Date 24th of March, 2021
Nairobi

Technical Brief on Kibera Road Developments 2021

This brief is co-developed by the Architectural Association of Kenya (AAK), Kounkuey Design Initiative (KDI), and the Institute for Transportation and Development Policy (ITDP). These organisations have experts in development, planning and engineering who have collaborated to review the infrastructure delivery proposed. Also within the collaborating organisations there is expertise in the context of informal settlements and particularly in how these neighbourhoods can be improved through infrastructure and community development. In preparing this brief this team has held meetings with Kibera residents, visited the construction activities and talked with KURA and contractor employees on the ground.

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1. Introduction & Background Context

Director General Badi of the Nairobi Metropolitan Services (NMS) announced on February 3rd 2021 the delivery of 28km of tarmacked roads in Kibera. The road developments have the potential to contribute to improving the quality of life of Kibera's residents, and represent critical infrastructure that can contribute to achieving this when planned and built in a context appropriate manner.

The announced construction of a 444 km access road across Nairobi County's informal settlements in February 2021, included plans for Kibera. It was indicated that all access roads were planned to be tarmacked and that the total of 444 km of access road across Nairobi's informal settlements would be completed within one year from the announcement of the intention to build them.

Following the announcement to build 28 km of the 444 km in Kibera a number of houses in Kibera were marked with a red X. The chiefs in some villages have made residents aware of the plans for the roads through megaphone and in Sarang'ombe ward demolitions started and are near completed. Residents were urged to comply with the order and to demolish their houses themselves to pave way for the roads. Compensations to residents and consultations prior to the marking of the houses for demolitions did not take place.

Photo 1: Concept sketch used by KURA ground team in Gatwekera Village (KDI, 2021)

A concept sketch (Photo 1) describing the 28 km of intended road upgrades for Kibera has been shared by NMS with the press and was used to locate and clear ROW by the contractor and under KURA supervision. The concept sketch includes all existing roads in Kibera as well as some of the footpaths in the settlement. The road concept sketch seems to have assigned roads for upgrading by following the existing settlement footpaths. The road classifications are not indicated in the sketch, but the engineers on the ground understood some hierarchy not shown. Many of the roads, especially towards the Ngong/Mtoni river and tributaries, or the railway reserve, are planned as dead-end roads. Some of the roads are understood to be planned with a 14m ROW, others with a 9m ROW. In addition, the KURA ground team shared that not all roads indicated in the map will actually be upgraded as tarmac roads, further evaluation on the ground will define if and what surface treatment will be used. Additionally, the KURA team clarified that adjustments to the concept sketch are possible to be made based on the conditions found on the ground and that further design detail besides the concept sketch, is limited or not yet available.

2. Observations & Risks

The implementation of the 28 km of road in Kibera is done with the intention to improve emergency and service access (e.g. access for water bowsers, police vehicles or exhauster trucks) and to provide the opportunity to improve security in the settlement. These intentions are very positive and this Technical Brief supports these development objectives for all informal settlements.

In May, 2020 NMS declared parts of Kibra as a Special Planning Area (SPA). This is also highly positive for Kibera's development as it evidences recognition of the special development challenges of the settlement and it provides a good mechanism for sustainable development of Kibra. Among some of the key special development dynamics, challenges and conditions of Kibera are the following:

- Spatial constraints such as high density and open public space scarcity
- Established community-adapted infrastructure and systems. For instance, in the absence of access and services, the community relies on open channel drains for the removal of waste from the neighbourhood.
- Kibera is located over several valleys and along several rivers and streams (that feed into the Nairobi Dam), there are steep hills, cliffs, and river floodplains.
- Due, in part, to the previous two points, Kibera residents are severely affected by flooding.
- Kibera settlement and Kibra ward do not have an Integrated Development Plan, or similar tools, to guide development.
- Demographic and societal conditions; for instance, the vast majority of residents walk as their primary mode of transportation;

3. Recommendations

Considering these special development challenges and conditions, below are some recommendations composed by urban and transport planners, civil engineers, and community development experts.

I. *Road standards for informal settlements*

Road reserve is a good example of a standard that should be reconsidered in the SPA process. Currently it is not known which standards are being applied to the roads in Kibera but assumed to necessitate compliance with the Kenya Roads Act and Physical Planning Handbook of 2002.

The first schedule of the Kenya Roads Act 2007 provides a classification of urban roads, including Class UL, that is, urban local roads which include local residential access roads and streets.The Physical Planning Handbook of 2002 (pg.65) (compare 2007) recommends road reserve widths for urban roads, including access roads. These widths are as provided below.

Local Distributors

- Major access road exceeding 150 m in length - 15 m.
- Access road not exceeding 150 m in length (normal residential street) - 12 m.

Access Roads

- Cul-de-Sac or short connecting road not exceeding 60 m in length - 9 m
- Service lanes - 6 m
- Cyclist lanes - 3 m
- Footpaths - 2 m

The minimum ROW of 9m seems to be applied in Sarang'ombe for access roads and major access roads are planned in Laini Saba.

The application of these standards, however, should consider the unique conditions in Kibera, as is the rationale for the declaration of the SPA. Possible configurations include the following:

- For two-way streets, a 6m wide carriageway for a two way single carriageway and a 1 m to 1.5 m drainage to keep the width of the road within 7 m to 7.5 m ROW.
- Pedestrian and cycle paths of 3 m and above
- Pedestrian paths of 2 m and above

See for further detail the Street Design Manual for Urban Areas in Kenya (SDMUAK) draft 2019, developed by the Ministry of Transport, Infrastructure, Housing, Urban Development, and Public Works.

The opening up of access routes through informal settlements provides opportunity to incorporate utilities within the access corridor eg. water supply and, where levels permit, sewer. The space constraints within informal settlements warrant careful consideration of the location and design of access routes so as to maximise multi-service gain from the opening up of routes for vehicles.

II. Recognizing context and risks in planning

It is important to further consider the context in which upgrades are planned and intended to take place. Especially in informal settlements, the main traffic that uses access roads is non-motorized traffic, mainly pedestrians. “About 95% of people living in informal settlements do not own any means of transport and thus depend on walking while about 4% own bicycles and 1% own cars" (Mchome, E.E., 2017). Designs for all roads should incorporate non-motorised transport consistent with the SDMUAK, 2019. Interconnected walking and cycling networks, therefore, should be considered in the overall road upgrading plans and roads need to have adequate traffic calming to slow down motorised traffic to ensure safety for the main users of the roads; pedestrians.

Where context appropriate planning processes are undertaken prior to implementing road infrastructure, space for roads could be negotiated and made available. One example is reblocking where an informal settlement undergoes spatial reconfiguration or readjustment to allow for infrastructure and basic services to be installed. Residents of informal settlements are engaged and consulted in reblocking projects. It is also practical to consider the functional classification and hierarchisation of a proposed road within an informal settlement and link this with the appropriate minimum right of way (ROW) requirements.

Moreover, when planning takes place prior to implementation of any kind of infrastructure, apart from considering the socio-economic context, physical and environmental conditions should be considered and responded to. In the case of Kibera, it is understood that the settlement’s topography, had not been put into consideration (see plan below where road alignments are shown to drop sharply off steep edges and towards river or stream dead ends).

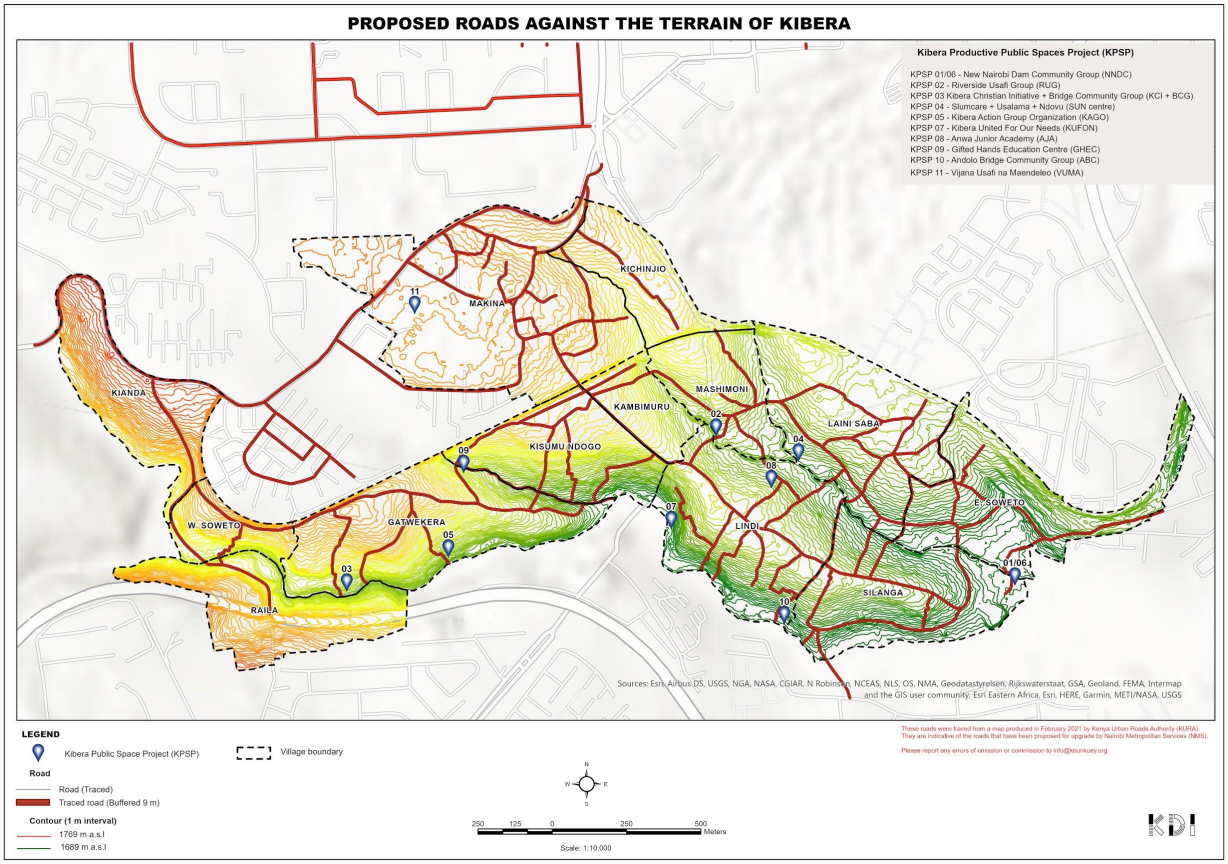

Fig 1: Kibera roads traced and overlaid with terrain (KDI, 2021)

Many of the indicated roads are on very steep gradients in some cases exceeding 30%. These are impractical and unsafe for vehicular access whether paved or unpaved. The maximum advisable gradient for safe vehicular use should not exceed 6% (2nd Draft Kenyan Road Design Guidelines for Urban Roads). In addition, a number of the roads are “dead-ends” (terminating at the Ngong River or at the Railroads).

Best practice for road development requires traffic studies to shed light on traffic volumes and the modal share among the various transport facilities and is also critical in the determination of the most suitable type of pavement structure to be adopted.Choosing the right pavement structure is essential for the durability of the roads to be developed. It also indicates the materials that will be required during construction which is another important aspect due to the traffic shock that results from ferrying materials to and from the construction site during

construction. This requires to be adequately planned for to ensure minimal interruptions to the day to day lives of the residents in Kibera.

Photo 2: Dead end access road in Gatwekera Village with 34% gradient (KDI, 2021)

III. Development that is informed by flood risk analysis

According to the concept sketch it appears that the planned roads will cross a number of tributaries and streams in the settlement. In addition, other roads indicated in the concept sketch lay in flood-prone areas, swampy areas and on top of existing tributaries (see figure 2). Building these roads would intensify the scale and risk of flooding.

River flooding should be considered in detail ahead of roads development. Our first recommendation would be to minimise crossings of rivers as the 10 new river crossings currently understood from Photo 1 have the potential to increase flooding. We recommend that the road along the Gatwekera village eastern boundary be reconsidered as it currently is aligned on top of a river. Lastly building roads within flood plains (see Fig 2) is advised against.

In regards to drainage, which we understand is being delivered alongside the road infrastructure, the design is not yet available for review. However, good practice drainage design should start with detailed desk studies to conduct hydrological analysis. This will ensure that adequate and networked drainage is considered to avoid erosion at road edges and downstream, and to avoid localised flooding. Local waterways often swell to several times their normal flow conditions due to heavy rainfall and high rates of runoff in the settlement. Drainage design should slow down the rate of runoff from neighbourhoods into rivers to avoid downstream flooding.

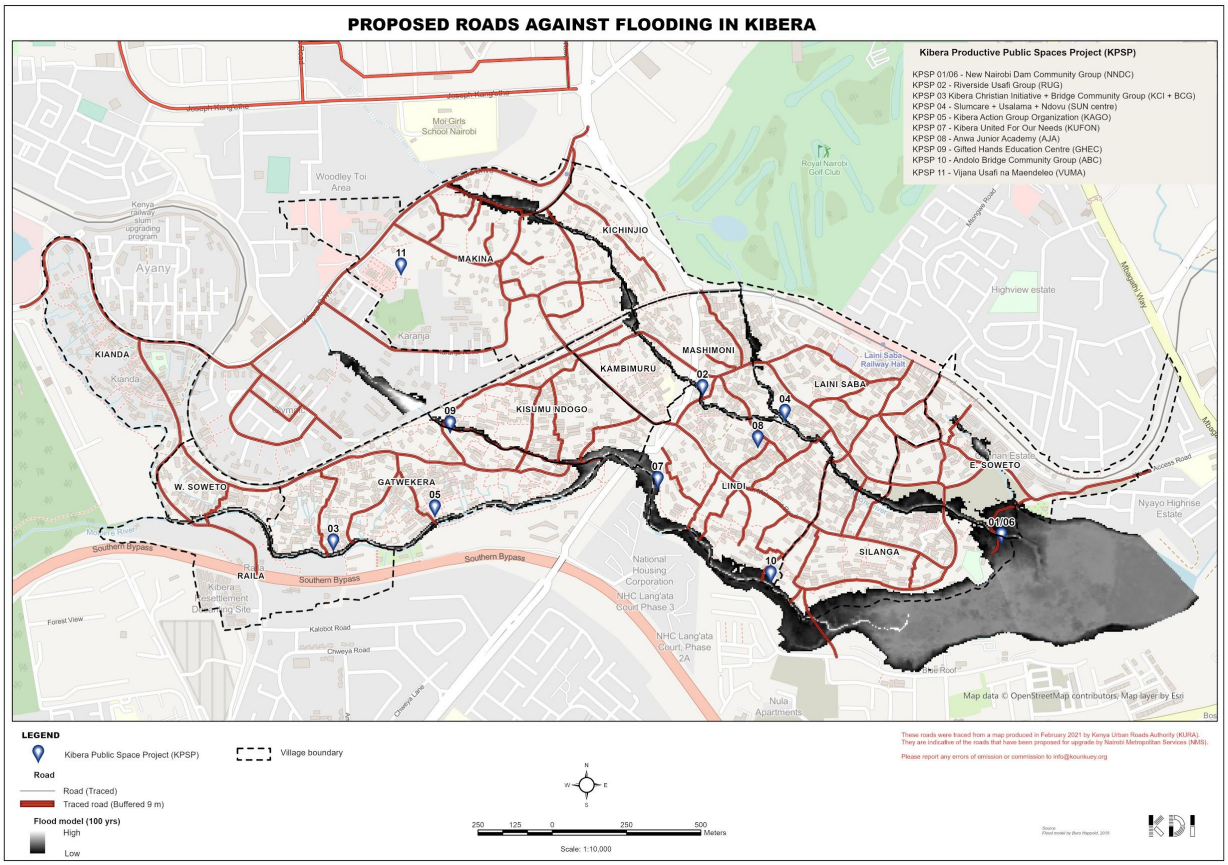

Fig 2: Proposed Roads Against Flooding in Kibera (KDI, 2021)

IV. Communication around the project & stakeholder engagement

Planning, management and development in urban areas in Kenya is directed by the Urban Areas and Cities Act, Kenya Roads Act and the Physical and Land Use Planning Act, which

advocate for government agencies to promote and facilitate engagement of residents and ensure their adequate representation in decision making as they are directly affected by the outcomes of planning and development decisions by government.

Past and recent informal settlement upgrading project experiences, such as the process applied by the government in Mukuru, evidence that enhanced sustainable upgrading outcomes are achieved where the government engages with residents of informal settlements to understand their needs and issues with regard to proposed upgrading projects, as well as the potential spatial, environmental and socio-economic impacts of the proposed project on residents.

Meaningful engagement of residents in infrastructure upgrading projects should include forums and spaces where room for dialogue between government, residents and other relevant stakeholders is provided, to ensure that all possible alternatives at improving the outcomes of infrastructure upgrading projects are explored collectively.

Upgrading projects do not only provide an opportunity to lay new or improve existing physical networks in informal settlements, but it also provides an opportunity for the government to understand the challenges and needs of its residents, and improve the relationship between government and citizens.

Under the ongoing roads project, KURA conducted consultations with residents of Kilimani neighbourhood this week with regard to the improvement of Argwings Kodhek Road. It is only fitting that such consultations are also extended to residents of Kibera as they are much more impacted by the roads project owing to the unique conditions of the informal settlement and the socio-economic constraints for residents.

V. Recognising existing infrastructure, community assets and livelihood sources

In Kibera there are existing infrastructure such as power lines, sewer lines, water lines, and stormwater drainage, for instance, that should be considered in relation to the road network. This would support and strengthen these existing infrastructure components and drive a more sustainable approach. There have been a number of damages made to these infrastructure in the road clearing so far and the quick and effective repair is requested.

Furthermore, formalised and registered community based organisations (CBO) have initiated, constructed and managed critical community infrastructures for decades, many of these provide sources of livelihood for residents and their families. It is our firm belief that the preservation of these elements should be assessed and prioritised for preservation, on a case by case basis driven by the local community and organisations.

One such example of existing infrastructure and community assets that also support livelihoods is the Kibera Public Space Project (KPSP). This award winning initiative is 15 years old, is a network of over 250 group members across 11 locations in 7 of Kibera's Villages. The KPSP network is a series of 11 public spaces featuring fundamental services and climate-resilient infrastructure, brought to life with small businesses. Co-designed, built, and managed by local residents, the KPSP is providing the groundwork for inclusive and integrated upgrading at a larger scale.

4. Summary

Our organisations are ready to meet NMS and KURA teams or individuals to contribute to the successful implementation of 28 km of roads in Kibera, and to set a course for future sustainable upgrading of Kibera, but also other informal settlements in Nairobi. We suggest the following next steps:

1. A visit on-site with Major General Badi, Eng. Kinoti and Prof. Arch. Maringa and representatives from our organisations to observe and discuss the 5km of roads at Sarang'ombe under construction at present. We propose that this can go ahead at the earliest time that is feasible.
2. Our organisations prepared this Technical Brief to initiate important dialogue and collaboration. We are eager to hear feedback this and meet with technical experts from KURA to further these considerations. We are focused on making proposals and adjustments that either improve or have little impact on the current timelines and budget.
3. In the ongoing structures clearance, we urge that i) communities are given due notice and compensation and ii) that existing community infrastructures and assets, which are not planned to be replaced by this project, are preserved as a priority and that any accidental damage to existing infrastructure is repaired or replaced within a fair timeline.
4. We ask that information about the process, design and detail is shared with our organisations and with the public so that we all may understand the project and support its objectives more actively.
5. A review of the proposed roads in Kibera that considers the special context and community would bring numerous advantages to NMS and KURA. These advantages include reducing construction times and therefore saving on resources, improving positive public opinion of the development, contributing to a sustainable neighbourhood development, and other significant advantages. Moreover, a review would assist in

aligning the positive objectives of both the SPA declaration of Kibra and the further upgrading of informal settlements in Nairobi.

5. Technical Team

a. The Architectural Association of Kenya (AAK)

Established in 1967, the Architectural Association of Kenya (AAK) is Kenya's leading Association for professionals in the built and natural environment in Kenya incorporating Architects, Quantity Surveyors, Town Planners, Engineers, Landscape Architects and Environmental Design Consultants and Construction Project Managers.

The Association is registered under the Societies Act and brings together professionals from the Private Sector, Public Sector and Academia. The Association also acts as a link between professionals and stakeholders in the construction industry: Including policymakers, manufacturers, real estate developers and financial institutions.

Stated objectives of AAK include:

- To co-ordinate, promote and direct the activities built and natural environment professionals in Kenya.
- To advance the science and art of planning and building by developing the standards of professional education, training and practice
- To create public awareness and provide professional opinions on the matters pertaining to the built and natural environment;
- To liaise with the Government and regulatory agencies on registration and licensing of built and natural environment professionals

b. Kounkuey Design Initiative (KDI)

KDI is a non-profit design and community development organization, founded in Kibera, Kenya in 2006. KDI has delivered infrastructure, amenity, information and research within Kibera by partnering with community based organisations, with the mission to advance equity and activate the unrealized potential in the settlement. One of our flagship projects has been the Kibera Public Space Project (KPSP) which includes 11 public spaces across Kibera. KPSP has won awards and accolades locally and internationally, and is currently shortlisted for the WRI Ross Prize for Cities: https://kounkuey.org/news

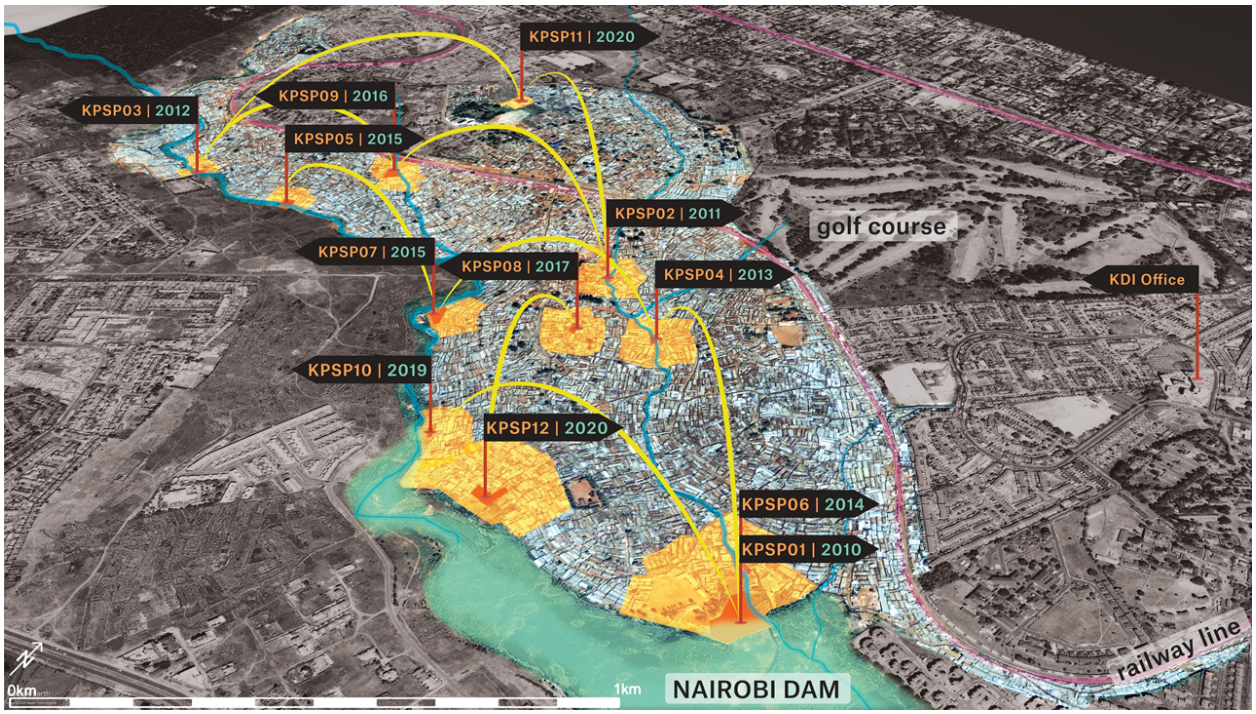

Fig 3: Kibera Public Space Project Network of sites and services (KDI, 2021)

c. Institute for Transportation and Development Policy (ITDP)

ITDP is a global organization at the forefront of innovation, using technical expertise, direct advocacy, and policy guidance to mitigate the impacts of climate change, improve air quality, and support prosperous, sustainable, and equitable cities. We have worked with over 100 cities in more than 40 nations to design and implement transport and urban development systems and policy solutions that make cities more viable, fair, and livable.

Today, ITDP works in all types of cities on five continents, with offices in China, Brazil, India, Indonesia, Kenya, Mexico and the United States. Our teams include architects, urban planners, leading transport experts, cycling activists, developers, data scientists, and policy specialists working directly with local governments to make visible, on-the-ground improvements. Our extensive resources for cities, planners, policymakers, and activists include technical reports, guides, standards, videos, infographics, and white papers on everything from bus rapid transit to e-scooter policies.

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