European Platform on Sustainable Urban Mobility Plans

Topic Guide

URBAN ROAD SAFETY AND ACTIVE TRAVEL IN SUSTAINABLE URBAN MOBILITY PLANNING

Imprint

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Topic Guide Urban Road Safety and Active Travel in Sustainable Urban Mobility Planning

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1 ETSC also provided the minutes of the AG 8 Meeting in December 1st 2014 enriched with the outcome of different workshops on road safety and a first draft of their 'PIN Flash Report 37 Safer roads, safer cities: how to improve urban road safety in the EU, June 2019, which was the first basis for this Topic Guide

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1. Executive summary

A total of 9500 people were killed on urban roads in the EU in 2017, accounting for 38% of all road deaths. Cyclists and pedestrians together make up over half of all road deaths in urban areas– pedestrians account for 39% and cyclists for 12%. In the EU, road deaths on urban roads decreased by just 14% over the period 2010-2017 compared to 24% on rural roads.

For seriously injuries comparable trends are observed with also a need to focus more on urban areas. Cities and towns will continue to play a significant role in achieving the third EU target to halve the number of road deaths and the first EU target to halve the number of serious road traffic injuries by 2030 compared to 2020 levels.

Road safety should be an essential component in the planning and implementation of local and regional SUMPs as sustainability is not impossible without safety. In attempting to secure change in urban mobility patterns to more sustainable modes, road safety should be regarded as a critical challenge. Real and perceived safety has a profound effect on modal choice especially in terms of the most sustainable modes of travel - walking and cycling and the ability to access public transport. It is important to recognise that safer roads also mean more sustainable roads. If groups of road users are deterred from using unsafe roads, they might shift to other less sustainable modes of transport.

This document is an annex of the new 2.0. guidelines on *Sustainable Urban Mobility Planning (SUMP)* indicating the crucial elements to be included in the SUMP process and the produced SUMP document to make Road Safety an Active Travel the crucial focus of the SUMP. This is a main condition to come to a sustainable plan.

The basic concept of a strong urban safety approach is "vision zero" which targets an overall reduction of the number of road deaths and seriously injuries to "zero". Vision Zero is the starting point of the safe system approach adopted at EU level by the Commission in the third Mobility Package in May 2018.

In each of the eight SUMP principles Road Safety is a crucial precondition to come to a sustainable urban mobility approach.

Policy makers and involved stakeholders should integrate road safety in each step of the planning cycle of the SUMP. In this way road safety will be kept high on the agenda while developing and implementing a SUMP and planners should be fully aware of the importance of road safety for the overall success of the SUMP. Crucial specific safety related elements are:

- Involve also stakeholders as health organisations, Active Travel organisations etc.
- Involve safety experts.
- Collect and understand safety data at least to answer the main safety questions, as where we have which type of collisions, who are the target groups for any action and what type of specific measures should be put in place.
- Include "Vision Zero" and the Safe System Approach in the key SUMP vision.
- Set clear intermediate targets to reduce road deaths and seriously injured.
- Identify effective and complementary measures in the domains of Engineering & infrastructure, Education & awareness, Enforcement & legislation and Emergency services.
- Create and maintain a wide public support and a political ownership
- Monitor the evolution in deaths and seriously injuries and review strategies.

2. Introduction

2.1 The new SUMP guidelines

This document provides guidance on a specific topic related to *Sustainable Urban Mobility Planning (SUMP)*. It is based on the concept of SUMP, as outlined by the European Commission's Urban Mobility Package[2] and described in detail in the European SUMP Guidelines (second edition)[3].

Sustainable Urban Mobility Planning is a strategic and integrated approach for dealing with the complexity of urban transport. Its core goal is to improve accessibility and quality of life by achieving a shift towards sustainable mobility. SUMP advocates for fact-based decision making guided by a long-term vision for sustainable mobility. As key components, this requires a thorough assessment of the current situation and future trends, a widely supported common vision with strategic objectives, and an integrated set of regulatory, promotional, financial, technical and infrastructure measures to deliver the objectives – whose implementation should be accompanied by reliable monitoring and evaluation. In contrast to traditional planning approaches, SUMP places particular emphasis on the involvement of citizens and stakeholders, the coordination of policies between sectors (transport, land use, environment, economic development, social policy, health, safety, energy, etc.), and a broad cooperation across different layers of government and with private actors.

This document is part of a *compendium of guides and briefings* that complement the newly updated second edition of the SUMP Guidelines. They elaborate difficult planning aspects in more detail, provide guidance for specific contexts, or focus on important policy fields. Two types of documents exist: While 'Topic Guides' provide comprehensive planning recommendations on established topics, 'Practitioner Briefings' are less elaborate documents addressing emerging topics with a higher level of uncertainty.

Guides and briefings on how to address the following topics in a SUMP process are published together with the second edition of the SUMP Guidelines in 2019:

- *Planning process:* Participation; Monitoring and evaluation; Institutional cooperation; Measure selection; Action planning; Funding and financing; Procurement.
- *Contexts:* Metropolitan regions; Polycentric regions; Smaller cities; National support.
- *Policy fields:* Safety; Health; Energy (SECAPs); Logistics; Walking; Cycling; Parking; Shared mobility; Mobility as a Service; Intelligent Transport Systems; Electrification; Access regulation; Automation.

They are part of a growing knowledge base that will be regularly updated with new guidance. All the latest documents can always be found in the 'Mobility Plans' section of the European Commission's urban mobility portal ELTIS (www.eltis.org).

[2] Annex 1 of COM(2013) 91.
[3] Rupprecht Consult - Forschung & Beratung GmbH (editor), Guidelines for Developing and Implementing a Sustainable Urban Mobility Plan, Second Edition.

2.2 Objectives of this Topic guide

The main objective of the Topic Guide is to provide planning recommendations and a relevant framework for stakeholders involved in urban planning on the topic of Road Safety and Vulnerable Road Users (VRU), with a specific focus on pedestrians and cyclists, named the 'Active Travel'.

This Topic Guide has a **policy focus** concentrating on how to address 'Safety and Active travel' in the SUMP planning and implementation process in order to achieve clear set of **policy goals on road safety**.

The primary target audience for this Topic Guide are practitioners with a broad variation in their level of expertise in relation to mobility and planning, not academics. The group of practitioners includes both policy makers and planners working in the field of urban transport, as well as consultants that support them.

In this Topic Guide we provide general guidance on how to integrate road safety into all 8 principles of sustainable urban mobility planning and implementation. In a later stage a range of good practice examples will be added as a key component of the guidance material.

2.3 Why road safety is a core element in sustainable urban mobility planning?

A total of 9500 people were killed on urban roads in the EU in 2017, accounting for 38% of all road deaths. Cyclists and pedestrians together make up over half of all road deaths in urban areas– pedestrians account for 39% and cyclists for 12%. In the EU, road deaths on urban roads decreased by just 14% over the period 2010-2017 compared to 24% on rural roads. Over 100,000 people were seriously injured on urban roads in the EU21[4] in 2017, representing over 50% of all serious road traffic injuries. At least 25% of the victims are pedestrians and 23% are cyclists[5]. The progress in reducing serious road traffic injuries on urban roads was particularly small over the period 2010-2017 with just 2% reduction compared to 7% reduction on rural roads.[6]

Given the scope of the road safety problem in urban areas, road safety efforts of cities and towns are crucial in moving closer to the EU target of halving the number of road deaths by 2020 compared to 2010 levels. Cities and towns will continue to play a significant role in achieving the third EU target to halve the number of road deaths and the first EU target to halve the number of serious road traffic injuries[7] by 2030 compared to 2020 levels.

Road safety should be an essential component in the planning and implementation of local and regional SUMPs as sustainability is not impossible without safety. In attempting to secure change in urban mobility patterns to more sustainable modes, road safety should be regarded as a critical challenge.

[4] In 21 EU countries that collect data. Serious injury data based on national serious injury definitions.
[5] Actual numbers are likely to be higher as it is known that there is a higher level of underreporting of collisions involving pedestrians and cyclists.
[6] https://etsc.eu/wp-content/uploads/PIN-FLASH-37-FINAL.pdf
[7] Using the common MAIS3+ definition of serious injury agreed with all Member States.

Real and perceived safety has a profound effect on modal choice especially in terms of the most sustainable modes of travel - walking and cycling and the ability to access public transport. It is important to recognise that safer roads also mean more sustainable roads. If groups of road users are deterred from using unsafe roads, they might shift to other less sustainable modes of transport.[8]

Safety fears are a major barrier to the uptake of cycling. A Eurobarometer survey shows that 73% of European citizens consider road safety to be a serious problem in cities.[9] Traffic safety was also identified as the main barrier to taking up cycling identified in a recent survey undertaken in nine European cities.[10]

Given that a large proportion of victims on urban roads are pedestrians and cyclists who do not pose risks to other road users but who are exposed to high risks created by motorised traffic, urban road safety panning should have Active Travel as a focus. Meeting the demands of the most vulnerable road user groups – the elderly, children and people with reduced mobility and Active Travel of travel – pedestrians and cyclists – will not only help to achieve the highest safety standards but also help all road users to profit from a much safer urban environment.

2.4 Concept of a strong safety approach

Road safety is not a new topic on any of the relevant administrative levels: local, regional, national or European. This is especially the case for road safety in built-up areas or cities. This can be seen in the wide range of measures and topics which can be identified from road safety initiatives over the past decades within different areas of expertise: (road and urban) infrastructure and design, legislation and enforcement, vehicle technology, education, etc.

Over the past years, there has been a movement towards a more integrated approach on road safety where the focus lies not only on the combination of different types of measures, but also the inclusion of different actors within a broader safety activity. As a result, safety related topics which are linked to Active Travel safety, but not limited to Active Travel safety, are also addressed.

Each vision on Road Safety should include "**vision zero**" which targets an overall reduction of the number of road deaths to "zero". Vision Zero can be regarded as a leverage point to generate and motivate change and needs to be far-reaching and long-term, looking well beyond what is immediately achievable.

Vision Zero is the starting point of the **safe system approach** proposed by many Road Safety Experts (e.g. [11] [12]) and adopted at EU level by the Commission in the third Mobility Package in May 2018[13]. is used as a strong framework to address the different elements and create a broad stakeholder platform which helps to effectively bring measures and solutions into practice. As such, supporting or corner stone safe

[8] https://etsc.eu/wp-content/uploads/PIN-FLASH-37-FINAL.pdf
[9] European Commission (2013), Attitudes of Europeans Towards Urban Mobility, https://bit.ly/1fPbjlQ
[10] SWOV, VIAS Institute, TU Dresden, TOI, and POLIS, (May, 2019)
Determinants and barriers of walking, cycling and using Personal e-Transporters: a survey in nine European cities, CEDR
[11] https://www.itf-oecd.org/safe-system-approach-strategy-all-countries
[12] https://www.itf-oecd.org/sites/default/files/docs/safe-system-cities.pdf
[13] https://www.iru.org/where-we-work/europe/europe-overview/european-commission-mobility-package

system elements which can be related to the different safety topics are: safe and forgiving infrastructure and transport services, effective legislation, enforcement and justice system support, effective emergency medical management for post-crash care, understanding of collisions, driver licensing; educating and informing the public. Within that context, road safety should also be integrated within other policy domains such as employment, environment and health.

2.5 This topic guide

This Topic Guide is an annex to the SUMP 2.0. Guidelines.

First the crucial aspects from 'Urban Road Safety and Vulnerable Road Users' perspective in relation to the 8 SUMP principles are presented.

Then guidance is given how to develop a good road safety approach in each of the SUMP steps of the SUMP cycle.

3. The 8 SUMP principles in the context of Urban Road Safety and Active Travel

3.1 Introduction

In this chapter we clarify how the recommendations on Road Safety aspects relate to the eight SUMP principles.

These 8 SUMP principles are:

1. Aim of sustainable mobility for the 'functional urban area'
2. Assessment of current and future performance
3. Develop a long-term vision and a clear implementation plan
4. Develop all transport modes in an integrated manner
5. Cooperate across institutional boundaries
6. Involve citizens and relevant stakeholders
7. Arrange for monitoring and evaluation
8. Assure quality

In the following paragraphs, you can find the crucial elements in each SUMP principle in relation with the policy focus of this Topic Guide: Road Safety and Active Travel.

3.2 Aim of sustainable mobility for the 'functional urban area'

Planners need to recognise that road safety is an essential component of and a condition for sustainability. The first point in the SUMP cycle is committing to the overall sustainable mobility principles. Road safety is pointed out as one of these principles, as sustainability is impossible without it.

Furthermore, taking measures to improve road safety will improve sustainability in related areas e.g. air pollution, public health. Additionally road users will be more eager to shift to active travel modes if the mobility context is objectively safer, resulting in a greater subjective feeling of road safety.

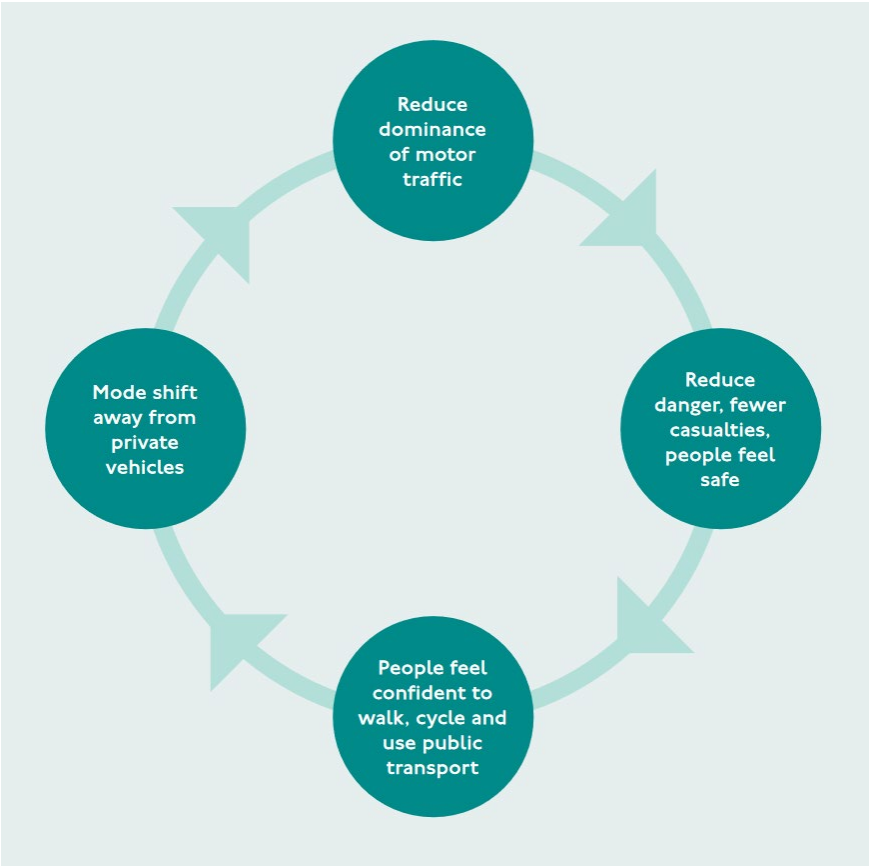


Figure 1 Road Safety as part of the Health Streets Approach (source: Vision Zero action plan, Mayor of London, July 2018)

Therefore, safe mobility for all users has to be acknowledged as a main focus and a main target in reaching for sustainability. Convincing people to use public transport, walk and cycle by providing safe and convenient infrastructure is the way forward to achieving sustainable urban mobility. The most powerful road users should be responsible for the safety of the less powerful.

Improving road safety conditions for – the elderly, children and people with reduced mobility and soft modes of travel – pedestrians and cyclists – will bring road safety benefits for all road users.

3.3 Assessment of current and future performance

Taking into account the importance of road safety in a Sustainable transport system, the understanding of the road safety conditions in the multi-modal transport network is crucial to assess the current road safety performance and determine future actions and targets.

Understanding where and how collisions happen and which road user groups are involved will help to define effective and specific road safety interventions in the urban area covered by the SUMP .

Urban road safety audit can be launched by e.g. using safety performance indicators that can be correlated with SUMP, such as the proportion of good quality and maintenance of the urban pedestrian and cycling paths.

Defining ambitious and measurable targets derived from agreed future objectives aligned with a vision of mobility and embedded, should be based on this understanding and is important to drive the safety strategy.

3.4 Develop a long-term vision and a clear implementation plan

Working on safe mobility conditions should result in both short and long term measures. Adopting a long-term vision is a necessity to reach both short and long term targets in a constructive and financially sustainable way. The development of a long-term vision allows for the inclusion of safety targets in different policy documents on different policy levels.

The development of a clear action plan, with timelines for delivery and identification of responsible actors, linked to other SUMP initiatives involving different stakeholders and holding these responsible for the overall system safety is an important step. This means close cooperation and coordination between policy makers, road safety experts, traffic planners, engineers, enforcement officers, road safety educators, health agencies, NGOs, vehicle manufacturers, fleet managers and the media. This results in a general alignment of road safety with societal, economic, traffic management and sustainability goals.

3.5 Develop all transport modes in an integrated manner

For road safety the first focus is that each transport mode functions in a safe way. However there is a strong interaction between the modes both along the network and in the nodes of the multi-modal network. In this way especially for safety in many circumstances we can't make it safe for one mode without discussing the functioning of another mode. Since our road networks are used by different modes, an important part of the unsafety in the network is the behaviour of one mode in relation to the other. The most difficult interaction between car or truck and bicycle but also other interactions need to be managed with a organisation of the infrastructure and clear rules to use it.

Here we come already to one of the important safety measures: traffic calming to bring the speed of the different modes on a comparable level and to minimise the risk of collisions and the consequences of these collisions if they do happen. In this way we have to take choices on the functioning of the network for cars: reduced speed or a fully separated network.

3.6 Cooperate across institutional boundaries

Since safety requires a strong integrated approach combining strategies and measures of the multi-modal transport system and towards the different users of the transport system, cooperation and consultation across different levels and across different sectors of government and relevant authorities is crucial. Often lack of cooperation and coordination between different institutions makes the implementation of a good regional and local road safety strategy very difficult.

3.7 Involve citizens and relevant stakeholders

Citizens and relevant stakeholders are crucial partners in building a strong road safety approach. Citizens are users of the transport system, their behaviour can be an important factor in improving road safety. Additionally the users should also comply with traffic law . Therefore, any effective approach should have also a focus on the road users.

Stakeholders are important to push a safe organisation and to inform and convince citizens to participate in the multi-modal transport system in a safe way. Stakeholders with an operational role in the organisation of transport should think and act in line with the safety strategy developed in the SUMP.

3.8 Arrange for monitoring and evaluation

Taking into account the importance of assessing the current and future performance of the road safety of the urban transport system, the need for a well-structured and transparent monitoring and evaluation of the road safety situation is obvious. Indicators help to measure progress, identify the successes and areas for improvements. The definition and adoption of a clear set of specific, measurable and relevant indicators with a feasible data collection strategy is a precondition for monitoring and evaluation.

3.9 Assure quality

While preparing a SUMP, it is essential to involve road safety experts to develop feasible and appropriate road safety measures to be included in each part of the SUMP. To ensure that previous agreements are well reflected (e.g. those in consultations with different road user groups), the draft of the document needs to be reviewed internally and by the important external stakeholders. Before the publication of a SUMP, an additional external quality reviewer with expertise on road safety should also check road safety aspects of the draft SUMP.

4. Urban Road Safety and Active Travel in the SUMP steps

4.1 General

Road safety is one of the overall principles of sustainable mobility and a key element in the SUMP guidelines. Within this chapter, we identify crucial aspects and recommend concrete actions to the general guideline cycle in order to encourage planners to take up road safety as a main focus of the SUMP.

This Topic Guide gives an advice to policy makers and involved stakeholders on how to integrate road safety in almost every step of the planning cycle of the SUMP. Its objective is to keep road safety high on the agenda while developing and implementing a SUMP and to make sure planners are fully aware of the importance of road safety for the overall success of the SUMP.

Figure 2 The 12 steps of Sustainable Urban Mobility Planning (SUMP 2.0)

For some steps the safety issues are detailed for each sub-step of the SUMP cycle, for others on the level of the step.

4.2 Phase 1 Preparation and analysis

In this phase we have the following steps in the SUMP process:

Figure 3 Steps in phase 1 'Preparation and analysis' of the SUMP process.

4.2.1 Step 1 Set up working structures

A good and efficient SUMP drafting process includes all relevant actors in order to define, develop and implement a good sustainable mobility policy. With the focus of Road Safety, and especially Active Travel, it is crucial to involve the right actors in all steps supporting this policy goal. This enables the development and implementation of a realistic safety strategy and measures in interaction with all relevant working sectors of a city.

In the SUMP Guidelines a Core Group is proposed as project owner of the SUMP coordinating and managing the SUMP process with sufficient capacities and resources as well as authority within the city. Also a 'steering group' consisting of important politicians and the key stakeholders should be established providing guidance and input on strategic decisions through-out the entire planning process.

Evaluate capacities and resources

Deciding who will participate in both groups will influence the extent to which Road Safety is strengthened in the SUMP. This includes deciding who is involved from the local administration and from other levels such as the regional government administration and other (non-governmental) stakeholders l Doing this, it is crucial to assure that people with sufficient experience in Safety are

involved. If we come the conclusion that this is not the case, specific Road Safety expertise should be brought in the SUMP process eventually with external experts can support the Core Team or the stakeholders.

Create inter-departmental core group

For road safety the following departments in the local and regional administration are important:

- Regional road authority/department
- Local road authority/department
- Police services
- Education department
- Health department
- Land-use department

These departments might have different views on road safety, based on their expertise and their view on the topic. They might offer various new ideas and opportunities, as they may have the access to different necessary contacts to involve citizens and citizen organisations.

Sometimes the most important stakeholders can be part of the core group e.g. a local public transport operator.

Traffic Co-ordination Advisory Council in Riga[14]

As a way to co-ordinate programmes and actions related to road safety among various stakeholders in Riga, the Traffic Co-ordination Advisory Council was established. It serves as the main platform for discussion of actions related to road safety. It is convened by the Riga City Council Traffic Department, in accordance with Traffic Department regulations. Stakeholders represented on the council are:

- Riga City Council Traffic Department(RDSD)
- Road Traffic Safety Directorate (CSDD)
- Latvian State Roads (LSR), a State Joint Stock Company
- Latvian State Police
- Riga municipal police
- Rīgas satiksme, the municipal limited liability company

Local community groups are allowed to make suggestions to the council via official letter or proposal. In some cases, groups such as local motorist unions or biking associations are invited for discussion.

The council meets every three or four weeks to discuss issues related to road traffic and safety. The questions discussed might include proposals on changing traffic organisation on particular streets; putting in place new infrastructure, such as public transport stops ;or installing traffic calming devices, such as speed humps or raised crosswalks. The council is considered an effective way to co-ordinate actions and take into account suggestions from a variety of stakeholders when implementing local programmes with a potential effect on road safety.

[14] https://www.itf-oecd.org/sites/default/files/docs/road-safety-european-cities-performance-indicators.pdf

Working towards a safe transport system in the GREATER MANCHESTER TRANSPORT STRATEGY 2040

Working through the GM Casualty Reduction Partnership (GMCRP), which comprises

- the ten local authorities,
- TfGM,
- Greater Manchester Police, G
- reater Manchester Primary Care Trust,
- the Greater Manchester Fire & Rescue Service,
- the Crown Prosecution Service,
- Her Majesty's Courts Service and
- the Highways England,

Greater Manchester have been successful in reducing deaths and serious injuries to road users.

Plan stakeholder and citizen involvement

In this step we need to identify the external stakeholders relevant for road safety in order to consult them in later steps of the SUMP process because of their specific expertise and knowledge, the need of a strong acceptance and awareness on safety measures and their role in the implementation of the road safety actions:

- Organisations representing the users of the different transport modes e.g. cycling federations, public transport users, walking association,...
- Local organisations or institutions working on road safety, like hospitals, health organisations, etc.
- Emergency services (fire, gas, police, health)
- Organisations representing specific user groups like schools and their parents, elderly people, disabled people (e.g. blind people)
- Organisations organising activities for larger groups of people like sport events, cultural events,...
- Transport service providers, both the larger operators of shared transport and the operators of all types of (new) transport e.g. scouters, shared bikes, etc.

Consulta Cittadina Sicurezza Stradale, Mobilità Dolce e Sostenibilità in Rome[15]

To actualize and implement the Road Safety Program of the city of Rome.

Allowing for the very first time the exchange of different opinions, around a permanent table, between all the institutional partners(public and private) working in the fields of road safety, soft mobility, urban transformation and sustainability. The Consulta has also a technical board to identify priority actions, optimize the use of available resources and take fully advantage of the different experiences from the partners involved.

Each year, by October 31, through a structured, cyclical and continuous course, the work of the Consulta is aimed at drafting the "Observations and Proposals" document and identifying the "Priority Actions" to be submitted to the Administration, who may take this into account when implementing the Road Safety Program.

Ensure political ownership

Although everybody will agree with the statement that Safety is important, making sure that road safety for Active Travel becomes a high priority for (local) administrations is not easy and Safety is often forgotten. Moreover to ensure that the Safety of Vulnerable Road Users is an important aspect in all phases of the design and implementation of the SUMP requires a strong decision makers' commitment. For example, the allocation of appropriate and stable budgets, setting appropriate speed limits based on the road function, safe road infrastructure design for pedestrians and cyclists, choices in the design of the infrastructure and the organisation of transport services making use of it, require a sustained effort. To achieve this, it is crucial that policy makers feel responsible to steer the process in a fundamental safe way and are committed to deliver on the road safety targets, even if this includes choices that limit the possibilities for some modes (e.g. reducing space for motorised traffic in order to create bicycle paths).

A simple road-design choice and more

Although it is desirable to have separate bicycle pathways everywhere, in some cases it can be challenging to build separate cycling paths on the existing road infrastructure in the limited public space . However, this does not mean that policy makers are not responsible for making the right choice for road safety of pedestrians and cyclists.

For example, when merging a separate bicycle pathway with a road becomes a necessity, the right choice may be to sacrifice some of the space allocated to motorised traffic (such as parking places) in order to create a safe and convenient merging zone. The wrong choice would be to create a sudden and hectic merging zone in order to save few parking spaces.

In Paris, the city have developed many cycle tracks by removing entire sections of on-street parking. In parallel, the city authorities have engaged in the civil enforcement of on-street parking meter violations, dramatically improving the use of meters, improving vehicle rotation and freeing up space.

[15] https://www.polisnetwork.eu/publicdocuments/download/2174/document/1b-iacarossi.pdf

Finally politicians should be made aware of the fact that as part of basic human rights, it is **a political responsibility to take care for the of wellbeing, health and safety of the citizens**. Moreover, making Active Travel of travel safe and attractive can encourage citizens to walk and cycle more, which in turn will bring positive outcome in reducing congestion, pollution and will improve the public health.

4.2.2 Step 2 Determine planning framework

Including Road Safety as a key element in the SUMP requires that the planning framework contains also elements important to be able to efficiently implement Road Safety principles in practice and to motivate (or oblige) to do it. This is the case both with the implementation of regulations to develop the SUMP as well as in the planning practice. This requires also making sufficient and appropriate capacities and resources available in the field of Road Safety.

For most of the EU countries **the regulatory framework** with the requirements and procedures for cities to make a SUMP (in some countries/regions it is an obligation e.g. Flanders in Belgium) and how to make it, is set at regional or national level.

If these requirements don't specify a specific focus on Road Safety and Active Travel, Road Safety should be added by the city as an extra aspect to develop in the SUMP.

Road safety experts should be present in the expert team that develops and implements the SUMP. The EU directives state that for the TEN-T motorways a certified Safety expert should assess the design but the requirements for these experts differ over the countries and we don't have such general requirement for the urban roads. Many countries have specific training courses on road safety and some countries also have specific certificates for professionals in relation to Road Safety. Integrating such qualification requirements in any selection criterion facilitates the allocation of the work at hand to qualified experts.

Taking into account this diversity of contexts for the EU cities, for each SUMP the best approach should be determined to get sufficient expertise in the team working on the SUMP. These expertise can be found internal, within the city administration, as well as with external support.

4.2.3 Step 3 Analyse Mobility situation

A strong analysis of the current mobility situation is important for a good and effective SUMP. It helps the process which develops the SUMP as the final document presenting visions, action plans etc. For the aspect of road safety this is even more true: monitoring the level of road safety in the city but also understanding the reasons why collisions happen and why road users feel unsafe on the roads, is crucial to improving road safety.

Identify data resources and planning documents

In this step all relevant data sources should be identified and collected. Gaps should also be indicated and – if possible – the initiative to collect missing data should be taken.

Precise, specific and complete data are crucial for an efficient road safety policy. However as cities might not be able to collect all needed data, regional and national initiatives may be required to facilitate data collection.

Setting priorities in the efforts to collect road safety data can take into account the different purposes of the data:

- Identifying the main type of collisions and road user groups involved as a basis to define the right targeted road user groups to approach and measures to developed.
- Identification of high risk sites in the multi-modal network.
- Setting realistic but ambitious road safety targets and following the progress towards the targets.
- Awareness building: correct collisions figures can help building awareness.
- Developing the most effective approaches to improve safety with measures on the different aspects as Engineering, Education, Enforcement, ...

Not all of these purposes are equally important to the different involved stakeholders. Differences exist between regional and EU bodies that set rules and develop guidance, scientific bodies developing approaches and cities that want to implement a safe multi-modal transport system.

For a good efficient local Safety plan (as part of the a SUMP or linked to it) the main questions to answer are:

- where we have which type of collisions,
- who are the target groups for any action and
- what type of specific measures should be put in place.

Below, **important and interesting data for a good Road safety policy are listed**, not only direct data on collisions and victims but also data on the movements of people and goods, on the traffic volumes of vehicles, the way collisions happen, mobility context data etc. Some relevant comments are added.

- number of road deaths and serious injured in road collisions
    - The location of these collisions in the city to identify where road safety interventions are needed the most
    - Figures over at least 3 last years, but preferable longer time series are needed to control for random fluctuations. In some cities the number of road deaths can be relatively small, thus they are a subject of substantial fluctuations. It is, therefore, important to collect and analyse serious road traffic injury data to evaluate road safety situation more accurately.
    - Information and analysis on the causes and circumstances of collisions and road user groups involved will help to define the best measures e.g. a change in signalisation of lay-out of the road or junction
    - Data sources: general Safety statistics collected by any safety department (at a local or regional level) and more specific/detailed data from local police;
    - Collisions are not always reported to the police, therefore these data can be completed with data from hospitals and insurance companies. However this is not always possible on local level but is especially important for bodies that set rules and develop guidance and road safety strategies.

The Swedish approach

In Sweden the STRADA (Swedish Traffic Accident Data Acquisition) is a national information system collecting data of injuries and collisions in the entire road transport system. Early trials began in 1999; in 2012 68 hospitals work with STRADA. In order to get the needed data, hospitals are compensated for the extra administration. Hospitals are paid by report to the government. Extra bonuses are provided if they do it quickly and complete the data. The implementation of this measure took 15 years and is still running.

The Rhône RoadTrauma Registry[16]

The Rhône Road Trauma Registry is a population-based registry which collects data on all new cases of injuries occurring in the French Département du Rhône following a road collision, whether the victim is hospitalised or not. Injuries are coded on the Abbreviated Injury Scale (AIS). The register began in 1996 and involves 50 hospitals. It links with police records when available and uses common information (no common ID).
The register is a valuable resource for analysis of collisions that are often under-reported such as single-party collisions, walking and cycling injuries.

- number of collisions resulting in serious injuries
    - Differentiated over the different road user groups
- observation data on traffic conflicts (incidents - near collisions) using the 'Traffic conflict techniques' (Lund University).
    - This is a resource active method but useful i.e. to draw conclusions on junctions which are perceived as very dangerous but for which the number of collisions are too small
- the sense of road safety or road unsafety people have in all parts of the multi-modal network
    - It is commonly known that specific categories of people will only cycle or walk if they assess a sense of safety that is high enough to expose themselves to the possible dangers. Young men i.e. tend to cycle more, even in circumstances found very dangerous by others.
    - A survey can be launched to identify whether road users feel safe when using different modes of transport and what they perceive as main road safety problems when using these different modes.
    - This can be based on general surveys and with specific apps allowing people to report on safe and unsafe locations.
    - This will give an idea on the needs and possibilities of communication when elaborating and communicating the plan.

[16] https://www.itf-oecd.org/road-safety-european-cities see p.34

- traffic volumes, especially on walking and cycling, both km walked, km cycled and vehicle kilometre travelled allowing to calculate vulnerable road user exposure
    - Modern technologies and the use of Smart phones, combined with apps, make it easier to gather exposure data, even for cyclists and pedestrians. Even for smaller cities these data are easier accessible.
    - Per purpose e.g. work, school, shopping, leisure activities, visits, just strolling…
    - Specified per vulnerable road user group e.g.
        - Number of women cycling
        - Number of elderly cycling
        - Number of elderly walking
        - Number of children walking unaccompanied
        - Number of children cycling

Of course this list should only be considered as a first indication bearing in mind that each city is different with specific characteristics requiring sometimes more in-depth analyses with a further data need.

In this step it is also very important to find out which data is available and which are missing. This will make it possible to search or build the missing data.

Taking into account all these possible data and the considerations about them, the following data seems a kind of **minimum set of data needed on local level to develop a good safety plan as part of a SUMP** of as a consequent action to the SUMP:

- Total number of road deaths and serious injuries per year by road user group in the city over at least 3 years
- Location and type of fatal collisions and collisions resulting in serious injuriess on the road network of the city.

On top of this, an action to include also data from hospitals to the general available collision data, will always make the knowledge type of collisions and the collision spots much stronger.

Additional considerations

Associated to overall mobility data **also other databases** are important, such as a speed limit signage database, or by extension, an overall road signage database and databases with land-use data with e.g. the density of population, the location of schools and other areas with high presence of children. This information is important to assure a consistent and clear-to-the user transport network in which e.g. traffic calming measures can be situated on the most efficient and urgent locations.

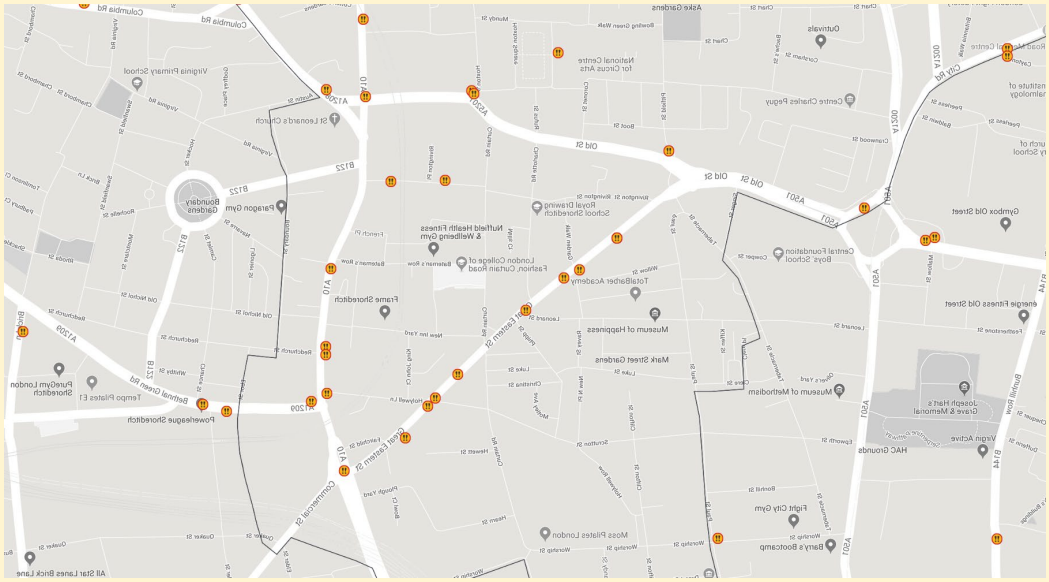
The recent evolution of **Open Data** can help to keep safety on the foreground. Open data maps seem to be much more powerful to build awareness and interest from citizen than any other way of providing information. More than ten countries already publish online maps of collision locations, according to a survey conducted among countries represented in the ITF IRTAD group (Owen,2018). Maps include exact collision location and severity. However, countries have adopted very different approaches to the

disclosure of further collision information. Some provide very little information, not even the date and time. Others choose to disclose casualty age, nationality and blood alcohol concentration (see [17]).

The London Collision Map

Transport for London has an online map available with all Fatal and serious collisions. You can discover where road traffic collisions have happened in London since 2005 and you can filter by year, road user, collision severity and age group.

The map shows traffic collisions that resulted in personal injury and were reported to the police.



See https://tfl.gov.uk/corporate/safety-and-security/road-safety/london-collision-map

Analyse problems and opportunities

A strong and well-structured analysis of all data sources is important to gain a clear understanding of the current road safety situation, in order to create the opportunity to make the best safety action plans and to define practical measures.

It is important to make associations between the different data-elements to gain understanding into which types of collisions occur, which road users and societal groups are involved in which areas of the city. This allows for the identification of the most suitable measures that can improve road safety. Furthermore, data analysis allows for the integration of both general city wide approaches as well as very specific interventions in the multi-modal network.

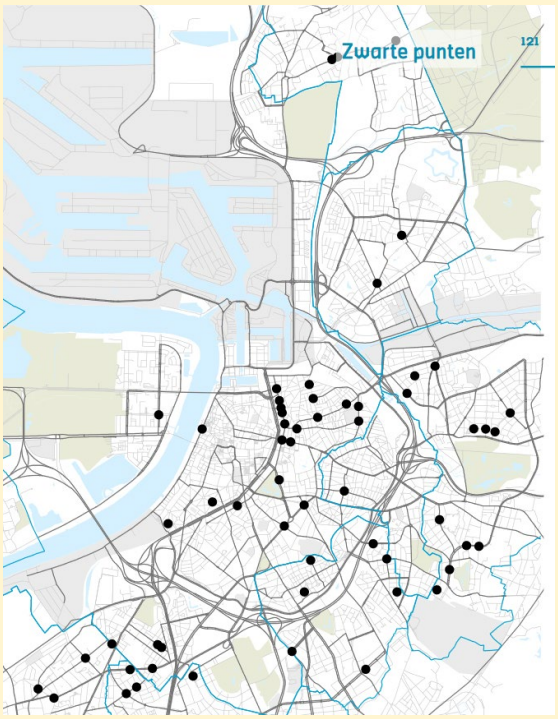
[17] https://www.itf-oecd.org/new-directions-data-driven-transport-safety-0 (p.65)

Further considerations are the following:

- Analyse collision/injury data: separate by road user group and collision types, identify trends/common threats.
- Analyses of road safety situation and link with indicators of the urban mobility scoreboard. Look at trends over time.
- Any data on vulnerable road user exposure is better than no data: if data are not available, use travel surveys, counting and other to gather any data.
- Try to "match" objective data (real collisions) with subjective data (citizens reporting unsafe spots)….
- Recently more efforts are done to analyse the network in a proactive way by conducting a thorough analysis of risk factors and incidents, network geometry, infrastructure defects, risky behaviours and close call incidents. This allows to predict risk levels and intervene before serious collisions happen.

The combination of data can also result in a **quantified prioritisation of unsafe points** in the multi-modal network. E.g. different criteria be combined with a motivated weight per criteria the number of collisions with deaths, the number of collisions with serious injuries, the frequency of usage of the location by pedestrians/school children/cyclists, etc.

Different ways of processing the data can be used to come to a better understanding of the current mobility situation with a focus on road safety for Active Travel. For example, the calculation of **walkability and bike-ability indices** for the multi-modal transport network can be important indicators towards safety and sustainability.



Collision hot spots identified in the Safety Plan of the SUMP for Antwerp

(source: Mobility Plan Antwerp)

The hot spot analysis of Lisbon[18]

Road safety practitioners can now use sophisticated statistical modelling techniques to predict collision counts at potential road safety hotspots. Researchers from Newcastle University developed such a tool, involving a Bayesian hierarchical model (Fawcett et al., 2017). The method has been implemented in a tool called Reactive Analytic Prediction Toolkit for Road Safety (RAPTO).

Not only is this method more proactive, it may also prevent unfit road safety investments based on the misinterpretation of naturally volatile collision figures. The municipality of Lisbon, in Portugal is already working in close collaboration with Newcastle University to develop prediction models that will be used in the context of a wider "Sustainable Mobility Plan" for the city.

Source: Newcastle University.

[18] https://www.itf-oecd.org/new-directions-data-driven-transport-safety-0 see p.30

Different ways of processing the data can be used to come to a better understanding of the current mobility situation with a focus on road safety for Active Travel. For example, the calculation of walkability and bike-ability indices for the multi-modal transport network can be important indicators towards safety and sustainability.

4.3 Phase 2 Strategy development

In this phase we have the following steps in the SUMP process:

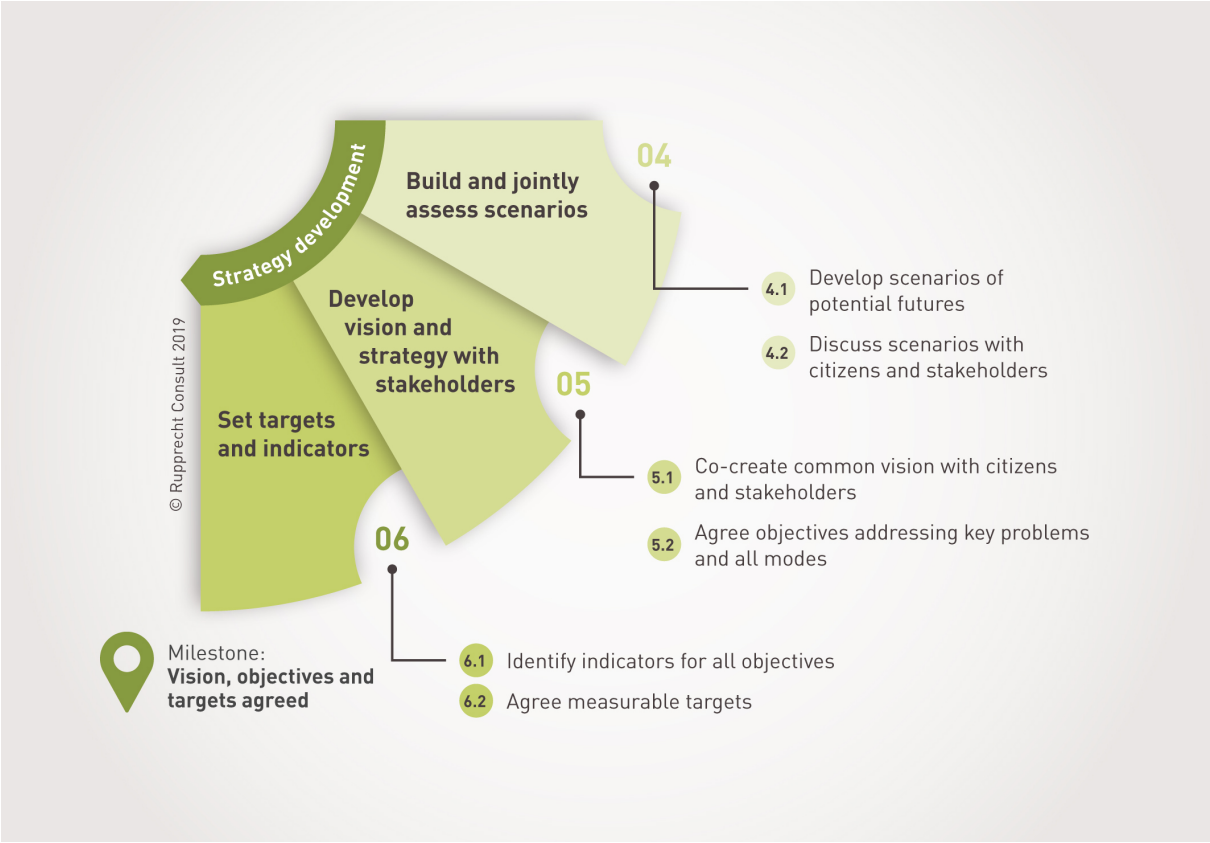


Figure 4 Steps in phase 2 'Strategy development' of the SUMP process.

4.3.1 Step 4 Build future scenarios

In any future mobility scenario road safety should be a crucial focus. In order to obtain this, a vision like 'Vision Zero' should be the main characteristic of any future scenario. Even if it might be impossible to reach vision zero, the principles of 'Vision Zero' should still be guiding the road safety work and the SUMP.

If a scenario gives better opportunities to reach sooner the 'Vision Zero' vision objectives then other scenarios this is a important reason to choose for this scenario.

4.3.2 Step 5 Develop common vision

The SUMP guidelines state that common vision building is a cornerstone in the development of an SUMP. Therefore, it couldn't be more important to integrate Road Safety as a main element in this vision. The fact that road safety is a crucial aspect of sustainability is an important additional motivation to have safety as a crucial focus.

Vision Zero and the Safe System approach should be the crucial principles.

Vision Zero is based on the ethical imperative that no one should be killed or seriously injured within the transportation system, independent of the motive for using that system. Important to realize is the fact that this is in conflict, whether consciously or not, with the choice we generally make in many instances to prioritize speed and convenience (or perceived convenience) above safety and health.

Bringing this in practice **the Safe System approach** is the strong framework to use.

The human end-user should be placed in a central position and role. The safe system approach recognises that people make mistakes that can lead to road collisions and that human body has limited physical ability to tolerate collision forces. While individuals have a responsibility to act with care and within traffic laws, a shared responsibility exists with those who design, build, manage and use roads and vehicles to prevent collisions resulting in serious injury or death and to provide post-collision care. All parts of the system must be strengthened in combination to multiply their effects, and road users are still protected if one part fails.[19]

Figure 5 Safe System approach – source: Safe Streets: insights on vision zero policies from European cities[20]

Better vehicle construction, improved road infrastructure, and lower speeds can all contribute to reducing the impact of collisions. The responsibility for the Safe System is shared in a coordinated

[19] https://www.itf-oecd.org/sites/default/files/docs/zero-road-deaths.pdf
[20] http://www.gmfus.org/publications/safe-streets-insights-vision-zero-policies-european-cities

manner across public and private sectors and its application is closely monitored to assess results and, if necessary, adapt measures taking into account experience, new data and new technologies"[21].

The key principles of the Safe System approach[22]

Comparison with the traditional road safety approach:

	Traditional road safety policy	Safe System
What is the problem?	Try to prevent all crashes	Prevent crashes from resulting in fatal and serious casualties
What is the appropriate goal?	Reduce the number of fatalities and serious injuries	Zero fatalities and serious injuries
What are the major planning approaches?	Reactive to incidents Incremental approach to reduce the problem	Proactively target and treat risk Systematic approach to build a safe road system
What causes the problem?	Non-compliant road users	People make mistakes and people are physically fragile/vulnerable in crashes. Varying quality and design of infrastructure and operating speeds provides inconsistent guidance to users about what is safe use behaviour.
Who is ultimately responsible?	Individual road users	Shared responsibility by individuals with system designers
How does the system work?	Is composed of isolated interventions	Different elements of a Safe System combine to produce a summary effect greater than the sum of the individual treatments- so that if one part of the system fails others parts provide protection.

Source: Inspired from New Zealand Transport Agency and VicRoads.

Four principles underpin a Safe System in road traffic:

1.People make mistakes that can lead to road collisions.

2.The human body has a limited physical ability to tolerate collision forces before harm occurs.

3.A shared responsibility exists amongst those who design, build, manage and use roads and vehicles and provide post-collision care to prevent collisions resulting in serious injury or death.

4.All parts of the system must be strengthened to multiply their effects; and if one part fails, road users are still protected.

Thus, the design and operation of the road transport system should guide the road user to safe behaviour and mitigate the consequences of common human errors.

[21] Europe on the Move, Sustainable Mobility for Europe: safe, connected and clean, Brussel 17.5.2018.
[22] https://www.itf-oecd.org/sites/default/files/docs/zero-road-deaths.pdf

In this vision a **clear hierarchy of road users** is crucial: the road users which have the potential biggest safety impact on other users should be responsible for the safety of the less powerful. The most powerful often travel at speeds which, combined with their vehicle mass, are unsuitable for a human being to have a physical collision with.

Figure 6 Safe System approach – clear hierarchy of road users (source: ETSC)

Cities can play an important role in implementing a Safe System approach e.g. by improving the road infrastructure and introducing lower speeds. Especially, **reducing speed** is one of the main important measures to obtain a reduced risk of a road injury or a road death. This is even more the case when targeting Active Travel road user's safety. Introduction of 30 km/h zones supported by traffic calming measures in residential areas, areas used by many pedestrians and cyclists and on the way to schools has proved to have a significant impact on the number and seriousness of collisions especially with Active Travel.

Traffic as a complete system in Gothenburg

Gothenburg, a city of 570,000 inhabitants, along with the rest of Sweden, adopted a long-term "Vision Zero" approach to road deaths and serious injuries. The city's intermediate targets are to reduce the annual number of road deaths from 9 to 3 and serious and moderate injuries from 227 to 75 over the period 2010-2020.

In 1978, Gothenburg had one speed-hump. In 2019, there are around 2500 traffic calming measures, and citizens are asking for more, especially in residential areas where the recommended speed limit is 30 km/h.

A study conducted by the Swedish Transport Research Institute (VTI)[23] estimated that traffic calming, together with separation of Active Travel from motorised traffic, contributed to three quarters of all reductions in serious road traffic injuries on Gothenburg's roads from 1990 to 2003. Over the same period, the investment and maintenance costs of traffic calming measures were € 21 million while the socio-economic benefits achieved through a reduction of road deaths and serious injuries has been estimated at € 1 billion. Every € 1 invested brought 48 € in socio-economic benefits. Traffic

[23] Evaluation of speed reducing measures in Gothenburg, https://bit.ly/2IpKfjA

calming measures helped to shift around 650,000 kilometers travelled by motor vehicles per day from local city roads to arterial or national roads where vehicles can travel at higher speeds, and where possible conflicts with pedestrians or cyclists are less frequent. Lower speeds and reductions in motorised traffic achieved through traffic calming interventions encouraged citizens to walk and cycle more often. Currently, four out of the five injuries sustained on the city's roads do not involve a car. Single bicycle or single pedestrian injuries accounted for 80% of all serious or moderate injuries sustained.

Maria Kraft, head of traffic safety at the Swedish Transport Administration, said the key to Vision Zero's success is that it involves treating the traffic network as "a complete system", as a system that should be designed so as to minimise the harm of potential human errors.

"People will always make mistakes. You can't count on that never happening," Kraft said, "But just like at a nuclear power plant, human errors on the roads need not have devastating consequences and so we focus on building systems that counteract such consequences."

"For instance, if you need to have an intersection on a road where the speed limit is 80 kilometres per hour, then you design the road in a way that ensures you bring down the speed of cars successively so as to prevent fatal collisions at that intersection. You may add a roundabout ahead of it, for instance," said Kraft. A collision at a lower speed will still involve damages, but there is a reduced likelihood of those involved in the collision dying or sustaining lifelong injuries.

The idea is that safety aspects should be built into the traffic system and included when planning, designing and building infrastructure projects. In practice, the Vision Zero policy has involved measures like separating car lanes with physical barriers and building so-called two-plus-one roads, which consist of a two-lane section in one direction and one-lane section in the other, allowing for safe overtaking.

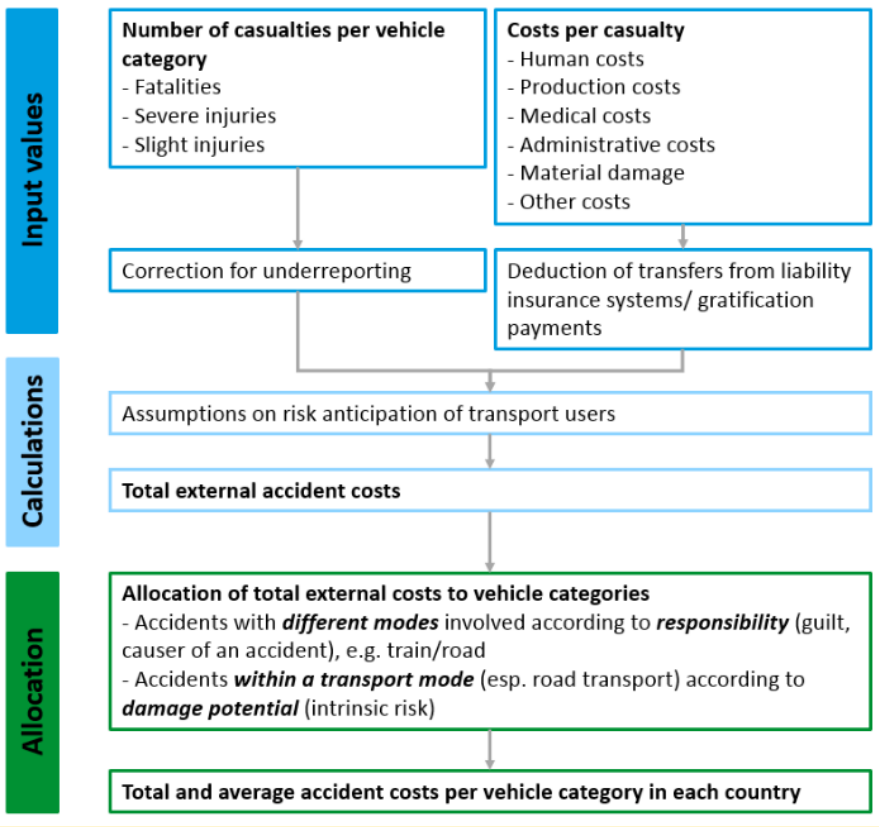
Other considerations are:

- When it comes to road design and vision zero, design needs to include a focus on active road users (pedestrians and cyclists). Currently, designers tend to focus on creating an infrastructure which is mostly oriented towards motorised traffic. A good vision should not only mange possible conflicts between pedestrians, cyclist and vehicles but should include also safe and forgiving roads for pedestrians and cyclists, protecting them from single-bicycle or pedestrian collisions and protecting them when such collisions happen. For example: the little poles on bicycle paths which are used to keep dangerous cars away are far more dangerous to cyclists than the cars that might occur on the cycle path. High curbs form an obstacle in crossing the street for wheelchair and rollator users as they might get stuck at the side of the street or stumble and fall.
- A focus on safe, forgiving and self-explaining roads and streets, especially for the most vulnerable groups means meeting the demands of the most vulnerable categories of road users. By designing roads for, for example elderly, children and people with disabilities it is also expected that other users will profit from the safest urban environment possible.
- Crosscutting issues may be integrated in a bigger vision regarding road safety. Road safety will inevitably influence other important domains:

- An ageing population means many people will only enjoy full mobility when it is safe enough for them to move and they feel like it is safe enough. This can only be done within a safe environment. Higher mobility of ageing people will result in higher feelings of wellbeing. This may in particular be the case in cities that experience a double-ageing conundrum: within the group of ageing persons, it may be that the oldest of the ageing group become a significantly larger group.
- Being able to move also implicates better health, which will lead to less spending for health care etc. The money gained will be spent in the society for other purposes, which will lead to better economical results. This way, it is important to conclude that the cost effectiveness of Road Safety measures will automatically lead much further than only health care cost reductions.
- Social-Economical costs of the reductions of road deaths and serious injuries may not be forgotten when talking about road safety visions, not only in health care, but also in the loss of invested money for schooling and education in correlation with the loss of production capacity, as well as the costs of congestion, resulting from collisions.

Handbook on the external costs of transport[1]

In the Handbook on the external costs of transport (version 2019) produced by the European Commission five main components of collision costs are identified: human costs, medical costs, administrative costs, production losses, material damages. Total and average collision costs are calculated using a top-down approach, starting with total collisions and then allocating them to different vehicle types.



Co-create common vision of mobility and beyond

A direct implication of working towards a safe system approach is the creation of a shared approach. Such a shared approach includes all different types of stakeholders (policy makers, planners, engineers, fleet managers, police services, road safety educators, health agencies and the local media) and holds these responsible for the overall system safety. For cities, this may mean opening up their communication structures to allow for the participation of such stakeholders in the wider policy-making process. At the same time, every group of road users, independent of the travel mode, is responsible for complying with the rules which are imposed within the system.

This results in a general alignment of the road safety management system with societal, economic or sustainability goals. As such, these present a direct handhold for SUMPs to include relevant parameters and indicators, which are to be used to also actively inform the public about road safety, measures, policies, opportunities, etc.

The direct interaction with the public and the different stakeholders is crucial making everybody aware of the advantages of road safety measures and actions. Going into dialogue with the public about mobility and safety also helps create safe streets.

Agree objectives

A SUMP should include a long-term vision with mid-term targets for the reduction of the number of road deaths and serious injuries. This is especially the case for Active Travel.

4.3.3 Step 6 Set targets and indicators

To set city policy targets on Road Safety operational Specific, Measurable, Achievable, Relevant and Time-Oriented (SMART) targets should not only focus on collisions, road deaths and serious injuries but also on those factors (intermediate indicators) that influence Road Safety such as the number of speed and alcohol control.

Different general policy notes are an inspiration for this:

- The European Union has set targets in a European Road Safety Program 2011-2020: detailed measures. The target of the program is: cutting road deaths in half in the European Union in this decade. Establishing a Road Injuries Target is one of the seven strategic objectives.
- In the third Mobility Package these targets are updated for 2020-2030. The EU's long-term goal will remain moving as close as possible to zero road deaths in road transport by 2050 ("Vision Zero"). The same should be achieved for serious injuries. The EU will also pursue new interim targets to reduce the number of road deaths by 50 per cent between 2020 and 2030 as well as to reduce the number of serious injuries by 50 per cent in the same period (using the new common definition of

serious injury agreed with all Member States). These new targets are enshrined in the new EU Road Safety Policy Framework 2021-2030 Next Steps Towards "Vision Zero".[24]

- OECD recommends in the TOWARDS ZERO Ambitious Road Safety Targets and the Safe System Approach report to set robust interim targets that relate to outputs, intermediate and final outcomes.
- The WHO targets to save up to 5 million of lives with the 'Decade of Action for Road Safety 2011-2020: saving millions of lives.

The following type of **targets** seem important (with some examples of quantitative targets):

- Reduction of the number of road deaths and serious injuries with a certain ratio over different time periods e.g. 20% over 3 years.
- Reduction of the number of road deaths and serious injuries for specific target groups e.g. reducing 50% cyclist deaths, reducing 20% children road deaths in the next 5 years.
- Reduction of the number of high risk points in the network with 50% in 5 years.
- Increasing the subjective end-user feeling of safety for the overall population with 15% in 3 years.
- Reduction of the number of cars or car-kilometres within the city or parts of the city with 30% in 5 years.
- Increasing walkability and bike-ability of the main corridors of the city bringing the walkability and bike-ability indices for all parts above a certain level (depends on the way this walkability and bike-ability indices is calculated).
- ...

Most of the targets in existing SUMPs are set in a qualitative way indicating 'safer', 'less causalities', 'safer junctions', etc. However quantifiable targets are desirable as they are much stronger to drive the safety strategy.

For most of these targets the indicators to measure whether the targets are met are obvious. The methods to come to the value of the indicators should be detailed depending on the available data sources.

[24] European Commission 2019 https://ec.europa.eu/transport/sites/transport/files/legislation/swd20190283-roadsafety-vision-zero.pdf

4.4 Phase 3 Measure planning

In this phase we have the following steps in the SUMP process:

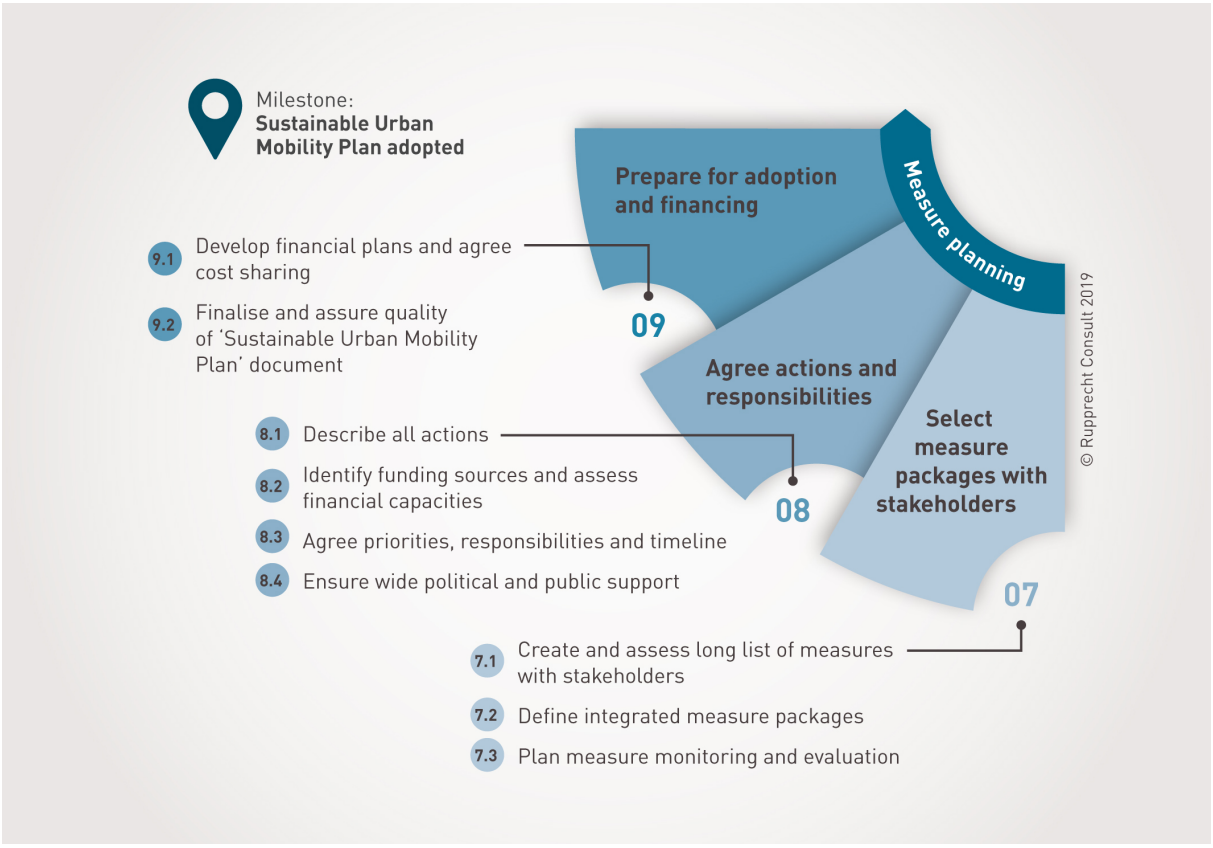


Figure 7 Steps in phase 3 'Measure planning' of the SUMP process.

4.4.1 Step 7 Identify measure packages

The Safe System approach including 'Vision Zero' should be the source to define the right measures starting from a strong analysis how the traffic system should and can function taking into account the interacting factors : infrastructure, vehicles, traffic law enforcement, drivers and other participants in the traffic.

A strong safety strategy consists of measures on different levels, that are developed and implemented by stakeholders who are also active on different policy and operational levels.

A strong local Safety approach will consist of specific actions to improve the existing mobility system and the way the users are using it. However also all others measures defined in the SUMP should be planned, designed and implemented in a safe way with a specific focus on the position of the Active Travel.

In this paragraph, we focus on the measures that can be implemented on a city-level. However the process of making a SUMP and developing a consistent safety approach for the city is also the good

moment to reflect on what can and should be done by other stakeholder which are so-far not involved in the SUMP process. Stakeholders that work "above" the city level (regional, national, etc.) can also contribute in a strong way making a local safety policy feasible and efficient. For example: technical improvements of bikes and cars, legislations on EU and national level that define the conditions for receiving funding, etc.

A first step towards identifying packages of measures that help to improve road safety, is to create a long-list of possible measures that may be suitable within the city context. In a successive step, cost-effective priority measures can then be identified which are brought in relation to the general mobility objectives and specific Road Safety objectives of the city. Measures with the best expected impact should be prioritised.

Create long list of measures

Different type of measures should be identified, which are related to different domains:

- Engineering & infrastructure
- Education & awareness
- Enforcement & legislation
- Emergency services

The common classification of a comprehensive Road Safety approach can be used to structure the measures. The list below gives a first overview of measures for each of the domains:

- Engineering & infrastructure
    - Management of road design
        - Execute extra road safety audit of plans: infrastructure audits from cyclists, pedestrians or motorcycles points of view
        - Implement road safety audit of existing infrastructure
    - Road design elements
        - Design safe junctions and crossing with clear management and visibility of conflicts
        - Improved signal plans with higher safety times and less internal conflicts" allowing only acceptable conflicts, visible and well understandable by the conflicting vehicles and pedestrians (no risk on collisions with deaths)
        - Implement traffic calming measures like area wide speed reductions, car-free zones, measures to eliminate the through traffic, … Especially adopt 30 km/h zones supported by traffic calming measures in residential areas, areas used by many pedestrians and cyclists and on the way to schools.
        - Try to arrange for cycle traffic and motorised traffic to be physically separated where the speed of the latter is too high or where the traffic flow is too high to allow them to mix safely**. If not possible to separate, lower the speed limit to 30 km/hour.**
        - Develop safe routes to schools and safe school environment with e.g. 'School streets'.
    - Land-use and mobility planning
        - Establish clear urban road hierarchies which better match road function to speed limit, layout and design based on the principles of the Safe System approach.
        - Discourage access by car where there are reasonable alternatives.

- Restrict heavy goods vehicle circulation in urban areas at certain peak times when there are high numbers of pedestrians and cyclists and develop recommended routes for heavy goods vehicles.
- Promote localisation of basic activities so that they can be reached on foot, by bicycle, or by public transport.

- Give priority in road maintenance to the quality of surfaces on footways, cycle paths and the parts of carriageways most used by crossing pedestrians and by cyclists.
- Strengthen enforcement against illegal parking when pedestrian and cyclist facilities are abused by parking on footpaths and cycle paths.

Safety improvement for cyclists in Oldenburg[25]

The city of Oldenburg, is working to increase both the attractiveness of cycling and cycling safety. One significant technical development has been the installation of cyclist sensors at junctions with traffic lights. Traditional sensors were designed to detect large vehicles such as cars and lorries, but do not work for bicycles. The new system can detect a cyclist and extend the green light timing to give the cyclist enough time to pass through the junction. This marks a change of a mindset in traffic management as cyclist mobility needs are considered as important as those of motorised road users.

This is one of the examples in the list of good practice examples for road infrastructure measures compiled by the German Road Safety Council (DVR) to serve as an inspiration for towns and cities.[26] The examples highlight individual infrastructure changes that have been implemented in cities which can step-by-step help to create safer urban environments for most Active Travel, and encourage people to walk and cycle.

The shift to sustainable modes in Torrejón de Ardóz[27]

Torrejón de Ardóz in Spain is a municipality of around 130,000 inhabitants located near the capital Madrid. The municipality has started working on improving the safety of pedestrians by providing lighting at pedestrian crossings.103

To encourage citizens to cycle safely, a dedicated infrastructure called the cyclist ring, connecting different neighbourhoods was created, and it has reached a length of 13.4 km in 2018.104

Free-of-charge bicycle parking facilities were also established at railway stations. In addition, the municipality runs two programmes with dedicated budgets: the "Operación Asfalto" which annually reviews the roads condition and identifies stretches that need to be repaired, and the roundabout scheme under which intersections that should be redesigned to roundabouts are identified and treated.105 There have been no road deaths in Torrejón between 2009 and 2016, and the town received the Vision Zero Award from DEKRA, being the only city in this size category with no one killed in traffic over a long period of time.

[25] https://etsc.eu/wp-content/uploads/PIN-FLASH-37-FINAL.pdf
[26] DVR, Gute Straßen in Stadt und Dorf, https://bit.ly/2M4ofhN
[27] https://etsc.eu/wp-content/uploads/PIN-FLASH-37-FINAL.pdf

Making space for Active Travel in Amsterdam

Amsterdam is planning to systematically strip its inner city parking spaces. Starting in the summer of 2019, the city plans to reduce the number of people permitted to park in the city core by around 1,500 per year. By reducing the permits steadily, the city will remove up to 11,200 parking spaces from its streets by the end of 2025. The cleared spaces will be replaced by bike parking, wider sidewalks and trees. [28]

- Education & awareness
  - School and leisure campaigns (focussed at children, working together with children)
  - Education of parents (building on school and leisure campaigns)
  - Vehicle user education!
  - Coaching and training fleet managers and employers to work with their clients and employees on safety
  - Awards at city level for safe approaches

- Enforcement & legislation
  - Local regulation of the use of personal mobility devices like electric scooters and bikes
  - Control on speed, alcohol, drugs, seatbelt use and use of child-seats
  - Control of the correct use of the infrastructure e.g. speed, not parking on sidewalks and cycle lanes (using ANPR, automatic cameras, …)

- Emergency services
  - Quick response units on bikes/motorbikes

Additionally to the own direct safety actions a city can have also **a strong influence of stakeholders and private enterprises active in the city**. Especially **procurement procedures** can be used to require safe solutions and safe approaches like the use of safer buses and safer garbage trucks, a safe organisation of traffic works especially for cyclists and pedestrians.

Safety oriented procurement rules for trucks in London

In the city of London, all of the vehicles used by city contractors, have to be equipped with blind spot pedestrian/cyclist detection systems.

On top of using the list above a city should **also be active itself to learn from other cities about successful approaches using different sources and participating in the safety exchange initiatives** in networks like POLIS, EUROCITIES and the Mobility Week workshops.

[28] Citylab (2019), A modest proposal to eliminate 11,000 urban parking spots, https://bit.ly/2I3B2xh

Different frameworks that enables cities to learn from other cities about successful approaches are already available in Europe:

- The European Road Safety Charter erscharter.eu (currently being evaluated and to be enhanced)
- The German Road Safety Council (DVR) has compiled a list of good practice examples for road infrastructure measures to serve as an inspiration for towns and cities.29
- Swedish STRADA database
- Existing tools for choosing measures and estimate effect: e.g.: TARVA (Finland /Lithuania), TS-EFFEKT (Norway), EVA (SWEDEN), HSM (USA)
- OECD report on safe cycling, Denmark cycling, study tips to safe cities
- ETSC reports: https://etsc.eu/making-walking-and-cycling-on-europes-roads-safer-pin-flash-29/, https://etsc.eu/safer-roads-safer-cities-how-to-improve-urban-road-safety-in-the-eu-pin-flash-37/, https://etsc.eu/the-european-unions-role-in-promoting-the-safety-of-cycling/
- Road Safety observatory for Vulnerable Road Users
- The ELTIS database http://www.eltis.org/discover/case-studies
- The tool developed within the ISAAC project, lead by SWOV: www.pedbikeplanners.eu: the factsheets about walking and cycling measures include evidence on the impact of measures on road safety
- ....

Assess and select measures and measure packages

From the focus of Road Safety for Active Travel the following elements are important in the selection of measures:

- The basic attitude of Road Safety should be part of the SUMP approach anyway, for some aspects no selection should be discussed since it would be a basic characteristic of each measure e.g. a safe design of roads and junctions
- A strong understanding on the location, the type and causes of the collisions are the basis for a selection of the best actions to improve safety.
- Integrated packages are crucial for a successful Safety approach, see 'Engineering, Education, Enforcement'

Specific Safety chapter focusing on Active Travel in the SUMP of Antwerp

The SUMP agrees on a list of actions to implement the safety plan:

- Focus on pedestrians and cyclists in the whole mobility policy
- Solving unsafe points in the cycling network
- Modifications of the cycling network for the safety of the e-cyclists
- Specific focus on large groups of victims: elderly, youngsters around 20 years old and children
- Obstacle free sidewalks and cycle paths, surely with road works and if bad weather

[29] DVR, Gute Straßen in Stadt und Dorf, https://bit.ly/2M4ofhN

- Asphalt for the construction of cycle paths
- Regular maintenance of sidewalks and cycle paths
- Evaluation of busy sidewalks and cycle paths
- Extra safety measures for busy cycle paths and two-direction cycling paths and if needed unbundling of these cycle paths
- Organising complex crossings e.g. tram crossings with extra care

4.4.2 Step 8 Agree actions and responsibilities

The simple result of this step should be a clear list of actions with well-defined outputs indicating the timing and which stakeholders are responsible for each action. Also the budget for each action should be clear. However specifically to achieve the safety objectives the following concerns are important:

- The most unsafe point in the network should have priority in the approach
- Vulnerable road users should have priority
- Safety is also a matter of safe design and implementation requiring that the budget for all mobility measures should enable safe solutions.

Estimate costs and funding sources

Effective road safety requires appropriate and stable funding. Local authorities should dedicate funds for road safety from their budgets for the implementation of SUMPs and their local road safety plans. Additional funding opportunities should also be made available from central government and EU funds.[30]

Central or regional governments in many countries fund road safety work at the municipal level. This is done by launching projects targeting specific road user group safety, specific infrastructure or enforcement measures, sharing costs of infrastructure safety improvements between the central government and municipalities, allocating part of the money collected from automated traffic law enforcement activities, or from motorised vehicle insurance payments to municipalities' work on road safety.[31]

Joint investments of cities and the government in Slovenia

In Slovenia, according to national law, investments in urban infrastructure are shared between the central government and the municipalities. The central government invests in the national roads crossing urban areas while pedestrian and cyclist infrastructure developments along these roads are covered by municipal budgets. This way, municipalities are encouraged to plan infrastructure developments simultaneously with the central government.[32]

Recently, the European Commission launched a "**Safe Transport Platform – Road Safety Advisory**" to promote safety as a key element for transport investment and to provide technical or financial advice

[30] https://etsc.eu/safer-roads-safer-cities-how-to-improve-urban-road-safety-in-the-eu-pin-flash-37/
[31] https://etsc.eu/safer-roads-safer-cities-how-to-improve-urban-road-safety-in-the-eu-pin-flash-37/
[32] https://etsc.eu/safer-roads-safer-cities-how-to-improve-urban-road-safety-in-the-eu-pin-flash-37/

for potential applicants who have ideas for the projects but face difficulties in finding information on appropriate EU funding or EU financial instruments. The advisory support addresses the public and private sector. Examples of eligible projects include traffic calming measures, facilities for cyclists and pedestrians and - on an experimental basis – measures to improve the safety of vehicle fleets (e.g. pooled procurement of safe public transport buses).[33]

The **European Regional Development funds** provide an opportunity for cities and towns to apply for financial support in developing urban transport, as well as cycling and pedestrian infrastructure. Cities and towns should actively apply for EU funds to improve urban road safety as the available funds from the current budgetary framework 2014-2020 are not yet fully exhausted.[34]

Ensure wide political and public support

As stressed in Step 1 'Set up working structures' making road safety for Active Travel a high priority for the citizens and (local) politicians seems easy. However in this Step, when we have to decide on the actions to do and the budgets to spend, it much more difficult to put the priority on safety if this implies e.g. in lower budgets, less space or less time at the junction for specific modes. To achieve this, it is crucial that policy makers feels responsible to steer the process in a fundamental safe way.

To support this process the following approaches can help:

- Create ownership by all citizens of the plan: owners will want to enhance road safety and will want to reach the targets themselves
- Stress that politicians are responsible for protecting their citizens especially the most vulnerable ones
- Nominate a specific road safety manager taking specific safety initiative and perform safety quality checks
- Engage safety advocates (e.g. parents, NGO's, etc.) to help build community ownership.
- Use road safety as a lever to create ownership of the whole of the SUMP. By understanding the needs for road safety in a plan, citizens may as well accept the overall SUMP more easily.

4.4.3 Step 9 Prepare for adoption and financing

In this step we finalise and assure the quality of the 'Sustainable Urban Mobility Plan' document including an agreement on the financial plans and the sharing between the stakeholders. As stated before Safety should be an important driver to make the right priorities.

[33] European Commission (2019), Safer Transport Platform: European Investment Bank and European Commission join forces to support investment in transport safety with special focus on roads, https://bit.ly/2CRsAxN, European investment advisory hub, https://bit.ly/2uBIoQW

[34] https://etsc.eu/safer-roads-safer-cities-how-to-improve-urban-road-safety-in-the-eu-pin-flash-37/

4.5 Phase 4 Implementation and monitoring

In this phase we have the following steps in the SUMP process:

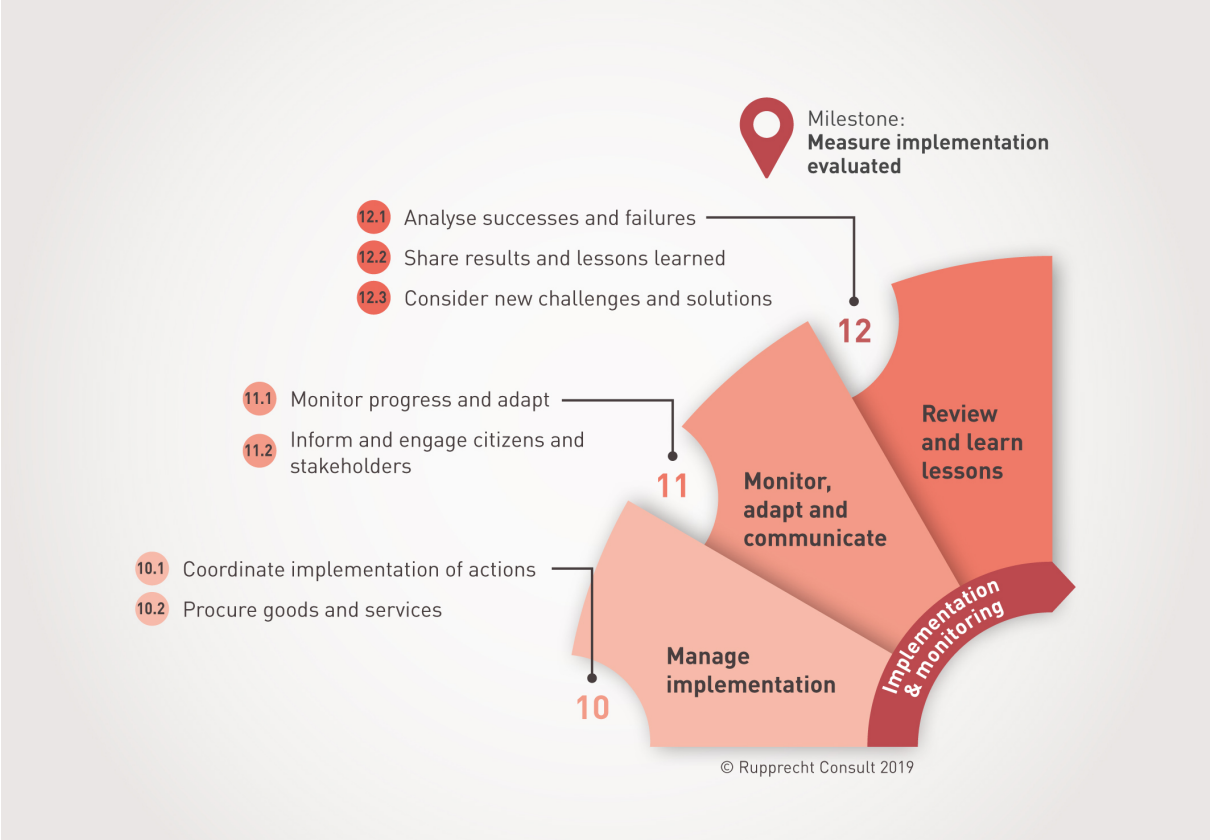


Figure 8 Steps in phase 4 'Implementation and monitoring' of the SUMP process.

4.5.1 Step 10 Manage implementation

Also for the Road Safety measures, a good handover to technical implementers and effective coordination of all implementation activities by the core team is important to ensure a coherent approach. Especially for an effective Road Safety approach a high quality development of the measures and well-focused approaches are crucial to achieve the envisaged impacts on the number of collisions and related deaths and seriously injured figures.

4.5.2 Step 11 Monitor, adapt and communicate

Taking into account the high public sensitivity on road safety, this step seems very important to steer continuously the implementation of effective road safety measures and to keep the focus in all measures on road safety requirements including the budget needs as a result of it.

Continuous monitoring, interpretation of the observations and optimisation of the approach should increase the efficiency of the process. This will contribute to a higher quality of implementation. Based on this data citizens and other affected stakeholders should be regularly informed and engaged.

Monitor progress and adapt

Many cities can rely here on the general monitoring on regional and national level which is done in most EU countries. Many countries collect in a structured way police data on collisions with information on the location of the collisions, the modes and persons involved and the number of serious injuries and road deaths. This minimal set of data allows the city to review the progress annually (with a basis time period of 3 years to avoid statistically inconsistencies.

Collision database for the city of Vienna

The collision database of Vienna is the tool to register all collisions in a structured way and to locate them on the network. The following information for each collision is included: Info per collision:

- Driving and moving direction of the collision participants
- Type of collision
- Date and time of the collision
- Road condition
- The circumstances of collisions
- Participation type (type of vehicle or traffic participation)
- Degree of injury

On a regular basis (e.g. every 3 years) a more in-depth evaluation (see step 3-7) should be repeated to optimise the road Safety approach. Especially the evolution towards the targets envisaged should be evaluated. A too slow evolution should result in a critical reflexion with technicians and policy makers how to implement stronger' measures or to implement measures earlier. Taking into account the possible impact of these changes on budgets and policy priorities (in relation to other measures) this can be a difficult and crucial moment in the implementation of the SUMP strategy and related measures.

Especially for Safety this mechanism should be part of the SUMP agreement itself (step 9) in which all stakeholders agree to take the responsibility to do all efforts needed to achieve the objectives.

After a longer time period (e.g. 5-10 years) also the targets can be adapted (see step 12).

Inform and engage citizens and stakeholders

A reporting on yearly basis or 2 yearly basis on the number of collisions and the number of serious injuries and road deaths is important or as part of a general progress report of the SUMP or as a self-standing information.

Just reporting these data will influence the general perception on the work of the city on Safety. However at least every 3 years a more in-depth analysis of the data seems important to really understand the reasons behind the evolution (or stand-still) observed. Also this understanding should be made

available and clearly reported to the citizens and stakeholders. Only in this way a clear acceptance and willingness to invest will be created for a 'stronger' Safety policy in the city. Especially understanding the link between general mobility measures and a reorganisation of the multi-modal transport system with Safety should be made clear.

A detailed evaluation of the safety with new traffic organisation in Gent as a driver to maintain the new organisation

The new circulation plan for the centre of the city of Gent (ties).implemented April 2016) did result in a significant decrease of the number of cars (-20-40%) in the centre resulting also in a significant decrease of the collisions with cyclists and pedestrians. This SAFETY improvement was observed as an important driver to keep the new organisation although many car users were not in favour of the new organisation.

4.5.3 Step 12 Review and learn lessons

The most important points for Safety are already mentioned in Step 11.

As emphasised in earlier steps, "Vision Zero" is a leverage point to generate and motivate change and needs to be far-reaching and long-term, looking well beyond what is immediately achievable.

However it is important to set intermediate targets and to update these targets on a regular basis (re)motivating all actors to continue and to increase efforts.

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