million (1)
	Reference Case	Updated TMPQ	Change	
Vehicle Operating Costs	74,420	66,203	8,217	19,015
Value of Time - Public Transport Savings	-	-	22,125	95,735
Value of Time - Private Transport Savings	-	-	64,460	233,068
Climate Emissions (CO_2)	6,977	3,862	3,115	17,965
Local Emissions	405	181	224	1,447
Accidents	2,862	2,688	174	73
Total Benefit	**84,664 (2)**	**75,666 (2)**	**95,583**	**367,294**

Note: 1) Over the evaluation period
2) Exclude VOT estimates, which are calculated in TAF tool directly in terms of savings

As far as the financial impacts are concerned, the revenue estimation for the Updated TMPQ, which will accrue to the operators of transport services in Qatar, is summarized below both in terms of the annual revenues in the ultimate Horizon Year of 2050 and in terms of the overall Net Present Value over the evaluation period.

Revenue Estimation for the Updated TMPQ

Revenue Component	Annual Revenues 2050 (QAR million)			NPV Revenues QAR million (1)
	Reference Case	Updated TMPQ	Change	
Public Transport Fare Revenue	3,767	7,733	3,965	20,864
Toll and Congestion Charging Revenue	0	5,345	5,345	29,609
Car Park Revenue	0	1,119	1,119	5,961
Total Revenue	**3,767**	**14,197**	**10,429**	**56,435**

Note: 1) Over the evaluation period

4.2.3 KEY ECONOMIC AND FINANCIAL INDICATORS

Benefit-Cost Ratio (BCR) is a ratio used in a cost-benefit analysis to summarize the overall relationship between the relative costs and benefits of a proposed project. In general terms, if a project has a BCR greater than 1.0, the project is expected to deliver a positive net present value in the long run and to have an Internal Rate of Return (IRR) above the discount rate used in the calculations.

The IRR generates the percentage return that the project is expected to create, and indicates the breakeven cash flow level of a project. The IRR is in effect the discounted cash flow return that makes the NPV zero. In general terms, if the internal rate of return on a project or investment is greater than the minimum required rate of return, typically the cost of capital, then the project or investment can be pursued.

If the NPV of a project or investment is positive, that means that the discounted present value of all future benefits is greater than the discounted present value of all costs, and therefore attractive.

The key socio-economic indicators for the Updated TMPQ, which ensure social value for money, are summarized as:

Economic Indicator	Value
Internal Rate of Return (IRR)	22%
Present Value of Costs (PVC)	QAR 84.9 Billion
Present Value of Benefits (PVB)	QAR 367.3 Billion
Net Present Value (NPV)	QAR 282.3 Billion
Benefit- Cost Ratio (BCR)	4.3

The key financial indicators for the Updated TMPQ, which ensure value for money for the Government or operators, are summarized as:

Financial Indicator	Value
Internal Rate of Return (IRR)	3.3%
Present Value of Costs (PVC)	QAR 84.9 Billion
Present Value of Benefits (PVB)	QAR 56.4 Billion
Net Present Value (NPV)	QAR 28.5 Billion
Benefit- Cost Ratio (BCR)	0.7

The Updated TMPQ presents a very healthy economic BCR, signifying that, over time, the overall discounted economic benefits are several times higher than the discounted costs. This is also reflected in the high IRR at nearly 22%. The overall NPV for the Updated TMPQ is over 282 billion QAR

4.3 KEY TARGETS

The table below sets out the key KPIs which should be used to monitor the performance of the Updated TMPQ. For each horizon year period, the table shows the KPI estimated for the Reference Case and for the Updated TMPQ. The KPIs shown in the table below form the performance targets of the Updated TMPQ. These KPIs should be regularly monitored to ensure the Updated TMPQ is meeting its objectives. If the Updated TMPQ fails to meet its performance targets, then remedial measures should be considered.

Expected Performance and Targets

Updated TMPQ Objective	Selected Key KPIs	Disaggregation	Unit	2025		2030		2035		2050	
				Reference Case	Updated TMPQ	Reference Case	Updated TMPQ	Reference Case	Updated TMPQ	Reference Case	Updated TMPQ
1. Provide an Efficient & Integrated Transportation System	Total distance traveled by mode	Private Vehicle	Vehicle-km per year	38,929,607,832	41,464,862,419	42,490,814,205	43,300,536,952	45,575,226,690	45,205,302,297	51,888,004,264	46,375,392,481
		Fright	Vehicle-km per year	2,637,575,795	2,946,355,262	2,610,955,273	2,919,770,384	2,575,876,422	2,878,691,450	3,058,277,214	3,493,377,871
		Public Transport	Vehicle-km per year	107,089,535	119,448,694	107,089,535	129,382,911	107,089,535	143,264,399	107,089,535	144,201,781
		Contract Bus	Vehicle-km per year	437,359,181	280,562,146	456,882,400	319,293,453	472,954,092	364,167,086	516,975,516	421,673,555
		Overall	Vehicle-km per year	42,111,632,343	44,811,228,520	45,665,741,413	46,668,983,701	48,731,146,739	48,591,425,233	55,570,346,529	50,434,645,689
	Percentage of goods vehicle hours under congested conditions over the total hours traveled	N/A	%	45%	43%	48%	41%	51%	39%	58%	43%
2. Provide an Efficient & Integrated Transportation System	Population within a certain distance of a PT service	N/A	number of residents	1,063,879	1,077,667	1,126,586	1,163,860	1,184,425	1,261,129	1,277,422	1,376,520
3. Ensure a Safe & Secure Transportation System	Number of traffic accidents recorded per 100,000 population	Serious	Incident/population/year	35.5	36.4	31.4	32.2	29.6	30.6	28.6	26.9
		Fatal	Incident/population/year	3.8	4.0	3.3	3.4	3.1	3.2	3.0	2.8
		Minor	Incident/population/year	395	406	361	372	345	359	338	320
4. Protect the Environment & Ensure Sustainable Development	Estimation of the Annual Fuel Consumption	Petrol	Million liters/year	2,462	2,570	2,582	2,551	2,748	2,588	3,172	2,513
		Diesel	Million liters/year	1,965	1,470	1,971	405	1,969	399	2,048	485
5. Support Economic Development	Improve Access to International Markets	Average travel times for goods to the airport and ports	minutes/journey	56.2	61.6	57.8	60.7	60.2	58.5	68.0	59.3
	Improve the Travel Experience for Tourists	Average travel time between main tourist O-D pairs by taxi	Taxi minutes/journey	29.7	28.1	35.9	27.7	45.7	28.1	88.2	27.3
		Average travel time between main tourist O-D pairs by PT	PT minutes/journey	37.0	41.9	36.2	42.7	37.1	41.1	48.9	54.0

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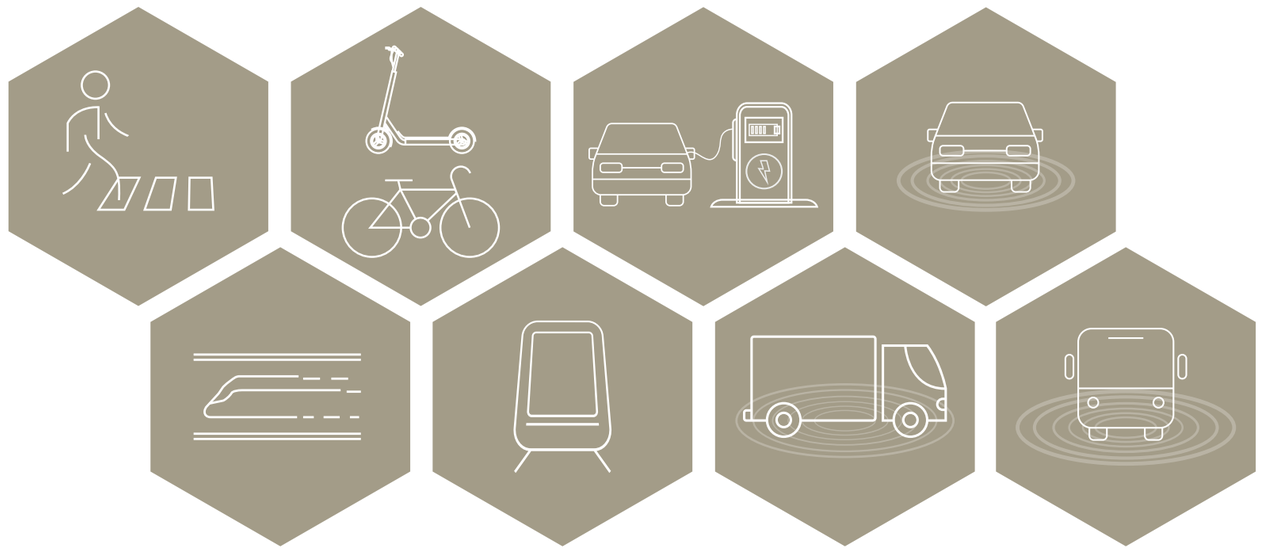
SECTION - 05

THE IMPLEMENTATION



5 THE IMPLEMENTATION

5.1 PRIORITIES FRAMEWORK

To ensure a successful and efficient development of the Updated TMPQ, all schemes need to be introduced in a staged, chronological and coherent manner. All transportation schemes which have been included in the Updated TMPQ for 2050 need to be phased according to the four Horizon Years (HYs) of the Updated TMPQ: 2025, 2030, 2035 and 2050.

The short-term horizon needs to consider the practicalities of the range of measures which can be achieved and implemented in such a short timescale, between 2021 and 2025. Schemes which require greater implementation time may need to start earlier given that the full benefit of the plan can only be realized by the completion of all of its components. This is especially important if infrastructure or services are to be contracted out to third party operators, because in this case MOT will need to take the technical and timescale requirements of such contractual arrangements into account too.

It is also essential to ensure deliverability in terms of human and financial resources, making sure the proposed implementation plan is feasible and deliverable.

The timetables for the implementation of each component of the Updated TMPQ (for each mode) must consider the following tasks, where relevant:

- Feasibility (or pre-feasibility) study;
- Tender for infrastructure/facility design;
- Infrastructure/facility design;

Tender for infrastructure/facility construction;

- Construction/implementation;
- Procurement for fleet;
- Receive fleet;
- Procurement for operations;
- Testing and commissioning; and
- Start of operations.

5.2 DELIVERY PHASING PLAN

The implementation phasing of the updated TMPQ 2020 schemes in Horizon Years 2025, 2030, 2035 and 2050 has been developed based on the analysis of the available and forecasted information and related analyses. The schemes implementation in the proposed phasing will depend upon funding availability, volume of projects and stakeholders commitments. It should also be noted that some of the major schemes could be implemented in stages rather than a complete scheme based on the available resources, raw material availability, procurement needs, operational priorities. Therefore, this implementation phasing plan provide the main framework and shall be updated regularly considering above elements as well as population growth and landuse development implementation progress.

The focus at the short term is to enhance the efficiency of the existing infrastructure through implementing travel demand management measures, to increase the use of non-car modes and fill existing gaps within the highway and public transport provision. In the longer term, when travel demand increases and existing infrastructure capacities have been maximized, then new infrastructure can be implemented. This will ensure better usage of existing resources in the first instance and provide a relief in the burden of public sector expenditure in the short to medium terms.

5.2.1 IMPLEMENTATION PROGRAM 2021-2025

Highway Infrastructure Schemes

Year	N. Schemes	Length (km)
2025	8	60.0

Public Transport Infrastructure Schemes

Mode	N. Schemes	Length (km)
Rail	0	0
Metro	0	0
Light Rail	0	0
Bus/BRT	5	93
Water Transport	1	39
Park-and-Ride	5	N/A
Total	**11**	**132**

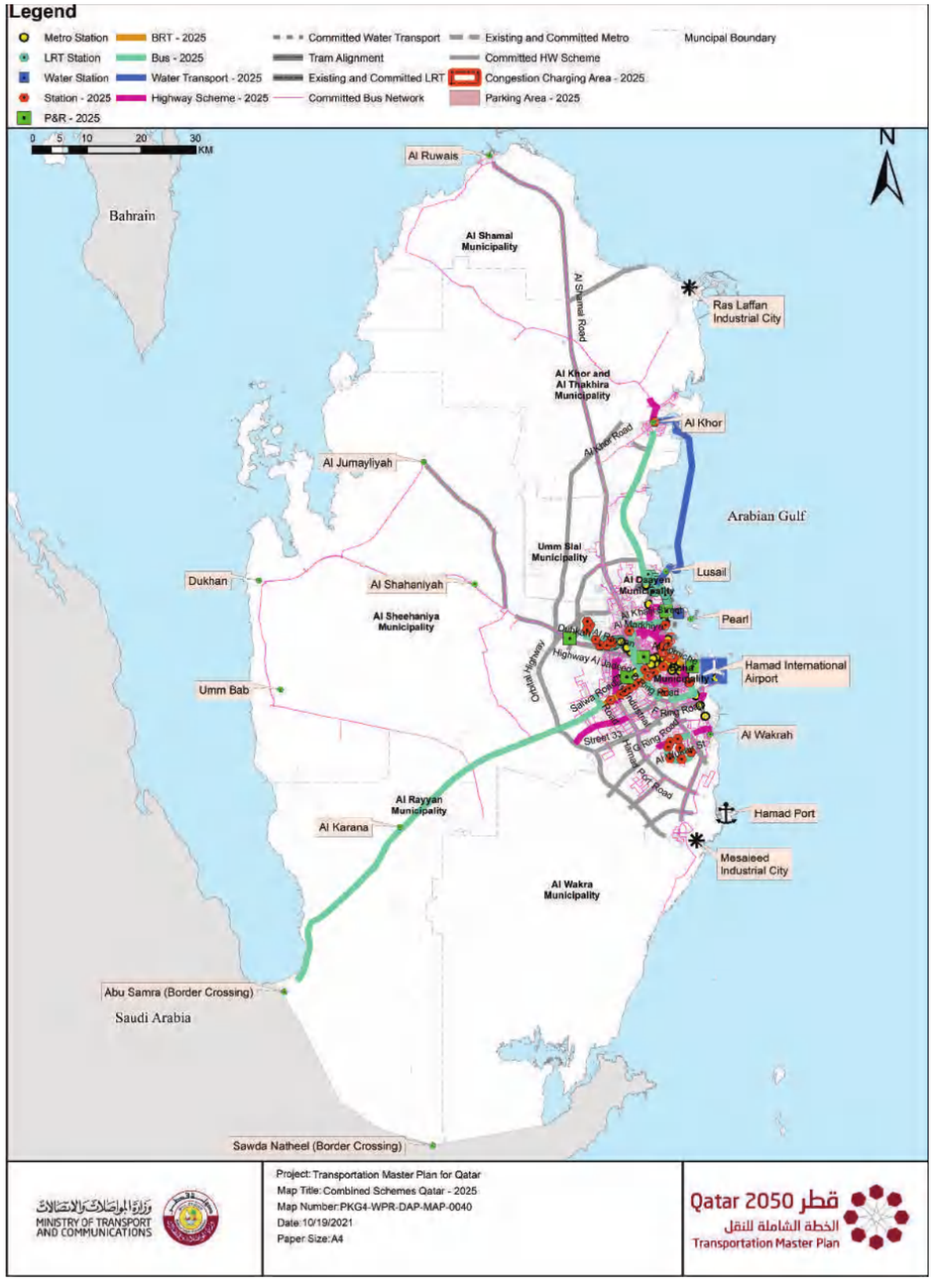
TDM Schemes

Pricing Scheme (1)	Location	Scheme Reference	Proposed fee
Parking Fees	Central Doha West Bay	(DM-09) (DM-10)	Low
Congestion Charging	Central Doha Phase 1 West Bay	(DM-02c) (DM-03)	Low

Notes: (1) All schemes are subject to regulation and exemptions for certain vehicle types or areas
(2) No parking charging schemes outside the DMA until after those in the DMA have been operating successfully.
(3) Phases 2 and 3 of the Congestion Charging scheme to coincide with the implementation of the Metro ME-05 and ME-06 along these areas.

Plans of combined Highway, TDM and public transport schemes for 2021-2025 are presented below, for Qatar and Doha.

Combined Schemes 2021-2025 Qatar



Combined Schemes 2021-2025 Doha

SECTION 5

5.2.2 IMPLEMENTATION PROGRAM 2026-2030

Highway Infrastructure Schemes

Year	N. Schemes	Length (km)
2030	9	112.9

Public Transport Infrastructure Schemes

Mode	N. Schemes	Length (km)
Rail	3	236.1
Metro	1	10.2
Light Rail	0	0.0
Bus	2	39.2
Water Transport	2	31.3
Park-and-Ride	1	N/A
Total	**9**	**316.8**

TDM Schemes

Pricing Scheme [1]	Location	Scheme Reference	Proposed fee
Parking Fees (Increased charge)	Central Doha West Bay Other locations	(DM-09) (DM-10) (DM-11 to DM-16)	Medium Medium Low
Congestion Charging	Central Doha Phase 1/West Bay Central Doha Phase 2/ Central Doha Phase 3 [3]	(DM-02c, DM-03) (DM-02b, DM-02a)	Low Low
Toll fees	Universal	(DM-06, DM-08, DM18)	Low
Fuel tax [2]	Universal	-	Low

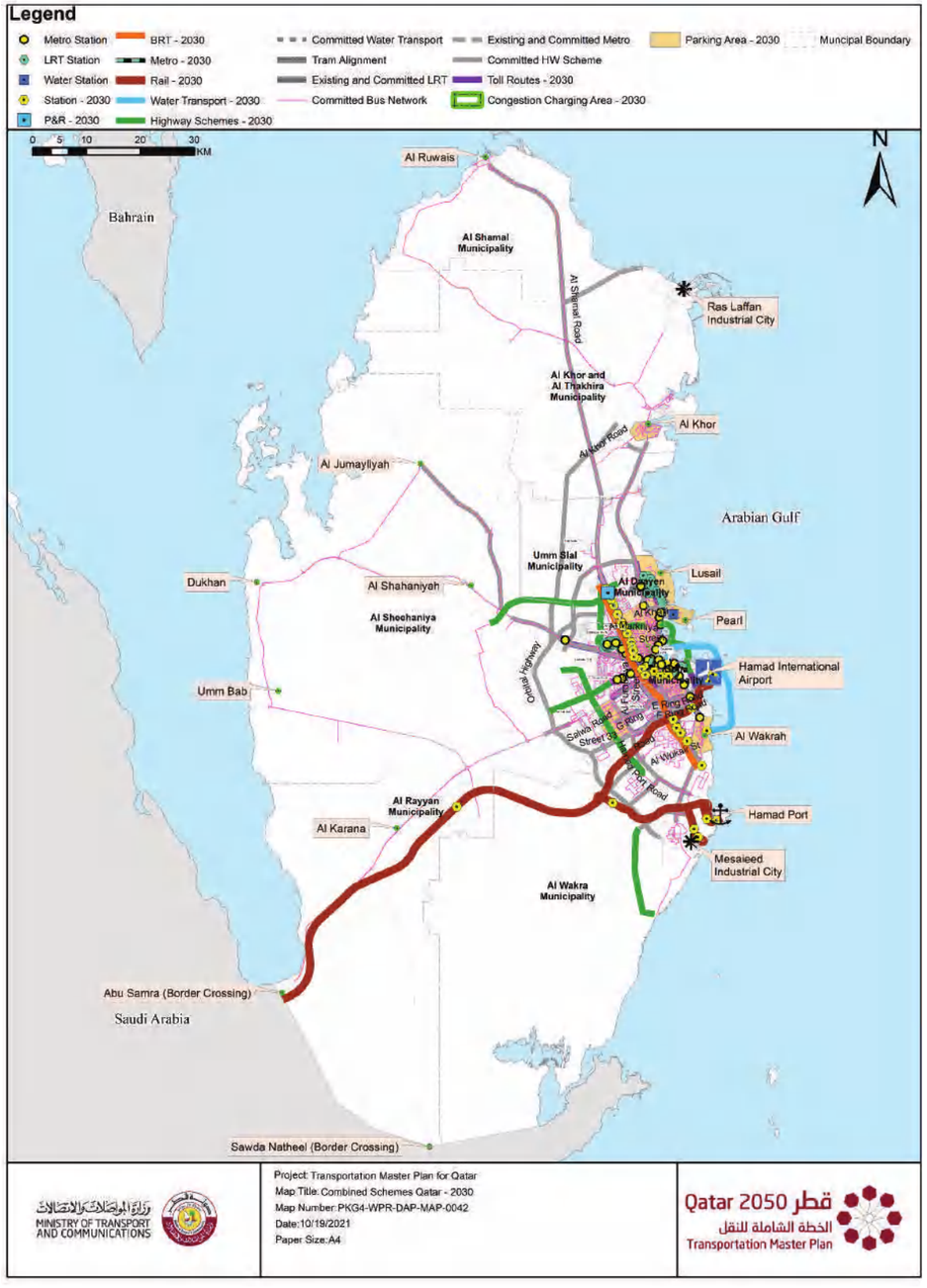
Notes: (1) All schemes are subject to regulation and exemptions for certain vehicle types or areas

(2) Fuel tax, as a component of the total fuel cost. It represents an increase in relation to the values included in the model for the Base Year.

(3) Phases 2 and 3 of the Congestion Charging scheme to coincide with the implementation of the Metro ME-05 and ME-06 along these areas.

Plans of combined Highway, TDM and public transport schemes for 2026-2030 are presented below, for Qatar and Doha.

Combined Schemes 2026-2030 Qatar



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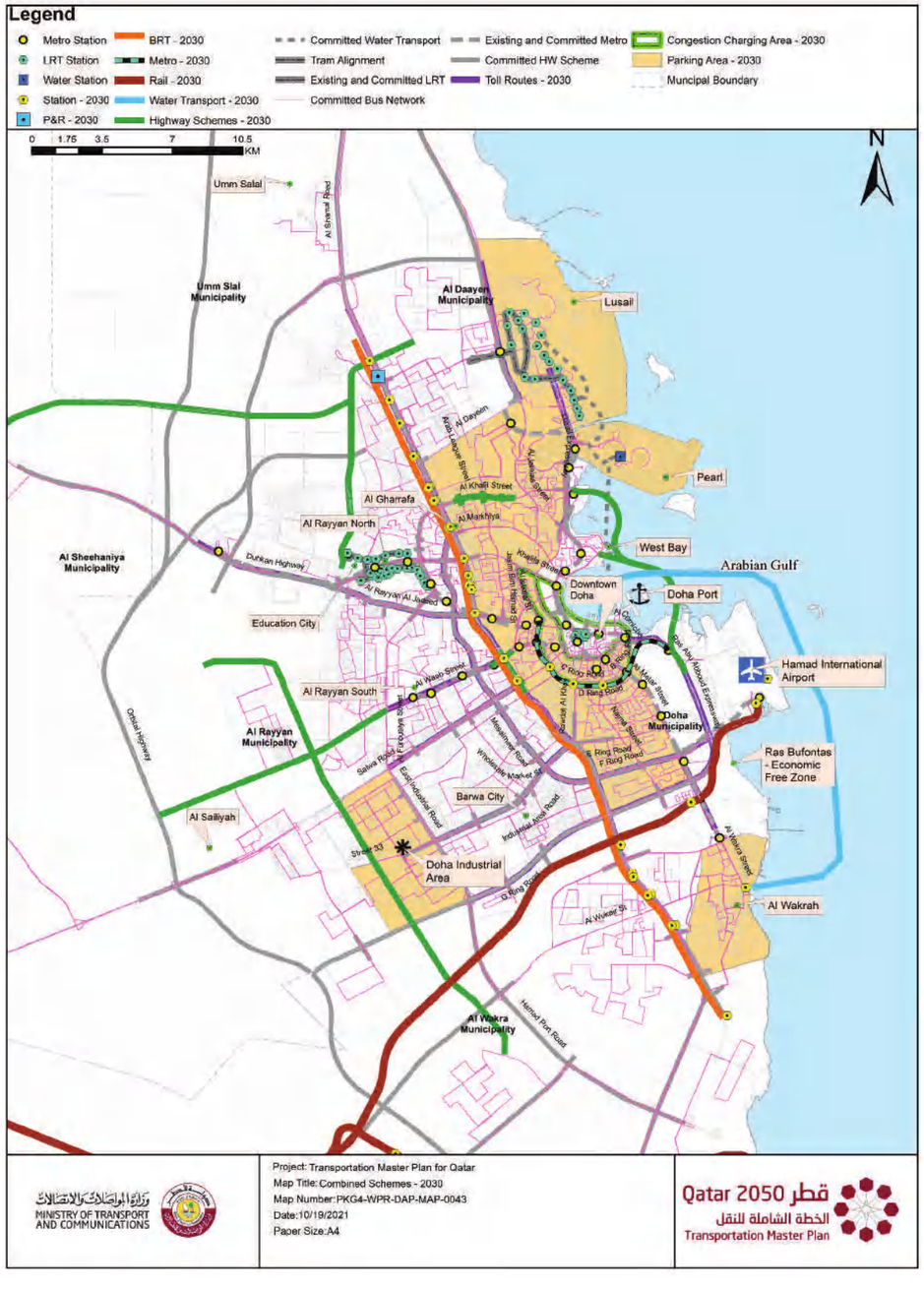
Combined Schemes 2026-2030 Doha



5.2.3 IMPLEMENTATION PROGRAM 2031-2035

Highway Infrastructure Schemes

Year	N. Schemes	Length (km)
2035	16	360.4

Public Transport Infrastructure Schemes

Mode	N. Schemes	Length (km)
Rail	0	0.0
Metro	5	73.3
Light Rail	1	4.0
Bus	0	0.0
Water Transport	0	0.0
Park-and-Ride	1	N/A
Total	**7**	**77.3**

TDM Schemes

Pricing Scheme (1)	Location	Scheme Reference	Proposed fee
Parking Fees (Increased charge)	Central Doha	(DM-09)	High
	West Bay	(DM-10)	High
	Other locations	(DM-11 to DM-16)	Low
Congestion Charging	Central Doha Phase 1/West Bay	(DM-02c, DM-03)	Medium
	Central Doha Phase 2/ Central Doha Phase 3 (3)	(DM-02b, DM-02a)	Medium
Toll fees	Universal	(DM-06, DM-08, DM18)	Medium
Fuel tax (2)	Universal	-	Medium

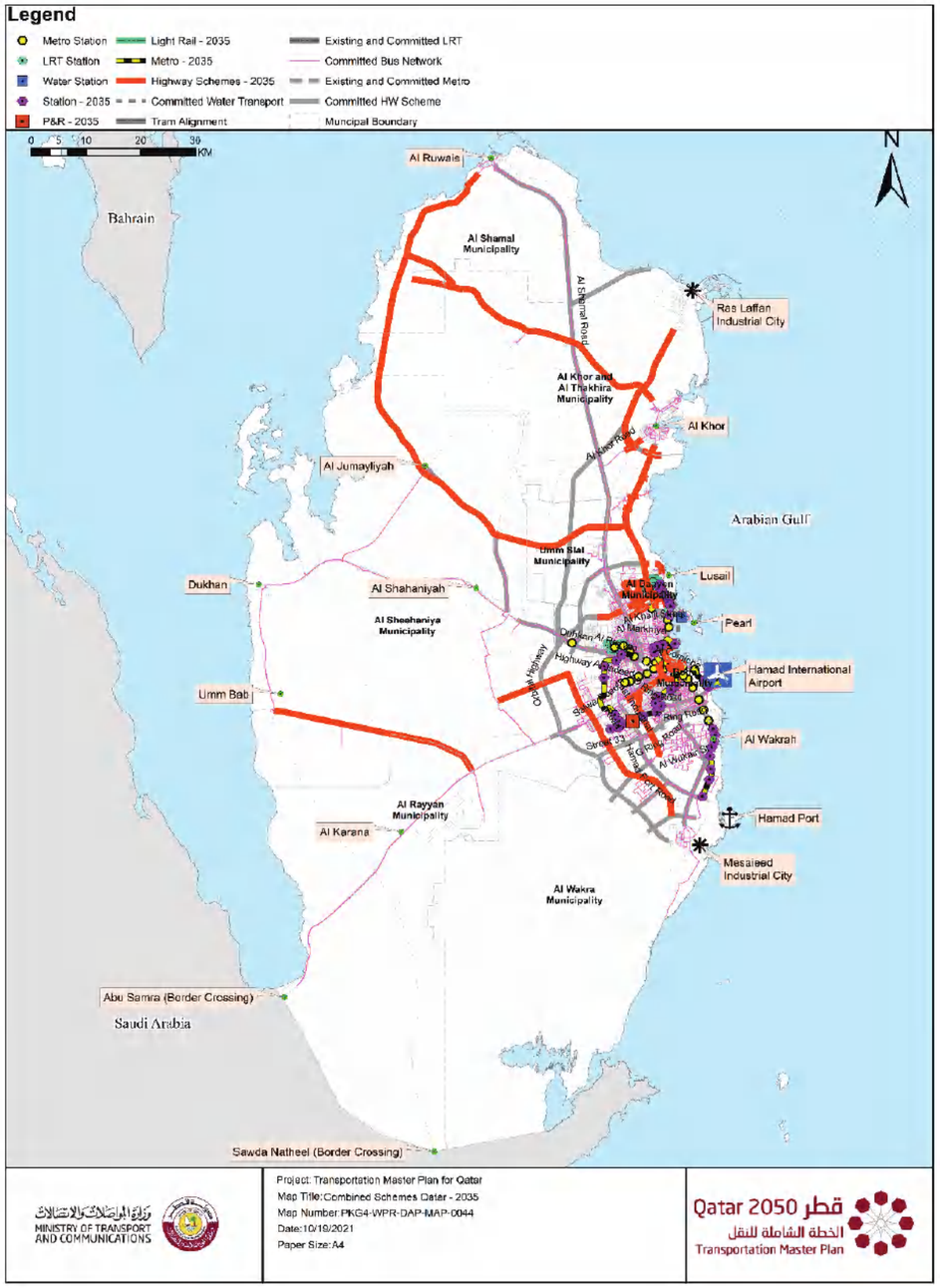
Notes: (1) All schemes are subject to regulation and exemptions for certain vehicle types or areas

(2) Fuel tax, as a component of the total fuel cost. It represents an increase in relation to the values included in the model for the Base Year.

(3) Phases 2 and 3 of the Congestion Charging scheme to coincide with the implementation of the Metro ME-05 and ME-06 along these areas.

Plans of combined Highway, TDM and public transport schemes for 2031-2035 are presented below, for Qatar and Doha.

Combined Schemes 2031-2035 Qatar



Combined Schemes 2031-2035 Doha

5.2.4 IMPLEMENTATION PROGRAM 2036-2050

Highway Infrastructure Schemes

Year	N. Schemes	Length (km)
2050	4	237.0

Public Transport Infrastructure Schemes

Mode	N. Schemes	Length (km)
Rail	0	0.0
Metro	2	16.7
Light Rail	0	0.0
Bus	0	0.0
Water Transport	0	0.0
Park-and-Ride	1	N/A
Total	**3**	**16.7**

TDM Schemes

Pricing Scheme [1]	Location	Scheme Reference	Proposed fee
Parking Fees (Increased charge)	Central Doha	(DM-09)	High
	West Bay	(DM-10)	High
	Other locations	(DM-11 to DM-16)	Medium
Congestion Charging	Central Doha Phase 1/West Bay	(DM-02c, DM-03)	High
	Central Doha Phase 2/ Central Doha Phase 3 [3]	(DM-02b, DM-02a)	High
Toll fees	Universal	(DM-06, DM-08, DM18)	High
Fuel tax [2]	Universal	-	High

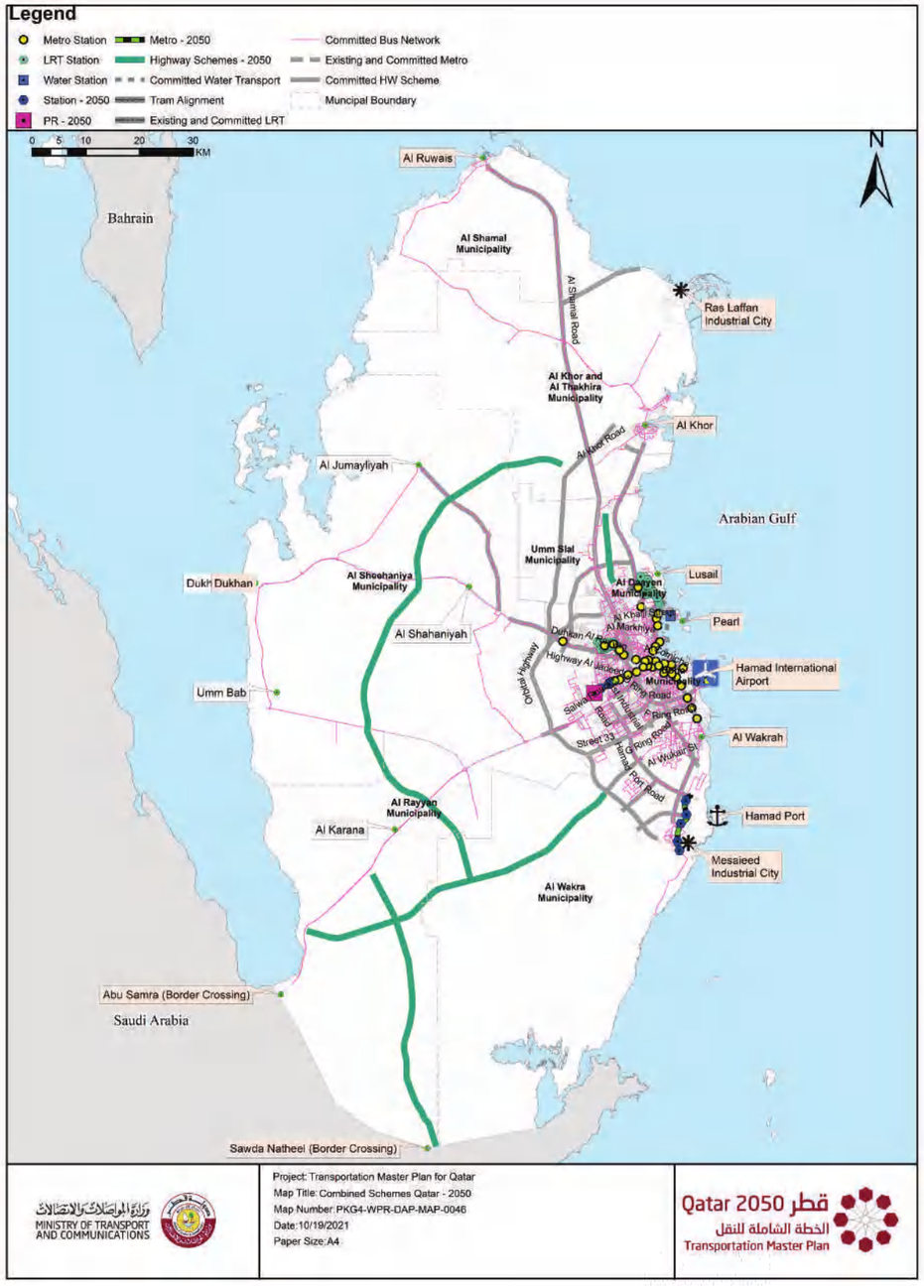
Notes: (1) All schemes are subject to regulation and exemptions for certain vehicle types or areas

(2) Fuel tax, as a component of the total fuel cost. It represents an increase in relation to the values included in the model for the Base Year.

(3) Phases 2 and 3 of the Congestion Charging scheme to coincide with the implementation of the Metro ME-05 and ME-06 along these areas.

Plans of combined Highway, TDM and public transport schemes for 2036-2050 are presented below, for Qatar and Doha.

Combined Schemes 2036-2050 Qatar



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Combined Schemes 2036-2050 Doha

5.2.5 STUDIES AND DESIGN PROJECTS PROGRAM

This section describes issues relevant to the program of studies and design projects required to implement the Updated TMPQ.

All assessments included in the Updated TMPQ were made for the complete set of projects, and not individually. Most projects proposed in the Updated TMPQ will require feasibility, pre-feasibility or design studies to be undertaken, so that the details and specifications for these schemes can be examined further and in isolation from all other projects. In other words, the impact of each project needs to be assessed on its own merits for feasibility to be determined. These studies should address issues such as safety, pricing, regulation, licensing, monitoring, environmental impacts and logistics.

Table below summarizes the studies and design projects to be implemented within the Updated TMPQ, by implementation phase.

Summary of Studies and Design Projects

Period	Studies Projects				Design Projects			
	N.	%	QAR million	%	N.	%	QAR million	%
2021 - 2025	21	57%	840	68%	18	32%	47	11%
2026 - 2030	16	43%	392	32%	14	25%	110	25%
2031 - 2035	0	0%	-	0%	19	34%	133	30%
2036 - 2050	0	0%	-	0%	5	9%	159	35%
Total	**37**	**100%**	**1232**	**100%**	**56**	**100%**	**449**	**100%**

Slightly more studies and schemes will be conducted in the period 2021-25 compared to 2026-30, however, the costs estimates involved in the first period are far greater than in the next period. The number of design projects is more evenly distributed across the HYs, while the corresponding implementation costs increase gradually over the horizon period, with more expensive schemes pushed further in the future.

5.3 IMPLEMENTATION CHALLENGES AND KEY ENABLERS

5.3.1 CHALLENGES

The key challenges that the implementation of the Upgraded TMPQ projects will face are:

1. Agreement of MOT and its jurisdiction of transport assets ownership and responsibilities with other key stakeholders, such as, MME, Ashghal, MOI, Qatar Rail and MOF.
2. Implementation of Transportation Assessment Framework with complete involvement of Ashghal, MME, Qatar Rail, Mowasalat, MOI, MOF, Mwani and HIA.
3. Funding mechanism for the various transportation projects, especially the distribution of revenues

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from revenue generating projects. to identify the gray areas and assign owners and responsibilities.

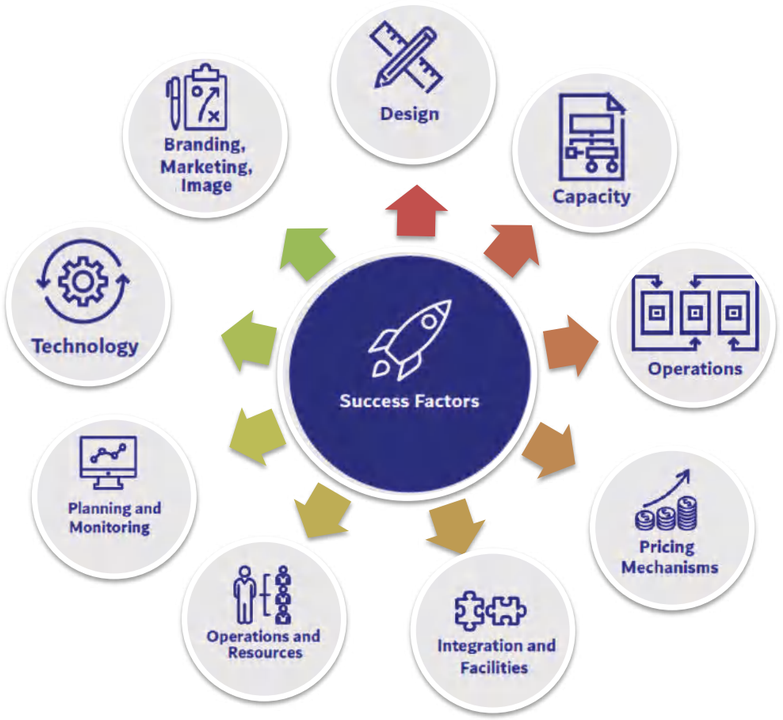
4. Adequate and capable resources to the projects to avoid delays.
5. Shifting transportation emphasis from more highways to public transport.
6. Implementing agencies coordination of the projects to achieve the Updated TMPQ vision and objectives.
7. Closing gaps in information sharing on complete project life cycle.
8. Political mishaps in the region could lead to increase in project costs.
9. Moving from traditional tour-based traffic model to an activity-based model.
10. Providing effective public transport modes coverage to all major employment, residential and education institutions.
11. Continuous monitoring of the transport system based on the recommended KPIs.

5.3.2 KEY ENABLERS

A range of success factors and enablers will contribute to the successful implementation of the plan in Qatar. The key enablers to mitigate the above challenges are:

1. Identify quick wins especially on the projects related to studies and policies, as these will develop a robust system where information will flow smoothly among various key transport organizations.
2. At the early stage define clearly the ownership, roles and responsibilities of the key stakeholders in the transport sector to avoid any grey areas.
3. The early implementation of the Transportation Assessment Framework process will bring transparency to project selections and give the tool to MOT to prioritize projects that will be more beneficial to the entire nation.
4. Appropriate pricing mechanisms to reduce the appeal of private travel to increase public transport ride share.

Success Factors and Enablers for the Implementation of the Updated TMPQ



5.4 GOVERNANCE AND PERFORMANCE MONITORING

5.4.1 GOVERNANCE

Effective governance needs to ensure that the institutional, legislative, regulatory, and policy frameworks in which transportation schemes are designed, implemented and managed, not only support program implementation, but also respond to the forthcoming changes shaping the transportation sector, such as the emergence of automated vehicles, big data in transport and the digital transformation of society and the economy in general.

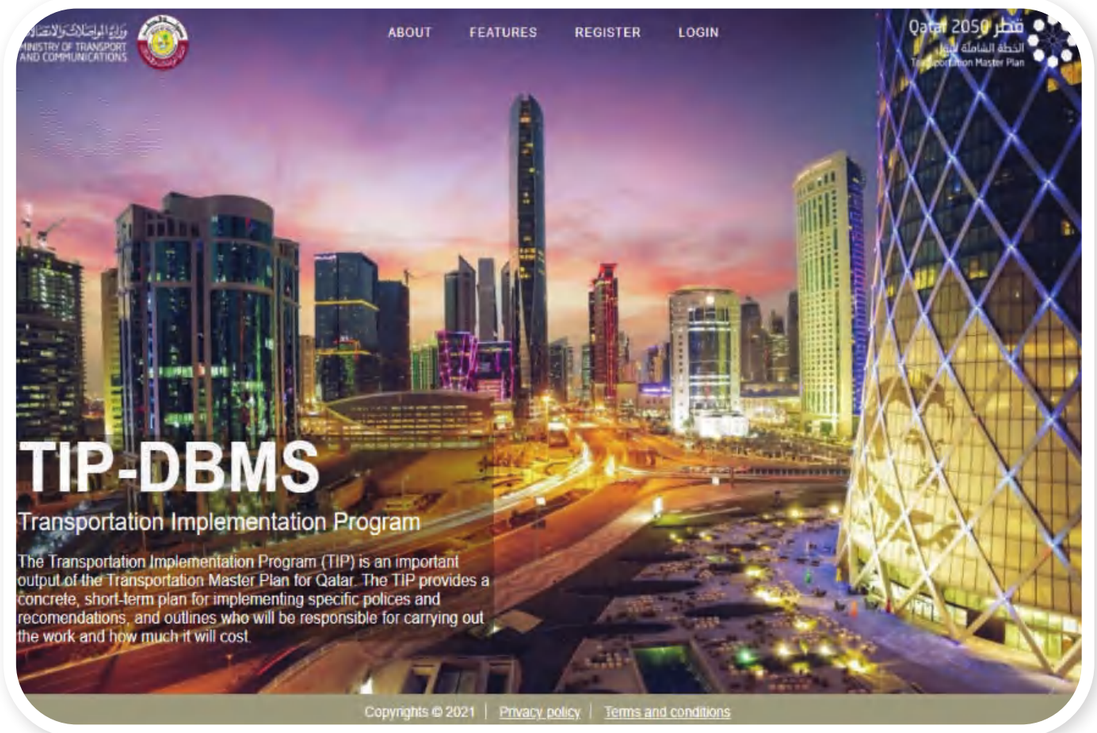
Governance shapes decision-making and policies affecting everything from local cycling paths to international rail connections. It provides a framework for legislation and regulation as well as decisions about issues such as the environment, accessibility, and technical solutions. Governance is often impacted by organisational and financial challenges. Importantly, it must aim to ensure the appropriate balance of responsibilities among all stakeholders, at all levels of authority.

Good governance reconciles objectives and needs with responsibilities and resources, often in the face of competing or conflicting priorities. Good governance should also ensure that public consultation is considered in decision-making. Governance for delivery of transport projects in the short-term (2021-2025) is focused on achieving immediate outcomes for the priority projects. In the short-term, there is a greater sense of urgency, with less time for planning and preparations, while focus is on the more imminent arrangements.

Governance for delivery of transport projects in the longer-term is focused on planning for achieving the best solutions that will meet future requirements. It demands a much more strategic thinking, with careful considerations on all aspects of the planning process, from conception, design, forecasting, procurement to implementation and monitoring.

Opportunities should be taken to learn from the TAF project appraisal process, and fine tune the approach working closely with MOF, to upgrade the appraisal and reporting inputs to budget submissions and optimise the decision-making processes.

5.4.2 IMPLEMENTATION MONITORING



Monitoring and evaluating the plan can also help assess whether the investment has delivered value for money and to ensure lessons are learnt from past experience which can facilitate the implementation of future projects.

The Transportation Implementation Program (TIP) Database Management System (DBMS) is a central GIS database system with synchronized, up-to-date and consistent information stored in and accessed from a central location. It offers important advantages on managing the implementation and monitoring of projects:

- Providing a comprehensive overview of the implementation program;
- Showing the status of each project within the general program;
- Facilitation project coordination and implementation; and
- Providing user interfaces for adding new projects to the program, modifying and following up on progress.

5.4.3 PERFORMANCE MONITORING

A number of KPIs will be used to evaluate the performance of the Updated TMPQ. In theory, the estimation of all KPIs in the future should be made from measurements from the actual trips and networks, reflecting real conditions. However, most of these measures are not practical, as they have been conceived on the basis of model outcomes (e.g. some estimates are based on O-D movements, others are based on link flows, etc.).

An Annual Transportation System Status Report will be used to evaluate transport performance against key Updated TMPQ objectives. The measurable KPIs included in this report are summarized below.

Measurable Key Performance Indicators for Annual Transportation System Status Report

Updated TMPQ General Objective	KPI	Type	Unit	Data Source
1. Provide an Efficient & Integrated Transportation System	Total distance traveled by mode	Light vehicles	Million vehicle-km/year	Annual vehicle mileage information from vehicle registration database
		Heavy vehicles	Million vehicle-km/year	
		Public Transport	Million vehicle-km/year	PT operator
			Million pass-km/year	PT ticketing data with location of boarding and alighting for each trip
	Percentage of goods vehicle hours under congested conditions over the total hours traveled	Good Vehicles	%	AVL data for Goods Vehicles or Travel Time Database at key routes and obtain data from Google / GPS
	Average time spent in transfers	Public Transport	Minutes	Measurement of the time to transfer between modes, which can be obtained from an integrated ticketing database system.
2. Promote Transportation Mobility & Accessibility	Number of passengers on Public Transport	Rail	Million pass/year	Fare collection system Automatic Passenger Counting Equipment
		Metro	Million pass/year	
		Light Rail	Million pass/year	
		Bus/BRT	Million pass/year	
		Water Transport	Million pass/year	
	Population within a certain distance of a PT service	Bus (200m)	number of residents	GIS analysis using population distribution information from census data
		BRT/Metro/Rail (400m)	number of residents	
		Water Transport (800m)	number of residents	
	Length of road network	Expressway/ Freeway	Km	GIS Geodatabase for Road Asset Management
		Arterial	Km	
		Collector/Local	Km	
	Length of PT network	Rail	Km	GIS Geodatabase for PT Asset Management
		Metro	Km	
		Light Rail	Km	
		Bus/BRT	Km	
		Water Transport	Km	
	Service provision	Rail	Million Vehicle-km/year	Service planning
		Metro	Million Vehicle-km/year	
		Light Rail	Million Vehicle-km/year	
		Bus	Million Vehicle-km/year	
		Water Transport	Million Vehicle-km/year	
2. Promote Transportation Mobility & Accessibility	Fleet [1]	Rail	Number	Operator
		Metro	Number	
		Light Rail	Number	
		Bus	Number	
		Water Transport	Number	
	Facilities	Cycle rack	Number	GIS database
		Cycle lane	Km	
		Park-and-Ride total	Number of sites	
		Park-and-Ride Legtaifiya Station	Peak hour demand (spaces)	P&R Operator
		Park-and-Ride Al Riffa Station	Peak hour demand (spaces)	
		Park-and-Ride Al Messila Station	Peak hour demand (spaces)	
		Park-and-Ride Sports City Station	Peak hour demand (spaces)	
		Park-and-Ride Ras Bu Abboud Station	Peak hour demand (spaces)	
	Facilities	Park-and-Ride for ME-01	Peak hour demand (spaces)	P&R Operator
		Park-and-Ride for ME-02	Peak hour demand (spaces)	
		Park-and-Ride for BU-02	Peak hour demand (spaces)	
3. Ensure a Safe & Secure Transportation System	Number of traffic accidents recorded per 100,000 population	Fatal	Incident/population/year	Traffic Accident Database from the Ministry of Interior (MOI) and Emergency Services
		Serious	Incident/population/year	
		Minor	Incident/population/year	
4. Protect the Environment & Ensure Sustainable Development	The annual fuel consumption	Petrol	Million liters/year	Fuel sales data by type from Woqod
		Diesel	Million liters/year	
	Electric fleet	Cars	% target new cars in fleet [2]	Vehicle registration database from Ministry of Interior (MOI)
		Public Buses	% of fleet [3]	
	Facilities	Public Charging Stations	Number [4]	GIS Geodatabase for Road Asset Management
	Pollutant emissions	CO	Tones/year	Emissions estimates on the basis of actual vehicle flows, speeds and emission rates
		HC	Tones/year	
		NO_x	Tones/year	
		PM	Tones/year	
		CO_2	Tones/year	

Measurable Key Performance Indicators for Annual Transportation System Status Report

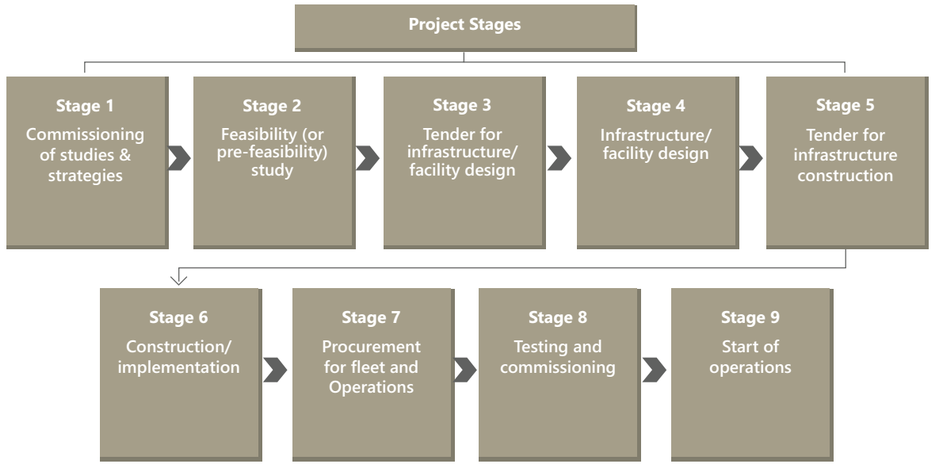
Updated TMPQ General Objective	KPI	Type	Unit	Data Source
5. Support Economic Development	Improve access to international markets	Average travel times for goods vehicles to the airport and ports	minutes/journey	AVL Data for Good Vehicles or Travel Time Database at key routes and obtain data from Google / GPS
	Improve the travel experience for tourists	Average travel times between main tourist O-D pairs (tourist attractions, hotel areas, HIA, Doha and Hamad Ports)	Taxi minutes/journey	Taxi AVL Data or Travel Time Database at key routes and obtain data from Google / GPS
			PT minutes/journey	Operator
	Transport revenues	Taxi Fare	Million QAR/year	Operator
		PT Fare	Million QAR/year	
		Congestion Charges & Road Tolls	Million QAR/year	
		Car Park Revenues	Million QAR/year	

5.5 FINANCING

5.5.1 BUDGET OVERVIEW

The short-term implementation horizon needs to consider the practicalities of the range of measures which can be achieved and implemented in such a short timescale, between 2021 and 2025.

The timetables for the implementation of each scheme (project) of the Updated TMPQ (for each mode) must consider the following stages in a project cycle, where relevant:



[1] Alternative financing policy, RTA's Commercial & Investment Department, April – 2017

The long-term financial requirements need to take account of the main financial components of the Updated TMPQ, comprising capital costs, operating costs, and revenues.

5.5.1.1 ESTIMATED CAPITAL COSTS

The total cost estimated for the implementation of the Updated TMPQ consists of the capital investment costs of infrastructure and vehicle fleet as well as the annual operational costs to run the shared mobility services and maintain the facilities. A summary of the capital cost estimates for the Updated TMPQ is given below by mode and implementation phase.

Summary of Capital Cost Estimate per Mode and Phase

Mode/Type		Measure	2025	2030	2035	2050	Total
Highway	Infrastructure	Costs (QAR million)	15,405	27,721	25,995	19,353	**88,473**
		N. Schemes	8	9	16	4	**37**
	Others	Costs (QAR million)	115	45	0	0	**160**
		N. Schemes	18	3	0	0	**21**
Public Transport	Infrastructure	Costs (QAR million)	1,881	45,521	58,842	10,791	**117,035**
		N. Schemes	11	9	7	3	**30**
	Others	Costs (QAR million)	1,311	19	0	0	**1,330**
		N. Schemes	15	6	0	0	**21**
Other Schemes	Infrastructure	Costs (QAR million)	25	20	44	0	**90**
		N. Schemes	11	12	9	0	**32**
	Others	Costs (QAR million)	780	182	0	0	**961**
		N. Schemes	87	57	0	0	**144**
Total Infrastructure		**Costs (QAR million)**	17,311	73,262	84,881	30,144	**205,598**
		N. Schemes	30	30	32	7	**99**
Grand Total		**Costs (QAR million)**	**19,517**	**73,508**	**84,881**	**30,144**	**208,050**
		N. Schemes	**150**	**96**	**32**	**7**	**285**

The vast majority of the costs for implementing the Updated TMPQ will be for large infrastructure projects, especially railway projects. The most extensive period for construction and expenditure will be from 2026 to 2035, when technical and financial resources will need to be in place to ensure the successful delivery of the plan.

5.5.1.2 ESTIMATED OPERATING COSTS

A summary of the annual operating cost estimates for the infrastructure projects in the Updated TMPQ is given below by mode and implementation phase. The costs for the schemes implemented at each HY are shown and then cumulated in separate columns to capture the overall operating costs including all schemes implemented in previous phases.

Summary of Annual Operating Cost Estimate for Infrastructure Projects per Mode and Phase

Mode	Measure	2025	2030	2025-30	2035	2025-35	2050	2025-50
Highway	Costs (QAR million per annum)	385	693	1,078	650	1,728	484	2,212
	N. Schemes	8	9	17	16	33	4	37
Public Transport	Costs (QAR million per annum)	18	1,215	1,232	495	1,727	130	1,857
	N. Schemes	11	9	20	7	27	3	30
Total	**Costs (QAR million per annum)**	**403**	**1,908**	**2,311**	**1,145**	**3,455**	**614**	**4,069**
	N. Schemes	**19**	**18**	**37**	**23**	**60**	**7**	**67**

The cumulative total annual operating costs of infrastructure schemes will increase across all HYs, as more projects are progressively implemented in the future. By 2050, the total annual operating costs of all infrastructure projects included in the Updated TMPQ will be around QAR 4 billion per year.

5.5.1.3 EXPECTED REVENUES

The operation of the various highway, public transport and travel demand management schemes in the Updated TMPQ will generate additional commercial revenue streams for the service provider from fares, tolls, charging, parking fees and fuel tax, which could be used to cover (at least partially) the operational costs. The extent to which any operating costs can be covered from fare revenues depends on the overall profitability of the system.

The revenue estimation for the Updated TMPQ, accruing to the operators of transport services in Qatar, is shown below both in terms of the annual revenues in the ultimate Horizon Year of 2050 and in terms of the overall Net Present Value over the evaluation period. The net annual revenues increase from around QAR 1.6 billion in 2025 to over QAR 10 billion in 2050

Annual Revenue Estimation for the Updated TMPQ by Implementation Phase

Revenue Component	Annual Revenues QAR million		
	Reference Case	Updated TMPQ	Change
2025			
Taxi Fare Revenue	938	955	18
Public Transport Fare Revenue	2,077	2,871	794
Toll and Congestion Charging Revenue	-	703	703
Car Park Revenue	-	80	80
Total Annual Revenue 2025	**3,015**	**4,611**	**1,596**
2030			
Taxi Fare Revenue	993	1,002	9
Public Transport Fare Revenue	2,128	3,508	1,380
Toll and Congestion Charging Revenue	-	2,234	2,234
Car Park Revenue	-	495	495
Total Annual Revenue 2030	**3,121**	**7,239**	**4,118**
2035			
Taxi Fare Revenue	1,044	1,054	11
Public Transport Fare Revenue	2,213	4,172	1,959
Toll and Congestion Charging Revenue	-	3,410	3,410
Car Park Revenue	-	614	614
Total Annual Revenue 2035	**3,256**	**9,250**	**5,994**
2050			
Taxi Fare Revenue	1,133	1,117	-16
Public Transport Fare Revenue	2,635	6,616	3,981
Toll and Congestion Charging Revenue	-	5,345	5,345
Car Park Revenue	-	1,119	1,119
Total Annual Revenue 2050	**3,768**	**14,197**	**10,429**

Note: 1) Over the evaluation period

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5.5.2 FINANCIAL STRATEGY ASSESSMENT

The successful implementation of the Updated TMPQ requires a financial strategy to:

- Identify the financial resources for investment projects required at each future time horizon (2025, 2030, 2035 and 2050) to successfully:
  - Construct infrastructure (e.g. new roads, railways, dedicated corridors, stations);
  - Implement facilities (e.g. truck weigh stations, truck resting areas, road signals, bus stops, taxi ranks);
  - Acquire fleet; and
  - Maintain and operate services.
- Seek to cover as much of the operating costs as possible through fare revenue and other operational revenue streams;
- Assess the financing options and alternative funding mechanisms, indicating whether they are appropriate for:
  - Private sector financing or contracting, including any developer contributions;
  - Public-private sector financing (PPP), which will depend on the capacity of schemes to attract private funding and financing;
  - Public sector financing; or
  - A combination of the above.
- Assess the financial viability and implications of schemes in relation to MOT's funding capacity. If there are affordability issues, then the levels of subsidy, fiscal policies and possible alternative sources of revenues to support the implementation of the plan may need to be revisited. Alternatively, the implementation plan may need to be adjusted accordingly.

5.5.3 OPPORTUNITIES FOR PRIVATE SECTOR PARTICIPATION

Some of the schemes proposed in the Updated TMPQ which involve a significant infrastructure component (e.g. Sharq Crossing, Metro, LRT and Rail lines) can be suited to traditional design and build contracts since operating costs in such schemes tend to be low when compared to the overall capital costs of construction.

Qatar already has an adequate legal framework for privatization, and has taken a significant step towards the award of concession contracts to the private sector and by announcing the privatization of key public sector companies, in an attempt to improve their efficiency and performance. In the context of the Updated TMPQ, there is scope for further participation of the private sector in the construction and operation of new schemes.

The following forms of financing can be considered during TMPQ implementation[1]:

- **Contractor finance**: Payments to a vendor are contractually linked to the acceptance of delivery of the vendor's services without a project or asset as collateral. The financial obligations are included as outstanding payables in the financial statements.
- **Working capital optimization**: Outsourced and contracted services and operations, with effective management of payment on contractual obligations as a key lever to free up cash-flow.
- **Corporate finance**: The public sector may indirectly access the regional financial market for lending facilities. Sources of corporate financing include corporate loans, commercial papers, corporate bonds and convertible bonds or even equity participations.
- **Asset finance**: Asset finance focuses on financing a specific asset or asset group which has similar characteristics, e.g. vehicle fleet. The financing includes the assets as collaterals for the lender. The public sector would not own but lease the assets instead. In particular, for vehicles which are commodity products this can offer attractive financing conditions. In a typical set-up the asset risk stays with the leasing company.
- **Project finance**: Project financing has a strict project entity scope for lending and is based upon the projected cash flows of the project rather than the balance sheets of its sponsors. To serve this purpose the defined financing of the investment is delivered via an independent legal entity, a Special Purpose Vehicle (SPV). When a State-Owned-Enterprise (SOE) participates jointly with partners from the private sector in such a business opportunity they are called Public-Private-Partnerships (PPP).
- **Developer contributions**: payments or works-in-kind towards the provision of infrastructure made by the proponent of a new development. Developer contributions can be equated by the application of Development Contribution Plans (DCP) or voluntary agreements. A DCP sets the plan for future infrastructure required to service the forecast population within a designated spatial area. A new development is required to contribute towards the planned infrastructure based on the provisions of the DCP.
- **Disinvestment of selected assets**: Certain assets that are undervalued and offer additional financing potential could be liquidated to create additional free cash-flows. This offers opportunities for selling or privatizing financial assets as they can easily be transferred while the control and governance can still be executed through MOT's regulatory power.
- **Securitization**: This option is not common for transportation authorities and is usually performed at a higher governmental level. It involves the ring-fencing for future revenues and assets to create a new financial instrument that can be marketed to potential investors. For example, selling all or a portion of future road pricing revenues to investors who pay a premium today in exchange for those ring-fenced future cash flows.

An initial review of the suitability of projects, and the potential project mechanisms has been carried out and recommendations are given in the table below.

Financial Strategy for Updated TMPQ Schemes

Scheme ID	Scheme Name	Type*	Financing**	Suitability for PPP***	Candidate Project Mechanisms****
HW-01a	Sharq crossing	1	4	2 (if combined with DM-17)	1
HW-01b	Sharq crossing – West Bay Connection	1	4	2 (if combined with DM-17)	1
HW-04	Lusail Connection Roads	1	1 (developer contribution)	4	N/A
HW-06a	Al Jamiaa Street (Road/ Interchanges)	1	3	4	N/A
HW-07	Al Markhiya Street upgrade	1	3	4	N/A
HW-09	Al Khafji Street (Road and Intersection, Including Al Markhiya Flyover)	1	3	4	N/A
HW-11	Al Soudan, Midmac & Al Asiri Interchanges	1	3	4	N/A
HW-13	Al Furosiya Street	1	3	4	N/A
HW-15	Upgrade of Haloul Road	1	3	4	N/A
HW-16	Major roads upgrade in the center of Doha City - D-Ring Road	1	3	4	N/A
HW-21	Sea Line Corridor	1	3	4	N/A
HW-22	Sawdat Natheel Road	1	3	4	N/A
HW-24	Mekeines - Umm Bab Road	1	3	4	N/A
HW-25	Al Khor Bypass and Services Roads	1	3	4	N/A
HW-26	Umm Birka Road	1	3	4	N/A
HW-28	Al Zubara Road	1	3	4	N/A
HW-29	Al Karana - Al Khor Highway	1	3	4	N/A
HW-30	Southern Highway	1	3	3	1
HW-33	Al Shamal - Al Dayeen Western Highway	1	3	3	1
HW-34	Al Waab/Al Sayliya Street Upgrade	1	3	4	N/A
HW-35	Conversion of C-Ring Road to Boulevard	1	3	4	N/A
HW-36	Conversion of Al Corniche Road to Boulevard	1	3	4	N/A
HW-38	Conversion of A-Ring Road to Boulevard	1	3	4	N/A
HW-39	Conversion to Boulevards (West Bay Area)	1	3	4	N/A
HW-41	Western Industrial Expressway	1	3	4	N/A
HW-42	Industrial Area Road Extension	1	3	4	N/A
HW-44	Al Shahaniya - Al Kharaitiyat Road	1	3	4	N/A
HW-45	Al Dayeen Arterial	1	3	4	N/A
HW-46	Bani Hajer - Lusail Link	1	3	4	N/A
HW-47	Al Riffa Highway	1	3	4	N/A
HW-48	Al Siliya - South Industrial Area Highway	1	3	4	N/A
HW-49	Ain Khaled North - South Connection	1	3	4	N/A
HW-51	Al Wukair Road	1	3	4	N/A
HW-55	Umm Birkat Road - Industrial Area	1	3	4	N/A
HW-56	Al Khor Costal Road - Northern Section	1	3	4	N/A
HW-57	Ras Bu Fontas Interchange & QEZ1 Connection	1	3	4	N/A
HW-60	Tunnel Under C-Ring Road	1	3	4	N/A
HW-83	Encourage the update of traffic management systems with latest technologies (Policy Paper Reference HWY-003)	1,2,4	1,3	2	2
HW-86	West Bay Beautification Project	1	3	4	N/A
TR-06	Implement and enforce the Truck Route Network and associated policies and regulations	1,2,4	1,3	3	2
TR-07	Truck Weigh Stations	2	4	2	2
TR-08	Logistics Parks	1,2,4	4	2	2
TR-13	Truck Parking (from Airport)	1,2,4	4	1	2
TR-14	Truck Parking (from New Doha Port)	1,2,4	4	1	2
TR-15	Truck Parking (QEZ2)	1,2,4	4	1	2
TR-16	Truck Parking (QEZ3)	1,2,4	4	1	2
TR-17	Implement Route Network for Oversized Trucks	1,4	1,3	3	2
BU-01	BRT Doha Expressway	1,2,3,4	4	1	2,3
BU-02	BRT Doha Expressway	1,2,3,4	4	1	2,3
BU-04	Priority Bus Along Corniche	1,2,4	4	2	2,3
BU-08	Renewal of bus stops and waiting facilities	1,2	4	1	2,3
BU-10	Implement trial bus priority routes	1,2,4	4	2	2,3
BU-14	New/Improved bus services between areas of high demand and new urban developments	2,4	4	3	2,3

Financial Strategy for Updated TMPQ Schemes

Scheme ID	Scheme Name	Type*	Financing**	Suitability for PPP***	Candidate Project Mechanisms****
BU-15	New bus services to connect non arterial locations without interchange at the Central Bus Station at Al Ghanim, connecting the Airport and Al Gharrafa on F Ring road. This route serves the key bus stations on the radial links.	2,4	4	3	2,3
BU-16	Local community link from Muaither to serve this part of north-west Doha.	2,4	4	3	2,3
BU-17	Refinement to local bus service in southern Al Wakrah area.	2,4	4	3	2,3
BU-18	Heritage Bus route	2,4	4	2	2,3
BU-19	Salwa Road BRT	1,2,4	4	1	2,3
BU-20	Air conditioned waiting areas for bus stops	2,4	4	1	2,3
BU-23	Fully electric bus fleet	2,3	4	2	2,3
CB-01	Central coordination of school bus operations	4	4	3	2,3
CB-02	Central coordination of Labor bus operations	4	4	3	2,3
WT-01	Al Khor Water Transport Line	1,2,3,4	4	2	1,2,3
WT-02	HIA Water Transport Line	1,2,3,4	4	2	1,2,3
WT-03	Al Wakrah Water Transport Line	1,2,3,4	4	2	1,2,3
PR-01	Park and Ride site - Legtaifiya (Red Metro Line)	1,2,4	4	1	1,2,3
PR-02	Park and Ride site - Al Riffa (Green Metro Line)	1,2,4	4	1	1,2,3
PR-03	Park and Ride site - Al Messila (Green Metro Line)	1,2,4	4	1	1,2,3
PR-04	Park and Ride site - Sports City (Gold Metro Line)	1,2,4	4	1	1,2,3
PR-05	Park and Ride site - Ras Bu Abboud (Gold Metro Line)	1,2,4	4	1	1,2,3
PR-06	Park and Ride site - ME-01	1,2,4	4	1	1,2,3
PR-07	Park and Ride site - ME-02	1,2,4	4	1	1,2,3
PR-08	Park and Ride site - BU-02	1,2,4	4	1	1,2,3
TA-02	Deploy additional taxi ranks and holding areas	2	3	4	N/A
RA-01	Passenger Rail Line 1 KSA-Doha Main International (QRail Phase 2)	1,2,3,4	4	1	2,3
RA-02	Freight Rail Line KSA-Hamad Port, Naval Base and Mesaieed Industrial Area (QRail Phase 2)	1,2,3,4	4	1	2,3
RA-03	Passenger Rail Line from Doha Main International to Doha International Airport (QRail Phase 3)	1,2,3,4	4	1	2,3
ME-01	Metro Green Line (western extension) - QRail Phase 1 & 2	1,2,3,4	4	1	2,3
ME-02	Metro Gold Line - QRail Phase 3	1,2,3,4	4	1	2,3
ME-04	Metro Gold (Blue) Line Airport - QRail Phase 3	1,2,3,4	4	1	2,3
ME-05	Metro Blue Line Central - QRail Phase 3	1,2,3,4	4	1	2,3
ME-06	Metro Blue Line West Bay - QRail Phase 3	1,2,3,4	4	1	2,3
ME-09	Metro Green Line (western extension)- Phase 3 QRail	1,2,3,4	4	1	2,3
ME-13	Metro Red Line South - Extension to Naval Base	1,2,3,4	4	1	2,3
ME-14	Metro Red Line South - Extension to Mesaieed Industrial City	1,2,3,4	4	1	2,3
LR-03	LRT Silver Line - QRail Phase 1	1,2,3,4	4	1	2,3
CY-02	A-Ring Road cycle track	1	3	4	N/A
CY-03	C-Ring Road cycle track	1	3	4	N/A
CY-04	Al Matar Street cycle track	1	3	4	N/A
CY-05	Rawdat Al Khail Street cycle track	1	3	4	N/A
CY-06	Jaidah Flyover - Salwa Road cycle track	1	3	4	N/A
CY-07	Al Rayyan Road cycle track	1	3	4	N/A
CY-08	Al Corniche road cycle track	1	3	4	N/A
CY-10	B-Ring Road and Al Istiqlal Street cycle track	1	3	4	N/A
CY-11	Al Markhiya Street cycle track	1	3	4	N/A
CY-12	Arab League Street-Jasim Bin Hamad Street cycle track	1	3	4	N/A
CY-14	Al Sadd Street cycle track	1	3	4	N/A
CY-15	Doha Expressway cycle track	1	3	4	N/A
CY-19	Al Waab Street-Mohammed Bin Thani Street cycle track	1	3	4	N/A
CY-28	Mesaieed Road extension cycle track	1	3	4	N/A
CY-29	D-Ring Road cycle track	1	3	4	N/A
CY-32	West Bay cycle track network	1	3	4	N/A
CY-33	Majlis Al Taawon Street cycle track	1	3	4	N/A
CY-35	Al Khor cycle track network	1	3	4	N/A

Financial Strategy for Updated TMPQ Schemes

Scheme ID	Scheme Name	Type*	Financing**	Suitability for PPP***	Candidate Project Mechanisms****
CY-37	Al Wukair Street cycle track	1	3	4	N/A
CY-39	Provide conventional private bicycle parking at public transport stations (Policy Paper Reference NM-004)	2	3	4	N/A
CY-41	Two wheeler advanced areas at signals (Policy Paper Reference NM-002)	1	3	4	N/A
CY-43	Add integrated cycle lanes on minor collectors (Policy Paper Reference HWY-002)	1	3	4	N/A
CY-46	Develop a full range of cycling facilities across Qatar (Policy Paper Reference NM-002)	1	3	4	N/A
CI-02	Urban development led by TOD along Salwa Road Corridor	1,4	4, developer contributions	1	1,2
CI-03	TOD at high-speed rail (HSR) station	1,4	4, developer contributions	1	1,2
CI-04	Public Transport Information / Customer Information strategy	1,2,4	4	3	3
TI-01	West Bay Automated People Mover (APM)	1,2,3,4	4	1	1,2,3
TI-10	Trial of implementing Electric Vehicle Charging Points (EVCP)	2,4	4	1	2,3
TI-15	Real Time Passenger Information, Multi Modal Integration and Service Integration App	1,2,4	4	2	2,3
TI-20	Develop Smart Corridor demonstration project (Policy Paper Reference TEC-004)	1,2,4	4	2	2,3
DM-01	To lower speed limits within central Doha urban area and de-classify any Expressway sections within this area	1	3	4	N/A
DM-02a	Area Based Road User Congestion Charging in Central Doha	1,2,4	4	1	1,2,3
DM-02b	Area Based Road User Congestion Charging in Central Doha	1,2,4	4	1	1,2,3
DM-02c	Area Based Road User Congestion Charging in Central Doha	1,2,4	4	1	1,2,3
DM-03	Area Based Road User Congestion Charging in West Bay	1,2,4	4	1	1,2,3
DM-06	Road Tolling (User Charges) on the 22nd February Street	1,2,4	4	1	1,2,3
DM-08	Comprehensive expressway tolling	1,2,4	4	1	1,2,3
DM-09	Parking Fees in Central Doha	1,2,4	4	1	1,2,3
DM-10	Parking Fees in West Bay	1,2,4	4	1	1,2,3
DM-11	Parking Fees in Al Khor	1,2,4	4	1	1,2,3
DM-12	Parking Fees in Northern Doha	1,2,4	4	1	1,2,3
DM-13	Parking Fees in Lusail	1,2,4	4	1	1,2,3
DM-14	Parking Fees in the Industrial Area	1,2,4	4	1	1,2,3
DM-15	Parking Fees in Al Wakrah	1,2,4	4	1	1,2,3
DM-16	Parking Fees in the Greater Doha Area	1,2,4	4	1	1,2,3
DM-17	Road Tolling (User Charges) on Sharq Crossing West Bay Connection	1,2,4	4	1	1,2,3
DM-18	Comprehensive expressway tolling strategy	1,2,4	4	1	1,2,3
DM-22	Intelligent parking pricing	1,2,4	4	1	1,2,3
DM-23	On-street public parking control policy and management (Policy Paper Reference TDM-002)	1,4	4	1	1,2,3
DM-37	Establish TDM demonstration project for FIFA World Cup 2022 (Tournament Route Network - TRN), to determine legacy measures (Policy Paper Reference TDM-005)	1,2,4	3	4	N/A
DM-40	Special event management; FIFA World Cup 22 demonstration project (Policy Paper Reference TDM-005)	4	3	4	N/A
WK-01	Sheltered Walkway - Al Corniche Road	1	3	4	N/A
WK-02	Sheltered Walkway - A-Ring Road & Bank Street	1	3	4	N/A
WK-03	Sheltered Walkways Network - West Bay	1	3	4	N/A
WK-04	Sheltered Walkway - C-Ring Road	1	3	4	N/A
WK-08	Pedestrian Only Road - Abdullah Bin Thani Street	1	3	4	N/A
WK-10	Grade-Separated Crossing on Al Diwan Street	1	3	4	N/A
WK-11	Grade-Separated Crossing on Majlis Al Taawon Street	1	3	4	N/A
WK-12	Grade-Separated Crossing on Al Markhiya Street - Unique Site	1	3	4	N/A
WK-13	Grade-Separated Crossing on C Ring Road near Al Muntazah	1	3	4	N/A
WK-14	Grade-Separated Crossing on Al Waab Street - Unique Site	1	3	4	N/A

Financial Strategy for Updated TMPQ Schemes

Scheme ID	Scheme Name	Type*	Financing**	Suitability for PPP***	Candidate Project Mechanisms****
WK-15	Grade-Separated Crossing on E Ring Road	1	3	4	N/A
WK-16	Grade-Separated Crossing on C Ring Road near Najma	1	3	4	N/A
WK-21	Grade-Separated Crossing on Al Rayyan Al Jadeed Street	1	3	4	N/A

- Type – 1: Construction of Infrastructure; 2: Implementation of Facilities; 3: Fleet Acquisition; 4: Operations and Maintenance of Services
- Financing – 1: Private Sector; 2: Public Private Partnership; 3: Public Sector; 4: Combination of 1 to 3
- Suitability for PPP – 1: Very suitable; 2: Moderately Suitable; 3: Slightly Suitable; 4: Not Suitable
- Candidate Project Mechanism – 1: BOT; 2. DBFO; 3: O&M Concession

2050

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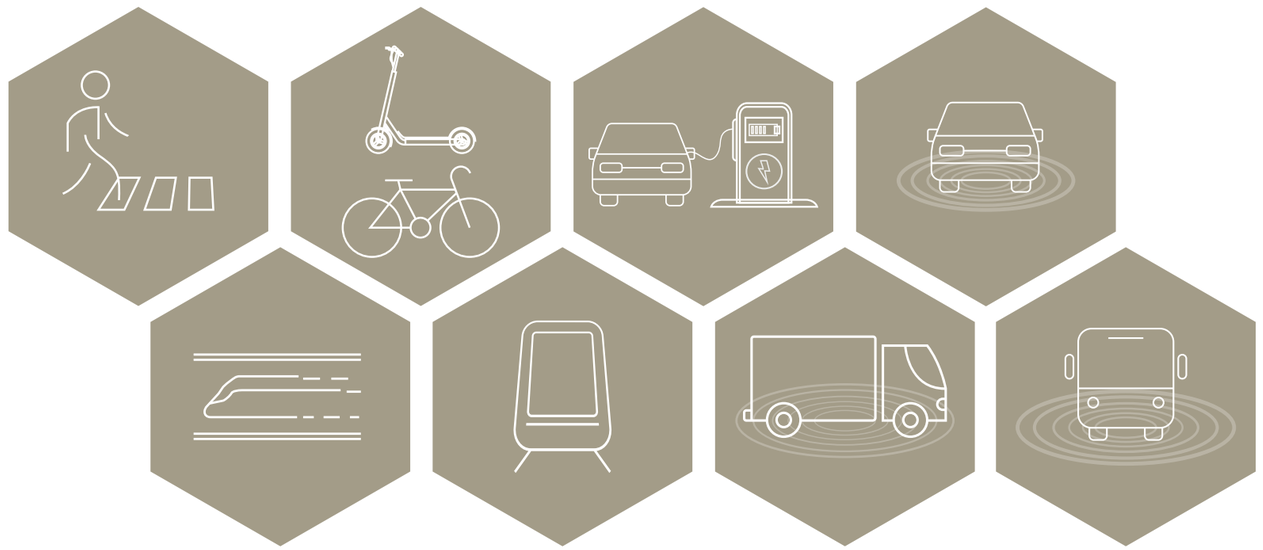
INTEGRATED & SUSTAINABLE TRANSPORT FOR ALL

06

SECTION - 06

GOING FORWARD



6 GOING FORWARD

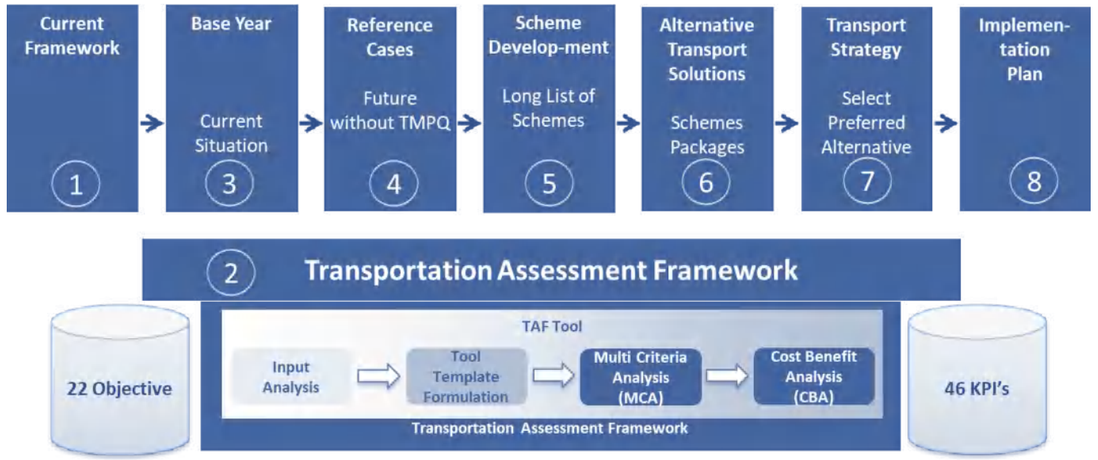
The Updated TMPQ is a strategic master plan to set out the entire vision, direction, framework, and future investment in transportation systems in the State of Qatar. Implementation of the master plan is critical to ensure that Qatar's future transport network supports implementation of the Qatar National Vision 2030 and Qatar National Development Framework.

MOT acknowledges the important and informed support of stakeholders and their significant contributions during the development of the Updated TMPQ. Throughout the project, stakeholder attendance at workshops, and continuing consultation has helped to both develop and strengthen the selected schemes, policies and measures proposed. During the implementation stages, stakeholder collaboration is even more important to success, and MOT will work closely with key stakeholders such as Ashghal, MME, MOI, Qatar Rail, Mowasalat and others, to support implementation of the master plan.

Formal structures and working groups for coordination between agencies need to be enhanced immediately to ensure that the structures are in place to ensure maximum coordination and efficiency, to deliver 150 schemes by 2025. The Updated TMPQ will be effectively implemented with the full buy-in and support of all relevant stakeholders, which in turn requires the formal structures and clear levels of responsibility to be set out from the start.

All recommended projects are to be subject to detailed feasibility studies, including use of the TAF tool to assess, compare and prioritize projects, and justify investment through cost-benefit analysis. Projects will not proceed to implementation without first passing through this process. Opportunities should be taken to learn from the TAF project appraisal process, and fine tune the approach working closely with MOF, to upgrade the appraisal and reporting inputs to budget submissions and optimise the decision-making processes.

MOT will work closely with MOF to define and update the process for justification of each project through specific Business Case submissions, and budget applications. This requires MOT to work with MOF to establish criteria for seeking funding approval for all transportation projects or services, formalize the use of the TAF, and to develop a formal business planning cycle and process which coordinates objectives and budget submissions for transportation projects. This is a critical activity if budgets are to be secured in particular for implementation of schemes over the period 2021-2025, and 2026-2030.

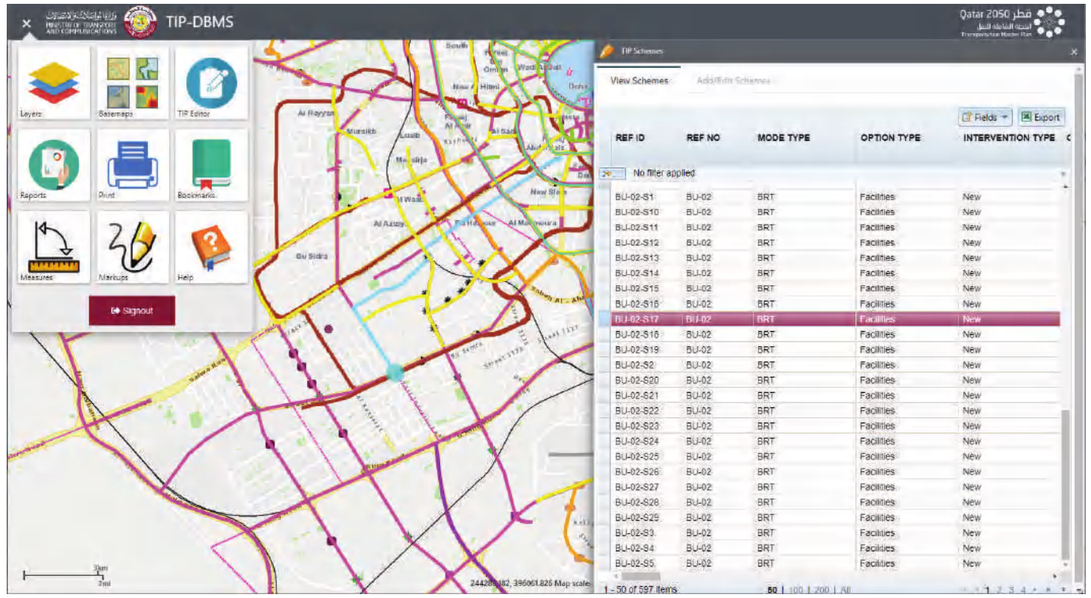


Effective governance and agency collaboration will ensure that the institutional, legislative, regulatory, and policy frameworks in which transportation schemes are designed, implemented and managed, not only support program implementation, but also respond to the forthcoming changes shaping the transportation sector, such as the emergence of automated vehicles, big data in transport and the digital transformation of society and the economy in general.

The early implementation of the Guide for Planning Roads and Road Network Hierarchy is critical to standardize the road corridors planning. In addition, the implementation of Roads and Bridges Asset Management Systems will be vital to have the spatial inventory of all road network assets and maintain it effectively by adopting advance automatic technology. This will increase the asset lives with huge savings.

To manage the transportation master plan implementation and ensure the successful and timely implementation of schemes, resources within MOT, as well as other agencies, will need to be enhanced. Additional technical expertise will be required for the planning, implementation, operation and monitoring of the various schemes contained in the Updated TMPQ. The planning, delivery and operation of the recommendations in the plan will require personnel from different areas of expertise, and new internal units such as Public Transport, and Cycling, will be necessary.

Ashghal will deliver highway projects and may require additional highway and civil engineer resources, contract and procurement specialists. Some traffic engineering expertise is proposed within other agencies such as MME and MOI, who will share responsibility for local project implementation which would be made more effective by in-house expertise.



For the Updated TMPQ plan to be successful, continuous monitoring of the projects based on KPIs is essential to ensure that the plan is meeting its targets. The plan implementation should be monitored for effectiveness, to learn lessons for the longer term. Experience of trying to deliver, manage and operate 150 schemes will provide valuable feedback and enable consideration of how the governance structure could be improved and strengthened to ensure even more effective implementation of future projects. A robust monitoring and evaluation framework will be established to measure and report on performance in tackling the Updated TMPQ implementation challenges and outcomes.

The schemes included in the Updated TMPQ were studied to ascertain whether any RoW additional to what is used by the existing or committed infrastructure will be required and also to reserve RoW for the proposed new schemes. The RoW requirements were established by following the standards contained in the Guide for Planning Roads, which has been developed as part of the Updated TMPQ.

Learning the lessons from the Ashghal's Expressway Program and Qatar Rail Metro Projects, land acquisition planning and settlements shall be initiated at an early stage of conceptual studies for the projects planned for HY 2025. For projects beyond HY 2025, the RoW reservation should commence at an early stage to demarcate the land requirements for each project.

As with every plan, transportation demand forecast do not always turn out as expected. Future demographic and socio-economic conditions may change differently from those envisaged. As a Rule-of-Thumb, master plans need to be updated regularly at approximately every 10 years. However, special circumstances may trigger the need for a review, such as significant changes in:

- Growth patterns different to what had been originally predicted, higher/lower population densities, land use distribution, and employment changes;
- External economic and social conditions (i.e. recession, property vacancy rates, pandemic);
- Financial challenges within the Government (discount rate, bond ratings, inability to secure funding, affordability, debt financing, etc.);
- Levels of Service and patronage (levels of customer usage far beyond expectations);
- Technological changes or challenges (such as the introduction of autonomous vehicles).

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