

DEVELOPING AN URBAN MOBILITY PLAN

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**This is a draft copy of the Quick Guide on Developing an Urban Mobility Plan.
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Key Messages

This quick guide is intended to provide city-level officials with an easy to understand guidebook on how to develop an urban mobility plan (UMP). It is the first in a series of quick guides addressing urban mobility planning, followed by guides on how to set up a metropolitan transport authority, how to develop an urban mobility compact, and how to set up a multi-stakeholder forum on urban mobility¹.

The key messages of this guide are:

- A core aim of developing a UMP is to create an overall attitudinal shift among stakeholders in the way urban mobility planning should be conceived (i.e. holistically and people-centered) and to prioritize sustainability at the forefront of all urban planning activities.
- An Urban Mobility Plan is successful only if it approached holistically. This means that the decision-making process must be inclusive of all stakeholders, and impacts and implications of other fields indirectly related to transport and mobility must be considered throughout the entire process, not just tacked on at the end.
- Creating a UMP is a long-term, flexible, and dynamic process. Even upon completion, the plan is likely to be revised over the course of many years in response to changing contexts and attitudes.

1 Introduction

1.1 Quick overview of urban mobility planning in developing cities today and purpose of this guide

Transport is an inherently complex field, interfacing with myriad other sectors such as environment, economy, social science, culture and political history. Urban mobility planning, therefore, must likewise be holistically undertaken. Urban mobility has taken center stage for sustainability concerns in recent history, and this is attributed to the fact that increasingly, cities are becoming engines of economic growth for a nation, and more and more people migrating to cities is creating increasing pressures on resources such as land. Cities have responded to this challenge by sprawling further, including formerly rural and peri-urban areas at their peripheries for housing, and enveloping them within urban boundaries. In turn, a need emerges

¹ The other Quick Guides are available at: [insert URL once all have been published](#).

to travel more and longer. This, coupled with the fact that most (developing) cities have not developed their public transport systems to be of high quality and meet cities' personal travel demand needs, has created very "personal motorized travel" and "car-centric" cities. Even relatively dense cities based on largely public transit and non-motorized transportation, where people have easy access to various activities, have proceeded to rapidly spread out due to the onset of motorization as a mode for personal mobility. This growth in personal vehicles has created what could be called a vicious circle of traffic growth, urban sprawl, and car ownership and use. This also results in increased local and global environmental pollution, road injuries and deaths, and a social mobility divide, where resources and services are inequitably distributed amongst the 'haves' and 'have-nots'.

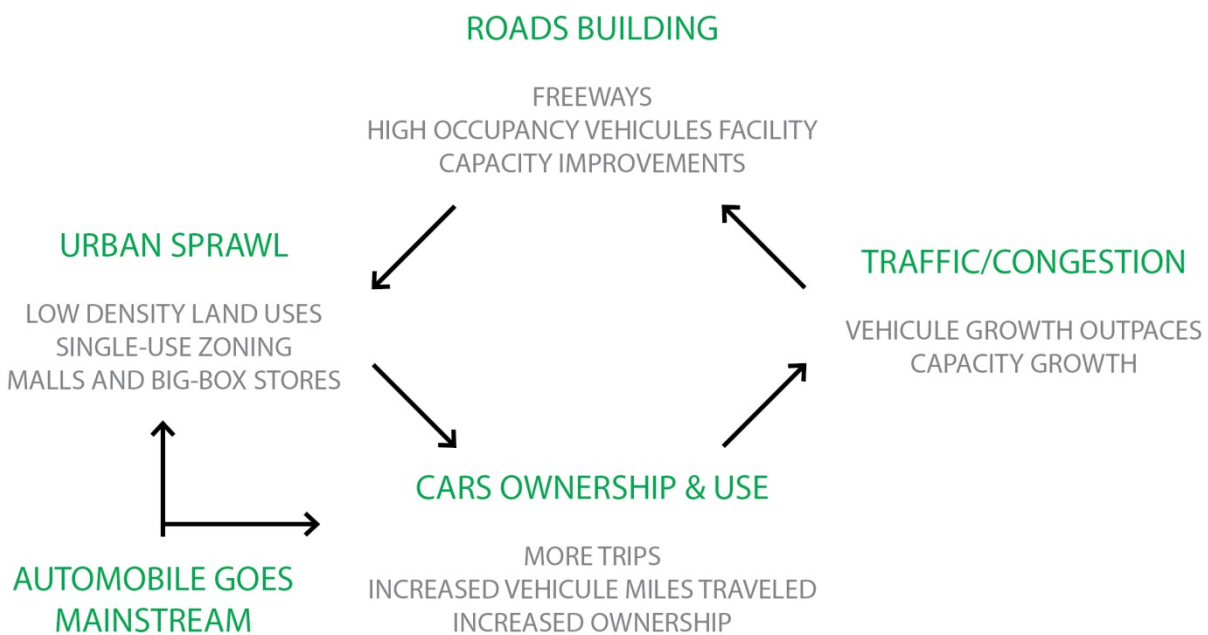


Figure 1: Vicious Circle of Automobile dependence.
(Adapted from Vivre en Ville, 2011)

What usually gets missed out in urban mobility planning is the connection of mobility with how land use is managed and cities are planned at a micro, grid, or block level. Land use and town planning are what shape cities' living environments and their structure. They help determine communities' mobility and energy consumption patterns, and they have an impact on the overall quality of life in cities.

There are many other aspects critical to a city's sustainability, including clean air, safe and open urban spaces to walk and play in, road safety, parks, safety in public transport systems and parks, and preserving local heritage and culture, for example. Any mobility plan should take

into account these aspects of high quality urban living. Then there is the question of governance and city administration, which needs to be a participatory and people-centric approach.

The intention of this Quick Guide is to provide a step-by-step introduction to the process of creating an urban mobility plan from a sustainable development perspective, especially for a city in a developing country.

1.1.1 What is an urban mobility plan?

Sustainable transport is at the crux of urban mobility planning. Thus, in defining an urban mobility plan, it is first useful to understand what we mean by sustainable transport. A sustainable transport system is one which “meets society’s economic, social, and environmental needs whilst minimizing its undesirable impacts on the economy, society, and the environment” (EU, 2006, N.P.). Others have defined sustainable transport in the following ways:

The World Business Council for Sustainable Development (WBCSD) defines sustainable mobility as “the ability to meet the needs of society to move freely, gain access, communicate, trade, and establish relationships without sacrificing other essential human or ecological values today or in the future” (WBCSD, 2001).

“The goal of sustainable transportation is to ensure that environment; social and economic considerations are factored into decisions affecting transportation activity” (MOST, 1999).

Environmentally Sustainable Transportation (EST) is “transportation that does not endanger public health or ecosystems and meets needs for access consistent with (a) use of renewable resources at below their rates of regeneration, and (b) use of non-renewable resources at below the rates of development of renewable substitutes” (OECD and BLFUW 1998).

The European Council of Ministers of Transport (ECMT) selected a comprehensive definition of sustainable transport in the year 2004 which has also been endorsed by the Transportation Research Board (TRB). “The definition has a broad scope and recognizes specific transportation issues. According to this definition, a sustainable transport system:

- Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.
- Is affordable, operates fairly and efficiently, offers a choice of transport mode and supports a competitive economy, as well as balanced regional development
- Limits emissions and waste within the planet’s ability to absorb them, uses renewable resources at or below their rates of generation, and uses non-renewable resources at or below the rates of development of renewable substitutes, while minimizing the impact on the use of land and the generation of noise” (ECMT, 2004).

Litman and Burwell (2006) attempt to classify the elements of a sustainable transport system into the following matrix:

Economics	Social	Environmental
Traffic congestion	Mobility for vulnerable groups	Air pollution
Infrastructure costs	Human health impacts	Habitat loss
Consumer costs (fares, automobiles, etc.)	Community cohesion	Hydrologic impacts
Mobility barriers	Community livability	Depletion of non-renewable resources
Accident damages	Aesthetics	Noise

Source: Litman and Burwell, 2006

An Urban Mobility Plan (UMP) is a people-centered urban development roadmap which defines a long-term vision for mobility in an urban area and outlines strategies to achieve its objectives. **It aims to achieve sustainable, inclusive mobility for all people within an urban center, and should therefore emphasize “pedestrian facilities, non-motorized transport measures, and public transport systems, including buses and sustainable mass rapid transit systems”** (ADB, 2008, p. 6).

A UMP is more than simply a list of projects; it is a comprehensive document which is distinct because of its focus on:

- the linkages between projects and their impacts city-wide. The UMP, the city Master Plan, and budget allocations, for example, are all interrelated and should not be viewed in isolation. The UMP will promote all actions that support sustainable development, including those outside the scope of individual projects.
- the impacts of all actions at the social, environmental, economic, and political levels. Crucial in this process, it must: identify project need, evaluate alternatives, comprehensively analyze the impact of each alternative, and introduce performance measurements to ensure that expected outcomes are reached (Hidalgo et al., 2012).

1.1.2 Urban mobility world-wide at a glance

Urban mobility has evolved in different ways around the globe, and different technologies and infrastructures have been implemented to accommodate changing needs.

In industrialized nations, urban mobility developed slowly and can be grouped into three stages that have spanned more than two centuries. The Walking-Horsecar era of the industrial revolution (1800-1890) was characterized by mixed land use and high urban density. The Electric Streetcar/Transit era (1890-1920s) led to the migration of middle and upper classes to the suburbs, thus creating an urban class divide and reduced urban density. Finally, the

Automobile era is marked from 1930 onwards, at the time when automobiles (though introduced some decades earlier) reached the point of affordability for many, and ownership rates soared. This contributed to urban sprawl and increased street congestion. In North America, cars soon became the dominant form of transportation (Rodrigue, n.d.). European cities initially followed the same trend, but later reformed their transport strategy to take on a more environmentally conscious, multi-modal approach emphasizing alternatives to personal vehicles (Ascher, 2003; Papon, 2003).

By comparison, many cities in developing countries are characterized by exceedingly rapid urbanization. The urban population growth that took place during industrialization in developed countries a century ago is happening at far faster rates in the developing world today. For instance, the population of London grew from 1 to 8 million people over a period of 130 years. The same was achieved in Seoul in only 25 years (Giraud and Lefèvre, 2006). In most developing cities, this growth has led to a palliative response in the way of hurried construction of inadequate transport infrastructure. Developing cities are now prematurely struggling with issues of high density, heavy congestion, worsening environmental safety and security conditions, and, with the recent popularization of personal vehicles, significant declines in public transport use (Rodrigue, n.d.; Gwilliam, 2003).

The case could be made that certain (mostly European) cities lead by example in terms of sustainable mobility planning and should be used as a guide for other cities around the world. To be sure, sharing of best practices in urban mobility planning has been proven worthwhile. For example, London, Stockholm, and Milan have all adopted Singapore's congestion charge policy, which has significantly alleviated congestion in their city centers (Boquet, 2009). Nevertheless, it must not be understated that the mobility needs of each city are context-specific. For instance, weaker policy and institutional frameworks are often endemic of urban transport scenarios in developing countries (Gwilliam, 2003). This must be taken into account in the planning process. An urban mobility plan in one city may influence UMPs in other cities, but should not be blindly duplicated. Individual tailoring is needed in any case. This Quick Guide aims to pinpoint the individual considerations that should be taken into account in developing a specific UMP.

1.1.3 Problems/challenges

In many developing cities, transport planning and development tends to be strongly project-driven and lacks consideration for the implications/consequences of a given development initiative on other sectors. Although the importance of developing transport projects sustainably is gradually becoming understood by national and policy levels (due to increasing visibility of urban transport as an important area for working towards sustainable development at the global level), little is being done on this front at the local levels due to various reasons

such as lack of capacity (both manpower and knowledge), financial resources, and time, as well as inadequate legal and institutional frameworks.

Frequently, the impacts on the end user are ignored in transport development planning. In India, for instance, urban mobility plans often do not adequately account for the safety of travelers, do not create for sufficient accessibility (particularly to vulnerable groups), and demonstrate little consideration for public health (in the way of reducing pollution and promoting clean fuels) (TERI, 2010).

Local government efforts to address urban mobility planning have been insufficient due to the following reasons:

- Lack of a proper vision statement– “Where are we? Where do we want to be? How do we get there?”
- Institutional issues-soft and at times unfavorable policies/rules/laws, administrative hurdles of inter-agency co-ordination, lack of clear authority and leadership, lack of visibility on the political agenda, capacity gaps and top-down planning approach
- Data gaps at the city level; inadequate studies and surveys and information on where cities stand (baseline)
- Incomplete analysis of and justification for urban transport proposals; selection of fancy, expensive and new solutions as opposed to improving the existing situation
- Lack of people’s participation
- Lack of sufficient time and/or resources for proper participatory, holistic, and integrated planning to occur.

1.1.4 Who is this guide intended for?

This guide was created with the intent of helping to create positive paradigm shift towards mobility planning in developing cities. It is meant to serve as a guiding framework for developing cities to prepare an urban mobility plan. For this reason, the primary target audience of this Quick Guide is city authorities, as they are the ones who should be responsible for the design of UMPs (ADB, 2008; Wolfram and Bührmann 2007). Beyond this, it is also intended for all stakeholders of urban mobility – anyone with an interest in the outcome of urban transport policy – including other government departments, end users, service providers, planners, academics, financiers, and civil society organizations.

1.2 What does an Urban Mobility Plan entail?

1.2.1 Purpose – why do we do this?

It is commonly understood that a UMP should outline a long-term mobility strategy (20+ years) for the populace of an urban area with the objective of creating step-by-step plans for

implementation that are both sustainable and cost-effective (PPIAF, n.d.). This long term vision needs to be consistent with shorter term actions and policies undertaken by the authorities and citizens, and helps in aligning day-to-day actions with the longer view. Beyond this, there should be a common understanding among all decision-makers involved in the creation of a UMP that mobility is not the sole goal of the plan. Higher quality of life of all residents should be the primary goal of any UMP, and a commitment to this should drive the plan (Bührmann et al., 2011).

1.2.1.1 *Benefits*

A successful UMP offers many benefits for a city socially, economically, environmentally, and politically (PPIAF, n.d.). A description of some of these benefits is provided below.

- **Improved quality of life:** UMPs can lead to increased road safety, more aesthetically pleasing public spaces, lowered noise and air pollution. The latter can also result in health benefits for members of the community.
- **Positive environmental impact:** Urban mobility planning is also a good driver of climate change mitigation.
- **Mobility and accessibility:** UMPs can make residents more mobile make urban areas and their services more accessible.
- **Participatory decision making:** Urban planners can incorporate the perspectives of citizens and other stakeholders in development planning, thereby giving the project a higher level of legitimacy.
- **New political agenda:** If carried out well, urban mobility planning can enable politicians to create clear, long-term programming with less conflict.
- **Integration:** Urban mobility planning works towards the achievement of mobility goals as well as overlapping goals in other sectors (e.g. health, safety, social inclusion, land use, environment, and economic development) (Bührmann et al., 2011).

1.2.1.2 *Objectives*

The box below describes the minimum aims of any UMP:

- Ensure the accessibility offered by the transport system is available to and usable by all
- Improve safety and security
- Reduce air and noise pollution, greenhouse gas emissions, and energy consumption
- Improve the efficiency and cost-effectiveness of the transportation of people
- Contribute to enhancing the attractiveness and quality of the urban environment and urban design (Bührmann et al., 2011, p. 6)

Many of these aims are cross-cutting, and the rationale behind them is briefly elaborated below:

1.2.1.3 People-Centered, Integrated Planning

A UMP should strive to **facilitate the mobility of people (as opposed to vehicles)**. Urban transport plans that do not favor a people-centered approach tend to include infrastructure design for vehicles (road networks, flyovers, etc.), which actually decreases the mobility of pedestrians and users of public and non-motorized transport. A UMP aims to reverse this by:

- **Creating socially equitable accessibility:** This should be designed especially with the needs of poor, disabled, and otherwise vulnerable user groups in mind, and ensuring that public transport modes are safe as well as financially and geographically within reach of users.
- **Promoting and improving public and non-motorized transport options:** Such environmentally friendly transport modes can reduce the number of vehicles on the road, thereby cutting down air and noise pollution. Less traffic congestion also leads to higher efficiency and improved road safety.
- **Establishing an effective means of integrating land use and transport planning:** It is essential to integrate commercial and residential development with mass transit development in order to decrease private vehicle dependence (ADB, 2008). The design of green spaces should also be included in the plan.
- **Creating a multi-modal strategy:** The UMP should consider all modes simultaneously, not each mode separately (PPIAF).

The main features of such a UMP are outlined in Figure 2 below:

1.2.2 Features

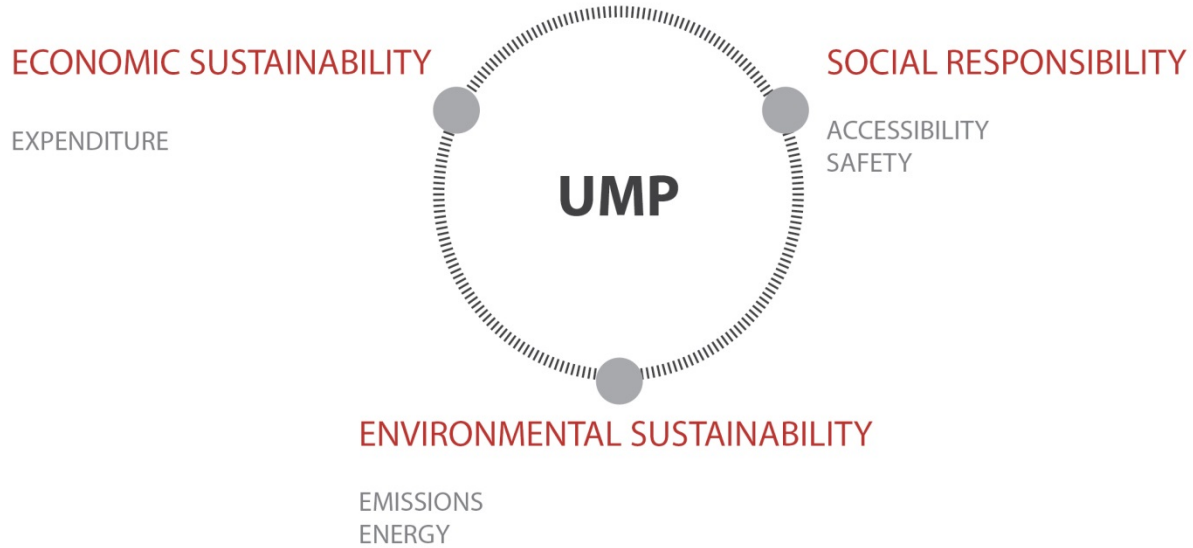


Figure 2: Main Features of a UMP (Adapted from Tiwari, 2012, p. 7)

1.2.2.1 Who does this?

City-level government officials are responsible for creating urban development plans (ADB, 2008; (Wolfram and Bührmann 2007). Nevertheless, it is a multi-stakeholder process, involving actors from all areas (public and private sectors, community members, etc.). For further information on the multi-stakeholder process, see Quick Guide 4 of this series: Establishing a Multi-Stakeholder Forum for Urban Mobility.

1.2.2.2 What are the elements of a UMP?

A UMP seeks to tackle urban transport problems through environmentally friendly solutions that optimize the mobility of people. The policies defined therein address all forms of transport (public and private, moving and parking, motorized and NMT). The characteristics of a comprehensive UMP include:

- A participatory approach: involving citizens and stakeholders from the outset and throughout the process in decision making, implementation and evaluation, building local capacity for handling complex planning issues, and ensuring gender equity
- A pledge for sustainability: balancing economic development, social equity and environmental quality
- An integrated approach: of practices and policies between policy sectors (e.g. transport, land-use, environment, economic development, social inclusion, gender equity, health, safety), between authority levels (e.g. district, municipality, agglomeration, region,

nation, EU), and between neighboring authorities (inter-municipal, inter-regional, transnational, etc.)

- A focus on achieving measurable targets derived from short term objectives, aligned with a vision for transport and embedded in an overall sustainable development strategy
- A review of transport costs and benefits, taking into account wider societal costs and benefits, also across policy sectors
- A method comprising the following tasks:
 1. status analysis and baseline scenario
 2. definition of a vision, objectives and targets
 3. selection of policies and measures
 4. assignment of responsibilities and resources
 5. arrangements for monitoring and evaluation (Bührmann et al., 2011, p. 6)

However, the reality in most developing countries is that UMPs do not reflect all of these elements. For example, integrated land use and transport planning tends to be relatively shallow; participatory processes are often weak, if existent; and these plans are often little more than laundry lists of transport projects (TERI, 2010).

2 Developing a UMP – Steps

The development of a UMP can be broken down into a series of six steps, some of which may be reiterated as necessary. These steps are as follows:

- Step 1 – Preparation – Conduct Situational Analysis
- Step 2 – Identify Objectives
- Step 3 – Draft UMP
- Step 4 – Engage Stakeholders
- Step 5 – Revise UMP

2.1 Preparation – Conduct Situational Analysis

In the preparatory phase, a thorough review of existing plans and policies related to urban mobility should be conducted. Frequently, city plans tackle urban issues on a sector by sector basis, failing to take into account the interrelated nature of urban issues (See for example, CAI-Asia and CDIA, 2012, p. 33). The effectiveness of current transport and mobility services should be analyzed holistically to understand their implications both on current as well as future scenarios (Wolfram and Bührmann, 2007).

2.1.1 Understand the potential for a strong UMP

In order for a UMP to be successful (which is to say, sustainable), it is first necessary to understand the potential for a UMP in a given urban area. Myriad factors play a role in the success of a UMP, both in the planning and implementation phases. Some key questions that should be asked at this stage are described below.

How committed are relevant decision makers to sustainable mobility principles?

- Assess the degree to which sustainability is addressed in current policy (both in transport policy and in related fields).
- Engage with decision makers (in transport and related fields) to understand how sustainability aligns with their political priorities.
- Ensure that there is a common understanding of what sustainable mobility means.
- Advocate to gain agreement among policy makers to put sustainability at the crux of urban mobility planning. This should later be extended to encompass all aspects of urban planning (not just planning directly related to transport and mobility).

Table 1 below provides a framework for examining the above:

Table 1 Policy objectives and possible institutional issues to be addressed

Policy objective for sustainable urban transport	Possible institutional issues/questions to be addressed
General issues	Do the policy-makers have predictable responses with respect to the various kinds transport policy measures (also when the media is taken into account)? How must policy proposals be framed to have a chance of being implemented (given self-interest of politicians)?
Accessibility	Are transport services available at locations and times users need them to be available? What is the maximum distance, passengers are willing to travel (on foot or by other means) to access public transport? Can pedestrians access bus stops, metro stations and rickshaw stands safely? Are the city streets walkable and cyclable? Is transport disabled-friendly? Can people afford to access public transport services? Do the transport services provide for and encourage people from different social classes?

Acceptability	How do the citizens inform themselves about transport policies? What type of reasoning and simplifications do they employ in order to form judgement on a certain policy measure? What notions of “fairness” do citizens have? What can be learnt from the case studies in this respect?
Transport quality	Transport quality is very important for acceptability, and therefore political feasibility of transport policies and the questions above apply here as well.
Safety	The number of deaths from road crashes in developing cities is extremely scary. What measures are being taken to address road safety issues? What kind of regulatory arrangements are in place to ensure safer road and vehicle designs, road environments for vulnerable road users? How pedestrian friendly are our neighbourhoods? What emergency response systems exist in order to cater to the needs of road crash victims?
Environment	It is important to analyse how policy makers respond to the environmental effects of certain transport policies and alternatives. How much importance environmental concerns get while selecting transport projects? What is the level of participation of the community and NGOs in such projects?
Coordinated planning	Which institutions should be involved? How is responsibility shared so that operations run efficiently? How can we ensure that this information is shared?
Integrated land use and transport	What does integration imply for institutions? What kind of interactions are needed? And in what sequence?
People-centred approach	What are the opportunities for citizens, particularly the urban poor and other vulnerable groups, to be involved in the transport planning process?
Equitable space allocation	Do mobility and engineering plans cater to all road users including pedestrians, street vendors and cyclists? How can equitable space allocation be best enforced?
Investment in public transport and NMT	What are the opportunities for cooperation with private sector organisations? What legal structures are needed? Policy?

Private Motorization	How to address the challenge of growing private motorization, and the negative externalities associated with it (congestion, pollution, road fatalities, noise)?
Strategies for parking and freight traffic movement	What kind of regulations need to be put in place to control these?
Financing methods	In what ways can institutions keep public transport costs affordable to passengers? What financial disincentives can institutions implement for using less environmentally-friendly transport methods? How can user fees and taxation methods be better employed to promote high quality public transport while dis-incentivising private motorization? How can central and state government funding programs be made most effective for implementation of local level sustainable transport projects?
ITS and cleaner technologies	What ITS and cleaner technologies are most feasible? How can institutions get hold of these and promote usage of these?
Best practices	How can knowledge sharing across institutions and regions be achieved most effectively?
Capacity building	How can capacity amongst government officials be enhanced for both understanding technical areas as well as project management and supervision skills on an on-going basis?

(Adapted from Niskanen et al., 2003, p.65)

How would existing regional/national frameworks be impacted?

- Identify, record, and analyze any policies, legal regulations, funding criteria, coordination and integration restrictions, as well as any other higher level plans or requirements that may influence how the UMP will be able to work.
- Summarize relevant regional/national framework conditions and offer recommendations for how to address these points in the UMP.

How well suited is the local context for a UMP?

- Identify any gaps in existing transport planning practice in the area (determine whether planning is holistically conceived; if not, what aspects are overlooked).

- Pinpoint and critically assess any constraints and opportunities to transport development in the area. Examine institutional, legal, and financial constraints as well as potential constraints on the implementation process (communication, management, etc.). Then identify any opportunities to aid implementation, and strategize ways to exploit these opportunities to address constraints.
- Identify and analyze any areas of social exclusion in existing transport policy. Determine whether all groups (particularly vulnerable groups—ethnic minorities, children, the elderly, the poor, the handicapped) are given equal treatment. Gender equality should also be ensured. Consider the following questions:
 - Are equal access, availability and affordability assured under the current system?
 - Do current transport policies aid employment and promote an inclusive labor market?
- After completing the above steps, conduct an honest self assessment to aid in the planning process later on. This does not need to be made public.

Are there adequate resources available?

- Identify relevant skills within key organizations and stakeholders, and ensure that all skills necessary for sustainable urban mobility planning (operative, technical, management) are utilized.
- Create a strategy manage and fill any skill gaps (via capacity building, sub-contracting, etc.). Figure 3 below elaborates this further.
- Calculate an estimated budget for the urban mobility planning, implementation, and maintenance process, as well as any additional background and recapitalization costs. Assess financial resources, and gain political approval (Bührmann et al., 2011; PPIAF, n.d.).

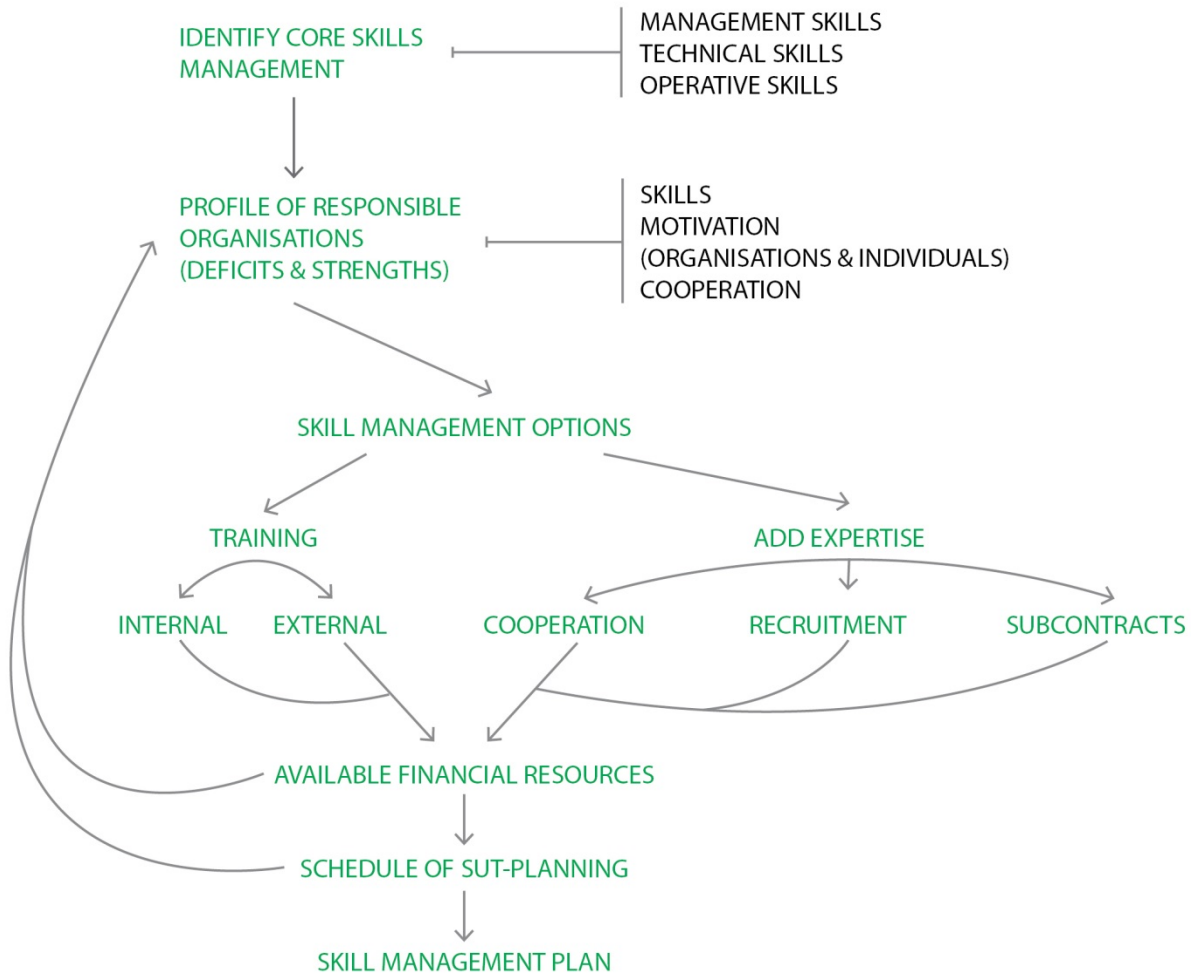


Figure 3: How to Develop a Skill Management Plan (Bührmann et al., 2011, p. 24; PILOT, 2007)

2.1.2 Identify key stakeholders

A critical step in the preparatory phase of developing a UMP is to accurately and comprehensively identify all relevant stakeholders. This is especially helpful in anticipating conflicts between stakeholders as well as utilizing alliances between others. Such factors may greatly influence the planning process. Therefore, a thorough understanding of the stakeholder scenario is necessary in order to determine how to best approach all stakeholders, especially those groups which are traditionally less engaged in community planning. The following steps should be carried out:

- Identify all relevant stakeholders and map out their aims, power, abilities, and resources. Utilizing table 2 below can facilitate this process.
- Determine which stakeholders may be weaker, less engaged, and in need of empowerment.

- Establish create a cooperative planning alliance of all key stakeholders, find potential synergies between actors, and work to avoid power conflicts wherever possible (Bührmann et al., 2011).

	Low Influence	High Influence
Low Stake	Least priority stakeholder group	Useful for decision and opinion formulation, brokering
High Stake	Important stakeholder group perhaps in needs of empowerment	Most critical stakeholder group

Table 2: Stakeholder Influence-Interest Matrix (UN-Habitat, 2001)

Identification and assessment of stakeholders also provides critical information for assembling a planning group for the UMP. In creating the core planning group, the following is advised:

- Strive to keep the size of the group small to maximize efficiency. At the same time, ensure that all skill sets and knowledge resources are being tapped. Draw on expertise from transport and stakeholder engagement professionals as well as members of appropriate city departments.
- Ideally, the size of the group should be limited to 10 people. This may not be possible for large projects. In this case, try to sub-divide the project into smaller tasks and create small planning groups for each.
- If possible, try to engage people who have a personal stake in the success of the project and have a demonstrated history in good cooperation.
- Select a project manager who has pertinent experience and is seen as having credibility among relevant stakeholders (Kelly et al., 2004).

2.1.3 Identify geographic scope

It is important to note that each urban mobility plan must be tailored to suit the local context. Defining the geographical scope of the plan is a vital part of this process. Other key components of this phase include: cooperating with stakeholders, integrating policy, and finally, agreeing on a work plan.

- Evaluate travel patterns and define perimeters for UMP. Both short-distance trips within the urban area as well as access to long-distance corridors should be considered.

- Engage key stakeholders within the planning perimeter and seek to gain consensus on geographical scope of the UMP. If consensus is not possible, endeavor to achieve cooperation among all stakeholders as a minimum baseline.
- Allocate responsibility to appropriate stakeholders for each stage of the plan. Facilitate open and transparent communication among all stakeholders. This may involve the employment of permanent staff to report regularly to key decision makers in the political sphere (Bührmann et al., 2011).

2.1.4 Evaluate mobility conditions and development scenarios

This final element of the preparatory stage is critical, as it creates the foundation for setting goals in a way that is both logical and transparent. First, a complete analysis of the constraints and opportunities for urban transport and mobility should be conducted. This includes but is not limited to an analysis of: mobility and accessibility (modal shares, travel time, trip length, and land use parameters), infrastructure (quality, ease, and comfort), safety, security, affordability, environmental impacts (emissions, fuel consumption, and land resource depletion), health hazards, and economic indicators (Tiwani, 2012, p. 25). This assessment is useful, because it aids in understanding development in different scenarios in the future.

- Analyze land use in the urban area, including the city structure, location of LIC households, densities, mixed land use patterns, etc.
- Assess the quality of transport infrastructure in the area (NMT, public transit, and personal vehicles) (Tiwari, 2012)
- Identify relevant planning policies and documents and determine whether the UMP can build upon any existing strategies. Examples of such documents include:
 - City Development Plan
 - Master Plan
 - Comprehensive Transport and Traffic Studies
 - Industry Development Plan
 - Detailed Project Reports (DPRs) related to Transport Measures
 - Any other related plans/studies (ADB, 2008, p. 18)
- Using data evaluation and planning tools, identify as many transportation improvement alternatives as possible. Conduct social and environmental impact assessments for each, and evaluate viability (FHWA/FTA, 2007).
- Collect all available data on urban mobility in your area as well as on related fields that will impact the UMP. For example, while collecting data pertinent to pedestrians, it would be useful to gather information on:
 - Footpaths
 - Width
 - Single sided/both sides

- Continuity
 - Encroachment by other activity/vehicles
 - Pavement condition
 - Lighting
 - Clear markings
- Intersections
 - Signalized crossing
 - Level/raised crossing
 - Traffic calming tools like speed breakers
 - Intermediate crossing sections
 - Crossing distance
- Access
 - Barrier free access to bus stops
 - Barrier free access to footpaths (Ramachandra Rao et al., 2012, p. 14)
- Meet with community members to understand their perception of present urban mobility conditions. This may include household surveys, intercept surveys, phone surveys, semi-structured interviews, focus group discussions. Disaggregate this data according to social identity criteria such as gender, income level, age, ethnicity, etc. to ensure to the greatest extent possible that all social groups are represented (See Ramachandra Rao et al., 2012 for further information on calculating sample size and margin of error).
- Evaluate the reliability of all data collected, and synthesize its content. If any significant gaps in the data appear, work to fill them. This can be done using a variety of primary or secondary research techniques. The best method for any given scenario will depend on context.
- Based on policy objectives in your city, create quantitative indicators to describe the current transport situation. For instance, the number and severity of accidents can tell about the current road safety conditions.
- Identify areas within the transport system that need increased resilience. A UMP is best suited to address long-term issues, such as inadequate fuel supply (operational plans are better suited to tackle short-term issues, such as flooding).
- Based on the above data, and in collaboration with relevant actors, create a quantitative summary of the present state of urban mobility in your area. Prioritize all main issues that the UMP needs to address (Bührmann et al., 2011).

Case Study: Budapest

The Budapest Transport Company was established in the 1960s. The company was responsible for providing public transport services for the city area. With time, the infrastructure of the company began to show cracks. A committee was appointed in order to survey the condition of the company's services, fleet, operations, etc. The transport company looked towards the success of Transport for London (TfL) for the overhaul of its administration, operation and financing. On the basis of the recommendations, a motion was passed by the General Assembly of the Municipality of Budapest to establish the Centre for Budapest Transport (BKK). It is an independent body owned by the city municipal body, national government and the regional county.

Since its establishment in 2010, it has undertaken many major projects to make the public transport services more accessible, reliable, and safe. Not only was the fleet upgraded and expanded, but the services were also expanded greatly. Integration of the transport services has greatly benefitted its organizational structure and its ability to streamline the decision-making process. Regional transport companies too are needed to get their transportation plans approved from the government. Efforts to make the plans of the city and the region synchronous with one another are being conducted by them. A competitive tendering process will begin to operate soon as the directly awarded contracts after the overhaul of the transport company soon come to an end. The BKK has a budget awarded to it by the central government and was initially supported by an EU grant (BKK, 2013).

Sample Case

In our ideal sample scenario, an independent facilitator is employed to conduct a situational analysis of CITY in order to understand the best conditions for developing a UMP. She and her team comprise researchers with experience in holistic development planning. They have no bias or personal stake in the UMP, but do have a clear understanding of the local context (political and economic conditions, cultural norms, etc.).

The research team carries out a thorough literature review to further acquaint themselves with transport and transport-related legislation in CITY. Any opposed or ineffective policy is noted as well as any expected reasons behind these issues. The team uses this secondary research to gain a preliminary understanding of the current social, economic, and political scenario as it affects mobility in CITY. It examines factors including: projected economic and population changes in the urban area, current and projected future transportation needs, current operations, maintenance, and safety of transport facilities.

The team then endeavors to understand the context on a deeper level, through in-field observation and interaction with stakeholders. An exploratory transect walk is conducted to better understand the landscape, land uses, location and distribution of resources. The team utilized social and community resource mapping tools to gain an overview of relevant stakeholders, target areas, and issues. The team conducts separate, household surveys and semi-structured interviews with representatives from the community, civil society organizations, local businesses, the local government, and any other relevant stakeholders to understand the priorities and problems perceived by each group.

After sufficient evidence is gathered, the facilitator convenes a meeting with all relevant stakeholders to share findings and invite feedback. She then makes recommendations for and assists in putting together a small planning group that is representative of all viewpoints. The team decides on the time and place of the second meeting, to be held 1-2 weeks in the future. The entire process outlined above lasts 2-3 months.

2.2 Identify Objectives

The first stage in this process is to assess the UMP's vision statement to ensure that it works to achieve the aims of a sustainable transport system (discussed previously). The vision statement and associated objectives should all be people-centered with a focus on inclusivity and well-being. It should also be in line with the overall development vision for the urban area (PPIAF, n.d.). Figure 4 shows an example of the inter-linkages between a UMP vision, its goals, objectives, and criteria.

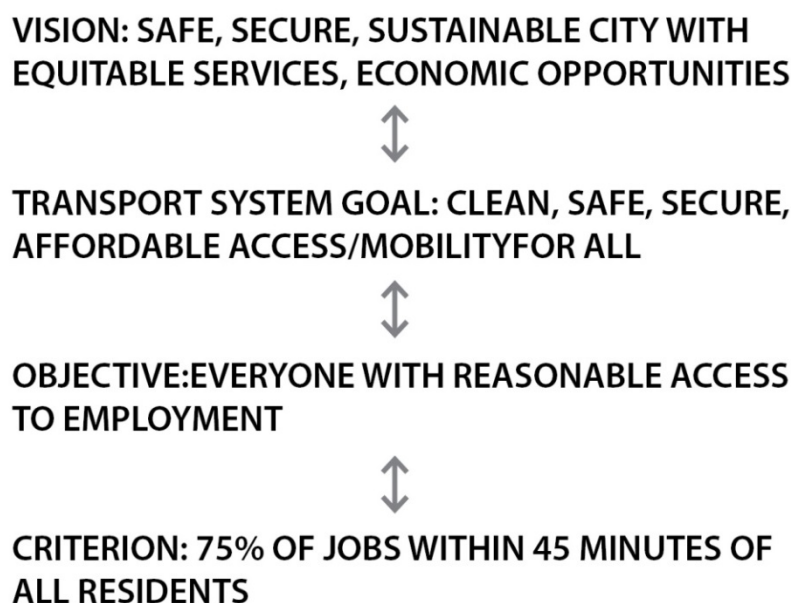


Figure 4: (Adapted from PPIAF, n.d., p. 23)

The UMP's vision statement needs to be carefully created on a case-by-case basis, taking into account the particular challenges of a given urban context. Below are some critical aspects which should be clearly defined for any UMP vision statement:

2.2.1 Transport Infrastructure (including for Non-Motorized Transport users)

The first step is to conduct a thorough review of existing transport infrastructure in your urban area. In addition to infrastructure serving primarily motorized vehicles (roads, intersections, traffic signals, etc.), safety, pedestrian, and NMV facilities should also be assessed. The areas that are in a critical state should be determined and analyzed further. Table [X] below provides an example of how such a review can be conducted (ADB, 2008).

Survey Items	Description
Outline of Road Network	In order to provide a comprehensive outline of the city's road network, collect information such as road length, right of way, and road density.
Inventory of Arterial Road Network	Compile inventory of the arterial road network of the city to be used for subsequent development of a transport demand model.
Inventory of Underpasses and Flyovers	Identify all existing flyovers at intersections, railway over bridges (ROBs), and railway underpasses.
Inventory of Major Intersections	Identify and inventory critical intersections and roundabouts, in particular those intersections that are important from the viewpoint of the entire road network or that are heavily congested.
Parking Facilities	Review of the city's existing parking facilities for both on-street and off-street parking.
Traffic Control Facilities	Compile a list of traffic control facilities such as signals.
Pedestrian Facilities	Summarize data on pedestrian facilities.
NMV Facilities	Facilities for non-motorized vehicles (NMVs), such as bicycles and cycle-rickshaws are recognized as an important component of a sustainable transport plan.
Level Crossings	Collect data on level crossings as level crossings are not only major bottlenecks of the network, but also cause accidents for both road traffic and the railway.
Public Transport and Paratransit Facilities	Prepare a list for bus stops, paratransit stops, parking and terminals.
Map of Road Infrastructure and Facilities	Based on the above inventories, prepare maps indicating locations of infrastructure measures.

Table 3: Sample Review of Existing Transport Infrastructure (ADB, 2008, p. 18)

The overarching goal of sustainable transport should play an important role in the development of a UMP's vision with regards to transport infrastructure. Public transit should be emphasized,

and, importantly, the needs of non-motorized transport (NMT) users should be integrated into the vision for the UMP.

2.2.2 Land use and urban design (including public spaces)

Land use and urban design should also be taken into account during the development of a UMP vision statement. The plan should maintain cultural sensitivity by identifying and preserving sites of cultural significance. It should work towards creating more livable neighborhoods with greater social cohesion (TERI, 2010).

The way in which public space is distributed within a city says a lot about the prioritization of people and transport modes. The two Colombian cities shown in Figure 5 below illustrate this:

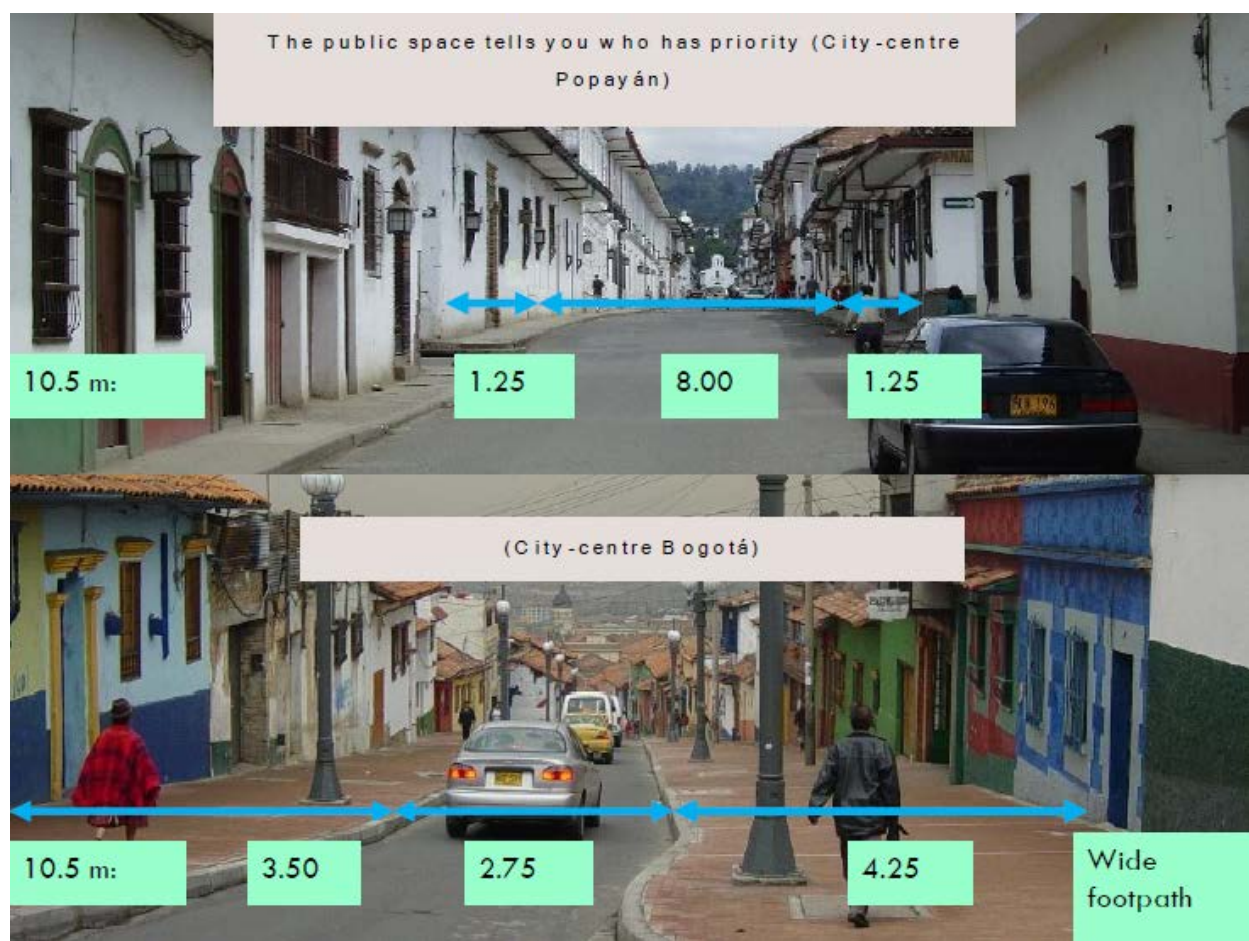


Figure 5: Prioritization of Public Space (Arora and Gadepalli, 2012)

Geospatial technologies are useful tools in urban mobility planning and can be used by a different actors (policy makers, transport planners, NGOs, etc.). With geospatial technologies, existing data can be used to picture and create a variety of scenarios, and potential impacts can be better understood. This can result in more informed decision making. It can also lead to more

sustainable outcomes, because such technologies challenge and offer alternatives to standard mobility planning strategies. Additionally, they are typically counterintuitive to transport and traffic engineering (Arora and Gadapalli, 2012).

2.2.3 Safety and security (recommendations for motorized transport as well as NMT users, road safety cells, etc.)

Safety and security should be a top priority in any UMP vision statement, as it directly impacts on the quality of life of the people, and urban mobility planning is an inherently people-centered approach. Thus, the vision statement should include objectives which address the needs of both motorized transport as well as NMT users. Examples of such objectives include:

- Providing segregated rights of way for cyclists and pedestrians
- Providing a safe environment for mobility of all traveler categories
- Ensuring strict enforcement to reduce encroachment of footpaths
- Specific recommendations for security of women, children, elderly and vehicles (TERI, 2010, p. v)

To obtain indicators of safety and security in an urban area, the following secondary data should be collected. Additionally, a perception study is recommended.

Data Required	Description
Traffic Count	Screen line by modes
	At intersection by modes
Delay and Queue Length	Queue length by mode
	Delay by mode
	Travel speed by mode
Number and location of facilities on road	By victim mode (Traffic Police)
	By impacting vehicle (Traffic Police)
Reported crimes	Disaggregated by mode (Police)

Figure 6: Data Needed for Safety and Security Indicators (Jain, 2012, p. 14)

2.2.4 Accessibility

By definition, a sustainable urban transport system offers and improves access to all traveler groups, and by effect “promotes equity in terms of opportunities available to individuals, companies, and societies for their overall growth” (TERI, 2010, p. 26). Such a system allows residents access to any transport mode (including walking, NMV, public transport, and personal vehicles). However, it encourages public and non-motorized transport modes.

Accessibility (especially for vulnerable traveler groups) should therefore have its own set of objectives in the UMP. This involves the promotion of connectivity to areas inhabited by the urban poor as well as specific efforts to improve accessibility for vulnerable traveler groups

(including the disabled, women, children, and the elderly). Equitable use of infrastructure (for example, equitable allocation of road space) should also be considered in the UMP (TERI, 2010). Table 4 below provides an example scenario for assessing equitable access in urban mobility planning.

UMP Recommendations	Corresponding projects/studies/proposals identified in the UMP	Remarks
Dedicated road space for mass transit and NMT NMT Plan Public transport system Road infrastructure improvements/expansion	BRTS Bus augmentation Rail based MRT Footpaths Road projects Mobility corridors	No projects identified for cycle paths Need to ensure physical and financial accessibility of all vulnerable traveller categories while detailing the public transit and NMT projects

Table 4: Assessing Equitable Access (TERI, 2010, p. 48)

2.2.5 Equitable Mobility Strategies

Equity with regards to mobility should be cross-cutting through multiple other objectives of the UMP. Gender equity should be ensured during the participatory planning stages of the UMP. Gender equity should also be a part of the cross-sector, integrated approach to designing the UMP. Furthermore, social equity should be a goal of any sustainable transport system. (Bührmann et al., 2011).

Exclusive mobility plans have a tendency to favor:

- Main breadwinners only (male)
- Motorized modes
- 'Regular' trips (O-D, frequency/week)
- 'Long enough' trips
- Middle class
- Well-to-do areas (easier to survey) (Mahadevia and Joshi, 2012)

Therefore, equitable mobility plans should encompass all of the dimensions illustrated in Figure 7 below:



Figure 7: Dimensions of Inclusiveness in Mobility Planning (Adapted from Mahadevia and Joshi, 2012)

The affordability dimension refers to the percentage of total household expenditure that is dedicated to transport. The social dimension explicitly includes the poor and socially marginalized (based on gender, caste, religion, etc.). The occupational dimension encompasses blue collar and white collar laborers alike. The locational dimension facilitates the accessibility of different destinations (work-residence, residence-social facilities, etc.). Finally, the modal dimension aims to include all modes, and especially promote NMT.

In order to remove biases and be as inclusive as possible, a carefully designed data collection and analysis process should be employed. OD surveys may be utilized, but this alone will be insufficient to achieve an inclusive sampling. Fresh data should be collected on household-based travel demand (of all modes – including pedestrians and bicycles, and all subsets of society – including slum dwellers, street vendors, and minority groups) (Jain, 2012). This data should be:

- Representative of spatial distribution
- Representation of different income and social groups
- A two-stage sampling (both city-level and neighborhood-level) (Mahadevia and Joshi, 2012, p. 11).

2.2.6 Integration (of public transport system, land use)

Integration is important both in land use and transport systems, because it leads to more efficient and sustainable mobility for all people. It also offers better accessibility in myriad areas, including education, employment, health, as well as other goods and services (ADB, 2008).

Some of the benefits of effective integration of land use and transport planning include:

- Reduction in the need to travel
- Encouragement of walkable / cyclable communities
- Promotion of transit-oriented growth
- Promotion of balanced spatial growth
- Promotion of social cohesion and community livability (TERI, 2010, p. iv)

The World Bank recommends integration in the following areas:

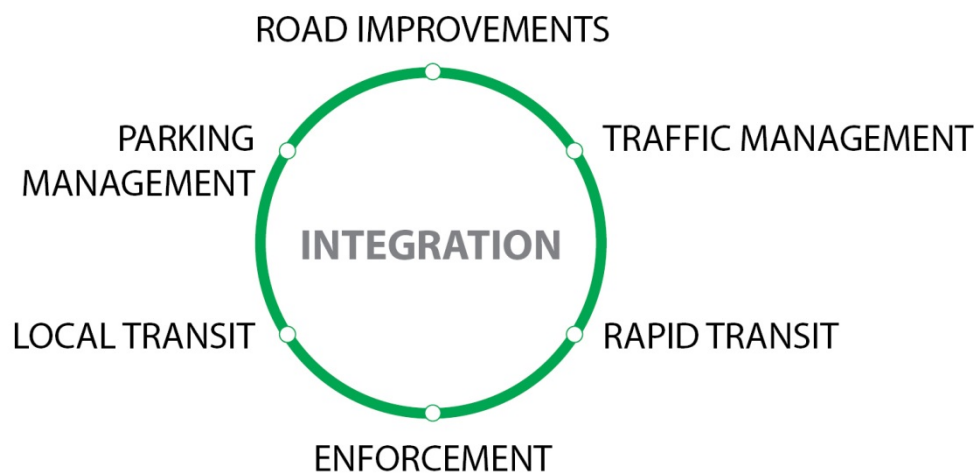


Figure 8 Integration (PPIAF, n.d., p. 32)

2.2.7 Health and well-being (clean/alternative fuels, promotion of public transport, reduction of vehicular pollution, etc.)

In keeping with the overall aspiration of higher quality of life associated with a UMP, it is paramount that the vision statement strives to improve the health and well-being of the people. A sustainable transport system is one which has the lowest possible negative impact on human health. This involves minimizing air and noise pollution (environmental initiatives) as well as limiting accidents, injuries, and fatalities (also linked to safety/security initiatives and urban design).

Therefore, a UMP should aim to limit:

- Air pollutants
- Emissions

- Noise pollution
- Water pollution
- Land pollution
- Waste generation
- Ozone depletion

And reduce dependence on fossil fuels by:

- Promoting mass transport
- Promoting non motorized transport (NMT)
- Energy efficiency
- Ensuring smooth movement on roads
- Promoting use of clean fuels like electricity (from renewable energy sources), solar energy, hydrogen, bio-fuels, etc. (TERI, 2010, p. 26)

2.2.8 Efficiency

Efficiency in a UMP is important for multiple reasons. First, it provides recommendations to reduce traffic congestion/demand as well as manage current traffic. Second, a UMP which is efficient automatically encourages more users of the system, which by effect promotes sustainability. Among other benefits, an efficient UMP can:

- Promote smooth movement on roads
- Provide for incentives for shifting to collective transport modes; disincentives for using personal motorized transport
- Encourages virtual commuting
- Promote efficient movement of freight traffic (TERI, 2010, p. v)

Case Study: Singapore

Urbanization of Singapore after independence was heavily motorized and dogged by inadequate public transport. Growing concerns about sustaining the city's economic, social and environmental infrastructure prompted the authorities to develop a comprehensive plan in 1972. It laid out an extensive network of transport infrastructure and buttressed it with equally strong spatial and land use policies to decentralize the growing city. Every successive regional development plan has strived to be as holistic in its approach as possible and has yielded impressive results for the world to see. Citizens not only enjoy diverse modes of transport but incentives that support the vision of the city, as well. Quality of life and people-centered development have evolved and continue to drive the spirit of planning for the city. It is worthy of note that the city continues to be loyal to its vision. Singapore's unique governing structure and advantageous urban area greatly support the city's ambitions.

The objective of transport planning authorities of Singapore for its transport policies was to discourage vehicle density on its roads by providing its citizens high-quality public transport options. It strongly believes in providing people-centered options for mobility that suit the diverse needs of its population. The city has showed an envious commitment to its vision and made sustained efforts towards realizing it with a combination of imposing regulations, providing infrastructure and effective governance. The Revised Concept Plan of 1981 comprehensively laid out a plan to integrate development of transport services with land use policies to maintain the density of growth within the city. Subsequent plans have been drawn up in order to fulfill the city's vision.

The Land Transit Authority (LTA) of Singapore is responsible not only for planning and development of transport infrastructure, but also bringing together various planning organizations to design and implement integrated transport and land use policies. It was established as a statutory body under the Department of Communications by unifying four of its existing bodies (the Registry of Vehicles, Mass Rapid Transit Corporation, Roads and Transportation Division of the Public Works Department, and the Land Transport Division). Singapore adopted integrated approaches towards planning early on in order to maintain the momentum of industrialization in a nation with scarce resources. Although the State mostly functioned in the capacity of providing transport services after independence, it quickly evolved to exercise greater control over transport planning and regulation as the city began to urbanize rapidly and rely increasingly on cars.

Although LTA was formed gradually, transport policies have enjoyed a shift towards more inclusive and sustainable options for decades. The administrative bodies have monitored the implementation of their policies with rigor and iterated from their learning swiftly (Chor, 1998).

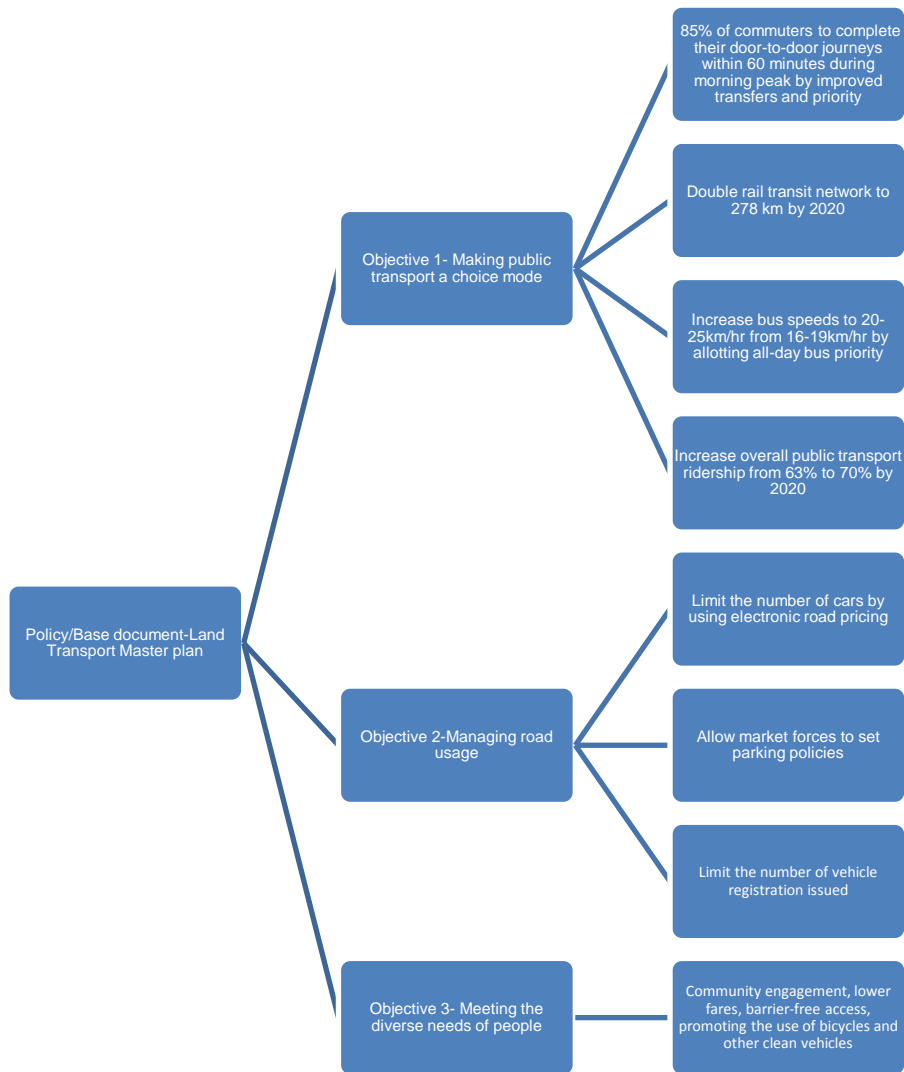


Figure 9: Singapore's systematic approach of setting performance targets in line with policy
(Adapted from TCRP, 2010)

Sample Case

At the second meeting, the planning team selects a team leader who is unanimously viewed as impartial to direct the planning process. The role of the team leader is to act as a facilitator, ensuring that everyone's views are heard and receive equal consideration. The team leader also handles logistical matters such as arranging meetings, ensuring that deadlines are met, etc. The team leader also has the power to cast the deciding vote in the event that the planning team cannot reach a consensus on its own. In our sample case, the independent facilitator is chosen to take on this position.

The team collaboratively brainstorms all existing issues affecting urban mobility in CITY. The facilitator records all of these on a whiteboard visible to everyone. After an exhaustive list is completed, the facilitator then asks the team to determine each issue's type by assigning it to one of the eight categories listed above. For example, all identified issues impacting accessibility are grouped together. The facilitator outlines these categories and issues for each on the whiteboard. Viewed in terms of this categorization, the facilitator then invites team members to reevaluate the issues to see whether any other issues belonging to these categories have been overlooked as well as whether any additional categories should be included.

Once the sub-groupings are complete, the team collectively decides on the objectives of the UMP. They first decide whether all of the issues listed during the brainstorm are appropriate to be addressed in a UMP. Once the issues to be tackled are decided, these are translated into UMP objectives. This includes many long-term goals, as urban mobility planning is an inherently long-term process, but it also importantly includes short-term goals in order to demonstrate progress to interested stakeholders over the course of the UMP implementation.

The team convenes multiple times during this stage to analyze, interpret, and revise objectives as necessary. This process lasts for 1-2 months.

2.3 Draft UMP

The next step in developing a UMP is the drafting phase. It is likely that this step will be repeated and/or the draft modified as the work progresses.

2.3.1 Agree upon means to realize objectives

Based on the objectives defined in the previous step, relevant tasks need to be determined. This should be a highly cooperative and coordinated decision-making process. A coordinator should then be delegated to organize resources and assign responsibilities. The realization of the objectives set forth in the previous step can take on many forms, depending on context.

However, there are some elements which should remain constant across all UMPs. A strategy for the translation of objectives into concrete projects should be created and a corresponding timeline established. Clear deadlines should be defined and responsibilities delegated to all responsible parties. Finally, the strategies to finance projects as well as the allocation of funding should be determined.

2.3.2 Outline timeline and milestones

The timeline created in step 2.3.1 should be further elaborated, adding milestones and securing political approval where necessary. Flexibility is important here, as it may become necessary to alter the work plan over the course of the work (Bührmann et al., 2011). This stage should include the following steps:

- Work to make sustainability the core focus of all stages of the UMP implementation schedule (which, as discussed previously, should overlap with other sectors in addition to transport and mobility).
- Decide on a realistic timeframe for creating an operational UMP framework. Institutional, political, technical, and other local factors will largely determine the length of this process, but 1-3 years is typical (this includes preparatory phases preceding the planning process). The planning process alone would take 1.5 years in an ideal scenario.
- Take decision-making windows into account in determining the best times for political coordination on the UMP. For example, the months leading up to an election may hinder progress on the UMP and impact on the overall timing of the process.
- Factor short-term, high visibility achievements into the implementation plan. This is important for decision makers who need to demonstrate advances towards meeting sustainability goals. It is also helpful in avoiding the impression of project stagnation. It is equally important, however, that these measures do not jeopardize the integrity of the UMP approach over the long term.
- Determine a timeframe for implementation that is fitting to the local context. This can range anywhere from 3 to 10 years.
- Create a monitoring and evaluation schedule to review and update the plan every 2-5 years (Bührmann et al., 2011).

A summary of the above timeline is illustrated in Figure 10 below:

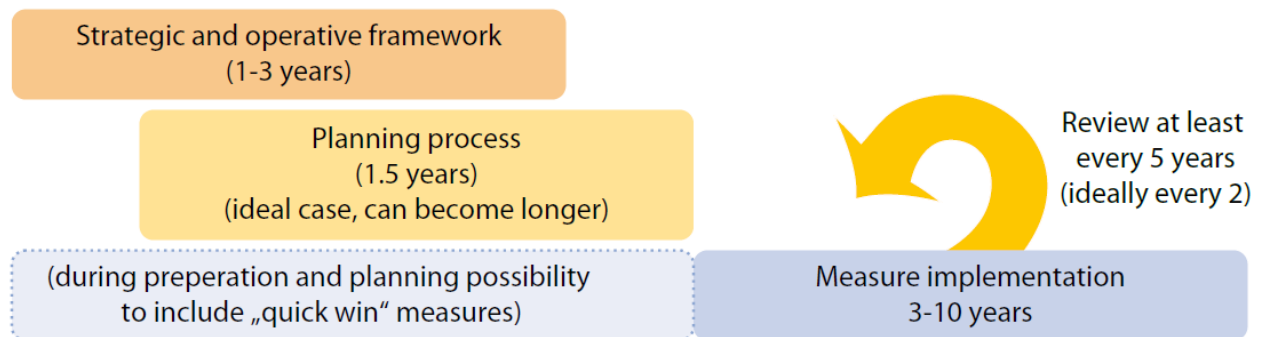


Figure 10: Timeline for a UMP (Bührmann et al., 2011, p. 30)

2.3.3 Define clear implementation strategy

If there were any gaps in data identified during the situational analysis stage (step 1), use the data you have available to draft a preliminary plan, but also determine ways to close these gaps and create a more complete plan later on (Bührmann et al., 2011).

2.3.4 Make recommendations on institutional set-up

A robust institutional set-up is useful in helping an urban area implement its UMP in an integrated way. The UMP should provide thorough recommendations for institutional mechanisms which ensure that the process is coordinated, inclusive, and participatory. Key questions to be asked at this stage are:

- What are the institutional arrangements being proposed to implement the plan?
- What kind of structure is proposed for urban transport authorities, and what are the functions and powers given to them? (TERI, 2010, p. vi)

Institutional set-up can be carried out in the following steps:

- Assign roles to each member of the planning group (managing the project, evaluating the process, providing information, representing special interest groups, etc.).
- Define all official decisions that need to be made, and list all information required to make these decisions.
- Decide on a hierarchy of power and define responsibilities within the team. Determine who has the deciding vote in the event that no consensus can be reached within the team.
- Define all necessary organizational groups. In addition to the core planning group, what other project groups, working groups, committees, etc. will be necessary?
- Define members of each organizational group, and establish a schedule of regular meetings for each. Frequent communication is essential for the success of the UMP (Kelly et al., 2004).

An example of an institutional organization for transport planning is illustrated in Figure 11 below. It is important to note that this is an example from a particular context and should not be replicated on other contexts. Rather, it is meant to serve as a starting point for designing an institutional set-up in other contexts.

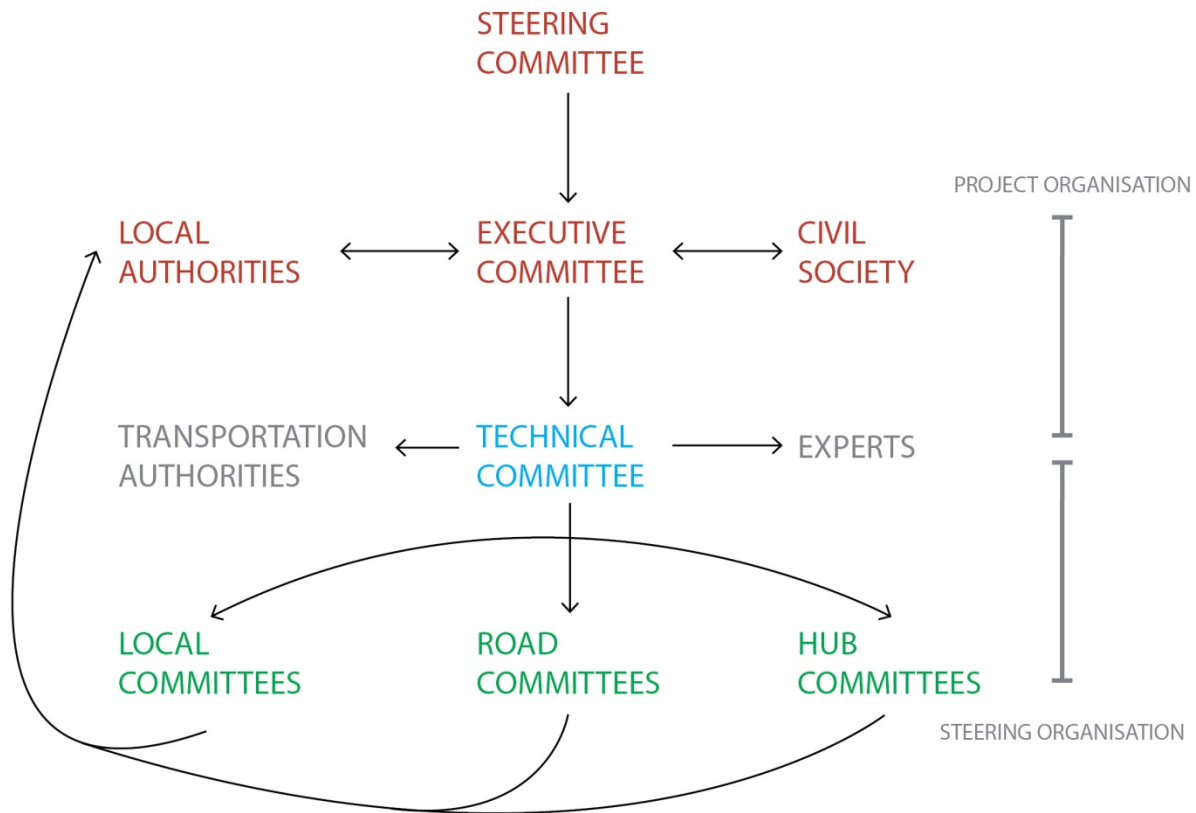


Figure 11: Sample Organigram for Transport Decision Making in a Large Urban Area (Kelly et al., 2004, p. 9)

2.3.5 Incorporate Monitoring and Evaluation into the Plan

Monitoring and Evaluation (M&E) should be an integral part of the plan. This should include indicators and targets to assess achievement of objectives. It should also contain some discussion on who will be involved in the M&E process and how. Some key questions to be asked include:

- Are there any targets set to be achieved through implementation of plan strategies? If yes, then are these targets in line with the transport vision for the city?
- Does the UMP formulate indicators to measure performance of plan implementation? What is the rationale to develop these indicators? (TERI, 2010, p. vi)

To incorporate suitable monitoring and evaluation into the UMP, the following tips are suggested:

- Select indicators to review both the planning and implementation stages of the UMP. These should include data on:
 - Action taken (e.g. construction of new infrastructure)

- Impact of action (e.g. improvements on quality of life)
- Planning and implementation process (e.g. efficient use of resources)
- In addition to indicators of achievement, it is also important to define indicators that measure trajectory and progress towards reaching targets.
- Indicators should be both qualitative and quantitative.
- Arrange for pre-implementation appraisal to use as a benchmark for post-implementation evaluation.
- Re-examine data collected in step 2.1.4 and determine whether any gaps have become evident during implementation. If yes, revert back to step 2.1.4 and revise the UMP accordingly.
- Incorporate monitoring and evaluation into the UMP post-implementation project schedule.
- Allocate responsibilities for conducting M&E to an experienced, unbiased third party.
- Appropriate funding for M&E (usually a minimum of 5 percent of the total budget) (Bührmann et al., 2011).

It is important to note that M&E does not need to be a costly endeavor. For example, key data can be collected inexpensively by means of a well planned survey, and the results can be used as indicators of progress or problems. This method is currently in use in various programs in Latin America (by the Latin American Development Bank and the *Cómo Vamos* program, for example) (Hidalgo et al., 2012).

2.3.6 Include capacity building programs

Finally, the draft UMP should include a detailed section on capacity building programs, as such initiatives will help to make urban mobility programs sustainable and locally-owned. If any capacity building programs have already been proposed in the area, they should be outlined here, as well as an evaluation of their adequacy and room for improvement (TERI, 2010).

Case Study: Cairo, Egypt

Greater Cairo (GC) is the largest urban area in Africa and the Middle East. It is a growing urban area with polycentric urban development. GC's center as well as its eight surrounding satellite cities serve as home to major urban activities. The city is densely populated, and the projected rapid population growth (from 17 million in 2005 to 29 million in 2030) poses many threats to the area (Metge and Jehanno, 2006; Huzayyin et al., 2009).

As in most mega cities in the developing world, road congestion and energy consumption are serious problems in Cairo. Due to limited space and financial resources, street widening proved difficult. The age and condition of the public transport vehicles was sub-standard, especially

during periods in Egyptian history when restrictions on foreign trade made it difficult to obtain spare parts and maintain the fleet properly. Additionally, the lack of bus priority measures made this means of transportation less efficient and hence less attractive to users. The government also encountered obstacles in promoting bicycle use in GC, due to a lack of safe cycling routes and the perception that this mode was socially unacceptable for certain classes.

Urban mobility planners in Cairo have understood the overlapping nature of transport, land use, energy, and the environment. Policies have therefore addressed all of these issues together. The government built a Ring Road around the periphery of the city and decentralized many of GC's main activities, thus alleviating some of the congestion in the core area. Green areas have been introduced throughout GC. New building regulations have been implemented to more efficiently utilize space, especially parking space. Laws have been put in place to protect agricultural land around GC. Finally, government monitoring and evaluation of the aforementioned issues has been bolstered (Huzayyin et al., 2009).

Sample Case

The team leader facilitates a discussion surrounding the translation of the previously determined aims into a strategy for achieving these aims. A SWOT analysis of the plan is conducted. Specific actions and processes required to achieve each objective are mapped out. Capitalizing on the individual skills and background of each team member, all members are given responsibility over at least one task in this process. The completion of each task corresponds with a measureable baseline target necessary for achieving a stated objective. This includes preparatory tasks such as securing funding, gaining political approval, and budgeting properly. The responsibilities of each team member are made clear, and timelines for all tasks are outlined. The team leader manages this stage and follows up with each team member to ensure that deadlines are met. This entire stage lasts 6-8 months.

2.4 Engage Stakeholders

The next step in developing a UMP is engaging stakeholders to gain feedback on the draft and understand the implications of the proposal from a holistic perspective. To this end, it is important to reach out to as many stakeholder groups as possible (PPIAF, n.d.). The below table identifies stakeholder groups that should be sought out in this process:

Government/Authorities	Business/Operators	Communities/Local Neighbourhoods	Others
Local authorities	Transport operators/providers	National environmental NGOs	Research institutions
Neighbouring cities	Transport consultants	Motorist associations	Universities
Local transport authority	Car sharing companies	Trade unions	Trading institutions

Traffic police	Bicycle rental operators	Media	Experts from other cities
Other local transport bodies	Other mobility providers	Local authority forums	Foundations
Other local authority bodies	National business associations	Local community organisations	
Politicians	Major employers	Local interest groups	
Other decision-makers	Private financiers	Cycle/walking groups	
Partnering organisations	International/national business	Public transport user groups	
Project managers	Regional/local business	Transport users	
Professional staff	Local business associations	Citizens	
Emergency services	Small businesses	Visitors	
Health & safety executives	Retailers	Citizens in neighbouring cities	
European Union	Utility services (e.g. electrics, telecoms)	Disabled people	
Ministry of transport	Engineers/contractors	Landowners	
Other national ministries		Transport staff	
Regional government		Parents/children	
		Older people	

2.4.1 Invite feedback on proposed measures

A common challenge of sustainable urban mobility planning is convincing local politicians of the value of this approach. One drawback of a UMP is that it that due to the long-term nature of this process, its positive impacts normally take more than one electoral cycle to become evident. Therefore, convincing local decision makers to prioritize a UMP may prove difficult. Stakeholder engagement can be helpful in this regard, as it can provide a concrete way to demonstrate voter support (Bührmann et al., 2011).

As previously discussed, participatory planning has many benefits. It works towards achieving local ownership, and by effect, sustainability of development initiatives. Participatory planning is most successful, though, when it is an inclusive and comprehensive effort. Often only certain stakeholder groups end up having a voice in decision making. It is the role of the UMP to ensure that everyone's needs are accounted for. Unique strategies should be employed when reaching out to city authorities, civil society organizations, local businesses, or all of them together. Outlined below are some guidelines for conducting planning of this nature.

- Identify and schedule suitable decision-making stages, formats and methods for involving all different stakeholder groups.

- Establish involvement activities as part of common planning practice - prepare, perform and follow up.
- Ensure a sound identification of all UMP stakeholders and involve them in all stages of the UMP.
- Take into account the different interests, resources and capacities of stakeholders.
- Provide sufficient and transparent information on the UMP in order to enable informed stakeholder involvement and to avoid negative perceptions (e.g. secrecy or corruption).
- Implement follow-up mechanisms to ensure that stakeholders' requirements are taken on board.
- Consider different involvement tools and techniques, and select the most suitable ones for your local context (Wolfram and Bührmann, 2007, p. 41).

2.4.2 Particular focus on vulnerable traveler groups

Furthermore, special care must be taken to include the most vulnerable, those traditionally not included in such participatory planning processes. The insight of these groups is especially important, because it is they who most rely on public transit and sustainable non motorized transport modes and are often not considered sufficiently, if at all, in urban mobility plans.

Case Study: Lille, France

In most cases, broader stakeholder involvement in the UMP process is limited to the stage following the preliminary drafting of the plan (informing them about the vision development process and outcomes). However, in Lille, France, the planning committee went above and beyond the call of duty and included the general public directly in building the UMP vision as well as interactively involving them in the preliminary design phases of the UMP itself.

Lille, an urban area comprising 85 municipalities, enacted its first urban mobility plan in 2000, called the *Plan de Déplacement Urbain* (PDU). Prior to government adoption of the draft PDU, several working groups were established, each made up of both local stakeholders and relevant political representatives. These working groups actively involved local residents in various activities. They organized a mobility forum (*Forum des déplacements*) and also set up a campaign known as *Mardi du PDU* (PDU Tuesdays). Both of these functioned as public debate sessions and provided a platform for all stakeholders to voice their opinions and engage in discussions with political representatives of Lille on an equal playing field. Technicians also contributed their expertise by explaining the various themes and components of the PDU.

After the PDU was drafted, all of the aforementioned stakeholders were again consulted to suggest modifications before the final plan was completed. This final stage involved a comprehensive campaign reaching out to citizens and other stakeholders. Through this, accountability and widespread acceptance of the PDU were achieved (Eltis, 2012).

Sample Case

Once a completed draft is prepared by the core planning group, the team engages in outreach activities to a wider audience within the community. Spreading the word takes on many forms. Team members tap into their personal professional and social networks to reach already recognized stakeholders in easily accessible spheres (political, corporate, and non-governmental). A UMP website is created for CITY, and traditional and social media outlets are utilized to notify the general public about the project. However, this is only the beginning of the process. The team then strategizes how to best reach stakeholders that are most vulnerable and typically less engaged in decision-making processes, bearing in mind that these stakeholders may not have access to all forms of information-sharing (internet, phone, etc.).

The planning team decides to contract the team leader (who was also the independent facilitator from Step 1) and her research team to conduct targeted field research in various areas of CITY. Several low-income neighborhoods are selected in different parts of the urban area, especially areas with highly limited accessibility to urban transport resources. The research team is sent into the field and meets with neighborhood residents, especially the disabled, the elderly, women, children, the socially ostracized, and other vulnerable groups. The research team discusses with them urban mobility issues affecting their lives, briefs them on the concept behind the UMP, explains the value of their opinion on the project, gets their preliminary feedback, and invites them to attend upcoming city-wide meetings to participate in the decision-making process. Transport to and from the meetings is offered to anyone in need of it. The research team also recognizes that the best way to reach out to vulnerable groups is to utilize the expertise of vulnerable groups themselves. Therefore, during these discussions, the team asks interviewees about existing social capital mechanisms (neighborhood organizations, etc.) available for spreading the word about the UMP. They also invite any interested participants to assist in their awareness-raising efforts.

After as many available stakeholders as possible have been contacted and notified about the UMP (a process lasting several months), a series of city-wide meetings are scheduled. The complete UMP draft is presented and the floor is opened to stakeholder feedback. The facilitator is present throughout to encourage participation of all attendees and limit domination of any one stakeholder or group of stakeholders.

2.5 Revise UMP

It should be expected that irrespective of the time and research that was put into drafting the UMP, it will go through one, if not many, stages of revision prior to implementation. It may become apparent that additional surveys and other primary data collection will be needed (TERI, 2010). This final step is likely to be part of an iterative process, repeated alone or in

conjunction with any of the preceding steps, each time the UMP is reviewed. It should be anticipated that the UMP will undergo some level of revision after every round of monitoring and evaluation. This should be incorporated into the timeline. Any revisions should be discussed with the stakeholders concerned in order to facilitate public acceptance and implementation of the plan.

2.5.1 Identify lessons learned

This is a crucial step which serves as a way to reflect on gaps in the plan as well as constraints and opportunities of the mobility scenario. It provides a springboard from which to respond to new developments. In undertaking this step, the following is advised:

- While reflecting on lessons learned, bear in mind that the UMP will not be flawless. It may become evident during this stage that certain elements of the plan no longer make sense. Remain open to this.
- Determine which objectives could not be met and why.
- Recognize how changing conditions may have made certain elements of the plan obsolete (See Bührmann et al., 2011).

2.5.2 Amend as necessary

The UMP will not remain static. As urban areas are in a state of perpetual fluctuation, so too must the UMP be able to adapt to suit current needs. Therefore, it is expected that the UMP should be reevaluated every five years at a minimum, and revisions made accordingly (GMDA, 2008). Any alterations to the UMP should be made in close collaboration with relevant stakeholders. Depending on how the program performs during implementation (a period which can last for several years), implementation strategies may need to be altered. Any changes made to the UMP should be transparent, and formal approval from political authorities should be obtained, as appropriate for the legal and institutional structure of the city in question (See Bührmann et al., 2011).

Case Study: Strasbourg, France

At the end of the twentieth century, the city of Strasbourg, recognizing a need to change urban mobility conditions in order to meet sustainable development goals, decided to draw up its first ever urban mobility plan. The primary focus of the plan was to abate the ubiquity of cars. The three objectives associated with this plan were: to reduce car traffic, to increase usage of public transport, and to increase bicycle usage.

The results of a post-implementation evaluation have pointed to many positive impacts of this UMP and also identified some lessons learned.

The top barriers observed are primarily non-technical in nature, which is common across many case studies on urban mobility:

Top five obstacles to the implementation of Strasbourg UMP

1. Legal problems
2. Problems of institutional/interdepartmental co-operation
3. Technical problems
4. Complexity of the new initiative
5. Insufficient public funds

The benefits seen since implementation of the UMP have been remarkable and in line with the objectives in the vision statement:

Top five benefits from the implementation of Strasbourg UMP

1. Better access for citizens
2. Generally higher quality of public services
3. Better co-operation with other institutions
4. Higher rate of enforcement of regulations
5. Better organizational integration

Notwithstanding the progress made to Strasbourg's urban mobility scenario, further issues have been brought to light which were not taken fully into account in the initial planning process:

Top five mobility-related problems in Strasbourg

1. Commuting to work during rush hours
2. Freight delivery in the city centre
3. Peri-urban freight traffic
4. Adoption of pedestrian-friendly mobility measures
5. Implementation of 30km/h-zones and traffic control devices (Ricci, 2000, p. 48)

The above example illustrates the need for regular monitoring and evaluation of any urban mobility plan. Although significant advances have been made towards achieving sustainable development in Strasbourg, this example also serves as a reminder of the dynamic and ever changing quality of cities, which necessitates constant reassessment.

Sample Case

While each stakeholder expresses his/her viewpoint in the previous step, the facilitator records all comments and recommendations. In a follow-up meeting with the core planning group, these points compiled and reviewed. The prioritization of objectives is discussed to ensure that the majority of stakeholders favor the plan outline. It is democratically decided which modifications should be made to the UMP and how. Not everyone is in total agreement with the plan, but due to the participatory nature of the process, it is understood that tradeoffs are inherent to the decision-making process.

Each team member determines whether he/she wishes to continue involvement in the post-implementation monitoring and evaluation stage of the process. A timeline for M&E is fixed at 2-year intervals. During M&E, the evolving urban mobility conditions in CITY are reassessed, and any necessary amendments to the UMP are made. This final step as well as any of the preceding steps are repeated as appropriate.

3 Conclusions

The five-step process described here is an ideal process, and it should be made clear that each city would need to modify it to make it its own. However, a few constants should be highlighted in all UMPs. A holistic, people-centered approach is critical for creating successful long-term transport solutions. Transport and mobility cannot be viewed in isolation. They must be integrated with all related planning areas that impact on quality of life. Furthermore, urban mobility planning must be participatory in order to be effective. Engaging all stakeholders, especially the most vulnerable and typically overlooked, creates a more equitable transport scenario and leads to development initiatives that are locally owned, and hence sustainable.

4 Abbreviations

BKK	Centre for Budapest Transport
DPR	Detailed Project Report
ECMT	European Council of Ministers of Transport
EST	Environmentally Sustainable Transportation
GC	Greater Cairo
LIC	Low-Income country
LTA	Land Transit Authority
M&E	Monitoring and Evaluation
NGO	Non-Government Organization
NMT	Non-Motorized Transport
NMV	Non-Motorized Vehicle
O-D	Origin-Destination
PDU	Plan de Déplacement Urbain
TfL	Transport for London
TRB	Transportation Research Board
UMP	Urban Mobility Plan

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7 Useful Definitions for Discussion on Urban Mobility

Transport and urban development concepts that might come up during the multi- stakeholder forum	Definition	Source
Accessibility	The ease of reaching destinations. The degree of ease with which it is possible to reach a certain location from other locations. One meaning of accessibility specifically focuses on people with disabilities and their ability and right of access to facilities and services.	GTKP
Access to and Egress from to transit	Time taken/distance to be travelled to reach a transit station from origin and time taken/distance to be travelled to reach the destination from the transit station, respectively.	
Area Licensing Scheme (ALS)	A demand management strategy aimed to reduce auto travel within city centres. The Singapore Area Licensing Scheme, introduced in 1975, required motorists to purchase a license (and display it) to enter the central area. It was the first pricing scheme to be successfully implemented in the world. It was replaced by the current Electronic Road Pricing (ERP) system in 1998.	GTKP
At grade	An at-grade intersection is a junction at which two or more transport axes cross at the same level (or grade).	
Auto-free Zones	Areas of a city or town in which automobile traffic is prohibited (also called "Car-free Zones and "Pedestrianised Zones").	GTKP
Average Daily Traffic (ADT)	The total volume of traffic, combining both directions, using a road in a single 24-hour period.	GTKP
Bikeway	A facility designed to accommodate bicycle travel for recreational or commuting purposes. Bikeways are not necessarily separated facilities; they may be designed and operated to be shared with other travel modes.	GTKP
Bikesharing	A bicycle sharing system, also known as bikesharing, is a service in which bicycles are made available for shared use to individuals who do not own them.	
Bus Lane	A lane designed to give priority to buses and save journey time in places where roads are congested with other traffic.	GTKP

Bus Rapid Transit (BRT)	A bus-based mass transit system that delivers fast, comfortable, and cost-effective urban mobility through the provision of busways and bus priority measures along with rapid boarding and alighting and excellence in customer service.	GTKP
Busway	A bus only, exclusive right-of-way (at-grade or grade-separated). Dedicated bus lanes that operate separately from all other traffic modes.	GTKP
Bollards	Rigid posts that can be arranged in a line to close a road or path to vehicles above a certain width. Bollards can be mounted near enough to each other that they block ordinary cars, for instance, but wide enough to permit special-purpose vehicles through. Bollards can be used to enclose car-free zones: removable bollards allow access for service and emergency vehicles.	GTKP
Carpooling	The shared use of a car, especially for commuting to work, often by people who each have a car but travel together to save cost and to promote other socio-environmental benefits. In some locations, there are special facilities intended to encourage carpooling such as designated pick-up points and high-occupancy vehicle lanes that only allow cars with multiple riders at certain times of the day.	GTKP
Carsharing	A type of car-rental where people rent cars for short time periods, often by the hour with self-service reservation, pickup, and return.	GTKP
Central Business District (CBD)	A term generally used to describe the heart of an urban downtown.	Hamilton City
Congestion Charge	A demand management strategy aimed to reduce auto travel into congested urban areas. The London congestion charge is a fee for some motorists travelling within those parts of London designated as the Congestion Charge Zone. It aims to discourage the use of private cars, reduce congestion, and raise funds for investment in public transport.	GTKP
Capacity	A transportation facility's ability to accommodate a moving stream of people or vehicles in a given time period.	FHWA/FTA, 2007
Carbon Monoxide	A colorless, odorless, tasteless gas formed in large part by incomplete combustion of fuel. Human activities (i.e., transportation or industrial processes) are largely the source for CO emissions.	FHWA/FTA, 2007
Demand-responsive public transport	Provision of public transport services to meet individual needs of travellers (origin and destination, time of day, etc.), normally using a central dispatching system.	GTKP

Density	Density is a measure of the intensity of use of housing land. It is calculated on the basis of the number of habitable rooms per unit area.	SCC
Design guidelines	Criteria established to guide development toward a desired level of quality through the design of the physical environment, and which are applied on a discretionary basis relative to the context of development.	Hamilton City
Electronic Road Pricing (ERP)	A demand management strategy aimed to reduce auto travel in selected areas and along certain routes within congested periods. Introduced in Singapore in 1998, the system is based on a pay-as-you-use principle and motorists are automatically charged during peak hours. A device known as an In-vehicle Unit (IU) is placed on the lower right corner of the front windscreen within sight of the driver, in which a stored-value card, the CashCard, is inserted for payment of the road usage charges. It is mandatory for all Singaporean vehicles to be fitted with an IU if they wish to use the priced roads.	GTKP
Environmental Impact Assessment	The process by which information about the likely environmental effects of major projects is gathered, evaluated and taken into account by the local authority in considering whether or not planning permission should be granted.	SCC
Environmental Justice	Environmental justice (EJ) assures that services and benefits allow for meaningful participation and are fairly distributed to avoid discrimination.	FHWA/FTA, 2007
Flyover/overpass	A bridge, road, railway or similar structure that crosses over another road or railway.	GTKP
Geographic Information System (GIS):	Computerized data management system designed to capture, store, retrieve, analyze, and display geographically referenced information.	FHWA/FTA, 2007
Grade separated	A grade-separated crossing provides continuity of a bicycle/pedestrian facility over or under a barrier. A bicycle/pedestrian crossing structure may be either a bridge or an underpass.	CAMPO
High-Occupancy Vehicle	(HOV): a vehicle with two or more occupants, used in HOV, or carpool, lanes.	GTKP
HOV Lane	A lane reserved for vehicles with a driver and one or more passengers. These lanes are also known as "Carpool Lanes", "Commuter Lanes", "Diamond Lanes" and "Transit Lanes".	GTKP
Impact Evaluation:	The assessment of the effects of an intervention beyond the outcomes on individuals targeted by the intervention.	
Infrastructure	The underlying foundation or basic framework of a city, including streets, parks, bridges, sewers, street lights, and other utilities.	Hamilton City

Instruments (policy, economic, fiscal)	Actions and rules that are implemented by the government to achieve a change in behavior. Examples include taxes, fees, and subsidies.	
Integrated Planning	Integrated Planning is the interaction between the transportation decision-making process and external processes. Identifying the influences of these external processes on the transportation process is important in ensuring the end product of the transportation process is comprehensive and attained through full collaboration with other partners.	PIARC
Integrated transport systems	Networks of links (bus, rail, road etc.) rather than individual routes, connected in terms of physical access, ticketing, service frequency, timing and capacity.	SCC
Intelligent transportation Systems (ITS)	A combination of Information Technology and telecommunications systems used in the development of car navigation systems, traffic signal control systems, container management systems, variable message signs, speed cameras, monitoring systems (such as security CCTV systems). Also included are applications that integrate live data and feedback from a number of other sources (such as parking guidance and information systems, weather information, bridge de-icing systems, and the like).	GTKP
Interchange	A grade separated intersection or junction that enables traffic to change from one road to another without crossing a stream of traffic.	GTKP
Intermodal	The connections between modes of transport.	GTKP
Land Use	Refers to the manner in which portions of land or the structures on them are used (or designated for use in a plan), i.e., commercial, residential, retail, industrial, etc.	FHWA/FTA, 2007
Living Street	A street in which the needs of car drivers are secondary to the needs of users of the street as a whole; traffic calming principles are integrated into their design.	GTKP
Mass Rapid Transit	A rail based public transport system that transports large numbers of people at high frequency through the provision of multiple sets of high capacity vehicles, high speeds, exclusive right-of-way infrastructure, efficient fare collection systems, and fast boarding and alighting techniques.	GTKP
Metropolitan planning organization	Organization made up of representatives of local government and transport authorities, with responsibility for defining transport policy in a given metropolitan area	PIARC

Mobility Management	A demand-oriented approach to passenger and freight transport that involves building partnerships and using a set of "tools" to support and encourage a change of attitude and behaviour among transport users towards using sustainable modes of transport. Mobility Management requires information, organisation, co-ordination and effective marketing and promotion.	GTKP
Modal Split	The percentage of travellers using a particular type of transportation. For example, if 60% of all travellers use cars to get from A to B, while 30% use the train and 10% use the bus, then the public transport (bus and train) modal share would be 40%, while the motor vehicle (car and bus) modal share would be 70%.	GTKP
Mode Share	The proportion of total journeys (trips) carried out by various modes of transport. Modal split can also be defined as the share of different modes of transport, including non-motorized modes and pedestrian trips, within overall transport demand.	GTKP
Mixed uses	Provision of a mix of complementary uses, such as say residential, community and leisure uses, on a site or within a particular area.	SCC
Multi modal	The availability of transportation options within a system or corridor.	GTKP
Non-Motorised Transport (NMT)	Any form of transportation that provides personal or goods mobility by methods other than by fuel powered engines (including electric power). This would include walking, trips by bicycles and tricycles, human portorage, handcarts and wheelbarrows; animal drawn carts and other human powered vehicles.	GTKP
Origin Destination (O-D) survey	A survey conducted of the traffic using the study area roadway system to determine/document current traffic patterns.	
Park and Ride	Public transport stations that allow commuters and other people wishing to travel into city centres to leave their personal vehicles in a car park and transfer to a bus, rail system (rapid transit, light rail or commuter rail) or carpool for the rest of their trip. The vehicle is stored in the car park during the day and retrieved when the commuter returns. Park and rides are generally located in the suburbs of metropolitan areas or on the outer edges of large cities.	GTKP
Parking Management	Parking Management includes a variety of strategies that encourage more efficient use of existing parking facilities, improve the quality of service provided to parking facility users and improve parking facility design. Parking Management can help address a wide range of transportation problems (see Parking Evaluation and Parking Solutions), and help achieve a variety of transportation, land use development, economic, environmental objectives.	VTPI

Paratransit	An alternative mode of flexible passenger transportation that does not follow fixed routes or schedules.	GTKP
Peak Hour	The 60-minute period in which the largest volume of travel is experienced.	GTKP
Peak Traffic flow	The maximum traffic flow recorded during a given period of time (e.g. hourly, daily, monthly).	PIARC
Pedestrian oriented	An environment designed to make movement by pedestrians fast, attractive and comfortable for various ages and abilities; considerations include separation of pedestrian and auto circulation, street furniture, clear directional and informational signage, safety, visibility, shade, lighting, surface materials, trees, sidewalk width, intersection treatment, curb cuts, ramps and landscaping.	Hamilton City
Performance Measures	Indicators of how well the transportation system is performing with regard to such measures as average speed, reliability of travel, and accident rates. Used as feedback in the decision-making process.	FHWA/FTA, 2007
Polluter pays principle	One of the core principles of sustainable development is the "Polluter Pays" Principle. This recognises that the polluter should pay for any environmental damage created, and that the burden of proof in demonstrating that a particular technology, practice or product is safe should lie with the developer, not the general public. Unfortunately, when and how much the polluter should pay is often unclear.	Sustainable Environment
Public Transit	Transport system available to the public in an urban centre, using vehicles designed for use by multiple individuals, with fares, schedules and routes that are planned and available in advance.	PIARC
Public Transport	Public transport includes public transit (urban buses, underground, tramways and suburban trains) and the use of road vehicles, trains, boats and sometimes planes. It may involve fixed fares, schedules and routes (ferries, trains and planes) or more flexible systems adapted to individual needs (car pooling and shared taxis). Public transit services are generally provided by buses, underground, tramways and suburban trains.	PIARC
Private Transport	A transport system in which one or more persons use a private vehicle.	PIARC
Quiet Lanes	Minor rural roads that are appropriate for shared use by walkers, cyclists, horse riders and motorised users. They should have low traffic flows travelling at low speeds.	
Road hierarchy	Categorisation of roads by function and intended traffic management treatment.	Hamilton City

Road Pricing	A term used to cover all the various charges applied for the use of roads. The term includes fuel taxes, licence fees, tolls, and congestion charges, including those that may vary by time of day, by the specific road, or by specific type of vehicle being used.	GTKP
Road Safety Audit	A systematic safety analysis procedure which brings traffic safety knowledge into the road planning and design process with the purpose of preventing traffic accidents.	PIARC
Sidewalk	A path for pedestrians, situated alongside a road.	GTKP
Site Plan	A plan prepared to scale, showing accurately with dimensions the boundaries of the site and the location of all buildings, structures, natural features, uses and principal site design features proposed for a parcel of land.	Hamilton City
Smart growth	An approach to urban planning and transportation that concentrates growth in the centre of a city to avoid urban sprawl; and advocates compact, transit-oriented, walkable, bicycle-friendly land use, including neighbourhood schools, streets that work for everyone, mixed-use development with a range of housing choices.	GTKP
Social Impact	A change in the quality of life of a community that extends beyond the direct use of the road space in the vicinity of the community.	PIARC
Speedtable	A traffic calming device designed as a long speed hump with a flat section in the middle. The long, flat design allows cars to pass without slowing as significantly as with speed humps or cushions.	
Stakeholders	Individuals and organizations involved in or affected by the transportation planning process. Include federal/state/local officials, MPOs, transit operators, freight companies, shippers, users of the transportation infrastructure, and the general public.	FHWA/FTA, 2007
Sustainable urban mobility	"The ability to meet the needs of society to move freely, gain access, communicate, trade, and establish relationships without sacrificing other essential human or ecological values today or in the future."	WBCSD, 2001

Sustainable transport system	<p>A sustainable transport system:</p> <ul style="list-style-type: none"> - Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations. - Is affordable, operates fairly and efficiently, offers a choice of transport mode and supports a competitive economy, as well as balanced regional development. - Limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, and uses non-renewable resources at or below the rates of development of renewable substitutes, while minimizing the impact on the use of land and the generation of noise. 	ECMT, 2004
Tactile paving	Tactile paving is a system of textured ground surface indicators found on many footpaths, stairs and train station platforms to assist blind and vision impaired pedestrians.	
Traffic Calming	A set of strategies which aim to slow down or reduce traffic, thereby improving safety for pedestrians and bicyclists as well as improving the environment for residents.	GTKP
Traffic Congestion	Occurs when transport demand exceeds transport supply in a specific section of the transport system. Under such circumstances, each vehicle impairs the mobility of others.	GTKP
Traffic Incident	An abnormal and unplanned situation, including an accident, adversely affecting the traffic flow.	PIARC
Traffic Management	The process of adjusting or adapting the use of an existing road system to meet specified objectives without resorting to substantial new road construction.	GTKP
Transit-Oriented Development (TOD)	A mixed-use residential or commercial area designed to maximize access to public transport, and often incorporates features to encourage transit ridership.	GTKP
Transportation Demand Management (TDM)	The application of plans and policies to change or reduce demand for car use by encouraging the behavioural change of household choices of travel. It is sometimes also referred to as "Travel Demand Management".	GTKP
Travel Time Index (TTI)	The ratio of the travel time during the peak period to the time required to make the same trip at free-flow speeds. A value of 1.3, for example, indicates a 20-minute free-flow trip requires 26 minutes during the peak period.	GTKP
Urban design	The planning and design of cities focusing on the three dimension form and function of public and publicly accessible space.	Hamilton City

Urban Traffic Management and Control (UTMC)	A framework to allow the different applications used within modern traffic management systems to communicate and share information with each other. Thereby a more robust and intelligent system can be used to meet current and future management requirements.	GTKP
Vehicle occupancy	The ratio of the number of passengers to the operational capacity of a vehicle. For private vehicles the driver is included.	PIARC
Wayfinding	The information available to people which they need to find their way around the city and can be verbal, graphic, architectural and spatial.	Hamilton City
Zebra crossing	A zebra crossing is a type of pedestrian crossing usually painted in alternating dark and light stripes on the road surface and designed to give rights of way to pedestrians, while crossing roads.	