





# Feasibility study for bikeshare in Addis Ababa

Institute for Transportation and Development Policy United Nations Human Settlements Programme February 2021

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# 1. Introduction

Addis Ababa is the capital and largest city in Ethiopia. It is the political, commercial, and cultural hub of the country. It is the seat for Africa Union headquarters and a hub for many international organisations. As of 2017, the city was home to 3.2 million inhabitants, and is projected to reach 4.7 million by 2030.<sup>1</sup> Home to 17 percent of the country's urban population, Addis Ababa is among the fastest-growing urban areas in the world.<sup>2</sup> The number of private vehicles in the city is rapidly increasing, contributing to worsening congestion, loss of the public realm, air pollution, and traffic fatalities. As the city continues to modernise and motorise, major investments and strategic decisions will be required to keep the economy humming and avoid the negative impacts generated by private motorised mobility and traffic congestion.

The Addis Ababa Transport Bureau (AATB), with technical support from the Institute for Transportation and Development Policy (ITDP) and the United Nations Human Settlements Programme (UN-Habitat), plans to introduce a bikeshare system to provide a low-cost, environmentally friendly mobility option to the residents of Addis Ababa. Bikeshare is a personal public transport system in which people have access to bicycles that can be used across a network of closely spaced stations. With a smart card or other form of identification, a user can check out a cycle from a station and return it to any other station.

Bikeshare is expected to boost the use of public transport by providing crucial last-mile connectivity, thereby expanding the catchment areas for the region's rapid transit systems. By encouraging a shift to sustainable modes, the bikeshare system will reduce dependency on automobiles, reduce traffic congestion, vehicle emissions, and demand for motor vehicle parking. The system will also support the transformation of streets to become environments, where pedestrians and bicyclists feel safe and comfortable.

Bikeshare systems have transformed cities around the world, offering the convenience of cycling without the burden of ownership and the flexibility to accommodate one-way trips. Over 2,900 cities are enjoying the benefits of bikeshare.<sup>3</sup> In cities such as Hangzhou, Shanghai, Washington, D.C., Paris and London, the bikeshare system have helped reenergize cycling and encourage more people to use this non-polluting and healthy mode of transport. In short period, Addis Ababa will also be one of the cities worldwide that gains benefit from the bikeshare system. In its first phase, the bikeshare system will serve areas in the city centre, such as Mexico, Leghare, Stadium, Meskel Square, Bole, Hayahulet, Kazanchis, Urael, Atlas, British Embassy, Filwoha, Post Office and Entoto and Sheger Parks. The system will begin with 730 cycles and will be expanded in future phases to accommodate 10,000 cycles and serving all of central Addis Ababa. Bikeshare will improve last-mile connectivity to public transport and serve short trips in central Addis Ababa through a safe, healthy, and environmentally friendly means of transport.

<sup>&</sup>lt;sup>1</sup> https://populationstat.com/ethiopia/addis-

 $ababa\#:\sim: text = The\%20 city\%20 of\%20 Addis\%20 Ababa, people\%20 in\%20 its\%20 city\%20 area.$ 

<sup>&</sup>lt;sup>2</sup> UN-Habitat. (2017). The State of Addis Ababa 2017: The Addis Ababa We Want. Retrieved from https://unhabitat.org/books/ the-state-of-addis-ababa-2017-the-addis-ababa-we-want/

<sup>&</sup>lt;sup>3</sup> Galatoulas, Nikolaos-Fivos. (2020). "Spatio-Temporal Trends of E-Bike Sharing System Deployment: A Review in Europe, North America and Asia." Sustainability. Retrieved from https://www.mdpi.com/2071-1050/12/11/4611

# 2. Project goals

The bikeshare system in Addis Ababa aims to help the city achieve the following goals:

- Improve access to employment, educational, and recreational opportunities in central Addis Ababa and nearby areas.
- Facilitate the use of the city's public transport system by improving last-mile connectivity to LRT stations, BRT stations, and public bus stops, stations, and terminals.
- Increase the mode share of cycling in Addis Ababa.
- Transform the image of cycling, making it a popular means of travel for all income groups and genders.
- Expand women's transport options.
- Promote the use of active transport, helping to improve public health. Cycling for 30 minutes a day has been reported to reduce the risk of heart disease by 82 percent and diabetes by up to 58 percent.<sup>4</sup>
- Reduce household travel costs.
- Reduce congestion, mitigate carbon emissions, and improve air quality by attracting users from private motor vehicles.<sup>5</sup>
- Create employment opportunities through the planning, installation, operation, and management of the system.
- Stimulate local businesses, particularly those in the cycling sector.
- Create a system that is financially sustainable, transparently operated, and accountable to the public.

The proposed bikeshare system will help to improve access and provide seamless connectivity to locations not served by public transport service. Bikeshare stations will be strategically placed to ensure physical connectivity and fill in the gaps where public transport is missing. Cycles will be available on demand, saving time for users who currently spend time waiting for buses or taxis. In addition, bikeshare will be less expensive than alternate modes.

# 3. Bikeshare and COVID-19

The first COVID-19 case was discovered in Ethiopia in March 2020. As the number of infections began to increase, the government appointed a COVID-19 committee at the national level to plan and implement measures control the spread of the virus in the country. The Ministry of Transport (MOT) in turned formed a sub-committee to guide the implementation of public health measures in the transport sector. Passenger capacity on the public transport was reduced by half and transport fares increased by 50 percent. Motorcycle were requested not to carry any other passengers, and Bajaj (three wheelers) were to carry only one passenger. Amidst the occupancy restrictions on public

<sup>&</sup>lt;sup>4</sup> City of Wilmington. (2015). Risks and Benefits of Bike Share. Retrieved from https://www.wilmingtonde.gov/home/showdocument?id=574

<sup>&</sup>lt;sup>5</sup> Fishman, Elliot, et al. (2014). Bike share's impact on car use: Evidence from the United States, Great Britain, and Australia. Transportation Research Part D: Transport and Environment. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S1361920914000480

transport, MOT and AATB encouraged citizens to use cycle and walk as an alternative mode reduce volumes on public transport and encourage physical distancing. Addis Ababa implemented around 3 km of cycle lanes in the southwestern part along the Jemo-Lebu corridor. New roads constructed by the Addis Ababa City Road Authority (AACRA) on arterial streets with right-of-way of 30 m or more are to include cycle tracks as part of the design. With proper sanitisation measures, bikeshare can build on these efforts, offering a safe mode of transport during the pandemic.

# 4. System features at glance

To address the challenges encountered during the earlier bicycle rental pilot, the Addis Ababa bikeshare system will employ the following best practice features:

- A dense network of stations across the coverage area, with stations within 300 m of most locations in the coverage area.
- Cycles with specially designed parts and sizes to discourage theft and sale as whole or for parts
- A fully automated locking system at stations that allows users to check cycles in or out without the need for staffing at the station
- Radio frequency identification devices (RFIDs) to track where a cycle is picked up, where it is returned, and the identity of the user
- Real-time monitoring of station occupancy rates through General Packet Radio Service (GPRS), used to guide the redistribution of cycles.
- Real-time user information provided through various platforms, including the web, mobile phones, and/or on-site terminals.
- Advertising space on cycles and at stations (provides revenue generation options for system operator or city).
- Pricing structures that incentivize short trips, helping to maximize the number of trips per cycle per day.

These characteristics are described in more detail in the sections below.



Figure 1: Modern bikeshare systems feature a dense network of stations. A user checks out a cycle using an RFID-enabled smart card and can return it to any other station.

# 4.1 Bicycles

The bicycle used in a bikeshare system is different from a typical bicycle sold in a shop for personal use. The bike is designed as a utilitarian vehicle that balances usefulness with attraction. Some of the attributes that differentiate a bikeshare bicycle from a "typical" bicycle are:

- Universal design: The geometry of the bicycle can satisfy all sizes, genders, and types of clothing. The frame should be a step-through design with an easily adjustable seat.
- **Proprietary tooling:** The nuts and bolts of the bicycle have a unique design that protects against theft and vandalism.
- **Distinctive styling:** The fleet bicycles will be uniform and distinctive in colour and style. This will create brand awareness and also guard against theft and misuse.
- Utilitarian design: The bicycles will have a front basket for carrying goods and mud guards to protect against water and mud. (A rear rack is discouraged as it may be used to carry an extra passenger, who would exceed the carrying capacity of the bicycle.)
- **Safety:** Front and rear lights and a complete set of front, rear, and side reflectors are needed to improve visibility.
- **Robustness:** The bicycle is designed to be solid and strong. In contrast, many personal bicycles are designed to be lightweight but cannot withstand regular use. The tires are puncture resistant, cable routing is inside the frame, gearing is internal to minimise vandalism and breakage, and the saddle is made from a material that is resistant to cuts.
- **Comfort:** The design should offer a high level of comfort even during hot summer months. A grey colour can minimise the temperature of the saddle when exposed to direct sunlight.



Figure 2: Good cycle designs can increase brand awareness and make the system easy to use for a wide range of users.



Figure 3: A unique, unisex, robust bicycle design is critical.



Figure 4: Proprietary tooling, including specialized bolts and nuts, deters theft and vandalism.

#### 4.2 Stations

Bikeshare station design is a function of the level of demand, the amount of space available, and the nature of the urban environment. Decisions on station design need to take into account the impact on the city's image. All stations need to accommodate a fully automated check-in and check-out. IT-based management of bicycles and users is critical to the operation of modern bikeshare systems. It also allows a user to check out a cycle without interacting with an attendant, thus decreasing the time required to check out or return a cycle and limiting the possibility of a station being off-line because an attendant is not present. While fully automated stations may represent higher capital costs, they will help the city save on operating costs because the stations do not need to be manned at all times.



Figure 5: A typical bikeshare station includes docks, space for advertising, and (optionally) a terminal.

The size of a station, number of docking points will depend on the level of demand. Stations typically have a modular design (varying sizes from 10 to 30 docks), allowing for a variety of sizes that can be tailored to the level of demand and the amount of space available in the street environment. The station should incorporate a roof element minimise the heating of bicycle saddles in hot weather.



Figure 6: Stations have a modular design that can be tailored to the level of demand and the amount of space available in the streetscape.

Stations will be placed at frequent intervals creating a coverage area. The distance between stations is typically 200 to 400 m, depending on demand and the cityscape. Close station spacing reduces the distance that a user has to walk to access the bikeshare system. It also reduces the distance that a user needs to walk to another station should s/he find a station either completely full or completely empty.

The specific siting of stations will be determined on a case-by-case basis. Stations should be placed in locations that are clearly visible to passers-by and should make use of the underutilised and vacant spaces to minimise interference with other activities. A station can fit in a 2-m wide on-street parking lane. A station can be placed in the furniture zone of a footpath, provided there is sufficient clear space for walking beside the station. Typical placement options include the following:

- The furniture zone of pedestrian footpaths (where the furniture zone is wide enough to accommodate the station without compromising clear space for pedestrians).
- Pedestrian streets, plazas, and other public spaces.
- Open spaces in front of public transport terminals and stations.
- On-street parking spaces.
- Premises of government offices.



Figure 7: A bikeshare station can fit in a 2-m wide parking lane.



Figure 8: Bikeshare station spacing configurations (top) and dimensions (bottom).<sup>6</sup>

The dock is the structural unit that receives and releases bicycles at the station. Bollard style docks are designed as individual units that are fixed to the ground or to a platform and can receive one or two bicycles. Beam-style docks are horizontal fixtures that receive multiple bicycles. Either docking style has both advantages and disadvantages. Bollard style docks are more expensive but can allow pedestrians to pass through a station. Beam style docks create a barrier and are non-porous to pedestrian traffic but may be cheaper to install. A front wheel mount locking mechanism is typically more secure than a side mount or head tube mount locking mechanism.



Figure 9: Beam-style docks are cheaper but may interrupt pedestrian movement (left). Bollardstyle docks have an individual stand for each cycle, making the station more porous (right).

<sup>&</sup>lt;sup>6</sup> Sources: NACTO and PBSC.



Figure 10: Side mounting mechanisms (left) allow the bike to be used as a lever to dislodge the bike from the dock and are less secure than wheel mount locking mechanisms (right).

The locking mechanism may be positioned on the cycle rather than the dock (Figure 11). In a stationbased bikeshare system, a cycle can be locked to a passive dock with an electronic mechanism or a cable lock mounted on the bicycle.



Figure 11: Some bicycle sharing systems have terminals mounted on the cycles and passive docks that accept a locking mechanism kept on the cycle: Bhopal (left) and Portland (right).<sup>7</sup>

Many new bikeshare systems follow a dockless model, which allows the user to locate and unlock a bicycle using a smart phone. After completing the ride, the user can leave the bike anywhere he or she chooses. Docks are the most capital-intensive aspect of a bicycle sharing system, so dockless systems

<sup>&</sup>lt;sup>7</sup> Source for photo at left: Akasped via Flickr.

may be less expensive to implement. While cities have seen significant investment in dockless bikeshare systems, it is advisable that the system in Addis Ababa adopt a more traditional station-based typology.



Figure 12: Cycles from dockless systems in Guangzhou (left) and Tianjin (right).

Some bikeshare systems have terminals that provide general system information; information on station capacity and the availability of docks at adjacent stations; details on the user's subscription and account balance, and temporary subscriptions for walk-up users.



Figure 13: Terminals provide system information and allow walk-up users to obtain temporary subscriptions to the bicycle sharing system.

Stations can be hardwired to the electrical grid or can rely on solar power. The wiring for the electrical supply involves minor excavation, but the overall cost of hardwired terminals is typically lower than that of solar-powered stations. Hardwired stations may be fitted with backup batteries if the supply is intermittent. Solar power has the benefit of not requiring excavation and having the image of a "green solution." A downside of solar is that the panels may not receive enough sunlight in an area with many tall buildings such as central Addis Ababa. In addition, the infrastructure of a solar

panel is in the public realm and is susceptible to theft. Considering these factors, the stations in Addis Ababa should be wired to the grid.



Figure 14. Bikeshare stations in Marrakech, Morocco.

#### 4.3 IT system

A robust IT system is critical to the success of the bikeshare system. The IT system collects and disseminates information through various platforms including a website, smartphone apps, terminals, and face-to-face interaction. These various platforms allow customers to set up accounts and receive information about the system.

While the majority of users may access the system through the website or station terminals, it is important to have a face-to-face platform at the operational headquarters and/or at large stations. "Brick-and-mortar" kiosks offer the same benefits of the online system for users who do not have access to technology. Providing this brick-and-mortar service is essential to making the bikeshare system in Addis Ababa accessible to a wide range of users. To provide this service, we recommend that a flagship station be located at Le Gare. Such a station would be prominent in its design, placement, and functionality.



Figure 15: The IT system facilitates real-time system management and exchange of customer information.

# 5. Target user groups

The following user groups are expected to comprise a major portion of the user base for the Addis Ababa bicycle sharing system:

- Commuters who travel by LRT, BRT, or bus to central Addis Ababa and need a "first-" and "last-mile" option to travel between public transport stops and workplaces, markets, residences, or other locations. This includes people using the LRT to commute to LRT stations such as Meskel Square and Mexico, and people using buses and public taxis to commute to hubs such as Meskel Square, Mexico, Bole, Urael, and Le Gare. The planned B2 BRT corridor also passes through the bikeshare coverage area.
- Employees, customers, students who need to make short-distance errands during the day. Public secondary schools with a large number of students such as Bole Medhanilem, Assai, and Black Lion School will greatly benefit from the bikeshare system. Tertiary schools such as Tikur Anbessa teaching hospital, AAU School of Commerce, Tegbared Polytechnic, and St. Mary's University are located within the CBD. The bikeshare system can help alleviate traffic congestion caused by school drop-offs.
- **Public sector employees.** There are numerous government offices and agencies found along the busy corridors of Bole and Churchill. The bikeshare system will offer flexibility for government employees to use a combination of transport modes in running short-distance errands without heavily relying on taxis.
- **Retail shoppers.** A cluster of shopping malls is found in the Bole and Olympia areas. Edna Mall is a prominent centre for both shopping and entertainment. There is heavy traffic and high pedestrian volume in the surrounding Edna Mall, especially during the weekends and weekday evenings. Peacock Park is a popular park that has been used to host various events including festivals, concerts, and wedding ceremonies. The Lion Zoo park is set to be relocated to Peacock Park in a couple of years and is envisioned to be a major point of attraction.
- Women, children, and the elderly will be targeted with specific marketing and outreach efforts to ensure that they benefit from the system.
- **Tourists who will use bicycles to explore the city centre.** There are several tourist destinations within the bikeshare coverage area, including the National Theatre, Addis Ababa Museum, Ethio-Cuba park, Lion of Judah, and conference centres such as the UNECA, Entoto and Sheger parks. With the bikeshare system, tourists may find it easier to explore the city and enjoy the scenery by biking rather than driving as the points of interest are close to each other.

The placement of stations, system pricing, and marketing campaigns will be tailored to appeal to these key user groups. Based on a survey conducted at major public transport hubs around the city, many city residents experience long walk times to their final destinations after alighting from public transport. Bikeshare can improve last-mile access, particularly for commuters who walk more than 10 minutes to reach their destinations.





People who already use bicycles will benefit from "safety in numbers" once the bikeshare system begins to generate a larger number of cycling trips in the city. Within the planned coverage area, cyclists are widely seen at Hayahulet, especially along the route stretching from Addis Hiwot General hospital to the New Stadium and the Djibouti St retail corridor. People who already use cycles for errands or recreational trips will benefit from the dedicated cycle tracks that are planned within the bikeshare coverage area. In addition, bikeshare stations can be paired with parking areas for personal cycles.

The registration system will incorporate safeguards to accommodate vulnerable users. While the majority of users may access the system through the website or station terminals, it is important to have a face-to-face platform at a central location where users can subscribe to the system and make payments. Through creative approaches to user registration, payment, and system management, the project will overcome implementation barriers related to purchasing power, credit card/debit card penetration, smartphone penetration, and security.



Figure 17. Survey responses: would you use a bikeshare system?

# 6. System planning

#### 6.1 Coverage area

The delineation of a coherent coverage area and the saturation of the coverage area with stations at frequent intervals are critical to the success of the Addis Ababa bikeshare system. From the first day of operations, the coverage area needs to be sufficiently large to cover a robust set of origins and destinations. It also should enhance the city's public transport system in a meaningful way.

Many parts of the city have the potential to support a successful bikeshare system. Drawing on the site observations, the project team rated the areas according to a number of criteria, including potential usage of the bikeshare system; diversity of user groups; and presence of barriers that would prevent movement within the study area, such as large roads and rail lines.

	Proximity to MRT & public transport	Mixed land use	Density of activities	Diversity of users	Absence of barriers	Safety from vandalism
Mexico	High	Medium	High	High	High	Medium
Stadium	High	Medium	High	High	High	Medium
Megenagna	High	High	High	High	Medium	Medium
Meskel Square	High	Medium	High	High	High	Medium
Le Gare	High	Medium	Medium	High	High	Medium
Piazza	High	High	High	High	Low	Medium
Bole	Medium	High	High	Low	Medium	High
Urael/Atlas	High	High	Low	Low	High	Medium
Merkato	High	Low	High	High	Low	Low
Jemo	Medium	Low	Medium	Medium	Medium	Medium
Ayat	Medium	Low	Low	Medium	High	Medium
Kazanchis	Medium	Medium	Low	Low	Medium	Medium
Imperial	Medium	Medium	Low	Medium	Low	Medium
AU	Low	Low	Low	Low	High	Low

Table 1: Criteria for coverage area selection.

The team identified central Addis Ababa as the area that satisfies the largest number of criteria. The chosen coverage area for the first phase of the system has a number of advantages:

- Last-mile connectivity: The bikeshare system can improve access for commuters who take buses, LRT, or BRT to the city centre and then take a taxi or walk a significant distance to their final destinations.
- **Inclusivity of the system:** A system in central Addis Ababa has the potential to serve a diverse cross section of city residents representing different income groups.

- **Mixed land use:** A bikeshare system can function most effectively if it can replace short trips taken throughout the day. The proposed coverage area has such trips: going to lunch, going to meetings, or going on errands. The coverage area includes both residential and commercial land uses, helping to contribute to a diverse set of travel needs.
- Ability to expand upon success: The system can be extended in to adjoining areas with high density of activities, such as Megenagna, Piazza, and Merkato.

#### 6.2 Station locations and system size

Good station siting is crucial to achieve a successful and effective bikeshare system. Stations will be placed at frequent intervals, serving public transport hubs; offices and institutions; healthcare facilities; educational institutions; cultural hubs, and tourist destinations. Close station spacing reduces the distance that a user has to walk to access the bikeshare system. To configure the station siting and maximise the usefulness of each station for riders, certain existing conditions were used to inform station locations. Optimal station locations include major activity centres with dense, mixed-use development; public transport hubs; destinations such as colleges, hotels, and conference centres; and open spaces.

Within the proposed coverage area, prospective station locations were identified. Stations are placed near important origins and destinations that are likely to generate significant ridership:

- Public spaces and civic centres:
  - o Public spaces such as Meskel Square, Ethio-Cuba park, and Bole peacock park
  - Cultural centres such as the St' Estifanos Church, and Millennium Hall
  - Tourist destinations such as the National theatre, Addis Ababa museum, Red terror Martyr's museum, Sheger and Entoto parks and Grand palace areas
- Educational institutions:
  - Addis Ababa University / School of commerce, Higher and elementary schools.
- Healthcare facilities:
  - Black lion hospital, Zewditu hospital.
  - Private and government health centres
- Commercial areas:
  - Major hotels, restaurants, and cinemas.
  - Shopping mall and business centre
- Offices and institutions:
  - Africa union.
  - United Nations Economic Commission for Africa.
  - o Government and private offices

In the absence of a single important building, stations will be placed at existing nodal points, important public spaces, and intersections to serve origins and destinations in multiple directions.

The proposed station locations were checked on site to confirm that sufficient space exists on the ground. Depending on the street right-of-way (ROW) and surrounding context, bikeshare station placement can be configured to fit variety of spaces. Bikeshare stations can be placed in parking lanes, occupying the same space as two or more car parking spaces. Such stations should be sited near intersections to enhance pedestrian visibility.



Figure 18: Proposed locations where bikeshare stations can be sited in parking lanes: Addis Hiwot Hospital (left) and Chechinya near Moyos Café (right).

Wide sidewalks can accommodate bikeshare stations without impeding pedestrian mobility. Depending on the width of the sidewalk, various of configurations are possible: e.g., in the furniture zone or back up against a compound wall.



Figure 19: Proposed locations where bikeshare stations can be sited on footpaths: Ethiopian Red Cross building (left) and National Theatre (right).

Open space such as parks, plazas, public seating areas, and vacant lots are ideal locations for bikeshare stations. Placing stations near open spaces can enliven the surrounding area and help leverage underutilised space.



Figure 20: Proposed bikeshare station near open spaces: the parking lot of Sengatera condominium (left) and underutilised space in front of Intercontinental Hotel (right).

Bikeshare and public transport are complementary modes, so station locations have been identified placing bikeshare stations important public transport stops to improve last-mile connectivity. Given the high pedestrian volumes at these locations, care should be taken when siting the stations to avoid hindering pedestrian access.



Figure 21: Proposed station locations near public transport stops: Bus station at Stadium (left) and LRT station at Hayahulet (right).



Figure 22: Representative station locations: Le Gare in front of Lion of Judah Statue (left) and Edna Mall at the junction (right).



Figure 23: Entrance to Black Lion Hospital (left) and Churchill in front of Ethiopian Broadcast Agency (right).

Stations were sized according to the level of patronage at nearby destinations, using proxies such as observed foot traffic and the presence of public transport hubs. Stations were categorised into three groups: small stations with 10 docks/parking spaces, medium stations with 20 docks/parking spaces, and large stations with 30 docks/parking spaces. The number of cycles was calculated assuming a ratio of 2.0 docks per cycle. The resulting station density of 10 stations per sq km is consistent with the minimum recommended station density for bikeshare systems.<sup>8</sup>

Table 2: Phase 1 system parameters.

Coverage area (sq km)		10.3
Number of stations	Small (10 docks)	72
	Medium (15 docks)	19
	Large (20 docks)	12
	Total	103
Number of bicycles		730

<sup>&</sup>lt;sup>8</sup> Institute for Transportation and Development Policy. (2014). The Bike-Share Planning Guide. Retrieved from https://www.itdp.org/wp-content/uploads/2014/07/ITDP\_Bike\_Share\_Planning\_Guide.pdf



Figure 24. Bikeshare station locations and sizes for phase 1.



Figure 25: Proposed bikeshare locations with 300 m buffers for Phase 1.

#### 6.3 Ridership scenarios

A key objective of the bikeshare system is to improve last mile connectivity, i.e., to narrow the gap from public transit stop to destination. Therefore, placing the bikeshare stations near public transport stops and important origins and destinations will help improve access and generating ridership. Some initial estimates of the number of potential subscribers were prepared considering the number of passengers on the various public transport modes in Addis Ababa.

Minibus taxis are the dominant form of public transport, carrying around 80 percent of total public transport demand. Higer midibuses, Anbessa buses, and Sheger buses are other form of public transport that are affordable compared to minibus taxis and run long-distance trips. Higer midibuses operate on 37 major arterial routes and carry more than 700,000 passengers per day. Anbessa buses operate on 124 routes and carry an average of 309,888 passenger per day. Sheger buses operate on 48 corridors and carry an average of 198,000 passengers per day. The LRT transports over 120,000 passengers per day on the two corridor that operate from Ayat to Torhailoch and from Kality to Menilk II Square.

The scenarios estimate the subscriber base as a fraction of public transport users who subscribe to the bikeshare system. Each subscriber is assumed to make 200 trips per year on the bikeshare system. The scenarios indicate an uptake rate of around 0.6 percent of public transport users will generate a reasonable trip rate of 6 to 8 rides per cycle per day. If the uptake rate is higher, the system should be expanded to ensure that cycles are easy to find at most stations.

	Assumption	Subscribers	Trips / subscription	Trips / year	Trips / day / cycle
Scenario 1	0.3% of public transport passengers obtain annual subscriptions	3,984	200	884,670	3.5
Scenario 2	0.6% of public transport passengers obtain annual subscriptions	7,967	200	1,769,340	6.9
Scenario 3	0.9% of public transport passengers obtain annual subscriptions	11,951	200	2,654,010	10.4

Table 3: Representative ridership scenarios.

# 7. Operations

A robust design of the supply and operation of the bikeshare system, ranging from the user registration process, to the redistribution and maintenance procedures is integral to the long-term success of the system.

#### 7.1 User registration

User registration is essential because it provides identity verification. Bikeshare systems ensure security by linking the borrowed bicycle with the identity of the user. Users will register with the bikeshare system through various customer service portholes (website, a phone app, or a brick-and-mortar service centre). Frequent users will be directed to complete an online registration form. Those

who are not internet savvy can also fill out a membership form at the customer service kiosk at the flagship station.

The system obtains identification details during the registration process and the user is issued a smart card with chip linked to the user's account. In Addis Ababa, subscribers will sign up by providing a national ID or driver's license. The prospective user will submit the relevant documentation and pay the fee, depending on which package s/he chooses. Chips are also present on the cycles. When a user checks out a cycle using a smart card, the identity of the user is linked that of the cycle that s/he checks out.

If the cycle is not returned within a specified time period, say 24 hours, the user's balance is forfeited and his/her smart card is deactivated. In addition, the user will be barred from registering for the system again. In the case of daily or weekly subscriptions by walk-up users who pay by debit card, the system places a hold on the user's debit card account for the duration of the subscription. If the user is in good standing, the hold is removed at the end of the subscription. However, if a cycle is not returned then the hold remains on the user's account.

User registration can be a barrier to entry to the system. The registration should incorporate safeguards to accommodate vulnerable users, including those who are unbanked or lack access to collateral to offset the cost of a stolen bicycle. With creative thought and interagency cooperation, these barriers can be overcome and an equitable bikeshare system can be created.<sup>9</sup>

#### 7.2 Redistribution and maintenance

Redistribution is broadly defined as the rebalancing of bicycles from stations that are near or at capacity to stations that are nearly empty. The operator will be responsible for redistributing bicycles during peak periods to ensure that bicycles remain available at all stations and that some docking positions remain open at each station. Redistribution is the greatest challenge to operating the bikeshare system, and accounts for the largest portion of operating costs.

The bikeshare system will be operated on a day-to-day basis by a private sector contractor. The private operator will have several responsibilities, including redistribution, maintenance, and customer service. For an experienced operator, redistribution becomes predictive, and is better thought of as the rebalancing of cycles to stations where the operator expects a shortage to occur. The devices on the cycles allow the operator to record all of the trips that are made with the system. After a short period of operation, the IT system generates a full record of the trip patterns and station occupancies. This information can be used to guide the redistribution process. Many operators use logistics software to assign routes and schedules to redistribution crews.

Regular preventative maintenance is necessary to keep the cycles in good working condition. Cycle redistribution vehicle maintenance teams will be responsible for carrying out minor repairs onsite and notifying redistribution teams to collect major repairs that need to be completed at the depot. In addition to cycle maintenance, maintenance teams need to have basic knowledge of fixing minor problems at docking stations and terminals. Station and cycle cleanliness is an important aspect of the image of the system. Cycle maintenance teams should wipe down all cycles at least once a week and

<sup>&</sup>lt;sup>9</sup> See for example, Andersen, Michael. (2016, Aug 29). "In Philly, \$5 bikeshare memberships for food stamp users take off." Better Bikeshare Partnership. Retrieved from http://betterbikeshare.org/2016/08/29/philly-offering-bikeshare-discounts-food-stamp-cards-working-great/

should also clean the station area. The implementing agency will set service level standards to ensure that redistribution and maintenance activities are carried out diligently.

The project will provide an employment opportunity to the poor, particularly in the form of the semiskilled labour in support of system operations. The system will result in the creation of new jobs related to cleaning, maintenance, and redistribution activities. Combined with jobs generated indirectly through bicycle shops, bicycle tourism, and related activities, the system is likely to spur the creation of up to around 100 jobs.



Figure 26: System operations are monitored at a control centre (left). The operator can dispatch maintenance and redistribution crews from the central depot (right).



Figure 27: Redistribution keeps the number of bicycles and available docks balanced across the system. Redistribution can be accomplished with trucks (left) or non-motorised carriers (right).

#### 7.3 Performance metrics

A reliable, efficient, cost effective system will maximize two critical performance metrics:

• Average number of daily uses per public bike: Turnover is a measure of system efficiency and critical to a successful bikeshare system. Ideally, maintaining an average of four daily uses per bike allows to maximize the public cost-benefit of the system.

• Average daily trips per resident: This is a metric of market penetration. High quantity of uses among the population of the coverage area is key to achieving the primary objectives of a bikeshare system. Ideally, one daily trip per twenty to forty residents is the optimum range for market penetration.

# 8. Business model & institutional structure

The Addis Ababa bikeshare system will be implemented by the Addis Ababa Transport Bureau (AATB) in collaboration with the Ministry of Transport, Addis Ababa City Road Authority, Addis Ababa Transport Authority, and Traffic Management Agency. After completing the preparatory activities, AATB will contract a private operator to install the system and handle day-to-day operations and maintenance over a six-year period. The system will be funded through a combination of revenue sources, including advertising, sponsorships, user fees, and the city budget. A potential structure for the private operator is a joint venture comprised of an international supplier of bikeshare hardware and software along with a local company with operations expertise. Such an arrangement would capitalise on the technical expertise of the international supplier and the local know-how of the operator.

Most successful bikeshare system are combination of public and private partnerships. For the Addis Ababa bikeshare system, publicly owned and privately operated model is proposed. This type of contracting structure means that the government owns the assets and contracts a private entity to run the service. The procurement of bicycles for the system can be done by the government or it may be the responsibility of the operator. All other assets—software, control center, stations—are owned by the government. The advantage of the publicly owned, privately operated model is that the private operator manages all logistics, the public owner has some control during key phases of the project, and operating details and system risk are not the responsibility of the public body.

PMU (AATB, AATA, AACRA and TMA) Private operator Maintain cycles and stations. Plan and design the system. • • Fund the installation and operations of the Redistribute cycles within stations to • maintain optimum number. system. Provide space for stations and control Provide customer service. • centre. Operate the control centre. Set service level benchmarks. Provide real-time system information. Monitor the operator's performance. Market the system through traditional and ٠ Receive subscription and user fees. online channels. Identify a system sponsor. Organise press conferences and launch

Table 4: Responsibilities of the bikeshare PMU and the private operator.

events at major project milestones.

It is important that the AATB have full-time staff whose only job is managing the bikeshare system. Initially, the AATB can include three positions: a director, a financial officer, and an operations/IT officer. As the bikeshare system grows, there can be additional staff. Candidates selected for these positions should be skilled professionals with field experience in similar areas of work. AATB, ITDP, UN-Habitat, WRI, and other project partners will organise capacity building trainings in partnership with experts in bike-share planning and operation. In addition, staff from the AATB will have the opportunity to interact closely with the bikeshare operator's operations teams.



Figure 28: AATB will contract day-to-day operation of the Addis Ababa bikeshare system to a private operator.

Revenues generated from user subscription fees and advertisements will accrue to the bikeshare operator. Financial incentives are important to ensure that the system remains in a good state of repair. At the beginning of the contract, the bikeshare operator will be required to set aside a security deposit that will be refundable at the end of the contract. Penalties will be applied if system performance falls below service levels stipulated in the operator's contract, and any applicable fees will be deducted from this fund. Sample service level standards are displayed below. These standards need to be measurable and will be listed in the operator contract. The contract will require the operator to deliver the service level statistics to the AATB on a real-time basis to enable the nodal agency to monitor the operator's performance.

Table 5	Proposed	service	level	criteria.
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Parameters	Threshold value	Penalty
Delay in starting Phase 1 operations	1 week after commercial operations date	ETB 20,000 per day
Delay in provision of full bicycle fleet	2 weeks after commercial operations date	ETB 40 / cycle / day (for the missing cycles)
Number of rides/cycle/days	Under 6 rides/cycle/day	ETB 10 /cycle / day
Unauthorised advertisement hoarding at stations	-	ETB 2,000 / hoarding / day

Parameters	Threshold value	Penalty
Sub-letting of station space to third party for commercial activity	-	ETB 10,000 / infraction
Cycles parked outside of station area	Cycle parked outside of station of more than 1 hour	ETB 20 / observation of erroneous parking
Revision in customer price without city's approval	-	ETB 200 / overcharged ride
Operating the system without third party insurance	-	ETB 20,000 / day
Unauthorised release of customer data	-	ETB 400,000 / release

# 9. Communications and marketing

Marketing of the Addis Ababa bikeshare system will begin well before the system is operational and will carry on through the life of the system. Initial marketing efforts include promoting the system name, tag line, and logo. A user doesn't take a cycle—s/he takes "Vélib" (Paris) or "Bicing" (Barcelona). A trendy name and logo will be established for the system.

# 9.1 Marketing strategies

Survey responses indicate that the vast majority of residents have not heard of bikeshare. Therefore, the early marketing strategy should offer basic information about the system, covering the following points:

- What is bikeshare?
- The process of checking out a bicycle.
- How to register for the system.
- Station locations.
- Hours of operation.
- The pricing system.
- Phone numbers and websites for obtaining more information.



Figure 29: Survey responses: have you heard of bikeshare?

The marketing campaign needs to send a message that bikeshare is trendy, healthy, and environmentally friendly. It should also stress that bikeshare is a more efficient alternative to crowded minibuses, uncooperative taxi drivers, or long walks. The nodal agency can bring in celebrities and prominent citizens to project a positive image. The system will be promoted through give-aways and promotional events prior to the launch. The nodal agency should retain a professional public relations firm to handle these events.

After the launch, an on-going campaign will communicate with existing and potential customers and public at large through newspapers, a website, blogs, and smart phone apps, advertisements on bikeshare stations and bus stops, and other collateral. During the first six months, the system will employ "Bikeshare Buddies" to provide customer service at 40 important stations. The Bikeshare Buddies will serve a dual role, assisting users in learning how to operate the system while also providing security. The system would likely need two shifts. The bikeshare system can give preference to applicants from very low-income communities. The main skillset would be customer service.

Moreover, other initiatives such as involving the health and recreational clubs to actively promote the concept of bikeshare system. The bikeshare PMU can tie up with major hotels in Addis Ababa where the hotels lend the cycles to tourists at no cost. Under this arrangement, the hotels will be responsible for the cycles and shall ensure that no theft or significant damage occurs.

#### 9.2 Expanding access to cycling for women

At present, cultural barriers prevent many women from cycling in Addis Ababa. A better understanding of motives for cycling among women is needed to expand access to the bikeshare system for women. In general, cost, personal security, and time poverty are considered as the three main factors that influence women's travel choices.<sup>10</sup> Cultural perceptions and spatial location also shape women's mobility. The efficiency of public transport services places different burdens on women and men, with the costs of poor public transport often being borne disproportionately by women. Women are less likely to have personal means of travel and are more dependent on public transport than men, especially when they are from lower-income groups. Women tend to make more multi-stop trips or chain trips in order to pick up children, run errands, shop, or fulfil other family obligations. The Addis Ababa bikeshare system has the potential to expand women's public transport options and make trips faster, thus saving time.

The survey conducted as part of the bikeshare study offers insights into how the Addis Ababa bikeshare system can meet the needs of women and improve their cycling experiences. When asked about their trip purposes, most of the commuters interviewed were traveling to work. Among the women interviewed, a greater fraction was shopping or accompanying others. Planning for the bikeshare system should consider the differences in the destinations accessed by women and men and ensure that the system caters to all.

<sup>&</sup>lt;sup>10</sup> Allen, Heather and Marianne Vanderschuren. (2016). Safe and sound: International research on women's personal safety in public transport. FIA Foundation. Retrieved from https://www.fiafoundation.org/media/224027/safe-and-sound-report.pdf



Figure 30: Survey responses: trip purpose.

Respondents were asked if they have faced sexual harassment while commuting. Nearly half of women noted that they experience harassment at least a few times per year. There is also a large difference in the fraction of respondents who know how to ride a cycle, with 56 of males saying that they know how to cycle, compared to only 22 percent of women. The need for cycle tracks was the top intervention requested by women and men to make it easier to cycle. Women also mentioned the need for greater acceptance of cycling by family and community and a reduction in the risk of sexual harassment.



Figure 31: Half of female respondents reported experiencing sexual harassment in Addis Ababa.



Figure 32: Survey responses: Do you know how to cycle? A majority of male respondents know how to cycle, compared to only 22 percent of female respondents.



Figure 33: Female respondents, like men, mentioned dedicated cycle tracks as a top priority. Women were more likely to cite concerns about sexual harassment and acceptance by family.<sup>11</sup>

These findings direct to what measures could be pursued to encourage more women to cycle:

- **Infrastructure that supports cycling:** Respondents said that they would consider cycling more often if safer bicycle infrastructure and facilities were available, including cycling lanes, better street lightning, and security features.
- Education and enforcement: Greater emphasis on education is needed to change negative perceptions about cycling and women riding bicycles. In addition, there is need to educate drivers on how to share the road with cyclists and enforce laws to prevent motorcycles and other vehicles from encroaching on bike lanes.
- **Cycling events:** Women cycling in groups face less harassment, hence cycling events for women would offer safety in number for women who would otherwise not cycle alone. The cycling events should be children or family friendly to allow women to come along with their families. Cycling events also can function as marketing activities for the bikeshare system.
- **Cycle trainings:** The cycle sharing system can enlist experienced female cyclists to provide trainings for women who are trying out cycling for the first time.
- Women champions: The more women cycle, the more it becomes the norm and encourages more women to join in. Women champions will inspire more women to cycle regardless of

<sup>&</sup>lt;sup>11</sup> Results normalised to account for the differing sample sizes for men and women.

their age, fitness level, or ability. All women on cycles should be celebrated as champions: women cycling to the shop, to work, for leisure, or for exercise.

• **Discounts and membership benefits:** Cost of travel can be prohibitive to women who rely on public transport to move around. Offering discounts and more membership benefits may encourage more women to cycle. For example, in Citibike system in New York City experienced a surge of women users when the system offered discounts to women.

In conclusion, involving women cyclists in the bikeshare project, especially at the decision-making level, will ensure that their specific needs are taken into consideration and that the system will succeed at improving access to cycling for women.

# 10. Risk analysis

Pro-active engagement of stakeholders early in the planning process can help mitigate the risks and challenges that the Addis Ababa bikeshare project is likely to encounter. Following are some of the risks and possible responses during the planning and implementation phases:

- Station placement: In the complex urban environment of central Addis Ababa, securing space for bikeshare stations may prove challenging. The early involvement of shop owners, security services, and other stakeholders is essential to identify locations that weight the need for visibility against the impacts on surrounding uses. Wherever possible, preliminary station locations identified in this report seek to minimise conflicts with other uses.
- **Road safety:** A rapid increase in the number of cyclists on the road in Addis Ababa city centre may prove challenging for motor vehicle users who are not used to sharing the road with non-motorised transport users. Public information campaigns and the involvement of traffic police as road safety ambassadors can help sensitise motor vehicle drivers to the need to give right-of-way to non-motorised transport users. In the long term, the growing numbers of cyclists will become a natural constituency to demand safer facilities for cycling.
- Slow uptake: If commuters are slow to take to the new system, the operator can explore financial incentives to encourage users to sign up, including discounted subscription rates. The operator can also organise cycling events to offer potential users a chance to try out the system.
- **Rapid uptake:** Under a scenario where the system faces overwhelming demand (e.g., more than 10 rides per cycle per day), system expansion plans should be expedited. In the short term, a modest increase in the fee for trips lasting over 30 minutes can help encourage more users to deposit their cycles back at stations so that other users can pick them up.
- Challenges in bicycle redistribution: Highly directional movements, in which commuters emerge from public transport hubs and cycle to their destinations in the morning and follow the opposite pattern in the evening, may lead to challenges in maintaining an even supply of docks and cycles. A possible solution is to offer financial incentives for users to travel in the off-peak direction. For example, the Vélib' bikeshare system in Paris adds credit to users'

accounts for cycling uphill to Montmartre, where users typically travel in the opposite direction.  $^{\rm 12}$ 

• Vandalism: The risk of intentional damage to stations and cycles can be mitigated through robust designs that incorporate special parts and minimise external wiring. To the extent possible, stations should be sited in locations with good visibility and with opportunities for passive surveillance from nearby buildings.

# 11. System expansion

Following the launch of the first phase, the bikeshare can be expanded into the adjacent areas of Merkato, Piazza, Lideta, and Megenagna, Gottera, Sarbet in phase two. The third phase will extend to Summit, Lebu to Jemmo, Akaki Kality, Gerji and Kera, CMC and Ayat. As with the first phase coverage area, these areas have a high concentration of activities and mixed uses, features that will contribute to the success of the system. The second phase has a combined coverage area of 37 sq km and third phase has 53 sq km. The second and third phase expansion were selected considering the last-mile connection to public transport such as the LRT stations, bus stops, bus terminals, and the future BRT, presence of mixed land use, and popular destinations cited in the bikeshare survey.

While the bikeshare system generates enough revenue to cover ongoing operating costs, additional funds will be required to cover the capital cost of the system expansion. On-street parking fees should be explored as a potential funding source for future phases.

<sup>&</sup>lt;sup>12</sup> Clark, Josh. (2008, Oct 17). "Winning the Uphill Battle." Big Medium. Retrieved from https://bigmedium.com/ideas/velib-bonus.html



Figure 34: The expansion plan adds service in Merkato, Piazza, Lideta, Megenagna, Gottera, and Sarbet in phase 2. The third phase extends the system to Summit, Lebu to Jemmo, Akaki Kality, Gerji, Kera, CMC, and Ayat.

# 12. Supporting infrastructure

Bikeshare can achieve greater results when paired with measures to improve safety and convenience for cyclists on city streets. Such cycle infrastructure can take the form of physically separated cycle tracks or traffic calming measures to reduce motor vehicle speeds.

Addis Ababa has more sunny days and relatively warm weather for most of the year, therefore new street trees should be planted to provide shade along the cycle corridors.



Figure 35: Central Addis Ababa has many wide two-way streets with fast-moving traffic. Safety on these streets can be improved through the introduction of protected bicycle lanes. Bole road (Left), Kazanchis to Filwoha (right).

Most respondents reported feeling unsafe while cycling in Addis Ababa. The respondents also were asked what it would make it easier to cycle in Addis Ababa, and the intervention cited most often was the need for dedicated cycle tracks.



Figure 36: Survey responses: how would you rate safety while cycling in Addis Ababa?



Figure 37: Survey responses: measures to make it easier to cycle in Addis Ababa.

# 12.1 Dedicated cycle facilities

Cycle tracks and protected bicycle lanes are typically built on larger streets where there is a large differential between the speed of mixed traffic and that of cyclists. Cycle tracks can be placed in the median or at the outer edges of the carriageway, with a minimum width of 2 m for one-way movement and 3 m for two-way movement.



Figure 38: Dedicated cycle facilities complement the bikeshare system in Barcelona. In Addis Ababa, cycle facilities can be developed initially as protected cycle lanes (left) and eventually converted to cycle tracks (right).

Cycle tracks can only succeed if adjacent footpaths have enough space to accommodate pedestrian movement. Otherwise, pedestrians are likely to walk in the cycle tracks, compelling cyclists to travel in the carriageway. Many footpaths are too narrow to support existing pedestrian volumes. Therefore, space in the carriageway should be reclaimed not only for protected cycle lanes, but also to expand the pedestrian realm.

The cycle track typologies will depend on mixed traffic movements and the street network layout:

- One-way cycle tracks on one side of the street: In cases where the traffic network has nearby one-way pairs (e.g., the cycle tracks can be designed for one-way movement in the same direction as general traffic)
- Two-way cycle tracks on one side of the street: Where one-way pairs are further apart, the cycle tracks should be designed for two-way movement on each street. and
- One-way cycle tracks on each side of the street: On two-way streets, a unidirectional cycle track can be implemented on each side of the street.



Figure 39: The network of cycle routes and land uses in central Addis Ababa.

This bicycle network stretches from Mexico through Meskel square to Urael, Bole bridge to Meskel square, Bole bridge through Urael to Kazanchis, Kazanchis through Filwoha to Post office, Stadium to Ambassador, Mexico to Ambassador, Leghare to Post office, Meskel square through Temenja Yaje and Israel garage to Bambis. It will serve as a major mode of transport for residents and workers residing in Kirkos, Yeka and Bole sub cities

Table 6: Approximate costs of protected cycle lanes (at ETB 8.6 million per km).

Facility	Corridor length (km)	Cost per km (ETB)	Cost (ETB)	
Protected cycle lanes	30	8,600,000	258,000,000	

#### 12.2 Street designs for phase-one coverage area

The existing streets in phase one have different hierarchies ranging from local streets to Principal Arterial streets. These streets have a Right of way ranging from 8 to 40 m. The streets have no dedicated lane for cyclist and they are forced to share the carriageway with the vehicles.



Figure 40: Cyclist riding in mixed traffic on a street in Kazanchis (left). Wheelchair user in the carriageway, Bole Rd (right).



Figure 41: Cyclists navigating intersections at Signal.

#### 12.2.1 Urael to Kazanchis

Right of way: 30 m

Land uses along the street: Residential, commercial, and administration offices

Connection: Urael Church area to Kazanchis and Aborea



Figure 42: Existing and proposed cross sections for Urael-Kazanchis street.

# 12.2.2 Bole Bridge to Urael

Right of way: 30 m

Land uses along the street: Mixed use buildings, cafeterias, shops, commercial and administrative offices

Connection: Bole Airport area to Atlas and Urael Church



Figure 43: Existing and proposed cross sections for Bole Bridge-Urael street.

#### 12.2.3 Hayahulet to Mexico

Right of way: 40 m

Land uses along the street: Mixed use buildings, cafeterias, shops, commercial and administrative offices

Connection: Hayahulet to Urael, Meskel Square, Stadium, Le Gare, and Mexico





Figure 44: Existing and proposed cross sections for Hayahulet to Mexico.

#### 12.2.4 Olympia to Bambis

Right of way: 20 m

Land uses along the street: Mixed use buildings, hotels, and river

Connection: Olympia to Bambis





Figure 45: Existing and proposed cross sections for Olympia to Bambis Street.

# 12.2.5 Kazanchis - Filwoha - Post office

Right of way: 30 m

Land uses along the street: Palace, recreational venues, mixed-use buildings, hotels, and river Connection: Kazanchis area to Old Palace, Filwoha Hot Spring, Post Office, and Ministry of Transport.





Figure 46: Existing and proposed cross sections for Kazanchis - Filwoha - Post Office.

# 12.2.6 Bole Bridge to Meskel Square

Right of way: 40 m

Land uses along the street: Mixed use buildings, airport, hotels, apartments and administrative offices Connection: Airport to Wollo Sefer, Olympia, Meskel Square







Figure 47: Existing and proposed cross sections for Bole Bridge to Meskel Square.

# 12.2.7 Hayahulet to Bole Rwanda

Right of way: 30 m

Land uses along the street: Mixed use buildings, hotels, and apartments.

Connection: Airport to Wollo Sefer, Olympia, Meskel Square





Figure 48: Existing and proposed cross sections for Hayahulet to Bole Rwanda.

# 12.2.8 Dembel to Meskel Flower

Right of way: 25 m

Land uses along the street: Mixed-use buildings, airport, hotels, apartments, and administrative offices.

Connection: Dembel Bole to Meskel Flower area





Figure 49: Existing and proposed cross sections for Dembel-Meskel Flower.

# 12.2.9 Signal to Kazanchis

Right of way: 30 m

Land uses along the street: Mixed-use buildings, hotels, and apartments

Connection: Signal Apartments to Kazanchis area



Figure 50: Existing and proposed cross sections for Signal-Kazanchis.

# 12.2.10 Hayahulet to British embassy under construction

#### Right of way: 25 m

Land uses along the street: Small houses, Mixed use buildings, colleges, hospital, hotels, and apartments

Connection: Hayahulet and British Embassy





Figure 51: Existing and proposed cross sections for Hayahulet to British Embassy.

# 12.2.11 Le Gare to Post Office

Right of way: 40 m

Land uses along the street: Historical buildings, park, mixed-use buildings, hotels, and apartments.

Connection: Le Gare to Post Office and Ethio-Cuba Park



Figure 52: Existing and proposed cross sections for Le Gare to Churchill.

#### Meskel Square to Post Office 12.2.12

Right of way: 40 meters

Land uses along the street: public spaces stadium, mixed-use buildings, hotels, church, and apartments



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Connection: Meskel Square to Post Office



Figure 53: Existing and proposed cross sections for Meskel Square to Post Office.

# 12.2.13 Getahun Besha to Signal

Right of way: 20 m

Land uses along the street: Mixed-use buildings, small houses, shops, and cafeterias

Connection: Signal Apartments to Kazanchis area







Figure 54: Existing and proposed cross sections for Getahun Besha to Signal.

# 12.3 Local streets

Right of way: 8 to 15 m

Land uses along the street: small houses, kiosk shops, and small cafeterias

Connection: From local areas to the nearest arterial streets



Figure 55: Existing and proposed cross sections for 8 m local streets.



Figure 56: Existing and proposed cross sections for 15 m local streets.

Traffic calming can help ensure that streets in the bikeshare coverage area are safe for cyclists, particularly on local streets that do not have separate cycle tracks. Devices such as speed breakers, speed tables, and neck-downs can reduce vehicle speeds, ensuring safety for cyclists who share the road space with mixed traffic. Traffic calming measures will also improve safety for pedestrians.



Figure 57: Traffic calming measures such as speed tables (left) and staggered driving lanes (right) can ensure safety for cyclists on streets that are too narrow to accommodate separate cycle tracks.

# 13. Appendix: Bikeshare survey methodology

The charts in this report display the findings from a survey conducted by AATB to gather input on the potential for bikeshare in Addis Ababa. AATB data collectors were trained by ITDP to collect data using smartphone app. They were assigned to ten different locations with a high concentration of activities. Locations included public transport hubs as well as fast-growing mixed-use hubs in the periphery of the city. These locations include Mexico, Meskel Square, Megenagna, Ayat, CMC, Bole, Kazanchis, Urael, Leghare, and Akaki/Kality. The sample size was 100 per location. Out of 1,000 individuals, 845 were willing to participate (695 males and 150 females).

	Proximity to MRT & public transport	Mixed land use	Density of activities	Diversity of users	Absence of barriers	Safety from vandalism
Mexico	High	Medium	High	High	High	Medium
Stadium	High	Medium	High	High	High	Medium
Megenagna	High	High	High	High	Medium	Medium
Meskel Square	High	Medium	High	High	High	Medium
Le Gare	High	Medium	Medium	High	High	Medium
Piazza	High	High	High	High	Low	Medium
Bole	Medium	High	High	Low	Medium	High
Urael/Atlas	High	High	Low	Low	High	Medium
Merkato	High	Low	High	High	Low	Low
Jemo	Medium	Low	Medium	Medium	Medium	Medium
Ayat	Medium	Low	Low	Medium	High	Medium
Kazanchis	Medium	Medium	Low	Low	Medium	Medium
Imperial	Medium	Medium	Low	Medium	Low	Medium
AU	Low	Low	Low	Low	High	Low