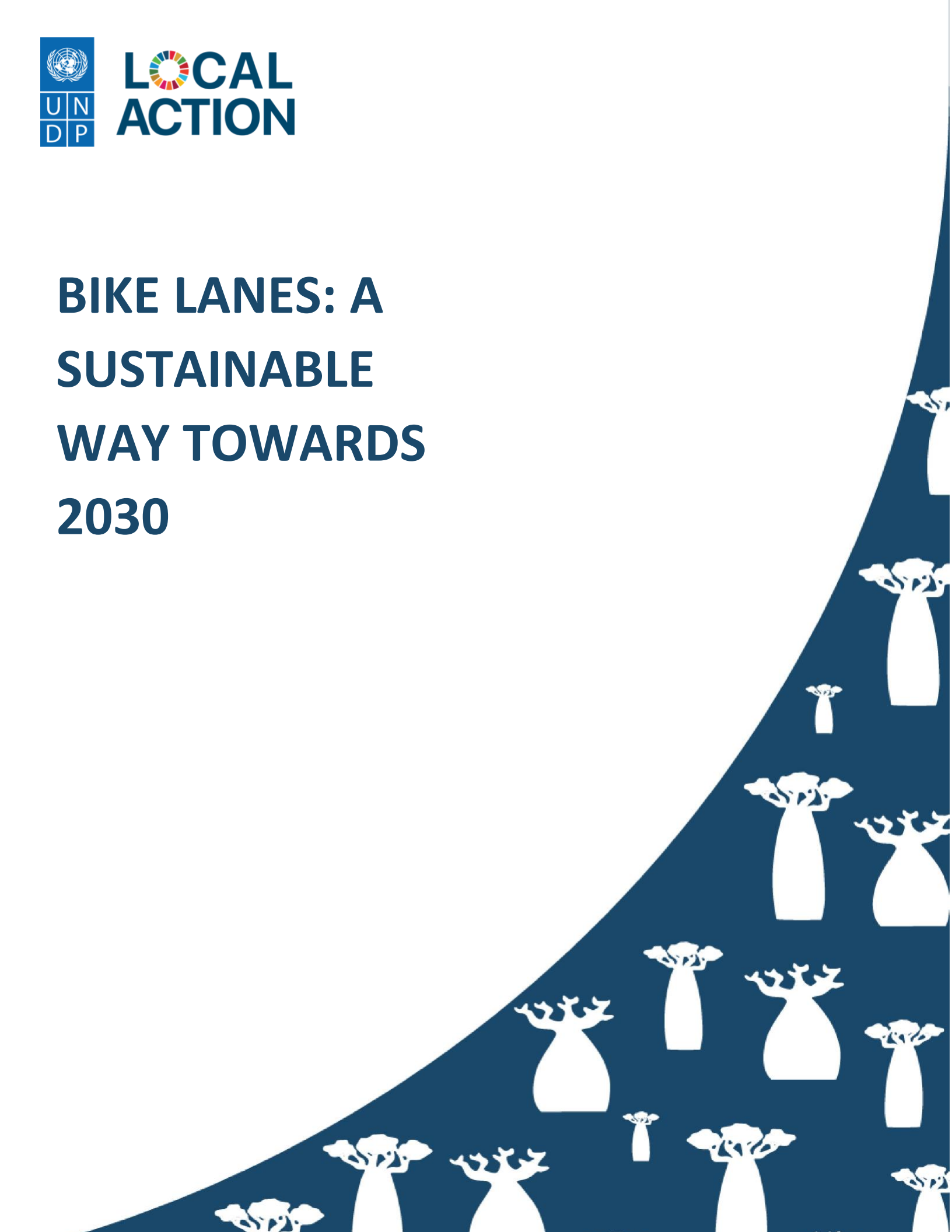
LOCAL ACTION

BIKE LANES: A SUSTAINABLE WAY TOWARDS 2030



New alternatives to urban mobility, particularly cycling, plays a crucial role in achieving the Sustainable Development Goals (SDGs).

As cities face increasing challenges related to traffic congestion, air pollution, and health concerns, cycling becomes a viable solution to urban mobility with quick and proven results in terms of improving not only urban mobility, but also quality of life.

This document wants to guide cities that are considering increasing biking in their streets and public space. We hope that you find this small guide useful and inspiring! Investing in Non-Motorized Transport (NMT), implementing supportive policies, and fostering a culture of cycling can create sustainable, inclusive, and livable cities while addressing the challenges of urbanization and promoting sustainable development.

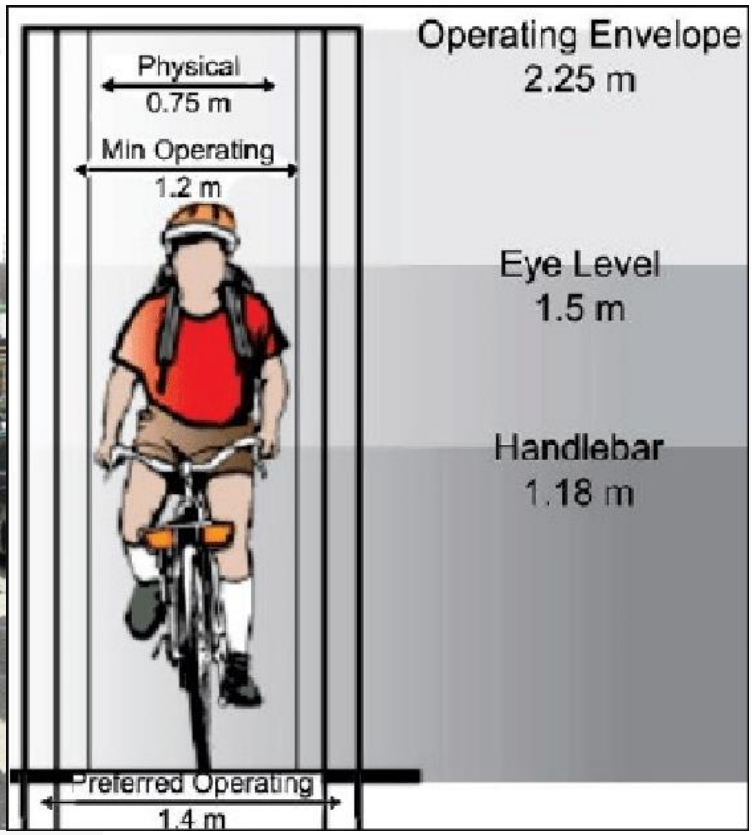
People ride shared bicycles in central business district in Kigali, Rwanda, on Sept. 9, 2021. (Photo: Xinhua)

This short guide explores different types of bike lanes, and offer some options for their planning, design and construction. We will also compare the pros and cons of different options of building materials and lastly, we will look into the specific case of Netherlands where cycling is deeply ingrained in society and is an integral part of everyday life for many people.

BIKE LANES, AN INTRODUCTION

Bike lanes are often integrated into existing road networks, and the design may vary based on available space, road width, and surrounding infrastructure.

Buffered Cycle Lane/Track, and Docking Station/Bike Parking Station, New York, USA



Cycle/Bike Lane dimension (NACTO[1], 2016)

HOW TO AVOID COSTLY RETROFITS

As any operation involving construction, building bike lanes is prone to inflation, adaptation to last minute challenges and factors that are often difficult to foresee, and which results into unexpected budget increases.

The following can help you to avoid running out of budget:

1. Plan for the big scale: Incorporate a long-term vision for cycling infrastructure in the city's Master Plan.
2. Even if the bike lanes start as a small pilot, start planning for the future expansion and evolution of the network over time, considering potential future developments and changes in travel patterns.
3. Develop a comprehensive network plan that identifies key routes for bike lanes or tracks based on existing demand, connectivity, and potential future growth.
4. Consider factors such as population density and growth, employment centers, schools, and recreational areas to determine priority routes.
5. Coordinate land use and zoning regulations with the bike lane or track planning from the start.
6. Encourage mixed-use developments and higher residential density along cycling routes to promote active transportation and reduce reliance on motor vehicles.

TYPES OF BIKE LANES	DESCRIPTION	PHOTO/PICTURE
Separated bike lanes	Also known as cycle tracks, these lanes are physically separated from motor vehicle traffic by curbs, bollards, planters, or parked cars. They provide a higher level of safety and comfort for cyclists.	Separated bike lane, Kigali, Rwanda
Buffered bike lanes	They have a designated space separated from vehicles by painted buffers, typically striped markings or painted areas. The buffers provide some separation between cyclists and vehicles.	Buffered bike lane, Portland, USA
Conventional bike lanes	They are demarcated by painted lines on the road surface and are typically placed adjacent to the vehicle travel lane. They offer less physical separation and low level of safety to cyclists, but still provide a designated space for cyclists.	Conventional bike lanes, Copenhagen, Denmark

COMPARATIVE ANALYSIS BETWEEN CONCRETE AND ASPHALT BIKE LANE/TRACK

The approach to constructing bike lanes and the choice of surface materials can vary significantly based on the specific city and its unique circumstances. City authorities, urban planners, engineers, and landscape architects usually work in collaboration to decide on the type of lane and construction materials to be used.

There are generally two types of bike/cycling lanes based on surface materials: concrete and asphalt, although their underlying layers are similar, both have their advantages and considerations, and the choice between them depends on various factors such as budget, maintenance requirements, and local conditions.

Below is the comparative analysis between a concrete bike lane and an asphalt bike lane. However, the aspect of cost has been deliberately ignored, as the cost varies across different countries. In many developing countries like in Africa, concrete is cheaper than asphalt, whereas in developed countries, asphalt is cheaper than concrete (e.g. : in Rwanda, the average cost of One cubic meter of finished and laid asphalt on site is 250 US$, whereas the average cost of One cubic meter of finished and laid plain concrete on site is 130 US$, yet, in developed countries, the average cost of one cubic meter of concrete can range from $100 to $200, and the average cost of one cubic meter of asphalt concrete typically ranges from $80 to $150.)

TYPES OF MATERIAL	PICTURES	ADVANTAGES	DESADVANTAGES
Concrete bike lane: The primary material used in constructing a concrete cycle lane is the concrete mix itself. It is typically a combination of cement, water, aggregates (such as sand and gravel), and sometimes additives or admixtures. The specific mix design will depend on		1. **Longevity and durability**: Concrete is known for its durability and long lifespan, making it a suitable option for cycling lanes that experience heavy traffic or harsh weather conditions. 2. **Better resistance to temperature changes**: Concrete has a higher resistance to temperature	1. **Longer installation time**: Concrete requires more time to set and cure properly, which can result in longer construction timelines for cycling lanes 2. **Surface hardness**: The rigid nature of concrete can be less forgiving on cyclists, leading to a potentially less comfortable ride compared to asphalt.

TYPES OF MATERIAL	PICTURES	ADVANTAGES	DESADVANTAGES
hot, soft bitumen, stony materials, and sometimes additives or admixtures. Asphalt concrete is excellent as a cycle track wearing course and normally has a technical lifetime of 15-20 years, although it may not remain even for more than 10 years	 (Rolling out a red carpet on asphalt concrete for cyclists (Netherlands)	the risk of jolts and vibrations while riding 2. **Easy maintenance**: Asphalt is relatively easy to maintain and repair. Small cracks and potholes can be filled easily, and resurfacing can be done without major disruptions to the cycling lane. 3. **Quick installation**: Asphalt can be laid relatively quickly, allowing for faster construction of cycling lanes 4. **Flexibility**: Asphalt has a certain level of flexibility, allowing it to withstand minor ground movements without significant damage	may lead to surface deformations or cracking over time 2. **Environmental impact**: The production of asphalt requires the extraction and refining of crude oil, which contributes to carbon emissions and dependence on fossil fuels.

TYPES OF MATERIAL	PICTURES	ADVANTAGES	DESADVANTAGES
factors like climate, traffic load, and desired strength		fluctuations compared to asphalt, reducing the risk of surface deformations and cracks. 3. **Environmental benefits**: Concrete is more environmentally friendly than asphalt in terms of production, as it does not require crude oil extraction and has a longer lifespan, reducing the need for frequent reconstruction.	3. **Difficult repairs**: If concrete cycling lanes develop cracks or other damage, repairs can be more complex and costly compared to asphalt. Replacement or resurfacing may be required
		4.	**4.**
Asphalt concrete bike lane: Asphalt concrete is produced by mixing		1. **Smooth surface**: Asphalt provides a relatively smooth and comfortable surface for cyclists, reducing	1. **Susceptible to temperature changes**: Asphalt can expand and contract with temperature fluctuations, which

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CASE STUDY – THE CITIES IN THE NETHELANDS

"There are more bicycles than residents in The Netherlands and in cities like Amsterdam and The Hague up to 70% of all journeys are made by bike". The BBC's Hague correspondent, Anna Holligan, 2013

Collectively, below factors are believed to have created a positive feedback loop, where the popularity of cycling reinforces the development of cycling infrastructure, which, in turn, encourages more people to cycle. This cycle has made the Netherlands one of the world's leading countries for cycling, with a high percentage of trips being made by bicycle.

Infrastructure	The Netherlands has an extensive and well-developed cycling infrastructure. There are dedicated cycling lanes, paths, and routes throughout the country, making it safe and convenient for people to cycle. This infrastructure includes separate cycling lanes, traffic signals for cyclists, bicycle parking facilities. This well-planned infrastructure encourages people to choose cycling as a primary mode of transportation.
Compact and Bike-Friendly Cities	Dutch cities are often compact and relatively flat, with shorter distances between destinations. This makes cycling a practical and efficient mode of transportation for everyday commuting, running errands, and going to school or work. The urban planning in many Dutch cities prioritizes cyclists, ensuring that cycling is often the fastest and most convenient way to get around.
Health and Sustainability	The Dutch value active and sustainable lifestyles, and cycling aligns perfectly with these ideals. Cycling promotes physical activity, and it is an environmentally friendly mode of transportation, producing zero emissions. The Netherlands has made efforts to reduce car usage and promote cycling as a means of improving public health and reducing congestion and pollution
Government Policies	The Dutch government has implemented policies and initiatives to promote and support cycling. This includes investing in cycling infrastructure, implementing traffic regulations to protect cyclists, and offering incentives such as tax benefits for employers who encourage their employees to cycle to work. These policies have helped create an environment where cycling is accessible and attractive to a wide range of people.