D.2.4 Modified Standard Tender Form

[Modified Standard Tender form for waste collection service]

This document is not following prototype of tender document

Government of ******* District**

Date: ***Day / Month / Year***

Tender Documents for the Project on Waste Collection & Transportation

At

*Khoroo No. **, ********* District*

Tender selection/ Contract Name and Contract No.:********

Contents

Contents

Chapter 1. Instruction to Tenderers

A. General Provision

1 Scope of tender

1.1 The client indicated in the Chapter 2 is inviting proposals to implement the works described in the DTTS, technical specifications and the Chapter 6. The best proposal among all the submitted will be evaluated and selected based on the tender document and the contract with the name and number indicated in the Chapter 2(Data Table of Tender Selection: herein after DTTS) and Chapter 6 will be signed with the tenderer who submitted this proposal (hereinafter to be referred to as "the selected tenderer").

1.2 The selected tenderer must complete the works in due time mentioned in the DTTS and the Special Conditions of Contract.

1.3 The works must be one package.

2 Financial sources

2.1 The client will finance the works mentioned above from the financial sources indicated in the DTTS.

3 Deception and bribery actions

3.1 The state official representing the client in the procurement, tenderers and contractors must comply with the high formalities or ethics when participating in procurement activities and contract implementation.

3.2 If there is any information about the officials participating in the procurement activities and the tenderers who have been involved in any of bribery, deception, behind-the-scenes agreement and intimidation, which were indicated in the Anti-bribery Law, the Law on Prohibition of Unfair Competition and the Criminal Law, it should be informed to the relevant officials or organizations properly.

4 Entitled tenderer

4.1 The tender invitation is open for any entitled tenderers. Tenderers or members of a consortium participating in the tender can be of any jurisdiction if foreign corporations are not strictly comply with the Article #9.3 of the Law on Procurement of Goods, Works and Service with the State and Local Fund.

4.2 Tenderers will be considered as unauthorized in the following cases (this also applies to every member of a consortium):

(a) If the tenderer's capacity of payment is not sufficient or it is being dismantled, negotiated with the financiers in order to avoid bankruptcy, operations have been stopped and being in the same conditions as indicated in the laws in the country of origin;

4.2.2 If the tenderer failed payments of fees and taxes indicated in the laws of Mongolia and country of origin;

4.2.3 If it is a state owned corporation or mixed property corporations that is dependent on the

client;

4.2.4 If the tenderer did not implement or violated the contract obligations seriously and any professional misses are identified by the court or authorized organizations when participated in procurement activities for the latest three years.

4.2.5 If the tenderer is in shared interests with those prepared drawings of goods, works and services, technical specifications and other documents or nominated for implementing contract monitoring or consulting services.

4.2.6 If authorized organizations identified the tenderer's proposal as it had contained obvious false information;

4.2.7 If the involvement of the tenderer in bribery, deception, behind-the-scenes agreement and intimidation, which were indicated in the Anti-bribery Law, the Law on Prohibition of Unfair Competition and the Criminal Law in last three years has been identified by the court;

4.2.8 If the tenderer (subcontractors also included) is in shared interest with those who prepared the project drawings, technical specifications and other documents or nominated as consultant for contract management;

4.2.9 If the legal representative of two or more tenderers participating in the tender is one corporation;

4.2.10 If the tenderer submitted more than one proposal unless submission of optional proposal is allowed in the Chapter 1.15 of this tender document (However, this indication does not restrict tenderers' participation in more than one proposals as a subcontractor and submission of proposals for more than one tender packages);

4.2.11 **If the tenderer is operated by a legal entity with whole or partial ownership by the procuring entity and non-profit organization.**

4.3 The tenderer is obliged to inform the client about the conditions indicated in the Chapter 1.4.2(a) to Chapter 1.4.2.11 in written statement. The tenderer also obliged to submit any relevant proofs or documents to the client based on the client's demands in order, for the client, to verify the conditions.

4.4 Whether tenderers are authorized or not will be identified based on the following information and proofs. These are:

(a) Place of registry, main types of operations, duplicated certificate of state registration that defines the tenderers' addresses or other equivalent documents issued by the state of origin;

(b) Letter of attorney for the representative who signed for the tenderer;

(c) If indicated in the DTTS, the special permission (license) to supply the defined goods;

(d) Decision made by the court and authorized organizations. If tenderers faced the circumstances indicated in the Chapter 1.4.2.2, Chapter 1.4.2.4, Chapter 1.4.2.6and Chapter 1.4.2.7 of the Instructions to Tenderers, they are obliged to inform the client about the circumstances and submit the relevant decisions made by the court and authorized organizations together with their proposals.

5 Tenderer's capacity for contract implementation

5.1 All tenderers must arrange and submit the necessary information for the "Tender Form",

"Capacity Information" and "Tender Security Form" as indicated in the Chapter 3, and methodologies and schedules being proposed for implementation of the works together with work drawings or schedules if necessary.

5.2 If the client did not organize pre-qualification or if it is not differently indicated in the DTTS, all tenderers are obliged to deliver the following information as evidences that are necessary for the client to identify their capacity of contract implementation based on the requirements by the client.

(a) Place of registry, main types of operations, duplicated certificate of state registration that defines the tenderers' addresses, a copy duplicated from relevant originals of licenses (as for works that requires license) and letter of attorney for the bodies representing the tenderer;

(b) An annual financial statement that reflects data indicated in the DTTS for identification of tenderers' financial capabilities. If it was indicated specifically in the DTTS, the statements must be certified by audit;

(c) Information about the experiences and capacities of main personals to be involved in contract implementation and management and technical staffs;

(d) Information about the tenderer's experience related to the implementation of similar works in terms of volume and work type must be presented by year, detailed information about current or planned works and addresses of customers who are able to inform about these works;

(e) Primary machineries and equipments proposed for implementation of the contract and their types and models;

(f) Evidence certifying the sufficiency in current assets for implementation of the contract (decided loan or other possible financial sources);

(g) Tenderers' official statements that allow the client to request their banks to supply bank references;

(h) Information about lawsuits or disputes in which the tenderer has been involved recently or involved in last three years;

(i) If it is not indicated specifically in the DTTS, tenderers who contracts out the works with amount of more than 10% of the total contract amount to subcontractors are considered as partnership; and thus, the information about the subcontractors must also submitted. Works to be contracted out must be reflected in the proposal. The maximum budget of works that can be contracted out to subcontractors will be indicated in the DTTS.

5.3 Tenderers must satisfy the following minimum capacity requirements in order to implement the contract indicated in the Chapter 1.1 of the Instructions to Tenderers. These are:

(a) The arithmetical average of annual budget of the works conducted by the tenderer throughout the period indicated in the DTTS must not be less than the amount indicated in the DTTS;

(b) Work experience as the main contractor for works (similar to the contract of concern) implemented in the last year of the period indicated in the DTTS (in order to meet this requirement, at least 70% of the nominal amount of the works must be implemented);

(c) Proposal to arrange or secure the availability of the primary machineries and equipments indicated in the DTTS in due time (own equipments or arranging by means of rental etc.

should be indicated);

5.4 As for a partnership participating in the tender, the indicators of each member of the partnership will be added in order to identify whether the minimum capacity indicators indicated in the Chapter 1.5.3(a) However, each member must satisfy at least 25% of minimum requirements of Chapter 1.5.3(a), Chapter 1.5.3(b) while the representing member must satisfy at least 40% of the same requirements. If these conditions are not met, the partnership will be considered as unsatisfactory and rejected from the tender. In order to identify satisfaction of the minimum capacity requirements of the Chapter 1.5.3(b), Chapter 1.5.3(c), ability of each member must be considered together.

5.5 When identifying tenderers' satisfaction of minimum capacity requirements, experiences and financial capabilities of their subcontractors will not be considered. However, if works undertaken by contractors require license, the subcontractor must possess the proper one.

6 Cost for participation in the tender

6.1 Tenderers will bear all costs related to preparation and submission of their proposals by themselves. The client will not be liable for any of these costs in any circumstances.

7 On-site survey

7.1 Tenderers are allowed to conduct on-site survey at the worksite and collect information about its location and conditions of the environment that is useful for preparation of their proposals and establishment of contract. The tenderers must bear all the costs related to the on-site survey.

B. Contents of the Tender Document

8 Contents of the tender document

8.1 The tender document will consist of following 7 chapters and amendments made in accordance with the Chapter 1.11 of Instruction to Tenderers.

Chapter 1.Instructions to Tenderers
Chapter 2.Data table for tender selection (DTTS)
Chapter 3.Tender Selection Forms (TSF)
Chapter 4.Technical Specification
Chapter 5.General Conditions of Contract (GCC)
Chapter 6.Special Conditions of Contract (SCC)
Chapter 7.Contract Forms

8.2 The tender invitation published by the client will not be a part of the tender document.

8.3 The client will not liable for any incorrect or missing information in the tender document and its amendments if tenderers do not receive these documents directly from the client.

8.4 Tenders are advised to check all the instructions, conditions, necessary forms and the technical specifications included in the tender documents. It may become a basis of proposal rejection if they do not contain information and materials required by the tender document.

9 Clarification of the tender document

9.1 If entities interested in the tender needs clarification about the tender document, they should send their written request of clarification to the address of the client indicated in the DTTS through mail, telex and fax. The client will respond to only requests received until the date indicated in the DTTS. The contents of requests and the clients' responses must be informed to all tenderers who purchased the tender document in writing or through telephone without mentioning the names of the requested tenderers simultaneously.

9.2 If the client considers amending the tender document based on the results of the clarifications, the amendment will be made in compliance with Chapter 1.11 and the Chapter 1.19.2 of the Instructions to Tenderers.

10 Meeting before the submission of proposals

10.1 If the DTTS requires organization of a meeting before the submission of proposals, entities interested in the tender and their representatives will be invited. The purpose of the meeting will be clarifications of problems which may arise during the preparation of proposals and responses to questions to be raised by the invitees.

10.2 Tenderers are allowed to deliver their questions in written statements before the organization of the meeting.

10.3 The records of the meeting containing these questions with the relevant answers without containing the information about the questioner and other relevant information prepared after the meeting will be delivered to all the entities that purchased the tender document in writing or through telephone simultaneously.

10.4 Necessary amendments in the tender document, which are decided by the client based on the results of the meeting, will be made in compliance with Chapter 1.11 and the Chapter 1.19.2 of the Instructions to Tenderers.

10.5 Restricting tenderers rights to participate in the tender based on their no attendance in the meeting is prohibited.

11 Amendments of the tender document

11.1 The client is allowed to amend the tender document before the deadline for proposal receipt.

11.2 The amendments will be inseparable part of the tender document and they must be informed to all tenderers who purchased the tender document in written statement or through telephone simultaneously. Tenderers are obliged to report the receipt of each amendment to the client through telephone.

11.3 The client is allowed to extend the deadline for proposal receipt in accordance with the Chapter 1.19.2 of the Instructions to Tenderers in order to provide tenderers with the opportunity to consider the amendments of the tender document when preparing their proposals, if necessary.

C. Preparation of Proposals

12 Language of Proposal

12.1 Proposal, official letters and other documents exchanged between the client and tenderers

related to the tender must be prepared in accordance with the Instructions to Tenderers. All relevant documents will be prepared in Mongolian language

13 Proposal Components

13.1 The proposal must consist of the following items:

(a) The proposal prepared in accordance with the form indicated in the Chapter 1.14 of the Instructions to Tenderers;

(b) The evaluated phased work schedule to be prepared in accordance with the Chapter 1.14 and Chapter 1.16 of the Instructions to Tenderers;

(c) Tender security required by the client and indicated in the the Instruction to Tenderers;

(d) Certified signatures of the representatives who signs proposals on behalf of tenderers and the letter of attorney as indicated in the Chapter 1.20 of the Instructions to Tenderers;

(e) Evidences indicated in the Chapter 1.4 of the Instructions to Tenderers necessary to identify the entitlement of the tenderer;

(f) Evidences indicated in the Chapter 1.5 of the Instructions to Tenderers necessary to identify the tenderer's capacities to implement the contract;

(g) Technical proposal to be prepared in compliance with the Chapter 1.18 of the Instructions to Tenderers;

(h) Optional proposal if the client indicates in the Article of the Instructions to Tenderers; and

(i) Other materials indicated in the Instructions to Tenderers and the DTTS.

14 Tender form

14.1 Tenderers must prepare and submit their proposal. Any modifications and omissions of words and meanings of the sentences written in the prototype forms are prohibited. Every cells of the form must be filled.

15 Optional proposal

15.1 In other cases that the optional proposal is allowed in the DTTS, tenderers must submit only one proposal that satisfies the requirements of the tender document and submission of optional proposal is not allowed.

16 Tender price and price discount

16.1 The tender price and the evaluated phased work schedule being proposed by the tenderer must meet the following requirements;

16.2 Tender price must be based on the phased work schedule evaluated by the tenderers themselves and cover the total cost of the contract works defined in the Chapter 1.1.1 in the Instructions to Tenderers;

16.3 When evaluating works defined in the technical specifications and relevant drawings, tenderers must set unit and total prices for each work classification specified briefly in the phased work schedule. If unit and total prices for any of the work classifications are not filled, the client will not make the payment for the implementation of the relevant jobs since this will

be considered as included in prices for other jobs;

16.4 The price filled in the tender form must be an undiscounted total price offered for the tender;

16.5 Tenderers must reflect an unconditional price discount and its calculation mythology in the proposal submission form;

16.6 All the taxes and fees to be paid by the contractor in accordance with this contract and other basis must be included in the tender price based on the laws to be valid as of the date 14 days before the deadline for proposal receipt. Tenderers must fill unit and total price for each work classification together with the grand total in the price form by each items specified in the phased work schedule;

16.7 Please refer to the Chapter 1.1.3 of the Instruction to Tenderers for information about the tender packages. If tender packages were indicated, a tenderer is allowed to submit proposals for more than one package. Submission of proposal for a part of one package is prohibited.

16.8 Tender price proposed by tenderers will be fixed throughout the implementation of the contract.

17 Currencies of Tender and Payment

17.1 The currency of tender shall be Mongolian Tg (TUGRUK). During the implementation of the contract, all payments by the client to the contractor will be made in Tg.

18 Components of Technical Proposal

18.1 Tenderers will prepare and submit the technical proposal consisting of implementation methods, equipments, labor force, work schedule and figure showing the compliance of the work performance and the implementation period with the client's requirements in accordance with the form indicated in the Chapter 3 of the tender document together with the other information.

19 Tender Validity Period

19.1 Tenders or proposals should be valid for the period specified by the client in the DTTS starting from the date of tender opening which was stated in the Chapter 1.25 of the Instructions to Tenderers. If the tender validity period proposed by tenderers in the tender form is shorter than that set by the client, their proposals are considered as unsatisfied the basic requirements and rejected by the client.

19.2 If the tender validity period was decided to extend due to an emergency, the client would request all the tenderers to extend the validity period to be proposed by them. The request and the reply about the extension of the tender validity period will be made in written statements or through telecommunications. Proposing tenderers who accept the request of extension to change the content of their proposals or permitting them to do so are prohibited.

20 Copies of Proposal to be Submitted and Signing the Contract

20.1 Tenderers must arrange the originals of the proposal components indicated in the Chapter 1.13 and specify it writing "Original" onto it. In addition to this, the tenderers must prepare necessary number of duplicate copies that was indicated in the DTTS and specify them writhing "Duplicate" onto them. If the original and duplicate copies contradict, the original will be followed.

20.2 The original and duplicate copies will be printed and certified by the signature of the person authorized to represent the tenderer.

20.3 Any corrections or additions must not be made in proposals if they are not for the purpose to adapt the client's instructions or correct errors based on necessities. If corrections and additions are made, they will be accepted as valid as long as the above-mentioned authorized representative certifies with his/her signature.

D. Submission of Proposal

21 Sealing and marking proposals

21.1 Tenderers must prepare their proposals in writing and deliver it to the client via mail, by himself or via his representative.

21.2 The original and duplicates of the proposals will be put into separate envelopes (inner) marked as "Original copy" and "Duplicate copy" respectively, sealed, put into outer envelopes and sealed again. Enveloping and sealing the proposal must be done in accordance with the Chapter 1.21.3 and Chapter 1.21.4 of the Instructions to Tenderers.

21.3 Requirements for the inner and outer envelopes are the following:

(a) Tenderer's name and address must be printed onto the envelop;

(b) Addressed to the client as indicated in the DTTS and the Chapter 1.1.1 of the Instructions to Tenderer;

(c) The name and the code of the tender selection defined in the DTTS and the Chapter 1.1.1 of the Instructions to Tenderer must be clearly written in order to distinguish the tender selection from the others;

(d) The note "Opening is prohibited until (date indicated in the Chapter 1.25.1 of the Instructions to Tenderers)" must be written.

21.4 If proposals are delivered to wrong address or opened before the tender opening due to the failure of requirements stated in the Chapter 1.21.3, the client will not be liable.

22 Deadline for proposal receipt

22.1 The client must receive proposals at the place of address specified in the Chapter 1.21.2 of the Instructions to Tenderers on the date before the time indicated in the DTTS.

22.2 If the client extended the deadline due to the amendments in the tender document made in accordance with the Chapter 1.11 of the Instructions to Tenderers, rights and obligations of the client and the tenderers will continue valid for the period of extension.

23 Proposals submitted after the deadline

23.1 The client must reject any proposals submitted after the deadline stated in the Chapter 1.22 announcing them and return them without opening.

24 Amendment and withdrawal of proposals

24.1 Tenderers are allowed to amend, replace and withdraw their proposals before the date of deadline set for the proposal receipt if they informed the client in written statement.

24.2 The written statement mentioned in Chapter 1.24.1 must be prepared in accordance with the Chapter 1.21 of the Instructions to Tenderers. After writing the purpose of the statement ("About amendment of the proposal", "About replacement of the proposal" and "About withdrawal of the proposal") on both inner and outer envelopes, it should be submitted to the client in accordance with the Chapter 1.22 of the Instructions to Tenderers. Statement of proposal withdrawal can be done by telephone; however, the written statement certified by

stamped signature must be submitted before the date of deadline set for the proposal receipt.

24.3 Amendments after the deadline for the proposal receipt are prohibited.

24.4 The initial proposal submitted by the tenderers who requested for proposal withdrawal will be returned back to the tenderers without opening in compliance with the Chapter 1.24.2 of the Instructions to Tenderers.

E. Tender Opening and Evaluation

25 Tender opening

25.1 The client organize tender opening at the place in due date and time indicated in the DTTS. Tenderers' representatives are authorized to attend the tender opening; and if do so, the representative are obliged to sign the tender opening form.

25.2 First, the client must open the envelope marked as "about the withdrawal of the proposal", announce the withdrawal requests and return the relevant proposals without opening. If the person signed the request of withdrawal did not supply certified signatures and a letter of attorney that are necessary to identify him or her as the authorized representative for the tenderer, proposal return is prohibited. The client should open and announce the proposal. Next, the client must open the envelope marked as "about the replacement of the proposal", announce the requests and return the submitted initial proposals back to the tenderers who made the requests without opening. The envelope marked as "About amendments of proposal" together with the relevant proposals are opened and announced. If tenderers do not confirm the signatures on the requests of proposal replacement or proposal amendments as those signed by their authorized representatives by relevant statements, replacements or amendments of the proposals are prohibited. The submitted initial proposals will be opened and announced to attendants.

25.3 During tender opening, name of tenderers, tender price, price discount (if proposed), price of optional tender/proposal (if permitted), updated information relevant to those mentioned above if the proposal was amended and other information considered necessary by the client must be announced and recorded. Tender prices, price discounts and optional tenders shall not be considered in tender evaluation.

25.4 The client shall prepare the tender opening record and the following information must be included in the record:

(a) Name of tenderers, the information whether withdrawal, amendment and replacement of proposal are made by the tenderers;

(b) Tender price and proposed price discount (price of optional tender if permitted). If necessary, this information must be recorded by each tender package; and

25.5 Rejection of proposals other than those submitted after the deadline is prohibited.

26 Confidence

26.1 Leaking information related to examination, clarification, evaluation and comparison of proposals and the recommendation on grant of contract rights to tenderers and other parties irrelevant to the tender selection activities is prohibited until the contract rights is awarded.

26.2 Any attempts by tenderers to influence the decision about the grant of contract rights during examination, evaluation and comparison of proposals can be considered as a basis to reject the

proposal of these tenderers.

26.3 The client and the tenderers must communicate to each other only in writing throughout the period from tender opening to granting contract rights.

27 Proposal Clarification

27.1 The client is allowed to request the tenderers to submit clarification about their proposal during the examination, evaluation and comparison of proposals. This request and the reply must be made in writing. However, any requests or recommendations for changes in the content of the proposal and the tender price other than those related to the correction of arithmetical errors identified by the client are not allowed.

28 Proposal examination and identification of requirement satisfaction

28.1 Before the conduct of thorough examination in proposals, the state of satisfaction of the following requirements must be verified:

(a) Tenderer's qualifications indicated in the Chapter 1.4 of the Instructions to Tenderers;

(b) Presence of confirmation signatures on the proposal;

(c) Presence of required security prepared in due form;

(d) Satisfaction of other requirements indicated in the tender document;

(e) Tenderer's satisfaction of acceptable lowest capacity set for the implementation of the contract that indicated in the Article #4 of the Instructions to Tenderer; and

(f) Satisfaction of other requirements necessary for implementation of the works

28.2 If a proposal satisfies the requirements of the indications in the Chapter 1.19.1 of the Instruction to Tenderers, the proposal will be considered as satisfied.

28.3 A satisfied proposal is the one that met the conditions and requirements of the tender document, especially those related to the tenderer's capacities for production and contract implementation and technical specifications, and the proposal that satisfied the volume of work without tangible difference. The following are considered as tangible differences:

(a) Scope and quality of the work defined in the technical specifications and contract conditions and performance might be affected;

(b) Restrictions noncompliant to the tender document made in the rights of the client and the obligations of the tenderers; and

(c) Acceptance and correction of proposals with difference than the requirements of the tender documents might affect the competence of other satisfied proposals.

28.4 The client must reject the proposal identified as non-satisfied. Tenderers are not allowed to revise these proposals in order to make them satisfied.

29 Correction of errors

29.1 The client shall check the arithmetical errors in the satisfied proposals and correct errors in the following manner:

(a) If amounts of a same item expressed in digits and letters differ, that expressed in letters will

be considered as correct;

(b) The addition of total prices of assortments differs from the total tender price indicated in the tender form, the total tender price will be corrected based on the addition of the total prices of assortments;

(c) If a total price of an assortment do not match the result of multiplying its unit price by the quantity, the total price of the assortment will be corrected based on its unit price. However, as client considers, dots in unit prices are obviously mistaken, the total price in that row will be considered as correct and the unit price will be corrected.

29.2 If the price of the best evaluated proposal needs corrections, the client shall inform the tenderer and confirm the tenderer's acceptance with a written statement.

30 Evaluation and comparison of proposals

30.1 The client must evaluate and compare only proposals that were identified as satisfied after examining them in accordance with the Chapter 1.28.

30.2 The client is authorized to accept or reject any amendments, imparities and optional proposal. When evaluating proposals, the client shall not consider a state of over satisfaction of the requirements of the tender document or amendments, imparities and optional proposals that offer any merits other than those indicated in the requirements of the tender document.

30.3 The client will not consider the following factors in evaluation

(a) Contract and commercial imparities:

(b) Costs of every item omitted or proposed differently from the commercial terms and contract conditions will be estimated and considered in the evaluation.

(c) Implementation period of the works:

The works of this tender document must be implemented in accordance with the work implementation schedule defined in the technical specifications and completed within the period specified. The tender price must be based on this schedule. A proposal offering completion earlier than the date specified in the schedule will not be awarded.

30.4 The proposal with the lowest comparable price will be selected for the best evaluated proposal after evaluating all satisfied proposals in accordance with the Chapter 1.30.2 of the Instructions to Tenderers. The optional proposal of the best evaluated main proposal satisfied the higher requirements than the main proposal its optional proposal will be selected.

F. Granting Contract Rights

31 Requirements for Granting Contract Rights

31.1 The client shall grant the contract rights to the tenderer whose proposal was evaluated as the best evaluated proposal in accordance with the Chapter 1.30.4.

31.2 If the tenderer did not accept arithmetical corrections made by the client in accordance with the indications of the Chapter 1.29 of the Instruction to Tenderers or failed to submit the written statement, the client shall reject his proposal and grant the contract rights to the tenderer who submitted the next best evaluated proposal in compliance with the Article #29.3 of the Law on Procurement of Goods, Works and Services with the State and Local Fund.

32 Statement of Contract Rights Grant

32.1 The client should deliver a written statement of contract rights grant to all the tenderers including the selected tenderer simultaneously before the end of the tender validity period. In the statement, the contract price or the payment for the works to be implemented in accordance with the contract must be indicated. The contract price must be the tender price that reflects the adjustments and the price discounts (also conditional price discounts).

32.2 Signing the contract within 5 weekdays after the delivery of the written statement to all the tenderers is prohibited. Violating this Article will be the basis to consider the established contract as invalid according to the Article #42.1.2 of the Law on Procurement of Goods, Works and Service with State and Local Fund.

32.3 The statements of contract rights grant will the basis to establish the contract. By delivering the statement, it is considered that a deal was made between the client and the tenderers granted with the contract rights until the receipt of the performance security and signing the contracts (as indicated in the Chapter 1.33).

32.4 The client must publish the tender name and the No. of package onto the website www.e-procurement.mn , the official procurement site for the Government of Mongolia, together with the following information:

(a) Names of all tenderers who submitted proposals;

(b) Tender prices announced at the time of tender opening;

(c) Name of the proposals covered by the thorough evaluation;

(d) Name of the tenderers whose proposals were rejected and the reasons for the rejections;

(e) Name of the selected tenderer, offered price and approved contract amount (translator: price?)

32.5 After the delivery of the statement of contract rights grant, unselected tenderers are authorized to submit letter of request for the reasons for the rejections of their proposals. If this kind of requests is made, the client must respond to it in a written statement.

33 Signing Contract

33.1 The client will send the contract form and an agreement reflecting all the negotiated conditions together with the statement of contract rights grant to the selected tenderer.

33.2 The selected tenderer should sign the contract immediately

Chapter 2. Data table for tender selection (DTTS)

The purpose of the following data on the works defined in the tender document is to clarify or modify the relevant provisions and Articles of the Instructions to Tenderers. If the data contradict those in the Instructions to Tenderers, the data in the DTTS will be considered as correct.

Relevant Articles of the Instructions to Tenderers (IT)	Contents
A. General Provision	
Chapter 1.1.1	The client: *Governor of ****** District, Ulaanbaatar City* Address ******, ****** *District, Ulaanbaatar City*
Chapter 1.1.1	The brief name and determination of the works or the contract: *The Project on Waste Collection and Transportation at Khoroo No. **, in ******* District*
Chapter 1.1.1	The name of the open tender and the distinctive No.: *********
Chapter 1.1.2	Implementation period of the works: *[Specify the date From **** to ****]*
Chapter 1.1.3	The tender selection consists of the packages with the following names and No(s): *There is no separated package.*
Chapter 1.2.1	Financial sources: *Government of *********District*
Chapter 1.4.4(c)	Indication of necessities of special permission (license) in order to implement the specified works: *No license and special permission are required.*
Chapter 1.5.2	Tenderers must submit the following additional evidences or materials necessary to identify the tenderers' capacities for contract implementation together with their proposals: *Waste collection equipments list together with manufacture year, current operational condition.*
Chapter 1.5.2(b)	Years for financial statements necessary to submit: *3years from year **** to year ***** Necessity of audited financial statements: *Necessary*
Chapter 1.5.2(d)	No. of years for the information to be submitted for identification of similar works experience: *5years from year**** to year *****
Chapter 1.5.2(h)	Tenderers are authorized to contract *10* percent of the contract price out to subcontractors. If more than the specified percent is implemented by a third party, the tenderers must establish a consortium and submit the relevant partnership contract together with their proposals. The other requirements of the Instructions to Tenderers must be met.
Chapter 1.5.3(a)	The No. of years, the total annual monetary values of *waste collection and transport* works implemented during which must be averaged: *Last 2 years* The average of the total annual monetary values of *waste collection and transport* works performance is not less than *50% of the total annual payment to be made by the client as financing of the contract*

Chapter 2 Data table for tender selection (DTTS)

Relevant Articles of the Instructions to Tenderers (IT)	Contents
Chapter 1.5.3(b)	The No. of years, during which similar works were implemented: *Last 2 years*
Chapter 1.5.3(c)	Main equipments and machineries necessary for tenderers to implement the contract: *(Example)* *At least one unit of Dump track (capacity range from 6m3 to10m3)* *At least one unit of Compactor track (capacity range from 4m3 to 15m3)*
B. Tender Document	
Chapter 1.9.1	The address to which the tenderers refer for clarification related to the tender document: *Person in charge: Mr/Ms. ********* *Address: *****, ******** District office, Ulaanbaatar City* *Telephone no: ********** The deadline for receiving requests of clarification should be *Month day, year*
Chapter 1.10.1	Organization of the meeting before submission of proposal: *No*
C. Preparation of Proposal	
Chapter 1.15.1	Submission of optional proposals is *allowed*.
Chapter 1.19.1	The tender validity period will be *60 days* since the tender opening.
Chapter 1.20.1	Number of duplicate copies to be submitted together with the original copy of the proposal: *2 copies*
D. Submission of Proposals	
Chapter 1.21.3(b)	The address for receipt of proposals: Person in charge of the receipt: *Mr./Ms. ******** Address of the organization: *Khoroo **, ****** District (Governmental office of ******* District)* No. of the floor and the room: *Room**, ****Floor* City and aimag: ******* District, Ulaanbaatar City* Zip or postal code: ******** Country: *Mongolia*
Chapter 1.21.3(c)	The following titles and No. of tender selection must be written on both of the inner and outer envelopes for smooth identification: [specify the name of the tender selection and the identification No. to be written on the envelopes].
Chapter 1.22.1	The deadline for proposal receipt: Date: [specify the day, month and year. (For example: 8 Nov 2011)] Time: [specify the hour and minute. (For example: 15:30 etc)]
E. Opening and Evaluation of Proposals	

Relevant Articles of the Instructions to Tenderers (IT)	Contents
Chapter 1.25.1	The address of the place where tender opening (proposal opening) will be conducted are the following: Name of the building and the street: *Governmental office of ********* District* No. of the room and the floor: *Room **, ** Floor* City/Aimag: ******** District, Ulaanbaatar City* Zip code: ******** Country: *Mongolia* The date and time of the tender opening: *(Example) Date: 20th day of the February、 2012* *Time: 10:00 am (Mongolian standard time)*

Chapter 3. Tender Selection Forms (TSF)

【Note for filling the tender selection forms】

Tenderers must fill these forms and submit them together with their proposals. If proposal includes several types of currencies, detailed information about prices must be indicated.

1 Form #TSF-1

Tender Form

[Date]

To: Mr./Ms/Mrs. , director, ***(name of the client organization)***

1. We, ***[the name of the tenderer]***, are proposing to implement the ***[name and the No. Of the contract]*** for ***[tender price in numerals and letters]*** Tg in accordance with tender document.

2. This proposal will be valid for ***[numerals]*** days since the deadline for the proposal receipt; and therefore, you can select this proposal before the end of the period.

3. If this proposal is selected, the statement of the contract rights grant will be the deal made between us until the official establishment of the contract.

Name of the tenderer: _____

Stamp and signature of the authorized official:_____

Name and position: _____

Address:_____

2 Form #TSF-2

Capacity Information

Note for filling the capacity information form

In order to prove the possession of sufficient capacity for implementation of the contract or clarify the changes in the information submitted for pre-qualification, tenderers must submit the following information in accordance with the Article #4 of the Instructions to Tenderers. This information will not be a part of the contract. Additional sheets can be used if necessary.
If documents attached to the form are in languages other than that of the proposal, the documents must be translated. If the tenderer participated in the pre-qualification, the information to be filled by it must be only the changed information.

1. Tenderer or each member of a consortium

1.1. Tenderer's certificate of legal entity and the special permission (license): ***[Attach the copy]***

Place of registry: ***[fill]***

Official address of business activities: ***[fill]***

Letter of attorney for the person representing the tenderer: ***[attach]***

1.2. Total monetary value of construction works implemented for [numeral][1] years, list by years: ***[fill]***

1.3 The works similar with the contract in terms of work types and contract prices implemented for last ***[numerals[2]]*** years as the main contractor and the total contract prices expressed in the currency specified in the #1.2 must be filled in the table below. Further, expected and ongoing works and their planned date of completion should be listed.

Name of the project and country	Name and contact number of the client or customer	Types of works and year of completion	Contract price
a)			
b)			

1.4. Information related to the types or models of main equipments and machineries necessary for the implementation of the contract must be filled in the following table. Please refer to the Article #4.3 (d) of the Instruction to Tenderers.

Types/Models of equipments	Determination, produced country, years of utilization	Current condition (new, good, old) and the number of equipments	Own, to be rented, to be purchased (from where?)
a)			
b)			

[1] *The numeral must be the same with that indicated in the provision #4 of the Instructions to Tenderers.*
[2] *The numeral must be the same with that indicated in the provision #4 of the Instructions to Tenderers.*

1.5. Skills and experiences of managers and specialists. Biographies must be attached. Please consider the Article #5.3 of the Instructions to Tenderers and the Article #9.1 of the special conditions of the contract.

Position	Name	Years of employment	Years of experience at the post similar to that being recommended
a)			
b)			

1.6. Recommended subcontractor. Please consider the Article #7 of the special conditions of the contract.

Types of works to be contracted out	Price of subcontract	Subcontractor (name and address)	Experience of similar works	State of settlement
a)				
b)				

1.7. The audited financial statements and reports of analysis that covered losses, profits and financial activities prepared for ***[numeral[3]]*** years. List the documents and attach the copies.

1.8. Evidences that can be useful in identifying the degree of satisfaction of the financial capacity requirements such as those related to cash and loan. List the evidences and attach the copies.

1.9. Name, address, contact number, telex and fax of the customer bank of the tenderer.

1.10. ***[Numerals[4]]*** years' information of tenderer related to lawsuits, parties of dispute, amount of claims and state of settlement.

Opposing parties	Name	Amount of claims	State of settlement
a)			
b)			

1.11. Statement of authority, but not relevant to the Article #4.2 of the Instructions to Tenderers.

1.12. Proposing work program (implementation methodology and work schedule). Definition and design drawings if necessary.

2. Consortium

2.1. All the information indicated in the #1.1 to 1.11 of the capacity information form must be filled by each member.

2.2. Information indicated in the #1.12 of the capacity information form must be prepared for the consortium.

2.3. Letter of attorney for the person who represent the consortium and sing on behalf of the consortium must be attached.

[3] *The numeral must be the same with that indicated in the provision #4 of the Instructions to Tenderers.*
[4] *The numeral must be the same with that indicated in the Article #4.3 (k) of the Instructions to Tenderers.*

2.4. Partnership contract that satisfies the following requirements and established among the members must be attached. The requirements are:

(a) The contract should specify the individual and joint liabilities of the members clearly in relation to the implementation of the contract;

(b) The contract must appoint the authorized person to undertake responsibilities and receive instructions on behalf of the other members, and to represent the consortium;

(в) The performance of the whole works will represented by the authorized person. And at the same time, the payment will be made only to him/her.

3 Form #TSF-4

Statement of Grants of Contract Rights

(Must be prepared on the client's official printed form of letter)

[Date]

To: Mr./Ms./Mrs. _____ director, [name of the contractor]

Subject: Grant of the Contract Rights

I am here informing you that our organization has accepted your proposal submitted on ***[date]*** for ***[name and No. of contract and tender selection indicated in the special conditions of the contract]*** with the tender price ***[contract price in numerals and letters]*** after it was corrected and adjusted[5] in accordance with the indications of the Instructions to Tenderers.

Please sign the contract form and deliver it within ***[numeral[6]]*** days after receiving this statement. ,

Failure of delivering performance security within 21 days since the receipt of this statement will be a basis to invalidate the contract rights.

The contract form and the conditions have been attached.

Name of the client organizations:_____

Stamped signature of authorized official:_____

Position and name: _____

Address:_____

[5] *If it is unnecessary, the terms "correction" and "adjustment" will be deleted. Please see the "Note for the prototype contract form" on the next page.*

[6] *It must be the same with the numeral indicated in the #33.2 of the Instructions to Tenderers.*

Chapter 4. Technical Specifications

1 Basic services

1.1 During the term of the Project, the Contractor shall collect, remove, transport, and dispose of all non-hazardous Solid Waste as defined herein and shall be solely responsible to furnish all Staff and Equipment, in a manner consistent with the Contract and considered good professional practice, and to the satisfaction of Client.

1.2 The Contractor shall collect and haul to the designated disposal site, within the operational hours of that facility, Solid Waste originating from all residential properties.

1.3 The Contractor shall make waste collection agreement with all business entities that are discharging non-hazardous waste within the collection area. In the event, the business entities are not agree to make an agreement with contractor, the contractor shall report to the Client to fined any solutions.

1.4 The contractor shall be responsible to clear illegal dumping which made by non-hazardous waste within the collection area.

1.5 The Contractor shall not be required by Client or any Generator to collect Hazardous Waste. Any discharge of Hazardous Waste shall be reported to Client within two hours, and it shall be the responsibility of Client and/or the Generator to promptly resolve safe management of the Hazardous Waste.

2 Commissioning period

2.1 The Commissioning Period comprises the one week prior to the Commencement Date. During the Commissioning Period the Contractor shall notify Generators about the details of the new Services to be provided under this Project.

2.2 The Contractor shall instruct Generators about waste placement and disposal requirements. The Contractor shall also advise the Generators about the mechanisms to address incomplete performance by the Contractor or other complaints.

2.3 During the Commissioning Period, the Contractor shall fully prepare for the performance of Services, and shall obtain any additional vehicles and equipment required to train the Contractor's Staff, and shall secure any other facilities as it may require.

3 Generator education and compliance

3.1 The Contractor shall, with the assistance of Client, educate the Generators about the Service and shall provide and distribute information about the rights and responsibilities of the Generators. The Contractor shall during the Commissioning Period prepare such information and submit same to Client for approval, which approval shall not be unreasonably delayed or withheld.

3.2 It is the Contractor's responsibility to instruct Generators to place Bags, Bundled Waste, Household Bins and Waste Containers at curbside or as close as practicable to collection vehicle routes by a specified time on the designated days of collection service.

3.3 After the Commissioning Period, the Contractor's Staff shall record and report to the Contractor's representative the time and location of any unauthorized, illegal, or clandestine dumping of Solid Waste that they observe. These reports shall be sent to Client the following

working day. It is the Contractor's responsibility to remove all unauthorized, illegal or clandestine dumps of Solid Waste within the Location.

4 Hours of service

4.1 The contractor shall collect the discharged waste following the time table below.

4.2 In the event of absent of collection and transportation works, the contractor shall appoint alternative contractor to carry out the Service. The cost incurred from alternative appointment shall be bear by the contractor.

5 Waste collection frequency

5.1 The contractor shall collect the discharged waste 6 days per week. The contractor shall collect the discharged waste completely at the time of collection table is shown in attachment (Table 4-5).

5.2 The waste collection day is fixed on Monday to Saturday.

6 Holidays

6.1 If a public holiday occurs or falls on collection days, the collection ordinarily made on that day by the Contractor may be made by the Contractor on the proceeding day or the next succeeding day. The Contractor will determine whether to observe holidays as non-collection days, and shall notify Client of said determination as soon as practicable. The observance of a holiday in no way relieves the Contractor of its obligation to provide collection service specified within this contract.

6.2 The contractor shall obtain approval from client for No collection service during special holiday such as Naadam and Tsagaan sar.

7 Locations and services

7.1 The Location of the Service to be provided under this Project is defined in attachment (Figure 4-1). The Contractor shall be fully responsible for the removal of all non-hazardous Solid Waste within the Location.

7.2 The Contractor shall provide a complete Solid Waste collection service throughout the Location and will be responsible for providing appropriate Equipment to cater for varying conditions, including road, topographical and settlement, within the Location.

7.3 The Services will comprise, but not be limited to Bags, Bundled Waste and waste storage facilities including: Public litter bins, Waste Bins, Household Bins, Waste Containers and Community Containers.

7.4 All waste storage facilities shall be carefully handled by the Contractor's Staff and shall be thoroughly emptied and left at their original point, standing upright, with any cover in place.

7.5 Estimated waste discharged amount is shown in attachment (Table 4-5).

8 Indiscriminate dump site

8.1 The Contractor shall notify Client in writing within 24 hours of the occurrence of an indiscriminate dump site in their Location.

8.2 The Contractor shall, having first sought the approval of the Authorized officer, erect anti litter signs at problematic areas with the Location.

9 Claims from Generator

9.1 In the event, the client receives a claim from Generator who lived in the Location. The contractor shall survey the contents of claim and its report to the client without any delay. If the reason of the claim is arising from the Contractor's Services, the Contractor shall solve the claim by his own expenses.

10 Vehicles

10.1 The Contractor's vehicles and equipment used for performing Services shall be adequate to perform the Services required by the Project as may reasonably be determined by Client from time to time.

10.2 For the collection of non-hazardous Solid Waste specialized collection vehicles shall be used. These fully contain the waste, eliminating potential nuisances such as odors, windblown litter and uncontrolled leachate discharge.

10.3 The Contractor shall paint all vehicles used for the routine collection of non-hazardous Solid Waste in the same color as the uniforms provided to the workers. The Contractor's name, telephone number, and vehicle number shall be visibly displayed on all collection vehicles in letters and figures not less than fifteen (15) cm high.

10.4 As vehicles and equipment become fully depreciated or reach the end of their useful life, the Contractor shall immediately purchase, rent, or lease vehicles and equipment to satisfy such requirements or replace such retired vehicles and equipment.

10.5 The Contractor shall ensure that all vehicles are registered and operate in compliance with all applicable laws and regulations.

10.6 The Contractor shall keep all vehicles and equipment used for performing Services in good repair, appearance and sanitary condition. All vehicles shall be washed and thoroughly disinfected every day.

10.7 All lights, horns, warning devices, mufflers, fuel tanks and emission controls on said vehicles and equipment shall be kept operable at all times, with an average fleet downtime of no more than twenty five percent. A sufficient supply of spare parts shall be kept on hand to ensure the timely and continuous fulfillment of this Project.

10.8 When vehicles are down for maintenance or repair, it shall be the Contractor's obligation to provide a replacement vehicle from the spares in its fleet or a comparable replacement through rental or leasing arrangements.

10.9 All vehicles and equipment shall be operated by qualified and licensed operators.

10.10 All vehicles shall be sufficiently secure so as to prevent any spilling or littering of Solid Waste. No vehicles shall be willfully overloaded.

10.11 All vehicles shall maintain a log of time and movement, including: departure time from the parking area at the start of work, arrival time at and departure time from the officially designated discharge location, and arrival time at the parking area at the end of work.

10.12 Vehicles which have their loads weighed or measured shall have this data included in their logs. Downtime and the nature of any break down and repair activities shall also be recorded.

Data from the vehicle logs shall be collated and presented in a monthly report of service delivery from the Contractor to Client. In addition, Client shall have access to the vehicle logs upon demand.

11 Vehicles routes and logs

11.1 The Contractor shall provide Client with the planned and scheduled route for each vehicle, so as to facilitate monitoring of performance of all work to be conducted under this Project.

11.2 All employees of the Contractor shall perform their duties in accordance with the planned and scheduled routes assigned to them. Whenever routes are changed by the Contractor, the Contractor shall provide Client with the new routes, and a justification for the changes, within one day of the changes. The Contractor shall make all driver's logs and records available for inspection on a daily basis, and whenever requested by Client. Generators who will be affected by the change must be notified at least one day prior to such change being effected.

12 Waste disposal

12.1 The Contractor shall transport the collected Solid Waste to Naragiin Enger Disposal Site located in Songinokhilkhan District, Ulaanbaatar City.

12.2 The Contractor shall at all times properly discharge solid wastes only to officially designated disposal facilities during their official hours of operation. No dumping of Solid Waste shall be made to drains, sewers, open lands, quarries, rivers, channels, swamps, or other locations not officially designated. The Contractor shall at all times supervise its workers and inspect their activities to ensure that unauthorized dumping does not occur.

12.3 The Contractor shall transport and discharge collected waste to NEDS.

12.4 The Contractor repeat the illegal dumping may result in the termination of the Contract, revocation of the license, and other punitive action prescribed by law.

12.5 The assigned disposal site may be closed and a new disposal site developed during the period covered by this Project. If the contractor is required to transport waste a further distance exceeding 10 km as a result, Client shall modify the Contract Price to compensate the Contractor for additional transit distance/time.

13 Tipping fees

13.1 At the commencement of the Project there will be no Tipping Fees at the NEDS. However, when new engineered sanitary landfill sites are constructed Contractors may be responsible for the payment of all Tipping Fees levied. The Contract Price shall be renegotiated at an appropriate time to reflect this potential additional expense to the Contractor.

14 Service additions and deletions

14.1 The Service shall be extended to all new or additional Generators, units and streets in the Location immediately upon request by Client or by the Generator. The Contractor shall provide this extension within the Contract Price. Any Variation to the Services will be taken into account on each anniversary of the Commencement Date (the Review Date) when the Contract Price is reviewed, and such increase or reduction shall take effect in respect of the twelve month period commencing on the relevant Review Date.

15 Regulatory framework

15.1 The Client shall implement the Regulatory Framework. The Client shall inspect Generators for compliance with regulations regarding use of proper receptacles for Solid Waste storage, collection, disposal, littering, unauthorized dumping and management of Hazardous Wastes.

16 Uniforms

16.1 The Contractor shall provide readily recognizable, brightly colored, shirts (or vests) and pants of a single design and color to all its workers, to be worn at all times when performing Services under this Contract, so that they can be readily observed and their performance can be readily monitored. Uniforms shall be kept clean and in good condition and replenished as they become worn or damaged, and on at least a semi-annual basis.

17 Protective equipment

17.1 The Contractor shall provide protective shoes and gloves to all workers, for use at all times during performance of services under this Project.

17.2 Protective equipment shall be kept clean and in good condition, and replaced by the Contractor as it becomes worn or damaged, and at least on a semi-annual basis.

17.3 The Contractor shall be responsible for providing regular medical check-ups for its Staff, on at least a semi-annual basis, and for providing a program of suitable inoculations, having first obtained medical advice from a medical practitioner.

18 Liability & Indemnity

18.1 The Contractor shall hold harmless, defend and indemnify the Client of the local government, and any Generator from claim or damage arising from the actual or alleged negligence of the Contractor in the performance of the Services and from any willful, or criminal acts allegedly occurring during the Services, including the time when the Contractor vehicles are in transit.

18.2 The Contractor shall carry full comprehensive (all risk) vehicle insurance and general liability insurance coverage with insurance companies reasonably acceptable to the Client throughout the term of this Contract and throughout any extension or renewal thereof, providing for replacement value in the case of theft or damage, and liability in the case of accident.

18.3 Prior to the Commencement date under this Contract, certificates of insurance or verified copies of all insurance policies shall be provided to the Client, together with a certificate of the insurer that the policy or policies are in full force and effect and that same will not be altered, amended or terminated without thirty (30) days written notice having been given to the Client. If the levels of coverage and policy conditions outlined in the insurance policies do not meet the requirements of the Client, the Contractor will be required to obtain additional coverage prior to the start of work. All insurance policies shall be renewed at least fifteen days before expiry. The Contractor shall furnish the Client with adequate evidence that the Contractor has obtained and is maintaining in force Worker Compensation and Employee's Liability insurance to cover immediate expenses and long-term costs, including loss of income, related to injury and disability obtained during and from work operations.

18.4 The proceeds of such insurance, upon payment after any loss, shall be used in a manner prescribed by the Client. If the proceeds of such insurance, upon payment after any loss, are not adequate to compensate for the loss, the Contractor shall be responsible to make full compensation.

18.5 The Contractor shall, upon demand of the Client, at the Contractor's sole cost and expense, defend and provide attorneys to defend the Client, Client's office Officer, and Client's office staff, against any and all claims, actions or suits brought against them, arising or resulting from or in any way connected with the above-mentioned operations, defaults, negligence, or performance failures.

19 Performance Monitoring

19.1 The Contractor shall allow the Client, including the designated officer and the Client's staff to have access at all times to inspect the work being conducted under this Contract, to inspect all records and documents maintained by Contractor regarding work performed under this Contract, and to inspect the Garage, including spare parts inventories, stores, and workshop repair facilities.

19.2 The Client has responsibility for monitoring and controlling the Services conducted under this Project. The Client may assign this responsibility to the Client's staff including health inspectors and police working with other departments of government, and/or may separately contract with a private Contractor called the monitor for monitoring services.

19.3 All work conducted under this Project shall be subject to performance monitoring by the Client and/or the Client's officially designated independent monitor. The Contractor shall cooperate fully with the efforts of the Client and the monitor to monitor and control the Services.

19.4 The Contractor shall establish and operate a complaint and public liaison office within its assigned zone of service. The Contractor shall also establish and operate a telephone line with a full time answering service or machine at the said office for receipt of complaints and public comments. Said office shall have at least one responsible person in charge and present during collection hours and shall be open during all collection hours.

19.5 A complete log of all communications is to be maintained, including a record of actions to follow-up on any complaints or comments. The Contractor shall make the log and record available for inspection whenever requested by the Client and/or its monitor. The Contractor shall respond to all complaints regarding the Services provided under this Contract in a courteous and prompt manner within .10 days.

20 Financial Penalties

20.1 For the purpose of assessing whether financial penalties are recoverable by the Client from the Contractor the following method shall be applied;

Each Notice issued shall correspond to the following default points;

Rectification Notice	:	-1 point
Default Notice	:	-2 points
Supplementary Default Notice	:	-3 points

20.2 Definition of Notice

(a) At any time after the commencement date of the contract the Client may investigate each case where the Contractor has failed to properly perform the Services in accordance with the provisions of the Contract. Where the Client is satisfied that in any particular case the Contractor has failed to perform the Services completely in accordance with the provisions of the Contract, the Client shall be entitled to issue to the Contractor a notice instructing the Contractor to remedy the failure within a reasonable period of time (Rectification Notice).

(b) In addition, where the Service which has not been performed in accordance with the

Contract is, of such a type and/or provided at such a frequency that the issuing of a Rectification Notice would be inappropriate and of no effect, the Client shall be entitled to issue a Default Notice.

(c) If the Contractor fails to remedy the Services deficiency which is the subject of a Rectification Notice, the Client shall be entitled to issue a Default Notice. Further failure on the part of the Contractor to remedy the Service deficiency may result in the issuing of Supplementary Default Notice. Each Default and Supplementary Default Notice will require the Contractor to remedy the Service deficiency within a set or defined period.

(d) Without prejudice to the generality of the foregoing, the following matters shall be included in the types of Services deficiencies for which notices may be issued.

- Failure to properly collect, in compliance with the schedule, any solid waste within the location
- Failure to clear spillages within the location
- Unsafe Working Practices
- Misuse of Vehicles and Equipment
- Overloading of Vehicles
- Failure to make returns and reports

(e) All Notices shall be recorded and used by the Client in determining the Contractor's overall Services performance and shall also be used in determining Financial Penalties and whether the Client may terminate the Contract.

20.3 In the event of incidents of the Contractor's failure to properly perform the Services the Contractor shall be liable to Client for the costs incurred thereby to be calculated as set out below;

Default Points in any month	Deduction from monthly installment
0-20	1.0%
21-40	2.0%
41-60	5.0%

21 Termination

This clause shall be refer to Chapter 5.33 and Chapter 5.34

22 Methodology Statement

22.1 The Contractor shall provide a methodology statement which should broadly explain their overall approach to the Project.

22.2 The Contractor shall complete the attached Table 4-1 which details specific information relating to collection methodology and frequency within specific communities.

22.3 The Contractor shall also detail, on the appropriate maps provided, their approximate daily collection routes. Separate maps may be submitted for each collection day or alternatively color coded daily routes can be placed on a single map as long as the information is clearly legible.

23 Submission of optional proposals

23.1 If the submission of optional proposal is allowed in Chapter 2 Data table for tender selection

(DTTS). The Contractor shall be required to submit Tender price for Original and Optional proposal and shall be required following documents for Optional proposal.

- Collection route and point Map which covered with collection area.
- Frequency and Time table of the waste collection

24 List of Equipment and Personal

24.1 The Contractor shall be filled up provided form Table 4-2, Table 4-3 and Table 4-4 for their equipment details and personals which will be involved for this project.

Table 4-1: Waste Collection Methodology

Location	Waste Collection		Waste Storage		Vehicle and Staff Specification	
Name	Number of Households	Type of Service (Curb side collection or Community containers	Frequency of Services (Specify which days per week)	Type of waste Storage facility(s) (Plastic bags/community container/ Household bin etc) to be provided by contractor (Include numbers & capacities where appropriate)	Location(s) of Storage facility(s) (Specify exact locations of community containers –if– relevant)	Type of Vehicle details (Rear loading Compactor/Skip etc.....) (Include numbers and capacities)

Table 4-2: List of Personals

Staff	Administrative	Technical	Supervisors	Drivers	Operators
Numbers presently employed					
Total numbers to be employed under the Project					
Proposed source of additional staff					
Mobilization period for additional staff					
Number of expatriates employed					
Number of regional personal employed					
Number of Ulaanbaatar City citizens employed					

Table 4-3: Existing Equipment

Description	Manufacture	Model	Year of Manufacture	Condition	Ownership (state who owns the equipment)

Table 4-4: Proposed Equipments

Description	Manufacturer	Model	Year of Manufacture	To be purchase or hired	Obtained from where	How financed	Mobilization period

25 Attachment

25.1 Collection Time Table

Table 4-5: Collection Time Table

Days		Sources	Freq. (times/ week)	Col. Hours	Col. Amount (kg)	Mon	Tue	Wed	Thu	Fri	Sat
Mon, Wed, Fri	**Morning Trip:**										
	1	Selbe houses/Orchlon	6	0:24	532	9:00		9:00		9:00	
	2	Macro Centre	3	0:13	312		⇢				
	3	Apart-9/1 & 5/1	3	0:13	197						
	4	Music and Dance College	3	0:24	519		⇢				
	5	Apart-39	3	0:08	208						
	6	Apart-4	3	0:13	409						
	7	Apart-6	3	0:17	409						
	8	Apart-5	3	0:08	409						
	9	Apart-5A	3	0:09	358	12:30		12:30		12:30	
		Expected Trip Waste (kg)				**3352**		**3352**		**3352**	
	Afternoon Trip:										
	1	Odkon Co., Ltd	1	0:03	236					14:50	
	2	Craft atilier	3	0:12	355	14:50		14:50			
	3	Apart-18 (15)	3	0:13	59						
	4	Apart-7A	3	0:17	709						
	5	Tanii delguur	3	0:06	153						
	6	Tegsh AOU/Panda's Villa	6	0:18	436						
	7	Tegsh's businesses	6	0:05	55						
	8	Sunny and trade	3	0:14	255						
	9	Business of Apart-13 (11)	6	0:08	55						
	10	Soraksan & GaM	6	0:05	55						
	11	Business of Apart-4	6	0:09	138						
	12	Business of Apart-5A	6	0:06	42	18:00		18:00		18:00	
	13	Chingeltei Electricity Supply	3	0:11	153			18:00			
		Expected Trip Waste (kg)				**2312**		**2465**		**2548**	
Tue, Thu, Sat	**Morning Trip:**										
	1	Selbe houses/Orchlon	6	0:24	532		9:00		9:00		9:00
	2	Democratic Party	1	0:02	10						
	3	Apart-9	3	0:11	414						
	4	Apart-8	3	0:21	296						
	5	Apart-7	3	0:30	632						
	6	Apart-10	3	0:45	1270		12:30		12:30		12:30
		Expected Trip Waste (kg)					**3153**		**3153**		**3153**
	Afternoon Trip:										
	1	Rehabilitation clinics	3	0:20	657		14:50		14:50		14:50
	2	Nova furniture	3	0:06	100			⇢			
	3	Frame factory	1	0:08	100						
	4	Apart-36 (Selbe-2)	3	0:18	260			⇢			
	5	Pizza romania, Khaliun trade c	3	0:18	290						
	6	Auto wash	3	0:06	58						
	7	Food market	3	0:07	580						
	8	Tegsh AOU/Panda's Villa	6	0:18	436						
	9	Tegsh's businesses	6	0:05	55						
	10	Apart-13 (11)	3	0:14	255			⇢			
	11	Business of Apart-13 (11)	6	0:08	55						
	12	Soraksan & GaM	6	0:05	55						
	13	Business of Apart-4	6	0:09	138						
	14	Business of Apart-5A	6	0:06	42		18:00		18:00		
	15	Smile and Selbe bars	1	0:16	355						18:00
		Expected Trip Waste (kg)					**2980**		**3080**		**3335**

Collection days=6 per week
Number of trips=12 per week

Travel hours: (1) Khoroo to NEDS=>0:50 (2) NEDS to Khoroo=>1:30 (break included)
Operation hours: (1) Collection hours=2:40 per trip; (2) Shifting hours=0:50 per trip

25.2 Waste collection route

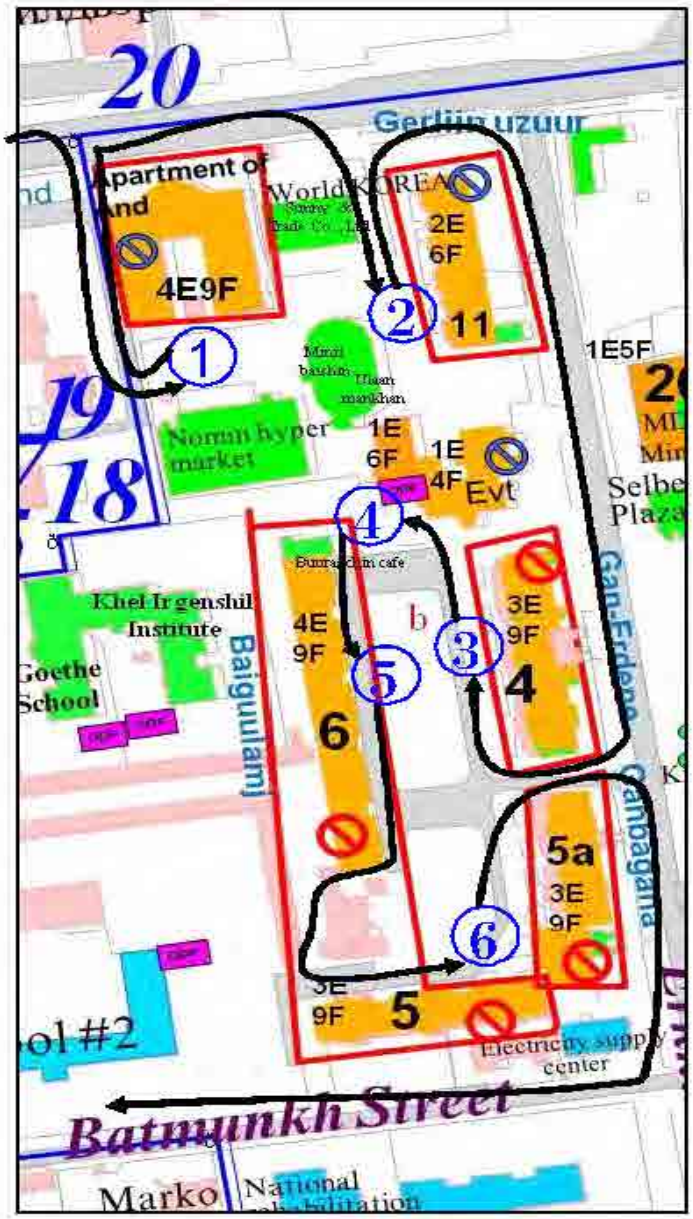


Figure 4-1: Waste collection points and collection sequence

Chapter 5. General Condition of Contract

A. General Provisions

1 Terms and Definitions

1.1 The terms are written in bold fonts.

Phased work schedule /volume of work The schedule includes prices for works of phases (or volume of work) and submitted by the contractor together with the proposal.

Conditions of compensation Conditions indicated in the Article #41 of the General Conditions of the Contract.

Date of completion The date which the Project Manager certified the completion of the works, it shall be compliance with the Chapter 5.31.1.

Contract The contract established between the client and the contractor on implementation and completion of the works and conduct of the operation and maintenance. The contract consists of the documents mentioned in the Chapter 7 of the contract form.

Contractor The Contractor who submitted the proposal shall be accepted by the client.

Proposal (or Tender) Complex of documents shall be prepared and submitted by the contractor in accordance with the client's conditions and requirements.

Contract price The price indicated in the Statement of Contract Rights Grant and adjustable in accordance with relevant Articles of the contract

Days or Months are those of the calendar.

Work-day Costs, amount of which are estimated based on the worked periods of workers and equipments (man-hour or machine-hour)

Breaches and defects Works are not conducted in accordance with the contract or with defects in quality and violated the design drawings and the technical specification.

Statement of breach and defect elimination The guarantee made by the Project Manager after the contractor eliminates the breaches and the defects.

Warranty period Period indicated in the special conditions of the contract which starts from the completion date of work. During this period, the contractor will be obliged to fix breaches and defects.

Drawing Approved design drawings or plans and approved estimations and other relevant information prepared by the Project Manager in relation to the drawings and plans.

Client Entity who is hiring the contractor for implementation for the work

Equipments Contractor's machineries, mechanisms and vehicles brought to the worksite temporarily to utilize on implementation of the works.

Initial price of contract (or "Initial contract price") The contract price indicated by the client on the statement of contract rights grant.

Planned date of completion The date set in the contract for completion of works.

Modification of the planned completion date can only be based on orders by the Project Manager.

Material All kinds of construction, raw materials, components, parts and other items to be used by the contractor for implementation of the works

Facility Constituent part with mechanical, electrical and chemical or biological functions

Project manager Person indicated in the special conditions of the contract and responsible for monitoring of work implementation and contract management (or person appointed by the client to deputize the project manager and informed to the contractor).

Worksite Area defined in the special conditions of the contract.

Report of worksite survey Report attached to the tender document which explains the conditions of the surface, soil, climate conditions and environmental assessment in the work field.

Technical specification The technical specification set for the works of the contract and its amendments made or approved by the Project Manager.

Date of commencement The date on which the contractor commences the works. The date will be indicated in the special conditions of the contract. Not necessarily be the same with the commencement date of work field management.

Subcontractor Entity signed contract with the contractor on implementation of a part of the works indicated into his contract.

By-work Work of planning, installation and removal necessary that for the contractor to conduct before construction of facilities or implementation of the works.

Alteration Instructions given by the Project Manager on altering the works

Works Works defined in the special conditions of the contract that must be implemented by the contractor and transferred to the client.

2 Explanation

2.1 Singulars written in the general conditions of this contract may stand for plurals and vice versa. Titles will not be paid significance. Words will be understood with their direct meanings if there are no special indications. Explanations and clarifications about the contract conditions will only be made by the Project Manager.

2.2 If the special conditions of the contract indicated to complete the works by phases or partially, the terms of the general conditions such as works, completed date of work and planned date of completion will be applied to each part of the works.

3 Language of contract and Law

3.1 The language of contract shall be made in Mongolian and applicable law is laws of Mongolia will be indicated in the special conditions of the contract.

4 Decision by the Project Manager

4.1 If it is not indicated specifically in the contract, any decision related of the contract will be made by the Project Manager on behalf of the client.

5 Transfer of rights and obligations

5.1 The Project Manager is allowed to transfer his duties to the other party for a period of time. However, the contractor must be informed before the transfer and the return of the Project Manager's rights and obligations.

6 Communication

6.1 The communication between the parties about the general conditions of the contract will be valid as long as they made in writing. Written statements will become valid when received by the other party.

7 Subcontracting

7.1 Subcontracting is allowed if the Project Manager accepts; however, it is prohibited to contract part of the works defined in the contract out to a third party without any written permissions by the client. Subcontracting will not alter the obligations of the contractor.

8 Other contractors

8.1 The contractor is obliged to provide the other contractors with opportunity to utilize the work field jointly for the periods indicated in their schedules in accordance with the indications of the special conditions of the contract. The contractor should provide these entities with necessary work instruments and services as indicated in the schedule. The client is authorized to amend the other contractors' schedules and obliged to inform the contractor about the amendments.

9 Labor force

9.1 The contractor will employ proper person(s) for functions indicated in the schedule of the major expert which was mentioned in the special conditions or those accepted by the Project Manager. If the contractor requests to replace the major expert, the Project Manager will approve the request as long as the skills of the expert recommended by the contractor match or over satisfy the requirements set in the above mentioned schedule.

9.2 If the Project Manager demands the contractor to terminate employment of one of his workers based on justifiable reasons, the contractor must release the worker from his duty within a week and will not allow him again to participate in the implementation work.

10 Risks undertaken by the client and the contractor

10.1 The client and the contractor will undertake the risks indicated in the contract as client's risks and contractor's risks respectively.

11 The client's risks

11.1 The client will undertake the following risks from the date of work commencement till the receipt of statement about the elimination of breaches and defects:

(a) Risks related to injuries, deaths and losses or breakdowns of properties occurred during or due to the following (risks related to works, facilities, materials and equipments will be excluded):

(1) Utilization of the work field in due manner of the contract and the incident was unpreventable; and

(2) Improper use of authorities, irresponsible actions and violation of obligations by the client or parties other than the contractor's employees.

(b) Risks of breakdowns in works, facilities, materials and equipments resulted from the client's fault, errors in the client's drawings or conditions of force majeure.

11.2 Risks of breakdowns in or losses of works, facilities and materials occurred during the period from the completion date, on which statement of breach and defect elimination received, due to other reasons than the below-mentioned will be undertaken by the client:

(a) Breaches and defects detected on the date of completion;

(b) Breaches and defects occurred before the date of completion that will not be a part of the client's risks; and

(c) Breaches and defects resulted from activities of the contractor on the work field after the date of completion.

12 Contractor's risks

12.1 The contractor will undertake the risks resulted from injuries, deaths and losses or breakdowns of properties (including but not limited to works, facilities and materials) as well as those that must not be undertaken by the client for the period from the date of work commencement to the issue date of statement of breach and defect elimination.

13 Insurance

13.1 The contractor must take out insurances against the following circumstances relevant to the contractor's risks on behalf of him and the client for the period from the date of commencement to the expiry date of the warranty. The amount of the insurances must be same with that indicated in the special conditions of the contract.

(a) Losses of and breakdowns in the works, facilities and materials;

(b) Losses and breakdowns of equipments;

(c) Losses and breakdowns of assets (works, facilities, materials and equipments) in relation to the contract implementation; and

(d) Injuries and deaths

13.2 The contractor must deliver the insurance policy and certificate to the Project Manager for his approval before the date of commencement. The insurance should be taken with the amount of the special conditions of the contract in order to compensate damages of the circumstances mentioned in the Chapter 5.13.1.

13.3 If the contractor failed to deliver the insurance policy or certificates, the client should take the insurance and the deduction the insurance payment from the amount to be paid by the client to the contractor. If the client has no duty of payment to the contractor, the insurance payment will be the debt of the contractor to the client.

13.4 Alteration of the insurance conditions without the permission of the Project Manager is prohibited.

13.5 Both parties must meet all the insurance conditions.

14 Report of worksite survey

14.1 When preparing the tender proposal, the contractor must use the report on worksite survey that was mentioned in the special conditions of the contract and other information designated for Contractors.

15 Questioning on the special conditions of the contract

15.1 The Project Manager will clarify and prepare explanations based on the questions about the special conditions.

16 Work implementation by the contractor

16.1 The contractor should implement the works in accordance with the technical specification and the drawings.

17 Completion of the work in due time (by the planned date)

17.1 The contractor must start the works on due date of commencement, implement in accordance with the work program prepared by him and the clarified work program approved by the Project Manager, and finish the works on the planned date of completion.

18 Guarantee by the Project Manager

18.1 The contractor must deliver the technical specification and drawings of the by-works proposed by him to the Project Manager. If these are compliant with the technical specification and drawings of the works, the Project Manager will approve.

18.2 The contractor is responsible for the design drawings for the by-works.

18.3 Approval of the by-works by the Project Manager does not alter the obligations of the contractor related to the design drawings of the by-works.

18.4 If necessary, the contractor must obtain permissions of other organizations which are relevant to the drawings of the by-works.

18.5 The Project Manager should approve all the drawings prepared by the contractor for the by-works before the commencement of the works.

19 Safety

19.1 The contractor will be responsible for the safety of all the activities to be conducted on the work field.

19.2 The contractor must take all measures necessary to protect facilities and buildings being constructed by him from natural disasters and unexpected casualties and adhere to any due requirements set by environmental, sanitary and emergency authorities in relation to the works.

20 Finds

20.1 Any historical and heritage finds discovered at the worksite will be the property of Mongolia.

The contractor must inform the Project Manager about finds if there are any and adhere to the instructions of the Project Manager.

21 Instructions

21.1 Any instructions made by the Project Manager must be compliant with the Laws of Mongolia and must be obeyed by the contractor.

22 Settlement of disputes

22.1 If the parties are not able to reach an agreement on the disputes related to the implementation of the contract obligations, a claim will be filed to the court.

B. Period monitoring.

23 Postponement of the dates by the Project Manager

23.1 The Project Manager is authorized to give instructions to the contractor to postpone the commencement of an activity of the works.

24 Meeting

24.1 Either the Project Manager or the contractor is allowed to demand the other party to participate in work meetings. During the meetings, the progress of the work will be verified and problems will be solved in accordance with the rule of precaution.

24.2 The Project Manager prepares minutes of the meetings and distributes copies of the minutes to the attended parties. The Project Manager also allocates necessary assignments to the parties during or after the meetings and informs all the parties about the assignments in written statements.

25 Rule of precautions

25.1 The contractor is obliged to precaution the Project Manager against situations that may affect the quality, contract price and implementation period. The Project Manager is authorized to require the contractor for information about the possible affects of occurred situations on the date of completion and the contract price. The contractor should deliver the necessary information as soon as possible.

25.2 The contractor will propose countermeasures to eliminate the above mentioned situation or to mitigate their impacts and cooperate with the Project Manager on implementation to his instruction.

C. Quality Control

26 Detection of breaches and defects

26.1 The Project Manager shall examine the progress of the works and inform the contractor about detected breaches and defects. This examination should not affect the obligations of the contractor. The Project Manager is authorized to provide the contractor with instructions about a conduct of inspections or experiments for the purpose to detect any defaults, defects and hidden problems.

27 Experiment

27.1 If the breaches and defects are found during experiments conducted by the Project Manager's requests (but not by the requirements of the technical specification), the costs of the experiments will undertaken by the contractor. If no breaches and defects are found, it will be considered as a condition of compensation.

D. Cost Control

28 Statement of payment

28.1 The Project Manager will check the implementation of the works and approves the amount of payment.

29 Payment

29.1 The client will pay the amount approved by the Project Manager to the contractor in the time indicated by the special conditions of the contract. In the events, the client did not make any payments to the contractor by due date, the fine for the delayed amount must be added to the amount of the next payment. The fine will be applied to the days between the due date of the payment and the paid date. The amount of the fine will be estimated based on interest rates of commercial loans.

29.2 If the amounts indicated in the previous statements (claims) increased due to a court decision or last statements, fine will also be paid to the contractor for the amount of increase (as this will be treated as delayed part of the previous payment). The fine will be estimated from the date when this amount of increase must have been paid.

29.3 If it is specified differently in the contract, all the payment and deduction will be settled in the currency of the contract.

30 Conditions of compensation

30.1 The following are the conditions to make compensation:

(a) The Project Manager decided to postpone works or did not provide the contractor technical specification and instructions necessary for the implementation of works;

(b) No breaches and defects are found through additional examinations or experiments conducted by the contractor based on the Project Manager's orders;

(c) The Project Manager did not approve subcontracting without any justifiable reasons;

(d) The Project Manager instructed the contractor to conduct additional works required by the situations resulted from the client's activities, safety and other reasons;

(e) The client's risks affected the contractor;

30.2 Every occasion that the contractor submitted a report that contains estimation of the contractor's costs affected by the compensation condition, the Project Manager will evaluate the estimation and adjust the contract price. If the contractor's estimation was considered unreasonable, the Project Manager will adjust the contract price based on his estimation. In doing so, it will be considered that the contractor will take necessary measures to eliminate any negative impact related to that occasion.

E. Completion of the contract

31 Completion of work

31.1 The contractor should request the Project Manager to submit the statement of completion. If the Project Manager accepts the completion of the works, he should deliver the statement of completion.

32 Final settlement

32.1 The contractor should prepare detailed estimation of the total payment in accordance with the contract and submit it to the Project Manager before the end date of the quality guaranteed period. The Project Manager should deliver a statement whether defaults and defects have been fixed and determine the final payment to be transferred to the contractor within 28 days after receiving the estimation submitted by the contractor if it is correct and acceptable. If the estimation is incorrect, the Project Manager should deliver explanations about the necessity to amend or correct the estimation to the contractor within 28 days. If the amended or corrected estimation does not meet the requirements, the Project Manager set the amount of payment and makes statement on payment.

33 Termination of the contract

33.1 The contractor can be terminated by any of the client and the contractor if one of the parties considers the other violated the contract seriously.

33.2 The below are the circumstance to be considered, but not limited to, as serious violations of the contract.

(a) Work has been suspended by the contractor for more than 28 days while no indication is reflected the Project Manager approves the decision about the suspension of work;

(b) The decision to stop the work given by the Project Manager to the contractor was not cancelled within 28 days;

(c) Either the client or the contractor went into bankruptcy, or was dismantled for other purposes than merger and restructure;

(d) The client failed in settlement of the payment that had to be made in accordance with the statement of payment submitted by the Project Manager within 84 days from the submission date of the statement;

(e) The contractor was informed by the Project Manager that his/her failure in fixing certain defaults and defects is considered as a serious defaults of contract obligations and the contractor fails again in fixing the defaults and the defects in due time indicated in the statement.

(f) The contractor did not supply the guarantee requested by the client;

(g) The contractor did not complete the work by the period indicated in the special conditions of the contract as a period for application of maximum default payment.

33.3 If a statement of contract violation by one of the contracted party was submitted to the Project Manager and the violation was not those indicated in the Chapter 5.33.2, the Project Manager should identify whether the violation is serious or not.

33.4 The client has rights to terminate the contract without considering the above mentioned if necessary.

33.5 In the case of contract termination, the contractor should stop the work immediately, ensure the entirety and the safety of the worksite and release it as soon as possible.

34 Payment for contract termination

34.1 If the contract was terminated due to the serious violation by the contractor, the Project Manager makes a statement that certifies the evaluation of implemented works and ordered materials. When making the statement, the amount of works uncompleted as of the date of the statement should be considered as those indicated in the special conditions of the contract and must be subtracted from the evaluation. An additional default payment must be imposed on the contractor. If the payment from the contractor to the client exceeds that from the client to the contractor, the difference will be a debt by the contractor to the client.

34.2 In the case of a termination where the client violates the contract seriously or the client demanded to terminate, the Project Manager make statement after verification of all the costs spent by the contractor such as prices or evaluation of conducted works and ordered materials, transport cost for the removal of the equipments from the worksite, costs for returning workers hired by the contractor for the implementation of the works and costs for security and safety of the worksite.

35 Exemption from obligation

35.1 If the contract became unable to implement due to force majeure conditions, the Project Manager is obliged to certify the conditions. Having received the statement, the contractor ensures the entirety of the worksite and stops working as soon as possible. The client is obliged to pay the contractor the amount for the works completed before the statement and done by orders after the statement.

Chapter 6. Special Condition of Contract

1 Part of the Contract Document

The following documents will be a part of the contract:

Chapter 5.8	Schedule of other contractors
Chapter 5.14	Report of worksite survey

2 Definition of Article contents

2.1 Chapter 5.1 Client: *Governor of Khoroo 7, Sukhbataar District, Address: ****, Sukhbataar District, Ulaanbaatar City*

2.2 Chapter 5.1 Project Manager: *Mr. **********

2.3 Chapter 5.1 Name of the contract and registration No. *20120120*

2.4 Chapter 5.1 The works consists of *collection of house waste generated waste (hereinafter: the Waste) by Khoroo ** citizen, ****** District, Ulaanbaatar City, transport and discharge the waste to Naragiin Enger Disposal Site which located in Songinokhirhan District, Ulaanbaatar City.*

2.5 Chapter 5.1Chapter 5.1 Date of commencement: [Specify the date]

2.6 Chapter 5.1 The work field is located in *Khoroo **, **** District , Ulaanbaatar City*

2.7 Chapter 5.3 The contract documents will be written in *Mongolia*

2.8 Chapter 5.3 *Laws of Mongolia will be applied in the contract*.

2.9 13Chapter 5.13 Items to be covered by the compulsory insurances and their minimum insurance payment are the following:

(a) The minimum amount to be paid by the contractor for casualty and life insurances will be the following:

(1) [Specify the amount] for employees of the contractor.

(2) [Specify the amount] for other people.

2.10 Chapter 5.17 planned date of work completion: [Specify the date]

2.11 Chapter 5.1 Date of commencing work field utilization: [Specify the date]

2.12 Chapter 5.29 The payment period will be *within 30 days* since the issue date of statements of payment.

2.13 Chapter 5.30 The following circumstance will also be considered as a condition of compensation:

1) *Fluctuation of Fuel price: If fuel price will increase more than 20% against price fuel as date of Contract signed.*

Chapter 7. Contract Forms

1 Form # CF-1

	Approved by:	**Accepted by**[7]**:**
CLIENT	Contractor	*[Supervising official of th organization to authoriz financing]*
_____ (Stamp)	_____ (Stamp)	
_____ (Signature)	_____ (Signature)	_____ (Stamp)
_____ (Position)	_____ (Position)	_____ (Signature)
		_____ (Position)

Contract for the Project on Waste Collection & Transportation at Khoroo**, ** District***

No. 20120120

..... city/province

*Government of ******* District* (hereinafter to be referred to as the client) from one side and *[name of the contractor, names of his/her residing city and country]* (hereinafter to be referred to as the contractor) from the other side have reached an agreement on the following items and established this contract on ******* (day, month, year).

1. The objectives of this contract are to regulate relations between the client and the contractor on construction of engineering facilities, or implementation of renovation and installment of equipments in accordance with the Civil Law, Law on Construction and other relevant laws and regulations; and to clarify their duties and obligations.

2. The client here accepted the implementation of *the Project on Waste Collection & Transportation at Khoroo **, ******** District : Contract number ********* hereinafter to be referred to as "works") with *[contract price by numerals and letters]* (hereinafter to be referred as "contract price") which was proposed by the contractor. The contract price or the total budgeted costs of the works will be the total financing.

3. Total contract price: _____ Tg. Of which:

From the State Budget: _____Tg in 20**

From the Local Budget: _____Tg in 20**

From own fund: _____Tg in 20**

4. The contractor will start the construction (renovation, installment of equipments etc) works of _____ (floors _____, coverage _____ , wall _____ , basement _____ , volume _____ m^3, area _____ m^2, capacity of _____) located in/at _____ together with its engineering facilities _____ (for supply of heat, electricity, water and waste

[7] *If the client and the finance authorizing organization are same organization, this part will be deleted.*

water) and the annex _____ on ... *[date]* and transfer them on .... *[date]*.

5. The following documents will be inseparable parts of the contract (hereinafter to be referred as "the contract document"):

5.1 Statement of granted rights for establishment of contract;
5.2 Other necessary documents;
5.3 Bill of quantities;
5.4 Special conditions of the contract;
5.5 General conditions of the contract;
5.6 Technical specifications;
5.7 Drawings;
5.8 Phased work schedule submitted by the contractor;
5.9 Schedule of financing;
5.10 Work implementation schedule.

The contract will be the final agreement between the parties and replaces all those made before. If the contract documents contradict one another, the priority will be set based on the above order and the contradiction will be solved.

6. The rights and obligations of the both parties are indicated in the general and special conditions of the contract.

7. The contractor is obliged to implement the works and to fix any defaults and defects found based on the payment to be made by the client in accordance with the conditions of this contract.

8. The client is obliged to transfer the contract payments to the contractor based on his/her performance of work implementation and elimination of any defaults and defects.

9. The parties will communicate each other in written statements or telephone regarding the issues related to the contract.

Representing the Client:	Representing the Contractor:
[Name and position] */Signature/*	*[Name and position]* */Signature/*
STAMP	STAMP
[address of the client] *[Tel/Fax]* *[Bank account, No of account and name of th bank]*	*[address of the client]* *[Tel/Fax]* *[Bank account, No of account and name of th bank]*

2 Form # CF-2

Performance Security Form

(Bank guarantee)

To: [Name of the client organization]

In relation to ***[Name of the contractor]*** (hereinafter to be referred to as "contractor") has been decided to implement the works indicated in ***the Project on Waste Collection & Transportation at Khoroo **, ***** District*** *(hereinafter to be referred to as "contract")* under the contract # ... dated on ... day ... month ... year:

[Name of bank] (hereinafter to be referred to as "bank") is here presenting the following as a guarantee for the implementation of the contractor's obligations based on the indication in the contract to submit a bank guarantee issued by a bank acceptable to the client for the below amount:

On behalf of the contractor, the bank will be responsible for the payment with the amount not exceeding ***[specify the amount to secure in numerals and the type of currency]([specify the amount in letters and the type of currency[8]])*** before ***Governor of ****** District*** (hereinafter to be referred to as "client") and undertake the duty to transfer the payment without any resistance immediately after the receipt of an initial requirements by the client that state the contractor's violation of its contract obligations. The bank will not demand the client to supply any evidences, basis and explanations for the specified amount ***[secured amount in numerals and letters and the type of currency]***.

Any changes in the conditions of the contract signed between the client and the contractor, alteration in the works to be implemented under the contract and amendments of the contract documents will not affect the duty of the bank under this performance security. Submission of any statements about the above-mentioned changes to the bank is not necessary.

This performance security is valid for 28 days from the issue date of statement of work completion.

Respectfully Yours,

_____signature of the authorized person of the bank
_____name and the position
Stamp of the bank

Date: _____

Address:_____

[8] *The amount will be specified by the guarantor and will be specified in percentage of the contract price. The currency will be those of the contract or accepted by the client.*

D.3 Weighbridge manual

WEIGHBRIDGE MANUAL

June, 2012

Preface

Around one thousand tons of waste is weighed on average in a total of 200 trips a day at a weighbridge (WB) that has been installed to weigh waste transported by vehicles into Narangiin Enger final disposal site (called entrance inspection). The information recorded at the weighbridge is quite important for official authorities to accurately grasp information on waste transported to the disposal site and utilize it for waste management. This information can be regarded as public property. While the city authority has responsibility to properly record, maintain and release the *property* in the best way, also our project has tried to assist them too. In that context, it was decided to put together this Weighbridge Manual in our project. Its content is divided into three chapters covering:

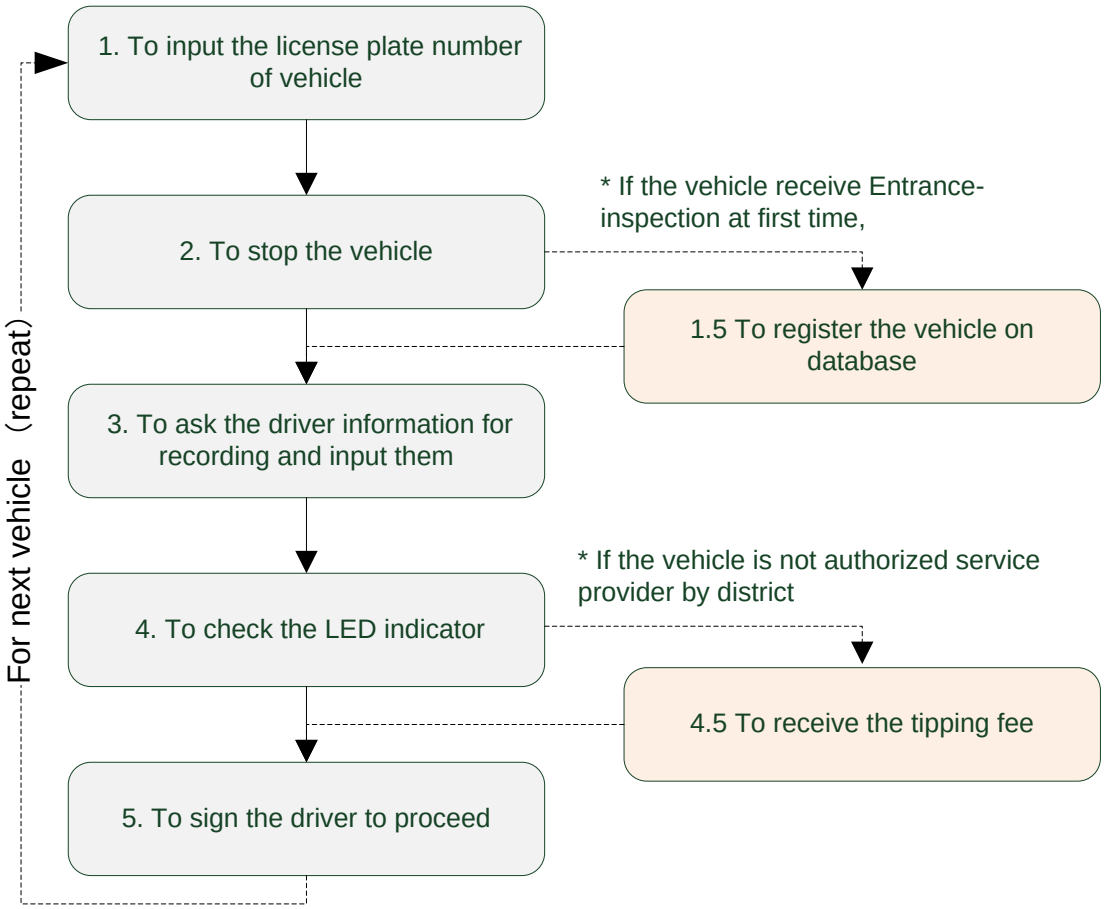
1. Procedures for recording information at the weighbridge
2. Regular tasks for maintaining and managing the information
3. How to view the information on the website

Besides, the progress regarding weighbridge are summarized in the below table.

Time	Event	Note
January, 2009	The weighbridge was installed during construction of the NE final disposal site and is now being utilized. A computer program for recording information, "Engine draft", was developed by a company called Link Engine and is now being utilized for entrance inspection.	Adequate inspection of waste transport vehicles at the entrance was started in this period. However, although this computer program provides a reliable record of vehicle type, when, and how many kilograms of waste was transported, it does not provide reliable data on where the waste is from and its type.
October, 2009	Our technical cooperation project commenced.	Present-condition survey about weighbridge data management was conducted through our project.
December, 2010	Workshop for improvement of weighbridge data management was conducted which was organized by EPWMD.	Abovementioned survey results were explained to participants from relevant organizations such as TUKs and WSFs, and there was a lively exchange of opinions.. Relevant organization's awareness regarding proper recording, management and release of WB data was raised in this period.
January, 2011	Daily email of WB data to relevant organizations started.	After above workshop, CMPUA started to distribute WB daily report to TUKs and WSFs via email. However, an interview research to users conducted later on showed that email distribution is not so efficient.
December, 2011	First edition of WB data website was published and the briefing meeting of relevant organizations was held.	Data distribution method shifted from email to website based on the result of above research. The website was published and the briefing meeting for relevant organizations was held.
January, 2012	Information recording program Engine Draft was re-developed to overcome its faults. (Improved independently by EPWMD)	As information recorded through entrance inspection was not completely accurate before this system, it increased confidence in the information including the place and classification of waste collected.
January, 2012	Installation of LED indicator	LED monitor linked to WB computer was installed so that drivers can see the information recorded at the weighbridge. This monitor reduced complaints from drivers as they could confirm the weight recorded.
April, 2012	Remodeling the website	The website was reconstructed in accordance with above-mentioned improvement of program. This is to adapt the website to be compatible with the latest recording program.

D.3.1 Recording information at the weighbridge

In this chapter, procedures to record the information of vehicle incoming at weighbridge of disposal site (entrance inspection) are described. There are five main processes for each vehicle. The flow chart is shown and each process is described below.



View of entrance looking out of the disposal site

Side view of truck scale and control house

1. Input license plate number

First of all, WB operator shall input the license plate number of vehicle to be inspected into the computer program as it approaches the truck scale.

Truck approaching the weighbridge

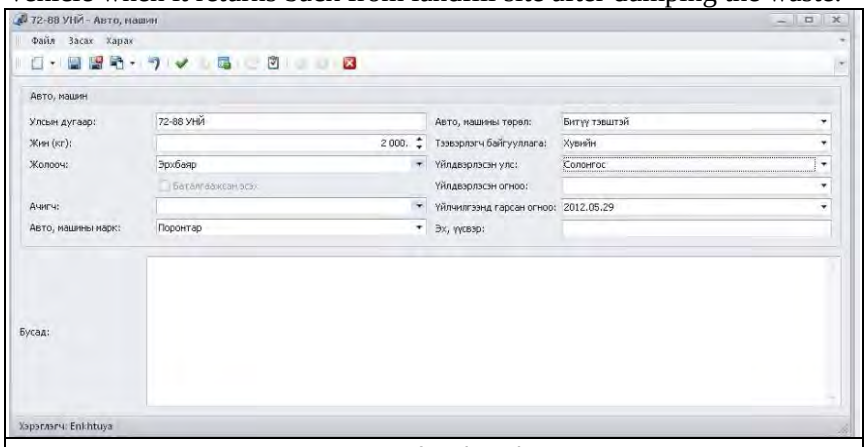
2. Stop the vehicle

Once the vehicle reaches the truck scale, WB operator shall stop the vehicle in the right place. That is, the truck should be right in the center of the truck scale without any part of the vehicle touching anything besides the scale. Also, once the vehicle is in the correct position, it should not move forward or backward until the recording is completed.

(* 2.5 Register vehicle in database)

If it is the vehicle's first time through the weighbridge the WB operator should make a new entry into the database. Items to be entered for registration are listed below.

Especially the operator should pay attention to checking and registering the tare weight of the vehicle when it returns back from landfill site after dumping the waste.



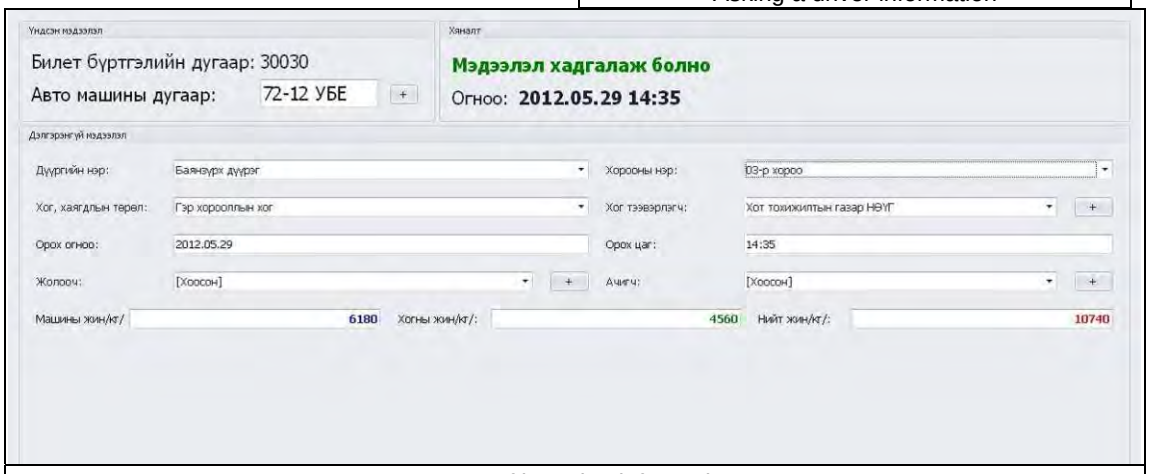
Screen of registration

1.	The plate number of vehicle
2.	The tare weight of vehicle
3.	The name of organization to which the vehicle belongs
4.	The number of khoroo where the vehicle usually collects waste
5.	The name of district where the vehicle usually collects waste
6.	The type of waste (place) from which the vehicle usually collects waste

3. Ask driver details that need to be recorded

WB operator shall ask the driver information for recording while the vehicle is stopped on the truck scale. There are basically three questions: the name of the district, the number of khoroo and the type of waste (type of place for example, apartment area or Ger area) the vehicle has collected.
The operator inputs this information into the program.

Asking a driver information



Screen of inputting information

4. Check the LED monitor

LED monitor directly linked to WB computer has been installed on the right of the truck scale (northern side of control house) in order to show the drivers the information that is being recorded regarding their vehicle.
The operator shall check if the monitor correctly shows the information they have entered into the program. Moreover, the operator shall check the weight of vehicle and waste and so on to ensure they have not made any mistakes.

LED monitor

(* 4.5 Receive the tipping fee)

Under Ulaanbaatar's current system, tipping fee is levied to cover landfill operation costs from all vehicles except those authorized as an urban waste transporter by one of the districts.
Therefore the WB operator shall receive the tipping fee from the driver, if the vehicle entering the disposal site is unauthorized. The list of authorized transporters as of March 2012 is shown below for reference. The tipping fee to be paid by a waste transporter is calculated at a set rate per ton of waste (2,080 tg / ton).

Receiving tipping fee from a driver

1.	Sukhbaatar District TUK
2.	Chingeltei District TUK
3.	Bayangol District TUK
4.	Bayanzurkh District TUK
5.	Songinokhairkhan District TUK
6.	Khan-Uul District TUK
7.	"Sukhbaatar Devshil" Local Property Public Company replacing former EU (Emergency Unit)
8.	"Unit of Common Services" Local Property Public Company replacing BZD WSF
9.	Production and Services Department, Bayangol District Government Office
10.	Tsuzuki Yume Co.Ltd. (now renamed as Ulaanbaatar Shinechlel Co.Ltd)
11.	Golden Prima Co.Ltd. (now renamed as Nashi Trade Co.Ltd.)
12.	Waste transportation unit of Songinokhairkhan District Office

5. Signal the driver to go ahead

The operator shall confirm the record and push the "record" command on the program after checking the LED monitor. Then, finally, he/she signals the driver to proceed.

D.3.2 Maintaining and managing data

(on daily/annual basis)

This schedule and procedures are described in order for proper WB data management. Basically, these tasks shall be regularly done by manager or representative person of disposal site.
Various tasks, both short term, daily, and long term, annual, are required.

Daily tasks

Three tasks should be carried out daily.

1. Backing up the “daily report” in Excel form

Every morning, the manager shall copy the “daily report” of the previous day in Excel form exporting it from WB computer to an USB flash drive. He/she then saves the file onto their own computer with the date included in the name e.g. daily_report_20120331.xls, for date of 31st March 2012.

2. Copying the database file to USB flash drive

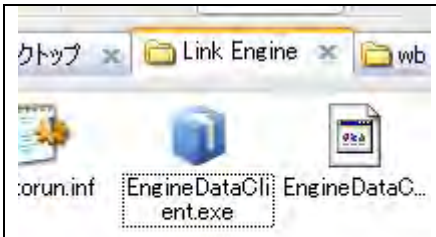
When the manager copies the daily report, he/she should also copy the database file, which must contain data of up to the previous day, from the computer onto the same USB drive.

3. Uploading the database file to Web server

After copying the database file to USB drive, the manager should then upload the file via the Internet to the website so the relevant organizations and the public can view the latest weighbridge data.

Extra note; How to download and upload the database file to the server

This is performed by the manager using uploading program, EngineDataClient.exe, developed by Link Engine. This program can be easily installed onto a USB flash drive, and the user can then easily download and upload files with only one click of the mouse.



1. EngineDataClient.exe in a USB flash drive

2. Program window

--- Launching the program

Double click on the "EngineDataClient.exe" file in the USB drive to launch the program.

--- Downloading from the WB computer to the drive

On the WB computer click the command "TATAX" to download the database file from WB computer to the USB drive.

--- Uploading from the USB drive to the web server

The manager inserts the USB drive into own computer and after launching the program clicks the command "ИЛГЭЭХ" to upload the database file from the USB drive to the web server.

Annual operation schedule

This section describes six tasks that must be undertaken throughout the year, with the schedule as follows:

	Annual Plan	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.	Caribaration of Truck Scale			✓									
2.	Tare weight Inspection									✓			
3.	Review of registered and recoded information	✓						✓					
4.	Backing up of Data Base	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.	Backing up of Data in excel form	✓						✓					
6.	Web Server Maintenace	✓											

* Cell filled with gray indicates the month at which backing up to CD shall be done

1. Calibration of truck scale

Relevant organizations and drivers are constantly suspicious and complain that the truck scale does not indicate the correct weight. Therefore CMPUA, which is responsible for the truck scale, must provide a technical reassurance that the scale is working properly. As such, it should be calibrated annually by National Center for Standardization and Metrology.

2. Tare weight inspection

One of the most important factors for WB data management is tare weight of trucks in terms of both waste management planning and financial management in the sector of waste collection services. Therefore tare weight inspection of registered vehicles must be conducted once a year.

3. Review of registered and recorded information

Of a similar importance to the abovementioned weight data is the accuracy and proper maintenance of data such as khoroo number, district name and classification.

This is because accurate trip information that indicates the amount and transporter and place where they collected of waste is essential for proper waste management. Especially, if the district office introduces an open tender system selecting a waste collection service provider, they must prepare a specification document that specifies the amount of waste to be regularly collected by the contractor. When determining this figure, WB data must be used as evidence. Even though the reliability of this data has improved considerably as a result of the revamped recording program by EPWMD in 2012, validity of information has to be verified by reviewing both registered and daily recorded information. Namely because this information frequently varies since vehicles does not always collect waste from same place. This review should be conducted twice a year.

4. Backing up database

There is a risk of losing the files on the WB computer database. This was the case when a lightning strike caused a power surge and the loss of all the records of a part of 2010 stored on the old database. That is why database must be backed up regularly to avoid any such accidents in future. It is desirable to back up to another computer every month and to a CD twice a year.

Backing up of database file		
	Regular back up	Occasional back up
Frequency	Every month	Twice a year
Method	Save the latest database file onto disposal site manager's computer	Copy the database of latest half year to 2 copies of CD. One is delivered to EPWMD, another is stored in CMPUA.

5. Backing up data in Excel format

In addition to the above, another more efficient backing up method has been proposed. That is backing up data in Excel format not only database. Database file type is not common, therefore it may not be viewable. On the contrary, data in Excel format allows most people to view it if they have access to a personal computer.

That is why it is absolutely vital to back up the daily report every morning. In both instances, daily and annual, backing up means to an Excel file, saved not only on the disposal site manager's computer but also other destinations, media. More details are shown in below table.

Backing up of "daily report" Excel file		
	Regular back up	Occasional back up
Frequency	Every day (described in daily operation)	Twice a year
Method	Save the Excel file of "daily report" onto disposal site manager's computer	Copy the "daily report" of latest half year in Excel file onto two CDs. One is delivered to EPWMD, another is stored in CMPUA.

6. Web server maintenance

Website has been adopted as a distribution method of WB data. Server maintenance is essential for proper running of the website. If the database volume becomes too large, it may make it very slow when viewing the site. Although optimizing the database file is ideal for preventing such problems, no practical or concrete methods could be found in this case. It should be taken a measure to hold the database file of latest five years and delete the older data. Accordingly, even though a tentative annual schedule for server maintenance has been set, it is most likely to be in the form of troubleshooting when trouble occurs. This section is merely to stress the importance of managers taking note of the web server and database file.

D.3.3 Using the website

This chapter goes over how users are to view NEDS WB records on the website. Our project is aiming to make weighbridge data, which on average records daily about 1,000 ton of waste from 200 trips, more accessible to the public and more accurate. In this context, the first edition of the website to publicize WB data came online on December 2011. This website allows users to view the latest WB records in their office with only a computer and internet connection. It is expected that relevant organizations such as TUKs, district offices and UB city will become the main users of this website with accounts and passwords. They can view latest information of how many tons, when and from where the vehicles of each organization transported wastes into disposal site in various formats with data filtering and sorting. Also, it gives ordinary people access to general information but not detailed information.

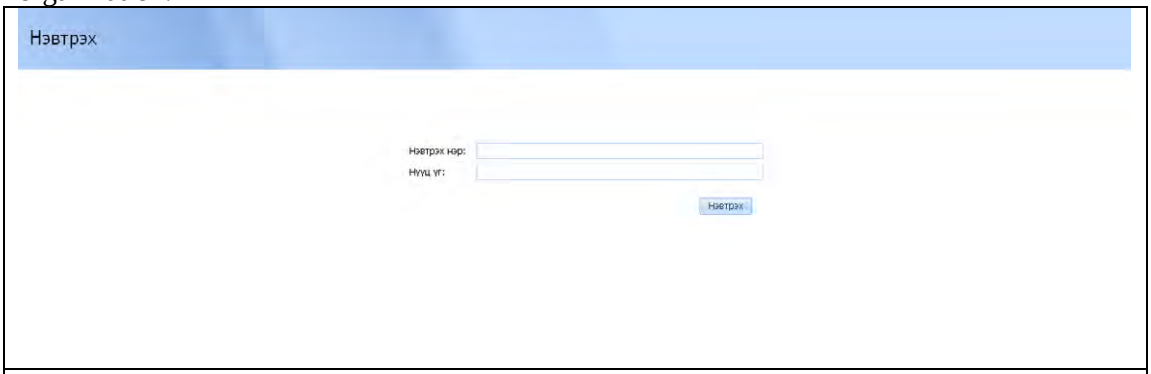
First steps

1. Accessing the website

First of all, access the website by typing "http:www.tuk.mn" in the address bar of your internet browser.

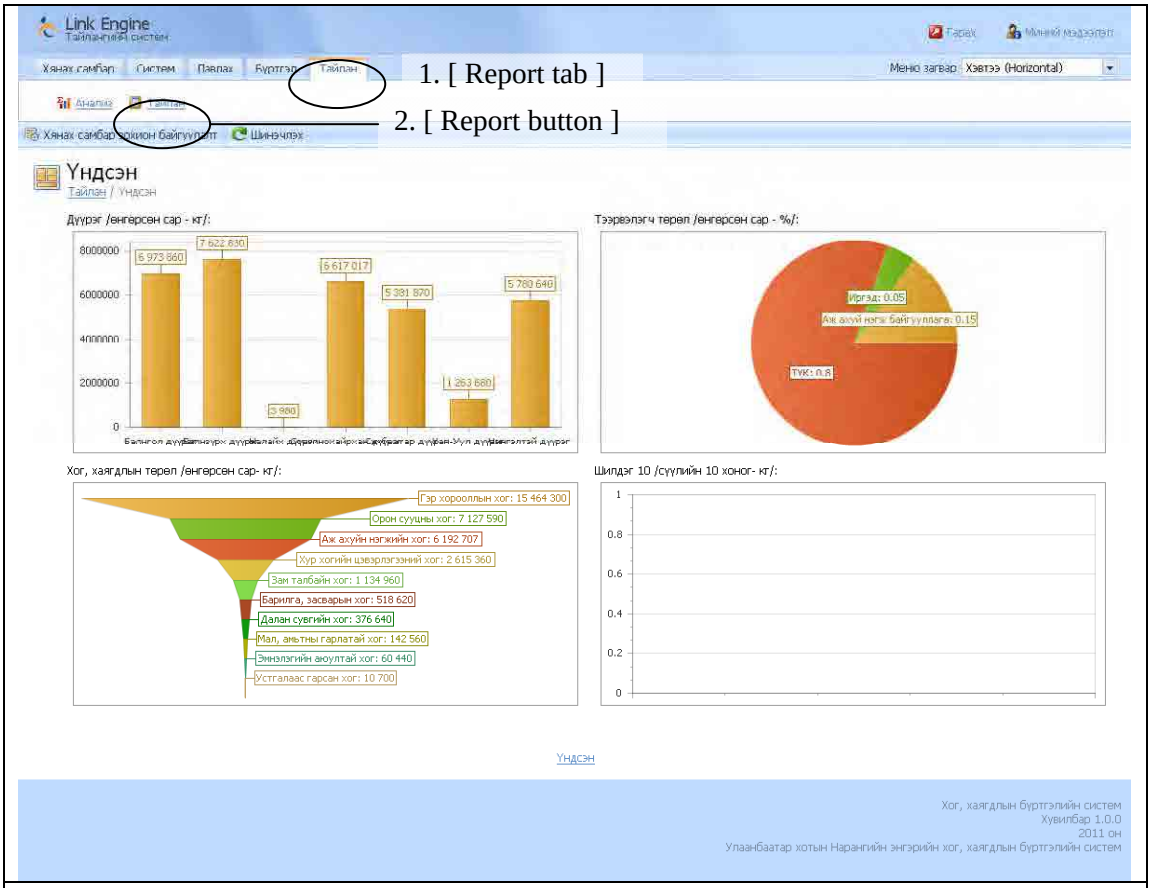
2. Signing in

Sign in to the website by entering the account name and password provided to each organization.



Sign in page

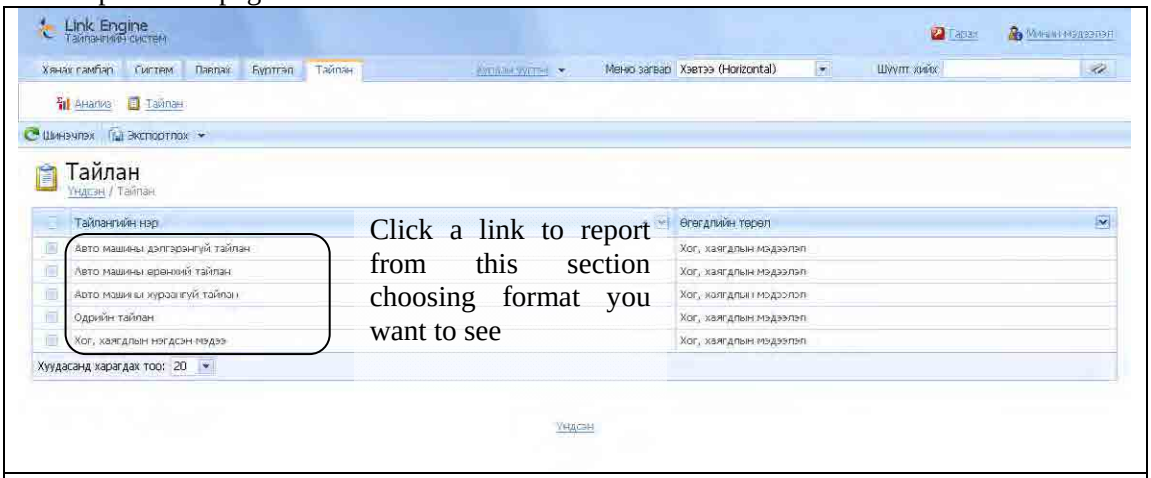
3. Top page



Top page

You can view some statistical data regarding to waste transportation to NEDS in graphics and charts. Please click 1.report tab at the right in the top bar, “Тайлан” and click 2.report button as shown in the above figure to go to the next step.

4. Report main page



Report main page

Once you have entered the main report page, you can choose the report you want to see. When you click a link of format you want from the section shown in above figure, new window will open up on your screen. At this moment, from top side, formats of “Details of each vehicle”, “Summary of transporters by vehicle”, “Daily reports” and “Summary of district by transporter” are ready for users to see. Features of each format are summarized in the below table.

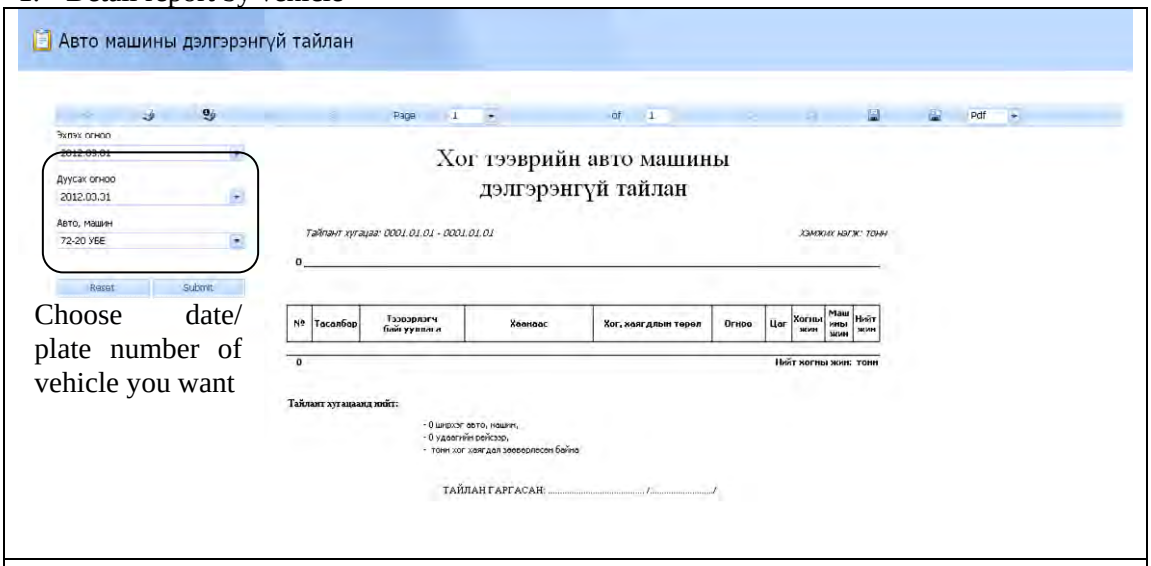
	Formats	Transcription	Features

1.	Detail report by vehicle	Авто машины дэлгэрэнгүй тайлан	To view detailed record of all trips of the vehicle you chose.
2.	Summary report of transporter by vehicle	Авто машины хураангуй тайлан	To view summarized record of vehicles that belong to the organization you chose. It is displayed according to each vehicle.
3.	Daily reports	Өдрийн тайлан	To view detailed record of all trips of a particular day
4.	Summary report of district by transporter	Хог, хаягдлын нэгдсэн мэдээ	To view summarized record of transporter and district you chose. It is displayed according to each transporter and district.

Then, now let us go to next step to see features of each format.

Main part

1. Detail report by vehicle



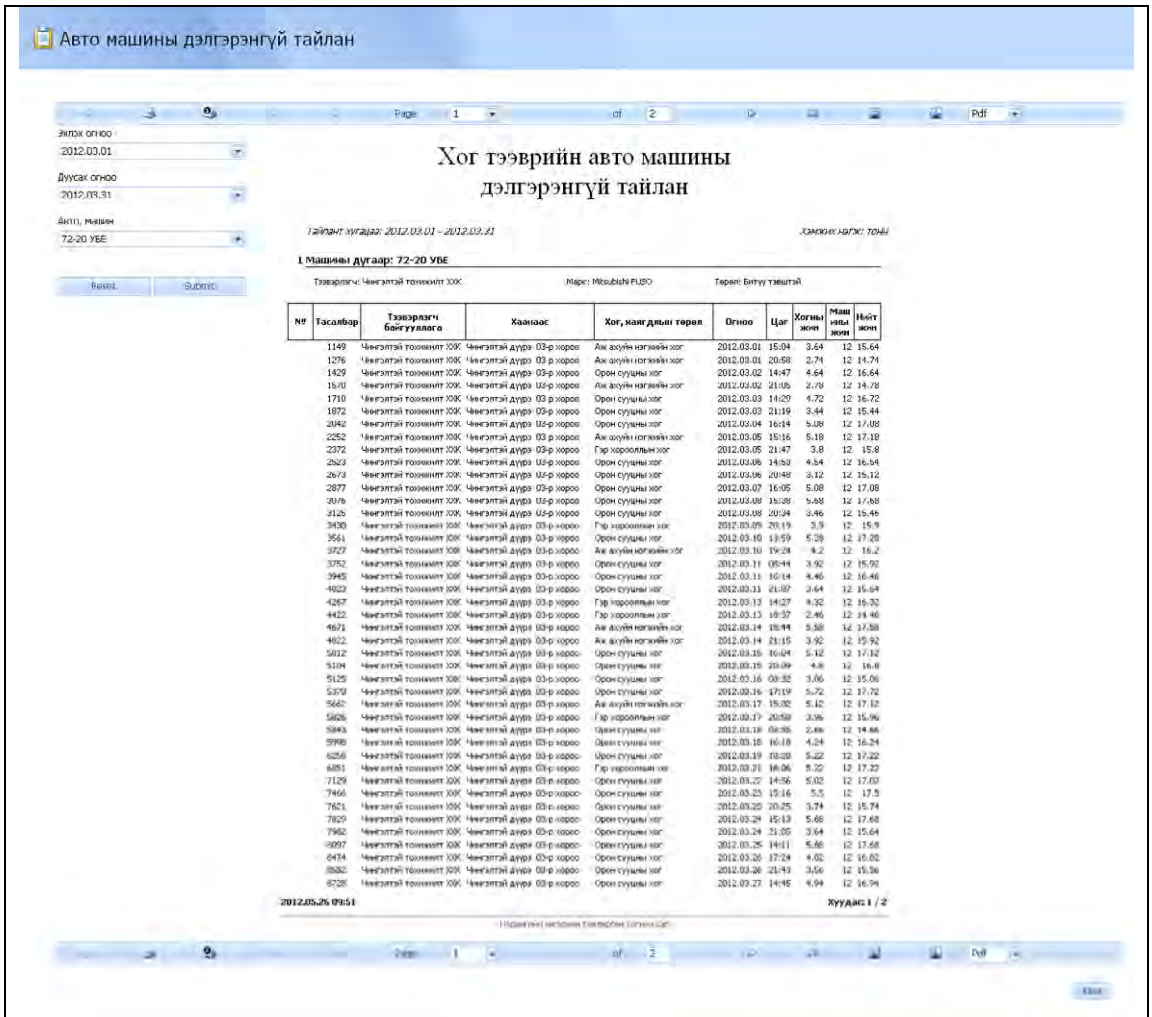
Choose date/ plate number of vehicle you want

Detail report by vehicle/input page

Once you entered into page of “Detail report by vehicle”, you can choose date and plate number of vehicle you want to get information on and then click “submit”.
After loading database for several seconds according to your command, the results come up on your screen.

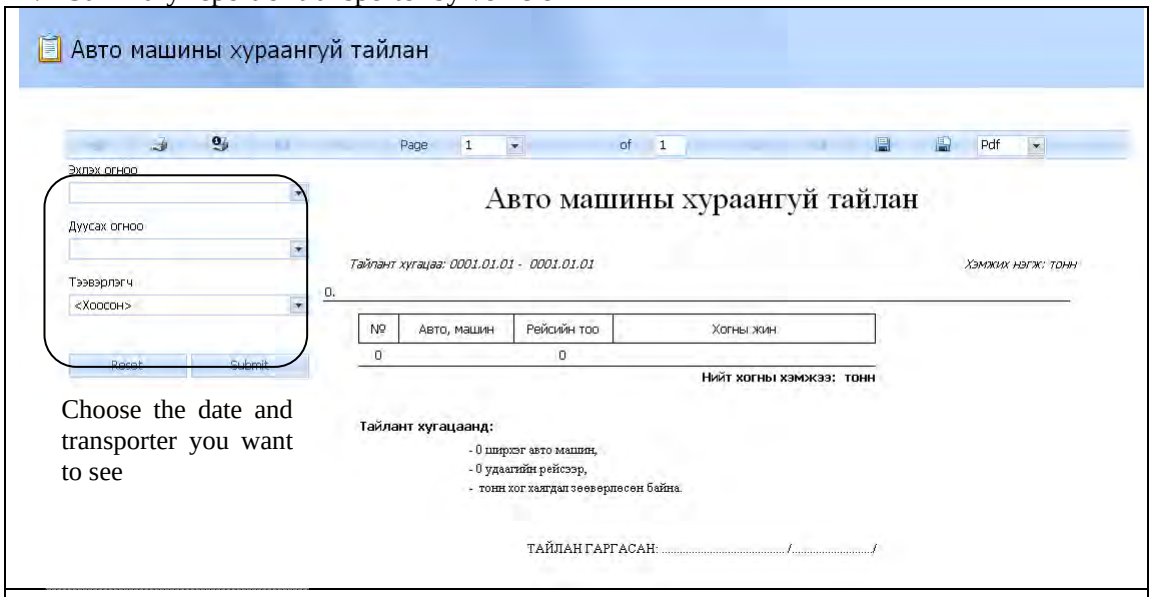
Result of user request is shown below.
（e.g.）In case of “License plate number：72-20 UBE、Date：2012/3/1-3/31”
--- Header of report

Ticket Number	Organization of Transporter	Area collected	Classification of Waste	Date	Time	Weight of Waste	Weight of Vehicle	Total Weight



Detail report by vehicle /search results

2. Summary report of transporter by vehicle



Choose the date and transporter you want to see

Summary report of transporter by vehicle /input page

Once you have entered the page “Summary report of transporter by vehicle”, you can choose date and transporter you want to get information on and then click on “submit”.

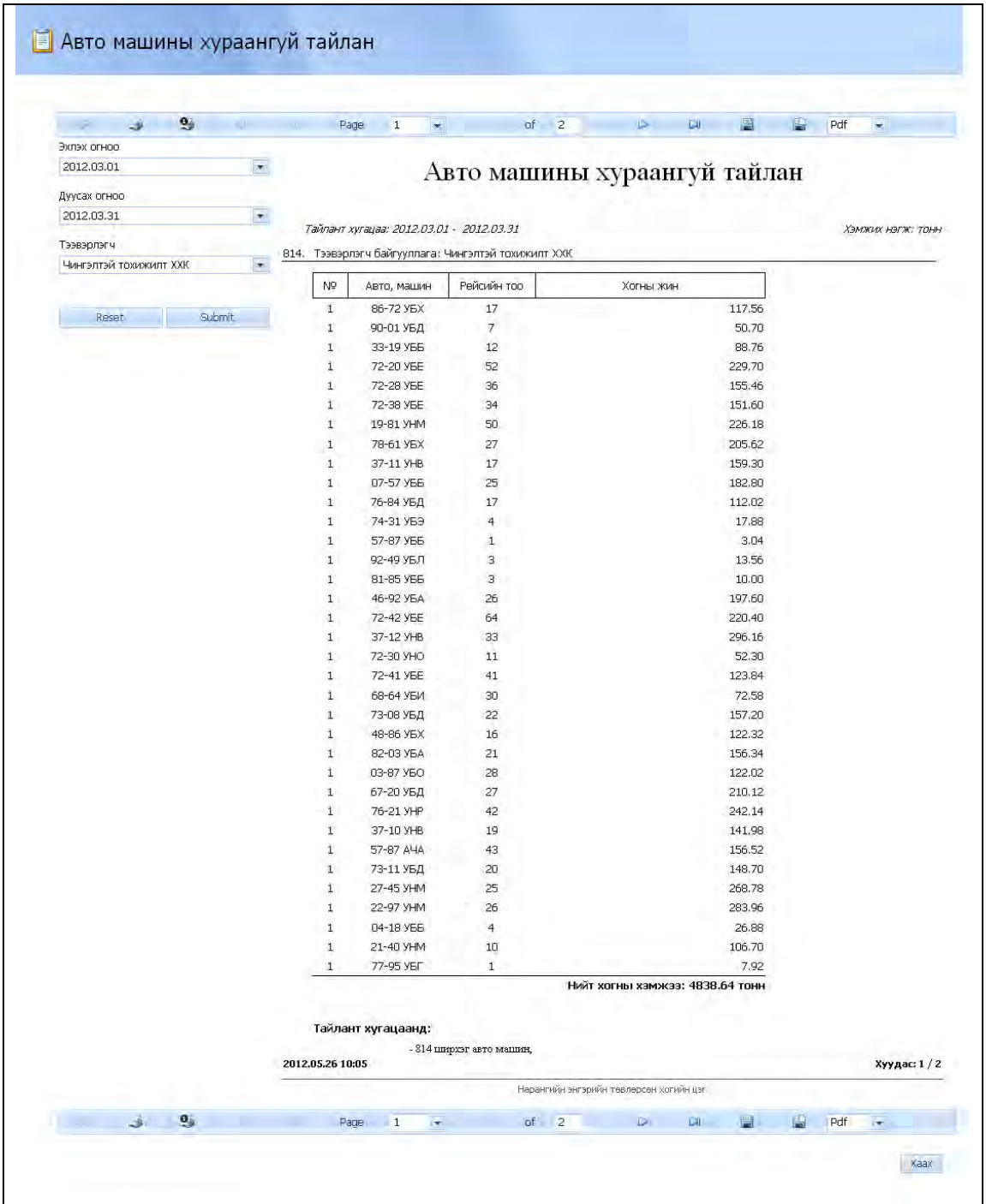
* If you leave the transporter cell blank, results will be displayed containing information of all transporters as far as the user account is authorized to see.

Result of user request is shown below.

（e.g.）In case of “Transporter：Chingeltei TUK、Date：2012/3/1-3/31”

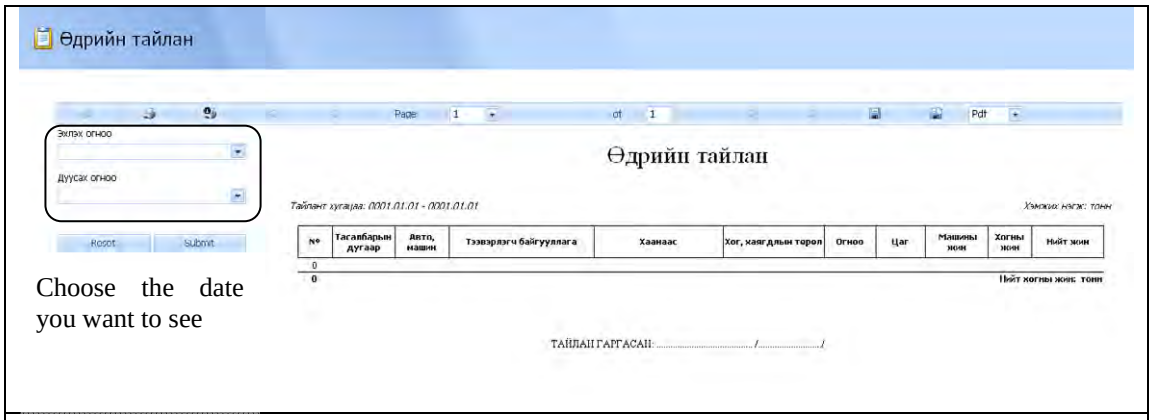
--- Header of report

Number	License Plate Number of Vehicle	Number of Trips	Total Weight of Waste



Summary report of transporter by vehicle /search results

3. Daily reports



Daily report /input page

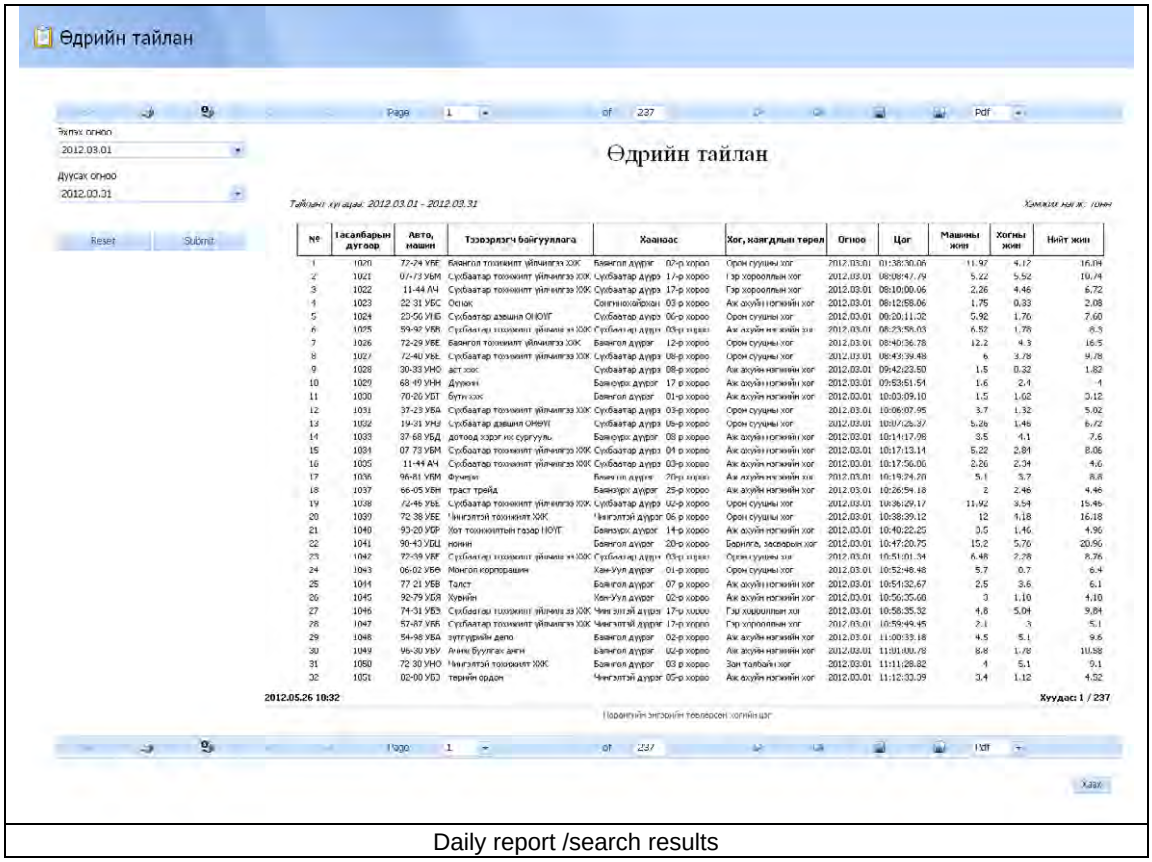
Once you have entered the page “Daily reports”, you can choose date and plate number of vehicle you want to get information on and then click “submit”.

Result of user request is shown below.

（e.g.）In case of “Transporter：Chingeltei TUK、Date：2012/3/1-3/31”

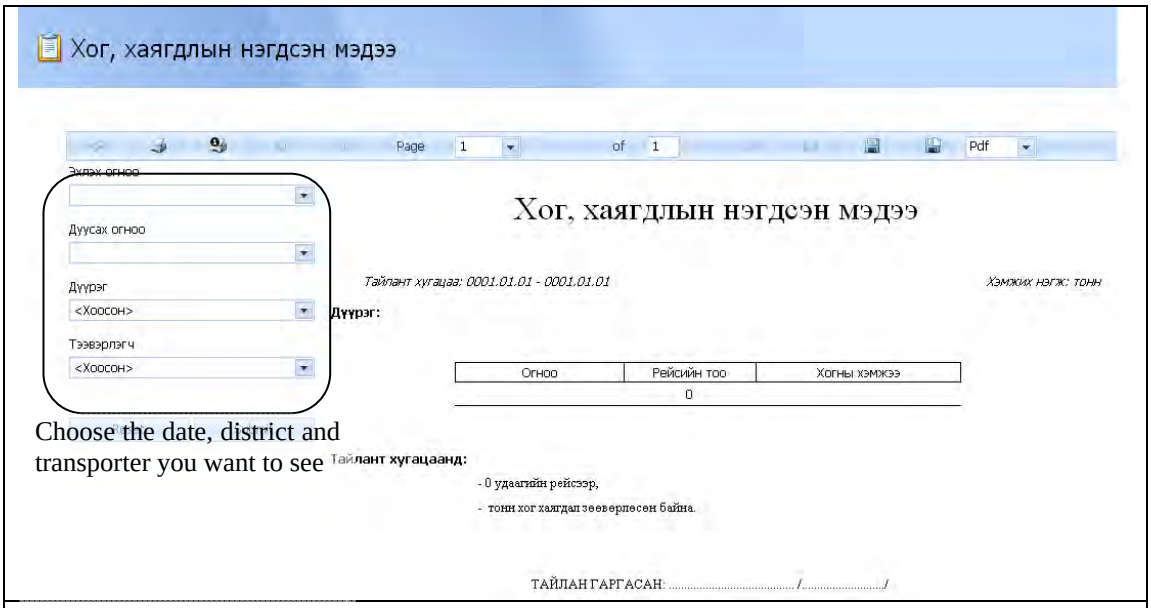
--- Header of report

Num	Ticket Num	License Plate Num of Vehicle	Organization Name of Transporter	Area Collected	Classification of Waste	Date	Time	Weight of Waste	Weight of Vehicle	Total Weight



Daily report /search results

4. Summary report of district by vehicle



Choose the date, district and transporter you want to see

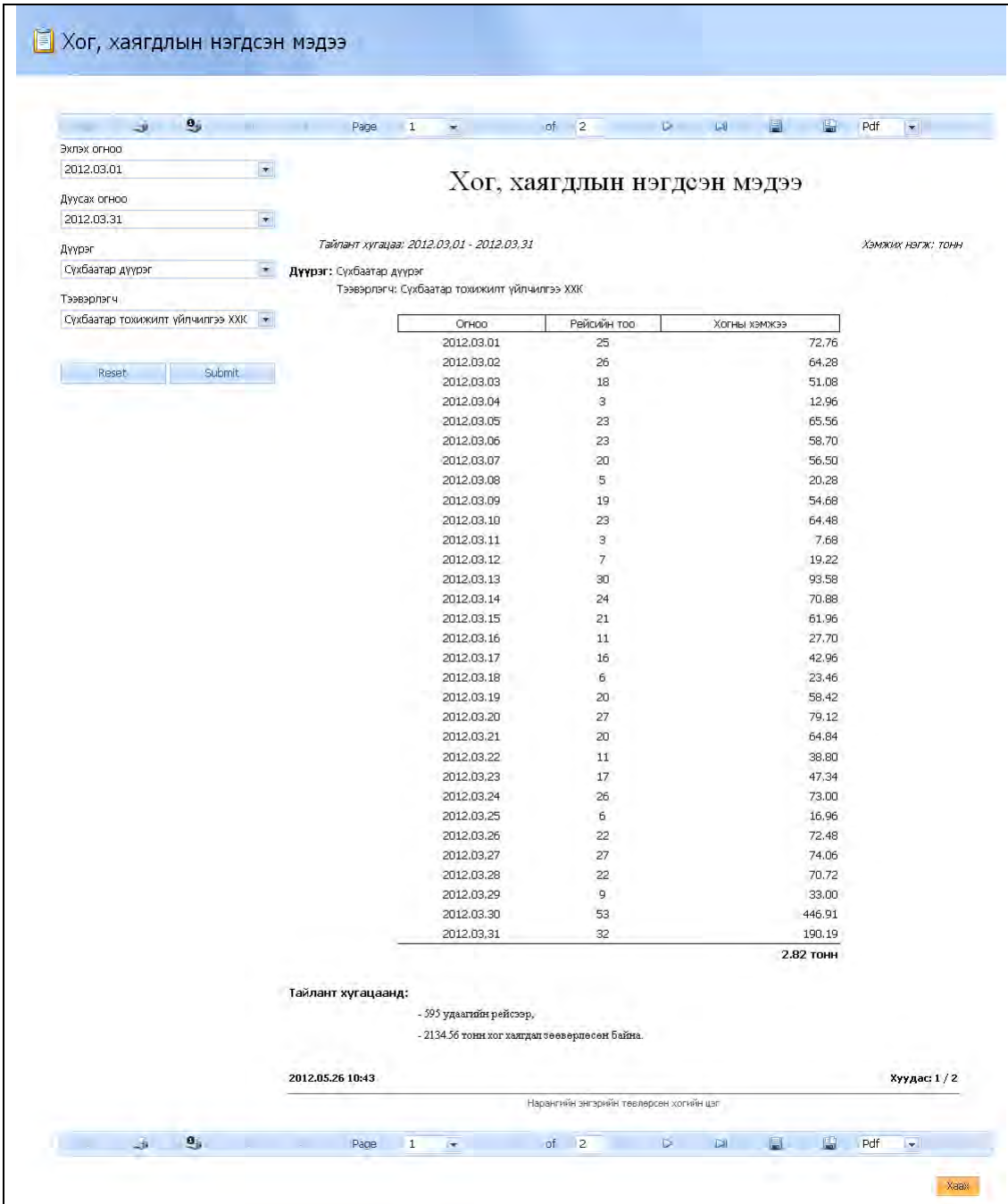
Summary report of district by vehicle /input page

Once you have entered “Summary report of district by vehicle”, you can choose date, district and transporter you want to get information on and then click “submit”.
Result of user request is shown below.

（e.g.）in case of “District：Sukhbaatar、Transporter：Sukhbaatar TUK、Date：2012/3/1-3/31”

--- Header of report

Date	Number of Trips	Total Weight of Waste



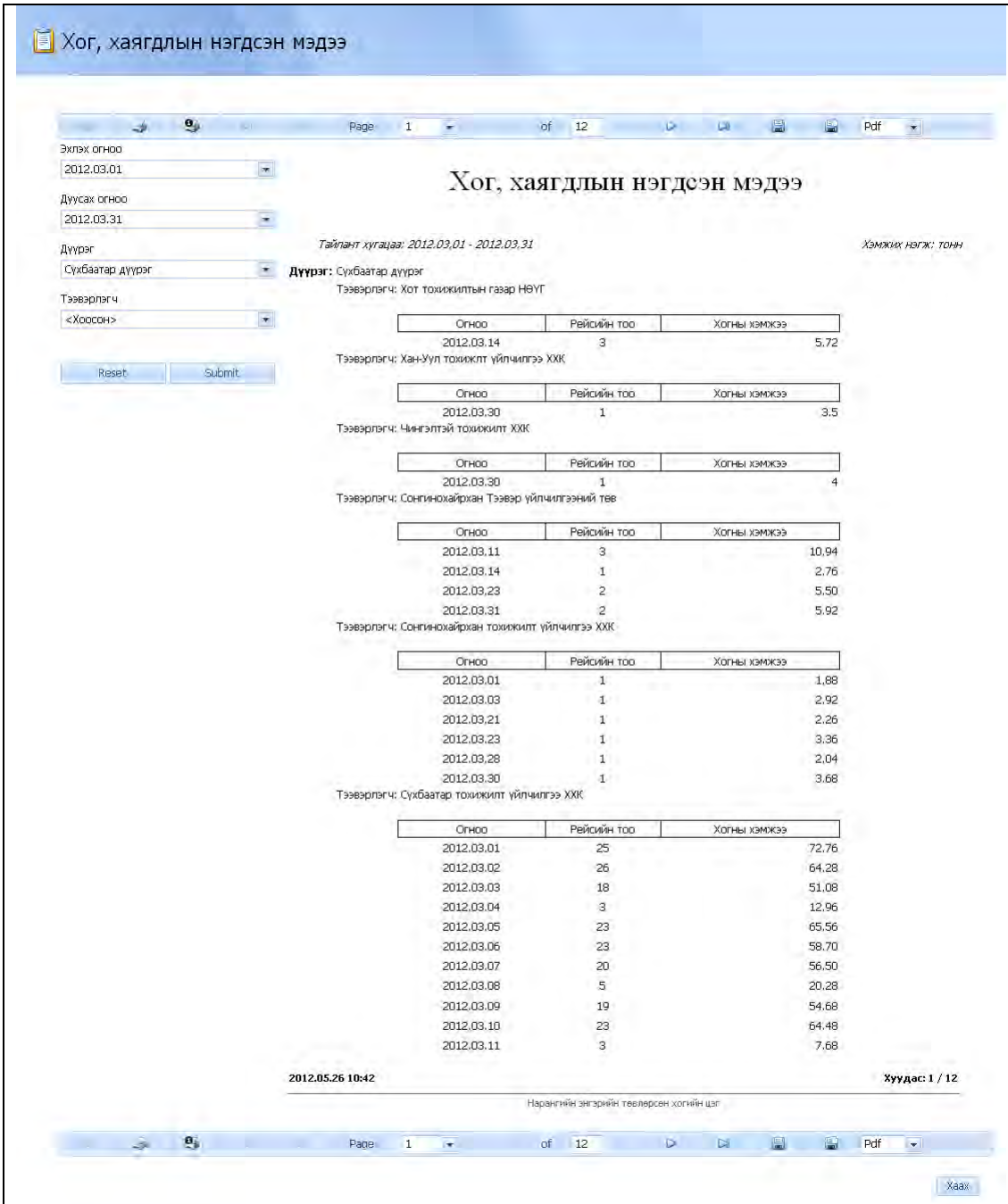
Summary report of district by transporter /search results

* If you leave the district or transporter cell blank, results will be displayed containing information of all transporters according to the user's authorization status. An example in case of leaving either the district or transporter cell blank is shown below.

（e.g.）In case of "District：Blank、Transporter：Blank、Date：2012/3/1-3/31"

--- Header of report

Date	Number of Trips	Total Weight of Waste

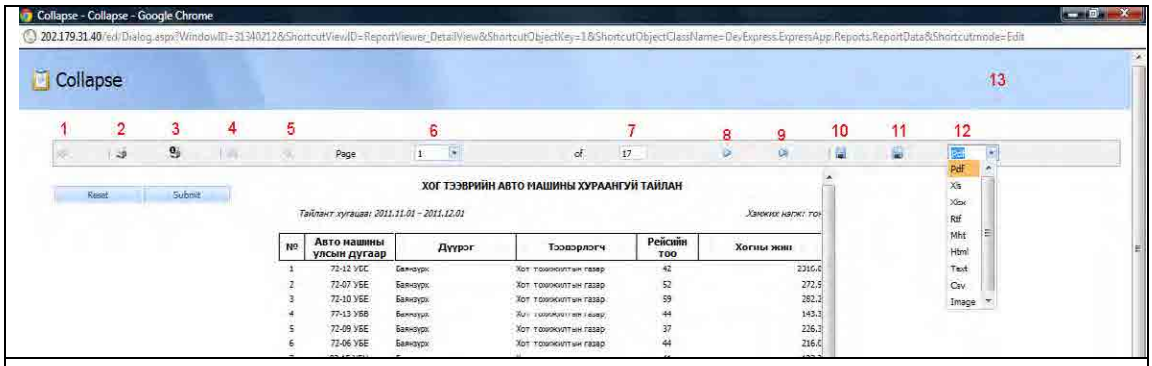


Summary report of district by transporter /search results

The report was displayed in the window with information divided into all of the districts and transporters that the user was authorized to see.

Extra; General functions in each report

You can use several functions in every page of report to use WB record in more convenient way. You can also search for a word within a report, print a page, as well as read a report in a common file type such as Excel, PDF by exporting it. Each function is introduced in below figure and table.



Functions for viewing and using reports

1	Search	7	Total number of pages
2	Print page	8	Go to next page
3	Print current page	9	Go to last page
4	Go to first page	10	Export and save report to disk
5	Go to previous page	11	Export report and show in new window
6	Insert page number	12	File format for exporting

SECTION E Pilot Project

E Pilot Project

E.1 Introduction

E.1.1 Rationale

The fundamental goal of the SWM M/P for the MUB formulated during the Development Study is "to establish an environmentally sound SWM system in UBC by the year 2020". Based on the fundamental goal of the M/P, a series of pilot projects (PPs) on waste recycling activities were implemented under this technical cooperation project to identify the most appropriate recycling system for UBC.

As recycling activity consists of separate discharge, separate collection and treatment stages, the PPs conducted under the technical cooperation project were planned for each of these stages. Based on the results of the PPs, recommendations for each stage of recycling activity should be formulated at the end of the technical cooperation project to form the most appropriate recycling system for UBC.

E.1.2 Implementation Policies

The major policies applied to the PPs are the following:

a. Public awareness

The improvement of public awareness on waste separation is essential in establishment of recycling system since waste separation at generation sources is the key in efficient recycling activities. Therefore, public-awareness-raising activities were considered as the most important component in the PPs planned for the technical cooperation project.

b. Key pattern of recycling activity

Considering the current composition of MSW, the share of kitchen waste is low due to dietary habits of residents in Mongolia. At the same time, demand for fertilizers is also low in the country due to its agricultural structure. Considering the conditions, composting is not suitable for key recycling activity in UBC.

On the other hand, shares of package waste such as cans, bottles and PET are quite high as Mongolia supplies most of its food and beverage consumptions by importing products from neighboring countries. Therefore, it is worthwhile to focus on separation and recycling of these wastes.

c. Scope of the PPs

There are two major trends in waste separation: separation at generation sources and sorting at disposal sites. Although sorting activities in the latter are inefficient and unsanitary, many developing countries tend to adopt as it does not require public cooperation. Since the results obtained through the PPs had to be applied in formulation of an appropriate recycling plan for UBC, both patterns were covered by the PPs on a pilot scale.

d. Cooperation with waste pickers

The groups of waste pickers organized at NEDS during the Development Study participated

in the PP on waste sorting at disposal site since it had been expected that their working place would shift from the landfill site to the recycling complex in the future.

e. Capacity development

Throughout the implementation of the PPs, efforts were made to strengthen the capacities of C/P organizations on SWM and public-awareness-raising by implementing the project activities in cooperation with the C/P members.

E.1.3 Pilot Projects

The purpose of implementing PPs was to obtain data that are necessary for identification of the most appropriate recycling system for UBC by implementing experiments on separate discharge (PP-1), separate collection (PP-2) and waste sorting at landfill site (PP-3).

Each PP consists of two components: (1) Preparatory activities and (2) Actual experiments. The components of the PPs are presented in the table below:

Table E-1: Components of the Pilot Projects

PPs	Components of the PPs	
	Preparatory Activities	Experiments
PP-1: Separate discharge	1-1: Improvement of discharge manner and promotion of waste separation at generation sources	1-2: Verification of separate discharge
PP-2: Separate collection	2-1: Intensification of waste separation and separate discharge and improvement of regular collection	2-2: Verification of separate collection
PP-3: Waste sorting at landfill site	3-1: Construction of sorting facility	3-2: Verification of waste sorting at landfill site

The purpose of the PP-1 was to verify the degree of residents' cooperation on waste separation at generation sources by implementing an experiment on separate discharge. Therefore, it was necessary to implement intensive public-awareness-raising activities in order to establish essential conditions for separate discharge before implementing the experiment.

As for the PP-2, separate collection was implemented to verify a system through which the waste separated by households during the PP-1 would be transported to a sorting facility of the landfill site. In order to implement the task successfully, it was necessary to improve the regular collection before implementing the separate collection.

During the implementation of the PP-3, the waste to be transported by both regular and separate collections was planned to be sorted at a sorting facility and results were to be compared. For implementing this task, a sorting facility needed at a landfill site before commencing the PP.

Therefore, the activities of the PPs are closely interrelated and most of the activities of different PPs had to be implemented at the same time or immediately after another.

The sequence of activities was shown in the following figure:

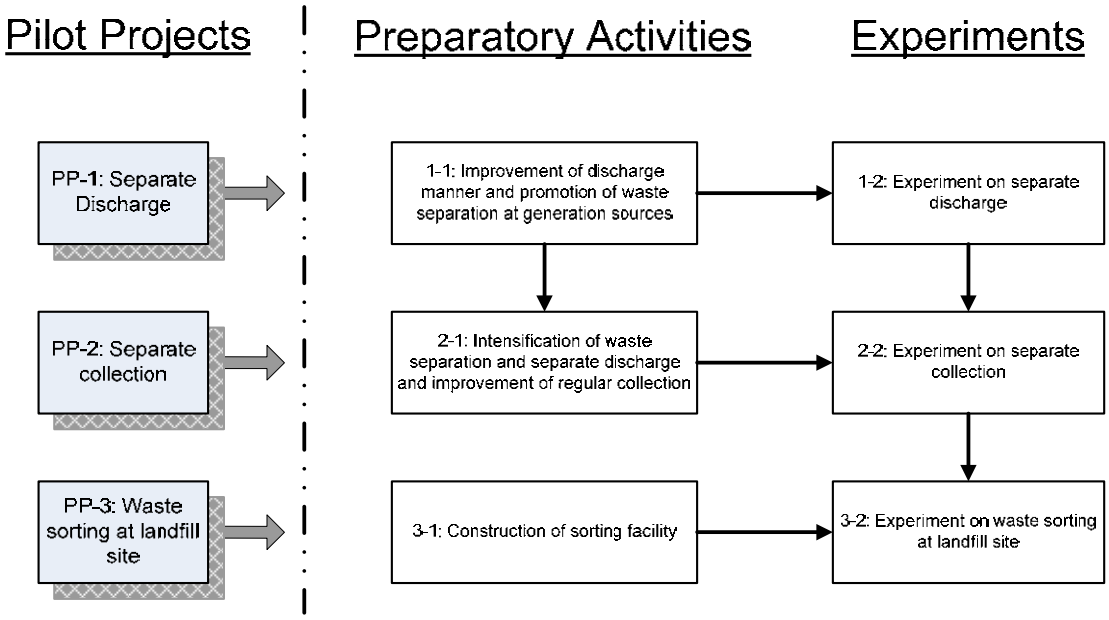


Figure E-1: The Components of the PPs and Implementation Sequence

The detailed information about the PPs, implementation methods, conducted activities and achievements is introduced in the next sections by each PP.

E.2 PP-1: Pilot Project on SEPARATE DISCHARGE

E.2.1 Outline of the Project

a. Project Description

As mentioned before, the purpose of the PP-1 was to verify the degree of residents' cooperation on waste separation at generation source through implementing an experiment on separate discharge. Since the residents' participation in the experiment was a prerequisite, it was necessary to improve the residents' discharge manner and promote waste separation at generation sources through conducting intensive public-awareness-raising activities in target khoroos. After improvement of public awareness, actual experiment on separate discharge was conducted.

The project was implemented in two phases.

For the 1st phase, four khoroos were selected and the activities of the PP were implemented by the initiative of the JET. During this phase, the JET aimed to establish implementation models and methods for EPWMD to conduct the project activities on their own. At the same time, the capacity of EPWMD on implementation of public-awareness-raising activities was developed through joint implementation of the project. For this purpose, the JET discussed every important issues related to planning, implementation, monitoring and adjustment of the project with EPWMD during weekly meetings of the technical cooperation project and maintained the involvement of the members in implementation of each activity.

During the 2nd phase, EPWMD took initiative and implemented the project activities by themselves in another four khoroos.

b. Implementation Period

The implementation period for each phase of the PP1-1 is as follows:

- Phase-1: From Apr 2010 until the completion of the technical cooperation project; and
- Phase-2: From Nov 2010 until the completion of the technical cooperation project.

c. Target Areas

For successful implementation of the PP-1, the JET with C/P organizations set criteria for the target areas including type of residential areas, district and khoroo offices' willingness to cooperate and types of waste and fee collection organizations. Based on the criteria, interviews were conducted in each district targeting district governors (deputy governors), PSD directors and khoroo governors and selected 4 khoroos for the Phase-1 of the PPs. For the Phase-2, EPWMD selected 4 khoroos as target areas for the PP through the same procedures.

The khoroos selected for the 1st phase of the PPs were SBD-5, SBD-7, BZD-1 and BZD-7 (marked with green color in the map below) while those for the 2nd phase were ChD-4, BZD-15, BGD-3 and KhUD-2 (marked with blue color in the map).

However, it was revealed that the collection service in BGD-3 had been irregular due to frequent breakdowns of the Chinese made DT dispatched by BGD-WSF to the khoroo. Although the JET requested the WSF to replace the truck with a reliable one, BGD-WSF was not able to dispatch different truck due to its insufficient fleet capacity. As the WSF was not able to conduct collection service even once a week regularly, the activities of the PP were stopped in the khoroo after implementation of the baseline surveys.

The location of each target khoroo is shown in the following map.

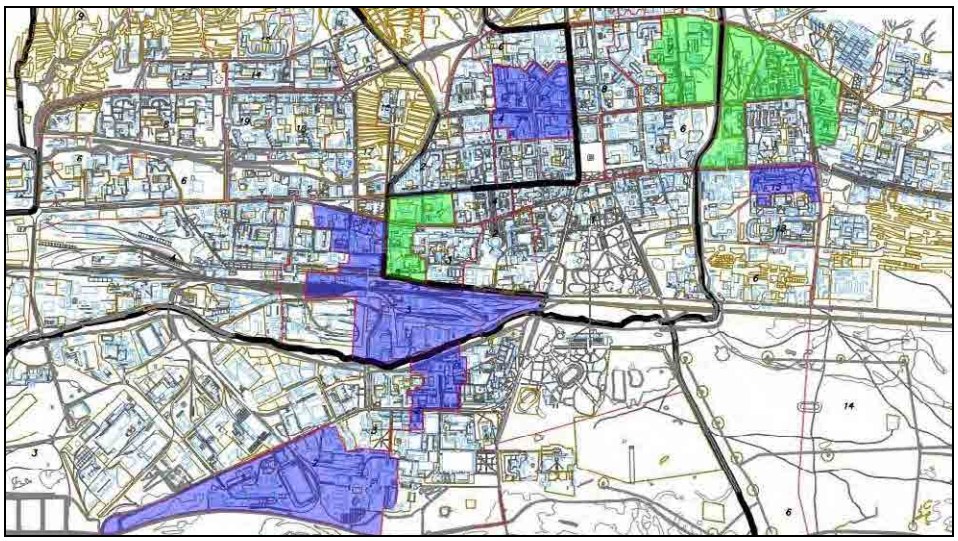


Figure E-2: Location of the Target Khoroos

d. Identification of Previous Conditions and Priority Tasks

In order to identify the conditions of SWM in the target khoroo and the degree of resident's awareness about SWM and waste recycling, baseline surveys were conducted in each target khoroo before implementation of the project activities. One of the purposes of these surveys was to collect basic information for preparation of detailed plans for implementation of project activities in each selected khoroo.

The baseline surveys included three major surveys: (1) Collection of basic information on SWM in each khoroo, (2) Public Opinion Survey and (3) Time & Motion Survey. The following are the results of the surveys.

d.1 Basic Information of SWM in Target Khoroos

The information collected during the baseline surveys is numbers of population, households, apartments, Apartment Owner's Unions (AOU), entrances in each apartment and watchmen in each target khoroo. In addition to this basic information, numbers, types and locations of discharge points located in the khoroos were identified and plotted into maps (an example is shown in Figure E-3).

The information and data was used in planning activities and calculation of copies of public education tools such as posters, leaflets and brochures.

The basic indicators identified during this survey were presented as follows.

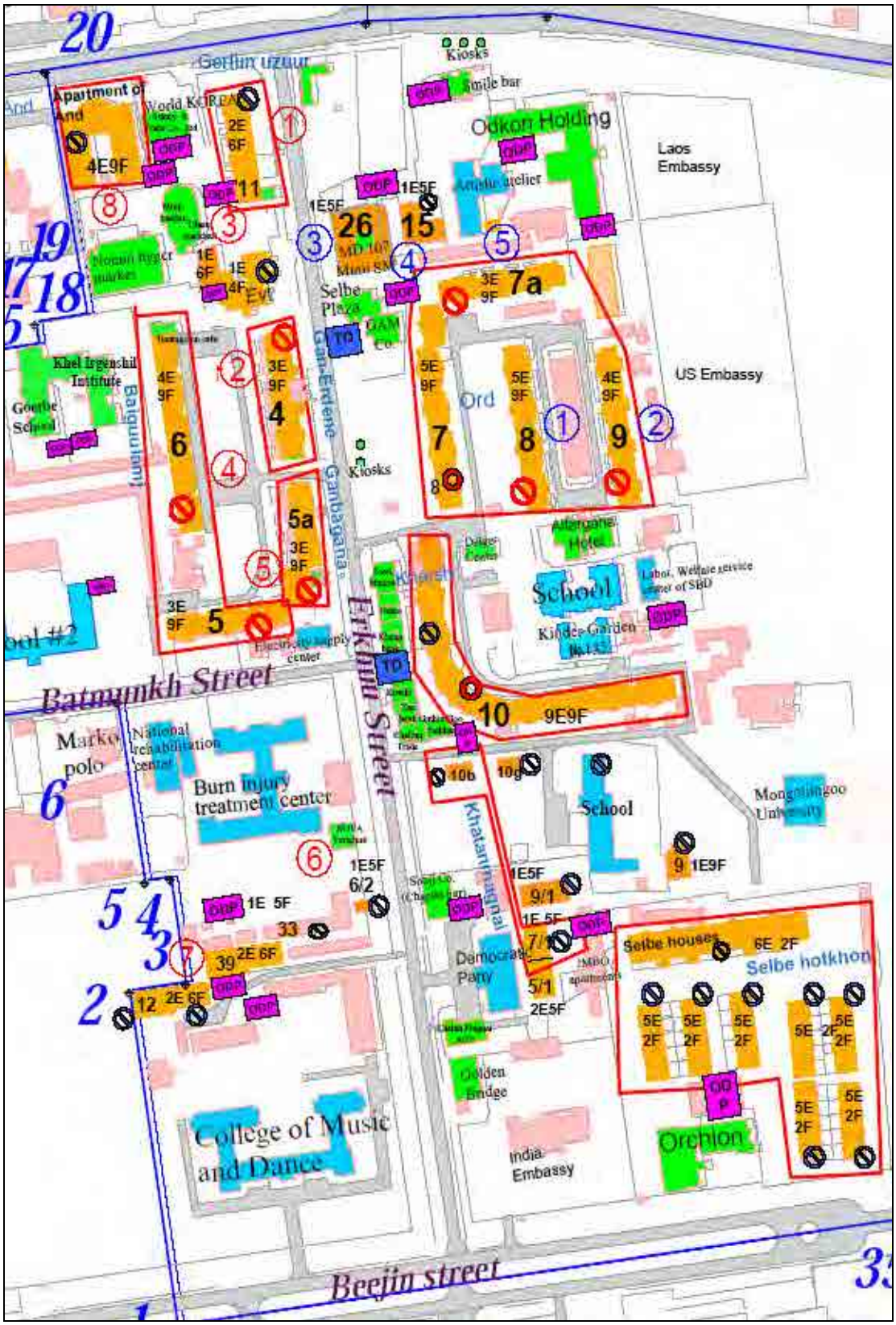


Figure E-3: An example of plotted map of a target khoroo

Table E-2: Basic Indicators of Target Khoroos

Indicators	Target khoroos of Phase-1				Target khoroos of Phase-2			
	SBD-5	**SBD-7**	**BZD-1**	**BZD-7**	**ChD-4**	**BZD-15**	**BGD-3**	**KhUD-2**
Apartment population	5,253	7,874	5,753	7,698	5,245	5,696	7,399	8,138
Apartment households	1,254	1,980	1,524	1,800			1,763	1,885
Business entities	100	150	many	many		many	180	350
Total apartments	29	25	44	20	33	29	50	35
With DC	14	9	18	12	0	27	5	1
Without DC	15	16	26	18	33	2	45	34
Number of AOUs	9	10	9	7	11	7	7+1	8
Fee collector	WSF	WSF	WSF	WSF	WSF	WSF	WSF	TUK
Waste collector	Tsuzuki Yume	EU	CMPUA	CMPUA	TUK	CMPUA	TUK	TUK
Frequency of collection								
Apartments with DC	7 times/week	1 time/week	3 times/week (Mon, Wed, Fri)	1 time/week (Wed)	7(mon-sun)		2times/wk(irregularly)	7(mon-sun) in the morning
Apartments without DC	7 times/week	2 times/week	3 times/week (Mon, Wed, Fri)	5 times/week (Mon, Tue, Thu, Fri, Sat)		2times/wk(irregularly)	1time/wk(irregularly)	
Businesses			3 times/week (Tue, Thu, Sat)				collected by Bayangol TUK	7(mon-sun) in the afternoon
Waste Discharge	The watchman keeps (at entrance) until collection	The watchman rocks the gate of dust chute	The watchman keeps (at entrance) until collection	The watchman keeps (at entrance) until collection	Residents put waste 9-12am		ODP	Residents put waste 9-12am
Bell collection service	YES (partly, 80% of no/DC apt.)	NO	YES	YES	○	× but car horn	×	○
Collection vehicles	1 compactor truck	1 dump truck	1 compactor truck	1 compactor truck	1compactor truck	1compactor truck (Japanese, 3.8ton)	1compactor truck,1dump truck	1compactor truck
	(Japanese 2.5 ton)	(Chinese 4.5 ton)	(Japanese 3.5 ton)	(Japanese 3.5 ton)	(Japanese, 15 ㎥)*		(Japanese, 8 ㎥)*	(Japanese, 15 ㎥)*
Community recycling	NO	YES	there is one recycling shop	NO	×	×	×	×
Recycling shop					×	×	1	×

d.2 T&M Survey

The objective of the survey was to obtain basic information about the current condition of waste collection service and residents' waste discharge manner in all khoroos selected for both the Phase-1 and the Phase-2 of the PP.

The findings obtained through the survey are as follows:

- About 1/3 of the total waste is discharged by business entities operating in the target khoroos.
- The most common types of discharge points are temporary discharge point (TDP), dust chute (DC), outside discharge point with containers (ODP) and discharge point for open-dumping (DPo).
- Waste to be discharged to DCs, ODPs and DPo-s are usually open and it hinders collection companies to collect waste efficiently. On contrary, waste at TDPs are usually put into bags; and therefore, the collection efficiency is the highest.
- Dump trucks are not suitable in collection of apartment areas since they undermine the collection efficiency.
- Waste collection at TDPs is often scheduled while that at DCs and ODPs is irregular and not scheduled.
- Recyclables are picked two times before waste is transported to disposal sites: by apartment watchmen before collection and by collection workers during the collection. The amount of recyclables picked by collection workers accounts for 1% to 2% in the total collection amount.

d.3 Public Opinion Survey[1] (POS-1)

As 30 % of the total waste was being discharged by business entities, the POS targeted not only households, but also business entities. The survey was implemented between 21 Apr 2010 and 30 Apr 2010 in target khoroos of the Phase-1.

During the survey, information about current conditions of waste collection service, waste management of apartments or business entities, discharge manner and recycling activities was obtained using a questionnaire prepared by the JET in advance. The number of respondents targeted by the survey was 400 households and 100 companies. EPWMD distributed the questionnaire to the target households and businesses via AOU leaders, WSF staff and heseg leaders.

Although the initial conditions before implementation of the PP varied khoroo by khoroo depending on their specific features, the common items identified through the survey were the following:

- Entrance watchmen play great role in maintaining sanitary conditions of apartments and waste separation.
- Types of discharge points vary depending on structures of apartments (with or without dust chutes etc).

[1] The POS was conducted three times for two purposes. One of the purposes was to identify the initial conditions of public awareness, level of satisfaction on collection service, waste discharge manner and possibilities of introducing waste separation at generation sources before commencement of the PP activities. The other was to collect data for evaluating achievements of the activities conducted under the PP. However, this section introduces only a part of the results of the 1st POS in relation with the initial conditions of the SWM in the selected khoroos.

- The most common discharge frequency is twice to three times per week.
- Most of the households do not separate recyclables. However, majority (more than 60%) of them are willing to cooperate on waste separation at generation sources.
- Among the businesses, restaurants and bars recycle glass bottles and PET while the other types of businesses are not keen to recycle any waste.
- The possible period of storing recyclables at households is 2 to 3 days.
- All the respondents consider that improvements in sanitary conditions of apartments and efficiency of collection service are necessary.

d.4 Results of the Baseline Surveys

d.4.1 Current Discharge Manner

During the baseline surveys, the JET identified that the public sanitation in residential areas had not been sufficient due to the bad discharge manner.

On the other hand, the discharge manner was dependent on the types of discharge points existed in the target khoroos at the time of project commencement. According to the baseline surveys conducted by the JET and EPWMD, many apartments in the target khoroos equipped with dust chutes (DC); and thus, residents discharge their waste at their convenient time. Although there are apartments without dust chute, many of them placed big containers outside the apartments (i.e. Outside Discharge Point, "ODP" in short) for residents to discharge waste. Like those of apartments with dust chute, residents living in this kind of apartments also discharge their waste at their convenient time. In most cases, waste to be discharged to DCs and ODPs is not put into bags.

As waste in DCs and ODPs was usually open and collected once a week or a fortnight, the waste had to be kept in the DCs and outside for a long time polluting the surrounding environment. In other words, keeping waste in DCs and ODPs for long time caused bad odors, insects, flies, waste scattering and even outbreak of fires in DCs or ODPs. As ODPs are open for anyone to access, outsiders and some businesses discharge their waste, waste pickers or stray dogs and animals scatter the waste of the ODP around surrounding environment. At the same time, collection companies faced inefficiency in collecting waste accumulated in DCs and ODPs.

d.4.2 Priority Tasks to Be Tackled and Items of Consideration

Based on the findings of the baseline surveys, the following tasks were decided to be tackled in the target khoroos through project implementation:

- Improvement of residents' waste discharge manners;
- Introduction of waste separation at generation sources; and
- Improvement of waste collection service.

The first and the second tasks should have been conducted for generation sources (households and businesses) using various means of public relation and public education activities while the third should have been implemented in cooperation with collection companies.

When planning and implementing the above tasks, the following items should be considered:

- As waste to be discharged by business entities occupy more than 30%, they should be

covered by the pilot project;

- Punctuality in collection service is the prerequisite for successful introduction of separate discharge;
- Closure of DCs and ODPs in the target khoroos is one of the important factors not only for improvement of discharge manner, but also improvement in collection efficiency; and
- For better achievements, all relevant organizations such as khoroo offices, WSFs, transporting companies and AOUs should be involved in implementation of the project activities.

e. Implementation Method

In order to implement PR activities effectively, the JET and EPWMD decided to organize regular meetings for AOU leaders and invite officials of the relevant organizations such as districts, khoroo offices and collection companies to the meetings throughout the implementation of the pilot project.

The purpose of these meetings was to exchange information, identify problems, set objectives of improvements, plan activities, discuss implementation method and exchange information.

The AOU meetings were organized 47 times in the target khoroos of Phase-1 by the JET and 17 times in the target khoroos of Phase-2 by EPWMD. All the important decisions such as waste discharge rules, contents of PR tools and waste collection schedules were made by the attendants during these meetings.

During the AOU meetings organized in the khoroos of Phase-2, knowledge and information on SWM was transferred from the EPWMD members to the attendants and good relationships among the EPWMD members and relevant organizations were established. The JET attended these meetings only as an observer and gave them advice when necessary.

AOUM at KhUD2 (by Mr. Ariguun）

AOUM at BGD3（by Mr. Odjargal）

AOUM at BZD15（by Mr. Batbileg）

AOUM at ChD4（by Mr. Amgalan）

Figure E-4: AOU meetings organized by EPWMD members

f. Planned Improvements

During the AOU meetings, important decisions about preferable improvements were made by Khoroo Offices and AOU leaders of the target khoroos and the entire pilot activities were planned based on them. The preferable improvements decided by the khoroos and AOUs were the following:

Waste separation: Residents will separate their waste into two categories: Recyclables and Other waste.

Discharge manner: Residents should put recyclables and other waste into different plastic bags before discharging. The bags of waste should be discharged only at designated point on designated days and time.

Waste recycling: Either residents or watchmen will sell recyclables to recyclable shops on their own.

Waste storage: Entrance watchmen will collect the bags of waste discharged by residents, keep them at storage places of their apartments and put them out at designated collection points when collection trucks come.

Waste collection: Waste collection schedule will be set and collection companies will collect waste according to the schedule.

Based on the decisions above, the PR tools were prepared and public-awareness-raising and improvement activities were implemented.

E.2.2 Improvement of Discharge Manner and Promotion of Waste Separation at Generation Sources

This part of the PP-1 is the most important activity for the components of all 3 PPs and consists solely of public-awareness-raising or PR activities for establishment of prerequisite conditions for introduction of separate discharge and separate collection.

Following are the detailed information about the implementation of the activity.

a. Activities Related to Improvement of Public Awareness

a.1 PR tools

Based on the above decisions by the AOU meetings, the JET and EPWMD prepared various PR tools for improvement of public awareness on SWM and promotion of PP activities for each target khoroo depending on their conditions.

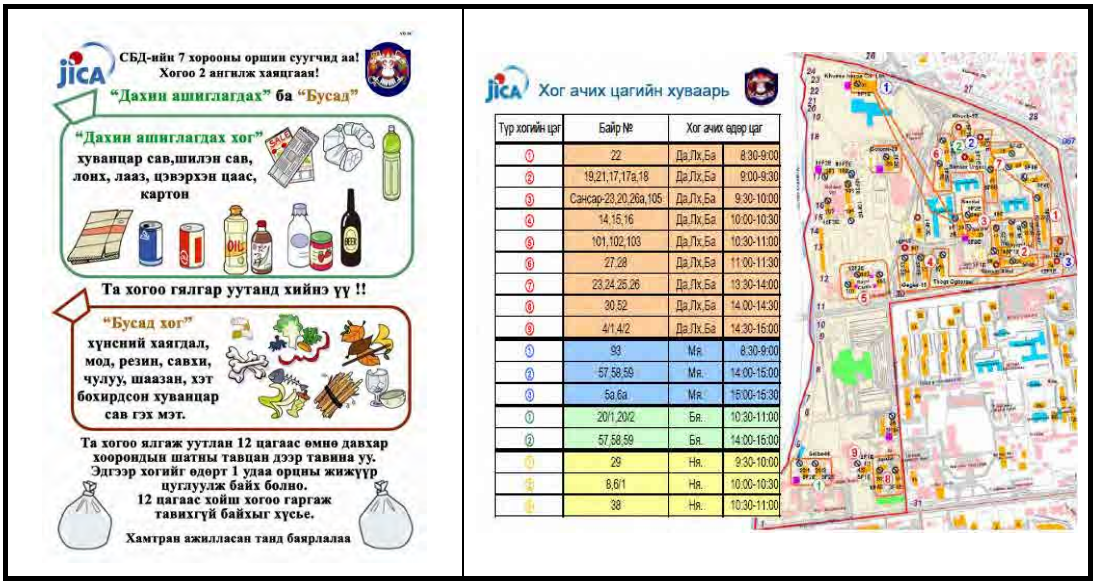
The major topics of the PR tools were:

(1) Waste related issues and SWM education
(2) The concepts and roles of 3Rs;
(3) Waste discharge rules for residents and business entities;
(4) Waste separation method and
(5) Collection routes and schedules.

The types of the tools were leaflets, posters, brochures, bookmarks, calendars, booklets, banners and even voice messages to be played during collection services. All these PR tools were made with Microsoft Powerpoint in order for C/P organizations to edit and use as samples in their future activities.

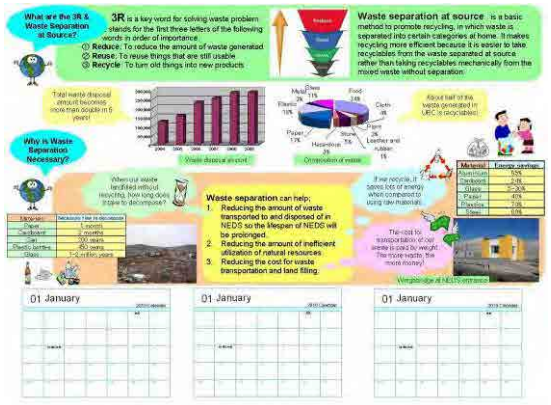
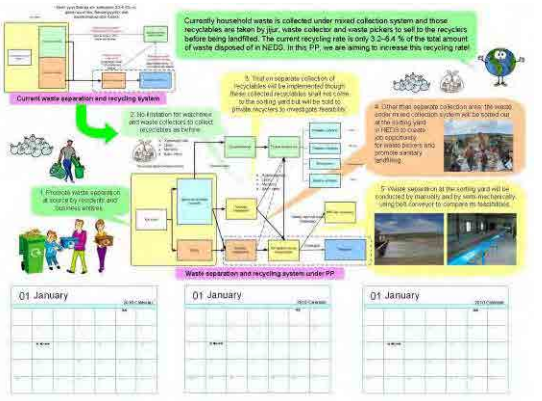
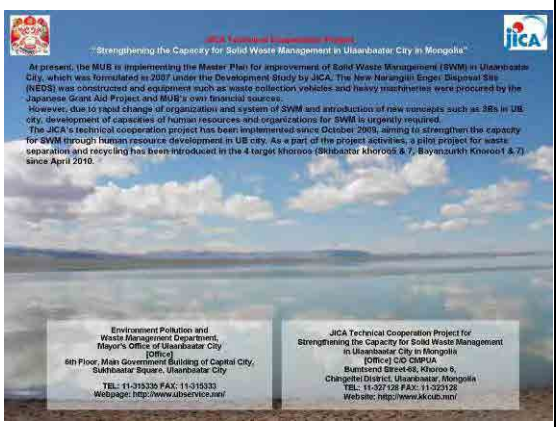
The PR tools were distributed to residents and watchmen directly during public meetings and via AOU leaders. Some of the tools are shown in the following figures.

Figure E-5: Brochure on SWM, discharge manner and pilot project



(a) A leaflet for waste separation	(b) Collection route and schedule

Figure E-6: Leaflets on Waste Separation and Collection Schedule

	
Calendar: A3 sized 250 gram glossy paper with two-side printing and coiled wire stitches. (1) Cover page: With the motto "Waste if mixed and resources if separated".	(2) Page for January, February and March months: Explanation about the pilot project and waste discharge rules
	
(3) Page for April, May and June months: Information about amount and composition of UB city waste, explanation about 3Rs and importance of waste separation at generation sources.	(4) Page for July, August and September months: Current waste separation and recycling activities in UB, explanation about waste separation and recycling system under PP
	
(5) Page for October, November, and December months: Explanation about how	(6) Back cover page: General information

separated recyclables are treated and utilization of RPF.	about the project and contact address

Figure E-7: Calendar for improvement of public awareness on waste related issues

During the implementation of the PR activities, it was known that more valuable PR tools such as calendars that can be used for longer are more effective than the leaflets and posters since there were occasions that residents discharge leaflets and tear posters stuck onto doors of entrances.

a.2 Public Meetings

Public meetings were organized for further improvement of public education on waste separation. Therefore, PR tools that help residents separate waste at household level were prepared and distributed during the public meetings organized in the target khoroos in Nov 2010. The meetings were organized in Saturday afternoons since many households would be expected to be present during weekdays.

The summary of the meetings are shown in the following table.

Table E-3: Public Meetings

	SBD5	SBD7	BZD1	BZD7
	1st PM	1st PM	1st PM	1st PM
Date	Nov. 6, 2010	Nov.20, 2010	Nov.13, 2010	Nov. 6, 2010
Place	In front of Apart #4	In front of Aprt And	In front of Apart #58	Khoroo government office
Target AOU	Delger 81, Urguu-5	Tegsh	Sansar Urguu	Mandakh nar, Khos zam urguu, Suld-115
No. of Participants	15	40	1	33
			2nd PM	2nd PM
Date			Nov.20, 2010	Nov.13, 2010
Place			Library at the 1st floor of Apart #58	Khoroo government office
Target AOU			Sansar Urguu	Altan ovoo, Michid, Sansar suub, Khantaishir
No. of Participants			15	15

The meetings were organized in two patterns: outdoors (among apartments) and indoors (in meeting facilities).

(a) Public meeting in SBD-5 (Outdoors)

(b) Public meeting in BZD-7 (Indoors)

Figure E-8: Public meetings

Although the venues and dates of the meetings had been informed and residents had been invited by khoroo offices and AOU leaders and through posters stuck on entrance doors, the number of participants was not sufficient. It was also revealed that the number of participants increase when this kind of meetings is organized outdoors as residents outside might be invited to the meeting. Although meetings were organized on Saturdays considering the availability of residents, the most of the attendants were elders.

Many residents requested to purchase valuables from them and implement separate collection.

Lessons learnt from the meetings and recommendations for future actions are summarized as follows:

- The low attendance by residents during above meetings implicates that public meetings that require a lot of resources and efforts such as those mentioned above are not effective as a tool for PR activities. Therefore, alternatives of PR activities using mass media such as TV advertisements need to be considered in order to cover as many residents as possible.
- Necessity of organizing public meetings in warm seasons for identification of seasonal dependence of residents' participation should be considered. In that case, possibility of organizing short meetings inside apartment entrances should be investigated since organizing a big meeting for all residents was not effective.
- If a system where waste would be separated into 3 categories (recyclables, RPF material and others) is introduced, it will be necessary to explain the importance of RPF and KOICA's plan for construction of the RPF facility to residents in advance in order to obtain their cooperation.

b. Activities Related to Improvement of Discharge Manner

In order to improve residents' discharge manner, the JET and EPWMD recommended closure of DCs and ODPs to AOU leaders of all target khoroos.

Based on the recommendation by the JET, the AOU leaders in the target khoroos discussed the closure of DCs and ODPs during the regular meetings and decided to close them and improve residents' discharge manner as recommended by the JET. For successful implementation, the closure of DCs and ODPs were implemented at the same time with collection improvement.

In relation with this task, the JET prepared necessary PR tools that contain information about the preferable discharge manner, advantages of the closing DCs and ODPs, date of closure and timetables of collection services. The PR tools were distributed to the residents and businesses through AOU leaders and khoroo offices.

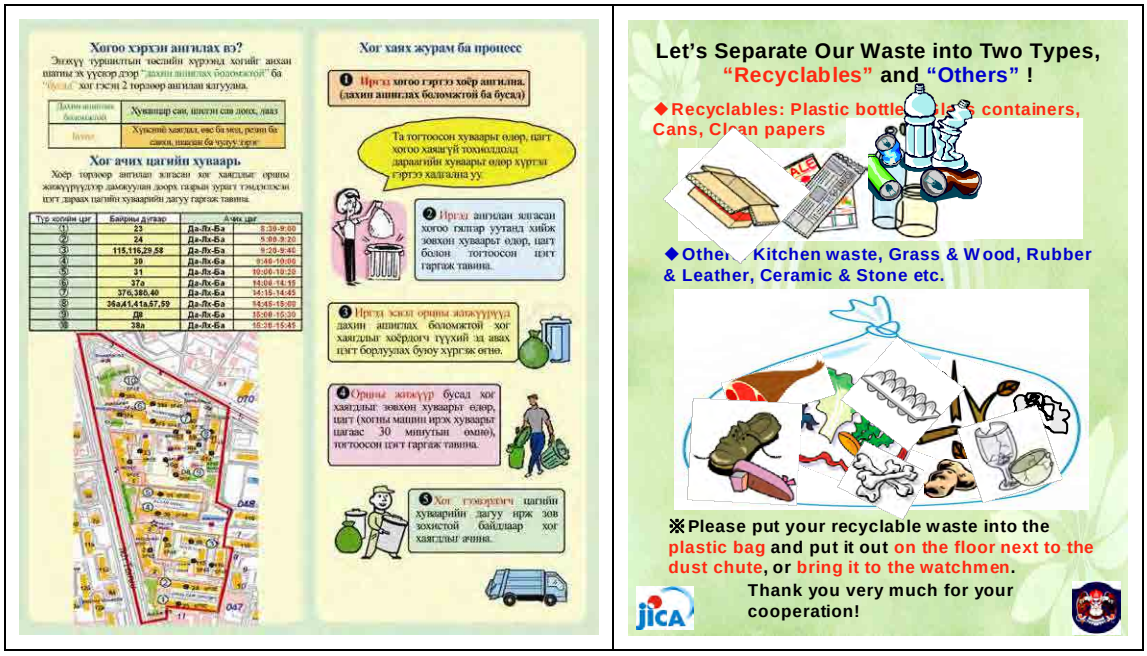


Figure E-9: Part of the PR tools designated for improvement of discharge manner

b.1 Closure of DCs and ODP

Having distributed sufficient information, AOU leaders closed DCs and removed ODPs at their apartments while JET placed notice or mini poster with logos of JICA and Ulaanbaatar city to inform about closure of DCs and ODPs and new discharge rules. The costs of ODP removal was paid by respective AOUs (there was a case in SBD-7 that the khoroo office paid the costs for removal of ODPs from apartments which did not belong to any AOUs). Banners about prohibition of waste discharge at the places where ODPs existed were prepared by collection companies and the JET.

Figure E-10: A closed DC and waste discharged in accordance with the new rules (in SBD-7)

Figure E-11: Conditions before and after the closure of ODP (in SBD-5)

Apartment 12a (KhUD-2)	Apartment 4 (BZD-15)	Apartment 5 (BZD-15)

Figure E-12: DCs closed during the implementation of the PP

At the time of T&M study in April, 2011. There was always scattering of waste.

June, 2011 just after the implementation of PP. The sign board was installed at DPO to prohibit the illegal dumping.

Feb., 2012. A new wall has been set up and there is no waste scattering even without sign board.

Figure E-13: Closed ODP at Apartment 12A in KhUD-2

The apartments where DCs and ODPs were closed during the pilot project were as shown in the table below:

Table E-4: Apartments where DCs and ODPs were closed

Khoroos	Closed DCs (as of 28 Jul 2010)		Closed ODPs	
	Apartments	Subtotal	Apartments	Subtotal
SBD#5	#4	1	#5, #13-2	2
SBD#7	All apartments with DC (#4,5a,5,6,7,7a,8,9,10)	9	"Tegsh", #12, #18	2
BZD#1	#57, #58, #59	3	#8	1
BZD#7	None	0	#37a, #38a	2
KhUD-2	12a, 12b, 12v	3	12a, 8	2
ChD-4	None	-	None	-
BZD-15	4, 5	2	None	-
Total		**18**		**9**

b.2 Problems

Apartments #57, #58, #59 (in BZD-1) and #5 (in SBD-5) reopened their DCs or ODPs afterwards due to the insufficiency of collection service. According to the Khoroo governor and AOU leaders, the insufficiency of collection service had been resulted from two factors: (1) shortage of fuel in Mongolia between from Jun 2011 to Aug 2011 and (2) hindrance in regular collection service in apartment area resulted by the expansion of the service in the Ger area. As for the latter, it was resulted by implementation of the inclusive collection of waste fee with electric bill in the Ger area which was started from July 1, 2011. Therefore, the apartments needed to reopen their DCs and ODPs to store their waste for several days or several weeks. The situations before the PP, immediately after the implementation of the PP and as of March 2012 are the following:

Conditions in Mar 2010. Before the PP. not only the residents but also those bars and restaurants nearby discharge waste.

Conditions in May, 2010. After commencement of the PP. The ODP was closed and a banner to inform closure of the ODP and prohibition of illegal dumping was made by Tsuzuku Yume Co., Ltd (collection provider).

Conditions at the end of 2011. Shortage of fuel supply and change of waste collection provider made them reopen the ODP.

Figure E-14: ODP of Apartment#5 (SBD-5)

Just after the PP implementation around May, 2010. DC was closed and poster was put for residents to put waste on the floor of each orts on time.	Watchmen separate waste and put valuables in the DC of the first floor.	The end of 2011, shortage of gasoline supply made them reopen the DC. There is scattering of waste outside of the DC.

Figure E-15: DC of Apartment#58 (BZD-1)

c. Activities Related to Improvement of Collection Service

c.1 Improvement of Collection Service

In order to secure the achievements of the improvements in the discharge manner, improvement of collection service was conducted at the same time.

One of the objectives of this task was to improve sanitary conditions at apartments and efficiency of collection service. Therefore, it was decided to shorten the time during which waste is put outside. For a successful implementation, the JET supported the WSFs and collection companies on preparation of collection plan including collection route and schedule for the khoroos of the Phase-1 based on the results of the T&M survey conducted as a baseline survey. During the implementation of the task, the JET prepared an improvement model for EPWMD to expand the improvements in the target khoroos of the Phase-2.

After preparation of the collection plans by the JET and EPWMD, AOUs decided discharge points and discharge time for residents. Relevant PR tools were prepared and distributed to each household and entrance watchmen. At the same time with enforcement of discharge rules by AOUs, the collection companies were requested to conduct punctual collection in accordance with the collection schedule.

Figure E-16: Posters on waste collection schedule

Among the target khoroos of the PP, great improvements were achieved in SBD#7 where many DCs exist and no collection schedule was set. As a result of the improvement activities, collection time at a collection point was drastically reduced from 2 hours to 2 minutes (see the pictures below).

	
Waste collection before closure of dust chute in SBD-7: Wastes were not in the bags and accumulated inside. Collection worker needed to crape out the waste and load on the vehicle.	Waste collection after closure of dust chute in SBD-7: Watchmen take out the wastes in the bags on curbside before the collection vehicle comes. Collection worker only load those bags on the vehicle. The collection efficiency was drastically improved.

	
ODP(before closure), Apt.37a BZD#7 The waste was accumulated inside the ODP; collection worker did no way but to crape out it, received it into the tub and loaded on the vehicle.	ODP(after closure), Apt.37a BZD#7 All the waste is put into the bag and collected at designated day and time after closure of ODP. There is no waste except the collection time on the area.

c.2 Monitoring on Implementation of Collection Schedule

In order to monitor the punctuality in collection service, arrival times of collection vehicles were recorded by watchmen of some apartments in ChD-4 and KhUD-2 where new collection schedules were introduced in the end of Jul 2011. Following is the detailed information about the monitoring.

Monitoring sheet: The arrival time of the collection truck is to be recorded by 4 watchmen in each khoroo in order to monitor objectively whether the transporting

organizations collect waste based on the new schedule or not. A monitoring sheet was distributed to the watchmen to record the arrival time of collection vehicles (Table E-5).

Table E-5: A sample of the monitoring sheets

Monitoring sheet for new collection time schedule

District : KhUD
Khoroo : 2
Apt No. :
Name :

Date		In time	Out time
18-Jul	Mon	8:30	8:45
19-Jul	Tue	8:40	8:50
20-Jul	Wed	No collection	
21-Jul	Thu		
22-Jul	Fri		
23-Jul	Sat		
24-Jul	Sun		
25-Jul	Mon		
26-Jul	Tue		
27-Jul	Wed		
28-Jul	Thu		
29-Jul	Fri		
30-Jul	Sat		
31-Jul	Sun		
1-Aug	Mon		
2-Aug	Tue		
3-Aug	Wed		
4-Aug	Thu		
5-Aug	Fri		
6-Aug	Sat		

Results of analysis: The following shows the results of average arrival time of the waste collection and standard deviation that indicates the difference between actual arriving time and average.

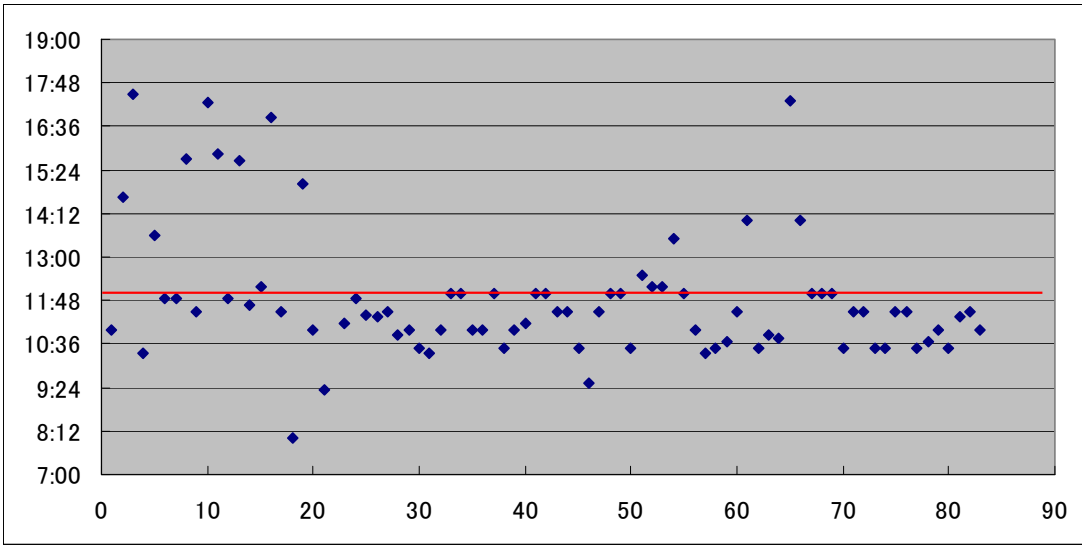


Figure E-17: Standard deviation of ChD4 Apartment #32,33,41,54

Regarding ChD4 apartment #32,33,41,54, the waste collection time that is newly set after T&M was 11:50~12:10, an average arrival time was 11:57 and the standard deviation was 1 hour 29 minutes. The standard deviation in the other apartments of ChD4 resulted in between

1 hour ~2 hours.

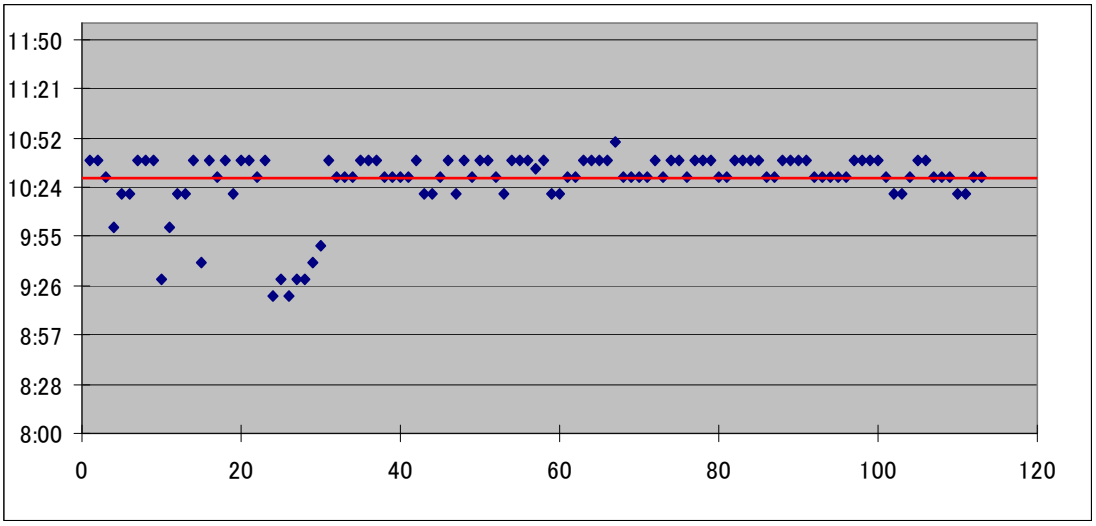


Figure E-18: Standard deviation of KhUD2 Apartment#11,12

Regarding apartment #11 and #12 in KhUD-2, the waste collection time that is newly set after T&M was 10:40~11:00, an average arrival time was 10:28 and the standard deviation was 14 minutes. The standard deviation in the other apartments of KhUD2 resulted in between 14 minutes ~ 30 minutes.

On the whole, the standard deviation of KhUD2 was lower than ChD4, it can be said that KhUD2 achieved the great improvement in waste collection time. The reasons for this could be 1) the motivation of EPWMD staff in charge was high, 2) Khoroo governor and AOU leaders had positive attitudes to improve waste management, 3) The Khoroo staff in charge of PP had a strong sense of responsibility on monitoring, 4) TUK (collection provider) staff were willing to cooperate with the PP. On the other hand, in ChD4, there was a frequent change of khoroo governor and the cooperation level of AOU leaders and TUK were relatively low. It would be desirable for collection providers to aim at achieving 90% of collection service within +/-30 minutes.

E.2.3 Introduction of Separate Discharge

The introduction of separate discharge or the experiment was implemented following the PR activities explained above in all the target khoroos. The purpose of this activity was to verify the degree of cooperation by the residents for separate discharge or waste separation at generation sources.

a. The Previous Condition and the Objective of the Activity

According to the baseline surveys, residents did not separate their waste before discharging. As the wage for watchmen was not sufficient, the entrance watchmen picks valuables from the mixed waste discharged by the residents and sell them to recycle shops located in their khoroos. However, entrance watchmen were not able to pick all the valuables discharged by the residents since many of the valuables got dirt due to the mixed discharge.

Therefore, the remained valuables were segregated by collection workers during the waste collection. As picking takes certain time, the segregation by collection workers influenced the

collection efficiency.

Based on the conditions above, the JET aimed to improve waste separation by watchmen and collection efficiency at the same time with verification of residents' cooperation on separate discharge and waste separation at generation sources.

b. Separation Method

Before discharging, residents had to separate their waste into two categories: recyclables and other waste.

The recyclables included materials that could be sold to recycle shops such as PET, bottles, glass containers, plastic containers and cardboards while the rest was considered as other waste.

c. PR tools

From the beginning of the pilot project, the waste separation method was introduced to residents through various PR tools. An example is shown in the following figures:

Figure E-19: PR tools on waste separation method and discharge

	PR tools on collection vehicles: (1) Message with music to be played during collection (mp3 format file): The music is a Japanese song “Ouma no oyako” with the messages “put the waste into a bag”, “discharge waste at specified time on designated day” and “separate waste into recyclables and others”. (2) Stickers for collection vehicles: The above message was printed on water proof sticker material (1m x 1m).

Figure E-20: PR Tools on Collection Vehicles

d. Achievements in Separate Discharge

In order to evaluate the progress of the separate discharge or waste separation, monitoring activity was conducted in two ways: (1) identification of waste recycled by entrance watchmen and (2) analysis on purchased recyclables at recyclable shops operating in the target khoroos.

The results of the monitoring were the following:

d.1 Amount of waste recycled by watchmen

In order to identify the waste recycled by entrance watchmen, the JET selected 4 to 6 watchmen in each target khoroo and prepared a monitoring sheet for them to fill the amount of recycled waste. The watchmen filled the amount of waste recycled by themselves into the monitoring sheet on daily basis and submitted the sheet to the JET monthly starting from the end of May 2010.

However, many of the watchmen selected for monitoring failed to record necessary data properly or forgot to fill the monitoring sheets timely. Therefore, the JET decided to evaluate the amount of waste recycled by watchmen with the data recorded by only those who recorded their data regularly over a year. These are the watchmen of entrance 4 in Apartment #1 and entrance 4 in Apartment#31 of BZD#7. The data are as shown in the following figure.

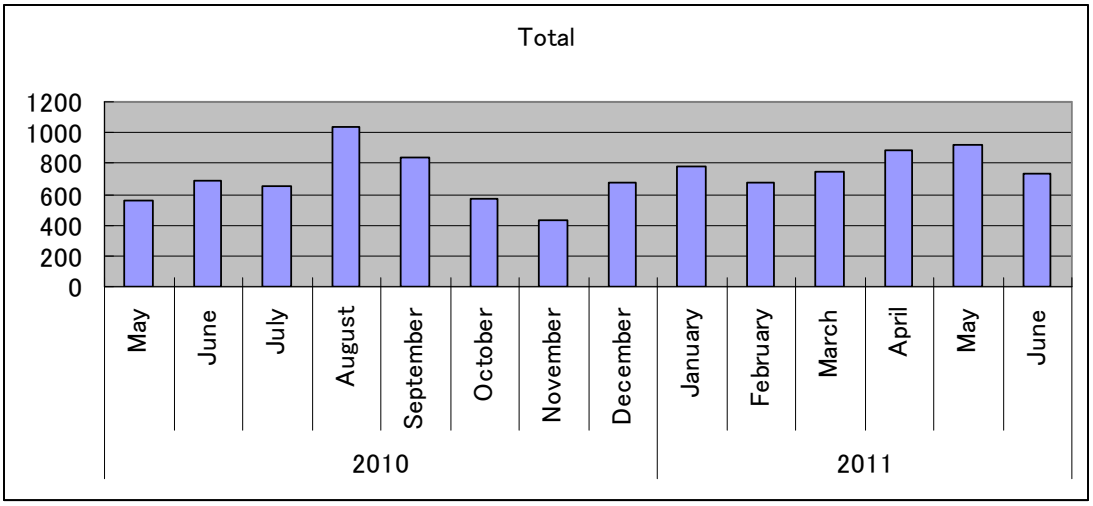


Figure E-21: Amount of recyclables sold by watchmen of BZD#7 (Unit: kg)

According to the figure, the amount of recyclables sold by watchmen increased gradually for the initial 4 months (from May through August), then decreased from September to November and increased again from December 2010. This result does not clearly show that the increase from May to August is influenced by PR activities and AOU meetings or merely because of the seasonal fluctuation. However, the above result might have been influenced by the project year since the first year of the project finished in August and PR activities became less active in September 2010.

Although amount of recyclables decreases during the cold season in Mongolia, it can be seen from the figure that the monthly amount of waste recycled in winter of 2010 to 2011 is bigger than those recycled in the summer of 2010, especially those in May through Jul 2010.

d.2 Amount of recyclables purchased at recyclable shops

The identification of the waste recycled by residents was conducted in cooperation with the recycle shop located in SBD#7. As no other recycle shops operate in the khoroo, residents and watchmen of the khoroo sells their recyclables only to this shop.

The amount of recyclables purchased at this shop is shown in the figure below:

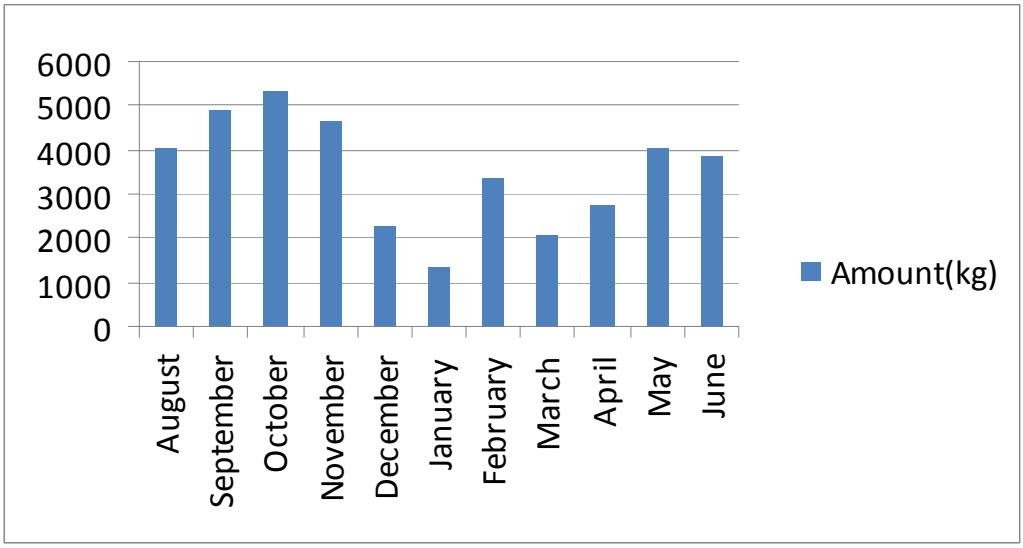


Figure E-22: The amount of recyclebles purchased by the recycle shop in SBD#7

The amount of recyclables purchased by the recycle shop located in SBD#7 has been increased by 25% for the initial 3 months (from August to October 2010). It can be said that various tools to promote waste separation activities and AOU meetings have contributed well to the above results.

One of the reasons for the decrease of purchase in Nov 2010 was resulted from the disputes on property rights of the shop between the owner and the AOU. As this caused the shop to stop operation for many days, the amount of purchase decreased in Dec 2010 through Apr 2011.

E.2.4 Evaluation of the Activities

Throughout the implementation of the PP activities, Public Opinion Surveys (POS) were conducted three times among residents and business entities to evaluate the project achievements and improvement in public awareness.

The first POS was implemented at the beginning of the implementation (in May 2010) to identify the initial level of public awareness, level of residents' satisfaction on collection service, waste discharge manner and possibilities of introducing waste separation at generation sources. The second POS was conducted in the middle of the project implementation (in Sep 2010) to assess the progress. The last survey was conducted before completion of the project (in Oct 2011) to evaluate the overall achievements of the project activities. By comparing the results of the POSs, the improvement in the public awareness was evaluated.

a. Applied method

In order to compare the results, the surveys were conducted using questionnaires contained 15 questions related with information about respondents' households, waste collection service, waste management by entrance watchmen, residents' waste discharge manner and activities of the PP. The questionnaire was prepared by the JET and distributed to the target households via AOU leaders and heseg leaders.

b. Number of respondents

Each POS targeted 100 households selected randomly in each target khoroo. However, the numbers of total collected questionnaires were 324 for POS-1 and 357 for POS-2, and 281 for POS-3.

c. Results of Evaluation

The findings obtained through comparative analysis of the survey results are the following:

- The public awareness activities are essential in improving the waste discharge manners; however, punctuality of waste collection would be a major premise. If waste is not collected in accordance with collection schedules, obtaining positive cooperation by residents in waste separation will be impossible. In order to ensure punctual collection (in accordance with collection schedules), it is necessary to establish a system through which collection service is strictly controlled by a local government organization such as former DWSFs.

- When judging comprehensively, the biggest success of PP was achieved in SBD-7. The major factors of success could be: (1) commitment to improvement of waste management by the Khoroo governor who is the highest decision maker in the khoroo was high enough, (2) There was a person who takes charge of waste management specially at khoroo level, (3) the AOU leaders who were mediators of communication between khoroo governor and residents were very positive to the improvement of waste management, (4) AOU meetings and public meetings were held intensively and various kinds of PR tools were distributed in order to introduce the PP of separate collection. Furthermore, in SBD-7 before the implementation of PP, the waste collection frequency was lower and collection manners were worse than those in other khoroos, which made residents feel more necessity of improvement of waste management.

- The recognition of the PP in the most of the khoroos shows very high; in some khoroo shows over 85%. It can be said that distribution of PR tools (Especially the calendar that can be put at home for a longer period) was effective.

- Comparing before and after the PP, those who answered that the waste separation at their homes was not so difficult than they expected showed more than a half. In addition, the waste separation rate also improved gradually, as time passes. It is predicted that it would not become so big burden for residents when waste separation by two categories is introduced in the UB city. However, there was a tendency not to keep recyclables for longer periods in their homes since residents still considered the recyclables as waste. It is also important to enhance the public awareness to sell recyclables to recycle shops nearby or provide them to watchmen. Alternatively, it is also important to consider the promotion of washing and keeping valuables at home like Japanese do in order to make residents clearly recognize the difference between waste and valuables (resources).

- Although there is some difference in level among three khoroos, it can be concluded that the implementation of the PP have contributed to the improvement of waste management at each khoroo as a whole.

E.3 PP-2: Pilot Project on SEPARATE COLLECTION

E.3.1 Outline of the Project

a. Project Description

The main purpose of the separate collection is to collect RPF materials and valuables (target items) from specified apartments in a khoroo selected for the PP and transport the target items to the sorting yard of NEDS. Residents of the specified apartments have to separate their waste into the target items and other waste (mainly kitchen waste) before discharging. As the regular collection service for the waste other than the target items had to be conducted as usual, the transporting organization was required to dispatch an additional truck for separate collection and transport the target items to the sorting yard.

Since the daily generation amount of the target items in one khoroo was expected to be small, separate collection had to be conducted once a week. In other words, the target items had to be stored at the apartments until the scheduled collection day. Therefore, entrance watchmen were requested to store the target items in the DCs apart from the other waste and not to

discharge them to the truck working on the regular collection.

The JET prepared a schedule and collection route for the truck assigned for the PP, implemented separate collection in cooperation with the transporting organization and conducted monitoring on the progress.

b. Objectives

The objective of the pilot project was to collect necessary data for planning raw material supply system for the RPF plant constructed by KOICA project through conducting an experiment on separate collection. The data obtained during the PP will also be used in formulation of the most appropriate recycling system for UBC.

c. Target Waste for Separate Collection

The target waste for the separate collection consisted of all kinds of valuables, papers and plastics separated by the residents and entrance watchmen at their households and apartments. Although the target items included valuables, the entrance watchmen were allowed to pick and sell valuables for themselves since the major objective of the PP was to transport RPF materials (papers and plastics) to the sorting facility.

d. Implementation Period

The implementation period of the project is as follows:

- Period: 17 May, 2011 - July 5, 2011(eight times in total)
- Frequency of Separate Collection: Once a week
- Day and Time: Every Tuesday, from 9:00-11:00

e. Selection of Target Area and Target Group

Considering the easiness of obtaining the cooperation by local residents on waste separation, the JET recommended EPWMD the 4 khoroos where activities of the PP-1 Phase-1 had been conducted.

The selection criteria proposed by the JET were the following:

1. Expected generation amount of target items;
2. Storage capacity (number of places to store the target items);
3. Willingness of cooperation by AOUs and
4. Willingness of cooperation by transporting organizations that works in the candidate khoroos.

In order for EPWMD to select the target area from the candidate khoroos, the JET conducted preliminary surveys in the khoroos, identified current conditions for each criterion and reported the results to the department. The following are the results of the survey.

Table E-6: Expected Amount of Target Items

Items		Unit	Candidate khoroos			
			SBD#5	SBD#7	BZD#1	BZD#7
Total population		people/khoroo	3,999	7,654	6,088	7,232
Population of apartments with closed DCs		target apartments	4	4,5a,5,6,7,7a,8,9,10	57,58,59	-
		people/khoroo	215	5,596	316	0
The rest of the population		people/khoroo	3,784	2,058	5,772	7,232
Generation rate		kg/person/day	0.312	0.312	0.312	0.312
Daily generation amount		kg/khoroo/day	67	1,746	99	0
Weekly generation amount		kg/khoroo/week	469	12,222	693	0
Estimated discharge amount of RPF materials (plastic bags and paper)						
Estimated amount (weight)	※1	kg/khoroo/week	70	1,833	104	0
Estimated amount (volume)	※2	m3/khoroo/week	1.0	15.0	1.0	0.0
Expected collection amount-1	50%	**kg/khoroo/week**	**35**	**917**	**52**	**0**
		m3/khoroo/week	**0.5**	**7.5**	**0.5**	**0.0**
Estimated amount of RPF materials and valuables (bottle, can, pet bottle, plastic bags and paper)						
Weight (RPF)		kg/khoroo/week	70	1,833	104	0
Weight (valuables)	※3	kg/khoroo/week	183	4,767	270	0
Volume (RPF)		m3/khoroo/week	1.0	15.0	1.0	0.0
Volume (valuables)	※4	m3/khoroo/week	0.3	7.8	0.4	0.0
Expected discharge amount (RPF)	50%	m3/khoroo/week	0.5	7.5	0.5	0.0
Expected discharge amount (valuable)	10%	m3/khoroo/week	0.0	0.8	0.0	0.0
Estimated amount (weight)		kg/khoroo/week	253	6,600	374	0
Estimated amount (volume)		m3/khoroo/week	1.3	22.8	1.4	0.0
Expected collection amount-2		**kg/khoroo/week**	**53**	**1,393**	**79**	**0**
		m3/khoroo/week	**0.5**	**8.3**	**0.5**	**0.0**

※1-Considered as 15% in the generation amount (based on WACS 2011 results)

※2-The specific gravity is 120 kg/m3 (based on WACS 2011 results)

※3-Considered as 39% in the generation amount (based on WACS 2011 results)

※4-The specific gravity is 612.5 kg/m3 (based on the WACS 2011 results)

Table E-7: Main Indicators of the Candidate Khoroos

No.	Indicators	Unit	Candidate khoroos			
			SBD-5	SBD-7	BZD-1	BZD-7
1	***General Information:***					
1	Population	person	3,999	7,654	6,088	7,232
2	Household	num	1246	2357	1,726	1785
3	Number of AOUs	num	10	9	14	7
4	Number of watchment/cleaning staff	person	27	52	73	54
5	Number of apartments	num	27	24	44	23
8	Waste collection organization		Tsuzuku Yume	Tsuzuku Yume	CMPUA	CMPUA
9	Administering organization		DWSF	DWSF	DWSF	DWSF
2	***Consideration of cooperation by AOUs:***					
1	Cooperativeness of AOUs		□	○	△	□
2	Apartments with AOUs	num	27	14	29	16
3	Apartments without AOUs	num	0	10	15	7
4	Apartments with watchmen/cleaning staffs	num	24	17	29	22
5	Apartments without watchmen/cleaning staffs	num	3	7	15	1
3	***Consideration of storage for RPF materials:***					
1	Apartment with closed DC	num	6	9	8	2
	Population of the APs with closed DC	num	215	5596	316	
2	Other population	num	3,784	2,058	5,772	
4	***Consideration of impact from service complaints:***					
	Regularity of waste collection		○	□	○	○
5	***Consideration of easiness for PR:***					
	Residents awareness of waste seperation and PP activities		□	○	□	□

○=>higher, □=>middle, △=>lover

Based on the criteria and the results of the preliminary survey, the EPWMD selected 1,404 households (residing in 9 apartments) in SBD-7 khoroo as the target group for the project.

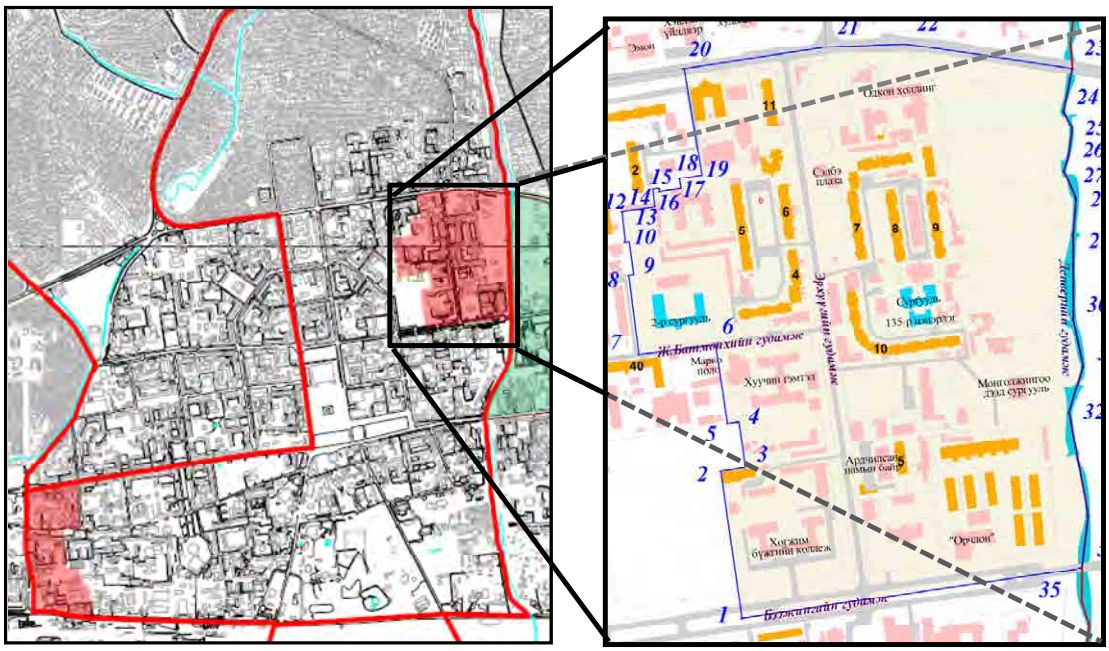


Figure E-23: Location of the Target Khoroo (SBD-7).

Table E-8: Target Group

AOU Name	Apt #	Households	Floors	Entrances	Watchmen	DC
Gan-Erdene	4	108	9	3	3	○
Ganbagana	5a	108	9	3	3	○
Baiguulamj	5	108	9	3	3	○
	6	180	9	5	5	○
Ord	7a	108	9	3	3	○
	8	144	9	4	4	○
	9	144	9	4	4	○
Harsh	7	180	9	5	5	○
	10	324	9	9	9	○
Total	**9**	**1,404**		**39**	**39**	

E.3.2 Intensification of Waste Separation and Separate Discharge

In order to ensure successful implementation of the separate collection, the JET organized AOU meetings in early May and obtained their cooperation on organization of PR activities for intensification of waste separation and separate discharge.

As residents had to be requested to separate target items before discharging their waste, the JET prepared necessary PR tools about project objective; the concepts of RPF; RPF raw materials and valuables; methods of proper separation and discharging; and collection schedule in consultation with the AOU leaders.

The PR tools were explained and distributed to the residents either through individual visits

to households or during the public meetings organized by the Khoroo Office and the AOUs before commencement of the separate collection.

The following are the detailed information about the implemented PR activities.

a. AOU Meeting

The AOU meeting was organized for khoroo governor, AOU leaders of the target apartment and district WSF staff in the SBD #7 as follows. Although JET mainly prepared the Power Point materials, Ms. Chanturnurmaa, a staff of EPWMD who is in charge of SBD made presentation in order to improve counterpart's capacity development.

Table E-9: Summary of AOU Meetings

No.	Date	Topics
1st AOUM	May 3, 2011	1） Introduction of PP2:Separate Collection & Sorting 2） New Waste Collection Schedule 3） Requirements for target residents on PP2 4） Planning for next step
2nd AOUM	May 10, 2011	1） Problems 2） Planning for public meeting 3） PR tools 4） Next public meeting
3rd AOUM	May 31, 2011	1） Current Progress 2） Results of sorting experiments in NEDS
4th AOUM	July 22, 2011	1） Results of sorting experiments in NEDS 2） Expected outcomes of PP3

b. PR Tools

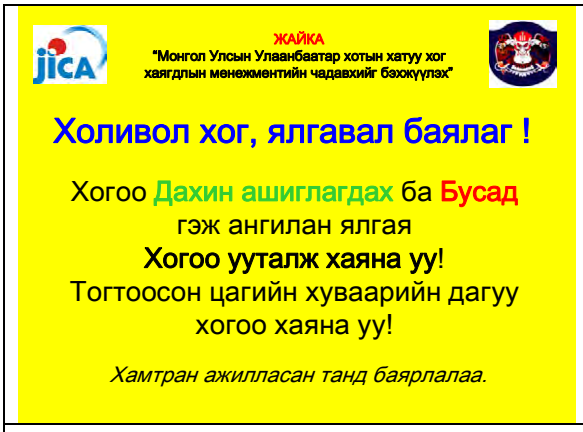
In the 1st and 2nd AOU meetings, discussion on PR tool for public-awareness-raising for separate collection was made. The following PR tools were prepared based on the discussion.

b.1 Waste Separation Calendar for Residents

Waste separation calendar for May, June, and July in 2011: A4 size, 250g glossy paper, and two-side printing. Cover: Explanation of waste discharging rule and schedule. Indicating collection date (Tuesday) in green in calendar.

Back of calendar: Explanation of RPF, purpose of separation of RPF material, and RPF plant construction plan of KOICA.

b.2 Sticker for Separate Collection Truck

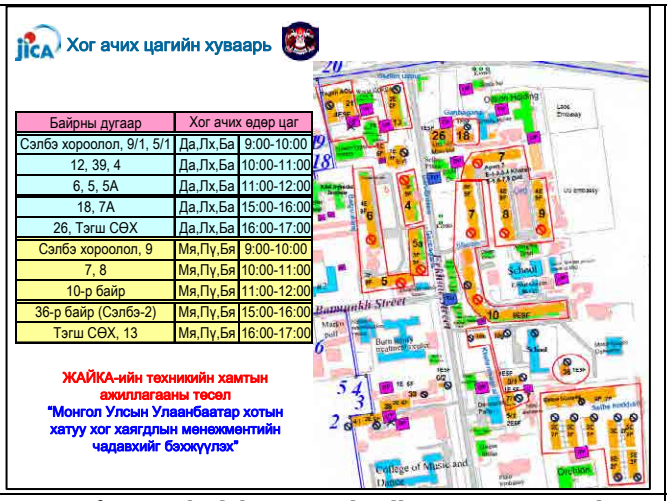


Sticker for Separate Collection Truck : 1m x 90cm, one sided seal. Calling for waste separation with the slogan of "Waste if mixed, Resource if separated"

The music of the bell collection for separate collection: different music from the music used in usual waste collection was installed in order for residents easily distinguish separate collection from usual collection.

b.3 PR tools for Entrance Watchmen

Big sacks are distributed for Jijur to store the separated recyclables such as plastic and papers except cardboard in big volume.



Poster of time schedule on usual collection: A4 size, glossy paper, one-side printing.

c. Public Meetings

The public meeting was held using the weekend when the resident can comparatively easily gather ahead of the implementation of separate collection as follows. The separate collection calendar was distributed at the same time as making PR for separate collection.

Table E-10: Progress of Public Meetings (PM)

	1st PM	2st PM
Date&Time	13:00~ May 15, 2011	15:00~ May 15, 2011
Place	In the park in front of Apt 6	In the park in front of Apt 8
Target Apt	Apt 4,5,5a,6	Apt 7,7a,8,9,10

No. of Participants	approx. 40	approx. 30

PM for Apt 4,5,5a,6. Gantime, a khoroo governor of SBD7 calls for residents for cooperation by her own initiative.

PM for Apt 7,7a,8,9,10. Most of participants were entrance watchmen.

d. House-to-house Visits

Since not so many people showed up in the above-mentioned public meeting, JET and project staff made house-to-house visit from May 17 to May 20, 2011 to enhance public awareness on PP2. We visited about 1260 apartment households from door to door. The outline of PP2 was briefly explained while distributing the separate collection calendars.

Only about 40% of the resident stayed at home when we visited all of the households, among them, only less than 30% of the residents answered that they had already received the PR tools as shown in the following table. Moreover, about 15% of the residents asked for plastic bag for separated waste, and about 10% had already been separating waste at home. About 5% showed the willingness to cooperate for waste separation voluntarily.

Results		
Total households	1260	
Visited households	539	39.1% of total households
Residents who received calender	148	27.5% of visited households
Residents who did not receive calender	391	72.5% of visited households
Residents who asked plastic bag for waste separation	Approx. 15%	
Residents who said already separate waste at home	Approx. 10%	
Residents who said willing to cooperate for w/separation	Approx. 5%	
Residents who not willing to cooperate for w/separation	Approx. 2%	

E.3.3 Improvement of Regular Collection

One of the measures taken to ensure successful implementation of the PP was the improvement in the regular collection service. There was a high possibility that residents and AOU staffs would discharge all their waste to the separate collection if the regular collection was insufficient.

Therefore, the JET prepared an improvement plan for the regular collection, requested Tsuzuku Yume Co., Ltd to implement the plan and monitored the implementation. Under the improvement activities, the JET in cooperation with Tsuzuku Yume Co., Ltd removed waste accumulated in the DCs of apartment from 15 May through 17 May 2011 and introduced a new collection route and schedule immediately after the complete removal of the accumulated waste (on 18 May 2011).

A monitoring was conducted on efforts made by both of the transporting organization and the AOUs throughout the improvement activity. Assessment on improvement was made two times – on 3 May (in the middle of the improvement activity) and 16 May 2011 (in the end of the activity) - based on the criteria shown in the table below:

Table E-11: Midterm assessment of the improvement in the regular collection

	Parties	Dispatching truck	Technical condition	Schedule implementation	Closure of DCs	DC locks	Waste bagging	Preparation for collection
1	Transporting organization	○	○	○				
2	AOUs by apartments:							
1	Selbe township	–	–	–	–	○	○	○
2	Apart-4	–	–	–	○	□	△	△
3	Apart-6	–	–	–	○	○	○	○
4	Apart-5	–	–	–	○	○	○	○
5	Apart-5A	–	–	–	○	○	○	○
6	Apart-7	–	–	–	○	△	△	△
7	Apart-8	–	–	–	△	○	△	△
8	Apart-9	–	–	–	○	○	○	○
9	Apart-10	–	–	–	○	□	□	○

○-Good; □-Sufficient; △-Further improvement necessary

The items marked with triangles in the table had been identified as improved at the time of the final assessment.

E.3.4 Implementation of Separate Collection

a. Truck Arrangement

Based on the results of the preliminary survey, the JET identified specifications and number of trucks required for the separate collection. Although a truck was sufficient for the expected generation amount of the target items, the JET requested Tsuzuku Yume Co., Ltd – the transporting organization of the target khoroo - to arrange two trucks for the separate collection: a DT and a CT (The DT was necessary to be arranged in order not to break bottles and glasses that residents might discharge to the separate collection).

Each truck was equipped with a speaker and provided with a sticker showing information about waste separation.

Russian made dump truck (ZIL-130)

Japanese made compactor truck (Nissan)

Figure E-24: Collection trucks arranged for the separate collection

b. Plan of Separate Collection

Since the target items (RPF materials and valuables) of the separate collection had to be stored for a week at most, the main requirement for selection of apartments was existence of a storage facility. Considering possible cases that WPs steal stored valuables, the security of the storage facility was also considered. Based on the requirements, the JET selected 9 nine-story apartments (38 entrances) where DCs had already been closed and implemented the separate collection from these apartments.

The schedule was set between 9:00 to 11:30 on Tuesdays of every week starting from 17 May 2011 till 5 Jul 2011. Before commencement of the activity, the JET planned a collection route for the separate collection and introduced it to the AOUs, entrance watchmen, drivers and collection workers.

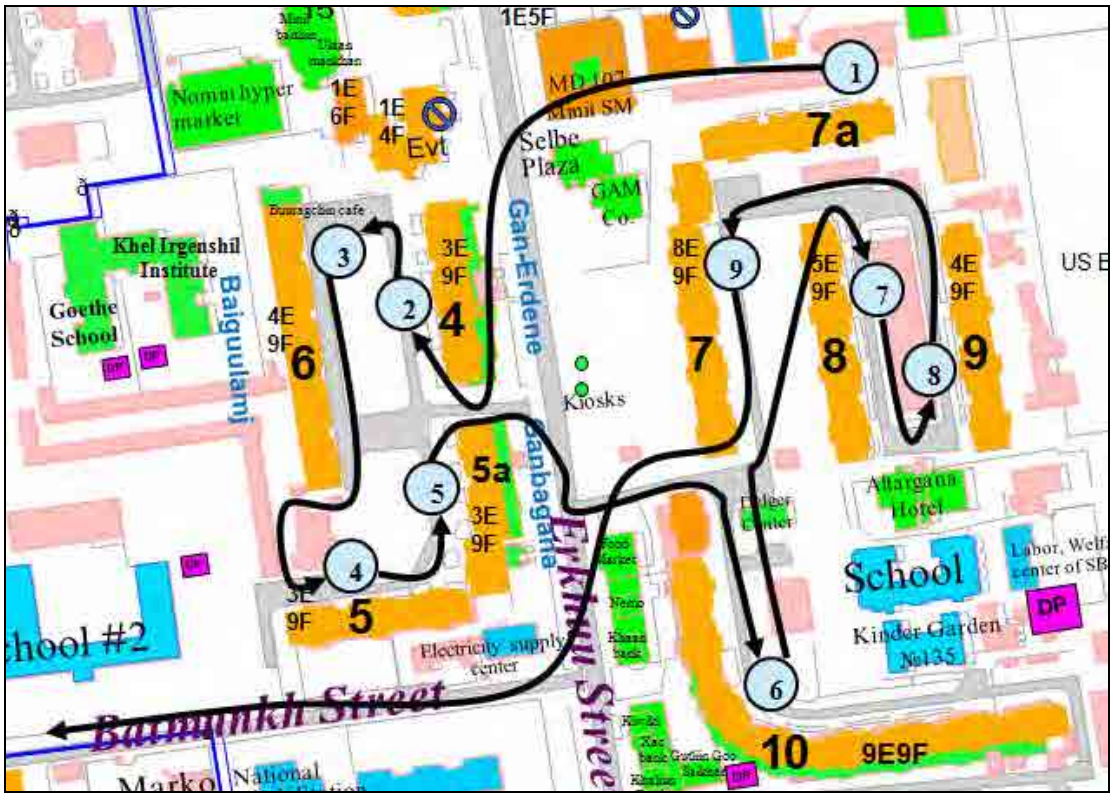


Figure E-25: Route of the separate collection.

c. Implementation of the Separate Collection

Throughout the project implementation, Tsuzuku Yume Co., Ltd conducted 8 trips on separate collection and transported 5,363.2 kg of target waste from the khoroo to the sorting yard at NEDS. The transported amounts by trips are shown in the following figure:

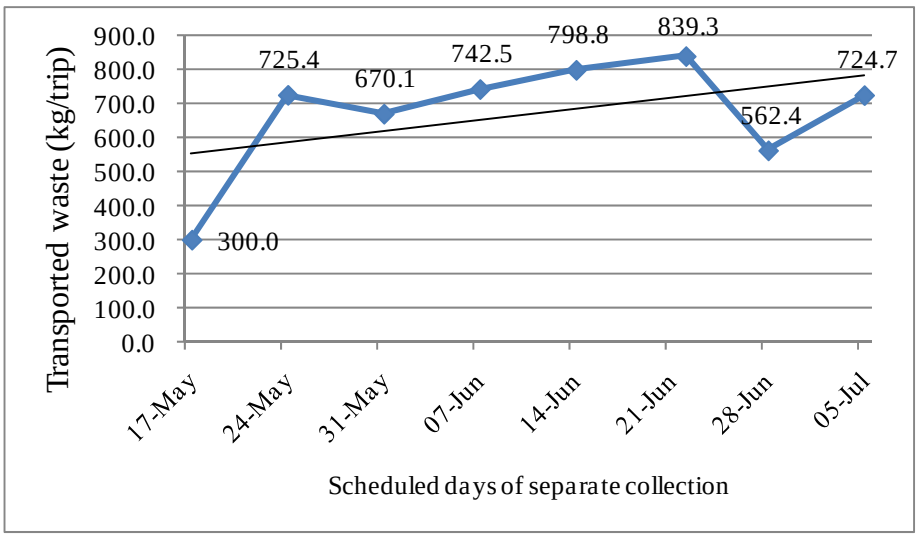


Figure E-26: Collected amounts by trips

According to Figure E-26, the amount of collected target items increased gradually along the trend-line. Although 300 kg of waste was collected with the 1st trip, the amount increased significantly by the time of the next collection.

After the initial 2 collections, it became known that most of the target items had been paper and plastics; and thus, the JET requested Tsuzuku Yume Co., Ltd to change the type of the truck from DT to CT. As a result, the CT operated on the remaining 6 collection.

On the day of the 6th collection, which was scheduled on 21 Jun, the compacting device of the CT broke down; and therefore, the collection was conducted on the following day (22 Jun 2011). Excluding the case, the separate collection was conducted punctually throughout the project implementation.

As the DCs in the apartments had been closed, residents discharged their waste at the side of DC trays in the entrance and watchmen carried the waste down to the storage rooms of the DCs. Although the residents had been requested to separate waste by themselves before discharging, most of the target items were mixed with the other waste at the time of discharging. Therefore, the entrance watchmen separated the waste into the target items and the other waste, stored them in the DC and arranged the target items in front of their entrance for the separate collection on the scheduled days. As the watchmen played the main role in separation and arrangement of the target items, the JET provided them with necessary tools such as working gloves and sacks.

JET staffs monitored and instructed the whole activities throughout the operation.

Arranged waste for separate collection

Waste collection

Waste being stored in DCs

Entrance watchman

Figure E-27: Photos of Separate Collection

d. Performance Evaluation

Performance of the separate collection was evaluated based on the monitoring sheet filled by the JET staffs throughout the last 6 collections. The performance indicators were the following:

1. Performance of separate collection (punctuality, collection amount, separate collection rate and efficiency);
2. Waste separation (Degree of cooperation by AOUs and waste arrangement at entrances) and
3. Impact on SWM (impacts on the regular collection and transportation costs).

The results of analysis conducted for each of the indicators are compiled below.

d.1 Performance of Separate Collection

d.1.1 Punctuality in implementation of the separate collection

Table E-12: Actual schedule of the separate collection shows the time at which Tsuzuku Yume Co., Ltd started separate collection at each entrance.

Table E-12: Actual schedule of the separate collection

Apartment No.	Entrance No.	Started Time						Average start time	Difference from the average* (+/-)
		31-May	7-Jun	14-Jun	22-Jun	28-Jun	5-Jul		
4	1	9:50	9:21	9:17	9:27	9:17	9:13	9:24	0:13
	2	9:49	9:17	9:15	9:25	9:14	9:18	9:23	0:13
	3	9:44	9:14	9:12	9:20	9:11	9:15	9:19	0:12
5	1	10:18	10:00	9:47	10:00	9:40	10:00	9:57	0:13
	2	10:15	9:55	9:43	9:55	9:37	9:57	9:53	0:13
	3	10:06	9:47	9:35	9:50	9:34	9:55	9:47	0:12
6	1		9:45	9:31	9:44		9:35	9:38	0:06
	2				9:41		9:32	9:36	0:06
	3	10:02	9:39	9:27	9:39	9:30	9:30	9:37	0:12
	4	9:59	9:30	9:24	9:37	9:26	9:29	9:34	0:12
	5	9:57	9:24	9:21	9:33	9:24	9:25	9:30	0:13
7	1	12:02	11:16	10:46	11:15	10:49	11:26	11:15	0:27
	2	12:01	11:12				11:25	11:32	0:25
	3	11:59	11:08	10:44	11:13	10:47	11:18	11:11	0:27
	4	11:56		10:40		10:36		11:04	0:45
	5		11:01	10:38		10:34	11:17	10:52	0:20
8	1	11:25			10:47	10:42	10:52	10:56	0:19
	2	11:22	10:45	10:22	10:48	10:14	10:48	10:43	0:23
	3	11:17	10:40	10:21		10:12	10:45	10:39	0:25
	4			10:20			10:44	10:32	0:16
9	1	11:48	10:58	10:35	10:54	10:28	11:13	10:59	0:28
	2	11:40	10:55	10:32	10:57	10:25	11:05	10:55	0:26
	3	11:32	10:50	10:26	10:59	10:20	11:00	10:51	0:26
	4	11:30	10:49	10:25	11:06	10:18	10:58	10:51	0:26
10	2	11:05	10:16	9:58	10:15	9:53	10:19	10:17	0:25
	3	11:00	10:18	9:59	10:16	9:55	10:20	10:18	0:23
	4	10:55	10:20	10:04	10:19	9:58	10:24	10:20	0:19
	5	10:54	10:22	10:06	10:23	10:00	10:31	10:22	0:19
	6	10:53	10:26	10:08	10:25	10:01	10:33	10:24	0:18
	7	10:49	10:30	10:09	10:27	10:03	10:34	10:25	0:16
	8	10:38	10:32	10:13	10:35	10:04	10:38	10:26	0:14
	9	10:35		10:17	10:31			10:27	0:09
5A	1	10:29	10:07	9:53	10:08	9:49	10:13	10:06	0:14
	2	10:25	10:05	9:51	10:06	9:47	10:10	10:04	0:13
	3	10:23	10:03	9:49	10:03	9:43	10:07	10:01	0:14
7A	6	9:08	9:08	9:07	9:13	9:06	8:58	9:06	0:04
	7	9:11	9:00	9:00	9:16			9:06	0:08
	8	9:03			9:10	9:01		9:04	0:04

(Note): *-Represented by the standard deviations calculated for each of the average start times.

In order to identify the punctuality, descriptive statistics for the durations of differences from the “average start time”-s was considered:

Table E-13: Descriptive statistics calculated for the distribution of difference durations from the average start times

Mean	0:17
Standard Error	0:01
Median	0:15
Mode	0:13
Standard Deviation	0:08
Range	0:41
Minimum	0:04
Maximum	0:45
Sum	10:58
Count	38

The mean value in the distribution of difference durations from each average start time is 17 minutes and its standard deviation is 8 minutes, according to Table E-13. As it means that separate collection at each entrance was conducted within a time range of “average start time

+/-25 minutes" (on average, "average start time"+/-17 minutes), it can be said that the separate collection was conducted punctually.

d.1.2 Collection amount per entrance

The average collection amount from an entrance is selected for evaluation of the dynamics of the project achievement. The figure below shows the results of the evaluation.

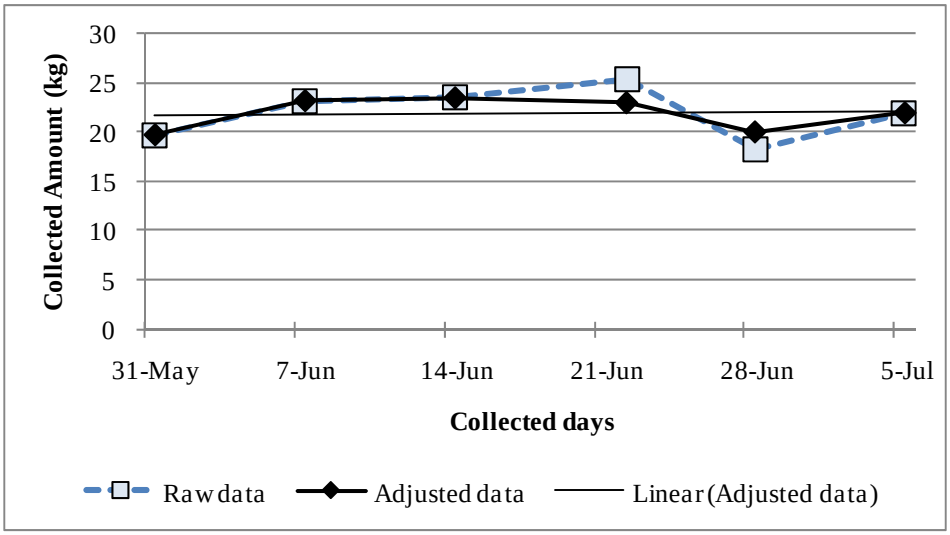


Figure E-28: Average collection amount from an entrance by collection days

The curve "Raw data" shows the original amounts. As mentioned before, the collection scheduled for 21 Jun was conducted on the following day; and therefore, the amount of the day includes 8 days' waste. On contrary, the amount of 28 Jun includes only 6 days' waste while others are those of 7 days. Based on the circumstances, the "Raw data" was adjusted and the evaluation has been based on the "Adjusted data". The average collection amounts of both distributions ("Raw data" and "Adjusted data") are the same equaling to 22 kg/entrance/collection.

No bigger change was revealed from the trend line estimated for the "Adjusted data". This might implicate that the possible upper limit of the project achievement is not far from the current level.

d.1.3 Separate collection rate

As the expected weekly generation amount of RPF materials is 1,833 kg/week (Table E-6:), the expected total amount to be generated for the 6 weeks is 10,998 kg (1,833 kg/week*6 weeks).

On the other hand, the total amount of target items transported throughout the 6 weeks is 4,337.8 kg; and thus, the collection rate is 40.0% (4,337.8 kg/10,998 kg).

It seems that increasing the rate from the current level is rather difficult unless households separate waste before discharging.

d.1.4 Collection efficiency

One of the indicators of qualitative results of the project activity is the collection efficiency since it differs depending on the degrees of waste arrangement and cooperation by

AOUs/watchmen.

The collection efficiency calculated for each collection has been shown in the figure below:

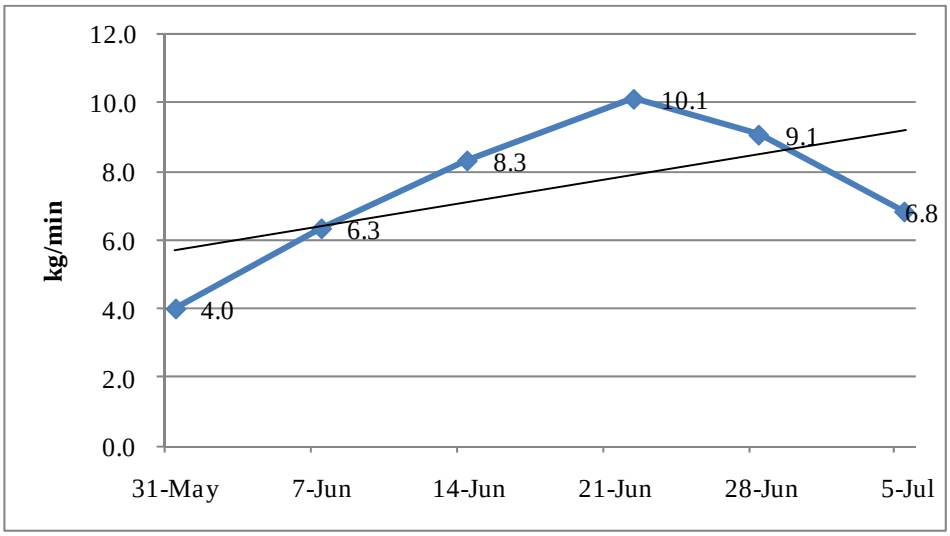


Figure E-29: Collection efficiency (unit: kg/min)

According to the figure, collection efficiency rises during the initial 4 collections reaching to 10.1 kg/min at its highest and declines gradually during the last 2 collections falling to 6.8 kg/min (6.9 kg/min on average).

As many factors (such as changes in collection workers or trucks, types of waste) that influence the efficiency had not been considered during the monitoring, the actual reason for the decline is not clear.

Somehow, the trend line shows the gradual increase in the indicator implicating a gradual improvement in the separate collection.

d.2 Waste Separation

d.2.1 Degree of Cooperation by AOUs

According to the analysis, separate collection was conducted from all of the target entrances (38). However, there were occasions that some of the entrances discharged all their waste to the regular collection as the watchmen did not need to separate waste when discharging to the regular collection. Figure E-30 shows the shares of the entrances covered by the separate collection on each collection day.

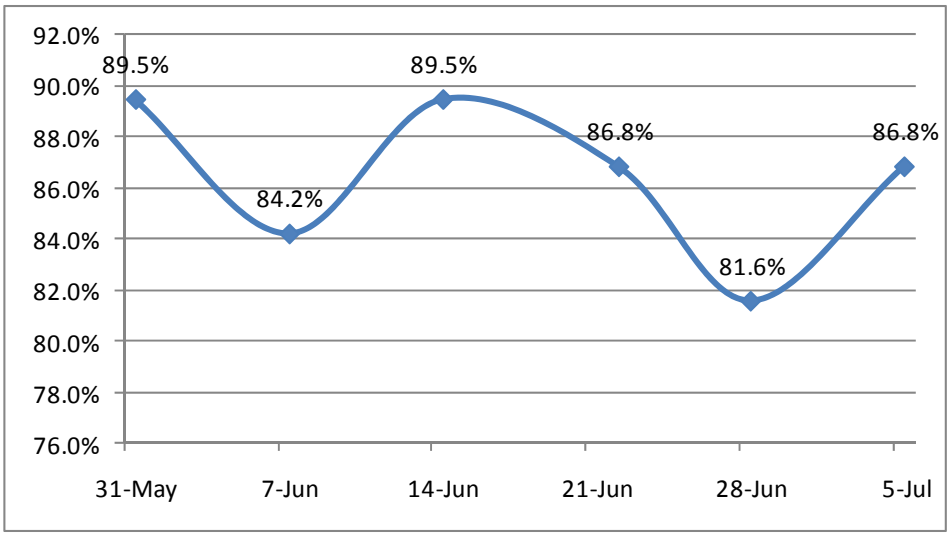


Figure E-30: Share of the collected entrances in the total.

According to the figure, the biggest shares occurred to the collections conducted on 31 May and 14 Jun reaching to 89.5% (34 entrances out of 38) while the smallest was that on 28 June (81.6% or 31 entrances out of 38). As the share of the collected entrance was 86.4% on average, the degree of cooperation by AOUs (watchmen) can be considered high.

Further, the efforts made by AOUs (watchmen) were evaluated based on the collection frequency occurred at each entrance. It was assumed that a watchman who did not separate and arrange target items for the separate collection must have been discharged all their waste to the regular collection; and thus, his/her entrance was not covered by the separate collection. In this case, the entrance must not be recorded in the monitoring sheet of the separate collection and the degree of efforts made by that watchman will be considered low. Following are the result of the evaluation:

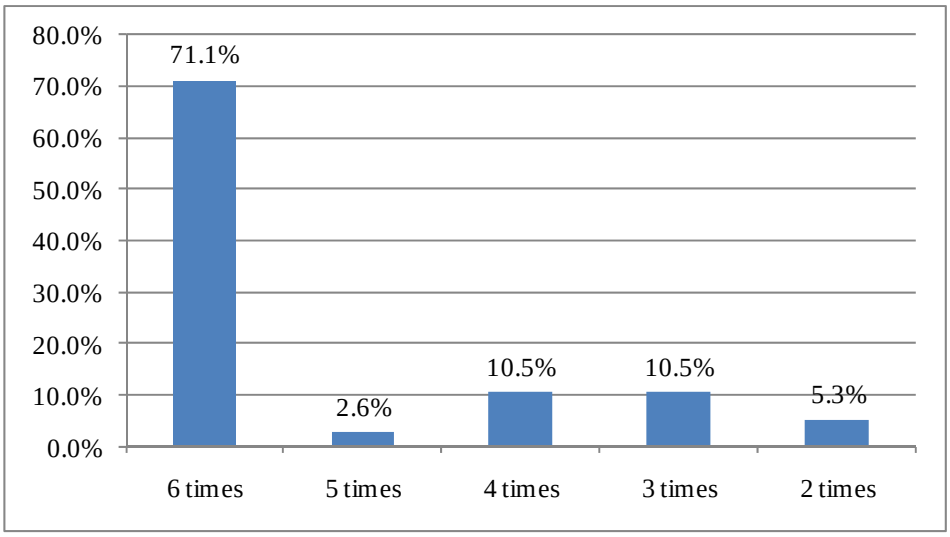


Figure E-31: Number of entrances by collection frequency.

Among the total 38 entrances, 71.1% (27) were covered by the separate collection 6 times, 2.6% (1) were 5 times, 10.5% (4) were 5 times, 10.5% (4) were 3 times and 5.3% (2) were twice. If the degree of efforts made by watchmen, whose entrances have been covered more than 5 times, is evaluated as good, 73.7% (28) of the watchmen can be considered as they

made sufficient efforts. If the "4 times" is considered as acceptable, the share reaches to 84.2%.

Therefore, the degree of efforts made by watchmen (AOUs) can be evaluated as 84.2%.

d.2.2 Waste arrangement at entrances

One of the indicators for identification of project performance is waste arrangement. Waste arrangement was evaluated with 2 criteria - the timing of waste separation (whether waste was separated before the arrival of the truck or not) and the composition of the separated waste (whether kitchen waste is mixed or not) - on all collection cases conducted at all entrances (184 cases at 38 entrances throughout the last 6 collections). If the waste is separated after or at the time of truck arrival, the waste arrangement can be considered as "negative". Likely, separated target items containing kitchen waste gets also "negative" evaluation.

The final result of the evaluation was shown in the table below.

Table E-14: Waste arrangement evaluation matrix.

	Kitchen waste is not mixed	Kitchen waste is mixed	Grand Total
Separated before collection	96.2%	1.1%	97.3%
Separated at the time of collection	1.1%	1.6%	2.7%
Grand Total	97.3%	2.7%	100.0%

According to the results, waste arrangement was excellent for the 96.2% in the total cases (177 cases out of 184) while it was not sufficient only for the 1.6% (3 cases out of 184).

In addition to the above, positive indicators – "Separated before collection" and "Kitchen waste is not mixed" - were considered in the further observation.

Figure E-32 shows the dynamics of the share of collection cases with positive indicators in the total.

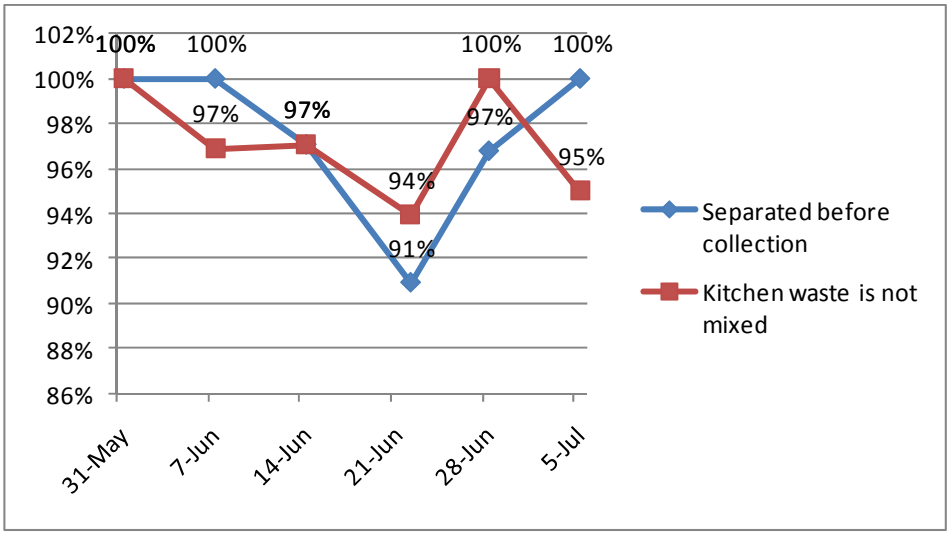


Figure E-32: Dynamics of the positive indicators.

According to the figure, both indicators are at the lowest level (91% and 94% respectively) for the collection conducted on 22 Jun 2011. The main reason for the low value has been resulted by the change of the collection day from 21 Jun to 22 Jun due to the breakdown of the truck. As the scheduled day was changed, some of the watchmen discharged the target items to the regular collection. Excluding the case, both indicators are at extremely high level (more than 95%).

Based on the results above, the degree of waste arrangement by watchmen/AOUs can be evaluated as more than sufficient.

d.3 Impact on SWM

d.3.1 Impact on the regular collection

During the preliminary survey, the truck working on the regular collection in the target khoroo conducted 3 trips/day on 2 days (Mon and Tue) and 2 trips/day on rest of the days (Wed, Thu, Fri and Sat).

According to the interview with the driver, the truck working on the regular collection conducted 2 trips/day on all days except Mondays from the target khoroo throughout the project implementation (from 17 May and 5 Jul 2011). As for Mondays, the truck conducted either 2 or 3 trips per day.

The weighbridge data was shown in the table below:

Table E-15: Indicators of regular collection

Days of week	Worked days	Trips conducted	Trip per day	Amount of wasate		
				Total (ton)	Daily average (ton/day)	Trip average (ton/trip)
Sun						
Mon	8	22	2.8	67.7	8.5	3.1
Tue	8	16	2.0	58.7	7.3	3.7
Wed	7	14	2.0	47.5	6.8	3.4
Thu	8	17	2.1	55.4	6.9	3.3
Fri	8	16	2.0	50.9	6.4	3.2
Sat	8	16	2.0	54.4	6.8	3.4
Grand Total	**47**	**101**	**2.1**	**334.5**	**7.1**	**3.3**

Source: Weighbridge data (No. of trips was adjusted based on the interview with the driver)

As the table shows, the truck conducted 101 trips and transported 334.5 tons of waste throughout the project implementation. Under "Without PP" case, the truck should have conducted 14 trips per week and transported 3 ton2 of waste with each trip. This means that the truck economized 11 trips when transporting the similar amount ("Without PP" case: 14trips/week*8week=112trips; 3 ton/trip*112 trips=336ton). **If the 8 trips of separate collectin are included, the number of net economized trips will be 3 (112-101-8).**

d.3.2 Impact on cost

Cost analysis was conducted in two ways: (1) for the separate collection and (2) for the entire

[2] Requirement by the DWSF is 3 tons per trip.

collection conducted in the khoroo. The following are the results of the analysis.

d.3.3 Cost of the separate collection

Table E-16 shows the results of the cost analysis conducted for the separate collection.

Table E-16: Cost analysis for separate collection

#	Indicators	Unit	Norm based WSF requirement	Actual	Difference	
					Value	%
1	Conducted trips	num	8	8		
2	Carrying capacity	ton/trip	3.2	3.2		
3	Waste per trip	ton	3.0	0.7	-2.3	-77.7%
4	Capacity utilization	%	93.8%	21.0%	-72.8%	
5	Cost per trip	tg/trip	65,000.0	65,000.0		
6	Total cost	tg	520,000	520,000		
7	**Total waste**	**ton**	**24.0**	**5.4**	**-18.6**	**-77.7%**
8	**Cost per unit of waste**	**tg/ton**	**21,667**	**96,957**	**75,290.4**	**347.5%**

According to the table, the unit cost (cost per unit of waste) estimated for separate collection is more than 4 times in comparison with the norm reaching to 96,957 tg/ton. The difference between the norm and the actual amount of the unit costs occupies about 350% in the amount of the norm.

The main reason for the increase is the considerable decrease in the capacity utilization rate that was resulted from the collection rate of the target items. In order to maintain normal operation, it needs either to conduct separate collection from several khoroos simultaneously or to decrease the collection frequency if it will be conducted from one khoroo .

d.3.4 Cost of the entire collection in the target khoroo

Under this analysis, the total transportation cost before implementing the PP was compared to that after the PP. The results of the analysis are shown in the table below:

Table E-17: Cost analysis for the entire collection conducted in the khoroo

#	Indicators	Unit	**Norm for "Without PP" case**	Actual ("With PP" case)			Difference (Plan<=>Entire)	
				Entire collection	Regular collection*	Separate collection	Value	%
1	Weekly trips	trip/week	**14**	**14**	13	1		
2	Considered duration	week	**8**	**8**	8	8		
3	Total trips	trip	**112**	**109**	101	8	-3	-2.7%
4	Cost per trip	tg/trip	**65,000**	**65,000**	65,000	65,000		
5	Total cost	tg	**7,280,000**	**7,085,000**	6,565,000	520,000	-195,000	-2.7%
6	Total waste	ton	**339.9**	**339.9**	334.5	5.4	0	0.0%
7	**Cost per unit of waste**	**tg/ton**	**21,418**	**20,844**	19,624	96,957	-574	-2.7%

*Note: *-Weighbridge data (No. of trips was adjusted based on the interview with the driver)*

According to the analysis, total cost of transporting the same amount of waste from the target khoroo decreased by 2.7% (195,000 tg). The cost per unit waste decreased by 2.7% (574 tg/ton).

d.3.5 Specific gravity of compacted RPF materials

The main reason for the decrease in the cost was resulted from the increase in the transported amount of the regular collection as RPF materials (mainly card boxes which are light and difficult to compact) had been separated and transported by the truck working on the separate collection. The information about the specific gravity of compacted RPF materials is shown in the following table.

Table E-18: Specific gravity of compacted RPF materials[3]

#	Indicators	Unit	Value
1	Carrying capacity of the CT*	ton	2
2	Specific gravity of compacted mixed waste	ton/m3	0.45
3	Volume of the body	m3	4.44
4	Amount of RPF materials collected	ton	0.839
5	Specific gravity of compacted RPF materials	ton/m3	0.189

**-Nominal amount indicated by the maker of the CT.*

E.3.5 Findings and Conclusions

The findings obtained through the experiment were the following:

- Although the number of residents who separated their waste increased gradually as time went by, delicate separation of RPF materials was mostly made by entrance watchmen. According to watchmen, separation of RPF materials was not troublesome for them since residents had separated big waste such as cardboards before discharging.
- The AOUs and entrance watchmen played significant roles in waste separation and arrangement for separate collections since the degrees of cooperation by AOUs and efforts by entrance watchmen were very high exceeding 84% and the waste arrangement was excellent for 96.2% of the total collection cases.
- Despite of the highest degree of cooperation by AOUs/Watchmen and punctual implementation of the separate collection, separate collection rate was around 40%. According to analysis, it seems that increasing the rate from the current level is rather difficult unless households separate waste before discharging.
- Due to the lower collection rate, unit cost of separate collection is much higher. However, separate collection increases the efficiency of the regular collection; and therefore, the total cost of entire collection in the target khoroo decreases. The main reason for the increase in the efficiency of the regular collection is transportation of cardboards through separate collection.

The conclusions based on the above findings are the following:

- The successful implementation of separate collection was resulted by the high degree of cooperation by AOUs/watchmen which was obtained through sufficient PR activities conducted before the commencement of the project. The other factor was the punctual operation of the collection truck dispatched by the transporting organization for the pilot project.
- Introduction of separate collection reduced the watchmen's burden by decreasing the

[3] According to the monitoring sheet of separate collection filled on 22 Jun 2011, the compacting device of the CT with registration No. 11-38 UNB (different than that worked on the rest of the days) could not rotate at the end of the collection. This implicate that the body of the CT had become full and the RPF materials in the body had been compacted completely. Therefore, the specific gravity of compacted RPF materials can be considered as the same with the estimation in Table E-18.

amounts of waste to be discharged to the regular collection at a time. Therefore, introducing separate collection at apartments with entrance watchmen might be effective regardless of achievements in source separation.

- In order to maintain efficient operation, it is necessary to decrease the cost of separate collection by promoting source separation, conducting separate collection from several khoroos simultaneously and decreasing the collection frequency when implementing in one khoroo.

E.4 PP-3: Pilot Project on WASTE SORTING AT LANDFILL SITE

E.4.1 Outline of the Project

a. Project Description

The purpose of implementing this PP is to obtain data for verification of waste sorting system at landfill site. The waste sorting system for the PP was considered as activity at a waste treatment facility, the JET planned to test the efficiency of waste supply methods for and waste sorting activity at the facility.

Before commencement of the project, the JET constructed a facility with two sorting lines – a conveyor sorting line and a manual sorting line – at NEDS and planned to supply waste to the facility through mixed and separate collections. During the implementation of the project, 15 to 20 waste pickers sorted the waste transported to the facility both manually and semi-mechanically (on conveyor) into 11 types of waste (9 types of valuables, RPF materials and Residue). The sorting scenarios were (1) mixed waste-manual sorting, (2) mixed waste-conveyor sorting, (3) separated waste-manual sorting and (4) separated waste-conveyor sorting.

Throughout the project activity, data on labor input, work hours, operation hours of heavy equipment, collection vehicles and amount of sorted waste were recorded for each of the sorting scenarios. Based on the data, cost and efficiency for each scenario were estimated and compared.

b. Objectives

The objectives of the pilot project are (1) to conduct sorting experiments on waste transported to the sorting yard of NEDS through mixed and separate collections and (2) to identify the most efficient sorting method for raw material supply system of the RPF plant constructed by KOICA project at NEDS.

c. Target Waste

The target waste of the PP was the waste generated in apartment areas and collected by either mixed collection or separate collection.

d. Implementation Period

The implementation period of the project is shown in the following table by each pilot alternative.

Method of sorting	Mixed Collection	Separate Collection
Manual sorting	(1) 6 days (Jul 29 to Aug 5, 2010)	(2) 4 days (May 17 to Jun 28, 2011)

Conveyor sorting	(3) 7 days (Apr 20 to Apr 29, 2011)	(4) 5 days (May 24 to Jul 5, 2011)

E.4.2 Preparatory Activities

a. Construction of the Facility

In order to implement the pilot project, the JET constructed a sorting facility at NEDS in 2010. The facility consisted of two lines: one for manual sorting with concrete floor and the other for semi-mechanical sorting with a conveyor installed inside the building. In addition, there is a storage area for types of sorted waste beside the facility in the yard.

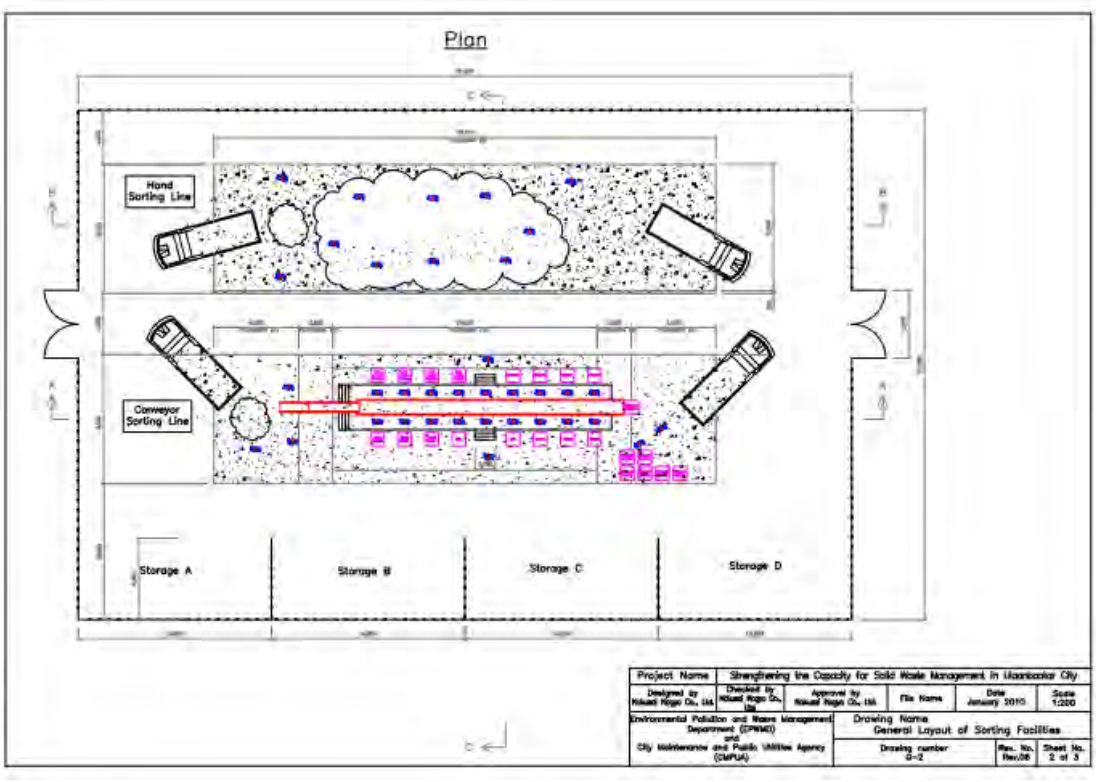


Figure E-33: Layout of the Sorting Facility

The treatment process is shown in the flowchart below.

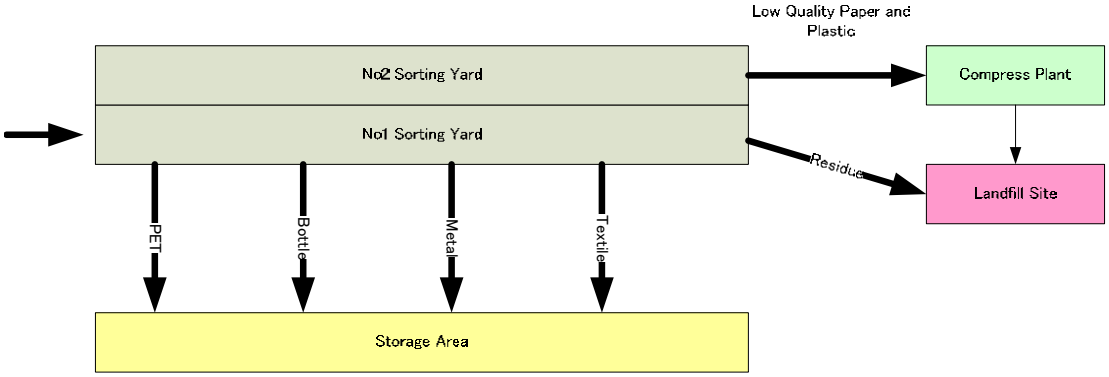


Figure E-34: Recyclable Flow at Sorting Facility

The photos of the sorting facility are shown below:

Figure E-35: Photos of the Sorting Facility

b. Training of Workers

As it was expected that waste pickers working inside the landfill site would be employed at sorting facility of NERC, the JET decided to involve them in implementation of sorting experiment as a preparation.

Therefore, it was needed to train the waste pickers to work under a rule during a certain period of time at designate place. For the purpose, weekly meetings for waste pickers were organized 11 times at NEDS throughout the pilot project starting from 22 Apr 2010.

At the meetings, information about the pilot project, implementation procedures, structure of the sorting facility, work rules and safety instructions were introduced to the waste pickers.

Figure E-36: Waste Pickers' Meeting

The contents of each meeting were shown in the table below:

Table E-19: Contents of Waste Pickers' Meetings

	Date	Contents
!st	April, 22	• Summary of Pilot Project • Schedule of Pilot Project • Registration of WP
2nd	April, 29	• Registration and ID card • Works at the sorting yard
3rd	May, 6	• Partial charge of works at the sorting yard • Allocation of incomes
4th	May, 13	• Position of group member to each work • Allocation of incomes • Questionnaires of current amount of collected recyclables
5th	June, 3	• Distribution of questionnaire about the current amount of collected recyclables • Installation of Notice board for WPs • Lecture (secure sanitary landfill, case of China)
6th	June, 8	• Introduction of sorting facility and report on completion of construction • Checking the progress on colleting answers of questionnaire
7th	June, 15	• Reporting of the results of questionnaire by CMPUA (Mr.Iderchuluun)
8th	June, 22	• Visiting tour of the sorting facility
9th	July,1	• Discussion about the mix waste manual separation pilot project.
10th	July, 6	• Discussion about the mix waste manual separation pilot project
11th	July, 27	• Discussion about the mix waste manual separation pilot project, final confirmation and getting consensus of the working rule.

E.4.3 Results of Experiments on Waste Sorting

The experiment on waste sorting was conducted in 4 scenarios: mixed waste-manual sorting, mixed waste-conveyor sorting, separated waste-manual sorting and separated waste-conveyor sorting.

The results obtained from each scenario are as follows.

a. Cost and Efficiency

a.1 Mixed Waste

a.1.1 Amounts of Sorted Recyclables

Table E-20: Amounts of Sorted Recyclables and Residues

Unit: kg	Hand-sorting			Conveyor-sorting		
PET bottle	68 kg	2.6%		78 kg	2.7%	
Colored Plastic Container	125 kg	4.9%		137 kg	4.7%	
Glass Bottle	582 kg	22.6%		607 kg	20.7%	
Iron	71 kg	2.8%		221 kg	7.5%	
Paper	232 kg	9.0%		240 kg	8.2%	
Bone	149 kg	5.8%		424 kg	14.4%	
Plastic bags	35 kg	1.4%		21 kg	0.7%	
Metal	30 kg	1.2%		27 kg	0.9%	
Cardboard	1,283 kg	49.8%		1,181 kg	40.2%	
Valuables Total	2,576 kg	100.0%	**9.5%**	2,935 kg	100.0%	**10.7%**
Others for RPF Material	790 kg		**2.9%**	1,590 kg		**5.8%**
Recyclables Total	3,365 kg		**12.4%**	4,525 kg		**16.6%**
Residue	23,675 kg		**87.6%**	24,139 kg		**83.4%**
Amount of Waste	27,040 kg		**100.0%**	28,664 kg		**100.0%**

The shares of valuables and RPF materials sorted during the experiments differed between manual and conveyor sorting. For manual sorting, the shares of valuables and RPF materials were 9.5% and 2.9% respectively while those for conveyor-sorting were 10.7% and 5.8%.

As the share of recyclables accounts for 12.4% for manual sorting and 16.6% for conveyor sorting, it can be considered that more recyclables are sorted with conveyor-sorting than manual sorting.

a.1.2 Labor Input

Table E-21: Indicators of Labour

	Manual sorting	Conveyor sorting
Number of Workers (Total)	75 persons	97 persons
Number of Workers (Daily AVG)	15.0 persons	19.4 persons
Working time/Pick/ (total)	6:37 hours	6:37 hours
Working time/Clean & Weigh/ (total)	3:06 hours	2:22 hours
Working time/Others possible/ (Daily AVG)	0:12 hours	0:27 hours
Working time/Pick/ per ton of waste	0:14:41 hours	0:19:42 hours
Working time/Clean & Weigh/ per ton of waste	0:06:53 hours	0:07:07 hours
Total	0:19:18 hours	0:26:49 hours

The daily average of allocated workers is 15 persons for manual sorting and 19.4 persons for

conveyor sorting. During the conveyor sorting, each worker should be allocated for a fixed role while it was not necessary to allocate workers to fixed roles during the manual sorting; and thus, the number of workers for conveyor sorting became more than that of the manual.

At the same time, conveyor sorting required much time than manual sorting since all types of incoming wastes except cardboard had to be checked through on the conveyor (26:49 min/ton). As for the hand-sorting, it did not require such a long time since it required only picking time (19:18 min/ton).

a.1.3 Operation Hours of Heavy Equipment

Table E-22: Operation Hours of Heavy Equipment

	Manual sorting	Conveyor sorting
Dump Truck		
Trip times of Dump trucks	11 units	11 units
Amount of Residue per trip (Average)	2,152 kg	1,553 kg
Required Trips per ton of residue	0.42 times	0.64 times
Average time per trip	0:08:05 hr	-
Backhoe Loader		
Operation hours of Backhoe loader for Leveling	0:41:00 hr	
Operation hours of Backhoe loader for Loading	2:51:00 hr	
Total	3:32:00 hr	0:54:00 hr
Operation hours of BL for Leveling per ton of waste	0:01:31 hr	0:02:41 hr
Operation hours of BL for Loading per ton of Residue	0:07:13 hr	

Note: The above table shows working hours of dump truck. In conveyor-sorting, the same figures as hand-sorting were used to calculate actual cost in order to make the conditions same in the cost required for the residues per unit.

The dump track discharging collected residue in the landfilll site carried 2,152kgs/trip of residues in average. Therefore, the number of trip necessary for one ton of residue can be considered as 0.42 times. Moreover, in the case of conveyer-sorting, it was 1,553kgs/trip, which is extremely little compared with the hand-sorting. The reason is that there were many trips discharging residue without emptying it. In addition, the common figures obtained in the hand-sorting were used to calculate actual cost because it was necessary to use the same number of trip necessary for one ton of residue for each scenario.

As for BL, the working hours of hand sorting was longer than that of conveyor sorting.One of the reasons can be that the BL is not necessary for conveyor sorting as the residue directly flows into dump truck from the belt conveyor, while hand sorting requires BL to load residues into the dump truck.

a.1.4 Cost Calculation Table

Using the above-mentioned basic data, the costs for both hand sorting and conveyor sorting under mixed collection were calculated. The following table shows the cost calculation method and its assumptions.

Table E-23: Cost Calculation Table（Hand sorting with mixed collection）

Input values				Num of Wps on survey	15			
Conditions		contents	value	unit	note	No.		Formula
		Number of Waste Pickers at 1line	15	persons		(1)		
		Working hours a day	7:00:00	hours/day		(2)		
		Operation hours per unit/Actual Operation/	0:21:34	hours/ton of waste		(3)		
		Operation hours per unit/Others/	0:12:24	hours/day		(4)		
		Amount of waste to be dealt	18.90	tons/ day		(5)	=	[(2) − (6)] / (3)
		Amount of Valuables	1.80	tons/ day		(6)	=	(5) * 9.5%
		Amount of RPF materials	0.55	tons/ day		(7)	=	(5) * 2.9%
		Amount of Residue	16.55	tons/ day		(8)	=	(5) * 87.6%
		Average of weight of waste per Compactor truck	2.25	tons/truck		(9)		
		Acceptable Number of Compactor trucks a day	8.39	trucks/ day		(10)	=	(7) / (9)
Expenditure								
Wage of workers	Waste Pickers	Wage of WP per hour	800	tg/hour/person		(11)		
		Wage of WP per day	5,600	tg/day/person		(12)	=	(11) * (2)
	Supervisor	Salary of SV	10,000	tg/day		(13)		
Heavy machinaries	Backhoe Loader	Unit of Rental fee for Backhoe loader	35,000	tg/engine hour	including driver	(14)		
		Unit of Fuel cost of BL	15,000	tg/engine hour		(15)		
		Operation hours for Leveling per unit	0:01:31	engine hours/ton of waste		(16)		
		Operation hours for Loading per unit	0:07:13	engine hours/ton of Residue		(17)		
		Operation hours per day	2:28:13	engine hours/day		(18)	=	(16)*(5) + (17)*(8)
		Total of Rental fee	86,461	tg/day		(19)	=	(18) * (14)
		Total of Fuel cost	37,055	tg/day		(20)	=	(18) * (15)
	Dump truck	Rental fee for Dump truck	10,000	tg/trip	including driver	(21)		
		Fuel cost of DT	15,000	tg/engine hour		(22)		
		Operation hour per trip	0:08:05	hours/ trip		(23)		
		Capasity for one trip	2.15	ton/ trip		(24)		
		Number of trips	7.7	Trip/day		(25)	=	(8) / (24)
		Total of Rental fee	76,906	tg/day		(26)	=	(21) * (25)
		Total of Fuel cost	15,556	tg/day		(27)	=	(22) * (23) * (25)
Income								
Selling Valuables	Valuables (without RPF)	Selling Price per ton	5,224	tg/ ton		(28)		
		Selling Price per day	98,767	tg/ day		(29)	=	(28) * (6)
	RPF	Selling Price per ton	5,000	tg/ ton		(30)		
		Selling Price per day	2,760	tg/ day		(31)	=	(30) * (7)
Reduction of Landfill Amount		Cost for landfill	2,080	tg/ton		(32)		
		Amount of Recyclables to be separated out	4,893	tons/day		(33)	=	(32) * (6) * (7)

Value obtained from survey Calculated autmatically Flexible figure to be input

Table E-24: Cost Calculation Table（Conveyor sorting with mixed collection）

Input values				Num of Wps on survey	19.4			
Conditions		contents	value	unit	note	No.		Formula
		Number of Waste Pickers at 1line	20	persons		(1)		
		Working hours a day	7:00:00	hours/day		(2)		
		Operation hours per unit/Actual Operation/	0:26:49	hours/ton of waste		(3)		
		Operation hours per unit/Others/	0:27:24	hours/day		(4)		
		Amount of waste to be dealt	15.10	tons/ day		(5)	=	[(2) − (6)] / (3)
		Amount of Valuables	1.62	tons/ day		(6)	=	(5) * 10.7%
		Amount of RPF materials	0.88	tons/ day		(7)	=	(5) * 5.8%
		Amount of Residue	12.60	tons/ day		(8)	=	(5) * 83.4%
		Average of weight of waste per Compactor truck	3.41	tons/truck		(9)		
		Acceptable Number of Compactor trucks a day	4.42	trucks/ day		(10)	=	(7) / (9)
Expenditure								
Wage of workers	Waste Pickers	Wage of WP per hour	800	tg/hour/person		(11)		
		Wage of WP per day	5,600	tg/day/person		(12)	=	(11) * (2)
	Supervisor	Salary of SV	10,000	tg/day		(13)		
Heavy machinaries	Backhoe Loader	Unit of Rental fee for Backhoe loader	35,000	tg/engine hour	including driver	(14)		
		Unit of Fuel cost of BL	15,000	tg/engine hour		(15)		
		Operation hours per unit	0:02:41	engine hours/ton of waste		(16)		
		Operation hours per day	0:40:26	engine hours/day		(17)	=	(16) * (5)
		Total of Rental fee	23,589	tg/day		(18)	=	(17) * (14)
		Total of Fuel cost	10,110	tg/day		(19)	=	(17) * (15)
	Dump truck	Rental fee for Dump truck	10,000	tg/trip	including driver	(20)		
		Fuel cost of DT	15,000	tg/engine hour		(21)		
		Operation hour per trip	0:08:05	hours/ trip		(22)		
		Capasity for one trip	2.38	ton/ trip		(23)		
		Number of trips	5.3	Trip/day		(24)	=	(5) / (23)
		Total of Rental fee	52,832	tg/day		(25)	=	(20) * (24)
		Total of Fuel cost	10,686	tg/day		(26)	=	(21) * (22) * (24)
Utility	Electricity	Bill of Electricity per unit	80	tg/KW		(27)		
		Usage of Electricity	0.71	KW/ ton of waste		(28)		
		Total Cost of Electricity	856	tg day		(29)	=	(5) * (27) * (28)
Income								
Selling Valuables	Valuables (without RPF)	Selling Price per ton	5,669	tg/ ton		(30)		
		Selling Price per day	85,581	tg/ day		(31)	=	(30) * (6)
	RPF	Selling Price per ton	5,000	tg/ ton		(32)		
		Selling Price per day	4,392	tg/ day		(33)	=	(32) * (7)
Reduction of Landfill Amount		Cost for landfill	2,080	tg/ton		(34)		
		Total cost for certain amount of Landfill	5,201	tg/day		(35)	=	(34) * (6) * (7)

Value obtained from survey Calculated autmatically Flexible figure to be input

The unit price calculated based on the two above-mentioned cost calculation tables is shown in the following table respectively.

Table E-25: Unit price for Cost Calculation

	Price	Unit	Reference
Wage of Waste Pickers	800 (5,600)	Tg/person/hour (Tg/person/day;7hours)	Result of Waste Picker Meeting and this Pilot

			Project
Salary of Supervisor	10,000	Tg/day	Interview for CMPUA
Rental Fee for Backhoe loader	3,5000	Tg/engine hour	Interview for CMPUA
Fuel cost for BL	15,000	Tg/engine hour	Interview for CMPUA
Rental Fee for Dump Trcuk	10,000	Tg/Trip	Interview for CMPUA
Fuel cost for DT	15,000	Tg/engine hour	Interview for CMPUA
Selling Price of RPF Material	5,000	Tg/ton	JICA, Development Survey
Cost for Landfilll	2,080	Tg/ton	Interview for CMPUA

Since there was a difference in percentage (weight) of valuables included in the incoming waste per unit to the landfilll between conveyer sorting and hand sorting, the selling price per ton of valuables was calculated based on each result. However, the same selling unit price of each valuable is used in calculation. The unit price is shown in the following table.

Table E-26: Valuable Puachasing Price

Price per Unit (MNT/kg)	
PET bottle	380.0
Colored Plastic Container	150.0
Glass Bottle	40.6
Iron	50.0
Paper	80.0
Bone	20.0
Plastic bags	200.0
Metal	630.0
Cardboard	17.0

a.1.5 Cost and Income Sheet

Based on the above results, the Cost and Income Sheet of each way of sorting operation was made as shown below.

Table E-27: Cost and Income sheet（Hand sorting with mixed waste）

At 1 line, One day	Contents		Unit		
Conditions					
	Number of WPs	15	persons		
	Operation hours	7:00:00	hours		
	Amount of wastes	18.9	tons		
	Amount of valuables	1.80	tons		
	Amount of RPF materia	0.55	tons		
	Amount of Residue	16.55	tons		
Cost					
Labor	Wage of WPs	84,000	MNT		
	Salary of Super Visor	10,000	MNT		
Machine	Backhoe Loader	123,515	MNT		
	Dump truck	92,462	MNT		
Electricity			MNT		
Reduction of Landfill amount		-4,893	MNT		
Cost Total		**305,083**	**MNT**		
Income					
Valuables	General valuables	98,767	MNT		
	RPF materials	2,760	MNT		
Income Total		**101,527**	**MNT**		
Daily Running Cost		**203,557**	**MNT**		
Running Cost per ton of Waste		**10,768**	**MNT/ton**	**8.5**	**USD/ton**
		1USD=	1,260	MNT	

In the sorting yard, if the hand sorting of mixed waste is to be conducted for one day under above conditions, the running cost will be 203,557 MNT/day. Converting it to per ton of incoming waste, it turns out to be 10,768MNT/ton.

Table E-28: Cost and Income sheet（Conveyor sorting with mixed waste）

At 1 line, One day	Contents		Unit		
Conditions					
	Number of WPs	20	persons		
	Operation hours	7:00:00	hours		
	Amount of wastes	15.1	tons		
	Amount of valuables	1.62	tons		
	Amount of RPF materia	0.88	tons		
	Amount of Residue	12.60	tons		
Cost					
Labor	Wage of WPs	112,000	MNT		
	Salary of Super Visor	10,000	MNT		
Machine	Backhoe Loader	33,699	MNT		
	Dump truck	63,518	MNT		
Electricity		856	MNT		
Reduction of Landfill amount		-5,201	MNT		
Cost Total		**214,872**	**MNT**		
Income					
Valuables	General valuables	85,581	MNT		
	RPF materials	4,392	MNT		
Income Total		**89,973**	**MNT**		
Daily Running Cost		**124,899**	**MNT**		
Running Cost per ton of Waste		**8,274**	**MNT/ton**	**6.6**	**USD/ton**
		1USD=	1,260	MNT	

In the sorting yard, if the conveyor sorting of mixed waste is to be conducted for one day under above conditions, the running cost will be 24,899 MNT/day. Converting it to per ton of incoming waste, it turns out to be 8,274MNT/ton. This is cheaper than that of hand sorting, but still not so cheap.

a.2 Separated Waste

a.2.1 Basic Data of the Results (Recyclables & Amount of Waste)

Table E-29: Basic Data of the Results (Recyclables & Amount of Waste, by different sorting method)

Unit: kg	Hand-sorting			Conveyor-sorting		
PET bottle	5.4 kg	0.5%		8.2 kg	0.7%	
Colored Plastic Container	19.0 kg	1.8%		19.5 kg	1.8%	
Glass Bottle	16.7 kg	1.6%		15.2 kg	1.4%	
Iron	3.8 kg	0.4%		8.9 kg	0.8%	
Paper	141.6 kg	13.4%		226.6 kg	20.7%	
Bone	0.0 kg	0.0%		0.0 kg	0.0%	
Plastic bags	2.4 kg	0.2%		8.5 kg	0.8%	
Metal	5.2 kg	0.5%		7.5 kg	0.7%	
Cardboard	863.0 kg	81.6%		802.0 kg	73.1%	
Valuables Total	**1,057.1 kg**	**100.0%**	**52.0%**	**1,096.4 kg**	**100.0%**	**47.5%**

RPF plastic	286.6 kg			284.7 kg		
RPF paper	259.4 kg			415.6 kg		
RPF Total	**546.0 kg**		**26.9%**	**700.3 kg**		**30.4%**
Recyclables Total	**1,603.1 kg**		**78.9%**	**1,796.7 kg**		**77.9%**
Residue	428.2 kg		21.1%	509.8 kg		22.1%
Amount of Waste	**2,031.3 kg**		**100.0%**	**2,306.5 kg**		**100.0%**

Table E-30: Basic Data of the Results (Recyclables & Amount of Waste in total)

Unit: kg	Total		
PET bottle	13.6 kg	0.6%	
Colored Plastic Container	38.5 kg	1.8%	
Glass Bottle	31.9 kg	1.5%	
Iron	12.7 kg	0.6%	
Paper	368.2 kg	17.1%	
Bone	0.0 kg	0.0%	
Plastic bags	10.9 kg	0.5%	
Metal	12.7 kg	0.6%	
Cardboard	1,665.0 kg	77.3%	
Valuables Total	**2,153.5 kg**	**100.0%**	**49.6%**
RPF plastic	571.3 kg		
RPF paper	675.0 kg		
RPF Total	**1,246.3 kg**		**28.7%**
Recyclables Total	**3,399.8 kg**		**78.4%**
Residue	938.0 kg		**21.6%**
Amount of Waste	**4,337.8 kg**		**100.0%**

Amount of valuables was about the half (49.6%) in weight of waste collected under separate collection system. However, its breakdown shows 77.3% for cardboard and 17.1% for paper. Therefore, it can be said that valuables such as PET bottle, the glass bottles, and the aluminum cans are extracted at each process of discharge, storage, and collection and cannot be found so much in the sorting yard.

Then, RPF materials account for 28.7% of total amount of waste. The results show that the amount of recyclables account for 78.4% of total amount of waste (21.6% for residue). It can be said that the experiment on the separate collection was successfully done (Refer to the section of separate collection for more details).

a.2.2 Cost and Income Sheet

Based on the above results, the Cost and Income Sheet of each way of sorting operation was made as shown below. The basic data other than the weight ratio of valuables, RPF materials, and residue (working hours and heavy equipment operation hours required for per ton of waste) were assumed the same as those of mixed collection.

Same as the mixed collection, even though there are some differences between hand sorting and manual sorting in the ratio of valuables (in weight) included in per ton of incoming waste, there were not so much residues and leftover valuables and RPF materials in both way of sorting systems. Therefore, in the separate collection system, the same weight ratio of

valuables, RPF materials, and residue included in the incoming waste to sorting yard is used for the hand sorting and vonveyor sorting. However, the same selling unit price of each valuable is used for all 4 types of scenarios. The list of unit price has already been reported in the previous mixed collection.

Moreover, in the following cost and income sheet, it is assumed that about 15 - 20 tons of separately collected waste are to be transported to the sorting yard.

In this case, if 1 ton of recyclables per day is assumed to be collected from 1 khoroo in separate collection system in rough estimate, it is necessary to collect that amount of 15 khoroos every day. The following assumptions should be considered to works out only after these conditions are achieved.

Table E-31: Cost and Income Sheet（Hand sorting with separate collection）

At 1 line, One day	Contents		Unit		
Conditions					
	Number of WPs	15	persons		
	Operation hours	7:00:00	hours		
	Amount of wastes	18.9	tons		
	Amount of valuables	9.38	tons		
	Amount of RPF materia	5.43	tons		
	Amount of Residue	4.09	tons		
Cost					
Labor	Wage of WPs	84,000	MNT		
	Salary of Super Visor	10,000	MNT		
Machine	Backhoe Loader	48,493	MNT		
	Dump truck	22,836	MNT		
Electricity			MNT		
Reduction of Landfill amount		−30,789	MNT		
Cost Total		**134,539**	**MNT**		
Income					
Valuables	General valuables	351,884	MNT		
	RPF materials	27,128	MNT		
Income Total		**379,013**	**MNT**		
Daily Running Cost		**−244,473**	**MNT**		
Running Cost per ton of Waste		**−12,932**	**MNT/ton**	**−10.3**	**USD/ton**
		1USD=	1,260	MNT	

※1 Cost for separate collection is excluded.

In the sorting yard, if the hand sorting of separated waste is to be conducted for one day under above conditions, the running cost will be 244,473 MNT/day in surplus. Converting it to per ton of incoming waste, it turns out to be 12,932MNT/ton in surplus.

Table E-32: Cost and Income Sheet（Conveyor sorting with separate collection）

At 1 line, One day	Contents		Unit		
Conditions					
	Number of WPs	20	persons		
	Operation hours	7:00:00	hours		
	Amount of wastes	15.1	tons		
	Amount of valuables	7.49	tons		
	Amount of RPF materia	4.33	tons		
	Amount of Residue	3.26	tons		
Cost					
Labor	Wage of WPs	112,000	MNT		
	Salary of Super Visor	10,000	MNT		
Machine	Backhoe Loader	33,699	MNT		
	Dump truck	16,462	MNT		
Electricity		856	MNT		
Reduction of Landfill amount		-24,585	MNT		
Cost Total		**148,432**	**MNT**		
Income					
Valuables	General valuables	280,979	MNT		
	RPF materials	21,662	MNT		
Income Total		**302,641**	**MNT**		
Daily Running Cost		**-154,209**	**MNT**		
Running Cost per ton of Waste		**-10,216**	**MNT/ton**	**-8.1**	**USD/ton**
		1USD=	1,260	MNT	

※1 Cost for separate collection is excluded.

In the sorting yard, if the conveyor sorting of separated waste is to be conducted for one day under above conditions, the running cost will be 154,209 MNT/day in surplus. Converting it to per ton of incoming waste, it turns out to be 10,216MNT/ton in surplus.

a.3 General Comparison

a.3.1 General Comparison in Weight Ratio

As a whole, there were clear differences in recyclables weight ratio including RPF materials among those incoming waste between mixed collection and separate collection system.

Recyclables amount collected after sorting account for 10 % or more in mixed collection, while that of separate collection accounts for 80% or less.

The ratio of RPF materials show 2.9%, 5.8%, 26.9%, and 30.4% from the left in the above table so it is considered to be more suitable to apply separate collecton than mixed collection and conveyer sorting than hand sorting to collect RPF materials. Therefore, it is concluded that the best options among all is separate collection with conveyer sorting to collects RPF materials.

However, in terms of collection of valuables, only cardboard and paper can be collected in the separate collection though various kinds of valuables can be collected in the mixed

collection. Therefore, the separate collection is controlled by the market price considerably (Actually the cardboard is not purchased at all in some season).

Table E-33: General Comparison of Recyclables & Weight Ratio of Waste

Unit: kg	Mixed collection				Separate collection			
	Hand sorting		Conveyor sorting		Hand sorting		Conveyor sorting	
PET bottle	2.6%		2.7%		0.5%		0.7%	
Colored Plastic Container	4.9%		4.7%		1.8%		1.8%	
Glass Bottle	22.6%		20.7%		1.6%		1.4%	
Iron	2.8%		7.5%		0.4%		0.8%	
Paper	9.0%		8.2%		13.4%		20.7%	
Bone	5.8%		14.4%		0.0%		0.0%	
Plastic bags	1.4%		0.7%		0.2%		0.8%	
Metal	1.2%		0.9%		0.5%		0.7%	
Cardboard	49.8%		40.2%		81.6%		73.1%	
Valuables Total	100.0%	**9.5%**	100.0%	**10.7%**	100.0%	**52.0%**	100.0%	**47.5%**
RPF Total		**2.9%**		**5.8%**		**26.9%**		**30.4%**
Recyclables Total		**12.4%**		**16.6%**		**78.9%**		**77.9%**
Residue		87.6%		83.4%		21.1%		22.1%
Amount of Waste		**100.0%**		**100.0%**		**100.0%**		**100.0%**

a.3.2 General Comparison of Cost and Income

Integrating the above data results and calculation method, each cost was compared as shown below. The separate collection was calculated adding the cost of separate collection. Refer to the separate collection separately for more details.

Comparing the cost of all 4 kinds of scenarios, the cost for sorting one ton of waste is 10,768MNT/ton for hand sorting with mixted collection, 8,274MNT/ton for conveyor sorting with mixed collection, 3,318MNT/ton for hand sorting with separate collection, and 6,034MNT/ton for conveyer sorting with separate collection. Then, the cost for recycling recyclables (including reuse) is 86,524MNT/ton for hand sorting with mixted collection, 49,953MNT/ton for conveyor sorting with mixed collection, 4,238MNT/ton for hand sorting with separate collection, and 7,707MNT/ton for conveyer sorting with separate collection.

Collecting RPF materials, the cost for collecting one ton of RPF materials is 373,780MNT/ton for hand sorting with mixted collection, 147,188MNT/ton for conveyor sorting with mixed collection, 16,561MNT/ton for hand sorting with separate collection, 26,026MNT/ton for conveyer sorting with separate collection. The results show that the hand sorting with separate collection is the most economical way for collecting RPF materials and valuables.

However, as mentioned previously, cost calculation work out only when this amount of recyclables is assumed to be collected in separate colleciton.

Table E-34: Cost and Iincome Sheet（General Comparison）

1US$= 1260 MNT

	Description	Unit	Mix Collection				Separate Collection			
			Hand-Sorting		Conveyor-Sorting		Hand-Sorting		Conveyor-Sorting	
A	Conditions									
	Number of Waste Pickers	nos	15		20		15		20	
	Operation Hours	hrs	7:00		7:00		7:00		7:00	
	Incoming Wastes	ton	18.90	100.0%	15.10	100.0%	18.90	100.0%	15.10	100.0%
	Amount of Valuables	ton	1.80	9.5%	1.62	10.7%	9.38	49.6%	7.49	49.6%
	Amout of RPF material	ton	0.55	2.9%	0.88	5.8%	5.43	28.7%	4.33	28.7%
	Amount of Residue	ton	16.55	87.6%	12.60	83.4%	4.09	21.6%	3.26	21.6%
B	Sorting Cost									
1	Sorting Cost									
	Labour Cost	MNT	84,000		112,000		84,000		112,000	
	Supervisor	MNT	10,000		10,000		10,000		10,000	
	Backhoe Loader	MNT	123,515		33,699		48,493		33,699	
	Dump Truck	MNT	92,462		63,518		22,836		16,462	
	Electricity	MNT	0		856		0		856	
	Reduction of Landfill Cost	MNT	-4,893		-5,201		-30,789		-24,585	
	Total		305,083		214,872		134,539		148,432	
2	Income from Valuables									
	Valuables	MNT	98,767		85,581		351,884		280,979	
	RPF material	MNT	2,760		4,392		27,128		21,662	
	Total		101,527		89,973		379,013		302,641	
3	Net Cost for Sorting Operation	MNT	203,557		124,899		-244,473		-154,209	
	Unit cost per ton of incoming waste	MNT/t	10,768		8,274		-12,932		-10,216	
		(US$/t)	8.5		6.6		-10.3		-8.1	
C	Additional Cost for Separate Collection	MNT/t					16,250		16,250	
	Basis of the Separate Collection Rate As of 2011 Jul, Collection company is collecting around 4 ton of mix waste at around 65,000Tg/trip. Therefore, Unit Cost for Mix Collection is around 16,250 Tg/ton As for separate collection, discharge amount of separated wastes from certain area are less than those mixed collection, collection truck should travel long distance for collecting same amount of wastes. Based on the separate collection Pilot Project, Compactor Truck can collect around 1 ton of separated waste in half day, So, 2 ton of separated waste can be collected by Compactor Truck in a day. Therefore, 65,000MNT/trip ÷2 ton = 32,500MNT/ton is calculated as the unit cost for separate collection. As a result, 32,500-16,250tg/ton = 16,250 tg/ton is the additional unit cost for separate collection.									
D	Unit Cost for sorting operation considering separate collection cost	MNT/t	**10,768**		**8,274**		**3,318**		**6,034**	
		(US$/t)	**8.5**		**6.6**		**2.6**		**4.8**	
E	Unit cost per ton of Recyclables	MNT/t	**86,524**		**49,953**		**4,238**		**7,707**	
		(US$/t)	**68.7**		**39.6**		**3.4**		**6.1**	
F	Unit cost per ton of RPF material	MNT/t	**373,780**		**147,188**		**16,561**		**26,026**	
		(US$/t)	**296.7**		**116.8**		**9.2**		**16.7**	

※1 Calculating F“Unit cost per ton of RPF material”, B-2 Income from RPF material is not included for calculation.

b. Cooperation with Waste Pickers

Cooperation of waste pickers and CMPUA is indispensable to manage disposal site efficiently in sanitary way as well as conduct this pilot project for verification of sorting system and sorting activity at sorting site which is expected to be done in future depending on results of pilot projects. In that sense, waste pickers play important roll to fulfill indicators of output 6 above-mentioned. Therefore our project holds weekly waste picker meeting, in which attendants is group leaders of current 13 groups of waste pickers, as frequent as possible in independent action of CMPUA aiming to build communication with them. In fact, persons that mainly participated as workers in this survey are these group leaders. Here it is mentioned about cooperation of waste pickers observed throughout this survey.

b.1 From view-point of work of waste pickers

b.1.1 Safety and Sanitary Condition

Currently, waste pickers that make their activities in NEDS are picking valuables at such place as bulldozers make landfilll. From the viewpoint of safety, it is very dangerous place because of heavy traffic of heavy machineries and, naturally, it is not sanitary because all wastes in UB city are being carried into there. System on our hand-sorting yard used in this survey is safer than it of picking at landfilll site. Because there are little cases that heavy machineries are operated nearby waste pickers and are not large number of them, since it is systematically conducted at particularly zoned area. Besides, it can be said that working environment at sorting yard is sanitary. Because they are not unnecessarily exposed to much amount of waste since waste of collection vehicles that contains much amount of valuables is only allowed to unload to hand-sorting yard. Generally, sorting method in this PP has the above-mentioned safety and sanitary conditions. The following shows its characteristics and evaluations of each soring method.

Table E-35: Evaluation of Safety and Sanitary Conditons

		Remarks	Evaluation
	Landfilll site picking	It is considerably low for the WPs in terms of Safety and Sanitation as mentioned above. Moreover, it is not preferable as it is troublesome for operation of heavy equipment for landfillling,	[Safety] Poor [Sanitation] Poor
Mixed collection	Hand sorting	Safety and Sanitary conditions are much better than picking at the landfill site. However, it can be said that it is generally low among four types of methods in this PP.	[Safety] Good [Sanitation] Good
	Conveyor Sorting	Sanitary condition is much better than hand sorting in the outdoor, because the conveyor is used. In terms of safety, it might be safety working inside of the building because WPs hardly happens to be in the same place with heavy equipment operating in the outdoor. However, it is necessary to note that the accident such as rolling in conveyor would occur.	[Safety] Very Good [Sanitation] Very Good
Separate collection	Hand sorting	Safety conditions in the separate collection are almost the same as the mixed collection but it is safer than mixed collection in the sense that WPs has less chance to get injury by the broken glass etc. because waste to be treated hardly contains waste such as kitchen waste and others but only ecyclables compared with the mixed collection waste. Moreover, sanitary conditions of separate collection are much better than that of mixed collection as same as above reasons.	[Safety] Very Good [Sanitation] Excellent
	Conveyor Sorting	Sanitary conditions are the highest because WPs work in the indoor with conveyor and deal with separated waste. Moreover, similarly to the conveyor sorting with mixed collection, it is the safest among all four types of sorting methods in general.	[Safety] Excellent [Sanitation] Excellent

※ In order of Excellent to Poor, Excellent > Very Good > Good > Fair > Poor

Mixed Collection/Hand Sorting

Mixed Collection/Conveyor Sorting

Separate Collection/Hand Sorting

Separate Collection/Conveyor Sorting

b.1.2 Working condition

On working condition, most difference between picking at landfilll site and sorting at sorting yard is that the former, individuals gather only their favored valuables (in other words, the easiest valuable to make much money) at the time and hours they favor for their own profit, while the latter, they have to conduct sorting valuables dividing their roles according to certain rules for and in a team. It is systematic as starting work at certain time under CMPUA

officer's management, playing certain roll, picking certain types of valuables, respectively. Therefore, although it was heard that there are possibility of uncooperative situation of waste pickers toward works such as cleaning and putting away tools which does not create directly profit before starting this survey, once started, they were well working in cooperation with each other in a team sharing respective roles under instruction of CMPUA.

Furthermore, in the conveyor sorting in which more rules and responsibilities of roles are required than hand sorting, WPs worked in collaboration under the supervision of the CMPUA supervisor. The conveyer sorting is divided roughly into the heavy loading role to move waste with shovel at the entrance and the exit of the conveyer and the rols to pick up valuables assigned respectively for each worker inside of the building. In addition, team work is requested more for conveyor sorting than hand sorting, as there is designated roles and responsibilities for each WPs such as who collects which valuable (especially 4 or 5 people are allocated for collection of RPF materials). They successfully accomplished the experiment in collaboration one another though more or less some trouble occurred.

We can judge that it is possible that waste pickers work on certain condition according to rules in cooperation with each other as long as in this survey. However, though detail is mentioned below, we have to consider in case of different system about income since the factor that ensured their daily wage of certain price in this survey could lead to a kind of successful result.

Although, in case of picking at landfilll site, there is no data to be quantitatively compared with this survey result too, it can be qualitatively considered that working at sorting yard is more efficient per person than picking at landfilll site. As for the reason, waste pickers have to have a lot of time to consume for moving one spot to others since a large number of collection vehicles dump their waste at landfilll site in wide range. Moreover, they have to find few valuables from waste dumped by collection vehicles from ger area or construction site that contains few recyclables. On the other hand, waste pickers can clearly sort valuables with not much seeking, at the certain area without moving widely at the sorting yard, since it allows only waste of compactor from apartment area which contain many valuables to be dumped at area zoned for sorting. Therefore working at sorting yard is more efficient than picking at landfilll site.

b.1.3 Behavior to work

The problem of behavior for picking up RPF materials has been particularly observed throughout the survey from the viewpoint of behavior to work of WPs. As mentioned above, RPF materials were sorted out in the survey on trial although it is not valuable in current UB city. In other words, they could not pick up RPF materials in beginning period, since they had no custom to pick them and did not understand what RPF materials are. They had very low motivation to pick it up was obviously turned out. Because RPF materials are not able to be exchanged for money despite the fact that there are a lot of amount of RPF materials supposed to be picked, which account for large portion in whole recyclables in its volume and quantity, since they are mainly composed of plastic bags. Therefore, when only RPF materials were remaining for picking and other valuables were finished out to pick in the survey field, it was observed that some people stopped their work on their own decision without any permission of the supervisor and took rest shitting on the floor. It can be thought that it is related to that they have little mind that workers follow instruction of payer such as that it is seen in general society in Japan.

However, this problem would be solved once they would get experienced it. Actually, amount of recyclables sorted increased as well as understainding on RPF materials by WPs became deeper according to progress of survey from second or third day and from mixed collecion to separate collection. Finally, though we adopted evenly the stable wage system not the commission system in the survey since we took RPF materials which are not valuable as target. The challenge, which have to be considered that how arrange and weigh the Cost and Income Sheet between picking work and profits sharing system, is still remaining, when UB city authority independently run this recycling system by themselves in near future until RPF materials will be really valuable in the market.

b.2 Income of WPs

Here, it was considered about income of waste pickers. A questionnaire survey which was conducted for waste pickers before has resulted that their average hours of work on summer season is 10.5 hours/day, and its average income is 7,629 tg/ day (727 tg/ hour). Generally based on the result, our project decided the price of wage of 5,000 tg/ day in the survey expecting 5-6 hours of work per day on agreement with waste pickers at WPs meeting. However, although they worked for 4 hours which meet waste of 5 trucks at first day, they worked in little bit low concentration and expressed opinion that 5,000tg is not enough for wage of this working hours. Accordingly, from next day we set up 2-3 trucks as target in order to obtain correct survey data of 2-3 trucks per day other than in correct data of 5 trucks. Consequently, they concentrated to work well and we have reached the conclusion that appropriate price of wage is 5,000tg per day for work of 2hours and half. Then, in the following conveyor sorting and separate collection, almost the same conditions have been applied.

However we have to consider that the survey was especial case since it is limited to the period of time. On a waste picker meeting after ending the survey, nearly half of them had mentioned that they would accept 5,000tg of wage per day for about 5 hours, if they got stably permanent job. On the other hand, another half of them mentioned that 7,000tg is appropriate for price of wage for 5hours day.

E.4.4 Findings

- Comparing hand sorting and conveyor sorting, hand sorting requires less number of workers and hours hangs than conveyer sorting even though more recyclables (valuables and RPF materials) can be collected in the conveyor sorting
- As for the weight ratio of collected recyclables, in the mixed collection, about 10% of valuable and 4 % of RPF materials were found in the incoming waste to the sorting yard, while about 50% of valuables and 28 % of RPF materials were found in the separate collection.
- In the mixed collection, the composition ratio of valuables in collected recyclables is 20% for glass bottle, 10% or less for paper, 50% or less for cardboard, and 10% for bone, and all types of materials are found to some degree but in the separate collection, it is 20% or less for paper and 80% or less for cardboard.
- Out of those collected RPF materials, 46% is plastic and 54% is paper by plastic.
- It can be concluded that hand sorting with separate collection is the most economical (16,561 MNT/ton; 9.2USD/ton) to collect RPF materials. However, it can only said under the assumption that certain amount of waste is collected in the separated collection.
- Work environment of waste pickers at the sorting yard is safer and more sanitary than

working in landfilll site as before. Among all, conveyor sorting with separate collection turned out to be most safety and sanitary, followed by hand sorting with separate collection.

- Waste pickers can work obeying the rules and regulation under certain condition in cooperation with other workers. However, in case of short period of employment such as 1 week, it has been observed that they tend to severely think the price of wage comparing to working hours and sometimes does not obey instruction of supervisor and manager.

As for the income of waste pickers, 5,000tg per day for 3 hours is available in case of short time employment. If they would be employed steadily for long period, it is possible that for them to accept the offer of 5-7 hours of work a day with above condition.