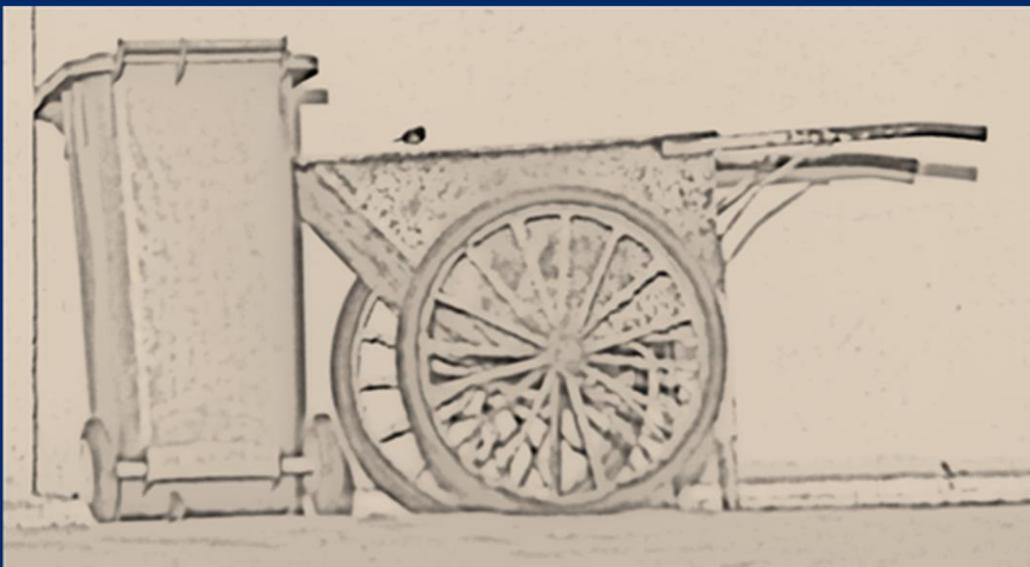


**TA-8566 REG: Mainstreaming Integrated Solid Waste Management in Asia -  
Solid Waste Management Team (46248-001)**

# Prefeasibility Study – Chan Aye Thar Zan Waste Collection District Concession **Mandalay**



**December 2016**

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## List of Abbreviations

<b>ADB.</b>	Asian Development Bank
<b>CAPEX.</b>	Capital Expenditure
<b>CMC.</b>	Colombo Municipal Council
<b>IRR.</b>	Internal Rate of Return
<b>MCDC.</b>	Mandalay City Development Committee
<b>OPEX.</b>	Operational Expenditure
<b>WtE.</b>	Waste to Energy
<b>PFS.</b>	Pre-feasibility Study
<b>PPP.</b>	Public Private Partnership
<b>RoE.</b>	Return on Equity
<b>Tpd.</b>	Tonnes per day
<b>YCDC.</b>	Yangon City Development Committee

## Executive Summary

The structure of the prefeasibility study for a proposed private waste collection concession for Chan Aye Thar Zan Township in Mandalay reflects the key objective of private sector incentives / risk absorption to achieve major improvement of performance standards for residential /commercial collection and street cleaning. The fundamental premise of the PFS is that failure to achieve defined performance targets would result in material reductions in fees paid for services.

The PFS notes that previously awarded PPP projects over the last couple of years in the Mandalay WtE sector and Yangon WtE and collection sector have not progressed after award and there remain open questions over if and when any of these projects might proceed. The PFS noted that in none of these cases, did the cities dedicate extensive resources and efforts to upfront pre-bid project preparation. In particular, there was a missed opportunity to carefully define objective performance standards representing the desired “output”. This latter critical element has now been incorporated into the PFS (and Solid Waste Action Plan) assumptions.

The PFS (together with the Solid Waste Action Plan) defines what the effective business proposition Mandalay should be making to private sector proponents for the Char Aye Thar Zan Collection District. During the collection of general and individual market sounding meetings held over 26-27<sup>th</sup> October 2016, the output based performance target approach was discussed extensively with prospective private contracts and was generally well understood and appreciated by both MCDC and the private sector.

An important premise for any concession was that private contractors would be required to purchase their own equipment. The assumption of concession period of at least 7 years was seen as essential so that contractors would be able to adequately amortize loans taken out to buy equipment. This provision is incorporated into the cashflow model projections in the PFS.

## 1. Introduction

The purpose of this pre-feasibility report under Asian Development Bank RETA 8566 is to summarize and preliminarily assess key commercial and technical issues for the proposed Chan Aye Thar Zan Township Waste Collection and Street Cleaning Concession. This report should be read together with the Solid Waste Action Plan which features a proposed terms sheet and bid parameters for this concession.

This study acts as a pre-cursor to a Final Full Feasibility Study along with fully developed Prequalification and Bidding Documents inclusive of a Draft Detailed Contract, which will follow on from this RETA.

## 2. Project Description

### 2.1. Project Rationale

The MCDC Cleansing Department has indicated interest in private sector participation in its residential and commercial solid waste collection and street [and drain] cleaning services citing major performance improvement and cost effectiveness as key policy objectives. Hazardous, hospital and construction waste are viewed as requiring specialized collection services and may be considered for private sector participation at a later stage.

Since waste collection and street cleaning are funded mainly by a dedicated property tax allocation, MCDC does not charge residential customers for collection services, but levies charges on commercial customers. Therefore, a private operator would be paid directly by the City. This, in any event, underscores the objectives of the exercise under which an operator should strive to be identified by customers as a significantly improved and sustainable service provider – not as the agent of the City to replace its allocated solid waste purpose property tax with a new collection charge.

In due course, the City may impose a collection charge as a useful policy (suggested in the ADB RETA Policy and Reform Paper), but this is a city financial and tax policy issue not necessarily driven by the introduction of a private sector operator in one district of the City.

### 2.2. Project Objective

The project objective is to introduce significantly improved service to a residential and commercial customer base that would benefit most and help build popular support for improvement of services across the City.

As waste collection and cleaning services are very essential city services, a wholesale privatization of the entire city should be avoided initially. Rather a pilot project approach is suggested under which MCDC designates only one out of its six collection Townships for private operation. MCDC has chosen the Chan Aye Thar Zan Township for proposed pilot status under this study. The township has been chosen due to its higher socio-economic profile in which citizen service demands would be expected to be higher and further, a central business district benefits.

This type of customer base would be expected to provide regular feedback on operator performance which will help the City better assess whether performance targets are being met and when necessary to impose penalties on the private operator.

### 2.3. Scope of Work Required by RETA 8566

In recent years, city level Public-Private-Partnership (PPP) projects in Myanmar have been on an Unsolicited Bid Basis or, if under competitive tender, awarded under very general parameters, leaving the designated private sector investor/ operator to develop the commercial, legal and technical aspects of the project largely on its own.

The prefeasibility report is intended to help MCDC undertake its own project due diligence and engage in early stage project preparation so that when the competitive tendering stage arrives, it will be able to confidentially deliver its technical service and commercial structure objectives as the basis for companies to submit expressions of interest at prequalification stage and final detailed bids with a reasonable value-for-money proposition.

RETA 8566 requires that this Prefeasibility Study covers both technical and commercial aspects for the project identified in the Integrated Solid Waste Management Strategy including a financial analysis of investment costs, revenue streams and gap in funding (if any).

## 3. Context

### 3.1. Policy Context (objectives of PPP structure)

MCDC has opened up environmental services to private sector operations. It has engaged a Thailand private operator to undertake a Build-Own-Operate Industrial Project and is preparing, with ADB and AfD assistance, a Design-Build-Operate tender for the Nakad Wastewater Treatment plant.

MCDC's efforts to open up solid waste services to the private sector have focused on an awarded Waste-to-Energy project which appears not to be progressing very quickly due to difficult impediments and per MCDC may not proceed.

The Project would be the first operating concession for services provided directly to a wide-scale consumer base. As such, detailed contractual performance targets would have to be measured by a City inspection unit who would be subject to the oversight of the consumers themselves.

### 3.2. Technical Context

The proposed collection service will be based on a door-to-door collection approach supplemented with community bins as required for hard to access areas and also commercial areas including the markets.

The approach is to move away from most collection being to primary dumping locations where many of these locations are uncontrolled open areas. This approach results in significant visual impact with large piles of municipal waste being left on the street during the day, and thereby, influencing the general community to also litter or embark on fly dumping activities. It was agreed with MCDC that the focus should be on door-to-door collection as well as a system of bins for community access and commercial enterprise use to avoid having piles of waste left on the street. Any waste that would not be collected directly from door-to-door activities would be deposited by the community or commercial ventures into metal skips bins equipped with lids. This means that there is no visible waste throughout the community, and therefore, in conjunction with a suitable community education campaign, will significantly reduce and eventually eliminate the current system of having open piles of waste on the footpath throughout the township.

A second element of the revised collection system is to reduce the amount of labour intensive activities associated with hand loading of waste from the primary dumping locations into collection trucks. This is both very slow as well as dangerous as MCDC workers are coming into direct contact with the waste. The new approach will be to have trucks equipped with front lifting and rear lifting forks which can lift bins directly into the truck so there is no need for the workers to contact the waste. There will always be some litter around the bins at the primary dumping skip bins which the workers will have to collect, but this will be a relatively small quantity and therefore the risk element is greatly reduced from the current system of hand loading almost all waste.

The third aspect of the revised approach is the use of waste compactor vehicles rather than open tipping vehicles. This means that the efficiency of the waste collection service is greatly increased as the density of waste within the waste compaction vehicles will be 2 to 3 times as much as achieved in a traditional tipping truck. Therefore, the efficiency of collection in terms of tons hauled to the landfill per trip is greatly increased. This is to be further improved by the use of large compactor vehicles carrying up to 28 cubic metres of waste at the time.

To support these large vehicles that will only be able to access the widest roads is a fleet of smaller vehicles that will load the smaller waste skip bins to be located in the narrower streets. In addition to these smaller compactor trucks, small motorized carts or tricycles will be used to access the alleyways and very narrow streets throughout the township. These will

be supported by a number of pushcarts for areas that are pedestrian-only accessible. These vehicles will haul waste to skip bins located on compactor truck accessible roads.

In summary, the approach is to move towards a door-to-door collection service supplemented by the use of metal skips bins rather than open dumping at the primary dumping locations throughout the township. This will be supported by the mechanized lifting of waste into vehicles which will compact the material thereby, resulting in a far more efficient system and one with much greater health benefits for the workers. The removal of the primary dumping locations, where waste is merely placed on the footpath for subsequent manual loading by the workers, will also encourage the general community to reduce their current littering and fly dumping activities, resulting in a much more aesthetically pleasing township.

### **3.3. Institutional Context**

Choosing to privatize operations of one Township rather than all Townships provides some interesting dynamics. First, all stakeholders will inevitably be comparing the service output of Chan Aye Thar Zan Township with the other five districts. Second, while the inspection unit would only be charged with measuring performance outputs of the private operator, there is always the danger that inspectors previously involved in collection and street cleaning operations may try to measure inputs, such as the type of vehicles purchased and the number of street cleaners on each shift.

While there are no means of stopping inspectors from judging the way an operator runs its business, it could be very useful that the inspection unit is also responsible for inspecting the other five districts remaining in public sector hands using identical performance standards to private operation. This would improve the overall experience of the inspection unit and hopefully provide MCDC with more information to inform decisions on provision of public or private solid waste services.

The formation of the inspection unit is primarily to enforce the existing terms of the contract and to cite instances which would trigger penalties for failure to perform. The recourse to appeal to a qualified arbitrator could serve as an effective ultimate oversight function if well-structured in the contract documentation with a qualified arbitrator.

### **3.4. Results of Market Sounding Exercise**

The market sounding was conducted with several potential concessionaires in open meetings and individual meetings attached to a workshop held in Mandalay on 26 October 2016.

There was strong support for an open transparent bidding process in which MCDC prepared detailed project information and draft contracts for bidders. If there would be a prequalification stage, clear criteria would need to be established. One local company requested that local shareholder preference points be awarded as part of the final bid criteria.

All companies requested that the MCDC Cleansing Department take a proactive role in developing the project for bid and assisting in dealing with the residential and business consumers in Chan Aye Thar Zan Township.

One company requested that by the time of final bid, that MCDC provide a plan for phasing of private sector participation on waste collection for other townships within the city.

A seven-year term was viewed as adequate by some, and too short by others.

### 3.5. Relevant Statistics for Chan Aye Thar Zan Township

Currently, Char Aye Thar Zan Township has an estimated 33,077 households and population of 146,481. Population growth is estimated at a very modest 0.38% p.a.

The tonnage per day generated of residential and commercial solid waste is estimated at 234 tonnes per day (tpd). Growth is projected to raise this amount to 270 tpd by 2025. At present, only 177tpd is actually delivered to the landfill due to recycling interventions at household level and primary dumping locations, illegal waste disposal and so on.

### 3.6. Proposed Categories for Contractual Performance Targets

The proposed categories for contractual performance targets are presented in detailed in **Annex 3: Performance Criteria for Collection Contract.**

However, the performance measures may be summarized as follows:

- Cleanliness of service area
- Safe disposal of collected wastes
- Customer satisfaction
- Customer dissatisfaction
- Worker productivity
- Vehicle productivity
- Recycling achievements
- Environmental controls
- Occupational health and safety controls
- Fair labour practices
- Hazardous waste segregation
- Fuel consumption
- Reliability
- Communication, and
- Finance

## 4. Viability

### 4.1. Revenue Potential

Revenues would consist almost entirely of a waste collection and street cleaning services fee paid by MCDC to the Concessionaire.

The model makes no assumption for recycling revenue as the labour force may be given the potential to remove any valuable recyclable products during collection.

### 4.2. Financial metrics (Assumptions in Cash flow model)

The Project's financial metrics are depicted below. The crucial financial metric in any private sector participation is the Return on Equity (RoE) of the proposition. We have modelled the project with the required RoE as objective and then worked backward on what the annual revenues to the operator should be offsetting the CAPEX, OPEX and the equity return.

Annual revenues of MMK 2,570 million are required as presented below. It has been assumed that this would then be paid by the Municipality to the operator conditional upon performance levels. In addition, the project's minimum debt service coverage ratio of 1.0 suggests that it is likely local financing may be obtained.

#### ■ Table 4-1 Project Financial Metrics

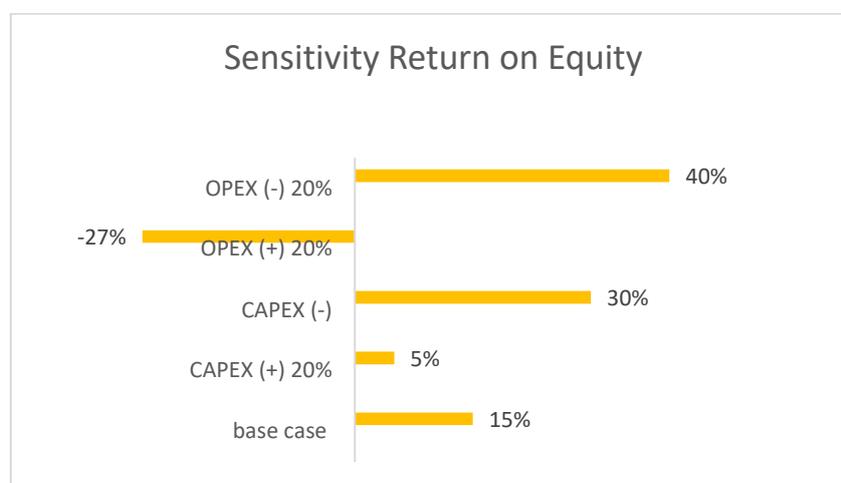
Input		Output	
CAPEX (MMK million)	4,386	Average DSCR	1.8
OPEX (MMK million)	1,780.2	Equity IRR	25%
Years concession	7	Revenues operator/year (MMK million)	2,570

## 5. Risks

### 5.1. Sensitivity Analysis

The purpose of the sensitivity analysis is to deepen the understanding of how realistic and robust the calculated annual revenues payment to the operator is. To this end the sensitivities of key variables were tested on the objective Return on Equity. Sensitivities of Capital Expense (CAPEX) and Operating Expense (OPEX) of plus and minus 20% were applied to assess minimum and maximum boundaries of the annual payment. The results are presented below.

Return on Equity is highly sensitive to the OPEX levels -- which is understandable given the importance of OPEX in a waste collection project. The inverse is also true as the payment to the operator has a medium sensitivity to CAPEX levels.



■ **Figure 5-1 Sensitivity to Equity IRR for changes in Capex and Opex**

### 5.2. Key Risks

The nature of any Public-Private-Partnership structure is to allocate risks to those with the most competence to bear them. For the Waste Collection and Street Cleaning Concession, the economics of the concessionaire should be driven almost wholly by performance and cost management. The Private Concessionaire should be shielded as much as possible from risks it cannot control such as changes of law or MDCDC policies. The following table lays out many of the most important risks for a business of this type and provides a suggested allocation:

■ **Table 5-1 Risk Matrix Covering Waste Collection Concession Risks**

Category	Description	Allocation	Mitigation
<b>Performance on Collection and Street Cleaning</b>	Defined Performance Targets not being met	Private Operator	Liquidated Damages Penalties as Deduction from Operating Fee.  Accumulation of [ ] days of Performance Shortfall within quarter year period triggers a Private Contractor contract default and give the City the right to terminate contract
<b>Waste Disposal Risk</b>	Transport and Disposal to Landfill	Private Operator	Private Operator must develop receiving procedures with City Landfill
<b>Landfill space availability</b>		City	City must direct Concessionaire to other disposal site and compensate for additional transport costs
<b>Cost Over-Run Risk on Equipment Purchase</b>	Project Costs Exceed Project Budget	Private Operator	Private Operator handles all equipment purchase and equipment is the property of the private operator
<b>Need to replace equipment</b>	Private operator must replace equipment that was not in its budget	Private Operator	Private operator is responsible for correctly estimating reliability and life of equipment in its budget
<b>Domestic inflation risk</b>	Operating cost increase due to inflation	City of Mandalay	Contract price will be adjusted yearly based on official inflation rate
<b>Private Operator Bank Debt Interest Rate</b>	Any floating interest rate on Private Operator bank debt increases	Private Developer	Unlike a private infrastructure BOT project for WtE, the City has no relationship to the Private Developer's lenders. This issue is for the Private Developer to manage.
<b>Cost Overrun on Operations and Maintenance</b>	Project Costs Exceed Project Budget	Private Operator	Private Operator receives a fixed fee with an adjustment only for domestic inflation rate. Fixed fee is not adjustable for any other reason.
<b>Major increase in collection customers(a)</b>	Collection Customers increase	City	Contract will specify maximum value collected with adjustment in fee for additional volume

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Category	Description	Allocation	Mitigation
<b>Revenues from City property taxes and any new collection 1) is demand risk and 2) is payment risk</b>	Cleansing Department revenues are not enough to pay fixed fee	City of Mandalay	Fixed fee obligation is not from the Cleansing Department only. It is a general obligation of the city government.
<b>Natural Force Majeure</b>	Private operator must procure commercial insurance for own risks	Commercial Insurance	Physical Loss Insurance to cover equipment losses  Private Operator is relieved of Performance obligations for time of relevant force majeure
<b>Currency Risk</b>	Foreign Exchange Devaluation (Foreign Investors Only)	City	Should only be introduced if City prequalifies a foreign investor for final bid.
<b>Capital Control and Profit Repatriation</b>	(Foreign Investors Only)	City	Should only be introduced if City prequalifies a foreign investor for final bid.

## 6. PPP Commercial Structure

### 6.1. Lessons learned from previous Yangon Waste Collection Concession

The Pollution Control and Cleansing Department of the Yangon City Development Committee (YCDC) tendered and awarded two residential waste collection concessions aggregately covering the city as a whole. While neither has been formally cancelled and one awarded company insists that its bid bond is still valid, YCDC has suspended operations after a few months of trial operations in 2015 following purported complaints from citizens on quality of services and major increases in existing collection fees.

YCDC ran a tender for waste collection for entire city on a completely free market model featuring:

- One stage bidding process with 11 bidders for 10-year household waste collection only (not commercial customers).
- Bidders given freedom to select preferred collection zones, develop own performance targets, own contact, etc.
- Based on feedback from bidders, existing fee of MMK 600 per month per household was to be raised by 3x for CBD, 2.5x for suburban areas and 2x for satellite city.

Winning bids were from Yangon based Zeya for South and East zones and Australia based TYTC for North and West Zones. YCDC suspended the plan to implement privatized operation due to dissatisfaction of the city populace over the mooted collection fee increase. This contradicted earlier city studies showing that residents were willing to pay more than these levels.

Other smaller cities across Myanmar have privatized waste collection but as part of a holistic outsourcing of all solid waste services including waste disposal sites.

### 6.2. Lessons learned from other selected countries

Several cities in the region have successfully implemented waste collection concessions.

*Colombo, Sri Lanka* – Three out of Colombo Municipal Council (CMC) Six Collection Zones are run as 4-year concessions (subject to re-tender). Private waste collection in Sri Lanka was piloted in CMC in 1998 and phased in over time. Standard contracts consist of fixed monthly payments less deductions for failure to meet service targets. CMC's three Concessionaires are Abans, Environmental Service, Berns Lanka Ltd. While Abans is a big company, the others are waste sector centred start-ups fostered in part by the CMC waste collection privatization.

*Singapore* – Over the last decade, most waste collection in Singapore has been privatized. There are four public waste collection companies operating in 9 sectors. Rights to manage waste are competitively tendered by these companies.

*Quezon City, Philippines* – The City (the largest in Metro Manila and the Philippines) outsources most of its waste collection to private collectors. However, contracts are bid out annually to the major detriment of the quality of equipment used, as tenders use very few purpose build compaction equipment and mainly open dump trucks.

### 6.3. Proposed PPP Model

Given the referenced domestic and international experience, the study recommends that MCDC incorporate the following features into its waste collection structure for Chan Aye Thar Zan:

- Establish principal before bidding process that MCDC determines what transaction terms it will offer and not the private operator.
- Clearly defined performance standards, as they provide an objective standard for penalties to be assessed.
- Payment from City for services delivered adjustable if customer based / measured mass increase above minimum defined level.
- Contract terms will have been discussed with bidders beforehand so that the scope for required contract negotiation is very limited – and the final bid can be operationalized in the quickest time possible.
- The private operator should be given the concession life necessary to amortize all equipment purchases necessary. To avoid future disputes, the private operator shall not be given the right to use City collection and street cleaning equipment. City equipment currently used for Chan Aye Thar Zan Township should be transferred back to the Cleansing Department fleet on the private operator start date.

## 7. Implementation Plan

### 7.1. Next Steps

- Correctly Estimate Bid Stage Service Budget and Funding Source
- Further Assessment of Affordability on Waste Collection Fee to establish well considered budget range
- Detailed definitions of Performance Target
- Draft Waste Collection Services Contract

### 7.2. Time Table (follows Action Plan from third bullet point onwards)

- Prequalification and Bid Document Drafting.....[4] months
- Prequalification Stage.....[2] months
- Bid period.....[4] months
- Evaluation.....[3] months
- Contract finalization with preferred bidder and Award.....[2] months
- Financial Close..... [6] months

## Annex 1: Financial Model

### ■ A: Macro economic

No.	Item	Unit	Value
1	Corporate income tax	%	30%
2	Inflation CPI	%	10.1%
3	USD/K	K	1271
4	Escalation revenues	%	10.1%
5	Escalation OPEX	%	10.1%
6	Operating days per year	#	365

### ■ B: Project Timetable

Item	Unit	Value
Construction period	years	1
Year -2	%/total construction	0%
Year -1	%/total construction	0%
Year 0	%/total construction	100%
Concession term	year operations	7

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■ C: CAPEX

No.	Item	Unit	Quantity	Rate (USD)	Cost (USD)	Comments
<b>Waste Collection Fleet and Equipment</b>						
1	Waste skip bins - 4.5 cu.m.	Item	250	1,200	\$300,000	
2	Waste skip bins - 1.2 cu.m.	Item	330	450	\$148,500	
3	Waste compactor collection trucks (28 cu.m. capacity) -	Item	7	180,000	\$1,260,000	Some with front lift forks and some with rear dump trays
4	Waste compactor collection trucks (8 cu.m. capacity)	Item	10	145,000	\$1,450,000	Some with rear lift forks and all with rear dump trays
5	10 wheeler tipping dump truck	Item	2	90,000	\$180,000	
6	Small motorised carts (Trikes with high lift dumping direct into skip bins)	Item	30	2,800	\$84,000	
7	Pushcarts	Item	70	400	\$28,000	
	<b>TOTAL</b>				<b>\$3,450,500</b>	

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■ **D: OPEX**

	Item	Number	Rate	Cost	Hours/ year	Cost/hr. (USD)	Annual Total (USD)
1.	Waste compactor collection trucks (28m3 capacity) - no running costs for spares	7	55,000	385,000	2,912	20	407,680
2.	Waste compactor collection trucks (8m3 capacity) - no running costs for spares	10	45,000	450,000	2,912	12	349,440
2.	Waste body-tipper litter/cleanup collection trucks (say 1t/load and 2 loads/day)	2	55,000	110,000	2,912	15	87,360
4.	Small motorised carts (primary collection to secondary sites)	30	4,000	120,000	2,912	3	262,080
5.	Pushcarts	70	55,000	3,850,000	1,248	-	-
	Item	Number	Rate	Cost	Months/ year	Cost/Mth. (USD)	Total (USD)
6.	Sanitary Inspector Wages/senior foreman	7			12	200	16,800
7.	Truck and trike drivers - spare drivers included for 7 day week rostering	49			12	140	82,320
8.	Garbage Collectors/Sanitary Worker Wages. Assume 2 garbage collectors per large vehicle (in addition to the driver) - additional workers included to allow for 7-day week rostering	44			12	140	73,416
9.	Pushcart staff	70			12	140	117,600
<b>10.</b>	<b>TOTAL OPEX/YEAR</b>						<b>\$1,396,696</b>

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### ■ E: Revenues

No.	Item	Unit	Rate
1	Annual payment municipality	K million	2570
2	Annual payment municipality	USD	2,022,030

### ■ F: Funding & Senior Debt

No.	Item	Unit	Value
<b>Funding</b>			
1	Required Return on Equity	%	15%
2	gearing ratio debt	%	70%
3	gearing ratio equity	%	30%
4	net working capital/% total revenues	%	10%
<b>Senior debt</b>			
5	Interest rate	%	13%
6	Loan tenor	years	7
7	Grace period interest payment	years	0
8	dividend pay out ratio available cash	%	1
9	WACC	%	11%

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■ **Income Statement**

INCOME STATEMENT (K million)		Year										
		-3	-2	-1	0	1	2	3	4	5	6	7
<b>1</b>	<b>Revenues</b>					<b>2,829</b>	<b>3,113</b>	<b>3,426</b>	<b>3,771</b>	<b>4,150</b>	<b>4,568</b>	<b>4,568</b>
1.1	Payment municipality					2,829	3,113	3,426	3,771	4,150	4,568	4,568
<b>2</b>	<b>Operating Expenditures</b>					<b>1,959</b>	<b>2,156</b>	<b>2,373</b>	<b>2,612</b>	<b>2,875</b>	<b>3,164</b>	<b>3,482</b>
2.1	Total O&M					1,959	2,156	2,373	2,612	2,875	3,164	3,482
<b>3</b>	<b>Operating Results (EBITDA)</b>					<b>869</b>	<b>957</b>	<b>1,053</b>	<b>1,159</b>	<b>1,275</b>	<b>1,404</b>	<b>1,085</b>
<b>4</b>	<b>Other costs</b>					<b>1,026</b>	<b>969</b>	<b>912</b>	<b>855</b>	<b>798</b>	<b>741</b>	<b>684</b>
4.1	Depreciation equipment					627	627	627	627	627	627	627
4.2	Interest loans					399	342	285	228	171	114	57
<b>5</b>	<b>Net profit/loss before corporate income tax</b>					<b>-156</b>	<b>-12</b>	<b>141</b>	<b>304</b>	<b>478</b>	<b>663</b>	<b>402</b>
<b>6</b>	<b>Corporate income tax</b>					<b>-47</b>	<b>-4</b>	<b>42</b>	<b>91</b>	<b>143</b>	<b>199</b>	<b>121</b>
<b>7</b>	<b>Net profit/loss after corporate income tax</b>					<b>-109</b>	<b>-8</b>	<b>99</b>	<b>213</b>	<b>335</b>	<b>464</b>	<b>281</b>

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■ Sources and Application of Funds

Sources and Application of Funds (K million)	Year										
	-3	-2	-1	0	1	2	3	4	5	6	7
<b>Cashflow operating activities</b>											
Net profit					-109	-8	99	213	335	464	281
Depreciation					627	627	627	627	627	627	627
<b>Net cash flow Operating Activities</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>517</b>	<b>618</b>	<b>725</b>	<b>840</b>	<b>961</b>	<b>1,091</b>	<b>908</b>
<b>Cashflow investment activities</b>											
Investments Equipment	0	0	0	4,385.6							
<b>Net cashflow investment activities</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-4,385.6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Cashflow financing activities</b>											
Loan Disbursements	0	0	0	3,070							
Equity Contributions	0	0	0	1,315.7							
Principle Debt Servicing					439	439	439	439	439	439	439
<b>Net cashflow Financing Activities</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,385.6</b>	<b>-439</b>	<b>-439</b>	<b>-439</b>	<b>-439</b>	<b>-439</b>	<b>-439</b>	<b>-439</b>
<b>Free Cashflows</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>79</b>	<b>180</b>	<b>287</b>	<b>401</b>	<b>522</b>	<b>652</b>	<b>469</b>
<b>Free Cashflow Accumulated</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>79</b>	<b>258</b>	<b>545</b>	<b>946</b>	<b>1,469</b>	<b>2,121</b>	<b>2,590</b>

## Annex 2: Value for Money Analysis

- Value for Money PPP vs Public Procurement

Value for Money PPP vs Public Procurement	
CAPEX distortion in public sector procurement	50%
OPEX distortion in public sector procurement	20%
NPV (MMK million) PPP procurement	-2,527
NPV (MMK million) public procurement	-6,942

## Annex 3: Performance Criteria for Collection Contract

■ **Table: Performance Monitoring Measures for Solid Waste Collection Operations**

<b>Performance measures</b>	<b>What is measured?</b>	<b>How is it measured?</b>	<b>Where is it measured?</b>	<b>How often is it measured?</b>	<b>By whom is it measured?</b>	<b>Basis for sanction?</b>
<b>Cleanliness of service areas</b>	Existence of litter Existence of clandestine waste piles Waste in drains Improperly placed waste bins Regularity and frequency of collection service Cleanliness around communal containers Weekly washing of communal containers Completeness of collection service – number of collection points unserved False loading of vehicle with water, stone, etc. to increase payments	Zone inspection reports Customer complaints register	Service zones	Daily	MCDC	Yes
<b>Safe disposal of collected wastes</b>	Waste quantity delivered at official site Clandestine dumping	City-wide inspections Records at disposal site Complaints by witnesses of clandestine dumping	City-wide Disposal sites	Daily	MCDC	Yes
<b>Customer satisfaction</b>	Perception about cleanliness of zone Willingness to pay Willingness to participate with collection requirements	Surveys of customer satisfaction Surveys of willingness to pay	Service zones	Semi-annually	MCDC Sub-Districts	No
<b>Customer Dis satisfaction</b>	Complaints about improperly placed waste bins, damage of waste bins, uncollected wastes, rude behaviour by collectors, poor appearance of collection vehicle and collection crew.	Zone inspection reports Records of complaints Records of follow-up of complaints Records on attainment of service frequency targets	Service zones	Weekly	MCDC	Yes
<b>Worker productivity</b>	Number of workers in service Waste quantity per worker each shift Absenteeism	Zone inspection reports Records at disposal sites Vehicle log books	Service zones Disposal sites	Weekly	MCDC	No

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<b>Performance measures</b>	<b>What is measured?</b>	<b>How is it measured?</b>	<b>Where is it measured?</b>	<b>How often is it measured?</b>	<b>By whom is it measured?</b>	<b>Basis for sanction?</b>
<b>Vehicle productivity</b>	Number of vehicles in service Waste quantity per vehicle each shift Waste quantity per vehicle each day Vehicle downtime	Records at disposal sites Vehicle log books Zone inspection reports Load inspections at landfill	Service zones Disposal sites	Weekly	MCDC	No
<b>Recycling achievements</b>	Types of materials recycled Quantity of materials recycled	Zone inspection reports Records from sales of recyclables	Service zones Records from service provider	Monthly	MCDC	No
<b>Environmental controls</b>	Exhaust emission control of vehicles Sump tank control of leakage from wastes in vehicles Control of litter from vehicles Washing of vehicles	Vehicle emission inspection reports Zone inspection reports Complaints about vehicle emissions and litter	Service zones Records from service provider	Weekly	MCDC	Yes
<b>Occupational health and safety controls</b>	Use of gloves Use of respiratory masks Use of uniforms Tools on vehicle to load loose waste Annual medical checks Provision of vaccinations Control over size and weight of lifted loads Operational status of vehicle lights (night lights, brake lights, and reversing lights) Number of accidents Adequate accident liability coverage (insurance)	Zone inspection reports Survey of workers Medical records Accident records Insurance policies	Service zones Records From Service provider	Weekly	MCDC	Yes
<b>Fair labour practices</b>	Wages paid - minimum or above Payment for overtime Medical expenses coverage Vacation and holiday allowances Adequacy of work breaks Proper hiring and justifiable termination procedures	Zone inspection reports	Service zones Records From Service provider	Monthly	MCDC	Yes
<b>Hazardous Waste segregation</b>	Refusal to collect hazardous waste Provision of special collection for household hazardous waste	Zone inspection reports Inspection of loads at disposal sites	Service	Monthly	MCDC	Yes

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<b>Performance measures</b>	<b>What is measured?</b>	<b>How is it measured?</b>	<b>Where is it measured?</b>	<b>How often is it measured?</b>	<b>By whom is it measured?</b>	<b>Basis for sanction?</b>
<b>Fuel consumption</b>	Fuel records showing consumption – per kilometre and per tonne Maintenance records on engine calibration Route rationalization	Vehicle log books Workshop vehicle records Zone inspection reports Route plans	Service zones Records from service provider	Monthly	MCDC	No
<b>Reliability</b>	Downtime of vehicles Number of accidents Worker strikes Absenteeism, illness and accidents of workers	Vehicle log books Workshop's vehicle records Medical records	Service zones Records from service provider	Monthly	MCDC	No
<b>Communication</b>	Notification of service problems Continuous radio accessibility Use of designated routes so vehicles can be located	Correspondence files Zone inspection reports Radio functioning between all trucks and central offices Adherence to route plans	Letters from Service provider	Monthly	MCDC	No
<b>Finance</b>	Payment of government property, income, VAT, and corporate taxes, etc., as required Regular payment of fair wages and benefits to workers	Financial records Reports of independent auditor	Records from service provider	Yearly	MCDC	Yes