Bus Rapid Transit for Dar es Salaam

Parking Management

Final Draft Report

Nelson\Nygaard Consulting Associates
785 Market Street, Suite 1300
San Francisco, CA 94103

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Table of Contents

Table of Figures

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The lead author was Adam Millard-Ball, with input from Michael King (Nelson\Nygaard) and Walter Hook and Karl Fjellstrom (ITDP). Data collection and analysis were managed by Arthur Szazs and Augustine Malamsha (ITDP).

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Recommendations were refined in discussions with PMU and Logit staff, and during two workshops with local business owners and City Council and Ilala staff.

Parking Management for DART

Summary

Effective parking management will be a critical component of the success of Dar es Salaam Rapid Transit (DART). This chapter presents recommendations for reforming parking policies in the city centre to reflect the arrival of DART. The conclusions are based on an extensive survey of parking supply and occupancy in the city centre; interviews with staff from the City Council and parking contractor; review of parking revenue records; and two workshops with local business owners and staff from the City Council and Ilala municipality.

Key Conclusions

The key conclusions from the study are as follows:

1. Paid parking was introduced in the City Centre in the late 1990s, at a rate of 300/- per hour in the core area. Revenue collection is contracted out to Nation Parking Solutions (NPS), with the City Council entitled to 75% of the revenue. This system of on-street management is extremely sophisticated compared to other developing cities; however, the City Council does not appear to be receiving the maximum potential revenue. Results presented in this report indicate that the City Council could expect to at least triple the amount it receives from the parking contractor to about 150 million shillings per month.

2. Off-street parking has been built as part of many new developments, as required under Ministry of Lands policy. The cost per space in recent large developments has ranged between US$3,000 and US$4,150. This indicates that an hourly parking charge of at least 175/- to 250/- is required to cover construction costs alone, without factoring in operating and land costs. At current rates, new off-street parking is therefore unlikely to be financially feasible without subsidy.

3. There is a large supply of available parking in the City Centre. More than 13,800 spaces exist on-street and in garages, and only 77% are occupied by parked cars. Projections show that even with 1,000 spaces lost to Bus Rapid Transit construction, there will be no shortage of parking in the City Centre, although occupancy levels will rise from 77% to 83%.

4. It can be difficult to find on-street parking in central areas, despite the overall abundance. This is the case for two main reasons: (i) underutilization of garages such as JM Mall, even in areas where on-street parking is fully occupied; and (ii) reserved on-street parking which reduces the number of spaces available to the general public.

Summary of Recommendations

This report recommends managing parking in line with five principles in order to make efficient use of the current supply, and reduce perceptions of parking scarcity:

- Do not subsidize parking with public funds.
- Maximize on-street parking revenue for the City
- Seek to constrain overall parking levels in the city centre in order to manage congestion and increase DART ridership
- Gradually shift to off-street parking in the city centre, through building peripheral garages once this can be done without subsidy
- Increase parking charges on the streets with greatest demand

The specific recommendations are as follows:

A. On-Street Parking

1) Do not replace parking lost through DART construction; survey results show that there is ample parking availability in the city centre to compensate
2) Introduce differential parking charges, with higher rates (500/- hour) on streets with the greatest demand
3) Increase the price of reserved parking in order to discourage this practice and free up space for other users
4) Use physical design solutions such as bollards to reduce walkway parking

B. On-Street Contract Management

1) Confirm inventory of spaces to ensure that the City is yielding a fair share of revenue from parking charges
2) Cease pay-and-display machine installation due to the cost to the City
3) Consider future fixed-price contracts, under which the City would received a fixed amount monthly rather than a percentage of revenue collected
4) Promote competition through introducing paid parking to other areas (e.g. Upanga and Oysterbay Beach), to allow other firms to enter the market
5) Strengthen enforcement, through tendering a separate enforcement contract

C. Off-Street Parking

1) Abolish minimum parking requirements, allowing developers to choose how much parking they provide
2) Relate access locations to the street typology, through prohibiting garage access on a busway or pedestrian street
3) Identify potential sites for peripheral parking outside the CBD core

Importance of Parking

The quantity of parking provided and the way in which parking is managed are fundamental determinants of the character of any city. Parking supply affects urban form, such as the intensity of development and pedestrian friendliness; transportation characteristics; and municipal finances. For these reasons, there is a close relationship between parking policies and the success of the planned Dar es Salaam Rapid Transit (DART) system.

In Dar es Salaam, there are also more direct considerations, as the proposed DART routing along Morogoro Road and Kivukoni Front will necessitate removal of many on-street parking spaces, plus at least part of the off-street lot adjacent to City Hall.

Specifically, parking policy in Dar es Salaam influences the following areas of interest:

- **Economic Development.** While private cars account for a small share of trips – less than 13% - it is critical to retain good private car access to the CBD, in order to maintain its economic and political importance to decision makers. This is particularly true in advance of full implementation of DART on all major corridors. The impacts of CBD access constraints (i.e. congestion) can already be seen, in that many new retail and office development are choosing to locate on the Bagamoyo Road corridor, undermining the pre-eminence of the CBD.
- **Vehicle Speeds.** On many streets in the CBD, on-street parking is the only effective form of traffic calming. By narrowing the effective right-of-way to about 2 meters, parking reduces vehicle speeds substantially. Parking has been well-placed on many streets to achieve this goal (*see image*).
- **Public Revenue.** On-street parking provides about 50 million shillings in net monthly revenue to the City Commission – or about US $6 million annually, as shown in Figure 1.

Parking on Indira Gandhi Street narrows the effective right of way and calms traffic

- **Traffic Congestion.** Dar es Salaam's street network has finite capacity, and parking planning needs to be coordinated with decisions on roadway capacity. If no new roadway capacity is planned to the CBD, as seems likely, then it is ultimately futile to construct more parking for all-day commuter use in the CBD; this parking would only add to existing congestion and undermine the ridership base for DART.

- **DART Ridership.** One of the most exciting aspects of DART is that it will appeal to a wide cross-section of the City's population, including more affluent residents who do not ride the daladalas. However, if parking is free and unlimited, there will be little incentive for people to use DART instead of their cars.

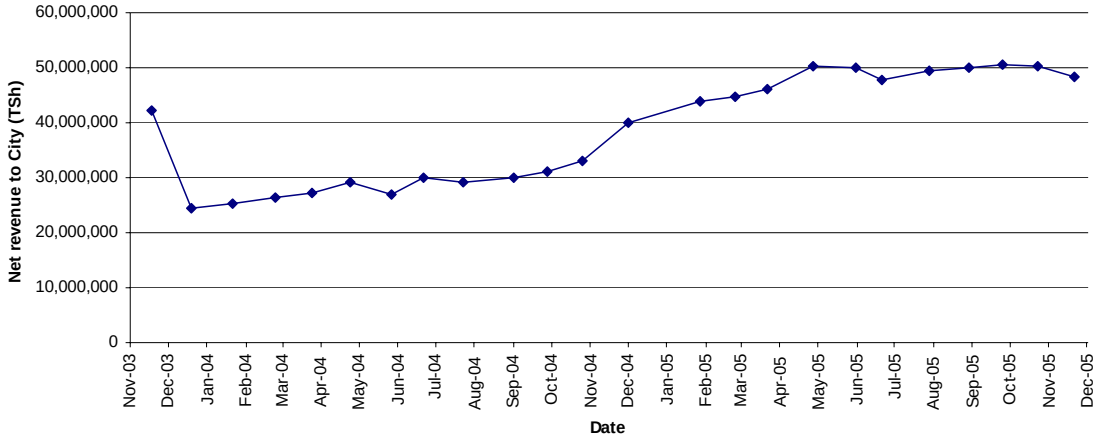
- **Pedestrian Safety and Comfort.** On some streets, parking in the CBD provides a useful buffer between moving vehicles and the walkway, improving pedestrian comfort and safety. On other streets, however, the reverse is true; parking on the walkway and in pedestrian crossings forces pedestrians into the roadway and affects visibility.

- **Urban Design.** Central Dar es Salaam benefits from a lively, interesting street fabric, with continuous active frontages on most streets in the CBD and Kariakoo. However, there are some examples of recent off-street parking facilities that interrupt these frontages, most notably the large (temporary) surface lot across from City Hall. On the other hand, parking garages such as the underground PPF House facility show how parking can blend into the streetscape. The JM Mall entrance, meanwhile, is from the side street (Mission), maintaining the continuous retail frontage on the key pedestrian corridor (Samora).

Large surface parking lots such as the one on Morogoro Road and Sokoine Drive *(above)* detract from the character of the CBD, while parking garages such as Extelcom House *(below)* make for a dead street, unfriendly to pedestrians

- **Demands for Right-of-Way.** Streets in Dar es Salaam have many functions: movement (cars, buses, pedestrians and bicycles); exchange (social interaction and street vending); and storage (parking). On many streets in the CBD, there is insufficient right-of-way to accommodate all of these functions, and space dedicated to parking is unavailable for movement or exchange functions.

Figure 1 Net Parking Revenue to City



Source: City Solicitor

Existing Policy Framework

The overall policy framework for parking is outlined in the Central Area Redevelopment Plan (2000), and the earlier Sustainable Dar es Salaam plan. In essence, it calls for new development to be self-sufficient in terms of parking; buildings should provide enough off-street parking to satisfy the demand from residents, employees and visitors. On-street parking, meanwhile, is considered a common resource.

At the same time, the City Commission has actively sought to promote a culture of "paid parking" in the city centre, through the implementation of parking charges in the late 1990s as part of a sustainability plan. There were a number of reasons for establishing this paid parking system, including ensuring the availability of parking (which also reduces the amount of traffic circling in search of a space); increasing parking turnover; and reducing the number of on-street reserved spaces. Details of the system are provided in the following section.

On-street parking charges were intended as the first phase of the plan; they were designed to help people to understand that parking is a scarce, priced commodity. This goal has largely been achieved. Staff report that initial implementation was extremely difficult, since there was little public awareness and drivers were reluctant to pay, but that several years later the public is now accepting of the program.

The second phase of the plan (not implemented) would have removed parking from the street to new parking garages. This included a large intercept park-and-ride facility at Jangwani (on Bagamoyo, adjacent to the bridge), coupled with congestion

charging and an increase in parking rates in the city centre to reduce traffic to the city centre. Toll plazas would have been located at the fire station on Morogoro Road (adjacent to United Nations Road), and at Jangwani. The planned means of transport from the park-and-ride facility to the city centre, however, is unclear.

At the same time, the Central Area Redevelopment Plan identifies several sites for off-street parking in the CBD. These include the site of the former Kisutu Bus Terminal at Libya Street and Morogoro Road, and two small parcels on Simo Street (which are already used for surface parking). The Libya Street site is currently vacant, and is earmarked for a DART station. However, Ilala municipality recently advertised for expressions of interest from developers for a mixed-use project on the site, including a multi-storey parking garage; according to the Municipal Architect, it felt that parking alone would not be an economically viable use.

There is thus somewhat of a disconnect between the two areas of parking policy. On the one hand, parking is seen as a controlled resource, that should gradually be shifted away from the CBD towards intercept facilities. On the other hand, City policies aim to ensure that each building provides ample parking for its own use.

It should be noted, however, that on-street parking management in Dar es Salaam is extremely sophisticated compared to other developing cities. A review for the World Bank, for example, concludes that few developing cities have well-managed on-street parking policies, even though this is an important part of traffic management.[1]

On-Street Revenue Collection

Revenue collection for on-street parking (and for certain off-street lots such as the surface lot opposite City Hall) is contracted out to M.P. Environment Co. Ltd., which operates as Nation Parking Solutions (NPS). The authority is contained in the Street Parking bylaws (1998), which provide for the following:

- Parking charges in the CBD; Kariakoo; Oysterbay Beach; and other areas not specifically mentioned. At present, charges have been implemented in the CBD and parts of Kariakoo only.
- Hours of operation of 8 AM to 5 PM on weekdays, and 8 AM to 2 PM on Saturdays (except in beach areas, where hours of operation are also 2 PM to 10 PM on Saturday, Sundays and public holidays)
- Fees of 300/- per hour, 2,000/- per day, or 35,000/- to 50,000/- per month (depending on street) for a reserved slot (see photo). In Kariakoo and some other areas outside the CBD, fees are 100/- per hour or 20,000/- per month.

[1] Cracknell, John (2000). *Experience in Urban Traffic Management and Demand Management in Developing Countries.* Background paper for World Bank Urban Transport Strategy Review. UK Department for International Development.

- Exemptions for diplomatic, emergency, government, refuse collection, public transportation and taxi vehicles; loading and unloading (up to five minutes); and, between noon and 2 PM on Fridays, within the vicinity of places of worship.
- Clamping and/or towing of illegally parked vehicles

Contract Issues

The NPS contract runs for five years until 31 August, 2008. Key provisions include:

- The contractor assumes the following responsibilities:
  - Marking the current parking slots, and establishing new slots
  - Collection of street parking fees and installation of parking meters
  - Submission of a monthly performance and financial report to the City
  - Clamping and towing defaulters' vehicles to the City Council depot. While this is a contract provision, however, staff report that this is a function of Ilala municipality. It appears that towing is a rare event.

Spaces may be reserved by a business for employees (commonly the owner), or for the use of customers. According to NPS, about one-third of spaces are reserved.

- The City Council receives 75% of parking revenue, with 25% retained by NPS. However, once the electronic pay-and-display machines are operative, the City Council share of revenue falls to 25% until "full recovery of the investment costs" for the machines. After this time, ownership of the parking meters transfers to the City Council.
- The contract specifies that, for purposes of revenue sharing, the number of slots will be reduced by 10% to account for exemptions specified above (e.g. diplomatic and government vehicles). However, since payment to City Council takes the form of a percentage of revenue collected (not a flat fee per slot), this contract clause should have no impact.
- The contract covers the CBD, but not Kariakoo or Oysterbay Beach[2]

[2] These are the streets identified in the first and second schedules of the Dar es Salaam City Commission (Street Parking) By-laws 1998.

Revenue Collection

Revenue collection is done manually. One or two parking attendants per block collect payment, and issue a ticket which is placed under the windshield wiper. Staff also serve a traffic management function, through helping parked vehicles to back up out of spaces. Parking attendants are paid by NPS on commission, and their performance is monitored by supervisory staff and through the comparison of revenue collected against block-specific norms.

Parking attendants collect revenue from drivers; they either hand write a ticket or print a ticket from the machine

A pay-and-display machine

Most tickets are currently hand written. However, NPS is phasing in pay-and-display machines, which print tickets automatically upon deposit of a token. These machines are still operated by the parking attendants (using a token[3]); according to NPS staff, the costs are justified by the following advantages:

- The City obtains full computer records of the number of cars parked and revenue per block, which can help monitor contract compliance
- The machines provide an official receipt to the driver, allowing them to claim a refund for business expenses
- The machines improve the image of the City

As shown in Figure 1, net parking revenue to the City amounted to about 50 million shillings per month in the second half of 2005, and has increased substantially since 2004.[4] This compares to about 8 million shillings per month remitted by TPS. The revenue is understood to be used for road maintenance.

Note that the paid parking program appears to have reduced, but not eliminated, the

[3] Tokens are actually British two-pence pieces, since the machines are manufactured by a British company. Apparently, a shortage of tokens is currently hampering full rollout of the system, even though most machines have been installed.
[4] This information is contained in the monthly reports from NPS to the City Engineer.

practice of informal charging by touts, which is prevalent in other developing cities. However, while this represents an additional cost to the driver, touting does not appear to reduce the revenue to the City and NPS.

Parking Locations

The location of on-street parking spaces is governed by City Council guidelines, implemented by NPS. According to NPS, these allow any width of roadway in excess of 6.5 metres to be used for parking. Exceptions include at the entrances of banks, places of worship, hospitals, near electrical equipment, or within 3-6m of an intersection. In some cases, legal parking spaces are marked with signs or curb striping.

In many cases, however, parking spaces appear to be determined by custom and practice (with or without the assistance of NPS parking attendants). There are numerous examples of streets where the guidelines are not met (and where this is entirely appropriate, since the parking serves a traffic calming function), with the right-of-way for moving vehicles reduced to 2.5 metres or less.

Potential for Improvement

City staff report that they are highly satisfied with current contractor performance. This is largely because of the improvement compared to the previous contractor (TPS) regarding revenue collection and financial transparency, and a reduction in clamping. Indeed, observations suggest that the operation is highly professional, with visible, uniformed staff on each block and extremely high compliance in the CBD. However, there are several potential areas where improvements might be explored, discussed in the Recommendations section below.

Off-Street Parking

In essence, there are three approaches to regulating parking in association with new development:

- **Minimum Parking Requirements –** the government agency requires developers to build a certain number of parking spaces based on the size of each project. This approach is used in Dar es Salaam and many US cities, and was used in Britain until the late 1990s. It aims to ensure that new development is self-sufficient in terms of parking, and avoid spillover onto neighborhood streets.
- **No Parking Requirements –** decisions on parking are left to the developer. This approach is common in many downtowns, and was the de facto situation in Dar es Salaam until recently.
- **Maximum Parking Requirements** – the government agency limits the amount of parking that may be built on a site, in line with congestion management, environmental or economic development goals. Britain introduced maximum parking requirements in the late 1990s.

Parking requirements are set by Ministry of Lands policy, which is implemented by the municipalities. The standards (see Figure 2) were set in the 1983 Sustainable Dar es Salaam plan, but have only recently begun to be enforced.[5] Even so, there are still enforcement issues, particularly in Kariakoo where small plot sizes (e.g. 200-300 m^2) make it almost impossible to provide both required parking and ground-floor retail. Many development plans show parking spaces in a front setback, which is subsequently eliminated during construction (i.e., the building is constructed to the lot line and the parking never built).

Figure 2 Dar es Salaam Minimum Parking Requirements

Use	Parking Requirement
CBD	
Offices	1 space per 100 m^2
Commercial	1 space per 200 m^2
Hotel	1 space per 10 beds
Hospital	1 space per 10 beds
Flats	1 space per unit
Kariakoo	
One space per floor, or 4 spaces for high-rise buildings	

[5] E.g. see memorandum 12/4/94 from Martin Kitilla (then coordinator for urban transportation and air pollution) to City Planner, calling for enforcement of parking requirements.

One of the largest off-street parking facilities: PPF Tower car park on Garden Avenue

Note that these requirements are extremely high in relation to the mode splits. A typical office parking requirement for office buildings in suburban locations in the United States, where more than 90% of employees drive, is 1 space per 25m^2, while residential parking requirements are often 1-2 spaces per unit. In other words, Dar has parking requirements set at 25-50% of the US level, with a drive alone mode share that is less than 15% of that level.

Many new buildings, however, have been built with large quantities of parking. These include JM Mall (700 spaces); PPF Tower (470 spaces); TDFL (233 spaces); and Extelcom House (104 spaces).[6] At present, the only major private garage that is open to the public is the 700-space JM Mall facility at Samora Avenue and Mission Street, which charges 500/- per hour (customers receive one hour of free parking). According to building management, the parking is intended as an attraction and service to building tenants, and is not a revenue generator. Indeed, it is likely that the garage operates at a significant loss.

According to the Municipal Architect, there may be water table issues with underground parking in the CBD. This led to major problems with the Nyerere Tower development at Morogoro and Bibititi Mohammed. However, underground parking was provided at PPF House (adjacent to City Hall) and three levels of underground parking are planned for the building at the corner of Indira Gandhi and Morogoro. Water table issues should not present a problem in Kariakoo, according to the Municipal Architect.

Off-Street Cost Analysis

It is essential to understand the costs of off-street parking, in order to inform any decision on the construction of new public parking facilities to allow a reduction in on-street supply. Sample construction costs for two recent garages, for which parking costs could be separated from building costs, were obtained from Mr Zacharia T. Marenge of Inter-Consult (Figure 3).

This equates to a construction cost per space of $3,000 to $4,150. Data forthcoming from the DART financial modeling (specifically land value, interest rates, maintenance costs and revenue collection costs) will allow a full assessment of parking costs. However, these figures imply that an hourly parking charge of at

[6] Source: Report on potential for congestion charging in Dar es Salaam.

least US $0.15 to $0.21 (or 175/- to 250/-) is required for off-street parking to cover its construction costs alone.[7] It is unlikely that current on-street parking rates can support profitable off-street operations; however, information on land values and operational costs is required to complete this analysis (Figure 4).

Figure 3 Off-Street Parking Costs

Development	Number of spaces	Total construction cost including supervision	Cost per space
PPF Tower Car Park (Garden Avenue)	470	US$1.95 Million	$4,150
TDFL Car Park (opposite Movenpick on Ohio Street)	233	US$ 700,000	$3,004

Source: Inter-consult; space numbers from congestion charging report.

Figure 4 Cost Calculation for Off-Street Parking

Row	Input	Low End	High End	Source
A	Construction Cost per Space	$3,004	$4,150	See Figure 3
B	Real Interest Rate	10%	10%	Bank of Tanzania figures
C	Structure Life	30 years	30 years	Standard assumption
D	Land Value per Space	TBD	TBD	Can be estimated from DART financial analysis
E	Operational Costs per Space (revenue collection, security, maintenance, etc.)	TBD	TBD	Can be estimated based on personnel costs in DART financial analysis
F	Annual Cost per Space	Excel function: =-PMT(B, C, A+D) + E		
G	Annual Revenue Hours per Space	1300	2080	Based on 50 hours per week, 50%-80% occupancy. Will be revised based on parking survey results.
H	Hourly Price Required to Break Even	= F / G		

[7] Provisional assumptions: real interest rate of 10%, 30 year structure life, 40 revenue hours per space per week (equivalent to 50 hours per week with average 80% occupancy).

Current Use of Parking

A survey of parking occupancy was conducted in September 2005 in order to assess the availability of parking, and determine the impacts of DART construction. The days and times of surveys were determined with City staff, to represent the peak conditions on a typical weekday. The survey methodology was as follows:

- Surveyors supervised by staff from ITDP and the Project Management Unit counted the number of legal parking spaces on each street and in each parking garage within the City Centre, including Kariakoo and Kivukoni. The only spaces not counted were those in private garages to which surveyors were unable to obtain access; inclusion of these spaces would result in higher totals for parking supply.
- The surveyors counted the number of cars parked on each street and in each parking garage on three different weekdays. The results reported are the average of the three counts, in order to avoid fluctuations in demand due to weather conditions or special events. All parked cars were counted, whether legally or illegally parked.
- Surveyors also recorded the cost of parking (if any) and any restrictions such as reserved parking for a particular business owner.
- Surveys took place on weekdays between 10 AM and 3 PM; the order in which streets were surveyed was varied in order to ensure that a given street was surveyed at different times of day. Since parking occupancies are lower on weekends and evenings and spaces are easy to find, surveys were not conducted at these times.
- Results were entered and analyzed using Microsoft Excel, and the mapping performed using TransCAD and Illustrator. Quality control was performed by ITDP and Nelson\Nygaard staff.

The results are divided into four zones, as shown in Figure 5. Kariakoo includes the area west of Bibititi Mohammed Street. CBD South consists of the area between Bibititi Mohammed Street and Morogoro Road, including spaces on those two streets. CBD North covers the area north of Morogoro Road, up to and including Azikiwe Street. Kivukoni is the area between Azikiwe Street and the ocean.

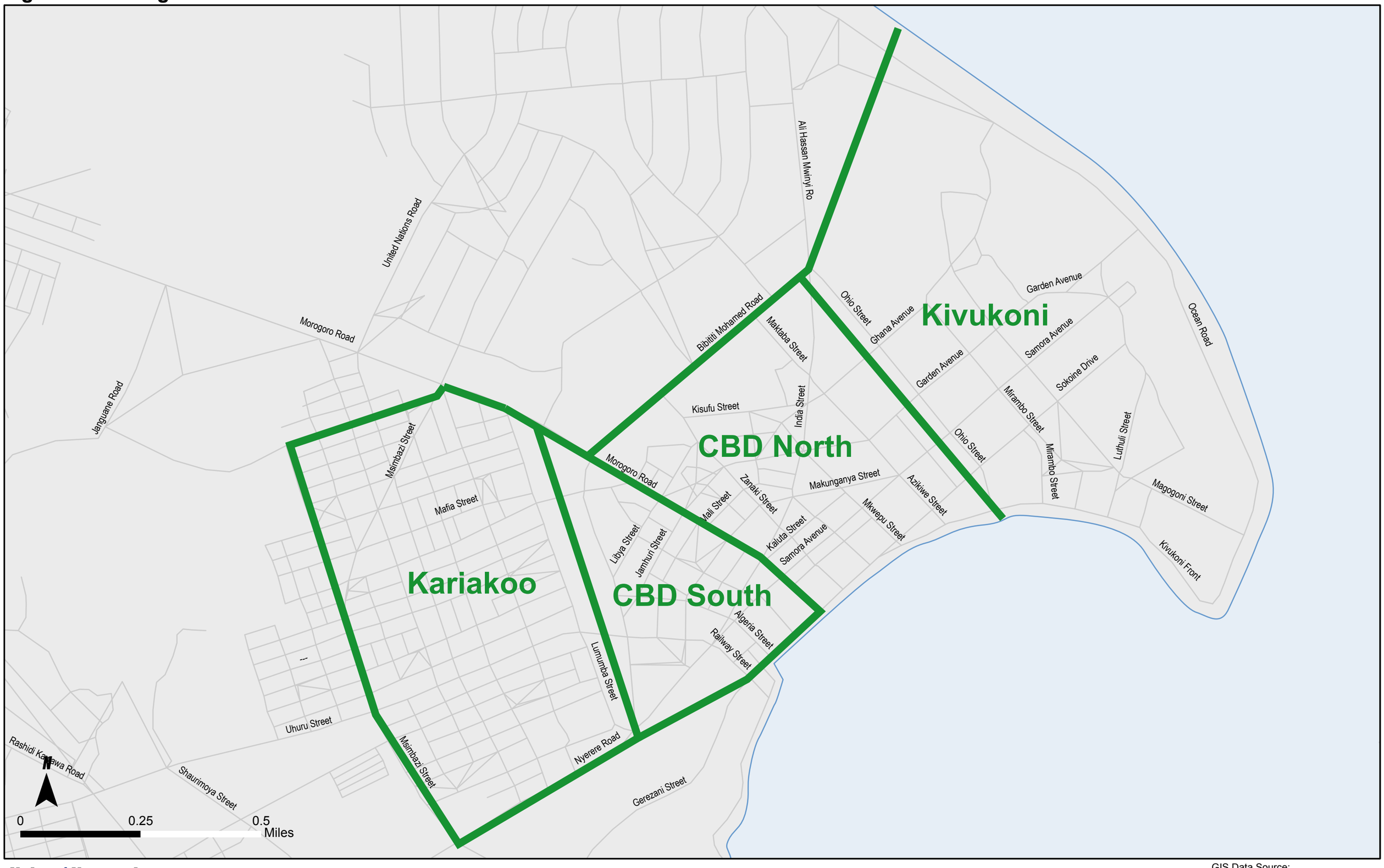
Figure 6 shows the summary of results. Figures 7 and 8 break the results down separately for on- and off-street parking. Figure 10 maps occupancy on each individual street, while Figure 11 shows off-street parking capacity. Green indicates an overabundance of parking (occupancy less than 70%); yellow indicates good availability (70-90% of spaces occupied); and red indicates that parking is effectively full (90%+ occupancy). For the map of off-street parking, the size of the circle is proportional to the size of the garage or lot.

The following conclusions can be drawn from these results:

- **There is no shortage of parking in central Dar es Salaam.** Only 77% of legal parking spaces are currently in use on a typical weekday. For comparison, 85-90% is generally considered the optimum balance between efficiency and ease of finding a space.
- **Ample parking will be available, even following DART construction.** Figure 9 shows the number of spaces that are likely to be lost to DART. In all four sub-areas, there will still be ample parking available.
- **It can be difficult to find a parking space in many central areas.** While there is no shortage of parking overall, there are many "hot spots" – particularly in the south of the CBD – where parking is fully occupied.
- **Off-street parking is underutilized.** Even in the south of the CBD, where on-street parking is at a premium, there are numerous empty spaces in garages. For example, JM Mall has more than 100 spaces available, plus additional levels that are currently used for storage.
- **Reserved parking means that not all spaces are available.** 20% of spaces that were counted as "unoccupied" during the surveys were reserved for a specific business, meaning that they were unavailable to the general public.
- **The City is not realizing the full revenue potential from parking.** The contract with Nation Parking Systems identifies 3,676 spaces in the CBD (between Lumumba and Lithuli streets). This survey identified 5,986 spaces in the same area[8] – 63% more. Even accounting for spaces that are occupied by government/United Nations vehicles, there is a significant discrepancy. Moreover, Figure 12 shows that the current revenue per space is significantly below what the City could expect to achieve. The revenue to the City equates to an occupancy rate of 17%-28%. Given that occupancy rates in this area are about 85%, **the City could expect to at least triple the amount of revenue it receives from the parking contractor to about 150 million shillings per month**. This accounts for lower occupancies on Saturdays and early or late in the day, and lower revenue per hour from reserved spaces.

[8] Including on-street spaces between Lumumba Street and Lithuli Street inclusive, plus the surface parking lot outside City Hall.

Figure 5: Parking Zones for Data Collection



Nelson|Nygaard consulting associates

GIS Data Source:

Location: Dar Se Salaam, Tanzania

Figure 6 Summary of Parking Survey Results (All Spaces)

	Kariakoo	CBD South	CBD North	Kivukoni	Total
Parking Spaces	5,260	1,728	4,261	2,554	13,803
Parked Cars	3,714	1,585	3,358	1,937	10,594
% Occupancy	71%	92%	79%	76%	77%

Figure 7 Summary of Parking Survey Results (On-Street)

	Kariakoo	CBD South	CBD North	Kivukoni	Total
Parking Spaces	5,130	1,231	2,693	1,502	10,556
Parked Cars	3,634	1,251	2,021	1,074	7,980
% Occupancy	71%	102%*	75%	72%	76%

* Note that occupancies over 100% are possible due to illegal parking.

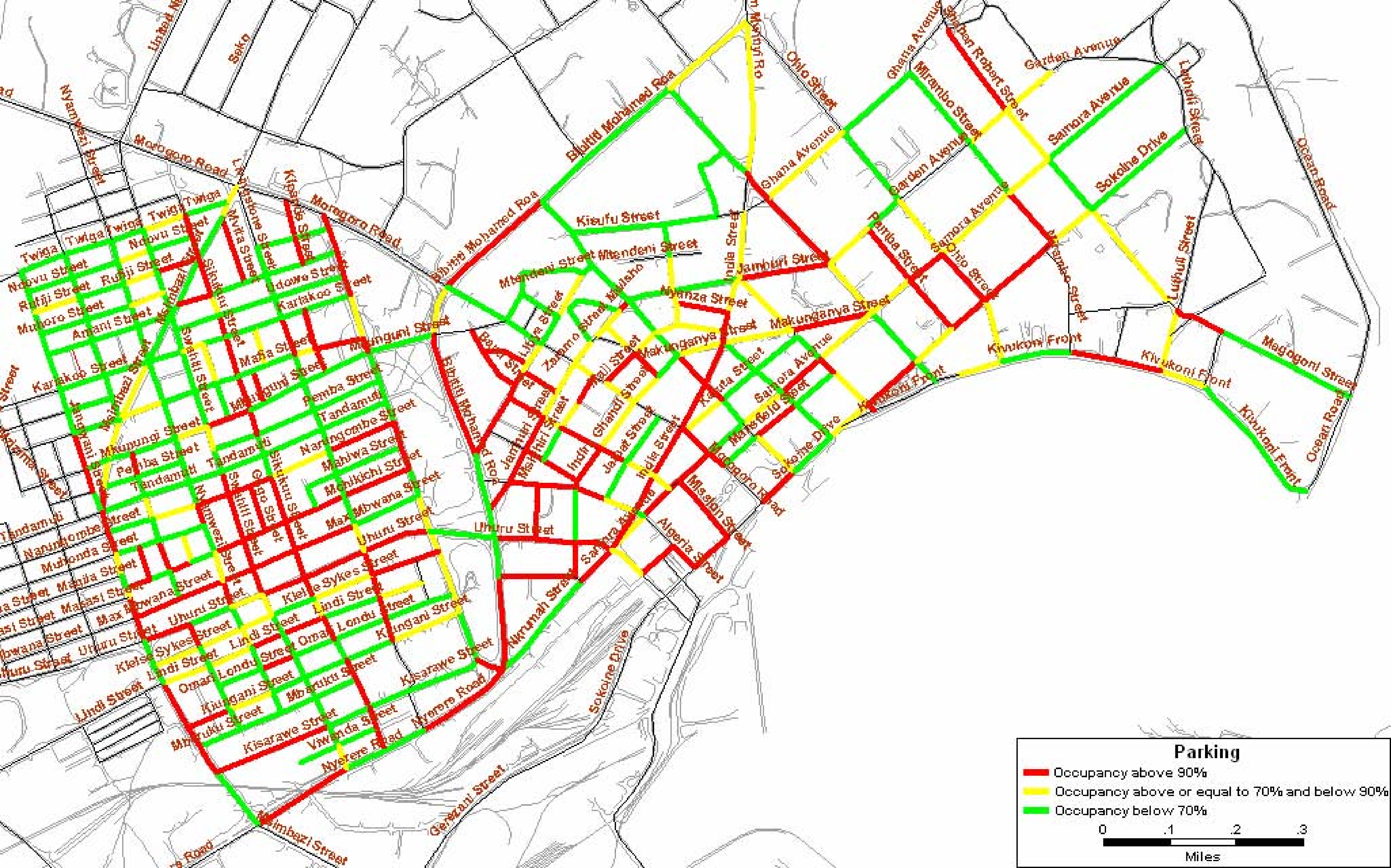
Figure 8 Summary of Parking Survey Results (Off-Street)

	Kariakoo	CBD South	CBD North	Kivukoni	Total
Parking Spaces	130	497	1,568	1,052	3,247
Parked Cars	80	334	1,337	863	2,614
% Occupancy	62%	67%	85%	82%	81%

Figure 9 Parking Lost to DART Construction

	Kariakoo	CBD South	CBD North	Kivukoni	Total
Potential spaces lost to DART*	-	Morogoro Rd – 83 spaces	Parking lot – up to 293 spaces Sokoine Drive – 47 spaces Kivukoni Front – 20 spaces	Kivukoni Front – 403 spaces on-street, plus 160 in surface lots next to the waterfront	
Total spaces		*83*	*Up to 360*	*563*	*1,006*
Available parking at present	2,363	393	1,034	739	4,529
Parking available following DART?	Yes	Yes	Yes	Yes	Yes

*Note that precise numbers will depend on final busway and waterfront design and related development plans.


Parking
Occupancy above 90%
Occupancy above or equal to 70% and below 90%
Occupancy below 70%
0
.1
.2
.3
Miles
Morogoro Road
Bibititi Mohamed Road
Kisutu Street
Mtendeni Street
India Street
Jamhuri Street
Nyanza Street
Makunganya Street
Ghana Avenue
Garden Avenue
Mirambo Street
Samora Avenue
Sokoine Drive
Luthuli Street
Ocean Road
Kivukoni Front
Magogoni Street
Ohio Street
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Masasi Street
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Ndovu Street
Rufiji Street
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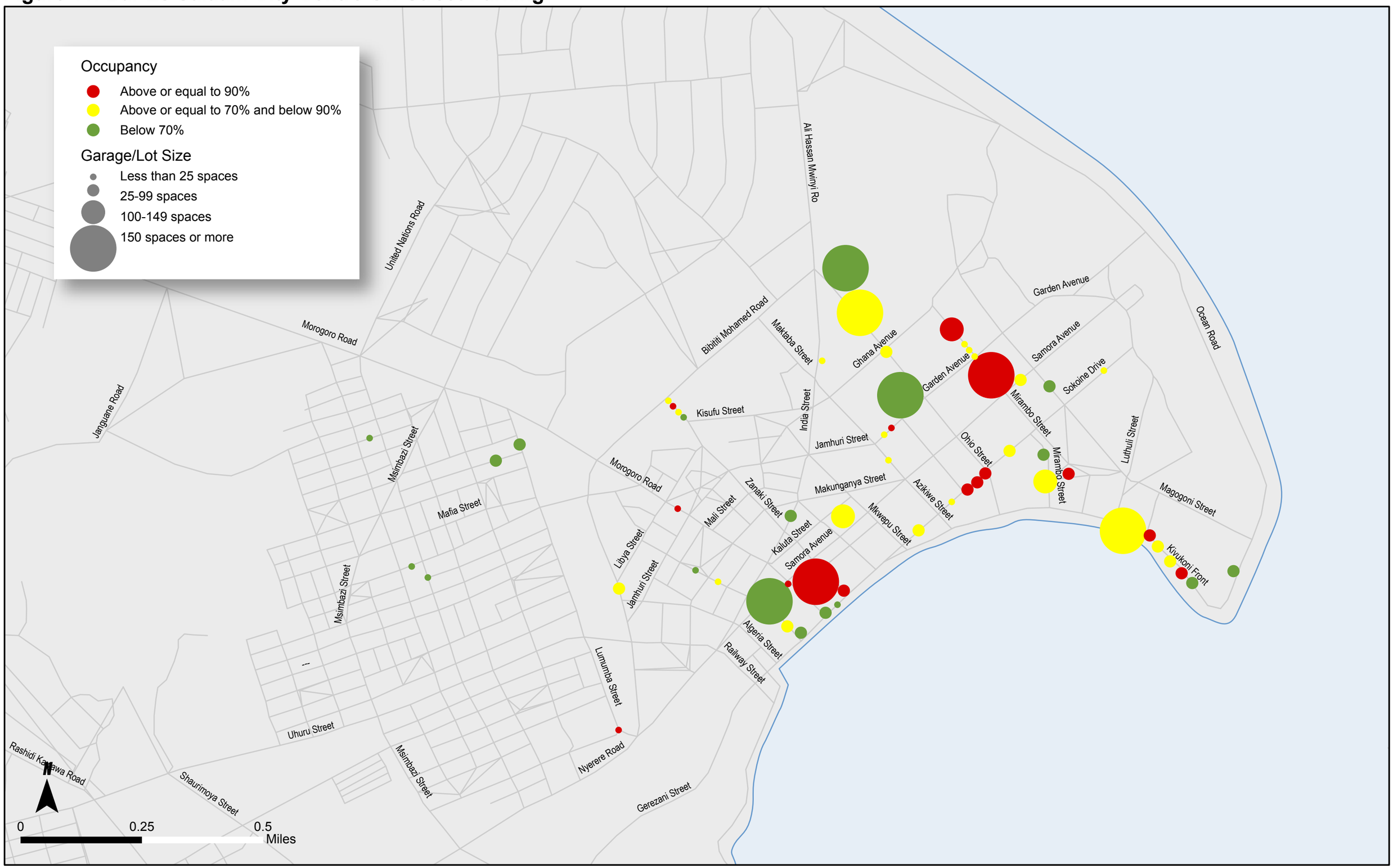
Garden Avenue
Ohio Street
Mkwepu Street

Figure 11: Dar Es Salaam City Centre Off-Street Parking



Nelson | Nygaard
consulting associates

GIS Data Source:

Location: Dar Se Salaam, Tanzania

Figure 12 Potential Parking Revenue Estimate

		Survey Data	Contract Provision
A	Number of parking spaces (1)	5,986	3,676
B	Monthly revenue to City (2)	49.5 million /-	
C	Gross revenue to NPS (3) (= B / 0.75)	66.0 million /-	
D	Monthly gross revenue per space (= C / A)	11,037 /-	17,972 /-
E	Paid hours per space per month (4)	36.8	59.9
F	Percentage occupancy (5) (= E / 213)	17%	28%

(1) Between Lumumba and Lithuli, including the off-street NPS-managed lot on Morogoro Road.
(2) Average for April-November 2005.
(3) Assumes that NPS retains 25% of collected revenue.
(4) Assuming hourly rate of 300/-.
(5) Assumes 21 weekdays (9 hours) and 4 Saturdays (6 hours) of paid parking per month.

Recommendations

This section outlines recommendations for parking in central Dar es Salaam. These have been refined following meetings with City staff, and two workshops held in October 2005 with merchants, business leaders and other stakeholders from the city centre. These workshops were publicized through invitations to those who would be most affected by any change in parking supply or policy, including NPS and merchants along Morogoro Road. However, further outreach is needed to refine these recommendations in the light of local expertise.

In general, the recommendations received considerable support at these workshops. Specific suggestions included making it more expensive to drive in order to encourage people to walk; ensuring that any additional parking revenue is invested in developing the infrastructure; better information to inform people where they are allowed to park; concerns over the professionalism of parking attendants; and concerns over increasing the cost of doing business in the City Centre.

The recommendations are divided into two parts: overall principles for parking policy, and specific actions that the City or municipality should take.

Overall Principles

1. Do not subsidize parking with public funds. Many of the recommendations here call for development of off-street parking facilities in the medium-term. However, these garages should only be constructed once they can be profitable. Given the small share of drive-alone trips in Dar es Salaam, which are generally made by the wealthiest residents, parking should not be subsidized; there are far more pressing uses for public funds for other transportation purposes.

2. Maximize on-street parking revenue. Parking is a significant revenue generator for the City at present, generating about 600 million shillings annually. However, this is far below the potential revenue. The City should seek to manage on-street parking contracts to maximize the revenue for other programs. Uses of this revenue might include road and walkway maintenance; covering any potential operating deficit for DART; or complementary programs such as non-motorized access to DART stations.

3. Seek to constrain overall parking levels in the city centre. There is little spare roadway capacity into the city centre at peak times (although DART will free up some capacity that is currently taken by daladalas). However, each new parking space has the potential to generate a new peak period trip, and diminish DART ridership. Rather than encouraging an increase in parking supply, the City and municipality should actively seek to limit parking growth as a strategy to manage congestion and increase the success of DART in attracting riders.

4. Gradually shift to off-street parking in the city centre. In the longer-term, it will be desirable to eliminate on-street parking on many streets in the CBD and Kariakoo, in order to free up space for pedestrians and other activities and improve urban design. The supply should be shifted to peripheral lots, which can be accessed from major arterials and avoid directing traffic through the narrower streets in the CBD or Kariakoo. Figure 13 shows some potential sites for peripheral parking facilities. All of the city centre is within 0.75 km – a 5 to 10 minute walk – of at least one of these garages, as shown by the overlapping circles.

This needs to be a gradual process on account of the significant revenue loss that it entails. Off-street parking should not be developed until it can be operated at a profit. Even so, however, the City will still lose some revenue; on-street parking is essentially free apart from revenue collection costs, while off-street parking charges will need to cover construction, land and maintenance costs. For this reason, on-street parking removal should only take place in association with other transportation and urban design improvements, such as DART construction, pedestrianization, or substantial investment in the streetscape.

5. Use parking charges as a means to maintain availability. As with any other product, demand for parking is a function of price. This allows the City to ensure that parking is available, through increasing the price for premium spaces (e.g. on busy commercial streets). Target occupancy should be about 85%; if all spaces are regularly filled, the price should be increased. In this way, pricing can also help direct motorists to underutilized off-street facilities and parking on side streets.

Specific Actions

A. On-Street Parking

A1. Do not replace parking lost through DART construction. Approximately 1,000 spaces will need to be taken for the busway and related development, including 83 spaces on Morogoro Road. The survey shows that there are at least as many vacant spaces on other streets (e.g. Africa Street) and off-street facilities (e.g. JM Mall). This means that no action is necessary to replace the spaces that are lost.

JM Mall has enough vacant spaces to absorb parking displaced from Morogoro Road and the surface lot

A2. Introduce differential parking charges. The current rates (300/- per hour, or 100/- in Kariakoo) have not been increased since the advent of the paid parking program. Occupancy levels are more than 100% on busy commercial streets, but there is a large amount of space on other streets, even at peak times. Differential pricing

should be introduced, with higher rates on "premium" streets where parking is fully occupied, such as Samora Avenue and Jamhuri Street. Initially, the rate should be 500/- per hour but this should be increased as necessary to ensure some space is available.

Rates on streets where parking is in lower demand and not currently priced – such as Garden Avenue and Upanga Road – could be set as low as 100/- per hour. The parking contractor should have the authority to assign streets to one of these three rate bands – economy (100/- per hour), standard (300/- per hour) and premium (500/- or more per hour), based on occupancy.

An increase in charges would have two advantages: (i) it would increase revenue to the City and NPS, compensating for the loss of parking spaces due to DART construction, and (ii) reduce demand, helping to improve availability. Higher rates on "premium" streets would help shift all-day parkers to side streets and into parking garages, ensuring that prime, "front door" spaces are available for customers.

A3. Increase the differential for reserved parking. Many of the spaces that are currently vacant are unavailable to the public because they are reserved by business owners. Moreover, it is actually cheaper to reserve a space than to pay the hourly rate. The cost of a reserved parking space should be increased significantly, possibly to 80,000/- per month in order to discourage this practice and free up space for other users. New requests for reserved parking should not be granted.

Good use of planters and bollards is already made to channel parking to the right places; this example protects the clinic entrance on Kaluta Street

A4. Use physical design solutions to reduce walkway parking. Dar es Salaam has done a good job on many streets in installing bollards and planting trees to create physical barriers to parking on the walkway and in front of restricted areas (e.g. clinic entrances). These should be extended to all streets in the CBD where walkway parking is an issue.

B. On-Street Contract Management

B1. Confirm inventory of spaces. There is considerable variation in reports on the actual number of spaces included in the paid parking program. About 4,000 slots were identified before the first (TPS) contract was issued, while the NPS contract reports a total of 1,874 developed (i.e. paved) slots, and a further 650 undeveloped slots. The field survey, in contrast, found nearly 6,000 parking slots in the area

covered by the CBD parking contract. This survey should be the basis for future contract payments.

B2. Cease pay-and-display machine installation. At present, the City receives 75% of parking revenue. However, this will fall to 25% when the machines are made operational, until their costs are recovered. This means that 75% of revenue will go to collection costs, which is disproportionate to the (relatively minor) benefits of the pay-and-display machines since on-street parking attendants are still required.[9] To the extent possible given potential contractual penalties, no more pay-and-display machines should be installed, given the high costs and minor benefits. Alternatively (as being considered by the City), the contract could be extended in return for maintaining the City's revenue share at 75%.

B3. Consider future fixed-price contracts. The most important purpose of the pay-and-display machines is to allow the City to verify the amount of parking revenue collected. One way to avoid this issue is to tender a fixed-price contract; i.e., the City receives a fixed amount rather than a percentage of revenue.[10] This avoids the need for the City to audit the parking contractor's financial records. An accurate inventory and the existing payment history would allow an accurate determination of the appropriate contract price.

B4. Promote competition. By all accounts, NPS is doing an excellent job, particularly by comparison to the previous contractor. However, the City should avoid being trapped in a situation where there is only one capable contractor, particularly if it seeks to tender a fixed-price contract. The City should promote competition by issuing separate tenders to introduce paid parking to other areas (e.g. Upanga, Ocean Road and Oysterbay Beach). The aim should be to have a number of contracts that facilitate market entry for new firms.

Some streets (e.g. Morogoro Road south of Samora Avenue) have good markings to indicate parking restrictions, but this is the exception rather than the rule.

B5. Strengthen enforcement. Physical design is probably the most important way to strengthen enforcement of on-street parking (especially parking on walkways). However, this needs to be complemented by a stronger enforcement approach, with ticketing and/or towing of illegally parked

[9] Even if the machines increase total reported parking revenue, this would have to rise by a factor of 3 before the City would see a net gain in revenue, due to collection costs being 3 times higher.
[10] One possible drawback is that this would encourage the contractor to maximize revenue, e.g. through permitting illegal parking close to intersections and on walkways. However, this perverse incentive is already present since the contractor receives a percentage payment based on revenue collected.

vehicles. Ilala municipality holds this responsibility, and reportedly undertakes some enforcement, but this is not always evident to judge from field observations. The on-street contractor is responsible for clamping and towing of defaulters' vehicles, although this appears to cover only motorists who fail to pay, rather than those who park in illegal spaces. In any case, there is a conflict of interest between maximizing revenue and enforcing "no parking" restrictions.

For this reason, we recommend that a separate enforcement contract be entered into by Ilala municipality. This should be self-financing (or a net revenue generator) through citation revenue; in Sao Paulo, for example, the contractor is paid a percentage of these proceeds. A prerequisite is clearer curb markings, striping and signage to indicate parking restrictions (which might also be funded through citations). On some streets (e.g. Samora Avenue), markings are extremely clear, but this is not the case on most other streets where the definition of "legal" parking spaces is largely a matter of custom and practice.

C. Off-Street Parking

C1. Abolish minimum parking requirements. In many cases, developers will want to build off-street parking in order to improve the marketability of their projects. In other cases, building parking will not make economic sense (e.g. on small lots in Kariakoo). Provided that on-street parking is managed effectively so that parking availability is maintained, there is no justification for forcing developers to build more parking, since this runs counter to the principle of managing congestion and building DART ridership. In addition, off-street parking requirements risk jeopardizing the intense activity and streetfront retail that typifies Kariakoo; on many plots, it is almost impossible to integrate parking.

In discussions with City staff and merchants, the concern was raised that eliminating off-street parking requirements could increase congestion as motorists drive around looking for a place to park. In the long-run, however, parking requirements will *increase* congestion as more, cheaper parking encourages trips by car. Congestion can also be dealt with through increasing parking prices, so that some spaces are always available.[11]

[11] See Donald Shoup, *The High Cost of Free Parking.* Chicago: American Planning Association, 2005.

C2. Relate access locations to the street typology. The street typology, discussed in the following chapter, relates form to function: the form of streets is governed by the primary users (e.g. pedestrians or DART). This also has implications for parking location. In general:

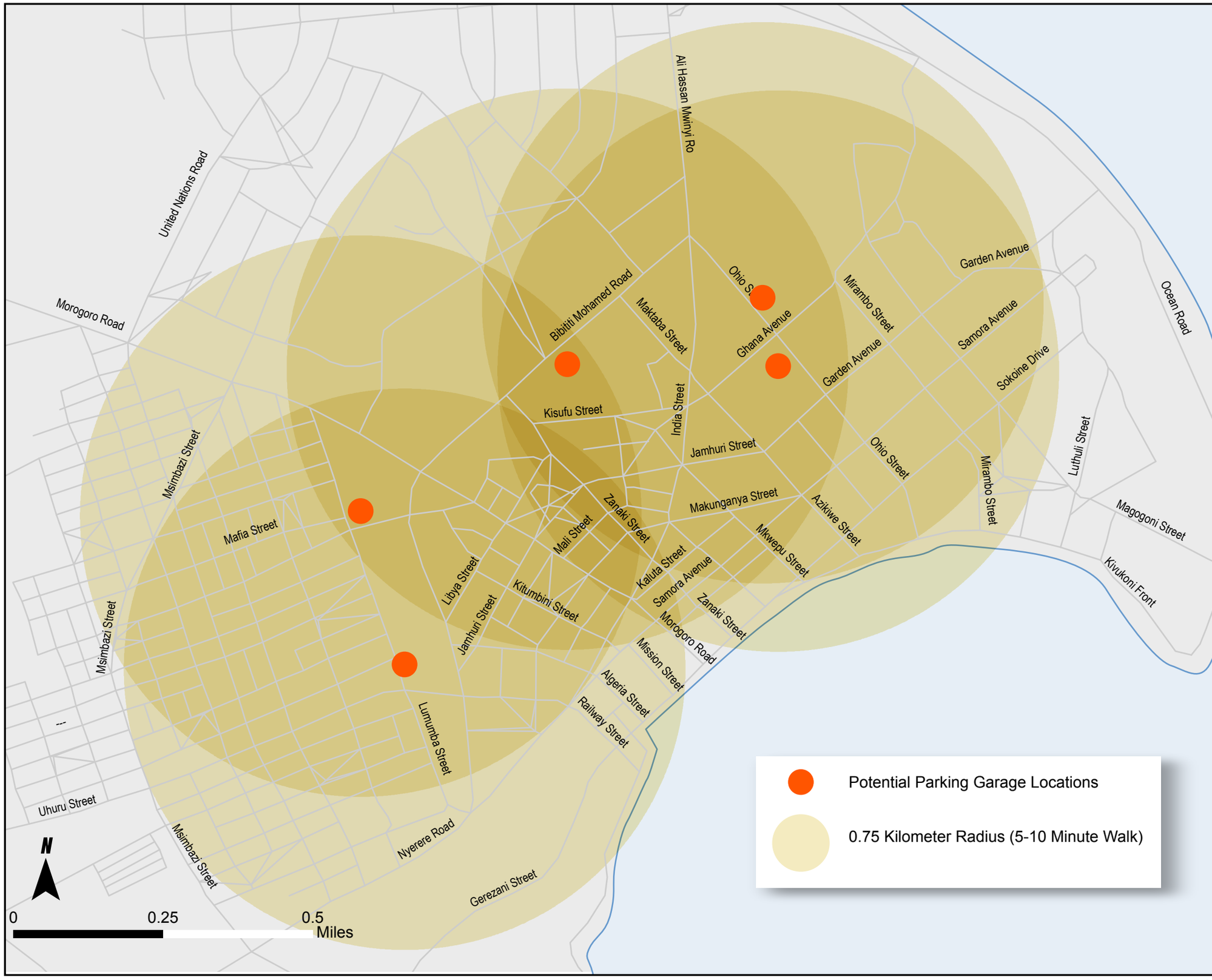
- No access to off-street parking should be approved from a busway or pedestrian street. Small off-street parking facilities (e.g. under 20 spaces) could be accessed from shared streets, but this should be discouraged.
- Any public parking facilities should be accessed from major arterials outside the core of the CBD or Kariakoo, specifically outside the area enclosed by Ohio and Bibititi Mohammed, and Lumumba and Msimbazi streets.

The entrance to the JM Mall garage is well positioned on Mission Street, off of the main pedestrian corridor of Samora

C3. Identify potential sites for peripheral parking. A preferred site or sites for peripheral parking should be identified to assist with future planning and site retention, even though parking should not be constructed until it is economically viable (i.e., when the hourly market rate exceeds a threshold to be determined). Examples of appropriate sites include the land north of the clinic between Lumumba and Bibititi Mohammed; Nyerere at Livingstone south of Kariakoo; and Ohio Street south of Ghana. Figure 13 shows some potential sites. Underground parking would provide more opportunities.

Potential site for a parking structure on Lumumba Street, north of Uhuru. This could be acquired and used as surface parking initially until demand warrants a structure.

Figure: Dar Es Salaam City Centre Potential Parking Garage Locations



Nelson|Nygaard consulting associates

GIS Data Source: ESRI

Location: Dar Se Salaam, Tanzania