5. Information, Education, and Communication (IEC)

A successful solid waste management entails the collective effort of the private and public entities, as well as the grassroots. IEC campaigns pave the way for the involvement of residents in championing the SWM practices implemented by the LGUs.

Promotion of segregation
5-1. Leaflet explaining waste segregation
5-2. Application for waste segregation
5-3. Collection bag for used paper

Promotion of waste reduction
5-4. Upcycling plastic waste into accessories
5-5. Plastic-free spaces
5-6. Seoul Upcycling Plaza Center

Promotion of SWM for private companies
5-7. Requirement to attend SWM course

IEC event
5-8. Live Green Conference
5-9. Zero Basura Olympics, “ZBO”
5-10. Spo-GOMI
5-11. Plastics Smart
5-12. Waste Wise Festival
5-13. Zero Waste Switzerland
5-14. Recycling competitions
5-15. Cleanup drive competition

5. IEC

5-1. Promotion of segregation
Leaflet explaining waste segregation
Mandaue City , Philippines and Japan

Target waste

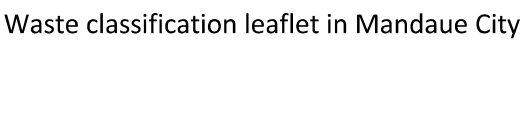
All type of wastes

Implementation entity

Mandaue City

Outline

- The LGU provides a leaflet that details the schedule of collection for each type of waste



Waste classification leaflet in Mandaue City

Good Practice Point

- Residents can check the waste classification and the collection day with the leaflet, and it can prevent improper waste disposal.

Similar cases

Target waste

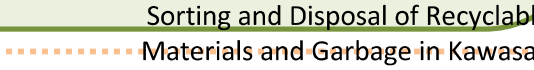
All type wastes

Implementation entity

Kawasaki City, Japan

Outline

- List separation and discharge methods for each waste type is detailed in the local government website and public relations brochure.



Sorting and Disposal of Recyclable Materials and Garbage in Kawasaki

References

- Kawasaki City Hall (2022) Packaging and disposal of Kawasaki's recyclables and waste [online] Available at: http://www.city.kawasaki.jp/tl/page/0000037807.html

5. IEC

5-2. Promotion of segregation
Mobile application for waste segregation
Philippines and Fujisawa City, Japan

Target waste

All type wastes

Implementation entity

Phiippines (DENR)
Fujisawa City, Japan

Jun 2018

Outline

- DENR released a Basura Buster app to reach the younger generation and teach them about proper segregation in an interactive approach.
- Fujisawa City distributes the "Fujisawa City Wastes Sorting App", an application service for smartphones that can be easily used for confirming wastes category, and also contains the calendars for the collection dates.
- The main functions are as follows:

- Function 1: Teach the waste categories
- Function 2: Show the collection dates
- Function 3: Alert user on approaching collection dates
- Function 4: Indicate the location of stores selling the waste bag
- Function 5: Inform the user on waste collection schedules during emergency situations

※1 Burnable wastes, Bin
※2 Non-burnable wastes, Book

(above) Fujisawa City Wastes Sorting App
(below) Basura Bustler app

Good Practice Point

- With more than 17,000 downloads, the Fujisawa City Wastes Sorting App was found to be especially effective for young people.
- DENR's Basura Buster app made segregation easily understood by kids through the gamification of the process.

References

- Sawaji O. (2019) "Plastics Smart" Campaign [online] Available at: https://www.gov-online.go.jp/eng/publicity/book/hlj/html/201906/201906_09_en.html
- DENR [2021] "DENR's free Basura Buster Game App For Kids Now Available [online] Available at: https://denr.gov.ph/index.php/news-events/photo-releases/3332-denr-s-free-basura-buster-game-app-for-kids-now-available

5. IEC

5-3. Promotion of segregation
Collection bag for used paper

Fukuoka City, Japan

Target waste

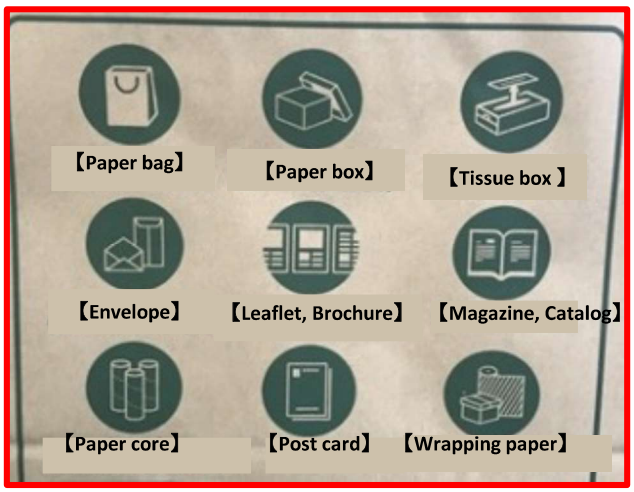
Used paper

Implementation entity

Fukuoka City

Front

Back



Outline

- The paper bag describes the types of used paper that can be recycled (paper bag, paper box, tissue box, envelope, leaflets and brochures, magazines and catalogs, tissue paper core, postcards, and wrapping paper)
- With this initiative, it is expected to encourage recycling of used paper by avoiding it from being mixed in with other waste.

Good Practice Point

- The bags are distributed to citizens for free, making it more accessible to everyone.

References

- [online] Available at: https://www.city.fukuoka.lg.jp/data/open/cnt/3/8722/1/ru-ru_e.pdf?20210310103323

5. IEC

5-4. Promotion of waste reduction
Upcycling plastic waste into accessories
Municipality of San Isidro, Davao Oriental, Philippines

Target waste

Recyclable wastes, particularly plastic waste

Implementation entity

LGU San Isidro partnered with WWF

Outline

- The partnership introduced 3R programs including "Wala Usik Program", CLOOP (close the loop) Program, and similar efforts to promote SWM awareness, plastic reduction, and upcycling and recycling activities.

Good Practice Point

- Wala Usik Program encourages store owners to reduce the use of single-use plastics in their establishments and promoting a zero waste, plastic-free environment.
- CLOOP program creates training opportunities for residents to upcycle collected plastic wastes into bags, accessories, and other sellable items. The program also includes soft skills training to build the capacity of residents to establish their own businesses.

Bag made from upcycled food wrappers

Promotion of refilling stations to reduce sachet waste

References

- WWF Philippines (2022) Plastic Smart Cities Video Series: Wala Usik San Isidro [online] Available at: https://youtu.be/HKCcDwq0PSI
- Wala Usik - Redesigning Sachet Culture in Community Convenience Stores in the Philippines [online] Available at: https://www.youtube.com/watch?v=aecPPJcOdec

5. IEC

5-5. Promotion of waste reduction
Plastic-free spaces
Municipality of San Isidro, Davao Oriental

Target waste

Recyclable wastes, particularly plastic waste

Implementation entity

LGU San Isidro

Outline

- As part of the Nutrition Month Celebration, bayongs were distributed in all 16 barangays of San Isidro, in order to promote the use of sustainable and locally-sourced products to replace plastic bags.

Good Practice Point

- Realizing that though laws that promote 3R are present but are rarely implemted, San Isidro launched their campaign *Dili Nako sa Plastik* Program that focus on plastic recovery and recycling and led to its pivotal participation in WWF-PH's Plastic Smart Cities to further their cause.Bayongs are distributed to households after identifying that single use plastic bags are one of the main types of wastes produced in the municipality

Distribution of bayong bags to encourage the use of reusable bags instead of single-use plastic bags

References

- Lacsamana B. (2021) Community solutions address PH plastic problem [online] Available at: https://www.bworldonline.com/sparkup-community-solutions-address-ph-plastic-problem/
- Perez A. (2019) War vs plastic wastes [online] Available at: https://www.sunstar.com.ph/article/1835462/davao/feature/war-vs-plastic-wastes

5. IEC

5-6. Promotion of waste reduction
Seoul Upcycling Plaza Center
Seoul City, South Korea

Target waste

All type wastes

Soule City, South Korea

Implementation entity

Seoul Upcycling Plaza

Outline

- Seoul Government opened Seoul Upcycling Plaza in 2017, an upcycling center that aims to raise awareness on environmental, social, and economic advantages of upclying.

Good Practice Point

- One can visit the museum of upcycled products and art pieces made of discarded materials, shop at a reuse store, take part in weekend flea markets, or enjoy food or beverage at a cafe.

Seoul Upcycling Plaza

References

- GAIA Asia Pacific (2019) Citizens at the Center: Seoul's Journey to Zero Waste [online] Available at: https://zerowasteworld.org/wp-content/uploads/Korea.pdf
- Visit Seoul (2021) Seoul Upcycling Plaza [online] Available at: https://english.visitseoul.net/attractions/Seoul-Upcycling-Plaza_/24608

5. IEC

5-7. Promotion of SWM for private companies Requirement to attend SWM course Santiago City and Municipality of Pantukan, Philippines

Target waste

Industrial wastes

Implementation entity

Santiago City
Municipality of Pantukan

Outline

- Santiago City and the Municipality of Pantukan have integrated environmental concerns into the distribution of business licenses, with a requirement to attend an SWM course before receiving the licenses.
- Through the involvement of transport groups, junkshop groups, and Youth for the Environment in Schools Organization (YES-O), Santiago City have organized seminars and successfully spread awareness of SWM good practices.

Good Practice Point

- The Municipality of Pantukan included SWM Compliance as a requirement for the issuance of business permits in their Business One Stop Shop where establishments can apply or renew permits.
- Santiago City was able to formulate effective incentive systems that encouraged the community to abide by SWM practices. Hand in hand with the “no segregation no collection” policy and awarding of eco-friend schools and barangays, their awareness campaigns were helpful in spreading information and awareness to the matter.
- The innovative strategies and partnerships with key offices paved the way for marginalized families to earn through processing waste to get ecobricks and other sellable products.

References

- Premakumara et al. (2016) Barriers for Implementation of the Philippine National Solid Waste Management Framework in Cities [online] Available at: https://www.jstor.org/stable/resrep02912?seq=1#metadata_info_tab_contents

5. IEC

5-8. IEC event
Live Green Conference
Muntinlupa City, Philippines

Target waste

All type wastes

Implementation entity

Muntinlupa City

Outline

- Live Green Conference is an annual competition among Muntinlupa City's youth which provides a venue for the expression of environmental perceptions through art.

Winning entries from 2014 Poster-making contest, Illustrating environmental sustainability awareness

Good Practice Point

- The event aims to increase the awareness of the youth not only on proper solid waste management, but also on the other environmental concerns which the City endeavors to address.
- Total of 27 campus journalists and artists from both private and public schools in Muntinlupa joined the contest in 2014.

References

- National Solid Waste Management Status Report (2008-2014) DENR-EMB. [online] Available at: https://nswmc.emb.gov.ph/wp-content/uploads/2016/06/Solid-Wastefinaldraft-12.29.15.pdfm
- Student winners in environmental sustainability contests announced. October 2014 (Marivic Faicol) [online] Available at: https://newsinfo.inquirer.net/642940/student-winners-in-environmental-sustainability-contests-announced

5. IEC

5-9. IEC event
Zero Basura Olympics, "ZBO"
Philippines

Target waste

All type wastes

Implementation entity

DENR

Outline

- ZBO is a nationwide contest to promote innovative and effective approaches in managing solid wastes. The initiative started as a competition among LGUs but has expanded to enterprises too.

Good Practice Point

- By acknowledging and rewarding the efforts of LGUs and private entities in promoting responsible SWM practices, observance to these practices will be encouraged, and can help spread awareness of good practices that can be emulated by others.

CEMEX Philippines winning ZBO for Business Book, 2017 for using the cement kiln for processing plastic wastes

References

- National Solid Waste Management Status Report (2008-2014) DENR-EMB. [online] Available at: https://nswmc.emb.gov.ph/wp-content/uploads/2016/06/Solid-Wastefinaldraft-12.29.15.pdf
- Zero Basura Olympics features CEMEX in launch of best practices book (CEMEX Holdings Philippines) [online] Available at: https://www.cemexholdingsphilippines.com/-/zero-basura-olympics-features-cemex-in-launch-of-best-practices-bo-1

5. IEC

5-10. IEC event
Spo-GOMI

Japan

Target waste

All type wastes

Implementation entity

General Incorporated Association Social Sports Initiative (General Incorporated Association)

A scene of Spo-GOMI

Outline

- Spo-GOMI is a sport in which players pick up wastes in teams in a predetermined area and compete for points based on the quantity and quality of the trash collected within the time limit.

Good Practice Point

- The sense of accomplishment and exhilaration of sports renews the participants' values and interest in collecting wastes.

References

- Spo GOMI Japan [online] Available at: https://www.spogomi.or.jp/about/

5. IEC

5-11. IEC event
Plastics Smart
Japan

Target waste

Plastic wastes

Implementation entity

MOEJ, Local government,
NGO , Research Institute etc.,

Event of the collection of plastic wastes in Kanagawa Prefecture

Outline

- The basic principles of this strategy are promoting the 3R for plastic as well as encouraging the use of recycled materials and bioplastics. In line with this, measures such as eradicating illegal dumping, curtailing the outflow of microplastics, and retrieving ocean litter will be implemented to deal with marine plastic litter.
- The campaign aims to spread across Japan with initiatives such as surveying the reality of the marine plastic litter problem as well as eradicating littering and reducing the disposal of unnecessary single-use plastics

Good Practice Point

- Examples of various initiatives will be presented online and companies and organizations with an interest in marine plastic litter issue will be encouraged to engage with each other in the Plastics Smart Forum.

paper straws as a more sustainable alternative

References

- Sawaji O. (2019) “Plastics Smart” Campaign [online] Available at: https://www.gov-online.go.jp/eng/publicity/book/hlj/html/201906/201906_09_en.html

5. IEC

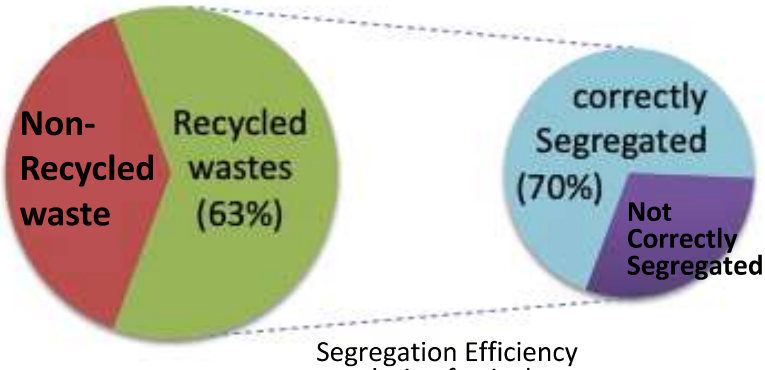
5-12. IEC event
Waste Wise Festival
Taipei, Taiwan

Target waste

Recyclables, non-recyclables and food waste

Implementation entity

Taipei City



Segregation Efficiency during festival

Outline

- Taipei City Government organized the Taipei Lantern Festival with the aim of showing citizens that they can enjoy themselves, while at the same time, without leaving a great deal of trash behind.
- Specially designed recycle bins were provided during the festival to collect recyclables, non-recyclables and food waste for composting.

Good Practice Point

- Organizing such initiatives can show the citizens concrete proof of the possibility of zero waste. Thus, encouraging them to learn from these events and apply their learnings at their homes.
- The festival lasted for ten days, and estimated attendance is over four million. Roughly 36 tons of waste was collected on site, and 23 tons of which were either recyclables or food waste suitable for composting.
- Remarkably, the recycling rate reached up to 63%, and 70% of the waste were placed correctly into the designated bin by participants of the festival.

References

- Pacific Economic Cooperation Council. (2003) Towards Zero Waste Society- New Management Policies for Solid Waste Disposal in Chinese Taipei at: https://www.pecc.org/resources/infrastructure-1/1246-towards-zero-waste-society-new-management-policies-for-solid-waste-disposal-in-chinese-taipei-1
- Lee D. (2019) Taiwan to Host Its First Eco-Friendly Lantern Festival in October [online] Available at: https://international.thenewslens.com/article/124383

5. IEC

5-13. IEC event
Zero Waste Switzerland
Bern, Switzerland

Target waste

All type wastes

Implementation entity

The Zero Waste Switzerland Association

A scene of the workshop

Outline

- The Zero Waste Switzerland Association encourages and enables citizens, institutions and economic parties to choose a manner of consumption and production without waste, by favoring a renewable and circular economy.

Good Practice Point

- They offer interactive workshops where participants are invited to reflect on their habits and are guided towards a Zero Waste transition, with concrete solutions.
- Based on their website information, they are encouraging those who would like to participate to donate.

References

- ZeroWaste Switzerland [online] Available at: https://zerowasteswitzerland.ch/en/
- Zero Waste Europe. Zero Waste Switzerland [online] Available at: https://zerowasteeurope.eu/portfolio/zerowaste-switzerland/

5. IEC

5-14. IEC event
Recycling competitions
Municipality of Maco, Davao de Oro, Philippines

Target waste

Recyclable wastes, particularly plastic waste

Implementation entity

Barangays under the LGU of Maco

Outline

- Promotion of recycling efforts rippled into the religious celebrations of Maco where, as part of the annual Lamdag Festival, barangays submit entries of Christmas Trees, Belen, and Parol, that should all be made out of recycled materials.

Good Practice Point

- Rigorous waste collection efforts are introduced leading up to the festival and are utilized in the celebration of the festivity, weaving plastic recycling into the culture of the municipality.

Lamdag Festival Celebration

References

- Cornelio C. (2018) Mga belen na gawa sa recycled materials tampok sa Compostela Valley [online] Available at: https://news.abs-cbn.com/news/12/12/18/mga-belen-na-gawa-sa-recycled-materials-tampok-sa-compostela-valley

5. IEC

5-15. IEC event
Cleanup drive competition
Davao Region, Philippines

Target waste

Marine waste, all waste types

Implementation entity

Bureau of Fisheries and Aquatic Resources (BFAR)

Outline

- Synchronized coastal cleanup drives are facilitated among the barangays in Pantukan, as they vie for a win in the Most Outstanding Municipality hosted by BFAR. Annual cleanup drives are also done in Monkayo every January in celebration of Zero Waste Month.

Good Practice Point

- Working under the theme *Malinis at Masaganang Karagatan tungo sa ikauunlad ng mamamayan*, the Municipality of Pantukan believes that regular and collective cleaning of its coastal resources are key to a sustainable waste management strategy.
- Acknowledging the continued efforts of the barangays through a healthy competition also helps promote the practice in the grassroots.

Coastal cleanup in Pantukan

Cleanup drive in Monkayo

References

- Philippine News Agency (2016) BFAR kicks off 53rd fisheries conservation week [online] Available at: https://region11.bfar.da.gov.ph/cmsFiles/region11/homepagecenter/pdf/ddbbd5a8-2d34-4474-9d99-67f6c8cd1fb7(02-09-2017).pdf

6. Waste Analysis and Characterization Study (WACS)

Proper and regular implementation of the Waste Analysis and Characterization Study (WACS) in LGUs make it possible for public offices to **understand the wastes being produced in the community, and allows for programs to be designed, updated, and implemented, ensuring best fit to handle the wastes being produced**. In this section, examples on how to implement WACS are described to guide LGUs in their own WACS implementation.

6-1. WACS Study with a classification of the community and seasons (ASTM D5231)
6-2. Statewide Municipal Solid Waste Characterization Study
6-3. Regular study and disclosure of WACS data to the public

6. WACS

6-1. WACS Study with a classification of the community and seasons (ASTM D5231)

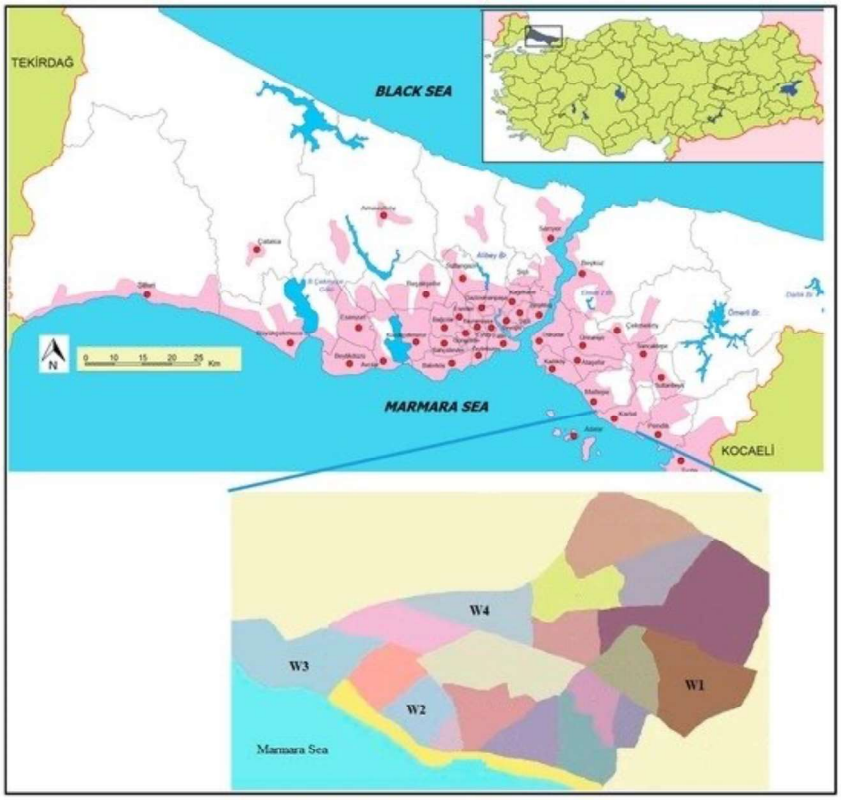
Kartal District, Istanbul, Turkey

Outline

- MSW samples were collected to represent 4 lifestyles (high, medium, low, downtown) in summer and winter periods.

Good Practice Point

- The findings obtained can be used to improve the waste collection activities, provide better opportunities to utilize waste as a secondary raw material, reduce the amount of waste sent for disposal, and decrease the total waste disposal cost.
- The results showed that organic waste rate and income level are inversely proportional.



Study area and municipal solid waste (MSW) collection points for characterization

References

- Ozcan H, et. al (2016) Municipal Solid Waste Characterization according to Different Income Levels: A Case Study [online] Available at: https://www.mdpi.com/2071-1050/8/10/1044/htm

6. WACS

6-2. Students' Participation in the Characterization study Indiana, USA

Outline

- This study pioneered waste characterization field study of MSW in Indiana landfills, primarily intended to provide an educational opportunity for Purdue Students in SWM and performing data collection and research.
- The limitations included difficulty of getting landfills to participate in the study, availability restrictions due to conflicting schedules of students, and the high cost of sending teams into the field.

Good Practice Point

- The collaboration with Purdue University was valuable in this pioneering activity under the objective of increasing awareness and expertise in the subject of waste characterization.

Data gathering for WACS by Purdue University Students

References

- Abramowitz H. et. al (2012) Municipal Solid Waste Characterization Study for Indiana [online] Available at: https://www.in.gov/idem/recycle/files/msw_characterizarion_study.pdf

6. WACS

6-3. Regular study and disclosure of WACS data to the public

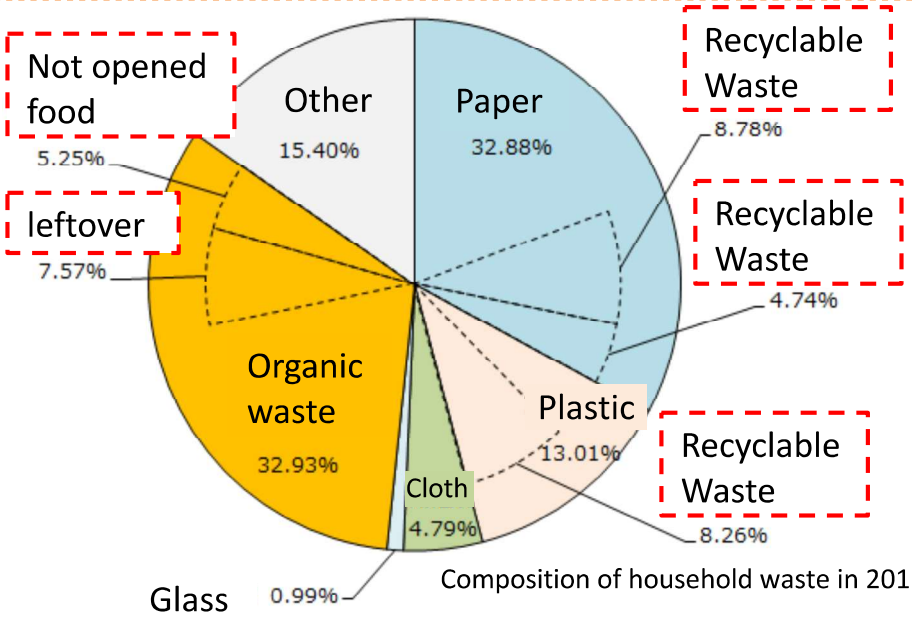
Japan and Bristol, UK

Outline

- The composition survey of household garbage (ordinary waste, recyclable waste, plastic containers and packaging, used paper and clothing) is conducted, and the secular change is disclosed.
- Data can be widely used for analysis, policy development or modification, monitoring, and promotion of proper solid waste management.
- Bristol produces an annual report of "Waste from Household" Data to monitor policy effectiveness and support policy development.

Good Practice Point

- A regular monitoring and analysis of waste generation serves as an objective and sound basis for policy development that will improve the SWM status of the community.
- The result is posted on the local government website, then it effective for raising residents' awareness.



Composition of household waste in 2017 in Osaka City

References

- Osaka City (2021) Summary of household waste composition analysis survey results in 2018 [online] Available at: https://www.city.osaka.lg.jp/kankyo/page/0000444225.html
- Department for Environment Food & Rural Affairs (2019) Statistics on waste managed by local authorities in England in 2018/19 [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/849167/201819_LA_collected_waste_mgt_annual_Stats_Notice_FINAL_Accessible_v4.pdf

Summary Matrix

The following section summarizes the compiled examples in this booklet per country to guide in seeking insights on the cultural, social, and economic factors, among others, that contribute to the success of the implementation of good solid waste management practices and technologies. The summary is organized alphabetically.

Cambodia **India** **Indonesia** **Japan**	p. 82
Malaysia **Philippines** **Singapore** **South Korea**	p. 83
Sweden **Switzerland** **Taiwan** **Thailand** **Turkey** **United Kingdom** **USA** **Vietnam**	p. 84

Summary Matrix (1/3)

Country	Cost Recovery	Collection and Transportation	Reduce, Reuse, Recycle (3R)	Landfill	IEC	WACS
Cambodia			3-3. Recycles of organic waste: Utilizing rice husks			
India			3-23. Promotion of appropriate waste management: Model Ward Initiative			
Indonesia			3-1. Recycles of organic waste: Black Soldier Fly (BSF) 3-8. Promotion of recycling: Ecobrick Movement 3-14. Promotion of recycling: Waste bank (Bank Sampah)			
Japan	1-1. Charge on a waste bag designated by local government 1-5. SWM cost allocated from general taxpayer	2-1. Door-to-Door Collection 2-3. Transfer Station -1 2-8. Cloud-based waste collection route optimization app 2-9. Station collection for recyclable waste 2-12. Group Collection of Recyclable Waste 2-13. Kitchen waste collection	3-5. Recycles of organic waste: Waste biomass torrefaction 3-6. Recycles of organic waste: Organic Waste Treatment System 3-7. Recycles of organic waste: Disassembled food waste disposer "Shorio¬ 3-15. Promotion of recycling: Act on Promoting Green Procurement	4-1. Fences, retaining walls 4-2. Daily Soil Cover 4-3. Leachate Collection Pipes of Semi-aerobic landfill 4-4. Gas Ventilation System of Semi-aerobic landfill 4-5. Surface lining system 4-6. Holding basin and Regulating pond for leachate 4-7. Leachate Treatment Facility	5-1. Promotion of segregation: Leaflet explaining waste segregation 5-2. Promotion of segregation: Mobile application for waste segregation 5-3. Promotion of segregation: Collection bag for used paper 5-10. IEC event: Spo-GOMI 5-11. IEC event: Plastics Smart	6-3. Regular study and disclosure of WACS data to the public

Summary Matrix (2/3)

Country	Cost Recovery	Collection and Transportation	Reduce, Reuse, Recycle (3R)	Landfill	IEC	WACS
Malaysia			3-2. Recycles of organic waste: Bokashi composting of food waste from restaurants and hotels			
Philippines	1-2. No Segregation * No Sticker - No Collection Policy 1-3. Volume-based Fee System Using Designated Garbage Bags 1-5. SWM cost allocated from general taxpayer 1-6. Garbage Fee Collection and MRF Rental 1-7. Sale of Recyclables	2-2. Food Waste Truck Program 2-15. Interactive segregated waste collection	3-8. Promotion of recycling: Ecobrick Movement 3-9. Promotion of recycling: Basuranihan Project 3-10. Promotion of recycling: WISHCRAFT 3-11. Promotion of recycling: Plastic for Rice Program 3-12. Promotion of recycling: Recycling Drop off Sites, IEC, Promotion of recycle 3-13. Promotion of recycling: Refuse derived paper and plastics densified Fuel		5-1. Promotion of segregation: Leaflet explaining waste segregation 5-2. Promotion of segregation: Mobile application for waste segregation 5-4. Promotion of waste reduction: Upcycling plastic waste into accessories 5-5. Promotion of waste reduction: Plastic-free spaces 5-7. Promotion of SWM for private companies: Requirement to attend SWM course 5-8. IEC event: Live Green Conference 5-9. IEC event: Zero Basura Olympics, ¬ZBO° 5-14. IEC event: Recycling competitions 5-15. IEC event: Cleanup drive	
Singapore		2-7. Model Country on waste collection and transportation				
South Korea	1-3. Volume-based Fee System Using Designated Garbage Bags	2-14. High-tech food waste recycling machines			5-6. Promotion of waste reduction: Seoul Upcycling Plaza Center	

Summary Matrix (3/3)

Country	Cost Recovery	Collection and Transportation	Reduce, Reuse, Recycle (3R)	Landfill	IEC	WACS
Switzerland					5-13. IEC event: Zero Waste Switzerland	
Taiwan	1-1. Charge on a waste bag designated by local government	2-6. Equipping Transporting Vehicles with GPS	3-4. Recycles of organic waste: Food Waste Recycling 3-15. Promotion of recycling: Act on Promoting Green Procurement 3-21. Promotion of reuse: Resource Recycling and Reuse Act		5-12. IEC event: Waste Wise Festival	
Thailand			3-22. Promotion of appropriate waste management: District Model of Waste as a Resource			
Turkey			3-16. Promotion of recycling: Smart Mobile Waste Transfer Centers			6-1. WACS Study with a classification of the community and seasons (ASTM D5231)
United Kingdom		2-10. Community-based of Mini Recycling Centers 2-11. Recycling Drop Off Sites	3-8. Promotion of recycling: Ecobrick Movement			6-3. Regular study and disclosure of WACS data to the public
USA	1-1. Charge on a waste bag designated by local government 1-4. Volume-based Fee System Using Designated Garbage Bags	2-4. Transfer Station -2 2-5. Truck Routing				6-2. Students' Participation in the Characterization study
Vietnam			3-13. Promotion of recycling: Refuse derived paper and plastics densified Fuel			

For any questions on this Booklet, feel free to contact:

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Solid Waste Management Division (SWMD)
Environmental Management Bureau
Department of Environment and Natural Resources
DENR Compound, Visayas Avenue
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Appendix 6: TSD Facility Survey

6-1 Report Summary
6-2 Questionnaire for EMB RO
6-3 Questionnaire for TSD

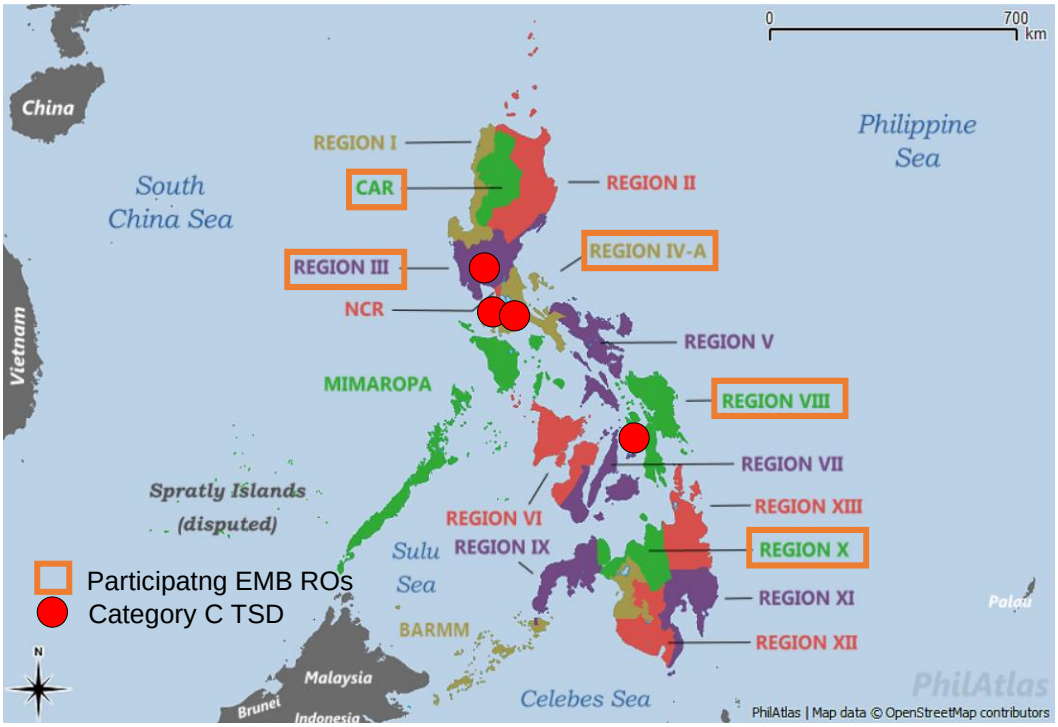
Appendix 6-1: Report Summary

I. Introduction

In line with data gathering for Activities 1-6 and 1-8 of Output 1 (OP1) of the Technical Cooperation Project (TCP), the JICA Expert Team (JET) has coordinated with five (5) EMB Regional Offices (CAR, III, IVA, VIII, and X) that regulates and monitors Category A and/or Category C Treatment, Storage, and Disposal (TSD) Facilities. In parallel, JET has also communicated to all four (4) registered Category C TSD facilities per the list published in the EMB website (as of March 31, 2021): Cleanaway Philippines Inc. (CPI), Metro Clark Waste Management Corporation (MCWMC), Cleanway Environmental Management Solutions Inc. (CEMSI) and Jorm Environmental Services Inc. (JESI). Additional Category A TSD facilities that accept ash wastes were identified during the interviews with Regional Offices. In addition, industrial facilities that generate ash were also included.

The criteria of selection of the region and facilities:

- Regions with registered category A and/or C TSD facilities.
- All four (4) registered Category C TSDs.
- Category A TSD Facilities identified by EMB Regional Offices that accepts ash wastes.
- Ash Generating Facilities (Powerplants)



II. Summary of Laws Governing Municipal Sanitary Landfills and TSD Sanitary Landfills

A number of National Laws and Department Orders mandate and define the minimum requirements and specifications pertaining to waste disposal facilities. The table below summarizes the laws relevant to Municipal Sanitary Landfills in the Philippines.

Table 1. Provisions of National Laws for Municipal Sanitary Landfills

Law	Title	Sections related to SLFs
Republic Act 9003	Ecological Solid Waste Management Act of 2000	• Has dedicated sections defining the following: o Criteria for Siting a Sanitary Landfill o Criteria for Establishment of Sanitary Landfill o Operating Criteria for Sanitary Landfills
DAO 2001-34	IRR of RA 9003	• Outlines Minimum Considerations for Siting and Designing Sanitary Landfills and details the Operating Criteria for Sanitary Landfills
DAO 2006-10	Guidelines on the Categorized Final Disposal Facilities (Sanitary Landfills)	• Defines the categorization of SLFs based on capacities and the respective technical and regulatory (permitting) requirements for each;
NSWMC Res No. 64 S. 2013	Adaptation of Modifies Guidelines on Site Identification Criteria and Suitability Assessment Procedure for Sanitary Landfill	• Provides the Site Identification Criteria and Screening Guidelines for SLFs (13 site selection parameters); • Defines the site suitability and selection procedure for SLFs
NSWMC Res No. 1452 S. 2021	Adopting the Total Solid Waste Management Solution to Optimize Waste Recovery and Utilization in the Sanitary Landfill Prior to Disposal	• Mandates the integration and adoption of the concept of Total Solid Waste Management Solution in the design and operation of proposed sanitary landfill projects.

The Environmental Management Bureau published the Technical Guidelines for Specific Categories of Treatment, Storage, and Disposal (TSD) Facilities in 2015. The document details the minimum protocols and standards on the categorization of TSD Facilities prescribed in Section 5.1 Categories of TSD Facilities of DAO 2013-22, also known as the Implementing Rules and Regulations of the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (Republic Act 6969). Sanitary landfills accepting hazardous wastes for final disposal shall adhere to the additional specifications detailed in Table 4 of the same guidelines.

Regardless of the nature of accepted wastes, all sanitary landfills must adhere to all environmental protection laws such as the Clean Air Act of 1999 (Republic Act No. 8749) and Philippine Clean Water Act of 2004 (Republic Act No. 9275) as well as their respective IRRs, DAO 2016-08 and DAO 2000-81. Pursuant to Presidential Decree 1586, EMB MC 2014-005 otherwise known as the Guidelines for Coverage Screening and Standardized Requirements under the Philippine Environmental Impact Statement System (PEISS) acts as a manual that provides the information on the categorization and subsequent documentary requirements of infrastructure projects, based on scale and location.

The below is the same as the Table 5.1 of DAO 2006-10 showing the matrix of implementation of different Sanitary Landfill categories and their minimum specifications. The clustering is based on the capacity.

Table 2. Implementation Features of Different Categories

Features	Category 1 ≤ 15 TPD	Category 2 >15 TPD ≤ 75 TPD	Category 3 >75 TPD ≤ 200 TPD	Category 3 >200 TPD
Daily and Intermediate Soil Cover	✓	✓	✓	✓
Embankments / Cell Separation	✓	✓	✓	✓
Drainage Facility	✓	✓	✓	✓
Gas Venting	✓	✓	✓	✓
Leachate Collection	Pond System	Pond System	Pond System	Combination of physical, biological and chemical Treatment
Leachate Recirculation	At a later stage of operation	At a later stage of operation	At a later stage of operation	
Clay Liner	Clay Min Thickness: 60 cm Permeability: 10-6 cm/sec	Clay Min Thickness: 75cm Permeability: 10-6 cm/sec		
Clay Liner and/or synthetic liner			Clay Min Thickness: 75 cm Permeability: 10-7 cm/sec or HDPE : 1.5 mm over Min Thickness: 60 cm Permeability: 10-6 cm/sec	HDPE : 1.5 mm over Clay Min Thickness: 60 cm Permeability: 10-7 cm/sec

In contrast, TSD Sanitary landfills irrespective of capacity, must be compliant to additional requirements set by the Table 4 of the Technical Guidelines for TSD (2015): Double Liner, Double Leachate Collection and Removal System (LCRS), Wind Dispersal Prevention Cover, and Run-off/ Run-on Water Control of at least 25-year storm.

III. Summary of Meeting and Data Requests

A. Regional Offices

JET were able to meet representatives of EMB Regions III, IVA, VIII, and X. The team has also successfully collected filled-out questionnaires and necessary supporting documents from all regional offices.

Table 3. Status of Requests to EMB Regional Offices

EMB Region	Meeting	Questionnaire	Data Request
CAR	N/A (No Ash-Accepting TSD)	OK (Jan 7, 2022)	N/A (No Ash-Accepting TSD)
Region III	OK (Jan 19, 2022)	OK (March 22, 2022)	OK (June 21, 2022)
Region IVA	OK (Jan 14, 2022)	OK (Jan 31, 2022)	OK (Jan 31, 2022)
Region VIII	OK (Jan 11, 2022)	OK (Jan 25, 2022)	N/A (No Ash-Accepting TSD)
Region X	OK (Jan 18, 2022)	OK (Jan 31, 2022)	OK (Jan 31, 2022)

B. Treatment, Storage, and Disposal (TSD) Facilities

The representatives of the management of Metro Clark Waste Management Corporation (MCWMC) have met with JET members last Jan 13, 2022. The team has also received an earlier declination and referral from the Pollution Control Officer of Cleanaway Philippines Inc. (CPI) on Dec 20, 2021. Nonetheless, JET has received CPI's filled out questionnaire from CPI through EMB Regional Office last March 29, 2022.

Signed endorsement letters from the Office of Dir. Cuñado were forwarded to Cleanway Environmental Management Solutions Inc. (CEMSI) and Jorm Environmental Services Inc. (JESI) last Jan 25, 2022. Following the Letter of Endorsement, meeting with CEMSI was conducted last Feb 21, 2022. While some questions were entertained by JESI through phone calls, negotiantions on meeting scheduling fell through.

Additional Category A TSD facilities were identified by interviewed Regional Offices to process/receive ashes. All three (3) were coincidentally Cement Manufacturing Corporations. These facilities were also later invited to participate in the study. JET members met with representatives of Republic Cement Batangas last March 15, 2022.

Table 4. Status of Requests to Treatment, Storage, and Disposal (TSD) Facilities

TSD Facility	Location/ Region	Meeting	Questionnaire	Data Request
Cleanaway Philippines Inc. (CPI)	Leyte/ Region VIII	N/A (Pollution Control Officer Declined; TSD Facility is NOT managing/accepting ash wastes; Submitted a filled out questionnaire following a direct request from EMB R8 last March 29, 2022)		
Metro Clark Waste Management Corporation (MCWMC)	Tarlac/ Region III	OK (Jan 13, 2022)	OK (Feb 2, 2022)	OK (Feb 2, 2022)
Cleanway Environmental Management Solutions Inc. (CEMSI)	Cavite/ Region IVA	OK (Feb 21, 2022)	OK (Feb 28, 2022)	OK (Feb 28, 2022)
Jorm Environmental Services Inc. (JESI)	Cavite/ Region IVA	N/A (Entertained a few question over phone but online meeting fell through)		
Republic Cement – Batangas (RCB)	Batangas/ Region IVA	OK (Mar 15, 2022)	OK (Mar 15, 2022)	OK (Mar 15, 2022)

C. Industrial Ash Generator

Following the presentation of initial results, JET has extended the target participants to include industrial ash generators such as powerplants. Contact list of ash generating powerplants were gathered through interviewed EMB Regional Offices, as well as the DOE-REMB- Biomass Energy Management Division. On April 11, 2022, JET was able to meet and discuss with the Environmental Management Officer/Pollution Control Officer of Pagbilao Power Station. The filled out questionnaire and other requested documents were received on May 27, 2022.

IV. Summary of Collected Data (Meeting Records, Questionnaire, and Monitoring Reports)

The respective *Chemicals and Hazardous Waste Management Sections* of the EMB ROs are the primary responsible units in monitoring and regulating TSD facilities regionally. Regions IVA and X have identified one (1) and two (2) ash-accepting TSD facilities within their regions respectively. These three (3) facilities are all cement-processing plants, and submits Self-Monitoring Reports (SMRs) quarterly, as well as Compliance Monitoring Reports (CMRs) twice a year. The aforementioned monitoring reports are not publicly published, but may be available upon formal request.

In addition, EMB is also receiving Compliance Monitoring and Validation Reports (CMVRs) semi-annually from the Multipartite Monitoring Team (MMT), an independent entity formed during EIA phase of the project. MMT is composed of various public and private stakeholders. The report is primarily to verify and validate the records of CMRs submitted by the proponent.

In the case of Region 3, the RO identified the only TSD that accepts ash is Metro Clark Waste Management Corporation, noting that the facility only accepts ash that the passed the TCLP, Reactivity, Ignitability, Corrosivity Tests. Nonetheless, the RO also listed two (2) companies that accepts fly ash: Eagle Cement Corporation - Bulacan, Republic Cement Cement & Building Materials, Inc.- Bulacan It is however noted that Republic Cement Cement & Building Materials, Inc.- Bulacan has two registered TSD facilities in Region III, per the masterlist as of March 31, 2021.

Table 5. Summary of Questionnaire (Section II)

EMB Region	Section Regulating/ Monitoring TSDs	Ash Accepting TSDs	Reports and Frequency of Reporting
CAR	Chemicals and Hazardous Waste Management Section	N/A (No Ash-Accepting TSDs)	
Region III		1. Metro Clark Waste Management Corporation (MCWMC) C	1. Self-Monitoring Report (SMR) – Quarterly
		2. Republic Cement & Building Materials, Inc., Bulacan Plant (RCBMI –Bulacan) A, B, D	1. Self-Monitoring Report (SMR) – Quarterly
Region IVA		1. Republic Cement & Building Materials, Inc., Batangas Plant (RCBMI – Batangas) A, B, D	• Self-Monitoring Report (SMR) – Quarterly • Compliance Monitoring Report (CMR) – Semi-Annual
Region VIII		N/A (No Ash-Accepting TSDs)	
Region X		1. Republic Cement Mindanao, Inc. (RCMI) A,B,D 2. Holcim Philippines, Inc. Lugait Plant (HPI – Lugait) A,B,D	• Self-Monitoring Report (SMR) – Quarterly • Compliance Monitoring Report (CMR) – Semi-Annual

Table 6. Summary of Questionnaire (Section III)

	Frequency of TCLP	Parameters in TCLP	List of SLFs employing 2015 TSD Guidelines
Region III	Depends on what is indicated in the TSD's ECC or Every batch for Disposal	Arsenic, Barium, Cadmium, Fluoride, Lead, Mercury, and Selenium (Toxicity) and all applicable parameters.	• AES Masinloc • SMC Bataan • Metro Clark Waste Management Corporation
Region IVA	Depends on generation of residual wastes.	Toxicity, Flammability, Corrosivity, and Reactivity	• None

	Frequency of TCLP	Parameters in TCLP	List of SLFs employing 2015 TSD Guidelines
Region VIII	N/A (No Ash-Accepting TSD)		• Cleanaway Philippines Inc. (Existing)
Region X	Depends on ECC review committee's recommendation (once or twice a year)	Arsenic, Barium, Cadmium, Fluoride, Lead, Mercury, and Selenium (Toxicity)	• Cagayan de Oro SLF (Proposed)

In principle, the costs of performing Toxicity Characteristics Leaching Procedures (TCLPs) are borne by TSD facilities. Prior to disposal, each transport batch of treated wastes from TSDs of any form (ash, liquid, solid, etc.) should have an accompanying waste manifest and treatment certificate. Per the Technical Guidelines for TSDs (2015), all by-products of waste treatment must be disposed in a TSD Sanitary Landfill or Surface Impoundment.

Ash waste is not included in Table 2.1 of DAO 2013-22, and hence must undergo TCLP to determine its classification. Non-hazardous ash wastes principally may be disposed with municipal wastes, onsite, or reutilized. Whereas hazardous ashes must be sent to and stabilized on appropriate TSD facilities based on test results and subsequent classification.

The nature of acceptance of ash waste from Category A and Category C TSDs was noted to be different. Category C facilities accept ash wastes for final disposal, whereas Category A facilities, which are all coincidentally cement-manufacturing plants, are receiving ashes for as an alternative raw material.

Category C facilities accept waste treatment residuals/by-products from other TSDs, regardless of solid form (dehydrated wastes, ash, solidified materials, etc.). By-products are accepted as long as they are accompanied with a treatment certificate and are within the waste codes included in their respective permits. It is also noted that none of the Category C TSDs confirmed to accept ashes from other industry sources (power plants, boilers etc.).

On the other hand, Category A facilities may accept both hazardous and non-hazardous ash from industry sources, so long it is permitted by their co-processing permit and TSD permit. The acceptance criteria of ash are arranged by the facilities' management, inconsideration of the cement plant's responsibility to attain the minimum requirements set for alternative ash fuel and/or alternative ash in cement kilns (DAO 2010-06), as well as internal guidelines based on the workability of ashes. The same guideline also lists a number of feedstocks that are prohibited for co-processing. In the case of cement manufacturing facilities, ash is currently utilized as cement alterative raw materials as long they are non-hazardous.

While in principle, cement factories may accept hazardous ash within the virtue of their TSD permit, Republic Cement Batangas, as well as other Republic Cement Plants in the entire Philippines, does not accept hazardous ashes. Republic Cement facilities are primarily accepting ash as an alternative raw material/additive to cement which is regulated by their co-processing permit; ashes are directly added without undergoing

treatment and processing. Their co-processing permit specifies that only non-hazardous wastes are allowed to be used as an alternative fuel or alternative raw material. Handling of hazardous materials entails additional costs, ash also has low calorific value, making it more unideal as feedstock for TSD.

Both Republic Cement and Pagbilao Power Station confirmed a costumer-supplier relationship among ash generators and cement factories. According to Pagbilao Power Station, the current arrangement with Republic Cement covers 100% hauling of bottom and fly ash. Nonetheless, only ash compliant with the standards set by Republic Cement are transported out of the facility. Rejected ashes will be dumped on the ash ponds within the facility for final disposal.

Table 5. Summary of Purpose and Requirements for Ash Acceptance

TSD Facility	Purpose of Acceptance	Acceptance Requirements
Metro Clark Waste Management Corporation (MCWMC)	• Final Disposal	• Treatment Certificate for ashes from other TSDs. • TCLP results for ashes from other sources.
Cleanway Environmental Management Solutions Inc. (CEMSI)		
Jorm Environmental Services Inc.		
Republic Cement & Building Materials, Inc., Batangas Plant (RCBMI – Batangas)	• As raw material for cement manufacturing.	• Cement factories must satisfy Heavy Metal and Ash Content Requirements set by DENR along with internal requirements set on the quality of the final product.
Republic Cement Mindanao, Inc. (RCMI)		
Holcim Philippines, Inc. Lugait Plant (HPI – Lugait)		

The summary of air and water quality parameters checked for point sources and ambient quality monitoring based on Self-Monitoring Reports (SMRs), Compliance Monitoring Reports (CMRs), and Compliance Monitoring Validation Reports (CMVRs) are as presented in the following table.

The monitored parameters varies among facilities despite the similarity of nature. This is mainly due to the influence of additional requirements for ECC compliance.

Table 7. Summary of Monitoring Parameters from Collected SMRs, CMVRs and CMRs

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
Metro Clark Waste Management Corporation (MCWMC)	SMR: • CO(mg/Ncm) • NOx(mg/Ncm) • Particulates (mg/Ncm) • H2S • TSP • NH3	CMVR: • PM10 (µg/Ncm) • TSP(µg/Ncm) • SO2(µg/Ncm) • NO2(µg/Ncm) • H2S(µg/Ncm) • CO (PPM) • Noise SMR: • Noise Level(dB) • CO (mg/Ncm) • NOx (mg/Ncm) • Particulates (mg/Ncm) • TSP (mg/Ncm) • SO2 (mg/Ncm) • H2S(mg/Ncm) • NH3(mg/Ncm)	CMVR(Lagoon Effluent): • Total Coliform • Barium • Cadmium • Iron • Lead • Manganese • Nickel • Zinc • Ammonia (NH3-N) • COD • Chloride • pH • Phosphate • Sulfate • Temperature • TSS • Color • BOD • Nitrate • Oil and Grease SMR(Lagoon Effluent): • Flow rate (m3/day) • BOD (mg/L) • TSS (mg/L) • Color • pH • Oil and Grease(mg/L) • Temp rise (C) • COD	CMVR/Surface: • Total Coliform • Ammonia (NH3-N) • COD • Chloride • pH • Phosphate • Sulfate • Temperature • TSS • Color • Nitrate as NO3-N SMR: • BOD • COD • TSS • Color • Oil and Grease(mg/L) • Total Coliform • Temperature	CMVR/Well: • Total Coliform • Ammonia (NH3-N) • COD • Chloride • pH • Phosphate • Sulfate • Temperature • TSS • Color • Nitrate as NO3-N

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
			• Total Coliform • Ammonia • Nitrate • Sulfate • Chloride • Phosphate		
Cleanway Environmental Management Solutions Inc. (CEMSI)	SMR: • CO(mg/Ncm) • NOx(mg/Ncm) • Particulates (mg/Ncm) CMR(TO): • CO • NO_x • PM_{10} • SO_X	SMR: • TSP • SO2 • Particulates • NOx CMR: • CO • NOx • PM10 • SOX • TSP	SMR(Source): WTP Effluent • Flow rate (m3/day) • BOD (mg/L) • TSS (mg/L) • Color • pH • Oil and Grease(mg/L) • Temp rise (C) CMR (WTP Effluent Piper): • BOD • COD • Color • Hex. Chromium • Lead • Mercury • Nickel • Total Coliform • Zinc	SMR: • Lead (mg/L) • Nickel(mg/L) • Zinc (mg/L) • Mercury (mg/L) • Total Coliform (MPN/100ml) • pH • DO (mg/L) • COD (mg/L)	CMR (Monitoring Wells): • BOD • COD • Color • Lead • Mercury • Nickel • pH • Vanadium • Zinc
Republic Cement & Building Materials, Inc., Batangas Plant (RCBMI – Batangas)	CMR(Source): Kiln Stack • NOx (µg/Ncm) • PM10 (µg/Ncm) • SOx (µg/Ncm) SMR:	CMR: • NOx (µg/Ncm) • SOx (µg/Ncm) • TSP (µg/Ncm) • Noise (dBA) SMR:	N/A	SMR: • pH • DO • BOD • COD • Oil and Grease • Temperature (C)	N/A

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	• Flow rate(Ncm/day) • CO • NOx(mg/Ncm) • Particulate Matter (mg/Ncm)	• Noise Level • CO (mg/Ncm) • SO2(mg/Ncm) • Particulates (mg/Ncm)			
Republic Cement Mindanao, Inc. (RCMI)	SMR (Source): Rotary Dryer/Rotary Kiln • Flow rate(Ncm/day) • CO(mg/Ncm) • NOx(mg/Ncm) • Particulate Matter (mg/Ncm)	SMR: • Noise Level(dB) • NOx (mg/Ncm) • Total Suspended Solid (mg/Ncm) • SO2 (mg/Ncm)	SMR (Source): WTP Effluent • Flow rate (m3/day) • BOD (mg/L) • TSS (mg/L) • Color • pH • Oil and Grease(mg/L) • Temp rise (C)		N/A
Holcim Philippines, Inc. Lugait Plant (HPI – Lugait)	SMR(Source): Rotary Kiln/Double Roller Crusher/ESP • Flow rate(Ncm/day) • CO(mg/Ncm) • NOx(mg/Ncm) • Particulate Matter (mg/Ncm) CMVR(Source): Vertical Raw Mill/Main Kiln Stack	SMR: • Noise Level(dB) • CO (mg/Ncm) • NOx (mg/Ncm) • Particulates (mg/Ncm) • TSP (mg/Ncm) • SO2 (mg/Ncm)	CMVR(Source): Sedimentation Basins/Cooling Pond/Settling Ponds • DO (mg/L) • BOD (mg/L) • TSS (mg/L) • pH • Temp rise (C) • Oil and Grease SMR: • Flow rate (m3/day) • TSS (mg/L) • pH	SMR/Note: Marine Water • pH • Temp • TSS (mg/L) • Oil and Grease (mg/L)	N/A

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	• Particulate Matter • SO2 • NO2 • CO • HCl • NH3 • BTEX (VOC) Source: Other Mill Lines and Stocks • PM				
Pagbilao Power Station (PPS)	SMR(Source): Boiler • Flow rate • NOx • SO_2 • CO • Opacity • Particulates • As • Cd • Cu • Hg • Ni • Pb • Sb • Zn SMR(Source): Generator Set • NOx • CO	SMR: • NO_x • SO_x • PM10 • TSP • As • Cd • Cu • Ni • Sb • Zn • Hg • Pb	SMR (Source): STP Effluent • Flow rate • pH • BOD • TSS • Oil and Grease • NH3-N • NO3-N • PO4-P • MBAS • Fecal Coliform (MPN/100ml) • Total Coliform • (MPN/100ml) • Cr • Cd • Hg • Pb • As • Fe • Zn	SMR (Marine): • Temp • pH • DO • Cr • Cd • Cu • Hg • Pb • As • TSS • Oil and Grease • Color • CN • Fecal Coliform	SMR: • pH • Cr • Cd • Hg • Pb • As • Cu

TSD Facility	Parameters				
	Air (Source Emission)	Ambient Air	Surface Water (Point Source)	Ambient Surface Water	Groundwater
			• Cr		
Azucarera Don Pedro Inc.	SMR(Source): Boiler • Flow rate • CO • NOx • Particulate Matter • SO_2	SMR (Lagoon, HQ): • Noise Level • CO • SO_2 • Particulates • NO2 • PM10 SMR (Hospital, Residential Area) • Noise Level • CO • SO_2 • Particulates • NO2 • PM2.5	SMR(Source): WTP • Flow rate • BOD • TSS • COD • pH • Oil and Grease • Temp rise • Nitrates	SMR (Fresh): • TSS • DO • pH • COD • BOD • Color	N/A
Pagbilao Energy Corporation	SMR(Source): Boiler • Flow rate • NOx • SO_2 • Particulates • % Opacity • CO • As • Cd • Cu • Hg • Ni	SMR: • SO_x • NO_x • PM10 • TSP • As • Cd • Cu • Ni • Sb • Zn	SMR(Source): Aerator Basin • Flow rate • pH • Oil and Grease • TSS • Cr • Cd • Hg • Pb • As • Fe • Zn	SMR (Marine): • Temp • pH • DO • Cr • Cd • Cu • Hg • Pb • As • TSS	SMR: • pH • Cr • Cd • Hg • Pb • As • Cu

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	• Pb • Sb • Zn SMR(Source): Generator Set • Flow rate • NOx • SO_2 • CO • Particulates	• Hg • Pb	• Cu • Ni • Br • COD • Phosphate	• Oil and Grease • Color • CN • Fecal Coliform	
SEM Calaca Power Corp.			SMR (Source): Discharge Channel/Outfall • As • B • COD • Cd • Cu • Cr • Hg • Ni • Oil and Grease • Phosphate • Pb • TSS • Zn • pH • Temp SMR (Source):Condenser	SMR (Marine/Riverine): • As • Cd • True Color • Thermotolerant Coliform • Cr • Hg • NO3 • Phosphate • Pb • TSS • pH • Temp SMR: • True Color • Thermotolerant Coliform	SMR (Ground Water/Well): • As • Cd • Cl • Color • Cr • Hg • NO3 • Phosphate • Pb • TSS • Thermotolerant Coliform • pH • Temp SMR (Ground Water): • Cl

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
			• B • COD • Oil and Grease • Phosphate • TSS • pH • Temp	• NO3 • Phosphate • TSS	• True Color • NO3 • Phosphate • TSS • Thermotolerant Coliform • pH • Temp
Republic Cement and Building Materials – Bulacan	N/A	SMR (Q1-2022): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP(mg/Ncm) • SO2(mg/Ncm) SMR (Q1-2021): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP(mg/Ncm) SMR (Q2-2021): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm)	N/A	SMR (Q1-2021) • pH • Temperature (°C) • BOD (mg/L) • TDS (mg/L) • Oil and Grease (mg/L) SMR (Q1-2021) • pH • Temperature (°C) • Color (TCU) • BOD (mg/L) • Oil and Grease (mg/L) • Nitrate (mg/L) • Phosphorus (mg/L) SMR (Q2-2021)	N/A

TSD Facility	Parameters				
	Air (Source Emission)	Ambient Air	Surface Water (Point Source)	Ambient Surface Water	Groundwater
		• Particulates (mg/Ncm) • TSP(mg/Ncm) • PM2.5(mg/Ncm) SMR (Q3-2021): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP(mg/Ncm) • PM2.5(mg/Ncm) SMR (Q4-2021): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP(mg/Ncm) • PM10(mg/Ncm) • PM2.5(mg/Ncm)		• pH • Temperature (°C) • Color (TCU) • DO (mg/L) • TSS (mg/L) • Oil and Grease (mg/L) • Chloride (mg/L) SMR (Q3-2021) • pH • Temperature (°C) • Color (TCU) • BOD (mg/L) • DO (mg/L) • Oil and Grease (mg/L) • Chloride (mg/L) SMR (Q4-2021) • pH • Temperature (°C) • Color (TCU) • BOD (mg/L) • Oil and Grease (mg/L) • Chloride (mg/L)	

TSD Facility	Parameters				
	Air (Source Emission)	Ambient Air	Surface Water (Point Source)	Ambient Surface Water	Groundwater
Eagle Cement Corporation - Bulacan	SMR(Q1 - 2022) • Flow rate (Ncm/day) • Co (mg/Ncm) • NOx (mg/Ncm) • Particualates (mg/Ncm) SMR(Q1 - 2021) Sources: Raw Mill Lines, Coal Mill Lines, Cooler Lines • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particualates (mg/Ncm) SMR(Q2 - 2021) Sources: Generator Set • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particualates (mg/Ncm) SMR(Q4 - 2021) Sources: Generator Set	SMR (Q1-2022): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP(mg/Ncm) • PM10(mg/Ncm) • SO2(mg/Ncm) • NO2(mg/Ncm) SMR (Q1-2021): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • PM10(mg/Ncm) • SO2(mg/Ncm) • NO2(mg/Ncm) SMR (Q2-2021): • Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • PM10(mg/Ncm) • SO2(mg/Ncm) • NO2(mg/Ncm) SMR (Q3-2021):	N/A	SMR (Q3-2021) Settling Ponds, Pampanga River • Flow Rate (m3/day) • BOD (mg/L) • TSS (mg/L) • Color (TCU) • pH • Oil and Grease (mg/L) • Temperature Rise (°C) SMR (Q3-2021) Settling Ponds, Pampanga River • Flow Rate (m3/day) • BOD (mg/L) • TSS (mg/L) • Color (TCU) • pH • Oil and Grease (mg/L) • Temperature Rise (°C)	N/A

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	• Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particualates (mg/Ncm)	• Noise Level • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP (mg/Ncm) • PM10(mg/Ncm) • SO2(mg/Ncm) • NO2(mg/Ncm) SMR (Q4-2021): • Noise Level (dB) • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • TSP (mg/Ncm) • PM10(mg/Ncm) • NO2(mg/Ncm) • SO2(mg/Ncm)			
Masinloc Power Corporation	SMR(Q1 - 2022) Sources: Stacks, Aux Boiler • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particulates (mg/Ncm)	SMR(Q1 - 2022) • Noise Level (dB) • CO (mg/Ncm) • NOx (ng/Ncm) • Particulates (mg/Ncm) • SO2(mg/Ncm) SMR(Q1 - 2021)	SMR(Q1 - 2022) Oyon Bay Soure: Sedimentation Basins, Storm Drain, WTFs, Cooling Warer • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • Color (TCU)	SMR(Q1 - 2022) • Arsenic (mg/L) • Cadmium (mg/L) • Lead (mg/L) • Mercury (mg/L) • pH • Conductivity (mg/L) • Chloride (mg/L)	

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	SMR(Q1 - 2021) Sources: Stacks • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particulates (mg/Ncm) • Arsenic • Mercury • Nickel SMR(Q2 - 2022) Sources: Stacks • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particulates (mg/Ncm) • Antimony • Arsenic • Cadmium SMR(Q3 - 2022) Sources: Stacks, Aux Boiler • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm)	• Noise Level (dB) SMR(Q2- 2021) • Noise Level (dB) • NOx (ng/Ncm) • Particulates (mg/Ncm) • SO2(mg/Ncm) SMR(Q3 - 2022) • Noise Level (dB) • NOx (ng/Ncm) • Particulates (mg/Ncm) • SO2(mg/Ncm) SMR(Q4 - 2022) • Noise Level (dB) • NOx (ng/Ncm) • Particulates (mg/Ncm) • SO2(mg/Ncm)	• pH • Oil & Grease (mg/L) • Temperature Rise (°C) SMR(Q1 - 2021) Oyon Bay Soure: Sedimentation Basins, Storm Drain, WTFs, Cooling Warer • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L) • Temperature Rise (°C) SMR(Q2 - 2021) Oyon Bay Soure: Sedimentation Basin, WTFs • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L) • Temperature Rise (°C) SMR(Q3 - 2021) Oyon Bay Soure: Sedimentation Basin, WTFs	SMR(Q1 - 2021) • Arsenic (mg/L) • Cadmium (mg/L) • Lead (mg/L) • Mercury (mg/L) • pH • Turbidity(mg/L) • TSS (mg/L) • Chromium (mg/L) SMR(Q2 - 2021) • Arsenic (mg/L) • Cadmium (mg/L) • Lead (mg/L) • Mercury (mg/L) • pH • Turbidity(mg/L) • TSS (mg/L)	

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	• Particulates (mg/Ncm) • Mercury • Nickel • Zinc SMR(Q4 - 2022) Sources: Stacks, Aux Boiler, Gen Set • Flow rate (Ncm/day) • CO (mg/Ncm) • NOx (mg/Ncm) • Particulates (mg/Ncm) • Mercury • Nickel • Zinc		• Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L) • Temperature Rise (°C) SMR(Q4 - 2021) Oyon Bay Soure: Sedimentation Basin, WTFs • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L) • Temperature Rise (°C)		
SMC Consolidated Power	SMR(Q2 - 2021) Sources: Stacks • CO (mg/Ncm) • SOx (mg/Ncm) • NOx (mg/Ncm) • PM (mg/m^3) SMR(Q3 - 2021) Sources: Stacks • CO (mg/Ncm) • SOx (mg/Ncm)	SMR(Q1 - 2021) • Noise Level (dB) • NOx (ng/Ncm) • Particulates (mg/Ncm) • PM10(mg/Ncm) • PM2.5(mg/Ncm) • SO2(mg/Ncm) • Lead (mg/Ncm) SMR(Q2 - 2021)	SMR(Q1 - 2021) Manila Bay Soure:WTP, Cooling Water • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L) • Temperature Rise (°C)	SMR(Q2 - 2021) • pH • TSS (mg/L) • Cadmium (mg/L) • Nickel (mg/L) • Zinc (mg/L) • Arsenic (mg/L) • Chloride(mg/L) SMR(Q3 - 2021)	

TSD Facility	Parameters				
	Air (Source Emission)	**Ambient Air**	**Surface Water (Point Source)**	**Ambient Surface Water**	**Groundwater**
	• NOx (mg/Ncm) • PM (mg/m^3) SMR(Q4 - 2021) Sources: Stacks • CO (mg/Ncm) • SOx (mg/Ncm) • NOx (mg/Ncm) • PM (mg/m^3)	• Particulate (mg/Ncm) • PM10(mg/Ncm) • PM2.5(mg/Ncm) • Lead (mg/Ncm) • Mercury (mg/Ncm) • SO2 (ng/Ncm) • NO2 (ng/Ncm) • Noise Level (dB) SMR(Q3 - 2021) • Particulate (mg/Ncm) • PM10(mg/Ncm) • PM2.5(mg/Ncm) • SO2 (ng/Ncm) • NO2 (ng/Ncm) • Lead (mg/Ncm) • Mercury (mg/Ncm) • H2S(ng/Ncm) • Noise Level (dB) SMR(Q4 - 2021) • Particulate (mg/Ncm) • PM10(mg/Ncm) • PM2.5(mg/Ncm) • SO2 (ng/Ncm) • NO2 (ng/Ncm)	SMR(Q3 - 2021) Manila Bay Soure:WTP • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L) SMR(Q4 - 2021) Manila Bay Soure:WTP, Cooling Water • Flow rate (Ncm/day) • BOD (mg/L) • TSS (mg/L) • pH • Oil & Grease (mg/L)	• TSS (mg/L) • Oil & Grease (mg/L) • Arsenic (mg/L) • Boron(mg/L) • Chromium (mg/L) • Copper (mg/L) • Phosphate (mg/L) SMR(Q4 - 2021) • pH • TSS (mg/L) • Oil & Grease (mg/L) • Nickel (mg/L) • Cadmium (mg/L) • Chromium (mg/L)	

TSD Facility	Parameters				
	Air (Source Emission)	Ambient Air	Surface Water (Point Source)	Ambient Surface Water	Groundwater
		• Lead (mg/Ncm) • Mercury (mg/Ncm) • H2S(ng/Ncm) • Noise Level (dB)			

V. Summary of Relevant Laws for Air and Water Quality Monitoring

Section 6 of DAO 2016-08 details the Water Quality Guidelines for Fresh and Marine Waters. There are a total of ten (10) Primary Parameters including: BOD, Chloride, Color, Dissolved Oxygen, Fecal Coliform, Nitrate, pH, Phosphate, Temperature, and Total Suspended Solids. These parameters are the required minimum to be monitored annually for each water body for classification. According to Table 3.1 of the Water Quality Monitoring Manual, parameters to be monitored and frequency of sampling for compliance monitoring must be in accordance to EMoP/ECC.

On the other hand, parameters to be checked for effluents (point sources) prior to discharge are identified industry-based. The following table summarizes the related PSIC codes for the TSDs.

Table 8. Summary of Sector-Based Effluent Parameters

PSIC Code	Parameters
Treatment and disposal of non-hazardous wastes (PSIC:38210)	Color, Temperature, pH, COD, TSS, Total Coliform, Ammonia,Nitrate, Phosphate, Sulfate, Chloride, Oil and Grease
Treatment and disposal of hazardous wastes (PSIC:38220)	Color, Temperature, pH, COD, TSS, and other parameters* depending on the nature of their activities
Manufacture of Cement (23940)	Temperature, pH, TSS
Scrubbing of flue gases from firing system (OC2)	Color, Temperature, pH, COD, Sulfate, Flouride, Chromium, Nickel, Copper, Cadmium, Mercury

The Implementing Rules and Regulation of RA 8749 or DAO 2000-81 serves as a guide for statutory limits for Air Quality Monitoring. The IRR differentiates types of sources: stationary, machinery, and vehicles. The relevant parameters are summarized in the table below. It should be noted that specific parameters to be monitored are defined during EIA process as a requirement for ECC.

Table 9. Summary of Air Pollutants/Parameters

Description	Parameters
Pollution From Stationary Sources / National Emission Standards for Source Specific Air Pollutants (NESSAP)	Antimony and its compounds, Arsenic and its compounds, Cadmium and its compounds, Carbon Monoxide, Copper and its compounds, Hydrofluoric Acid and Fluoride compounds, Hydrogen Sulfide, Lead, Mercury, Nickel and its compounds, except Nickel Carbonyl, NOx, Phosphorus Pentoxide, Zinc and its compounds
For National Ambient Air Quality Standards for Source Specific Air Pollutants from Industrial Sources/Operations:	Ammonia, Carbon Disulfide, Chlorine and Chlorine compounds expressed as Cl2, Formaldehyde, Hydrogen Chloride, Hydrogen Sulfide, Lead, Nitrogen Dioxide, Phenol, Sulfur Dioxide, and Suspended Particulate Matter (TSP, PM10), Antimony, Arsenic, Cadmium, Asbestos, SUlfuric Acid, Nitric Acid

VI. Summary and Conclusions

The following is the summary of Best Practices and Possible Point for Improvement on Current Regulations and Implementation Strategies on Ash Waste Management

Best Practices:

- Established relationship among generators and cement factories for reutilization of ash.
- Involvement of Private and Public stakeholders in validation of monitoring reports.
    - Promotes transparency.
-

PFI:

- Inclusion of specific form of solid waste on hazardous waste manifest;
- Distinction between fly ash and bottom ash on required routine TCLP testing;
- Requirement of protocol to handle hazardous ash for all industrial ash generators;
- Integration of TSD and Co-processing Permits;
- Improve standardization on Effluent and Ambient Air and Water Quality Monitoring.

ANNEX

I. Components of Monitoring Reports

A. Self-Monitoring Reports (SMRs) are quarterly notarized reports of facilities submitted to DENR-EMB. Each report is composed of six (6) modules, as summarized in the table below:

Table 10. Modules of Self-Monitoring Reports (SMRs)

Module No.	Title	Associated Law	Contents
1	General Information	N/A	• Name of Facility • Permits and Clearances • Operation Information
2	Hazardous Wastes	RA 6969	• 2A - Chemical Control Orders (CCO) Reports • 2B – Treated/Recycled Hazardous Wastes • 2C - Generated Hazardous Wastes
3	Water Pollution	RA 9275	• Water Pollution Data • Cost of Treatment • WTP Discharge Information
4	Air Pollution	RA 8749	• Summary of Air Pollution Source Equipment (APSE) and Air Pollution Control Facility (APCF) • Cost of Treatment • Air Emission Characteristics
5	Environmental Compliance Certificate (ECC) Conditions	PD 1586	• Ambient Air Monitoring • Environmental Management Plan/Program • Solid Waste Characterization/Information
6	Others	N/A	• Accidents and Emergency Records • Personnel/Staff Training

B. Compliance Monitoring Reports (CMRs) are bi-annual Module 5 of the SMRs, which are also submitted by project proponents to DENR-EMB. The report pro-forma is composed of five (5) major sections with the following outline:

I. Basic Project Information
II. Executive Summary
III. Results and Discussion
    a. Compliance Monitoring
    b. Impact Monitoring
        i. Summary of Previous Monitoring
        ii. Current Results and Findings
IV. Conclusions and Recommendations
V. Attachments

C. Compliance Monitoring and Validation Reports (CMVRs) are independent evaluation reports submitted by the established autonomous Multipartite Monitoring Team (MMT). The Pro- forma of the document has four (4) parts as illustrated in the outline below:

I. Basic Information
II. Executive Summary
III. Methodology
   a. Process Documentation for Review and Validation of Proponent's Monitoring Report
   b. Process Documentation for Validation of Water Quality
   c. Process Documentation for Validation of Air
   d. Process Documentation for Validation of Hazardous Waste Management
IV. Compliance Monitoring Results and Discussions
   a. Review & Validation of Proponent's Monitoring Reports
   b. Confirmatory Sampling and Measurement
   c. Complaints Verification and Management
   d. Other Remarks

II. Inventory of Files and Sources

Table 11. Inventory of Collected Documents

Source	Facility	Documents
Metro Clark Waste Management Corporation (MCWMC)		1. Filled-out Questionnaire 2. CMVR (2021-1st) 3. CMVR (2021-2nd) 4. SMR (2021 –Q3) 5. SMR (2021 –Q4)
Cleanway Environmental Management Services Inc. (CEMSI)		1. Filled-out Questionnaire 2. CMR (2021-2nd) 3. Quality Plan for CCB Ash Waste 4. Quality Plan for WWTP
Republic Cement Batangas		1. CMR (2021-2nd) 2. SMR (2021 –Q4) 3. Filled-out Questionnaire 4. 5-Process Diagram 5. EMP
EMB Region X	Holcim Philippines, Inc. Lugait Plant (HPI – Lugait)	1. CMVR (2020-1st) 2. SMR (2021 –Q4)
	Republic Cement Mindanao, Inc. (RCMI)	1. SMR (2021 –Q4)
EMB Region X		1. Filled-out Questionnaire
Region IVA	Republic Cement & Building Materials, Inc., Batangas Plant (RCBMI – Batangas)	1. SMR (2021 –Q3) 2. CMR (2021-1st)

	Cleanway Environmental Management Solutions Inc. (CEMSI)	1. SMR (2021 –Q4)
	Central Azucarera Don Pedro Inc.	1. SMR (2021 – Q3)
	Pagbilao Energy Corporation	1. SMR (2022 – Q1)
	Pagbilao Power Station	1. SMR (2022 – Q1) 2. CMR (2021 - 2nd) 3. Impact Management Plan (IMP) 4. Ash Lagoon Inspection and Maintinance Manual 5. Filled-out Questionnaire
	SEM Calaca Power Corp.	1. SMR (2021 – Q4)
Region IVA		1. Filled-out Questionnaire 2. Contact list
Region III	Republic Cement and Building Materials Inc. – Bulacan	1. SMR (2021 – Q1, Q2, Q3, Q4; 2022 – Q1)
	Eagle Cement Corporation - Bulacan	1. SMR (2021 – Q1, Q2, Q3, Q4; 2022 – Q1)
	SMC Consolidated Power	1. SMR (2021 – Q1, Q2, Q3, Q4; 2022 – Q1)
	Masinloc Power	1. SMR (2021 – Q1, Q2, Q3, Q4; 2022 – Q1)
Region III		1. Filled-out Questionnaire

Appendix 6-2: Questionnaire for EMB RO

PROJECT FOR CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES IN THE PHILIPPINES

I. Informant Information					
Name of Informant	:				
Position	:				
Contact Number	:				
E-mail	:				
DENR-EMB Region	:		Section/Department	:	

II. DENR-EMB Regional Office Reporting

1. Which Section/Department of the Regional Office (RO) regulates and monitors environmental compliance of registered TSD Facilities?
   -

2. What are the registered Category A and Category C TSD facilities that accepts bottom and fly ash under your RO? What kind of reports related to environmental compliance do they submit? Kindly list the TSDs and the respective type of report(s) along with frequency of reporting.

TSD Name and Category	Type/Title of Reports	Frequency of Reporting
1.	1.	
	2.	
	3.	
2.	1.	
	2.	
	3.	
3.	1.	
	2.	
	3.	

3. Are these reports published and open to public?
   -

III. Laws and Guidelines

1. Are there any laws that mandate the conduct and method of TCLP to ash wastes? If there are, kindly enumerate the laws. If none, what documents serves as bases?
   -

1.1. How often do you require TSDs to perform TCLP to their accepted inert wastes (ash)? Who covers the cost of TCLP testing?
   -

1.2. Which parameters do you require in TCLP tests? Are there DENR-imposed standards for sampling and testing protocols?
   -

2. Are there new/proposed TSDs after the publication of the Technical Guidelines for Specific Categories of TSDs in 2015? If yes, please identify.
   -

2.1. Have you imposed any changes in the regulatory requirements to existing TSDs following the release of the said guidelines? If yes, please enumerate and specify.
   -

2.2. Are there any existing and/or proposed TSD Sanitary Landfill (SLF) that employ the technical specifications described in the aforementioned guideline?(Double Liner,

Double Leachate Collection and Removal System and Water run-on and runoff control, 25 years RP). If yes, please enumerate. •
2.3. What are the minimum environmental quality monitoring parameters do you impose for ash-accepting TSDs? • Air: • Surface Water • Groundwater • Others:
IV. Document Request
1. Copy of Environmental Management Plan of all ash –accepting Category A and C TSDs(EMP; or portion of which related to ash handling/management and facility effluent) 2. Sample environmental compliance reports submitted to EMB such as Compliance Monitoring Report (CMR) and Compliance Monitoring and Validation Report (CMVR), for all ash-accepting Category A and Category C TSDs.

Appendix 6-3: Questionnaire for TSD

PROJECT FOR CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES IN THE PHILIPPINES

I. Informant Information					
Name of Informant	:				
Position	:				
Contact Number	:				
E-mail	:				
II. TSD Information					
Name of Facility	:				
Location/Address	:				
TSD Classification	:		Capacity (TPD)	:	
Years of Operation	:		Expected Closure Year		
DENR-EMB Region	:				

III. Facility Operations

1. Does the facility accept bottom and fly ash? If yes, does the facility have a special protocol in handling them?
   -

1.1. How often do you conduct TCLP to accepted inert wastes (ash)? Who covers the cost of TCLP testing?
   -

1.2. Which parameters are included in TCLP? What are your sampling and testing protocols?
   -

2. Are you aware of the Technical Guidelines for Specific Categories of TSDs published by DENR in 2015?
   -

2.1. Are there any changes in the regulatory requirements of DENR following the release of the said guidelines? If yes, please enumerate and specify.
   -

2.2. Does your TSD's Sanitary Landfill (SLF) employ the following specifications?
   - Double Liner(Yes/No):
   - Double Leachate Collection and Removal System (Yes/No):
   - Water run-on and runoff control, 25 years RP (Yes/No):

IV. Government Agency Reporting

1. Which Government Offices do you submit reports related to environmental compliance? Kindly list the agencies and the respective type of report(s) along with frequency of reporting.

Agency	**Type/Title of Reports**	**Frequency of Reporting**
1.	1.	
	2.	
	3.	
2.	1.	
	2.	
	3.	
3.	1.	
	2.	
	3.	

2. Are these reports published and open to public? •
V. Document Request
1. Copy of the Facility's Environmental Management Plan (EMP; or portion of which related to ash handling/management and facility effluent) 2. Copy of Facility's Operations Manual (or portion of which related to ash handling and management and facility effluent) 3. Sample environmental compliance reports submitted to related government agencies such as Compliance Monitoring Report (CMR).

Appendix 7: Recommendation on the Existing Regulations of Sanitary Landfill

Recommendation on the existing laws and regulations of sanitary landfills

When the WTE facility operates, the incineration ash generated from the WTE facility will be disposed of in sanitary landfill(SLF) for municipal solid waste (MSW) if it is classified as non-hazardous waste. Until now the Philippines has directly disposed of MSW that cannot be used, so after the WTE facilities go into operation, the landfilled materials will change. If the landfilled materials are changed, the quality of leachate generated from the SLF will also change.

Therefore, JET reviewed the existing laws and regulations related to SLFs for the purpose of considering the impact on SLFs when incineration ash is disposed of and identified the necessity of the revision of the existing laws and regulations. If revisions to existing laws, etc. are necessary, JET proposes the details of those revisions.

（1）Laws and regulations for SLFs and Disposal Sites

Table 1 lists the summary of the laws and regulations for SLFs and final disposal sites in the Philippines. In 2010, the NSWMC, with support from JICA, prepared a Technical Guidebook on Solid Wastes Disposal Design, Operation, and Management; National Solid Waste Management Commission Japan International Cooperation Agency (hereinafter referred to as "JICA Technical Guidebook"). This Technical Guidebook should also be consulted when revising existing regulations.

Table 1 Laws and Regulations for SLFs and Final Disposal Sites and their Summary

Laws and regulations	Title	Summary of laws and regulations
DAO 1998-49	Technical Guidelines for Municipal Solid Waste Disposal	This is a technical guideline for municipal solid waste disposal. Final disposal sites are classified into four types: open dumping, controlled dumping site, sanitary landfill level 1, and level 2, and the characteristics and criteria for each are presented.
DAO 1998-50	Adopting the Landfill Site Identification and Screening Criteria for Municipal Solid Waste Disposal Facilities.	The report presents evaluation items, criteria, considerations, and data sources for selecting a site for a final disposal facility.
RA 9003	Ecological Solid Waste Management Act of 2000	This is a law on solid waste management and for final disposal sites, it prohibits open dumping (all open dump sites must be converted to controlled dump sites within three years and be operational within five years) and establishes criteria for the suitable location, design, and operation of sanitary landfills.
DAO 2001-34	Implementing Rules and Regulations of RA 9003	Implementing Rules and Regulations (IRR) promulgated pursuant to Article 59 of RA 9003. For final disposal sites, the IRRs provide detailed rules for site selection, design, and operation of SLFs.
DAO 2006-10	Guidelines on the Categorized Final Disposal Facilities (Sanitary Landfill)	Final disposal sites are classified into four categories according to the amount of waste delivered per day and technical standards are specified for each category. Daily waste delivery volume by category Category 1≦15t/day 15t/day < category 2 ≤ 75t/day 75t/day < category 3 ≤ 200t/day 200t/day <Category 4
DAO 2013-22	Revised Procedure and Standards for the Management of hazardous Wastes (Revising DAO 2004-36)	This is a revision of DAO 2004-36, Procedures and Standards for the Management of Hazardous Waste. It classifies hazardous waste by type and specifies categories. A through H for facilities that treat, store, and dispose of hazardous waste. Final disposal sites are classified as Category C. Technical guidelines for Categories A-G were issued in January 2016.

Source: Project Team

（2）Structural regulations for SLFs

Below are the structural standards and characteristics of each SLF facility from existing laws and regulations regarding SLFs since the prohibition of open dumping.

1) RA 9003

Section 41 of RA 9003 establishes regulations for the construction of SLFs for liners and leachate collection and treatment system, gas control and recovery system, and groundwater monitoring well system, as shown in Table 2.

Table 2 Structural Regulations for SLFs in RA 9003

Facilities	Regulations
Liners	A system of clay layers and/or geosynthetic membranes used to contain leachate and reduce or prevent contaminant flow to groundwater
Leachate collection and treatment system	Installation of pipes at the low areas of the liner to collect leachate for storage and eventual treatment and discharge
Gas control and recovery system	A series of vertical wells or horizontal trenches containing permeable materials and perforated piping placed in the landfill to collect gas for treatment or productive use as an energy source
Groundwater monitoring well system	Wells placed at an appropriate location and depth for taking water samples that are representative of groundwater quality

Source : RA 9003

2) DAO 2001-34

In response to RA 9003, DAO 2001-34 provides detailed structural regulations for liners, leachate collection and treatment facilities, gas control and recovery system, and groundwater monitoring system as shown in Table 3.

Table 3 Structural Regulations for SLFs in DAO 2001-34

Facilities	Regulations
Liners	Landfills shall be provided with a base liner system consisting of clay and/or geosynthetic membranes (geomembranes). If the clay is used, it shall have minimum thickness of 0.75m and permeability of 1 x 10^{-6}cm/sec or less. Geomembranes shall be at least 1.5 mm thick with permeability of 1 x 10^{-14} cm/sec or less; Geosynthetic Clay Liners (GCL) shall have thickness of at least 6.4 mm and a permeability of 1 x 10^{-9} cm/sec or less. If the composite liner is used (clay under geo-membrane), the thickness of the clay liner may be reduced to 0.60 m. The overlying geomembrane shall have the same properties as stated above.
Leachate collection and treatment facilities	・ Leachate collection and removal system shall be provided and designed such that leachate buildup in the landfill will be minimized. For design purposes, an allowable leachate level of not more than 0.60 m over the liner system shall be maintained. If leachate is discharged to a receiving body of water, the discharge shall meet effluent discharge and water quality criteria prescribed by DENR. ・ Leachate storage facilities shall be designed with containment systems to prevent leachate from spillage and its migration into underlying groundwater or nearby surface body of water. For leachate impoundment ponds, the design shall include a geomembrane liner system, underlain by a low permeability soil layer of at least 0.30 m thick. The geomembrane liner shall be at least 1.5 mm thick with a permeability of 1 x 10^{-14} cm/sec or less.
Gas control and recovery system	A gas control system shall be provided when the volume of waste in the landfill has reached 0.5 million metric tons. The owner/operator shall consider recovery and conversion of methane gas into usable energy if economically viable.
Groundwater monitoring well system	Groundwater monitoring wells shall be placed at appropriate locations and depths for taking water samples that are representative of groundwater quality and for predicting groundwater flow.

Source : DAO 2001-34

In the standard for liners, either clay or geomembrane or both should be used for liners. If the clay is used, the thickness must be at least 75 cm, with permeability of 1 x 10^{-6} cm/sec or less. If geomembrane is used, thickness must be at least 1.5 mm, with permeability of 1 x 10^{-14} cm/sec or less. The use of GCL is also permitted for liners, specified to be at least 6.4 mm thick, with permeability of 1 x 10^{-9} cm/sec or less. When a composite liner of clay and geomembrane is used, the thickness of the clay under the geomembrane is allowed to be up to 60 cm.

For leachate collection facilities, it is stipulated that the accumulation of leachate in the landfill should be less than 60 cm. However, since the accumulation of leachate in the landfill increases the risk of leachate leakage, leachate collection facilities should be installed with pipes, etc. that have sufficient drainage capacity to prevent the storage of leachate in the landfill.

In the standard for liners of leachate pond, it is made to adopt composite liner in which geomembrane is laid on top of low permeability soil layer of at least 30 cm thick. It is appropriate that the specification for the low permeability soil layer should be the same as that standard for liners with minimum thickness of 60 cm, with permeability of 1×10^{-6} cm/sec or less.

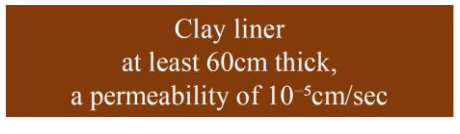
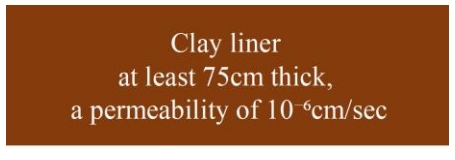
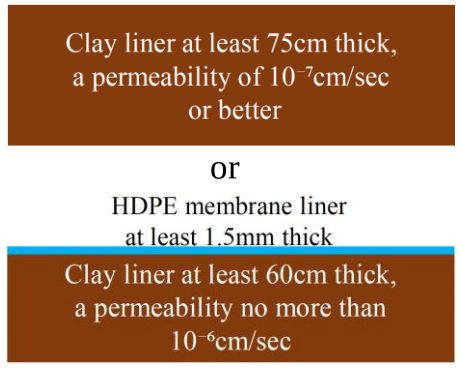
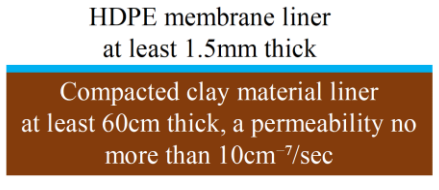
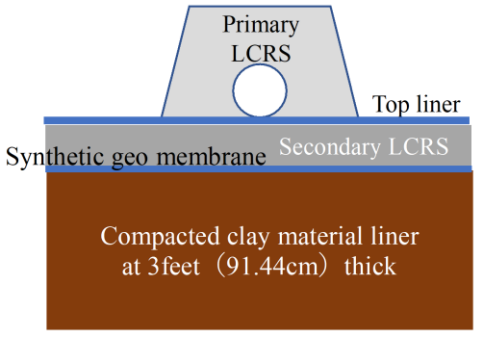
3) DAO 2006-10

DAO 2006-10 was promulgated after RA 9003 and DAO 2001-34. Table 4 shows comparisons of drainage facility, leachate collection and leachate treatment, and liners in the DAO 2006-10 Matrix of Implementation Features. The Matrix of Implementation Features also specifies standards other than those in Table 4 for the implementation of daily and intermediate soil cover, separation landfill with embankments or cells, and installation of gas venting in all categories.

As shown in Table 4, DAO 2006-10 divides SLFs into four categories based on the amount of landfilled waste delivered per day. However, the structure of SLFs should be classified by the type of landfilled waste, which is determinant of the risk of wastes flowing out of the landfill or the leachate leakage due to damage to the liners. Also, for leachate treatment facilities, the treatment system is specified by the amount of landfilled waste delivered per day, but the quality of the leachate will vary depending on the type of landfilled waste, it is appropriate to specify leachate treatment facilities according to the type of landfilled waste.

Liners are allowed in RA 9003 and DAO 2001-34 for geomembrane-only structures, whereas in DAO2006-10, only clay layer is allowed, but no geomembrane-only structure is permitted. Also, the use of GCL, which is allowed in DAO 2001-34, is not permitted in DAO 2006-10. Furthermore, the clay layer in Category 1 has permeability of 1×10^{-5} cm/sec, which does not meet the DAO 2001-34 permeability of 1×10^{-6} cm/sec.

Table 4 Existing Structural Standards for SLFs and TSD Landfills (Category C)

Facilities	Category 1 ≦15TPD	Category 2 ＞15TPD≦75TPD	Category 3 ＞75TPD≦200TPD	Category 4 ＜200TPD	Category C-Disposal Facilities
Order and Guidelines	DAO 2006-10				Technical Guidelines for Specific Categories of Treatment, Storage, and Disposal (TSD)Facilities 2015
Drainage Facility	Regulated to set, but no design criteria	Regulated to set, but no design criteria	Regulated to set, but no design criteria	Regulated to set, but no design criteria	Must have storm water run-on and runoff controls to prevent migration of hazardous constituents for at least a 25-year storm and a cover to prevent wind dispersal
Leachate Collection	Regulated to set, but no design criteria	Regulated to set, but no design criteria	Regulated to set, but no design criteria	Regulated to set, but no design criteria	**Double Leachate Collection and Removal System (LCRS)** ・Primary LCRS must be located above the top liner, while secondary LCRS must be located between the liners immediately above the bottom composite liner ・Secondary LCRS, which also serves as the leak detection system, must be: 〇Designed with a bottom slope of at least one percent 〇Made of materials chemically resistant to the wastes placed in the unit 〇Able to remove the liquids ・Must be designed to collect liquids in a sump and subsequently pump out those liquids
Leachate Treatment	Pond System	Pond System	Pond System	Combination physical, biological ＆chemical	No regulation
Liners	Clay liner should be at least 60cm thick and has a permeability of 10^{-5}cm/sec	Clay liner should be at least 75cm thick and has a permeability of 10^{-6}cm/sec	Clay liner should be at least 75cm thick, clay liner with a permeability of 10^{-7}cm/sec or better, or composite liner consisting of at least 1.5mm thick HDPE membrane over at least 60cm thickness of compacted fine marerial with permeability no more than 10^{-6}cm/sec	Synthetic liner should be at least 1.5mm thick HDPE membrane over at least 60cm thickness of compacted clay materials with permeability no more than 10^{-7}cm/sec	**Double Liner** Must consist of a top liner to prevent migration of hazardous constituents into the liner and a composite bottom liner consisting of a synthetic geo membrane and three feet of compacted soil material
Corss Section					

Source: Project Team

4) Technical Guidelines for Specific Categories of TSD Facilities

The regulations for the treatment and management of hazardous wastes include DAO 2013-22, and the regulations on treatment, storage, and disposal facilities for hazardous wastes include the Technical Guidelines for Specific Categories of Treatment, Storage and Disposal (TSD) Facilities 2015 EMB (hereinafter referred to as the "TSD Facilities Technical Guidelines"). Under the TSD Facility Technical Guidelines, disposal facilities are classified as Category C, which includes two types of disposal methods: SLFs and surface impoundments, and allowable hazardous wastes per disposal method for Category C of TSD facilities are listed in Table 5.

Table 5 Allowable Hazardous Waste per Disposal Method for Category C TSD Facilities

Types	Description	Allowable Hazardous Wastes
SLFs	Excavated or engineered sites where non-liquid hazardous wastes are deposited for final disposal. These sites are selected and designed to minimize the chance of release of hazardous wastes into the environment. Liquid wastes are not allowed to be disposed into a hazardous wastes SLF.	・K301 Solidified wastes ・K302 Chemically fixed and polymerized wastes ・K303 Encapsulated wastes ・M501 Pathological or infectious wastes* ・M502 Asbestos wastes ・M506 Waste electrical and electronic equipment (WEEE)
Surface Impoundments	Natural topographic depressions, man-made excavations, or diked areas formed primarily of earthen materials used for storage and treatment of liquid hazardous wastes. Examples include holding, storage, settling, aeration pits, ponds, and lagoons.	・M505 POPs wastes

Source: TSD Facility Technical Guideline

For the structural standards for SLF facilities in table 5, table 4 shows the standards and cross-sections for each facility for comparison with DAO 2006-10. The standards for surface impoundments in TSD Facilities Technical Guidelines are shown in Table 6.

Table 6 Technical Specifications of Surface Impoundments

Facilities	Specifications
Impoundment Unit	Must be designed to prevent the flow of liquids over the top of an impoundment (or overtopping) and ensure the structural integrity of any dikes.
Double Liner	Must consist of top liner to prevent migration of hazardous constituents into the liner and a composite bottom liner consisting of synthetic geo membrane and three feet of compacted soil material.
Double Leachate Collection and Removal System	・ Must be located between the liners immediately above the bottom composite liner, enabling the LCRS to collect the largest amount of leachate, while also representing the most efficient place to identify leaks ・ Must be designed with a bottom slope of at least one percent, be made of materials chemically resistant to the wastes placed in the unit, and be able to remove the liquids ・ Must be designed to collect liquids in a sump and subsequently pump out those liquids

Source: TSD Facility Technical Guidelines

The standards for liners of SLFs specified in the TSD Facilities Technical Guidelines shown in Table 4 is top layer of geomembrane and composite bottom liner consisting of geomembrane and three feet of compacted clay layer, in effect, triple liner structure. However, when compared to DAO 2006, the TSD Facilities Technical Guidelines do not specify thickness and permeability of the geomembrane or permeability of the compacted clay layer.

In addition, leachate collection facility in the TSD Facilities Technical Guidelines has adopted double leachate collection and removal system (hereinafter referred to as the "LCRS"). As shown in the figure in Table 4, this LCRS consists of primary LCRS in which leachate collection pipe is installed in the top layer of the geomembrane, and secondary LCRS between the top layer of the geomembrane and the composite bottom liner. The purpose of this secondary LCRS is to collect and drain leachate leaked by this secondary LCRS in case top liner geomembrane is damaged and leachate leaks. Therefore, it is specified that the bottom slope of landfill should be 1% or more and that materials capable of removing leachate should be used in the secondary LCRS. Additionally, for composite bottom liner, it is prescribed to lay the geomembrane over the clay layer to prevent leachate from flowing over the compacted clay liner.

Such structure with drainage layer between the double liners was also used in Japan when the double liners was mandated. However, if this LCRS is adopted, the construction cost will be high because it requires triple liners structure of two geomembranes and clay layer. In Japan, the geomembrane laid on the clay layer must be laid so that there are no voids between the geomembrane and the clay layer, in order to prevent leakage of leachate. Based on the above, the LCRS specified in Category C considered to be an excessive standard.

（3）Rules concerning the construction site of landfill

For rules regarding the location of landfill, DAO 1998-50 lists 13 factors, followed by NSWMC Resolution No. 64, Series of 2013, Section 1, which lists exemptions and conditional criteria for these 13 factors. Table 7 provides a summary of these factors.

Table 7 Evaluation Criteria and Screening Guidelines for landfill

Factors	Exclusion (absolute) criteria	Conditional (remediable) criteria
Proximity to groundwater resources	The site shall not be located on shallow unconfined aquifers. Area in or within 500 meters upgradient of groundwater reservoir or water supply intakes (water supply wells, jetmatic pump or open dug wells) used for private or public drinking, irrigation or livestock shall also be excluded.	Avoid sites within 1 km of confined aquifer (deep well) used as drinking water. Also, avoid major recharge areas for future potable water sources. Minimum distance of 2 m shall be maintained between the base of the landfill liner and the highest water table (during rainy season) at the site.
Proximity to perennial surface waters	The site shall not be within 300m of watershed area or upgradient of any surface waters used for public or private drinking water supply, irrigation, or livestock.	Avoid areas within 1 km upgradient of a perennial stream, river or lake stream from the creek, river, or lake. Observe the classification and actual use of water bodies near the site.
Local Geologic conditions	The sites shall not be located on areas with underlying rocks characterized as jointed, fractured or fissured; carbonate (limestone or dolomite); karst, and other porous rock formations; or in areas with sinkholes and caverns	Avoid areas within 300m of jointed, fissured, fractured, or porous rock formations. Avoid areas classified as geological hazards.
Seismic conditions	No facility shall be constructed at a site within 75 m from a Holocene fault (fault from 60 million years old to present) or a known recent active fault.	Avoid areas within 500 m of active faults or in areas with an average return period between 50 to 100 years for an earthquake of magnitude 6 and above.
Soil properties and availability of cover material	The site shall not be located in unstable, very soft and settling soils (sand, coarse sand, or fine sand) with high potential for liquefaction, slumping or erosion.	Avoid areas with highly permeable soils (loamy fine sand, loamy sand, sandy loam, fine sandy loam or very fine sandy loam).

Factors	Exclusion (absolute) criteria	Conditional (remediable) criteria
		Avoid areas with soil permeability values faster than 1 x 10^{-6} cm/s. The site needs to have an adequate quantity of earth cover material that is easily handled and compacted.
topography	The site shall not be located on a landslide-prone area with ground slopes nominally greater than 50% or 2.0:1 horizontal-to-vertical radio or as determined by authorities. No site shall be situated in old quarries or abandoned mine pits.	Avoid mountainous or hilly areas with ground slopes nominally greater than 20% or 5:1 horizontal-to-vertical ratio. Ideally, the site has a gently sloped topography.
Vulnerability to flooding	The site shall not be located in areas prone to seasonal floodings such as swamplands, marshes, and wetlands. This also includes areas that are deemed very highly susceptible to meteorologically influenced and related natural hazards (flood-prone areas) as declared by the DENR-MGB or other appropriate authorities.	Avoid locating site in area that may be subject to washout or inundation during a major flood, i.e., 100-year floodplain. Avoid areas with high rainfall and strong winds, such as those vulnerable to extreme weather events (more than 300mm/day) with increasing frequency as determined by DOST-PAGASA.
Proximity to residential areas and other sensitive land uses	The site shall not be located in or within 250m of existing or proposed residential, commercial or urban development areas, and areas of historical, archaeological, cultural, geological, or scientific interests, which are more than 100 years old and declared by the National Commission for Culture and the Arts, National Historical Institute or National Museum.	Avoid locating the facility within 1 km of residential, commercial, industrial, or urban development areas, memorial sites, churches, schools, historical sites, and other public places. Avoid areas that encroach the boundaries of any non-participating city or municipality, e.g. not part of the cluster or shared facility.
Proximity to ecologically sensitive or environmentally critical area	The site shall not be located within 500m of the boundaries of ecologically sensitive areas proclaimed as protected areas under the National Integrated Protected Area System(NIPAS)Act or by any related issuances, as national parks(area of national significance) conservation parks(area with valuable wildlife or interesting natural features), recreation parks(area managed primarily for public recreation with some native vegetation) forest reserves, sites of flora and fauna, of national regional significance, wildlife sanctuary, mangrove areas, coral reefs, or wetlands of important biodiversity	Avoid areas 500m of the boundaries of potentially ecologically sensitive areas that have proposed or pending declaration as national parks, conservation parks, recreational parks, forest reserves, sites of flora and fauna of national or international significance, wildlife sanctuary, mangrove areas, coral reefs, or wetlands of important biodiversity.
Consistency with current or proposed land use classification	The location of the facility shall be consistent with the existing or proposed land use classification or comprehensive land use plan (CLUP) of the host local government unit(LGU).	Avoid areas with valuable mineral and energy resources, tourist destinations or across major transportation routes, water, gas, electrical power or communication transmission infrastructure. Also avoid areas classified as prime agricultural land or re inconsistent with the strategic agricultural zones of BSWM of DA.
Proximity to airports	The site shall be not located within 3km of an airport serving turbojet aircraft or within 1.6km of an airport serving piston driven or turboprop (propeller) aircraft.	Avoid areas within 13 km of the nearest airport.
Landfill area and Lifespan	The site shall be large enough to accommodate waste for a period of 5 years,	Avoid sites where the area is insufficient for a landfill designed to have a total lifespan of at

Factors	Exclusion (absolute) criteria	Conditional (remediable) criteria
	with provision for expansion, during which people must internalize the value of environmentally sound and sustainable waste disposal.	least 10 years.
Hauling distance, accessibility and road conditions	The site shall be accessible from major roadways and thoroughfares, provided that if it is not accessible the project design shall include means of access.	Area more than 30 km away or 30 minutes travel time from primary waste generation centers have to be avoided as much as possible.

Source: DAO 1998-50

As shown in Table 7, the criteria for the location of the landfill are commendable because many factors are considered and the exclusion criteria and conditional criteria are clearly stated.

In addition, NSWMC Resolution No. 64, Series of 2013 Section 2 provides an evaluation of the landfill construction site and its procedures.

（4）Rules concerning the operation of SLFs

For the rules on the operation of SLFs, DAO 2001-34 provides minimum considerations for the operation of SLFs. Table 8 provides an overview.

Table 8 Considerations for SLFs Operation

Considerations	Details to be considered
Records in facility operation	The following five items shall be recorded. ・The weight or volume of the waste material disposed of; ・Records of excavations which may affect the safe and proper operation of the site or cause damage to adjoining properties; ・Daily logbooks or files recording unusual events, such as the occurrence of accidents; ・Record of personnel training; ・Contacts with relevant agencies and personnel;
Monitoring	Monitor surface water and groundwater, the water quality of effluent, and gases generated from landfill site every quarter. Treated leachate shall be measured for pH at the time of discharge, BOD every 5 days, and SS weekly. However, if treated water is not discharged daily, water quality shall be measured at the time of discharge.
Record keeping	Keep all documents, drawings, operating records, etc. related to the facility.
Signs	The following signs shall be installed: ・Signs at access points from a public road indicating the name of the facility and other relevant information; ・Signs at the primary entrance of the site indicating the operator of the facility, telephone number, and hours of operation; ・Road signs to the site roads and signs directing waste delivery vehicles to the site; ・Signs to protect personnel and public health and safety;
Anti-encroachment and safety fences	Fences shall be installed at necessary locations to prevent unauthorized entry into the premises by outsiders. Fences shall also be installed in ponds and other areas where there is a risk of falls.
Dust control	Implement dust control measures for the roads on the site and pollution control measures for the public roads connected to the site.
Sanitary facilities	Provide sufficient toilets and handwashing facilities for staff and others to use.
Drinking water	Drinking water is available for safe and appropriate use by staff.
Communication facilities	Install communication facilities that can be used quickly in an emergency.
Lighting	Lighting shall be installed to ensure safety during dark hours and for the operation of the facility and equipment.

Considerations	Details to be considered
Safety of workers	Operating and maintenance Personnel shall wear and use appropriate safety equipment as required by the Department.
Training for workers	Provide education and training for facility staff and keep records.
Assignment of qualified personnel	The facility operator will assign a sufficient number of qualified personnel to comply with laws, regulations, etc. In addition, the name, address, and contact information of the facility operator or person in charge should be notified to the local health authorities.
Periodic inspections	Conduct periodic inspections as determined by the Department.
Dumping area for landfill waste	The area of dumping waste from the vehicle to the landfill should be as limited as possible. The work area should be less than 1.5 m2 per ton/day (e.g., less than 30 m^2 for 20 t/day).
Methods of compacting solid waste	To maximize the compaction of solid waste, solid waste should be spread out in layers and repeatedly compacted. The thickness of one layer of solid waste should not exceed approximately 60 cm or 2 feet.
Cover surfaces of the disposal area	Cover surface disposal area shall be graded to promote lateral runoff of precipitation and to prevent ponding. Grades shall be established of sufficient slopes to accost for future settlement of the fill surface.
Cover material	Cover material should be temporarily stockpiled on the site after being compacted and drained to prevent problems from occurring.

Source: DAO 2001-34

As shown in Table 8, it can be appreciated that the SLFs operating regulations are established considering a variety of situations.

(5) Effluent Standards for treated leachate

Standards for the discharge of treated leachate generated from SLFs will follow DAO 2016-08, which divides treated water into five classes shown in Table 9 for discharge to freshwater and four classes shown in Table 10 for discharge to marine waters.

Table 9 Water Body Classifications and Usage of Freshwater

Classification	Intended Beneficial Use
Class AA	Public Water Supply Class I－Intended primarily for waters having watersheds, which are uninhabited and/ or otherwise declared as protected areas, and which require only approved disinfection to meet the latest PNSDW
Class A	Public Water Supply Class II－Intended as sources of water supply requiring conventional treatment (coagulation, sedimentation, filtration and disinfection) to meet the latest PNSDW
Class B	Recreational Water Class I－Intended for primary contact recreation (bathing, swimming, etc.)
Class C	1. Fishery Water for the propagation and growth of fish and other aquatic resources 2. Recreational Water ClassII－For boating, fishing, or similar activities 3. For agriculture, irrigation, and livestock watering
Class D	Navigable waters

Note: For unclassified water bodies, classification shall be based on the beneficial use as determined by the Environmental Management Bureau (EMB).

Source: DAO 2016-08

Table 10 Water Body Classification and Usage of Marine Waters

Classification	Intended Beneficial Use
Class SA	1. Protected Waters－Waters designated as national or local marine parks, reserves, sanctuaries, and other areas established by law (Presidential Proclamation 1801 and other existing laws), and/or declared as such by appropriate government agency, LGUs, etc. 2. Fishery Water Class I－Suitable for shellfish harvesting for direct human consumption
Class SB	1. Fishery Water ClassII－Waters suitable for commercial propagation of shellfish and intended as spawning areas for milkfish (Chanos chanos) and similar species 2. Tourist Zones－For ecotourism and recreational activities

Classification	Intended Beneficial Use
	3. Recreational Water ClassI－Intended for primary contact recreation (bathing, swimming, skin diving, etc.)
Class SC	1. Fishery Water Class III－For the propagation and growth of fish and other aquatic resources and intended for commercial and sustenance fishing 2. Recreational Water ClassII－For boating, fishing, or similar activities 3. Marshy and/or mangrove areas declared as fish and wildlife sanctuaries
Class SD	Navigable waters

Note: For unclassified water bodies, classification shall be based on the beneficial use as determined by the Environmental Management Bureau (EMB).

Source: DAO 2016-08

Next, parameters (items) related to the effluent standards of treated water are determined for each industry. For the quality of water discharged from SLFs, the standards in "E. Water Supply; Sewerage, Waste Management and Remediation Activities" are applicable, and the effluent standards are classified into treatment and disposal of non-hazardous waste and hazardous waste, and the effluent water quality is specified as shown below. The treated water cannot be discharged into freshwater AA and marine waters SA.

Table 11 Effluent Standards of Treated Water (Non-Hazardous Waste for SLFs)

Items	Unit	Freshwater					Sea area			
		AA	A	B	C	D	SA	SB	SC	SD
Chromaticity	TCD	－	100	100	150	300	－	100	150	300
Temperature	℃difference	－	3	3	3	3	－	3	3	3
pH		－	6.0～9.0	6.0～9.0	6.0～9.5	5.5～9.5	－	6.5～9.0	6.0～9.0	5.5～9.5
COD	mg/L	－	60	60	100	200	－	60	200	300
T-SS	mg/L	－	70	85	100	150	－	70	100	150
Total coliform	MPN/100mL	－	3,000	3,000	10,000	15,000	－	3,000	10,000	15,000
Ammonia	mg/L	－	0.5	0.5	0.5	7.5	－	0.5	0.5	7.5
Nitrate	mg/L	－	14	14	14	30	－	20	20	30
Phosphate	mg/L	－	1	1	1	10	－	1	1	10
Sulfate	mg/L	－	500	500	550	1,000	－	500	550	1,000
Chlorides	mg/L	－	350	350	450	500	－	n/a	n/a	n/a
Oils Grease	mg/L	－	5	5	5	15	－	5	10	15

Source: DAO 2016-08

SLFs in categories 1-4 of DAO 2006-10 would comply with the effluent standards in Table 11, which does not have BOD, so BOD would need to be added.

Table 12 Effluent Standards of Treated Water (Hazardous Waste for SLFs)

Items	Unit	Freshwater					Sea area			
		AA	A	B	C	D	SA	SB	SC	SD
Chromaticity	TCD	–	100	100	150	300	–	100	150	300
Temperature	℃difference	–	3	3	3	3	–	3	3	3
pH		–	6.0～9.0	6.0～9.0	6.0～9.5	5.5～9.5	–	6.5～9.0	6.0～9.0	5.5～9.5
COD	mg/L	–	60	60	100	200	–	60	200	300
T-SS	mg/L	–	70	85	100	150	–	70	100	150
Total coliform	MPN/100mL	–	3,000	3,000	10,000	15,000	–	3,000	10,000	15,000

Source: DAO 2016-08

The effluent standards for SLFs of hazardous waste are only the six listed in Table 12; the other effluent standards are to be set a situation-by-situation basis.

（6）Interview

In order to examine the laws and regulations actually applied to SLFs in the Philippines and the status of incineration ash disposal, interviews were conducted with the EMB regional offices and private hazardous waste treatment facilities listed in Table 13. The interview covered regional offices with jurisdiction over areas where SLFs are located as hazardous waste treatment facilities approved and registered with the EMB, and private companies operating all registered SLFs (for hazardous waste).

Table 13 Date of interview and the interviewees

Date	Interviewees
January 11, 2022	EMB Regional Office (Region 8)
January 13, 2022	Private company (Metro Clark Waste Management Corporation)
January 14, 2022	EMB Regional Office (Region 4a)
January 18, 2022	EMB Regional Office (Region 10)
January 19, 2022	EMB Regional Office (Region 3)
February 21, 2022	Private company (Cleanway Environmental Management Solution Inc.)
March 15, 2022	Private company (Republic Cement)

Source: Project Team

The interviews revealed that the hazardous waste SLFs was planned with DAO 2013-22 and the facilities design complied with the TSD Facility Technical Guidelines. However, none of the facilities had adopted the LCRS for leachate collection facilities.

（7）Field survey

In order to examine how SLFs are actually constructed and operated under the aforementioned regulations, field surveys were conducted at the five SLFs shown in Table 14.

Table 14 Field Survey of SLFs

Name	Location	Category	Ownership	Date of visit
San Pascual Municipal Sanitary Landfill	San Pascual, Batangas	1	LGU	May 26, 2022
Bauan Solid Waste Management, Inc.	Malindig, Bauan, Batangas	2→4	Private	May 26, 2022
San Pablo City Sanitary Landfill	San Pablo City, Laguna	3	LGU	May 26, 2022
New San Mateo Sanitary Landfill	Guinayang, San Mateo, Rizal	4	Private	May 27, 2022
Metro Clark Sanitary Landfill	Sitio Kalangitan, Capas, Tarlac	4/TSD	Private	May 23, 2022

Source: Project Team

Table 15 shows the results of the field survey.

Table 15 Field Survey Results for SLFs

Facilities	Survey Results	Evaluation
Liners	・All of the SLFs were laid with geomembrane. ・Metro Clark, the owner of the TSD SLFs, designed the landfill according to German standards. Therefore, the thickness of the clay layer was 75 cm instead of the 3 feet specified in the TSD facilities technical guidelines.	RA 9003, DAO 2001-34, also allows for geomembrane only as liners, and we do not see any problem regarding the construction of the liners. However, since waste was dumped directly onto the geomembrane, there is a risk that waste will damage the geomembrane.
Leachate collection facility	・Because of landfilled waste, it was not possible to directly check the leachate collection pipes, but from the drawings it seems that the leachate collection pipes had been installed. ・The leachate pit was constructed to collect the leachate and send it to the leachate treatment facility, but the leachate pit does not collect leachate and is not functioning. ・Metro Clark, which is a TSD facility, did not adopt LCRS.	Although leachate collection pipes appear to be installed, but the number of pipes is insufficient, and the diameter of the pipes is small. In addition, although a leachate pit has been constructed, it is not functioning. Therefore, there are areas where leachate remains in the landfill or leaks into ditches around the landfill, which are issues.
Landfill gas venting facility	・Pipes and concrete structure were installed as landfill gas venting facilities. ・At Metro Clark, wells were drilled in the landfill site, and facilities were installed to collect and burn the gas.	The diameter of the pipes was small, as were the leachate collection pipes, and the number of pipes was small. The amount of gas generated from the pipes was small and did not function effectively.
Leachate treatment facility	・Metro Clark and New San Metro had leachate treatment facility ・Leachate treatment facility have adopted a method called lagoon, in which leachate is stored in ponds and aerated. ・Metro Clark used the vegetative purification method using reeds, and New San Metro adapted the treatment method similar to the activated sludge process.	Some of SLFs did not have leachate treatment facility, and even where treatment facility is available, the treatment capacity appears to be insufficient for the area of the landfill. As a result, leachate was accumulating in the landfill at New San Metro, causing gas and odors. In addition, in order to make up for the lack of leachate treatment capacity at Metro Clark, leachate was stored in temporary leachate ponds.
Maintenance	・Other than San Pablo City SLFs, soil was excavated on the site and used as covering materials. ・Metro Clark was the only site where a weight bridge was installed.	SLFs, which were constructed and operated by private companies, are planning to expand the landfill area by excavating soil from the site and using the excavated soil for cover.

Source: Project Team

In this survey, all categories of SLFs were inspected (Bauan Solid Waste Management Inc. was initially Category 2, but was changed to Category 4 due to landfill expansion) . As a result, all the SLFs were laid geomembrane, and we evaluate that there are no problems regarding liners, but there are issues regarding leachate collection and its treatment. Although pipes are installed on the bottom of the landfill site for leachate collection, the diameter of the pipes is small, and the number of pipes is insufficient. The gas vent pipes are also small in diameter, and they are not enough. The gas vent pipes need to be connected to the leachate collection pipes and the pipes need to be raised as the landfill progresses, but this could not be checked.

Based on the results of the field survey, we believe that the adoption of the semi-aerobic landfill structure (Fukuoka method) adopted in Japan is highly effective in terms of early stabilization of landfilled waste. The design of leachate collection pipes and gas vent pipes (determination of pipe diameter and layout) in the case of a semi-aerobic landfill structure is based on the JICA Technical Guidebook. This Technical Guidebook also provides methods for determining the capacity of leachate pond and leachate treatment facility, which should be consulted.

（8）Planning, design, and maintenance of SLFs which disposed incineration ash

Until now, MSW generated from households that could not be used was directly transported to SLFs, and the waste that was disposed of consisted mainly of combustible wastes such as paper and plastic. However, with the introduction of WTE facilities, combustible wastes will be incinerated, and the incineration ash generated from WTE facilities will be newly disposed of in SLFs, resulting in a significant change in the quantity and quality of landfilled wastes.

Therefore, based on the results of the aforementioned review of laws and regulations for SLFs, we will summarize points to be considered in planning, design, and maintenance of SLFs where incinerated ash is disposed of.

1) Determination of required SLF capacity

When planning a new SLF, the first step is to determine required SLF capacity and find a construction site capable of securing that amount. To determine the required SFL capacity, it is necessary to decide the wastes to be disposed of. After the introduction of WTE facilities, the main landfilled wastes will be incineration ash, inert waste, and cover soil. However, if all waste is not incinerated, combustible waste will also be disposed of.

Next, it is necessary to determine the landfill period. While the DAO 1998-50 states that landfill period of 10 years or more is desirable, longer landfill period will cause problems such as deterioration of the geomembrane. Based on the results of durability tests of geomembrane laid on actual SLFs in Japan and other countries, we believe that maximum landfill period of 20 years is desirable since the geomembrane retain more than 70% of their strength after 20 years.

Once the landfilled waste and landfill period have been determined, the next step is to set the daily landfill volume (on a weight basis) for each landfilled waste. The daily landfilled volume is predicted based on actual waste generation and population change. According to recent Japanese experience, about 10% of bottom ash and about 3% of fly ash are generated in relation to the weight of waste to be incinerated.

Furthermore, since the specific gravity of incinerated ash is about 1.0t/m^3, the volume of incineration ash generated from WTE facility can be set based on the weight of waste to be incinerated. Thus, by setting the landfill weight of each landfilled waste, it is possible to set the required landfill capacity of the new SLF.

2) Selection of the construction site for the SLF

In selecting a site for the construction of new SLF, DAO 1998-50 should be followed; summary of DAO 1998-50 and NSWMC Resolution No.64 Series of 2013 Section 1 are shown in Table 7, which defines suitable site for SLF based on a variety of factors.

3) Planning and design of the SLFs

In the Philippines, incineration ash determined to be hazardous as result of the TCLP test will be disposed of at the SLFs of the TSD facilities, and incineration ash determined to be non-hazardous will be disposed of at the SLFs.

As mentioned above, TSD Facilities Technical Guidelines have higher specifications than the standards for SLFs in other countries, including triple liners, 3-feet thick clay layer, and the use of LCRS. Therefore, Metro Clark's TSD facility was also designed based on German standards, not TSD Facilities Technical Guidelines. In addition, there is no standard of leachate treatment facilities in the TSD Facilities Technical Guidelines.

On the other hand, according to DAO 2006-10, category 4 of SLFs requires double liners of 1.5mm-thick HDPE membrane and 60cm-thick compacted cay layer with permeability of 1 x 10^{-7} cm/sec. For leachate treatment facilities, it is stipulated that treatment method that combines physical, biological, and chemical treatment.

Therefore, we propose draft design standards for liners and leachate collection and treatment facilities for SLFs for disposing incineration ash, referring to the TSD Facilities Technical Guidelines shown in Table 4 and the structural standards in DAO 2001-34 and DAO 2006-10.

i) Liners

TSD Facilities Technical Guidelines have higher standards for liners than those in other countries. On the other hand, Category 4 of DAO 2006-10 is based on daily landfill volume of 200 TPD, so it is highly likely that SLFs currently owned by LGUs that will introduce WTE facilities will be classified as Category 4. The standard for the clay layer used for Category 4 liners is stricter than the Japanese standards of 50 cm in thickness and permeability of 1 x 10^{-6} cm/sec. Therefore, it can be evaluated that it has sufficient performance as liners for SLFs where incineration ash is disposed of.

Based on the above, it is appropriate to adopt the standard for Category 4 of DAO 2006-10 for the liners of SLFs where incineration ash is disposed of.

ii) Leachate collection facility

The LCRS in the TSD Facilities Technical Guidelines requires that the liners be triple liners, which would increase the cost of construction the SLF. In addition, Category 4 of DAO 2006-10 requires for leachate collection facilities to be installed, but there is no description of specific structures or specifications.

Furthermore, DAO 2001-34 stipulates that the internal storage of leachate in the landfill site should be minimized, and the leachate storage depth should not exceed 60 cm.

The internal storage of leachate in the landfill site would increase the likelihood of leachate leakage due to water pressure on the liners. In addition, the landfill will become anaerobic, resulting in the generation of greenhouse gases such as methane. Therefore, for leachate collection facilities, we propose the adoption of a semi-aerobic landfill structure (the "Fukuoka method"), which is capable of avoidance internal storage and suppression of methane gas generation. This semi-aerobic landfill structure has been approved as a Clean Development Mechanism and is being introduced to overseas SLFs with support from Japan.

Specific design methods for leachate collection facilities for a semi-aerobic landfill structure are described in the JICA Technical Guidebook.

iii) Leachate treatment facility

The TSD Facilities Technical Guidelines do not include the description of leachate treatment facility, and while Category 4 of DAO 2006-10 specifies methods that combines physical, biological, and chemical treatment, it does not indicate what specific treatment is required. Therefore, the required leachate treatment facility will be determined by comparing the quality of the leachate generated from the SLFs with the quality of the leachate to be discharged after treatment.

The quality of leachate generated from SLFs where incineration ash is disposed of will be different from that of leachate from SLFs where combustible waste has been disposed of in the past. Therefore, based on the literature published by Japan Waste Management Association, the leachate generated from SLFs that mainly landfill combustible waste and incineration ash and inert waste Table 16 shows the quality of leachate.

Table 16 Quality of leachate from SLFs

Items	Mainly combustible waste	Incineration ash and inert waste
BOD	1,200mg/L	50～250mg/L
SS	300mg/L	100～200mg/L
COD	480mg/L	50～200mg/L
T-N	480mg/L	50～100mg/L
Ca^{2+}	－	500～3,000mg/L
Cl^{-}	－	2,000～20,000mg/L

Source:「Guideline and Their Commentary for SLFs」and「Guidebook for Planning, Design, and Management of SLFs」

As shown in Table 16, the leachate quality from incineration ash and inert waste a SLFs has smaller values for all items. However, when incineration ash is disposed of in a SLFs, it is necessary to consider Ca^{2+} and Cl^{-}, which are not found in leachate from SLFs that mainly contain combustible waste. Slaked lime ($Ca(OH)_2$) is sprayed in exhaust gas treatment equipment for the purpose of removing HCl contained in exhaust gas generated from WTE facilities. As a result, fly ash contains a large amount of $CaCl_2$, which dissolves in rainwater in the landfill and is eluted as Ca^{2+} and Cl^{-}.

However, since the quality of leachate varies greatly depending on the ratio of incineration ash to the total landfilled waste, it is necessary to set the quality of leachate after considering the ratio of waste to be disposed of when the capacity of SLF is determined.

DAO 2016-08 shows the values in Tables 11 and 12 for effluent standards for treated water at SLFs. Other effluent standards will be set according to the conditions of the treated water discharge site. Therefore, Table 17 shows an example of Japanese effluent standards after treatment of leachate generated from SLF that disposes of incineration ash.

Most SLFs in Japan are used to dispose of the bottom ash and stabilized fly ash generated from WTE facilities, which often accounts for more than 50% of the total. Since heavy metals and dioxins are contained in fly ash and the fact that they dissolve is a concern when fly ash is disposed of in landfills, Table 17 defines effluent standards for heavy metals and dioxins. The effluent standards in Table 17 were determined in Japan, where incineration ash has been disposed of for many years, in consideration of the impact on the surrounding environment. Therefore, it is necessary for SLFs in the Philippines that mainly dispose of incineration ash to comply with these effluent standards.

Note that Ca^{2+} and Cl^{-}, which are shown in Table 16, Quality of leachate from SLFs for incineration ash and inert waste, are not included in the effluent standards in Table 17. However, high calcium concentrations in leachate can cause scaling in pumps and other equipments and interfere with facility operation, so many leachate treatment facilities in Japan have adopted calcium removal equipment. In addition, if the treated leachate is discharged for agricultural canal, desalination treatment may be necessary because the Cl^{-} in the leachate-treated water may cause crops to wither.

Table 17 Example of standards for discharge of treated leachate from SLFs in Japan

Items	Standard value
Hydrogen ion concentration (pH)	5.8～8.6（Correction required for sea area)
Biochemical Oxygen Demand (BOD)	≦60mg/L
Chemical Oxygen Demand (COD)	≦90mg/L
Suspended solids (SS)	≦60mg/L
Normal hexane extractables content (mineral oil)	≦ 5mg/L
Normal hexane extractables content (animal and vegetable oils)	≦30mg/L
Phenol content	≦ 5mg/L
Copper content	≦ 3mg/L
Zinc content	≦ 2mg/L
Dissolved iron content	≦10mg/L
Dissolved manganese content	≦10mg/L
Chromium Content	≦ 2mg/L
Coliform Group Count	≦Average of 3,000 pcs/㎤ per day
Nitrogen content	≦120mg/L(Daily average 60 mg/L)
Phosphorus content	≦16mg/L(Daily average 8 mg/L)
Alkylmercury Compounds	Not to be detected
Mercury and alkylmercury and other mercury compounds	≦0.005mg/L
Cadmium and its compounds	≦0.03mg/L
Lead and its compounds	≦0.1mg/L
Organic phosphorus compounds	≦1mg/L
Hexavalent chromium compounds	≦0.5mg/L
Arsenic and its compounds	≦0.1mg/L
Cyanide compounds	≦1mg/L
Polychlorinated biphenyls (PCBs)	≦0.003mg/L
Trichloroethylene	≦0.3mg/L
Tetrachloroethylene	≦0.1mg/L
Dichloromethane	≦0.2mg/L
Carbon tetrachloride	≦0.02mg/L
(1.2-dichloroethane)	≦0.04mg/L
(1.1-dichloroethylene)	≦0.2mg/L
Cis-1.2-dichloroethylene	≦0.4mg/L
1.1.1-trichloroethane	≦3mg/L
1.1.2-trichloroethane	≦0.06mg/L
1.3-dichloropropene)	≦0.02mg/L
Thiuram	≦0.06mg/L
Simazine	≦0.03mg/L
Thiobencarb	≦0.2mg/L
Benzene	≦0.1mg/L
Selenium and its compounds	≦0.1mg/L
1,4-Dioxane	≦0.5mg/L
Boron and its compounds	≦50mg/L(Correction required for sea area)
Fluorine and its compounds	≦15mg/L(Correction required for sea area)
Ammonia, ammonia compounds, nitrite compounds, and nitrate compounds	≦200mg/L
Dioxins	≦10pg-TEQ/Nm^3

Source: Project Team

Although many items are set in the Table 17 as effluent standards for treated leachate, the actual values of heavy metals, dioxins in leachate rarely exceed the regulation in Table 17. Since heavy metals and dioxins are not easily soluble in water, they are often adsorbed in the suspended solids (hereinafter referred to as "SS") of leachate; therefore, in many cases, the effluent standard for SS is set at 10 mg/L or less.

As mentioned above, the ratio of incineration ash to total landfilled waste is important in determining the leachate treatment method, and if SLF dedicated to incineration ash from a WTE facility is constructed, a treatment method similar that adopted in Japan should be adopted.

However, if incineration ash generated from WTE facility is to be disposed of in a SLF where combustible waste is currently disposed of, it would be realistic to measure the quality of the leachate periodically (about once/month) and consider additional treatment when items that worsen leachate quality are detected since the percentage of incineration ash in the total landfilled waste would be small and SS might be filtered out in the process of leachate percolation through the already landfilled waste.

The field survey also confirmed that in the Philippines, lagoons are used for leachate treatment due to their superior economic method. In the case of lagoons, it is possible to adjust the leachate volume and its treatment together by aeration of the leachate pond. However, if, for example, the SS concentration in the leachate increases due to landfilling incineration ash and a coagulation sedimentation equipment is added, an additional leachate pond must be constructed because the treatment capacity of the coagulation sedimentation equipment is quantitative.

The field survey also identified cases where leachate treatment facilities have not been constructed, and cases where expansion of landfill area does not increase the capacity of leachate treatment facility.

Therefore, the capacity of leachate pond and leachate treatment facility should be determined using the method described in the "JICA Technical Guidebook," taking into consideration the landfill area and rainfall.

4) Maintenance of SLFs

The maintenance of SLFs is described in detail in DAO 2001-34 and is appropriate to follow.

（9）Revision of existing rules and regulations regarding SLFs and TSD facilities

As mentioned above, we do not believe that there is a need to revise the criteria for selecting the construction site of landfill (DAO 1998-50) and the rules for maintenance of SLFs (DAO 2001-34). However, regarding the structural standards for the SLFs disposal of incineration ash, it is necessary to review regulations based on the current regulations because the quantity and quality of the landfilled waste change.

Table 18 shows the proposed structural regulations for SLFs for disposing of incineration ash determined to be non-hazardous waste as a result of TCLP testing. The proposed structural regulations are based on the regulations for Category 4 of DAO 2006-10 as the structural regulation for SLFs, and add regulations for leachate collection facility, rainwater collection facility, and landfill gas venting facility.

Table 19 shows the proposed structural regulations for SLFs for disposing of incineration ash determined to be hazardous as a result of TCLP testing. The proposed structural regulations are based on the TSD Facility Technical Guidelines, which are the regulations for hazardous waste, and add regulations for landfill gas venting facility and leachate treatment facility.

The specific design methods for leachate collection facility, rainwater collection facility, and landfill gas venting facility, as well as the determination of the capacity of leachate pond and leachate treatment facility, should be referred to the JICA Technical Guidebook.

Table 18 Proposed Structural Regulations for SLFs

Facilities	DAO 2006-10 Category 4	Proposed structural regulations	References
Liners	Double liner Top liner - HDPE geomembrane should be at least 1.5 mm thick Bottom liner - Clay liner should be at least 60 cm with permeability no more than $1.0x10^{-7}$ cm/sec	Double liners Top liner - HDPE geomembrane should be at least 1.5 mm thick with permeability no more than $1.0x10^{-14}$ cm/sec Bottom liner - Clay liner should be at least 60 cm with permeability no more than $1.0x10^{-7}$ cm/sec	- Adopted the structure in category 4 in DAO 2006-10 - Adopted the HDPE's permeability in DAO 2001-34
Leachate collection facility	No regulation	- Adoption of semi-aerobic landfill structure - Installation of perforated pipes, etc., capable of draining leachate generated by a 10-year chance of rainfall with a cross-section of 0.5	- Refer to JICA Technical Guidebook
Rainwater collection facility	No regulation	- Install a facility that can drain rainfall with a probability of 25 years	- Refer to TSD Facility Technical Guidelines
Landfill gas venting facility	No regulation	- Install perforated pipes or other means to collect and treat or effectively use the gas generated from the landfill.	- Refer to RA 9003
Leachate treatment facility	- Treatment Method - Combination of physical, biological, and chemical treatment	- Combination of physical, biological, and chemical treatment - Treatment Method - Capacity - Leachate pond and leachate treatment facility can treat the maximum rainfall over the past 20 years.	- Adopted the structure in category 4 in DAO 2006-10 - Refer to JICA Technical Guidebook

Source: Project Team

Table 19 Proposed Structural Regulations for TSD Landfills

Facilities	TSD Facility Technical Guidelines	Proposed structural regulations	References
Liners	Double liner Top liner - Prevent migration of hazardous constituents into the liner Bottom liner - Composite bottom liner consisting of a synthetic geo membrane and 3 ft of compacted soil material	Double liners Top liner - HDPE geomembrane should be at least 1.5 mm thick with permeability no more than $1.0x10^{-14}$ cm/sec Bottom liner - Clay liner should be at least 60 cm with permeability of no more than $1.0x10^{-7}$ cm/sec	- Adopted the structure in category 4 in DAO 2006-10 - Adopted the HDPE's permeability in DAO 2001-34
Leachate collection facility	Double Leachate Collection and Removal System (LCRS) ・Primary LCRS must be located above the top liner, while secondary LCRS must be located between the liners immediately above the bottom composite liner ・Secondary LCRS, which also serves as the leak detection system	- Adoption of semi-aerobic landfill structure - Installation of perforated pipes, etc., capable of draining leachate generated by a 10-year chance of rainfall with a cross-section of 0.5	- Refer to JICA Technical Guidebook
Rainwater collection facility	Facilities capable of collecting and draining rainfall with a 25-year probability	- No revision required	- Refer to TSD Facility Technical Guidelines
Landfill gas venting facility	No regulation	- Install perforated pipes or other means to collect and treat or effectively use the gas generated from the landfill.	- Refer to RA9003
Leachate treatment facility	No regulation	- Treatment Method - Combination of physical, biological, and chemical treatment - Capacity - Leachate pond and leachate treatment facility can treat the maximum rainfall over the past 20 years.	- Adopted the structure in category 4 in DAO 2006-10 - Refer to JICA Technical Guidebook

Source: Project Team

Appendix 8: Assistance to LGUs

8-1 : Assistance to Davao
8-2 : Assistance to Cebu

Appendix 8-1: Assistance to Davao

DRAFT TABLE OF CONTENTS OF SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF A NEW SANITARY LANDFILL

DAVAO CITY

CHAPTER 1: GENERAL PROVISIONS

Section 1: Position of this document

This document specifies the performance and standards required by the City of Davao for the design and construction of the Davao City New Sanitary Landfill Construction Project (hereinafter referred to as "the Project").

In addition, the leachate treatment required when disposing of the ash generated from the WTE facility at the New Sanitary Landfill is explained in Activity 1-8.

Section 2: Project Policy

Indicate the policy of the Project.

Section 3: Project Outline

1. Purpose of the Project

Indicate the purpose of the Project.

2. Project Name

Indicate the name of the Project.

3. Construction Site

Indicate the address of the landfill construction site.

4. Project Area

Indicate the extent and area of the Project site.

5. Construction Period

Indicate the construction period of the Project.

6. Scope of the Project

Indicate the scope of the Project. (For example, the Project will design and construct a new sanitary landfill in Davao City, etc.)

7. Related Works

If there is work other than that indicated in 6. Scope of the Project, indicate it here. For example, the contractor will support to make applications prepared by the client.

Section 4: Basic items of the facility

1. Basic requirements for the design

Indicate the category of the landfill, the required landfill capacity, and the weight or volume ratio of landfill objects. For example, for landfill objects, incineration residue 50,000t, inert 30,000t, cover soil 20,000t (no acceptance of MSW at this moment), etc.

2. Site conditions

Show the topography of the construction site on the existing survey map. Also, show the geological survey report.

3. Utilities around the site

Indicate the condition of utilities surrounding the construction site including roads, electricity, water, sewage, etc.

Section 5: Pollution control standards

Indicate the environmental standards for air, wastewater, noise, vibration, odor, etc. after the facility is in operation.

Section 6: Compliance with relevant laws and regulations

Indicate the laws and regulations that must be complied with in the course of design and construction.

Section 7. Application to public offices, etc.

Indicate the applications, etc. that the contractor must make in order to carry out the Project.

Section 8. Compliance with environmental impact assessment

In proceeding with the Project, indicate that the contractor will adhere to the results of the environmental impact assessment that has been conducted prior to the Project.

CHAPTER 2: REQUIREMENTS FOR DESIGN AND CONSTRUCTION

Indicate the basic requirements for the design and construction of the Project.

Section 1: Basic items

1. Design documents

Indicate reports that will be used as references for geotechnical investigations, environmental impact assessment, etc., when proceeding with the design.

2. Scope of application

Indicate the scope of application of this specification.

3. Basic requirements for the design

Indicate the basic requirements for the design.

4. Basic requirements for construction

Indicate the basic requirements for construction.

5. Doubts

Indicate how to respond to any doubts that may arise in the course of design and construction.

6. Consultation, approval, and instruction

Consultation refers to a discussion between the client and the contractor when design changes are required in the construction process after the design is completed.

Approval refers to the documents, etc. that need to be approved by the client in the course of design and construction.

Instruction indicates that the client may instruct changes to the design in the course

of construction. In addition, this section describes the measures to be taken when the construction cost is changed due to the instruction of the client.

7. Materials and machineries used

Indicate that the contractor must obtain approval from the client for the materials and machineries to be used in construction.

8. Inspection and testing

Indicate the inspection and testing procedures to be carried out in the course of design and construction.

9. Environmental considerations

Indicate that necessary measures will be taken to ensure that the surrounding environment is not adversely affected during construction.

Section 2: Survey and investigation

Indicate that the contractor is responsible for any surveys additionally required in the course of design and construction, such as topography surveys and geological investigations.

Section 3: Commissioning and operational guidance

1. Commissioning

For equipment such as pumps and leachate treatment facility, the contractor shall indicate that, upon completion of installation, the contractor shall be responsible for performing a trial run to confirm that the equipment is operating normally.

2. Operational Guidance

For equipment such as pumps, indicate that the client shall be provided with operational guidance on how to operate such equipment.

Section 4: Handover

Indicate that the contractor shall hand over the sanitary landfill to the client after passing the construction completion inspection.

Section 5: Documents to be submitted

Indicate the documents that the contractor must submit to the client in the course of design and construction.

1. Detail design documents

Indicate drawings, calculations, and other documents that the contractor must submit to the client in the design phase.

2. Construction plan

The contractor indicates that a construction plan must be prepared and approved by the client prior to the start of construction.

3. Documents to be submitted during construction

Indicate the documents that the contractor must submit to the client during construction.

4. Construction completion documents

Indicate documents that the contractor must submit to the client upon completion of construction, such as as-built drawings.

5. Construction photographs

Indicate photographs that the contractor must submit to the client prior to the start of construction, during construction, and upon completion of construction.

Section 6: Matters related to design

Indicate matters that need to be taken into consideration when proceeding with the design.

Section 7: Matters related to construction

Indicate matters that need to be taken into consideration when proceeding with construction.

Section 8: Spare parts, supplies, and tools

Indicate spare parts, supplies, and tools for pumps and other equipment, that must be provided by the client to the contractor.

Section 9: Construction of facilities

Indicate the requirements for the contractor when constructing the various facilities shown below.

1. Overall plan
2. Preparation of land for construction
3. Construction of groundwater collection facilities
4. Construction of drainage facilities
5. Construction of leachate collection facilities
6. Construction of gas control and recovery system
7. Construction of leachate treatment facilities
8. Construction of groundwater and other environmental monitoring facilities
9. Construction of access roads
10. Construction of a car wash facility
11. Construction of gates and fence
12. Construction of a storage yard for soil covering

Appendix 8-2: Assistance to Cebu

How to setup the Capacity of WTE
- in the Prep. of WTE conceptual plan -

JICA Expert Team (JET)
Technical Cooperation Project for Capacity Development on Improving Solid Waste Management through Advanced/Innovative Technologies

WTE Conceptual Plan

1. Confirmation of existing MSWM in the city,
   (1) Trends in population / waste generation,
   (2) Present waste treatment system (Waste Mass Flow),
   (3) Present issues in MSWM,
2. Facility Development Concept,
   (1) Define the Target Waste to be combusted,
   (2) New waste treatment system (Waste Mass Flow)
3. Setup the quantity to be treated by facility,
   Projection of population / waste generation per capita, future projection of waste quantity,
4. Setup the capacity of WTE facility,
5. Consideration of WTE facility site,
6. Setup the processing methods in WTE/MRF,
7. Utilization of excess heat
8. WTE project management plan

1. Confirmation of existing MSWM in the city,
(1) Trends in population / waste generation,
(2) Present waste treatment system (Waste Mass Flow),
(3) Present issues in MSWM,

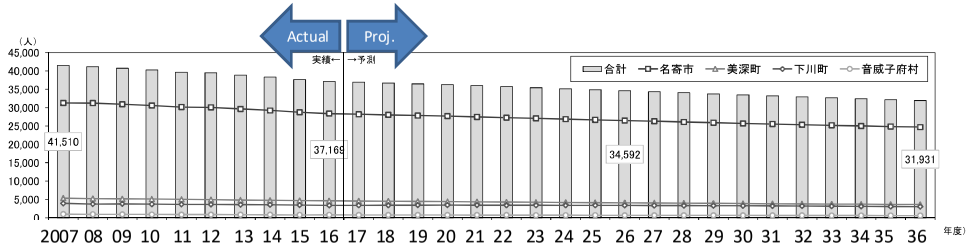


Figure-1: Trend of population (A sample in clusterizaiotn in Japan)

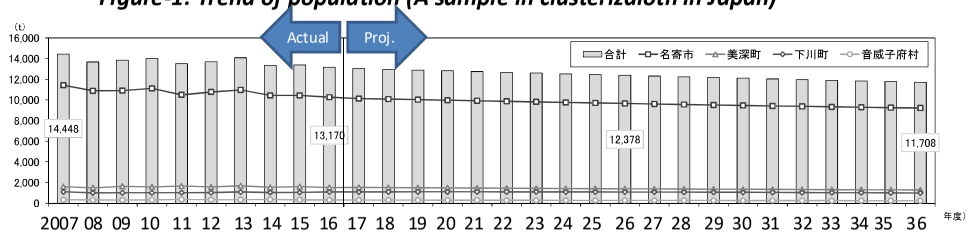
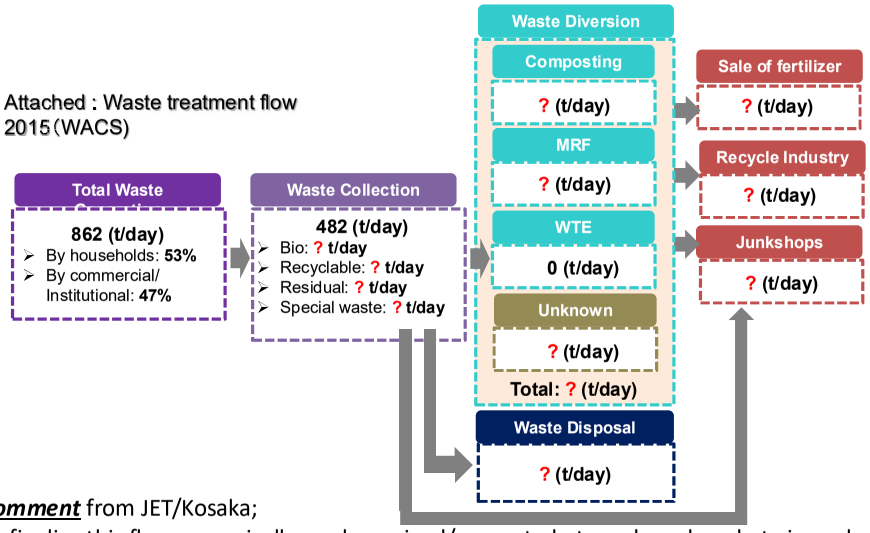


Figure-2: Trend of Waste Generation (A sample in clusterizaiotn in Japan)

1. Confirmation of existing MSWM in the city,
(1) Trends in population / waste generation,
(2) Present waste treatment system (Waste Mass Flow),
(3) Present issues in MSWM,

Attached : Waste treatment flow 2015 (WACS)



Comment from JET/Kosaka;
To finalize this flow numerically, each received/converted qty and produced qty in each composting facility / MRF shall be needed.

Appendix 8

1. Confirmation of existing MSWM in the city,
(1) Trends in population / waste generation,
(2) Present waste treatment system (Waste Mass Flow),
(3) Present issues in MSWM,

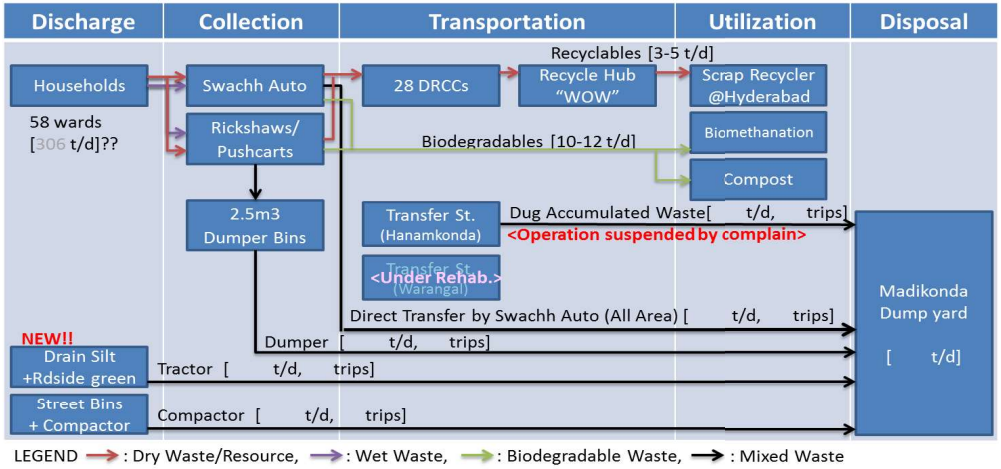


Figure-4: Sample Waste Mass Flow of a city in India

2. Facility Development Concept,
(1) Define the Target Waste to be combusted,
Based on the statistic data and WACS, define "waste category to be combusted"

(2) New waste treatment system (Waste Mass Flow)
WTE shall be located in the city's MSW Mass Flow

3. Setup the quantity to be treated by facility,
Projection of population / waste generation per capita, future projection of waste quantity (15-30 years),

4. Setup the capacity of WTE facility,
Based on above No. 2 (1)(2) and 3 together with expected performance of WTE facility (annual operation days, policy for ash), capacity of WTE facility can be set.

Afterward, No. 5.6.7.8. are also needed to specify before contract out.

1. Confirmation of existing MSWM in the city,
(1) Trends in population / waste generation,
(2) Present waste treatment system (Waste Mass Flow),
(3) Present issues in MSWM,

It should be listed out all of the problems/issues in present MSWM to be solved, e.g.;

Level	Problems/Issues to be solved
Discharge	Segregation category? Quality of segregation?
Collection	Weekly schedule?
Transportation	
Transfer Station	Recyclable market study? Supervision of city? Profitability?
MRF	Ditto
Compost Facility	Ditto
Final Disposal	Env. compliance? Remaining life time?
Other	Human / Knowledge resources? Priority of budget? Any inefficiencies? Possibility of clustering?

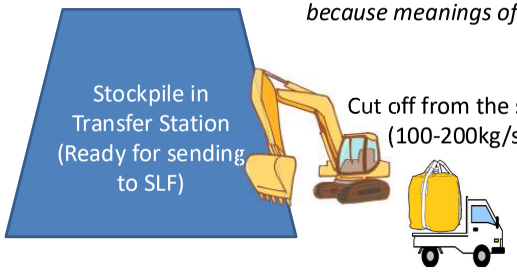
Outline of ADB-WACS Mar2018

Who	WACS team arranged by CCENRO supported by Motto McDonald ✓ 8 temp staffs ✓ 2 sorting teams = (4 waste pickers + 2 spare pickers) x 2? ✓ A waste specialist from Motto McDonald
When	13 – 19 March 2018 (7 continuous days: 1 rainy + 6 sunny)
Where	Shed Yard nearby Inayawan T/S (deemed as Mansei Yard)
What	WACS (Waste Analysis and Characteristic Survey): 14 Categories, Lab. Analysis (3 components): Combustible, Ash and Water Lab. Analysis (Ultimate): Cl, S, Cd, Pb, Hg
Why	???
How	Sampling at Inayawan T/S and deliver it to the Yard (See next page)
How many	32 samples (each day 4-6 samples)

Source: Solid Waste Management PPP Project (Cebu) (49407-005) Interim Report - Appendices "2. Methodology"

How to sample the target waste

It's fundamentally important where and how to sample the waste because meanings of data vary depending on the sampling point.



Cut off from the stockpile in T/S
(100-200kg/sample x 32 samples/7days)

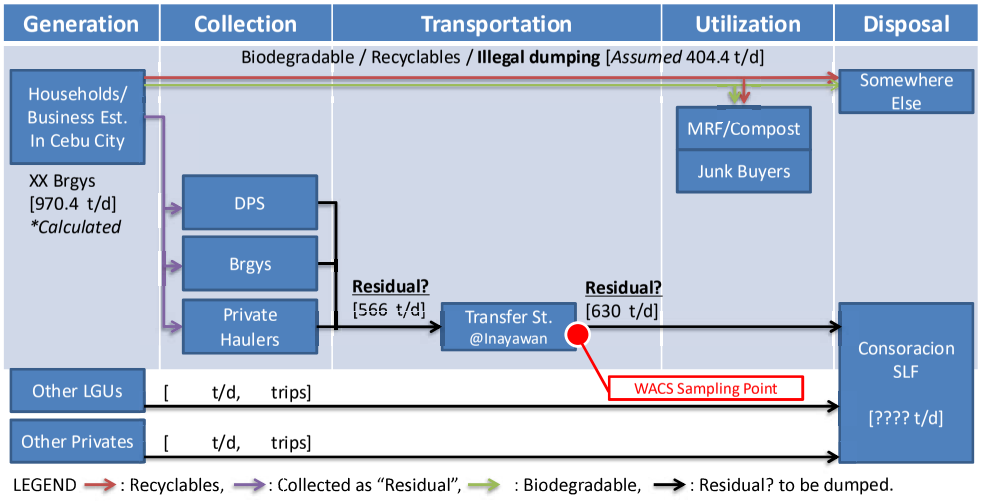
Bring to Segregation Table
- 14 categories + Fines (under 40mm),

14 categories under WACS of ADB

	Primary categories	Example materials	
1	Paper and Card	Newspaper & magazines, other recyclable paper, telephone directories, corrugated cardboard, thin non-waxy card, egg boxes, tetrapak, hard bound and soft bound books	紙類
2	Glass	Green, brown, clear and blue glass	びん（緑、茶、透明、青）
3	Ferrous and non-ferrous metals	Cans, aerosols, aluminium foil and food trays	金属類
4	Plastic bottles	PET bottles, HDPE bottles, other plastic bottles	プラボトル＊
5	Plastic film	Packaging film, supermarket carrier bags, other carrier bags, refuse sacks	プラフィルム
6	Dense plastics	Dense plastic packaging and non-packaging including recyclable tubs, pots, trays and cartons) excluding polystyrene	Denseプラ
7	Miscellaneous combustibles	Wood (treated and untreated non-garden waste), wooden furniture, soft furniture (e.g. cushions), carpets, mattresses, tyres, polystyrene	その他可燃物（庭木類を除、家財、ﾏｯﾄﾚｽ、ﾀｲﾔ、発泡S等）
8	Miscellaneous non-combustibles	Construction & Demolition / DIY waste (e.g. rubble, plasterboard, sand, gravel, ceramics), other non-combustible material not otherwise specified	その他不燃物（C&D、がれき、石膏ﾎﾞｰﾄﾞ、土砂、陶器等）
9	Textiles and footwear	Clothing textiles, shoes, belts & bags	布、靴、かばん
10	Food waste	All food waste, including cooking oil/fats	食品ごみ（食用油含）
11	Garden waste	Green garden waste, woody garden waste, soil	庭木類、土
12	Other putrescibles	Disposable nappies, pet litter	おむつ、ペット砂
13	Household hazardous	Paint cans, engine oil, batteries, pesticides, coolants	塗料缶、ｴﾝｼﾞﾝｵｲﾙ、電池、農薬、冷却液
14	WEEE (if any)	All electrical items	電子電機廃棄物
Rem	Fines	Material that passes through a 40mm grid screen table on which the sorting is undertaken (provide a description of the fine material for each load)	40mmアンダーのもの（カッコ内意味不明）

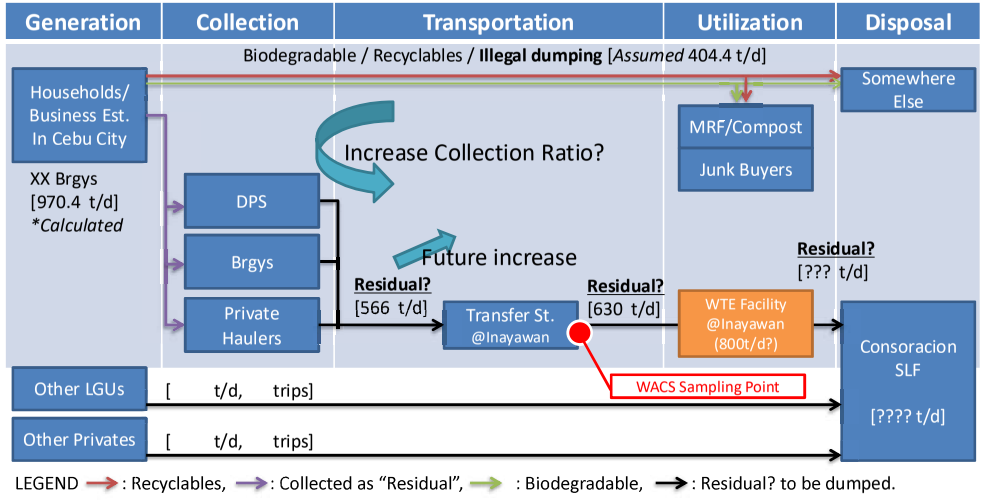
Source: Mott MacDonald

Waste Mass Flow (WMF) in Cebu City (As of 2019)

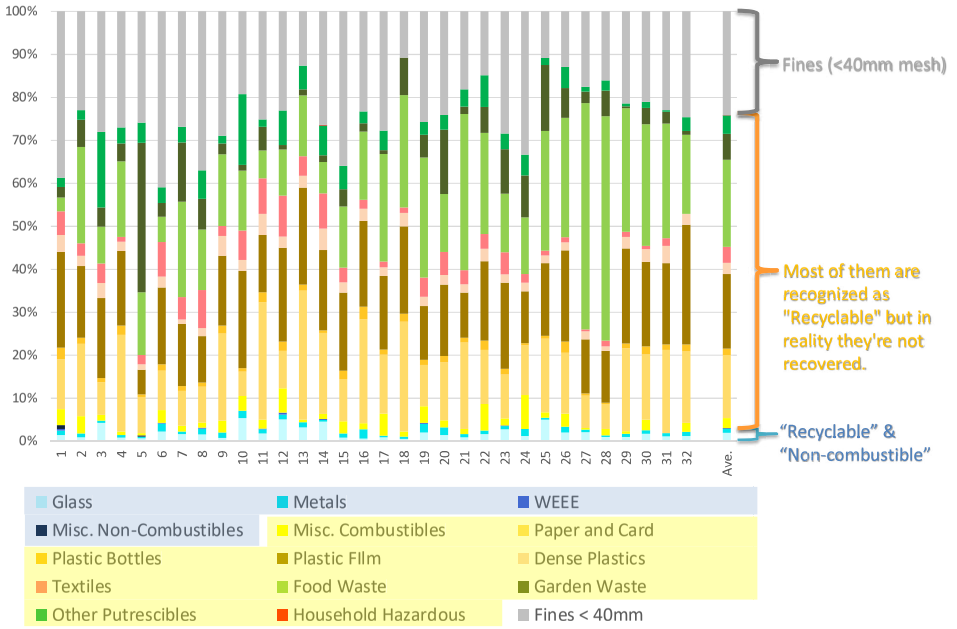


Appendix 8

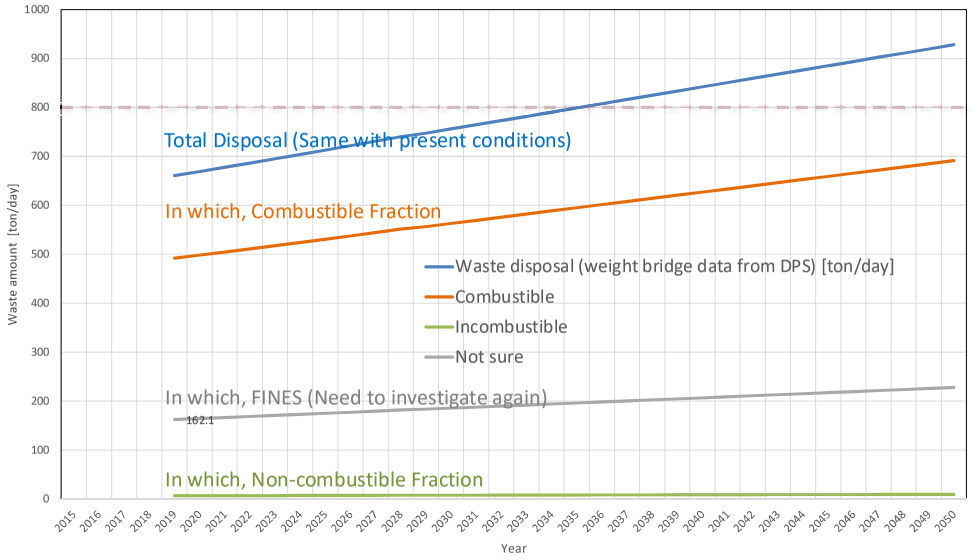
Waste Mass Flow (WMF) in Cebu City (In Target Year of 20XX)



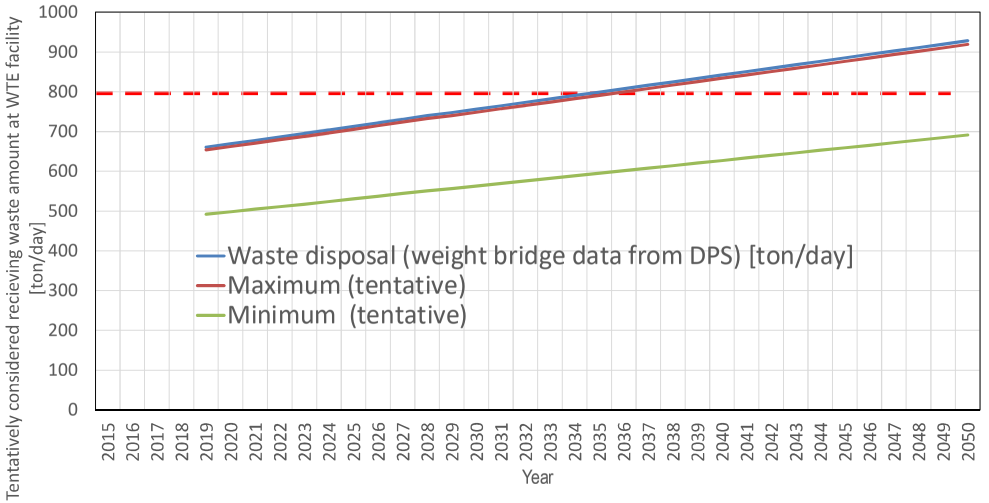
Physical Composition Result of ADB-WACS



Future Projection of Each Category of Waste

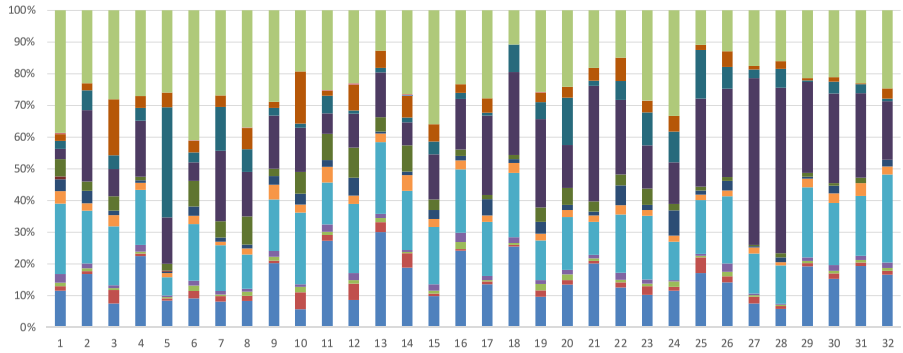


Comparison with 800t/d of WTE facility



Appendix 8

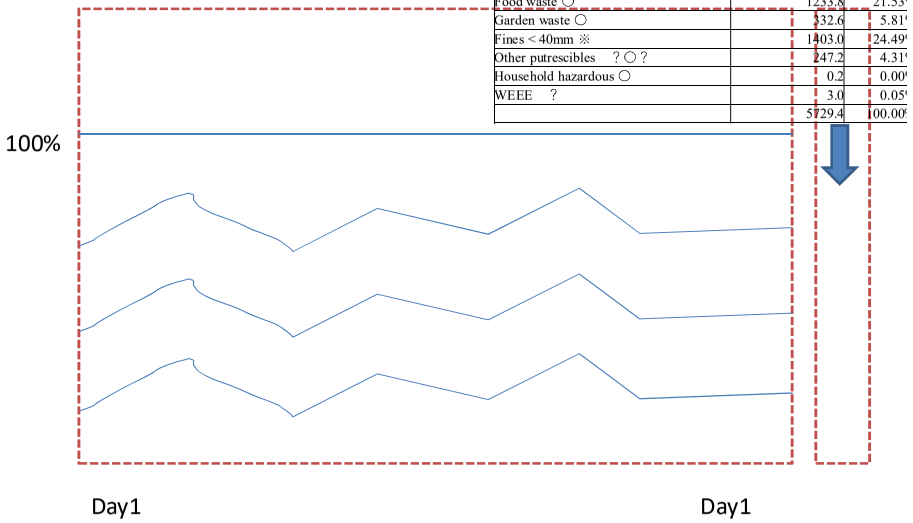
Physical composition of the survey

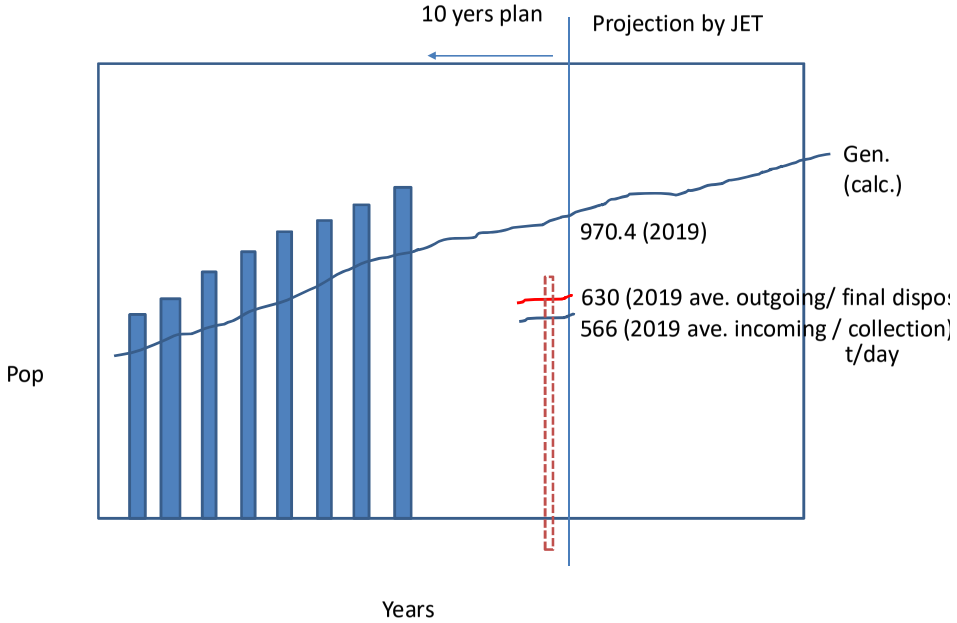


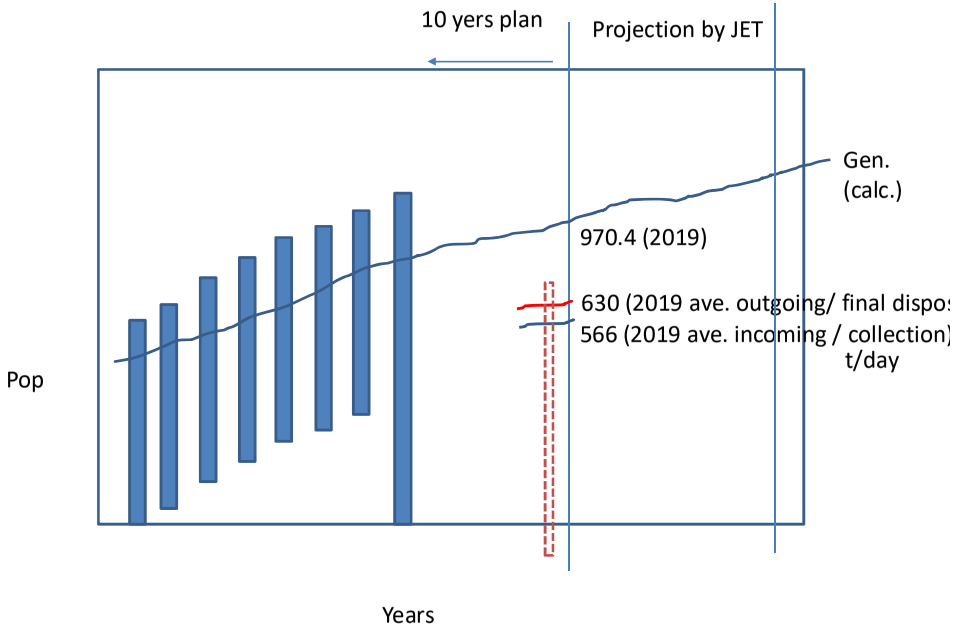
- Paper and Card Yes
- Metals No
- Plastic FIlm Yes
- Miscellaneous Combustibles Yes
- Textiles Yes
- Garden Waste Yes
- Household Hazardous No
- Fines < 40mm ?
- Glass No
- Plastic Bottles Yes
- Dense Plastics Yes
- Miscellaneous Non-Combustibles No
- Food Waste Yes
- Other Putrescibles Yes
- WEEE ?

- Physical composition is daily fluctuated.

Paper and card ○	807.0	14.09
Glass ×	107.4	1.87
Ferrous and non-ferrous metals ×	55.4	0.97
Plastic bottles ○	78.0	1.36
Plastic film ○	980.0	17.10
Dense plastics ○	146.2	2.55
Miscellaneous combustibles ○	134.6	2.35
Miscellaneous non-combustibles ×	1.6	0.03
Textile and footwear ○	199.4	3.48
Food waste ○	1233.8	21.53
Garden waste ○	332.6	5.81
Fines < 40mm ※	1403.0	24.49
Other putrescibles ? ○ ?	247.2	4.31
Household hazardous ○	0.2	0.00
WEEE ?	3.0	0.05
	5729.4	100.00







Appendix 8

How to setup the Capacity of WTE - in the Prep. of WTE conceptual plan – Result of Survey during 9th to 11th

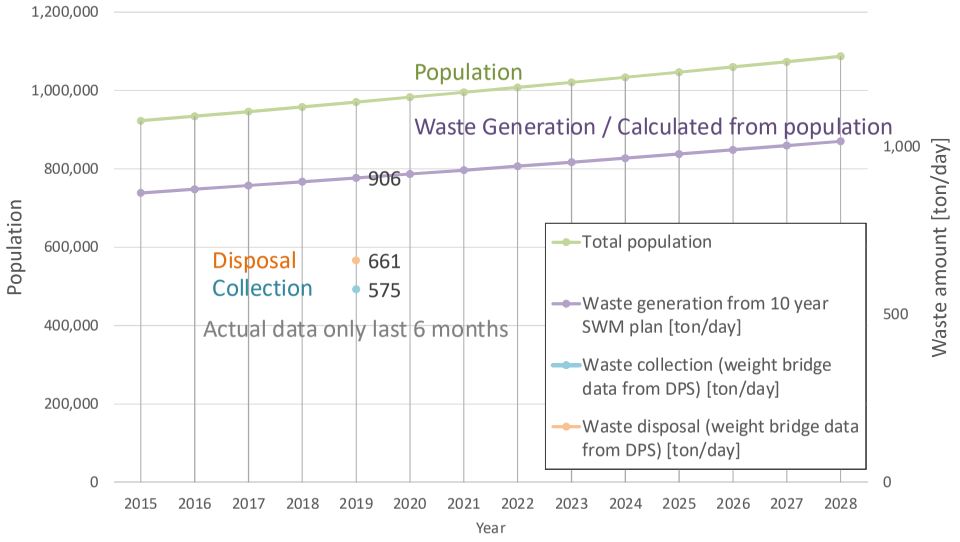
JICA Expert Team (JET)
Technical Cooperation Project for Capacity Development on Improving Solid Waste Management through Advanced/Innovative Technologies

Waste Quantity
- Generation -
- Collection -
- Disposal -

WTE Conceptual Plan

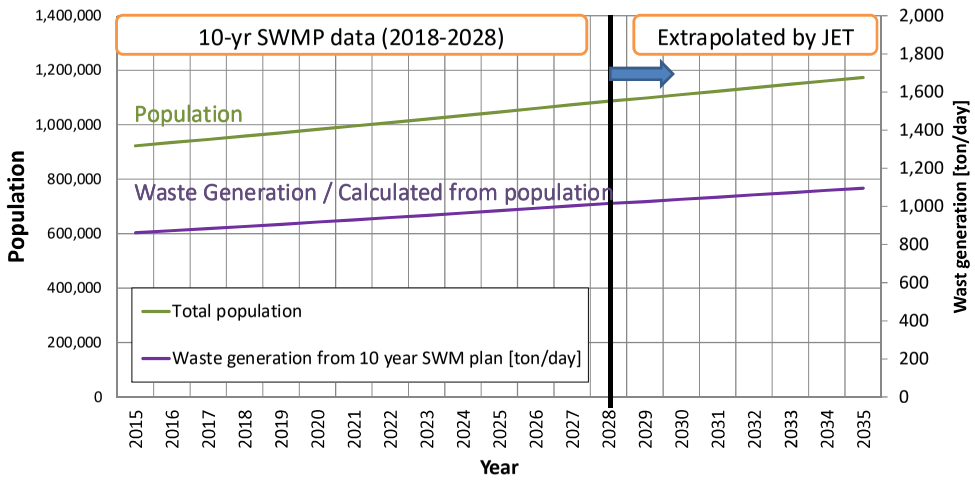
1. Confirmation of existing MSWM in the city,
   (1) Trends in population / waste generation,
   (2) Present waste treatment system (Waste Mass Flow),
   (3) Present issues in MSWM,
2. Facility Development Concept,
   (1) Define the Target Waste to be combusted,
   (2) New waste treatment system (Waste Mass Flow)
3. Setup the quantity to be treated by facility,
   Projection of population / waste generation per capita, future projection of waste quantity,
4. **Setup the capacity of WTE facility,**
5. Consideration of WTE facility site,
6. Setup the processing methods in WTE/MRF,
7. Utilization of excess heat
8. WTE project management plan

Population and waste amount

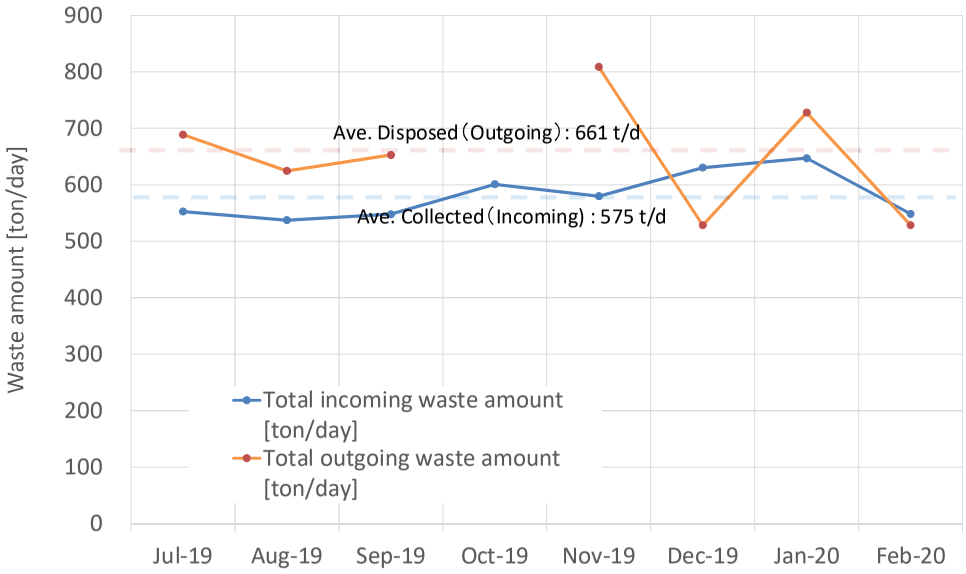


Appendix 8

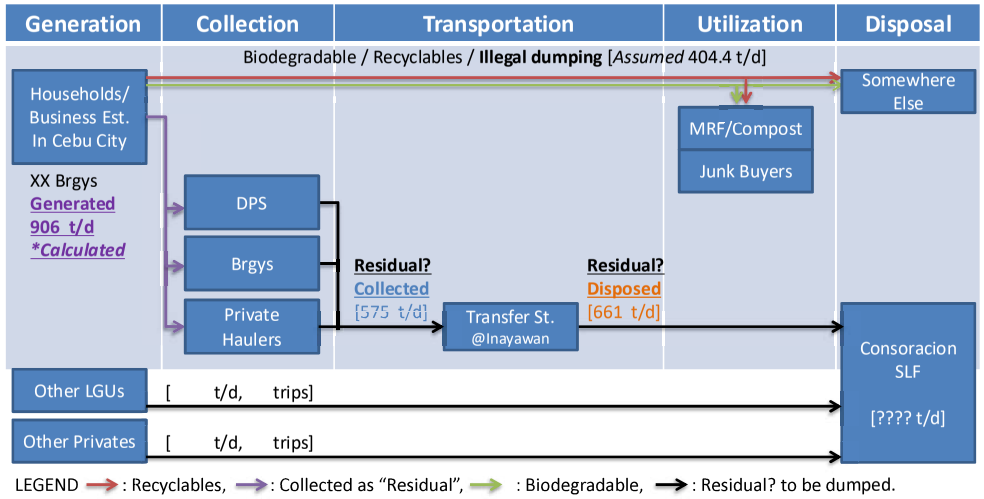
Population and waste generation (10 year SWM-Plan and Future Extrapolation)



Daily Waste (Collected/Disposed) from Weight Bridge data at Inayawan T/S



Waste Mass Flow (WMF) in Cebu City (As of 2019)



Waste Quality (Composition)

Appendix 8

Outline of ADB-WACS Mar2018

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Why	???
How	Sampling at Inayawan T/S and deliver it to the Yard (See next page)
How many	32 samples (each day 4-6 samples)

Source: Solid Waste Management PPP Project (Cebu) (49407-005) Interim Report - Appendices "2. Methodology"

How to sample the **target waste**

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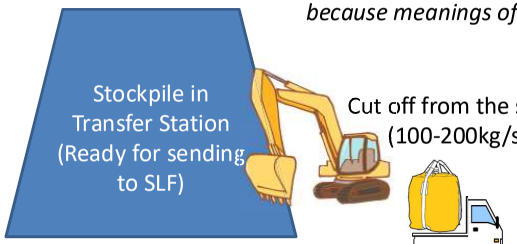

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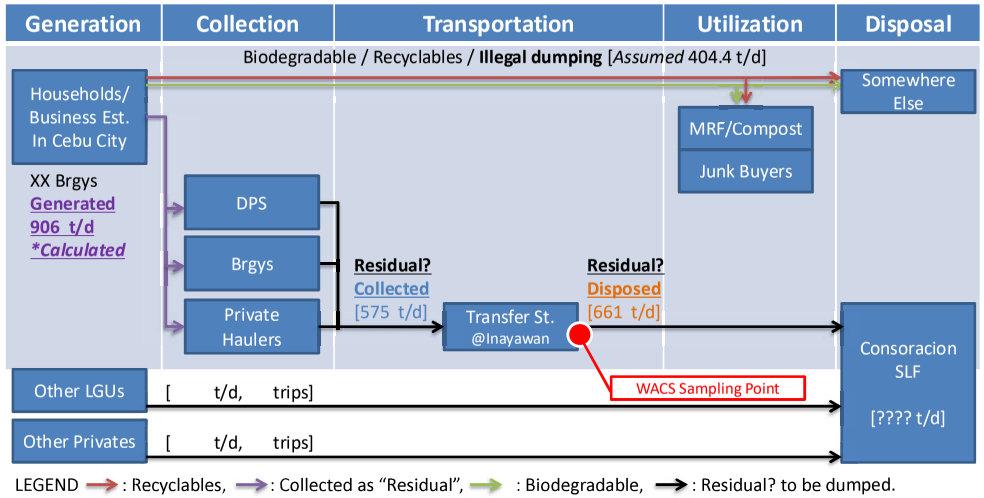
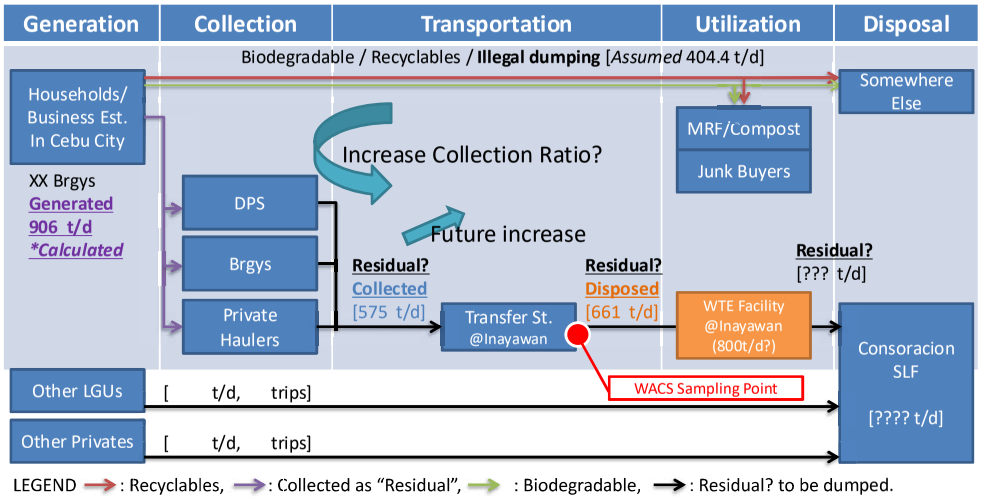
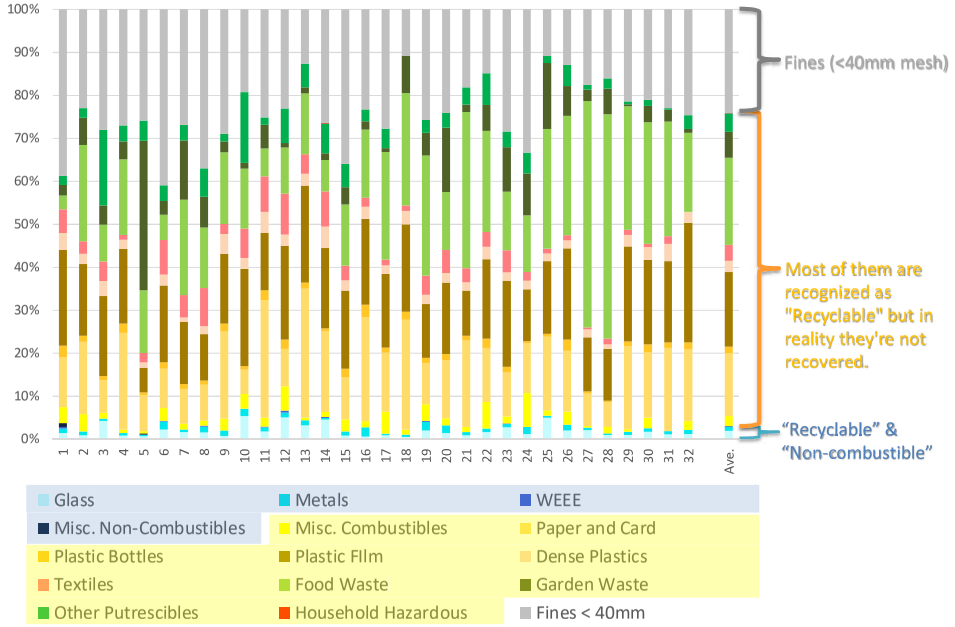


Waste Mass Flow (WMF) in Cebu City (In Target Year of 20XX)

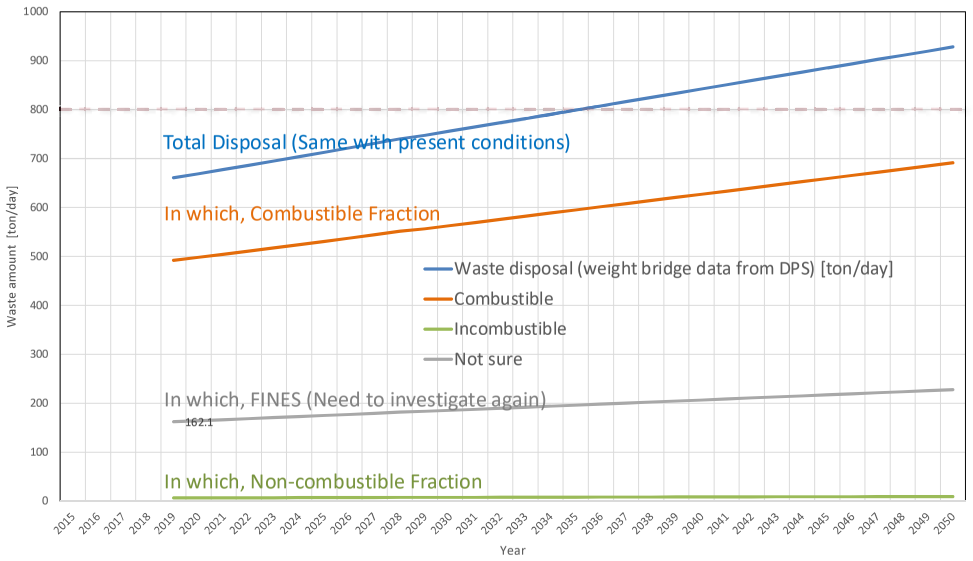


Appendix 8

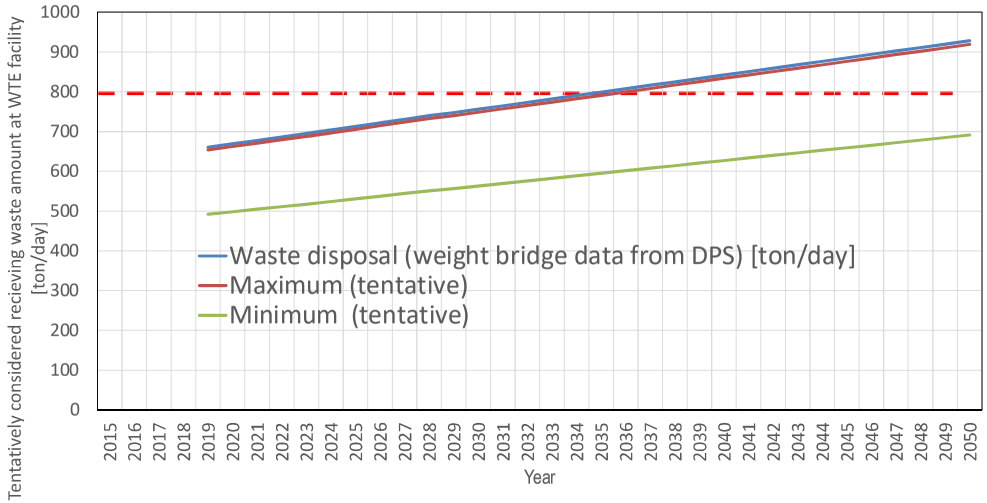
Physical Composition Result of ADB-WACS



Future Projection of Each Category of Waste



Comparison with 800t/d of WTE facility



Identified Issues and Recommendation (No. 1)

(1) Data management

- It is difficult to receive the data smoothly
- Possibility of counting durably
- Outgoing data is more than incoming data in most of monthly data from July to December

- Sharing electric data and unifying format
- Checking system of double counting (e.g. card by record of operation time, registration, etc)

Appendix 8

Identified Issues and Recommendation (No.2)

(1) 10 year SWM plan for WTE introduction

- It is necessary to prepare the 10 year SWM plan in line with WTE facility

- In this time, it is difficult to grasp how much waste is diverted at T/S, MRFs and at waste generation sources as well as illegal dumping, especially no collection area

- Prepare the format to measure the data of waste diversion.
- Necessary of continuous implementation of WACS at generation source

Categories under WACS of ADB

Item	Combustible or Incombustible	Item	Combustible or Incombustible
Paper and card	Combustible	Textiles	Combustible
Glass	Non-combustible	Food Waste	Combustible
Ferrous and non-ferrous metals	Non-combustible	Garden Waste	Combustible
Plastic bottles	Combustible	Other Putrescibles	Combustible
Plastic film	Combustible	Household Hazardous	Non-combustible
Dense plastics	Combustible	WEEE	Non-combustible
Miscellaneous combustibles	Combustible	Fines < 40mm	Not sure
Miscellaneous non-combustibles	Non-combustible		

Summary of Study

- JET implemented preliminary study to consider incineration capacity based on ADB F/S study and current collected and disposal waste
- Basically, according to the contact with the private company of WTE, there is no lower limit of receiving waste amount and no limit of lower calorific value and the private company all the waste generated in Cebu City.
- It will be necessary to plan the waste amount receiving at incinerator considering in aspect of combustible or non-combustible
- It will be also necessary to consider the future waste treatment system based on the projections of waste

Next Step

- JET assists the review of the draft contract with the private company for Cebu City
- If necessary, please contact with JET for supporting the WTE project in Cebu City

Appendix 8

Appendix 9 – Coordination with PPPC on PPP-SWM Project

October 19, 2022

Ms. Ma. Cynthia C. Hernandez
Executive Director
Public-Private Partnership Center
One Cyberpod Centris, Eton Centris
Quezon City, Metro Manila

Dear Director Hernandez,

On behalf of the JICA Experts Team (JET), we would like to submit to you the attached Accomplishment Report that our team has prepared to summarize the milestones that our partnership has attained, and to reflect on how we can even better our activities for future cooperation opportunities.

Our team is grateful for your cooperation in the conduct of our activities. Please confirm receipt of this report and let us know if there are any questions or clarifications from your end.

Best,

Mr. Takahiro Kamishita
Chief Advisor
JICA Experts Team

ACCOMPLISHMENT REPORT

March 2021-September 2022

In fulfillment of Activity 2-6:
Support to SWM PPP Projects to Clarify
Responsibility of LGUs under PPP Scheme

The Project for Capacity Development on Improving Solid Waste Management through Advanced/Innovative Technologies In The Republic of Philippines

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Conclusions and Recommendations 18

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Background

The Project for Capacity Development on Improving Solid Waste Management through Advanced/Innovative Technologies In The Republic of Philippines

Solid Waste Management (SWM) as a rising issue for developing countries, particularly to highly urbanized areas, prompted the Philippine Government to explore efforts to address the issue through programs, legislations, and capacity building efforts.

The Technical Cooperation Project (TCP) for the Capacity Development on Improving Solid Waste Management through Advanced/Innovative Technologies In The Republic of Philippines was commenced in March 2019 in line with the vision for the Philippines to improve its solid waste management situation. This TCP aims to improve the Philippine SWM system through the adoption of Waste to Energy (WTE) and other SWM technologies by conducting capacity building activities for concerned national agencies and local government units (LGUs).

The JICA Expert Team (JET) was deployed, in coordination with the Department of Environment and Natural Resources (DENR) to facilitate the implementation of the TCP through close collaboration with concerned national agencies and counterparts from the target LGUs - Quezon City, Cebu City, and Davao City.

Activity 2-6: Support to SWM PPP Projects to Clarify Responsibility of LGUs under PPP Scheme

The TCP is composed of four outputs to streamline the capacity building activities. In particular, Output 2 was crafted to enhance the target LGUs' capacity for Planning, Evaluation, Formulation and Supervision of WTE projects. This Project Output initially consists of activities aligned to supporting the target LGUs to review their current SWM practices, prepare them for the implementation of WTE projects, and to support the LGUs as they endeavor these projects through a Public-Private Partnership (PPP) scheme.

Through the course of the TCP, the WTE Projects of the target LGUs encountered challenges in its implementation and prompted the project team to reevaluate the activities, and formulate both new and reinforcement activities to adapt to the observed changes. Among

these reinforcement activities is Activity 2-6: Support to SWM PPP Projects to Clarify Responsibility of LGUs under PPP Scheme.

Activity 2-6 has allowed the TCP to expand its scope beyond the target LGUs, and to assist them through technical review of their SWM PPP Projects through coordination with the PPP Center (PPPC) Project Development Service (PDS) and Policy Formulation and Project Evaluation and Monitoring Services (PFPEMS).

JET and PPPC commenced this extended cooperation through a series of kickoff and consultative meetings last March-April 2021 to level the expected activities and timelines. The Work Plan was then prepared to illustrate these agreements.

Work Plan

Work plan Iterations

The Work Plan was developed to specify the timelines and deliverables expected from JET and PPPC in fulfillment of Activity 2-6. The first Work Plan (WP v1) was finalized on July 23, 2021 (Appendix 1) indicating a June-December 2021 timeline, considering the TCP's conclusion in March 2022.

The activities in the Work Plan encompassed seeking JET's technical expertise in the review of the SWM PPP Project Proposals of several LGUs, review of identified PPPC guideline documents, and participation in capacity building activities for national and local government units.

Several updates have been made on the Work Plan as changes in the LGU projects were made, and several other challenges were experienced that moved the timelines of the agreed activities. Moreover, during the 1st Joint Coordination Committee (JCC) Meeting last February 2021, the TCP was extended until December 31, 2022 considering the challenges brought by the COVID-19 pandemic, among other things. The activities as agreed in the Work Plan with PPPC were also moved accordingly.

Coordination between PPPC and JET was consistent during the span of the cooperation, but timelines were further hampered with the election season and the following change in administration. Proponents of the unsolicited proposals sent to the LGUs either chose to hold the processing until after the new administration had assumed, or withdrew their proposals for revisions.

The experienced delays prompted another change in the Work Plan (WP v2), adjusting the timeline of activities from June-September 2022 (Appendix 2).

Work plan Planned Activities

The following lists the activities included in all iterations of the Work Plan, and indicates the timelines and planned implementation strategies for the activities.

I. **Review and Provision of Recommendations to LGU Projects**

A. Unsolicited Proposal for the General Santos City (GSC) Sanitary Landfill (SLF) Project (WP v1)

The GSC SLF project briefer was shared with JET as attachment to the finalized Work Plan sent last June 2021, and the completion of the activity was set for December 2021.

Consultations with the LGU, proponent, and concerned stakeholders were plotted in the timeline to allow JET to provide necessary technical support in line with the feedback from the involved parties.

PPPC-PDS was expected to facilitate the coordination of the activities and bridge the communication with the LGUs. At the end of the project activity, JET was expected to produce a summary of recommendations on the GSC SLF Project for submission to the GSC LGU.

B. Unsolicited Proposal - Zamboanga Waste to Value (WtV) Project

This project was initially proposed but was shortly removed in the Work Plan upon the withdrawal of the proponent.

II. Participation in Knowledge Sharing Session (KSS)

A. KSS for PPPC employees (WP v1)

Through PPPC-PDS, a KSS for PPPC employees was scheduled for September 2021 where JET was expected to propose topics that PPPC employees will find relevant and useful in line with SWM Projects that can be fulfilled in a PPP track. Preparations for the event commenced in July 2021, where feedback from JET was expected to allow the organizers to formulate the program accordingly.

B. KSS for National Government Agencies (NGAs) and LGUs (WP v1)

A separate KSS, planned for September 2021, was intended to target National Government Agencies and Local Government Units, to discuss topics on relevant SWM PPP projects. PPPC-PDS in coordination with PPPC Capacity Building and Knowledge Management Service (CBKMS) organized the activity,

while JET was expected to propose possible topics to discuss on the event, and participate as a resource speaker to share expertise to the attending agencies.

III. Review and Provision of Recommendations to the SWM PPP Guide (WP v1, WP v2)

PPPC has been developing the SWM PPP Guide for LGUs, noting an intent to develop sectoral guides for national agencies and local government units for the development and implementation of SWM PPP Projects. JET has extended support in the review of the Working Draft of the SWM PPP Guide (Appendix 3), and a meeting with PPPC last February 2020 was facilitated to discuss the preliminary comments of the team on this draft.

Consultations were also facilitated with the LGUs and other related agencies to understand their needs that the PPP Guide can address relating to implementing SWM PPP projects. In their consultation last December 2019, Ms. Quintos from PPPC-PFD shared a presentation (Appendix 4) detailing the framework of the PPP Guide.

The draft PPP Guide was since then presented and enhanced following the feedback from the LGU intended users and an inter-agency consultation (Appendix 5) consisting of the National SWM Commission (NSWMC) and other concerned offices.

During JET's consultation meeting with Ms. Aislyn Yao from PPPC PFD last March 23, 2021, Ms. Yao reported that the PPP Guide has been reevaluated and led to the SWM PPP Guide: Guide on Assessing Unsolicited Join Venture (JV) Proposals of Waste-to-Energy (WTE) Projects ("Guide"). PPPC PFPEMS spearheads the development of the Guide and was planned to be published by September 2021 through JET's support by providing comments for the enhancement of the document.

IV. Review and Provision of Recommendations to the Conceptual Framework on Solid Waste Management PPPs (WP v2)

Shared last June 2022, PPPC PDS sought the support of JET in the review of a Conceptual Framework (CF) on SWM PPPs that would serve as an overview reference document for the LGUs to appreciate the bigger picture of the SWM PPP structure.

Completion of Activities

A. Review and Provision of Recommendations to LGU Projects - General Santos City (GSC) Sanitary Landfill (SLF) Project

PPPC shared the project briefer and other attachments to JET last July 1, 2021 to seek assistance in reviewing the unsolicited proposal received by the local government unit of General Santos City from East Asia Sheng Tai Corporation.

The construction of a Category 4 SLF in Barangay Sinawal was completed in 2016, and was operated by a private entity for a year until its Design-Build-Operate (DBO) contract was terminated in April 2017. The LGU of GSC took over in the management and operation of the SLF as well as of the Material Recovery Facility (MRF) in the SLF site.

The increased waste generation of the city posed a challenge to the LGU in the management of the SLF, and the unsolicited proposal from the proponent seeks to bridge this and extend the life of the SLF. The proposal, sent October 2018, intends for the proponent to take over in the management of the SLF and MRF, establish a waste conversion program that will transform plastic waste into diesel fuel additives, and implement a biomass working technology that will manage the biodegradable wastes in the SLF to supplement the composting facility existing in the SLF.

GSC SLF site

The LGU of GSC passed a local ordinance No. 28 Series of 2017, also known as the General Santos City Joint Venture Ordinance to define JV undertakings in their jurisdiction as guide to the 25-year Contractual JV structure of this PPP project.

Based on the materials shared with JET, Mr. Kosaka reported last July 17, 2021 to PPPC PDS the team's preliminary insights and requests for clarification from the proponents.

JET presented the preliminary findings to PPPC for the consideration of the General Santos City LGU and the proponents. After the said meeting, PPPC reached out to the LGU and project proponents to seek the additional information requested by JET.

The proponents have not sent additional materials since the presentation of the preliminary findings. With this, JET and PPPC agreed, during the meeting last September 14, 2022, to close this activity with the submission of this Accomplishment Report detailing the team's findings from the initial review. PPPC PDS will take charge in relaying the report to the GSC LGU.

B. Participation in Knowledge Sharing Session (KSS)

PPPC PDS and PPPC CBKMS initially intended to organize separate Knowledge Sharing Sessions for PPPC employees and for national and local government units. These two sessions were however married into a single event to discuss PPP SWM Projects, particularly touching on Waste-to-Energy Best Available Technologies (BAT)/ Best Environmental Practices (BEP) Guidelines.

The issuance of the DENR Administrative Order (DAO) 2019-21 opened the doors for WTE technologies for the integrated management of municipal solid waste. The introduction of best practices and technologies exercised in other countries is a means for the country to benchmark from these activities and explore what practices and technologies would fit best in the Philippine context.

The TCP has been developing a Case Study Analysis for Guidelines of Best Available Technique/Best Environmental Practice ("Case Study") (Appendix 6) in fulfillment of Activity 1-1. This document gathered examples from the USA, EU, and Asia to summarize the practices and technologies on managing WTE facilities encompassing technical aspects, institutional and financial aspects, and summarizing key insights that can be used in the adoption of WTE technologies in the Philippines.

The Case Study was developed in close coordination with DOST and other Output 1 Subgroup members with the intention of the output being a reference document for the BAT/BEP Guideline to be later developed by the National Ecology Center (NEC). At the time of the KSS, the Case Study has been approved by the Inter-agency Technical Working Group (ITWG) and has been endorsed to the Joint Coordination Committee (JCC) for its approval and adoption. Since the KSS, the Case Study has been finalized and approved (Appendix 7), and shall be made available in EMB platforms.

PPPC tapped JET to present an overview of the Case Study in the KSS to share the best practices from other countries and promote dialogue on Waste to Energy. With this objective in mind, the invitation to the KSS (Appendix 8) was disseminated to PPPC employees as well as other implementing agencies and local government units.

Other resource speakers included DENR-EMB who was tapped to present the highlights of the DAO 2019-21, Mr. Jon Alan Cuyno, National Consultant of the PPP Center discussed how the BAT/BEP Guidelines can be integrated into the MPSS used in PPP Projects, and Atty. Lerma Advincula tackled how the private sector can participate in SWM projects through PPP channels.

The KSS was scheduled on November 22, 2021 over MS Teams, and followed the following program:

1:30PM-1:45PM	House Rules and Introduction	
1:45PM-2:00PM	Welcome Remarks	**Atty. Mia G. Sebastian** Assistant Secretary and Deputy Executive Director PPP Center
2:00PM-2:30PM	Highlights of the DAO 2019-21	**Ms. Elvira S. Pausing** Program Manager Solid Waste Management Division DENR-EMB
2:30PM-3:00PM	Overview of the BAT/BEP Guidelines	**Mr. Takahiro Kamishita** Chief Advisor JICA Expert Team
3:00PM-3:30PM	Incorporating the BAT/BEP Guidelines to the Minimum Performance Standards and Specifications (MPSS) in PPP Projects	**Mr. Jon Alan M. Cuyno** National Consultant PPP Center
3:30PM-4:00PM	Private sector participation in SWM projects through PPP arrangement	**Atty. Lerma L. Advincula** Director IV Project Development Service PPP Center
4:00PM-4:30PM	Open Forum and Wrap-up	

The event was well-attended by LGU representatives from Quezon City, Zamboanga City, General Santos City, among others, and regulatory agencies including DENR, DOST, DOE, to name a few.

During the open forum, the participants were highly involved in the discussions, inquiring about different WTE technologies that can be explored in the country, the role of DENR and PPPC in the review of WTE PPP project proposals, and the effect of the COVID-19 pandemic on the SWM practices in the country. The speakers were able to share their insights in addressing these questions, and ended the open forum on a good note.

The program was concluded successfully with the support of DENR-EMB, JET, and PPPC, stepping towards the direction of a healthy dialogue on Waste to Energy.

C. Assistance for the finalization of the SWM PPP Guide: Guide on Assessing Unsolicited Joint Venture Proposals of Waste to Energy projects

PPPP PFD has been developing the SWM PPP since 2021, and JET has extended comments to this draft that was used in their consultation with LGUs and national government unit stakeholders. The revision of the manual later led to the **Guide on Assessing Unsolicited Joint Venture Proposals of Waste-to-Energy Projects** ("Guide") that was again shared to JET through Ms. Yao last September 2021 the draft **Guide on Assessing Unsolicited Joint Venture Proposals of Waste-to-Energy Projects** ("Guide") for the team's review and comments. This guidance document was prepared in lieu of the SWM PPP Guide after a surge of requests from LGUs seeking assistance in managing the unsolicited proposals received.

The Guide was then reviewed by JET and preliminary recommendations were presented to Ms. Yao during a coordination meeting last October 18, 2021. The comments were acknowledged and were considered in the updating of the Guide, but the updated document was no longer routed to JET for further review.

The detailed comments of JET on the Guide can be found in Appendix 9, and JET underscored the following highlights in the report to Ms. Yao:

1. <u>LGU Readiness Check Enrichment</u>
   JET identified prerequisite documents that LGUs must first prepare prior to its involvement in WTE projects, as part of the readiness check.

   The conduct of a feasibility study is recommended for LGUs to implement in a general scope, to understand the waste situation in their community. This will allow the LGUs to generate validated information instead of relying on private proponents providing waste data. In addition to the waste quantity analysis and profiling (F/S and WACS data), the LGU should be able to figure out the capacity of waste that it can provide, the budget that the LGU currently utilizes in the tipping fee payment and other related expenses, and they can also arrive at a list of preferred technologies that they would like to implement to ease their waste problem.

   If this F/S can be prepared and disclosed through the official website and other channels of the LGU, this will be useful for proponents and investors to tailor fit the solutions they will submit to the LGU. The more specific and in depth F/S can then be made by the proponents to supplement the report from the LGU.

With these measures, the LGU can be more in control of the projects that they can expect to receive, and they can also be more confident of the information that will be used in the proposals, having done the F/S by themselves. If the LGU will not be able to conduct the F/S on their own, a consultant may be hired, but the implementation should still be overseen by the LGU for supervision as well as for capacity building.

2. Screening at Project Idea Note Level Simplification

   The current screening procedure for proposals entail a heavy analysis on the legal and financial aspects of the project, often overlooking the technical details. Although the legal and financial aspects matter, the overall feasibility of the project must first be assessed before proceeding to a more exhaustive review process.

   JET recommends at least a 2-stage evaluation process, where the first stage will assess the technical feasibility of the proposed technology and a quick pass at the legal and financial evaluation of the proposal.

   The idea is to first assess the project's feasibility through a simplified review of the projects to understand whether the proponent and the LGU can undertake the proposal or otherwise. In this first clearing process, legal, financial, and WTE technical experts shall be invited to assess this.

   Once passed, a more detailed review of the project must be conducted in the second screening stage.

   This 2-stage review is expected to more easily screen out projects that are not technically feasible, and simplify the process of assessment by checking for the overall feasibility of the project before the deep dive in the project specifics.

3. Difficulties for LGUs for integration of WTE Aspect into the LGUs MSWM Master Plan

   WTE is new technology here in the Philippines, and LGUs have no prior experience in dealing with such proposals. Because of this, WTE experts must be hired by the LGUs very early on in the planning process to provide unbiased opinion and immersive guidance for the LGUs on how to deal with proposals involving such technologies.

   Primarily, WTE plans must be incorporated into the 10-year SWM plans of the LGUs. This not only guides proponents in the type of proposals to pursue with the LGUs, it also gives the LGUs to better align the developments to their long-term goals. Direct collaboration with WTE experts will give exposure for the LGU counterparts on

understanding different WTE technologies and find the best fit considering their SWM conditions, technology and financial readiness, and other key considerations.

4. Financial Feasibility Analysis

   Span and depth of the financial elements in the proposal must be identified, not only the capital outlay required of the proponent and LGU, but also the operational cash flows necessary to sustain the facility.

   For instance, a certain level of clarity must be incorporated in the report regarding the terms with the offtakers not just for power but for the other byproducts that can be yielded by the facility.

   Frameworks for a national government guarantee system must also be considered given that LGUs may not have enough financial resources to undertake a WTE project.

   Lastly, a holistic review of the SWM cashflows considering the institution of WTE facilities must be considered. Changes in the waste collection process, 3R projects, and other parts of the SWM value chain will be made to make way for the WTE facility, and the financial changes these will incur should also be considered by the proponents and assessed during the screening process for the proposals.

Going back to the core objective of the Manual, the comments of the team align to making the process of adopting SWM PPP projects easier for the LGUs. It is necessary to make more preparatory initiatives to ensure the readiness of the LGUs in undertaking a WTE project.

Investing in these steps will also tie the WTE project more closely to the LGUs and may promote better sustainability that can withstand the changes in administration. If incorporated in the 10-year SWM plan, F/S, and other materials prepared by the LGUs themselves, it will be easier for LGUs to appreciate and launch these WTE projects despite the recency in its introduction here in the Philippines.

Recent developments again steer the direction of the manual towards its integration to the National Solid Waste Management Commission (NSWMC) Guidebook on 10-year SWM Planning, in order to create a comprehensive document for LGUs in their identification of SWM projects, including SWM PPP project options.

D. Review and Provision of Recommendations to the Conceptual Framework on Solid Waste Management PPPs

The Conceptual Framework (CF) was crafted as an umbrella document that encompasses the PPPC guidance documents for LGUs in managing their SWM PPP projects. The use case of the CF is in the conduct of the preliminary assessment during the project development phase where initial studies in different SWM components are conducted to determine the scope of the PPP Project and the role of the private sector partner. The CF was shared with JET last May 25, 2022.

The team reviewed the document, consolidating their feedback as noted in Appendix 10. The following points summarize the main points noted during this review:

1. Inclusion of developments in LGU long-term plans

   The CF and its contents entail the analysis of the current situation in each of the SWM value chain components, and identifying the opportunities for partnership with the private sector. In order to align these efforts to the long-term plans of the LGUs, the team recommends harmonizing the CF to their 10-year SWM plan.

   Given that the 10-year SWM plan of the LGU also entails a component-based analysis of the SWM value chain, it is vital to use their insights on this on the issues that they would like to solve or programs they would like to undertake but will not have sufficient resources to implement- gaps that the private sector can help with through these PPP projects.

   Managing PPP undertakings as a piece of a bigger SWM picture is also necessary to ensure its sustainability. SWM PPP projects must be well-integrated with already existing facilities and projects in the pipeline to make sure that their functions are coordinated and to avoid conflicts or redundancies. Developing a harmonized mesh of projects will also help these initiatives weather administrative changes.

2. Consideration for new technologies

   It is understandable that LGUs have not built enough confidence on waste to energy technologies- incineration in particular- given that it has been banned for the longest time in the Philippines. JET however advises for the CF to be more embracing of new technologies including WTE for as long as the proper measures will be taken to ensure their environmental compliance and observance of protocols and legislations.

This also goes for the other technologies and practices that may be proposed by the private sector- LGUs must take appropriate measures to ensure that careful research and analysis is done to understand the technology, its applicability in the context of the LGU, and other key considerations. These analyses must be given more weight as LGUs consider these options for improving their SWM situation.

3. Caution on dependency on private sector

   The private sector provides a huge opportunity for the LGU through the provision of resources that the LGU is unable to provide. However, in the implementation of these PPP projects, the LGU must be wary of being too dependent on the private sector. We echo the note in the CF that assistance to the LGUs in developing these contractual arrangements will be vital in ensuring that key metrics including service level are met by the private proponent. LGUs must be able to establish Key Performance Indicators (KPIs) that will help them monitor the performance of the project operators, and they must also have the resources necessary to monitor these activities later on.

   Encouraging competition in the bidding process and project development will allow the LGUs to field the best plans for their SWM projects, benchmarking with best technologies and best practices in other regions will widen the awareness of the LGU of other potential endeavors, and other initiatives are encouraged to guarantee the best service from the private proponents.

4. Community consultation

   At the early stages of development, engaging the community that may be potentially affected by the SWM project may be necessary to minimize or even eliminate conflicts later on. Community consultations are necessary to provide a sense of ownership to the community and instill their support to the project. Their terms and considerations may also be raised during this period of consultation that may be incorporated into the terms and conditions to be settled with potential proponents.

Overall, the team aligns with the goal and contents of the CF. Through this guidance document, LGUs are expected to be more capable of assessing their current situation and determining the best courses of action to take to address their needs. The team notes however that LGUs may be expected of too much and may not be able to bear all these responsibilities. Firstly, the technical staff of the LGUs may be too few to take on all these roles, so support from the national government and field experts are encouraged to provide guidance to the LGUs. This support can come in the form of capacity building opportunities, provision of technical assistance, or other mechanisms that the LGU can outsource.

Conclusions and Recommendations

The extended collaboration of JET and PPPC, in fulfillment of **Activity 2-6: Support to SWM PPP Projects to Clarify Responsibility of LGUs under PPP Scheme**, has allowed the team to understand the actual situation and needs of the LGUs. These activities have helped uncover the gaps in the current system and explore channels of support aligned to bridging these needs.

The resounding theme of the team's insights on this collaboration with PPPC is the **empowerment of the local government units**. Currently, there are a lot of responsibilities and expectations from the LGUs but no holistic efforts are being taken to support their needs. LGUs are too spread thinly on their responsibilities and have limited resources in the planning, development, implementation, and management of their SWM PPP projects. Through the activities fulfilled in this collaboration between JET and PPPC, the team aligns with the objective of PPPC to provide consolidated assistance to the LGUs.

Primarily, the team advises that LGUs must take a more proactive approach in planning for their SWM activities. This recommendation is consistent throughout the activities in the Work Plan, and is aimed to ensure that all developments are aligned to their goal instead of having scattered initiatives that do not harmonize well together.

In order to do this, the team advises the LGUs to take the lead in establishing initial studies and planning for the bigger SWM picture including their long term goals and component-specific objectives. They must conduct their own initial feasibility studies, WACS report, and strengthen their 10-year SWM plan, among others.

The support of the national agencies also help strengthen the capacity of the LGUs in harmonizing their SWM strategies with their long-term plans through the provision of guideline documents. For example, NSWMC and JICA published the Guidebook for Formulation of Solid Wastes Management Plan to serve as a reference for the LGUs in drafting their 10-year SWM Plans. The SWM PPP Guide under development of the PPP Center will also be a useful reference for the LGUs, which shall serve as a supplementary reference to the Guidebook for Formulation of Solid Wastes Management Plan.

The development of these reports can also make the LGUs be more secure in the identification of the right projects and partnerships that they will have to undertake to achieve their plans. Studies and benchmarking performed by the LGU themselves also give them more confidence in managing even unsolicited projects. The reports make it easier for

LGUs to verify the credibility of the proposal and harmonize the project with their other existing and pipeline activities.

Once these studies are established, the LGUs will have a clearer image of their capacities and resources, as well as awareness of their current needs. The LGUs must also realize that there is no one-size-fits-all solution to their problems. Their analysis of their SWM issues, and current resources and capabilities should guide them in finding the best solution that would work for their context.

Research, consultation with experts, and benchmarking with other regions can provide avenues for the LGU to find the best fit solutions to their SWM needs. As reported by the team during the KSS, BAT/BEP studies are necessary not only for the LGUs but also to notify private companies of possible opportunities for PPP undertakings. Among the practices and technologies to be explored should include new and emerging technologies, that LGUs must be more receptive of in order to address their needs. National agencies can also assist with this through the facilitation of dialogues, trainings, and consultations with emerging technology experts that can open doors for new opportunities for the LGU.

This immersive effort from the LGUs at the onset of the development stage will allow the LGUs to understand their SWM situations better and see what solutions best fit their needs. This will eventually lead to more LGU-driven projects, undertaking SWM solutions through a solicited approach instead. Although JET recognizes the importance of unsolicited proposals to introduce new technologies and drive developments in the LGUs, JET notes that the solicited approach permits the LGUs to fit projects together more effectively, and ensures that each project is more tailored to their needs.

As LGUs commence the development of projects, assessments of the technical soundness and financial feasibility are performed, but the team also advises other aspects of assessment particularly social acceptability. This is especially important for new technologies to allow the communities to have a more immersive participation in the development of these projects. Doing so will allow them to understand the technology better, and also be a platform for them to voice their concerns that the LGUs and proponents can consider before they further with the implementation.

On the financial side, assessments for projects should not only span the expenses of the project but also the financial repercussions on the rest of the SWM value chain that the project may affect. Inclusion of this information, including the capital and operational expenses, will provide a clearer picture of the financial soundness of the project.

Considering all these notes, the team understands that the LGU may not have sufficient bandwidth to accommodate these responsibilities. Given this, support from the national government will be a big help for the LGUs to ensure that they perform their responsibilities properly. Through PPPC's projects, the LGUs can also be given the opportunity to be bridged to field experts that can help them develop their long-term plans, draft initial reports, assess projects, and monitor activities.

Lastly, JET underscores the importance of tapping experts very early on in the project development stage, even as far back as in drafting the LGU's 10-year SWM plan, in order to streamline the process of undertaking SWM PPP projects for the LGUs. Outsourcing technical expertise will benefit the LGUs in ensuring that all projects are reviewed thoroughly and at the same time provide exposure and capacity building opportunities for the LGUs, empowering them to undertake SWM PPP projects with more ease.

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Appendices

Appendix 1. 2021.07.23 Work Plan v1 (Finalized June 2021)
Appendix 2. 2022.06.09 Work Plan v2 (Drafted June 2022)
Appendix 3. Working Draft of SWM PPP Guide Nov 2019
Appendix 4. 2019.12.11 Consultation on the SWM PPP Guide for LGUs
Appendix 5. 2020.02.03 Meeting Minutes on the Inter-agency workshop on the draft SWM PPP Guide for LGUs
Appendix 6. 2021.11.22 KSS presentation of Mr. Kamishita
Appendix 7. 2022.01.07 JCC-approved Case Study Analysis for BAT/BEP Guidelines
Appendix 8. 2021.11.22 KSS invitation
Appendix 9. Comments on Guide on Assessing Unsolicited Joint Venture Proposals of Waste to Energy projects
Appendix 10. Comments on Conceptual Framework

REPUBLIC OF THE PHILIPPINES
PUBLIC-PRIVATE PARTNERSHIP CENTER

Technical Assistance of the Japan International Cooperation Agency (JICA) Expert Team to the Public-Private Partnership Center of the Philippines

Work Plan

1. Background

1.1. The Public-Private Partnership (PPP) Center of the Philippines is a member of the Joint Coordinating Committee (JCC) for the Technical Cooperation Project (TCP) for the Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies entered into by the JICA Expert Team (JET) with the Department of Environment and Natural Resources – Environment Management Bureau (DENR-EMB). The PPP Center representatives are composed of officers from its Project Development Service (PDS) and Policy Formulation and Project Evaluation and Monitoring Service (PFPEMS).

1.2. In the JCC Meetings held in 2020, the PPP Center and JET discussed collaborations in the development of the PPP SWM Guide and various SWM PPP projects. Specifically, JET agreed to provide technical assistance in the SWM projects of the local governments of Quezon City, Cebu City and Davao City.

1.3. On March 23, 2021, JET, in its meeting with the PPP Center, confirmed that its TCP contract would be amended to include its technical assistance to the PPP Center in the development of SWM PPP projects, without any limitation on the project's implementing agency and SWM technology.

1.4. The PPP Center and JET agreed to specify the scope and details of JET's technical assistance to through this Work Plan. The JET's technical assistance is directed to the PPP Center and the latter, upon its consideration, shall advice the implementing agencies concerned. The technical assistance as outlined in the Work Plan is envisioned to be effective for a period of six (6) months or until December 31, 2021 coinciding with JET's TCP.

2. Scope of JET's Technical Assistance

In line with the expanded scope of technical assistance to other implementing agencies and local governments, JET shall:

2.1. Provide its expertise in developing, evaluating, managing and implementing solicited and unsolicited SWM PPP projects [i.e., waste-to-energy (WtE), waste-to-value (WtV) and sanitary landfill (SLF), or other components of the SWM value chain as may be identified and agreed upon by the PPP Center and JET].

The PPP Center has initially identified the General Santos City SLF unsolicited proposal as a priority project that will be submitted to JET for assistance. The PPP

Center may add a maximum of three more projects, solicited or unsolicited, in the list of priority projects for assistance and advise JET.

2.2. Review and/or provide inputs on the technical eligibility criteria, key performance indicators (KPIs), and minimum performance standards and specifications (MPSS), among others.

2.3. Conduct a Knowledge Sharing Session (KSS) and capacity development activities on SWM for the PPP Center employees and implementing agencies, including national and local government units.

2.4. Provide assistance in the preparation of PPP Guides, including the PPP Guide on Unsolicited Joint Venture (JV) WTE Projects for local governments.

3. PPP Center's Activities/Deliverables

3.1. Identify and prioritize SWM projects which require JET's technical assistance and provide the necessary project documents to JET.

3.2. Advise the implementing agencies of JET's assistance and level of involvement in the development, negotiation and procurement of the SWM project, and obtain appropriate consents as may be necessary.

3.3. Provide a copy of the working draft of the template technical eligibility criteria, key performance indicators (KPIs), and minimum performance standards and specifications (MPSS), among others.

3.4. Provide copy of the working draft of the PPP Guide on Unsolicited Joint Venture (JV) WTE Projects for local governments and solicit technical inputs from JET.

4. Detailed Work Plan (to be updated as necessary)

	Tasks and Deliverables		Leads		Timeline						
			PPPC	JET	2021						
				Kosaka, Kamishita, Andrei	J	J	A	S	O	N	D
1		**Assistance to Projects under Development**									
	1.1	Provision of Project Briefs for (i) General Santos City SLF unsolicited proposal.	PDS – Project Officer								
	1.2	Kick-off/Onboarding Meeting per Project for (i) General Santos City SLF unsolicited proposal.	PDS – Project Officer								
	1.3	Provision of Initial Recommendations on the Unsolicited Proposal for (i) General Santos City SLF unsolicited proposal.		JICA-JET							
	1.4	Provision of Project Briefs for other identified projects by the PPP Center.	PDS – Project Officer								
	1.5	Kick-off/Onboarding Meeting per Project for other identified projects by the PPP Center.	PDS – Project Officer								
	1.6	Provision of Initial Recommendations on the Unsolicited Proposal for (other identified projects by the PPP Center.		JICA-JET							
	1.7	Meeting with implementing agencies and/or other stakeholders *(as requested)* for General Santos City SLF unsolicited proposal and other identified projects by the PPP Center.	PDS – Project Officer								
	1.8	Review of relevant project documents *(as requested)* for General Santos City SLF unsolicited proposal and other identified projects by the PPP Center.	PDS – Project Officer								
2		**Preparation of Template Tender Documents**									
	2.1	Identification of needed templates	PDS								
	2.2	Kick-off Meeting to discuss the needed template tender documents	PDS – Project Officer/NC								
	2.3	Drafting and review of the template tender documents	PDS/NC								
	2.4	Presentation to the PPPC Directors	PDS								
	2.5	Finalization of template tender documents	PDS – Project Officer/NC								
	2.6	PPPC Roll-Out	PDS – Project Officer								
3		**Knowledge Sharing Session (KSS) - Internal**									
	3.1	Recommend KSS topics and target PPPC employees		JICA-JET							
	3.2	Discussion of the proposed KSS topics	PDS								

	Tasks and Deliverables		Leads		Timeline						
			PPPC	JET	2021						
				Kosaka, Kamishita, Andrei	J	J	A	S	O	N	D
	3.3	Preparation of KSS presentation									
	3.4	Logistics for the KSS (schedule, invitation, attendance, etc.)	PDS/AS								
	3.5	KSS Proper	PDS								
	3.6	Post-KSS logistics (post-evaluation, sending of certificates and presentation materials)	PDS								
4		**Capacity Building Activities (NGAs and LGUs)**									
	4.1	Recommend KSS topics and target PPPC employees		JICA-JET							
	4.2	Discussion of the proposed KSS topics	PDS/ CBKMS								
	4.3	Preparation of KSS presentation		JICA-JET							
	4.4	Logistics for the KSS (schedule, invitation, attendance, etc.)	PDS/ CBKMS								
	4.5	KSS Proper	PDS/ CBKMS								
	4.6	Post-KSS logistics (post-evaluation, sending of certificates and presentation materials)	PDS/ CBKMS								
5		**Assistance for the PPP Guide**									
	5.1	Provision of latest draft	PFPEMS - PFD								
	5.2	Review and revision of the PPP Guide	PFPEMS - PFD								
	5.3	Publication of the PPP Guide	PFPEMS - PFD								

Appendix 9

Annex A - General Santos City SLF unsolicited proposal Briefer

Project	**:**	**General Santos City Sanitary Landfill Project**
Implementing Agency	**:**	**Local Government Unit of General Santos City**

1. Project Background

1.1. In 2016, the Local Government Unit of General Santos City ("GSC") completed the construction of a Category 4 Sanitary Landfill ("SLF") in Barangay Sinawal, General Santos City. Following the construction, the SLF was operated by a private sector contractor for about a year before the contract was terminated in April 2017. Since then, GSC has been operating the SLF together with a material recovery facility located within the SLF.

1.2. The Phase 1 cell of the SLF is expected to have a life of 6.13 years or until 2022. However, the increasing waste volume of the City is estimated to accelerate further the life of the SLF and increase the risk of building another cell site in the SLF.

1.3. In 2018, the LGU received an unsolicited proposal from East Asia Sheng Tai Corporation, a consortium composed of East Asia Solutions Technologies Corporation and Sheng Tai Energy Technology Company (collectively the Private Sector Proponent or "PSP").

1.4. The Project is a contractual joint venture and involves the operation and maintenance of the SLF and the establishment and implementation of a waste conversion program.

1.5. The original proponent status was granted by GSC to East Asia Sheng Tai Corporation (the "OP") on December 12, 2018 through the issuance of a certificate of acceptance[1]. Following this[2], the procurement or competitive challenge for the Project started on September 28, 2020. The sole prospective challenger did not pass the pre-qualification stage[3].

1.6. The Project is already for awarding to East Asia Sheng Tai Corporation. However, GSC agreed with the OP that the joint venture agreement ("JVA")

[1] In accordance with the General Santos City Joint Venture Ordinance No. 28 Series of 2017, "[u]pon the issuance of the certificate of acceptance, the [private sector proponent] is ipso facto conferred original proponent status..."
[2] GSC requested for assistance from the PPP Center on August 10, 2020
[3] The JV-SC denied the application of the sole prospective challenger due to the latter's non-compliance of the required regulatory documents. The JV-SC decision was approved by the City Mayor on March 15, 2021.

needs to be updated before the Project is officially awarded in order to reflect more clearly the points that were agreed upon during the contract negotiation stage.

2. Project Details

Mode	Unsolicited
Legal Framework	Ordinance No. 28 Series 2017 or the General Santos City Joint Venture Ordinance ("GSC JV Ordinance")[4]
Private Sector Proponent	East Asia Sheng Tai Corporation, a consortium composed of EastAsia Solutions Technologies Corporation and Sheng Tai Energy Technology Company.
Implementing Agency	Local Government Unit of General Santos City
Project Location	Barangay Sinawal, General Santos City (Please see Annex A.1)
Project Scope	The scope of the Project includes the following: a) The operation and maintenance of the Sanitary Landfill; b) The operations and maintenance of the Material Recovery Facility; c) Implement a plastic working technology within the SLF to handle plastic waste (i.e. establish processing equipment within the SLF that will recycle plastics and transform it into Diesel Fuel Additives) d) Implement a biomass working technology that will handle the volume of biodegradables within the SLF. This will supplement the current composting facility existing within the SLF. e) Collection of revenue from third parties from the sale of Diesel Fuel Additives and/or other materials generated by the plastic and biomass working technology[5].
Project Cost	PhP 107.78 million for capital expenditure (exclusive of LGU contribution to the Joint Venture), broken down as follows:

[4] The GSC JV Ordinance can be accessed in this GDrive.
[5] The products to be produced by the biomass working technology is still to be confirmed.

	Item / Cost (PhP Million) Construction cost: 17.175 Equipment cost: 77.000 Consulting services cost: 2.015 Detailed engineering design cost: 6.592
Type of PPP	Contractual Joint Venture
JV Period	25 years
Repayment Mechanism	Sale of diesel fuel additives and other materials generated by the plastic and biomass working technology. The diesel fuel additives shall be produced through the Plastic Working Technology of the private proponent. The private proponent estimates that the diesel fuel additive can be sold for PhP 29.00 per liter. The estimated annual revenue is PhP 144,073,061.
LGU Benefits from the Project	The following are the foreseen benefits of the LGU from the Project: • Cost avoidance from operating and maintaining the SLF; • Extension of the life of the SLF • Avoid construction of a new cell site in the SLF • Ten percent share of proceeds of production of the waste conversion or waste processing.

3. Proposed Technology and SLF Components

3.1. For the waste conversion program, the Proponent proposes to establish a plastic working technology (i.e. pyrolysis) and a biomass working technology (i.e. composting). The plastic working technology will recycle plastics and transform it into diesel fuel additives. Meanwhile, the biomass working technology will be used to convert biodegradable wastes into valuable products[6]. Further details regarding the plastic working technology and biomass working technology is needed from the private sector proponent.

3.2. The following are the details and components of the SLF:

- Category 4 Sanitary Landfill
- Total area size: 63.3 hectares
- Total area size occupied by Phase 1 SLF: 15 hectares

[6] The product to be produced by the biomass working technology is for clarification with the private sector proponent.

- Small 10-metric ton per day (mtpd) composting facility
- A Sequential Batch Reactor type Leachate Treatment Facility which includes an equalization Pond and a Wetland Treatment/Polishing Pond
- Ancillary facilities including an administration building, internal roads, perimeter fencing, a weighing scale (axle scale only), water supply system, onsite drainage facilities, storm water retention pond, and groundwater/landfill gas monitoring facilities; and,
- Access roads.

4. Private Sector Proponent

4.1. The Project was submitted by East Asia Sheng Tai Corporation, a consortium composed of East Asia Solutions Technologies Corporation and Sheng Tai Energy Technology Company.

4.2. East Asia Solutions Technologies Corporation[7]

EastAsia Solutions Technologies Corporation is a technology solutions company located in Quezon City, Philippines. It is a technology equipment supplier in the areas of water technology, weather technology, and environmental systems for the private and public sector.

4.3. Sheng Tai Energy Technology Company[8]

ShengTai Energy Technology Company is a construction waste processing and recycling company located in Taiwan. It has also ventured into the waste to energy and environmental technology industry.

5. PPP Center Assistance

5.1. The PPP Center has an existing Memorandum of Agreement ("MOA") with GSC which was signed last March 25, 2021. The MOA provides for a framework for cooperation and coordination between the Parties with the goal of developing a robust pipeline of PPP projects for the City of General Santos.

5.2. GSC requested for assistance during the competitive challenge (procurement) stage of the General Santos City Sanitary Landfill project last August 14, 2020[9].

[7] Further details regarding East Asia Solutions Technologies Corporation can be found in this GDrive.
[8] Further details regarding Sheng Tai Energy Technology Company can be found in this GDrive.
[9] The request was made after the OPS was granted in 2018.

5.3. In relation to the above, the PPP Center, through its Project Development Service (“PDS”), provided its review of the existing JVA as well as the drafted procurement documents through the issuance of a Project Evaluation Memorandum (“PEM”).

5.4. During the competitive challenge/procurement of the Project, no prospective challengers passed the pre-qualification stage. As such, the Project is already for awarding to East Asia Sheng Tai Corporation. However, GSC agreed with the original proponent that the JVA needs to be revised before the Project is officially awarded in order to reflect more clearly the points that were agreed upon between both parties during the contract negotiation stage.

6. Key Concerns in the Draft JVA

6.1. Plastic and Biomass Working Technology

There is currently no extensive discussion on the technical details of the Project in the current draft of the JVA. Specifically, there is no discussion on the technical standards for the plastic and biomass working technology.

6.2. Minimum Performance Standards and Specifications and Key Performance Indicators

Based on the current draft JVA, there is no provision on the minimum performance standards and specifications (“MPSS”) for the Project. The draft agreement only provides that the private sector proponent is required to operate the SLF based on the approved Operations and Maintenance Manual of the Sanitary Solid Waste Management and Disposal Facility (“O&M Manual”).

The PPP Center agrees with the use of the O&M Manual for the Project. However, including an MPSS in the JVA is also critical for the Project as it establishes the minimum technical specifications and minimum required performance levels of the Project. The MPSS can be formed to ensure that the Project is aligned with local and international industry standards and best practices as well as meet the target service levels of GSC. Thus, in addition to the O&M Manual, the PPP Center also recommends the inclusion of an MPSS in the final JVA. Annex A.2 provides the suggested MPSS by the PPP Center to GSC as provided in the PEM.

With regard to the Project’s key performance indicator (“KPI"), the draft JVA provides that the PSP needs to achieve a waste diversion ratio of 40 percent within six months of operations. Waste diversion ratio is defined as the ratio of waste diverted over the total waste received into the SLF. Annex A.3

provides the suggested KPIs by the PPP Center to GSC as provided in the PEM.

6.3. Revenue Sharing and Parties' Equity Contribution to the Joint Venture

Based on the current draft JVA, GSC is entitled to a revenue share equivalent to 10% of the proceeds from any product of waste conversion or waste processing by the private sector proponent. This revenue share can be in the form of cash or in-kind. The 10 percent share will be implemented for two years from the start of the commercial operations. It will be reviewed after two years and four years thereafter.

The PPP Center recommends that the revenue share of GSC be based on its equity contribution to the joint venture. However, the percentage contribution of both parties to the joint venture was not defined in the JVA; hence, the need for this particular provision to be inserted in the final JVA.

Further, the PPP Center also recommends that the entire revenue share of GSC be in the form of cash. This is to avoid the inventory and market risk associated with holding and selling the products.

The recommendations above are currently being considered by GSC in the revision of the draft JVA.

7. Project Timeline

The JVA is currently for revision by GSC and will be sent to the PPP Center for review and comments afterwards. Thereafter, the revised JVA will be finalized together with the OP. The table below shows the expected timeline for the Project:

Activity	Indicative Schedule
GSC's revision of the JVA	3rd Week, May 2021
PPP Center's review of the JVA	1st Week, June 2021
Finalization of the JVA with the OP	1st Week, July 2021
Awarding of the Project and Signing of JVA[10]	2nd Week, July 2021

8. Contact Details

For further details, please coordinate with:

Aaron Gabrielle M. Tanyag
Project Development Officer, Project Development Service, PPP Center

[10] According to Section 13 (d) of the GSC JV Ordinance, "[a]ll JVAs must be signed by the City Mayor with prior authorization by the Sanggunian Panglungsod."

Jan Irish V. Platon
Division Chief, Project Development Service, PPP Center

Vanessa Claire Plena
General Santos City PPP Coordinating Center Secretariat

ANNEX A.1. Location of the Project Site

Location of the General Santos City Sanitary Landfill
(Map extracted from the General Santos City Project Brief provided by GSC)

ANNEX A.2. PPP Center Suggested Minimum Performance Standards and Specifications

MPSS	Remarks
Construction	
Construction of new facilities	• Securing of the Relevant permits and clearances including the amendment to the existing ECC for the SLF within the agreed period and that the proposed SLF/treatment be consistent with the approved SWM Plan by DENR-EMB. • Ensuring the protection of underground water resources, if any, (e.g. Infiltration reduction and underground water resources protection such as incorporation of impermeable base layer if possible) • Incorporating appropriate water drainage system (or supplementing the existing system within the SLF) for leachate bottom drainage and rainwater drainage • Incorporating appropriate water treatment system such as basins and pumping stations for storage and recirculation
Operating Sanitary Landfills	
Conduct of Comprehensive audit of existing facility during transition and takeover period	• Compliance with existing environmental and social standards and requirements including the conditions of the Environmental Compliance Certificate (ECC) issued for the SLF • Establishment of an Environmental Management System for the Project • Incorporation of trends and status of the environmental and socio-economic conditions in the project area including the groundwater and surface water quality at the designated sampling points for monitoring as part of the development of the identified Plastic Working Technology and Biomass Working Technology.
Required certifications and reports during transition and takeover period	• Environmental Technology Verification (ETV) conducted by the Department of Science and Technology • Amendment of the existing ECC issued for the SLF to include the planned waste processing facility and prepare the required reports • Detailed site development plan and construction plan considering relevant standards and restrictions for GSC's approval, as applicable
Operations and Maintenance Manual	O&M Manual should include the following: • Updated O&M manual incorporating appropriate environmental and social impact management system including the development of a monitoring and evaluation system for review and approval by the LGU

MPSS	Remarks

	• Developing Strategies for better management of the Waste Segregation, Recovery and Disposal, including the following:
	  ○ Establishment of a Waste Placement Plan that may designate disposal in specific areas, ensuring accessibility with internal roads in the SLF complex, and using physical barriers to capture wind-blown litter
	  ○ Maintaining the appropriate slopes (e.g. steepness ration of 1:3)
	  ○ Usage of regular covers as much as practicable
	• Management of Incoming Wastes;
	• Enforcement of physical mechanisms to control and limit access to the SLF area
	• Management of waste processing products;
	• Facility Management (MRF, waste processing facilities, solid waste retaining facility, storm water drainage facility, liner system, leachate management facility, access roads, landfill gas vent system and other SLF appurtenances);
	• Landfill Management;
	• Ensuring a mechanism is in place to avoid and extinguish fire within the SLF complex
	• Environmental Impact Management.

Monitoring of perimeter gas	• Quarterly monitoring of perimeter gas • In areas where there is projected increase in temperature due to climate change, due consideration of the probable consequence of increased rate of decomposition or degradation of waste.
Compliance with regulatory standards and permits	• National Emission Standards for Source Specific Air Pollutants (NESSAP) • National Ambient Air Quality Standards (NAAQS)
Interdependency with other infrastructure sectors	1. Roads • Minimize the generation of dust and the tracking of materials onto adjacent public roads • Keep roads in safe condition and maintain it in such a way that vehicle access and unloading can be conducted during inclement weather. 2. Water Supply • Ensure availability of safe and adequate drinking water supply for the site personnel

MPSS	Remarks
	• Install backup water system (e.g. water tanks and water delivery) especially if source of water is affected by low pressure during dry season 3. Energy Supply • Ensure that backup power is put in place to ensure continuity of service. • Use renewable source of energy as much as possible. 4. Communication facilities • Install adequate communication facilities to allow quick response during emergencies
Record Maintenance	Maintain information on the following: • Fire, landslides, and earthquakes; • Unusual and sudden resettlement; • Injury and property damage; • Accidents; • Explosions; • Receipt or rejection of non-permitted wastes; • Flooding; • Other unusual occurrences.

ANNEX A.3. PPP Center Suggested Key Performance Indicators

Indicator Description	Target Performance	Reporting Frequency
Waste Diversion Ratio This pertains to the ratio of Waste Diverted over the Total Waste Received into the SLF. The computation must be based on the weight of the waste.	Waste Diversion Ratio of 40 percent.	Within six (6) months from the start of operations as provided in the JVA
Regular maintenance activities for all equipment and facilities including pollution control facilities	Working at an acceptable level of efficiency based on projected useful life	Annual or as agreed upon based on the O&M manual
Leachate quality and quantity maintained at an acceptable level	To be set and agreed upon during the transition period based on the further investigation and analysis of the existing SLF Operations data	Simultaneous with the reporting frequency requirement of the EMB-DENR
Landfill gas quantity and quality		
Surface water quality		
Groundwater quality		
Records of public complaints	Zero or managed complaints	To be set and agreed upon during the transition period
Serve its purpose as a pilot facility for integrated solid waste management	Scheduled educational tours visits (at least 2x a year to be adjusted based on demand)	To be set and agreed upon during the transition period

REPUBLIC OF THE PHILIPPINES
PUBLIC-PRIVATE PARTNERSHIP CENTER

Technical Assistance of the Japan International Cooperation Agency (JICA) Expert Team to the Public-Private Partnership Center of the Philippines

Work Plan

1. Background

1.1. The Public-Private Partnership Center of the Philippines ("PPP Center") is a member of the Joint Coordinating Committee ("JCC") for the Technical Cooperation Project ("TCP") for the Capacity Development on Improving Solid Waste Management ("SWM") through Advanced/Innovative Technologies entered into by the JICA Expert Team ("JET") with the Department of Environment and Natural Resources – Environment Management Bureau ("DENR-EMB"). The purpose of the TCP is to enhance the national government and local government units' capacity for improving SWM utilizing WTE and other SWM technology. The PPP Center, as a national government agency supporting various LGUs in the development, implementation and monitoring of SWM PPP projects, was invited to be part of the JCC. The PPP Center representatives are composed of officers from its Project Development Service ("PDS") and Policy Formulation and Project Evaluation and Monitoring Service ("PFPEMS").

1.2. In the JCC Meetings held in 2020, the PPP Center and JET discussed collaborations in the development of the PPP SWM Guide and various SWM PPP projects. Specifically, JET agreed to provide technical assistance in the SWM projects of the local governments of Quezon City, Cebu City and Davao City.

1.3. On March 23, 2021, JET, in its meeting with the PPP Center, confirmed that its TCP contract would be amended to include its technical assistance to the PPP Center in the development of SWM PPP projects, without any limitation on the project's implementing agency and SWM technology.

1.4. The PPP Center and JET agreed to specify the scope and details of JET's technical assistance to through this Work Plan. The JET's technical assistance is directed to the PPP Center and the latter, upon its consideration, shall advice the implementing agencies concerned. The technical assistance as outlined in the Work Plan is envisioned to be effective until September 30, 2022.

2. Scope of JET's Technical Assistance

In line with the expanded scope of technical assistance to other implementing agencies and local governments, JET shall:

2.1. Provide advisory assistance in developing, evaluating, managing and implementing solicited and unsolicited SWM PPP projects [i.e., waste-to-energy ("WtE"), waste-to-value (WtV) and sanitary landfill ("SLF"), or other components of

Commented [AM1]: May we please ask for your consideration to add the following items:

1. Inclusion of activities that have already been undertaken in order to see the progress that have been made in this engagement.
2. Specific output required from JET that will signify the fulfillment of each technical assistance need

Thank you!

the SWM value chain], as may be identified and agreed upon by the PPP Center and JET.

The PPP Center has initially identified the General Santos City SLF[1] unsolicited proposal as a priority project that will be submitted to JET for assistance. The PPP Center may add a maximum of three more projects, solicited or unsolicited, in the list of priority projects for assistance and advise JET accordingly.

2.2. Review and/or provide inputs on the technical eligibility criteria, key performance indicators (KPIs), and minimum performance standards and specifications (MPSS) of pre-agreed and selected relevant projects, among others.

2.3. Provide assistance and advise on major technical aspects in the preparation of PPP Guides, including the PPP Guide on Unsolicited Joint Venture (JV) WTE Project for local governments, and the Conceptual Framework on Solid Waste Management PPPs.

3. PPP Center's Activities/Deliverables

3.1. Identify and prioritize SWM projects which require JET's technical assistance and provide the necessary project documents to JET.

3.2. Advise the implementing agencies of JET's assistance and level of involvement in the development, negotiation and procurement of the SWM project, and obtain appropriate consents as may be necessary.

3.3. Provide a copy of the working draft of the template technical eligibility criteria, key performance indicators (KPIs), and minimum performance standards and specifications (MPSS), among others.

3.4. Provide copy of the working draft of the PPP Guide on Unsolicited Joint Venture (JV) WTE Projects for local governments and the Conceptual Framework on Solid Waste Management PPPs; and solicit technical inputs from JET, including possibly, JET's assistance during the stakeholder consultations for the Conceptual Framework.

Commented [AM2]: Instead of imposing a specific number of projects, we hope we can approve the addition of projects depending on the scope and depth of each proposal, and also considering the bandwidth of the team to handle the project review. On our end, we would really like to be involved and exposed to more projects, but we do not want to overpromise as well, so we hope that this setup can be explored.

Commented [AM3]: We noticed that these activities were not calendared in the detailed Work Plan- may we ask the timelines of these activities as well?

Commented [AM4R3]: Additionally, may we please ask for a sample document on past PPP projects showing the technical eligibility criteria, KPIs, and MPSS to give the team a clearer picture of what is required from us? If possible, we hope to also receive this within July for our guidance. Thank you!

[1] The LGU of General Santos City is currently waiting for the revised proposal from the original proponent. Initially, the scope of the project includes the operations and maintenance of the existing cell site of the sanitary landfill, and the implementation of a waste conversion program. However, due to increasing waste volume in the sanitary landfill, it became necessary to expand the project's scope. The new project scope now includes (1) construction of a new cell site; (2) waste collection; (3) improvement of the materials recovery facility; and (4) disposal of medical waste. It is expected that the revised proposal of the original proponent will cover the aforementioned activities.

4. Detailed Work Plan (to be updated as necessary)

	Tasks and Deliverables		Leads		Timeline			
			PPPC	JET	2022			
					June	July	August	September
1	**Assistance to Projects under Development**							
	1.1	Provision of Project Briefs for identified projects by the PPP Center.	PDS					
	1.2	Kick-off/Onboarding Meeting per Project for identified projects by the PPP Center.	PDS					
	1.3	Provision of Initial Recommendations on the Unsolicited Proposal for identified projects by the PPP Center.		JET				
	1.4	Meeting with implementing agencies and/or other stakeholders *(as requested)* for identified projects by the PPP Center.	PDS					
	1.5	Review of relevant project documents *(as requested)* for General Santos City SLF unsolicited proposal and other identified projects by the PPP Center.	PDS					
2	**Assistance for the PPP Sectoral Tools**							
	2.1	**Guide on Assessing Unsolicited Joint Venture (JV) Proposals of Waste-to-Energy (WTE) Projects**						
	2.1.1	Revise draft	PFD					
	2.1.2	Solicit comments from JET and other partners	PFD	JET				
	2.1.3	Finalization of the draft Guide	PFD					
	2.1.4	PPPC approval and posting on PPPC website	PFD					
	2.2	**Conceptual Framework on Solid Waste Management PPPs**						
	2.2.1	Provide draft to JET for review and inputs	PDS	JET				
	2.2.2	Conduct of feedback gathering session with select LGUs, private sector participants and national agencies	PDS					
	2.2.3	Finalization of the draft Conceptual Framework	PDS	JET				
	2.2.4	PPPC approval and roll out	PDS					

Commented [AM5]: As mentioned earlier, we would like to request for the accomplished activities to also be shown here in order to see the overall progress that have already been made on our activities.

Commented [AM6]: The team confirms with the July 31 deadline for receiving the Project Briefs and facilitating meetings with the LGUs.

Commented [AM7]: Considering the adjusted schedules in the CF formulation, we hope we can reconsider this June 30 deadline.

PPP Center

Guide for Solid Waste Management (SWM) Public-Private Partnership (PPP) Projects

Working Draft

PPP Center
11-15-2019

Commented [Kosaka EJ1]: **Comment for a whole document;**
It seems that the general revenue generated PPP project (such as toll road, power gen, water distribution etc.) and service fee payment waste management PPP (fee shall be paid by LGU to private entity as T/F) is written in a mixed description. We think this mixed description may increase LGUs' misunderstanding of "waste can generate money", thus, it is recommendable to explain like that "most of SWM-PPP projects is not revenue sharable PPP projects such as xxx, and LGUs shall pay T/F thru project period to private investor to recover their initial investment recovery."

Commented [Kosaka EJ2]: **Comment for a whole document;**
Are you going to prepare the "definition of terms" and "Abbreviation list"?
In the MSW management sector, there are several meanings by the difference of viewpoints (such as waste, residual, recyclable, etc.) so it is recommended that definition of this guide shall be settled first.

In addition, Some of tables/figures doesn't have sources.

Commented [Kosaka EJ3]: **Comment for a whole document;**
It is quite easy to understand for the relationship of RA9003 and its IRR, standards and PPP projects.
However, in some parts, requirement of RA9003 and other information which is not regulated by RA9003 and IRR are written in mixed shape.
I'm not sure if DENR will point out on this but we'd like to suggest you to separately write them what are the required in RA9003 and what are the international standards.
(e.g. Waste management hierarchy, etc.)

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Acronyms and Abbreviations

CAPEX	Capital Expenditure
FS	Feasibility Study
IA	Implementing Agency
ICC	Investment Coordination Committee
MCA	Multi Criteria Analysis
OPEX	Operational Expenditure
NEDA	National Economic and Development Authority
PDMF	Project Development and Monitoring
PPP	Private-Public Partnership
SWM	Solid Waste Management
VfM	Value for Money
JV	Joint Venture
NSWMC	National Solid Waste Management Commission
DENR	Department of Environment and Natural Resources
MTF	Medical Treatment Facilities
MBTs	Mechanical Biological Treatments
MRFs	Materials Recovery Facilities
ORFs	Organic Recovery Facilities
FOGOs	Food Organics and Garden Organics Facilities

About the Guide

As part of its strategy to deepen its engagement with local government units (LGUs), the PPP Center, together with the DENR Environmental Management Bureau, has drafted an SWM-PPP Guide for LGUs (the Guide).

The Guide is intended to assist LGUs in identifying, developing, procuring, and implementing SWM projects using the PPP scheme. It is a knowledge product of the PPP Center made possible through the valuable assistance and contributions from the [Insert partner NGAs] in cooperation with [insert institutional partners].

Commented [PPPC4]: Internal notes on the development of the draft

The SWM-PPP Guide is the first of a series of Sectoral Guides for PPP Project Development, and one of several PPP knowledge products that are available to implementing agencies and the general public:

1. Guidebook on PPP Project Development – Guides both national and local implementing agencies in the process of defining and structuring a project, and establishing the general terms and conditions that will in turn define the PPP Contract.

2. Guidebook on Joint Ventures for Local Government Units (LGUs) – Helps local government units understand joint ventures as an option for pursuing PPP projects and guides them in crafting their Joint Venture Ordinance and in the processes of tendering the project, selecting a joint venture partner, and awarding the joint venture contract.

3. Guidebook on Build-Operate-Transfer (BOT) Projects – Guides both national and local implementing agencies in the processes of securing the approval of a PPP project, and tendering and awarding of PPP projects following the Amended BOT Law.

   Guidebook on PPP Project Implementation – Guides both national agencies and local government units in managing the PPP contract, ensuring that obligation of parties and performance targets are met.

Commented [Kosaka EJ5]: No.4?

Lastly, it is to be noted that this SWM-PPP Guide does not discuss the general overview of the PPP processes and concepts, or provide guidance for the formulation of PPP Codes for SWM, as these are discussed in detail in other knowledge products of the PPP Center described above.

Other materials which may be useful for LGUs in developing SWM projects include:

Commented [PPPC6]: Note: Some of the materials listed below are currently in development. They will be hyperlinked in the draft SWM-PPP Guide once they become available to the public.

- Department of Science and Technology-ITDI's Waste Analysis and Characterization Guidebook;
- National SWM Commission's WACS and 10-year solid waste management plan guidelines;
- National SWM Commission's Technical Guidebook on Solid Wastes Disposal Design, Operation and Management
- SWM: Financial Mechanisms & Incentive Systems Manual – Demonstration of Best Available Techniques and Best Environmental Practices in Open Burning Activities in Response to the Stockholm Convention on POPs

Commented [Kosaka EJ7]: **Comment/Request**
It is not mentioned the provider of 4th material "SWM: Financial Mechanisms & Incentive Systems Manual".
Is it possible to share all the referenced materials bcs JET shall input them into our deliverables as well.

Scope and Content

The SWM contemplated by the Guide covers solid waste collection up to treatment and disposal, allowed under existing laws, rules, and regulations.

Commented [Kosaka EJ8]: **Just a comment**
In our terms, waste stream is beginning from "discharge" but it contains only residential activity (refuse, reduce and reuse) and doesn't have PPP activity.

The Guide shall:

a. Cover all phases of SWM-PPP projects from project development to implementation;
b. Provide a background on the national SWM strategy and the role LGUs;
c. Include useful case studies on SWM-PPP projects; and
d. Be limited to projects implemented by LGUs.

The Guide does not include the selection of the appropriate SWM intervention, nor does it identify or promote a specific SWM technology.

Commented [Kosaka EJ9]: Question
How do we understand the meaning of this "Intervention"?

Intended Users

This Guide is a knowledge product of the PPP Center and is intended to be a guide for PPP practitioners and project developers in identifying, developing, procuring, and implementing SWM projects using the PPP scheme.

The main audiences for the Guide include:

(a) Practitioners responsible for implementing PPP projects at the local level;
(b) Approving bodies for SWM-PPP projects for reference during project appraisal; and
(c) Transaction advisors and other agencies that work with implementing agencies in conceptualizing and implementing PPPs in the SWM sector.

LGUs interested in pursuing SWM projects through the PPP scheme should fulfill the following conditions:

- Must have a PPP Code legislated by its local sanggunian;
- Must have a 10 year SWM Plan approved by the National Solid Waste Management Commission and/or an Integrated SWM Plan;
- Must have a local Solid Waste Management Board;
- Must have a study on the amount of solid waste generated per day in the LGU.

Commented [Kosaka EJ10]: Comment/Question
There is a requirement that "LGU must have PPP code". We recognize the melt of PPP code, however, could you tell us the problems if LGU doesn't have PPP code?

Commented [Kosaka EJ11]: Comment
There is also a requirement that "LGU must have a study on the amount of SW". We agree on it but would like you to add "at least" because SWM processing facility shall need the information of target waste quantity. So, item classification in WACS in continuous manner is also required to prepare project capacity.
(In addition, only WACS data is not usable. So, it should be study report basis which includes implemented period, procedure and how to get sample.)

Chapter 1: National SWM Strategy and the Role of LGUs

1.1 Overview of the Ecological Solid Waste Management Act of 2001

Waste management is a global issue intensified by the volume and complexity of domestic and industrial waste discarded by society. On January 26, 2001, Republic Act (R.A.) No. 9003, otherwise known as the Ecological Solid Waste Management (ESWM) Act of 2000, was enacted into law, declaring the policy of the government to "adopt a systematic, comprehensive, and ecological solid waste management program" in the country.

Waste hierarchy and classification of waste

The Ecological SWM policy is based on the management of waste in the following hierarchy:

a) Source reduction (avoidance) and minimization of waste generated at source;
b) Reuse, recycling and resource recovery of wastes at the barangay level;
c) Efficient collection, proper transfer, and transport of wastes by city/municipality; and
d) Efficient management of residuals and of final disposal sites and/or any other related technologies fo the destruction/reuse of residuals.

All waste generated by the households, markets, industries, institutions and from agricultural activities are segregated into four (4) classifications of waste, namely: biodegradable waste, recyclables, residual waste, an special waste. Upon segregated collection, they are then transferred for processing according to type:

- Residual wastes are brought to Sanitary Landfill Facilities;
- Biodegradables and recyclable wastes are transferred to Barangay/Clustered Material Recovery Facilit for further sorting, recycling and composting; and
- Special wastes are transferred to an accredited Treatment, Storage and Disposal (TSD) facilities.

Effective implementation of RA 9003, particularly segregation at source, sets the foundation for establishing circular economy and for adopting new models for solid waste management (integrated SWM planning resource recovery, disposal using innovative technologies).

Comparison of traditional waste hierarchy and the new waste management paradigm

Source: Fagariba and Song 2017

Model for resource recovery

Commented [Kosaka EJ12]: Comment
"Waste management hierarchy of a) to d) is written in MSWM Policy". Is it the fact (we don't find such)?
Figure in the bottom of same page is also not described in RA9003 so there is a possibility to reader to be confused.

Commented [Kosaka EJ13]: Question;
In this context, what is the difference of recycling and resource recovery?

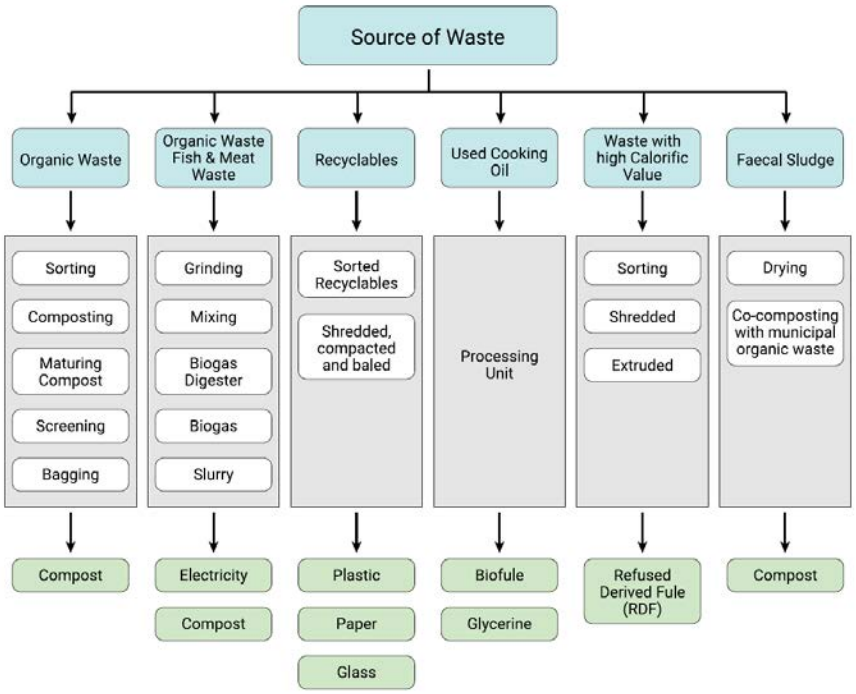
Commented [Kosaka EJ14]: Comment;
"All waste generated by the households… are segregated into 4…" If this sentence intends to introduce the requirement of RA9003, it shall be "shall be segregated into 4…" because real situation is far different with this.

Commented [Kosaka EJ15]: Comment;
Suggest to delete bcs 4 classification includes recyclables so NOT waste.

Commented [Kosaka EJ16]: Comments;
Detail items of the classification/segregation are differed by timing/locality, such as availability of re-production factories, market value, etc. So, LGUs shall consider and design of these categories in time to time.

Commented [Kosaka EJ17]: Comment;
It is unclear the title of the figure "Comparison of traditional and new ...", what is the meaning of this "new" in this GL? (Re-comment)
This Figure is not described in RA9003 so there is a possibility to reader to be confused. It's recommendable to explain.

Commented [Kosaka EJ18]: Comment;
Title of figure "Model for resource recovery" should be changed as, for example, "Example of resource recovery system in xxx city" or something similar. Using this original title may mislead as that PPPC suggest this SWM systems to the reading LGUs.
* In small part, recyclables shall have "metal".
* faecal sludge can be treated in sewage in big city so the system shall be completely depending on the locality and availability of re-production facility, and recyclable market as well, so, LGU shall design of these detail in time and time.



Source: Thompson

Legal and institutional set-up

Provided in R.A. No. 9003 and its implementing rules and regulations (IRR) are mandates and schedules of implementation to be undertaken by provincial, city/municipal, and barangay governments within their jurisdiction. The most important of these include:

a) Creation of a Solid Waste Management (SWM) Board (city/municipal and provincial levels);
b) Creation of an SWM Committee (barangay level);
c) Submission and approval of a 10-year SWM Plan (city/municipal levels);
d) Establishment of Materials Recovery Facilities (MRF) per barangay or cluster of barangays and city/municipal centralized MRF;
e) Closure of open dumpsites and conversion into controlled dumpsites by 2004 (city/municipal levels);
f) Banning of controlled dumpsites by 2006 (city/municipal levels);
g) Rules on final disposal and/or management of residual waste.

Commented [Kosaka EJ19]: **Comment;**
"c) Submission and approval of 10yrs SWMP"
Considering the time stream, "Drafting and approval" are better. Submission of MSWMP to NSWMC would be coming afterward.

Commented [Kosaka EJ20]: **Comment;**
Don't you mention about the recycling target ratio, 25% by 200x?

The National SWM Commission (NSWMC or the Commission) is the major agency tasked to implement th Ecological SWM Act of 2000, which called for the institutionalization of a national program that will manage the control, transfer, transport, processing and disposal of solid waste in the country. It oversees the implementation of appropriate SWM plans by end-users and local government units (LGUs) as mandated by law.

Figure 1 provides an overview of the NSWMC. For more information on the programs and projects of the Commission, please visit their website (http://nswmc.emb.gov.ph/.

Figure 1. National Level Solid Waste Management Structure

Commented [Kosaka EJ21]: Source?

Major functions and responsibilities of the NSWMC

a) Prepare the National Solid Waste Management Framework
b) Approve local SWM plans in accordance with RA 9003 rules and regulations
c) Review and monitor the implementation of local SWM plans
d) Coordinate the operation of local SWM boards in the LGUs
e) Develop and implement a program to assist LGUs in the identification of markets that are diverted from disposal facilities through the 3Rs
f) Manage the SWM Fund
g) Develop and prescribe procedures for the issuance of Permits and clearance
h) Formulate the necessary education promotion of IEC campaign.
i) Formulate and update a list NEAP.
j) Encourage private sector initiatives, community participation and investments in resource recovery-based livelihood programs for local communities.

For more information on the programs and projects of the NSWMC, please visit their website: http://nswmc.emb.gov.ph/.

Status of implementation per functional phase (collection, diversion and recovery, handling and treatment, disposal)

Table 1. Status of implementation per functional phase	
Type of service	**Status**
Collection *Refers to the act of removing solid waste from the source or from a communal storage point. RA 9003 requires segregated collection by LGUs. Waste segregation and collection are to be conducted at the barangay level specifically for biodegradable and recyclable wastes while disposal and collection of non-recyclable/residual and special wastes are the responsibility of the city or municipality*	• It is estimated that waste collection coverage in the LGUs may vary from 30% to more than 99%, with urban centers registering higher coverages and frequencies compared to rural areas. • **In Metro Manila and other urban centers, collection of solid wastes is one of the areas of the value chain which has seen the most private sector participation. However, it is also regarded as potentially the most expensive of the functional elements of SWM.**
Diversion and recovery *Refers to activities which reduce or eliminate the amount of solid wastes from waste disposal facilities, and the collection, extraction or recovery of recyclable materials from the waste stream for the purpose of recycling, generating energy or producing a product suitable for beneficial use.*	• As of 2015, solid waste diversion rate in Metro Manila is 48 percent while outside Metro Manila the rate is 46 percent. RA 9003 requires at least 25 percent of all solid wastes from waste-disposal facilities is diverted or recovered through reuse, recycling, composting, and other resource-recovery activities. LGUs are also mandated to put up or establish several waste facilities such as materials-recovery facilities (MRFs) for processing recyclable and biodegradable waste. As of 2016, about 9,883 MRFs are in operation in the country serving 13,155 barangays (31.3% of the 42,000 barangays in the country). • **The informal and semi-formal waste economy is an important contributor to successfully diverting wastes away from disposal sites. Some LGUs have explored ways for partnering with them, and there are available markets for recyclable materials except for those with low economic value.** For the latter, LGUs have had to seek alternatives to recycling these materials into marketable and innovative products such as bags, slippers, fashion accessories, among others.
Handling and treatment of special wastes *Refer to household hazardous wastes such as paints, thinners, household batteries, lead-acid batteries, spray canisters and the like. These include wastes from residential and commercial sources that comprise of bulky wastes, consumer electronics,*	• **Handling and treatment of special wastes is one of the areas which could benefit most from more private sector investment.**

Commented [Kosaka EJ22]: Question;
Which LGU/s reach more than 99% of collection ratio?

Commented [Kosaka EJ23]: Comment;
What does this paragraph mean?
This may lead misunderstanding of WM. It is not "value chain". MRF, compost and WTE are extracting the usable parts from discarded waste with COST.

Commented [Kosaka EJ25]: Comment/Request;
We don't believe 48% in MM and 46% in other LGUs of resource recovery ratio are in fact.
So, it is recommendable to mention the source and issued year.
*We'd like to read and understand more about these figures so please kindly provide the source material.

Commented [Kosaka EJ26]: Comment;
Target year of 25% of waste diversion ratio requirement to LGUs by RA9003 shall be mentioned, is it 2005?

Commented [Kosaka EJ24]: Comment;
Considering the waste management hierarchy, generating energy shall be after producing a product.

Commented [Kosaka EJ27]: Comment;
What we know about MRFs (also composting plants) is that most of their capacity is less than 5t/day. So, in quantity-wise, MRFs/Compost facilities are not so big effect on the material recovery ratio considering total collection/disposal qty of LGUs.

white goods, yard wastes that are collected separately, batteries, oil, and tires. These wastes are usually handled separately from other residential and commercial wastes.	
Disposal *Refers to the discharge, deposit, dumping, spilling, leaking or placing of any solid waste into or in any land while disposal sites refer to areas where solid waste is finally discharged and deposited.*	• The number and percentage of LGUs with access to sanitary landfills have increased from 63 LGUs (3.9%) in 2008 to 228 LGUs (14%) in 2015, based on figures from the NSWMC. • **While disposal is the least preferred method of managing solid waste, it plays an important role in dealing with residual waste.**

Source: National Solid Waste Management Commission

Commented [Kosaka EJ28]: Comment/Request
Which document? Pls kindly let us know.

1.2 Roles and responsibilities of LGUs

Local government units have a vital role in the implementation of a Comprehensive Solid Waste Management in the country. In general, the LGU is primarily responsible for the implementation of the provisions of RA 900 within its jurisdiction.

Pursuant to Section 10 of the ESWM Act, "Segregation and collection of solid waste shall be conducted at th barangay level specifically for biodegradable, compostable and reusable wastes: *Provided*, That the collection o non-recyclable materials and special wastes shall be the responsibility of the municipality or city."

Moreover, the Act states that LGUs:

(1) Are mandated to consolidate, or coordinate their efforts, services, and resources for the purpose of establishing common waste treatment and disposal facilities (*Section 44*);

(2) Are authorized to collect SWM fees (*Section 47*); and

(3) Shall evaluate alternative roles for the public and private sectors in providing collection services, type o collection systems that best meet their needs (*Section 21*).

Under the assigned roles to LGUs, the following are further specified in the ESWM Act and the IRR.

Table 2a. Salient Points of RA 9003

Section 11. On the Provincial Solid Waste Management Board	The Provincial SWM Board shall: a) develop a provincial solid waste management plan from the submitted solid waste management plans of the respective city and municipal solid waste management boards; b) review and integrate the submitted plans of all its component cities and municipalities and ensure that the various plans complement each other, and have the requisite components; and c) shall submit the **Provincial Solid Waste Management Plan** to the National Solid Waste Commission for approval. The **Provincial Plan** shall reflect the general program of action and initiatives of the provincial government in implementing a solid waste management program that would support the various initiatives of its components cities and municipalities. a.) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Section 17 of the Local Government Code. b.) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem. c.) Recommend measures to generate resources, funding and implementation of projects and activities as specified in the duly approved solid waste

Commented [Kosaka EJ29]: **Question/Clarification/Argument;**
This would be needed to discuss more.
What is the real meaning of "primarily responsibility of LGU" in RA9003?
In Japan, Waste Treatment and Cleanness Law in XXXX says that "even if LGU contract out the construction, O&M to private, LGU still have all responsibility of it."
This means that if private company failed to comply with standard, or is bankrupt and cease to operate in any reasons, LGU shall have avoidance/recovery plan before the start its operation to keep continuous operation.

Likewise, we'd like talk about barangay's responsibility to collect/recycle of biodegradable waste and recyclables. If brgys can't do it, who shall be responsible? It should be LGU in Japanese manner.

	management plans. d.) Identify areas within its jurisdiction, which have common solid waste management problems and are appropriate units for planning local solid waste management services in accordance with Section 41 of the Act. e.) Coordinate the efforts of the component cities and municipalities in the implementation of the Provincial Solid Waste Management Plan. f.) Development an appropriate incentive scheme as an integral component of the Provincial Solid Waste Management Plan. g.) Convene joint meetings of the provincial, city and municipal solid waste management boards at least every quarter for purposes of integrating, synchronizing, monitoring and evaluating the development and implementation of its provincial solid waste management plan. h.) Represent any of its component city or municipality in coordinating its resource and operational requirements with agencies of the national government. i.) Oversee the implementation of the Provincial Solid Waste Management Plan. j.) Review every two (2) years or as the need arises, the Provincial Solid Waste Management Plan for purposes of ensuring its sustainability, viability, effectiveness and relevance in relation to local and international developments in the field of solid waste management. **k.) Allow for the clustering of LGUs for the solution of common solid waste management problems.**
Section 12. On the City and Municipal Solid Waste Management Board	The City and Municipal SWM Board shall: a) Develop the City or Municipal Solid Waste Management Plan that shall ensure the long-term management of solid waste, as well as integrate the various solid waste management programs and strategies of the barangays in its area of jurisdiction. In the development of the Solid Waste Management Plan, it shall conduct consultations with the various sectors of the community; b) Adopt measures to promote and ensure the viability and effective implementation of solid waste management programs in the component barangays; c) Monitor the implementation of the City or Municipal Solid Waste Management Olan through its various political subdivisions and in cooperation with the private sector and the NGOs; d) Convene regular meetings for purposes of planning and coordinating the implementation of the solid waste management programs of the respective component barangays;

Commented [Kosaka EJ30]: Plan?

	e) Oversee the implementation of the City or Municipal Solid Waste Management Plan; f) Review every two (2) years or as need arises the City or Municipal Solid Waste Management Plan for purposes of ensuring its sustainability, viability, effectiveness and relevance in relation to local and international developments in the field of solid waste management; g) Develop the specific mechanics and guidelines for the implementation of the City or Municipal Solid Waste Management Plan; h) Recommend to appropriate local government authorities' specific measures or proposals for franchise or build-operate-transfer agreements with duly recognized institutions, pursuant to RA 6967, to provide either exclusive or non-exclusive authority for the collection, transfer, storage, processing, recycling or disposal of municipal solid waste. The proposals shall take into consideration appropriate government rules and regulations on contracts, franchises, build-operate-transfer agreements. i) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Section 17 of the Local Government Code; j) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem; and k) Coordinate the efforts of its component barangays in the implementation of the city or municipal Solid Waste Management Plan.
Table 2b. Salient points of RA 9003's Implementing Rules and Regulations	
Rule VII, Section 3 of the IRR	Provides that specific projects or component activities of the Local Government Solid Waste Management Plan (LGSWMP) may be offered as private sector investment activity with appropriate incentives in consonance with Section 45 of RA 9003.
Section 6 of the IRR, on the Barangay Solid Waste Management Committee	The Barangay Solid Waste Committee shall: a.) Formulate Solid Waste Management program consistent with the City/ Municipal Solid Waste Management Plan; b.) Segregate and collect biodegradable, compostable, reusable wastes; c.) Establish a Materials Recovery Facility; d.) Allocate barangay funds; look for sources of funds; e.) Organize core coordinators; and

Commented [Kosaka EJ31]: **Comment;**
Is this written in RA9003 and/or IRR?

Commented [Kosaka EJ32]: **Comment;**
Is this also required for LGU?? Forget to delete?

Commented [Kosaka EJ33]: **Comment;**
It's better to explain briefly otherwise all readers shall see RA9003.

	Submit SWM monthly reports.

A copy of RA 9003 and its IRR may be downloaded through this link.

Option to cluster

To achieve common SWM goals, LGUs may also utilize a cluster-based approach as mandated by RA 9003 and Section 17 of the Local Government Code. Such clustering among LGUs may provide several advantages and benefits.

Commented [Kosaka EJ34]: Comment;
Suggested?

Table 3. Advantages and benefits of clustering

Advantages of Clustering	Benefits to LGUs
May make the project more viable under the PPP scheme	Scarce resources to implement projects will be supplemented by other members' shares
Development needs easier to identify and address	High possibility of funding assistance and approval of proposals from donor agencies/financial institutions
Serves as tool in establishing growth centers in the Province/Region	Wider market for services will be established
Allows wider area jurisdiction to achieve desired economies of scale	Increase in employment opportunities for constituents

Source: Atty. Ernesto P. Maceda, Jr. (2006) as cited in National Solid Waste Management Strategy 2016-2022; PPP Center

Commented [Kosaka EJ35]: Comment;
Agreeable. However, there are many difficulties to be cleared such as;
-Long-term arrangement of MOA among LGUs,
-Who will lead?
-Location for NIMBY facility,
-Processing/Tipping fee payment agreement,
-Secure ECC/residential opinion, etc.

LGUs/Provincial government shall clear such barriers.

1.3 Issues at the local-level and options for private sector participation

The tasks of solid waste management present complex technical challenges, and the effective management o solid waste is not a straight forward process. Common problems encountered at the local-level include:

a) Low efficiency level of services due to lack of long-term planning (e.g. 10-year SWM plan);
b) Lack of financing options (e.g. especially for smaller cities, some SWM interventions may be too costl for a single LGU to shoulder);
c) Lack of technical capacity (e.g. poor grasp of the market for recyclables and recycled products prohibitive investment costs and high management burden for comprehensive provincial/municipa SWM systems); and
d) Poor social acceptance and awareness of ecological SWM practices.

In addressing these issues, LGUs may tap the private sector to participate in municipal solid waste management. According to the Asian Development Bank, there are a large number of options for private secto involvement in SWM that range from very simple short-term service contracts to complete privatization an asset sales. "The options vary depending on numerous factors, such as the ownership of equipment or disposa sit, possible fleet of collection equipment including expensive compaction vehicles, risk allocation, access t skills and technology, and so on."

Figure 2 illustrates the spectrum of private sector participation, Table 2 summarizes these types of private sector involvement and their benefits, while Figure 3 identifies possible waste projects per segment of the traditional waste hierarchy. The subsequent sections of the Guide discuss considerations for developing SWM projects under the PPP scheme.

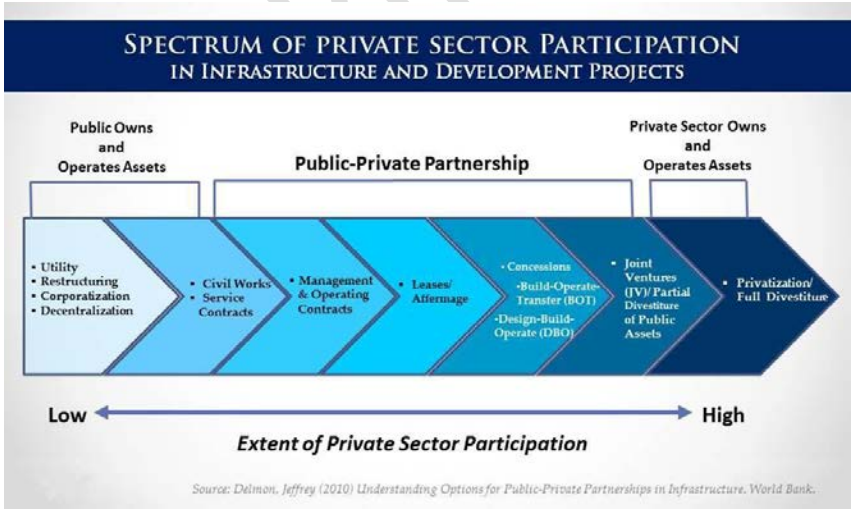
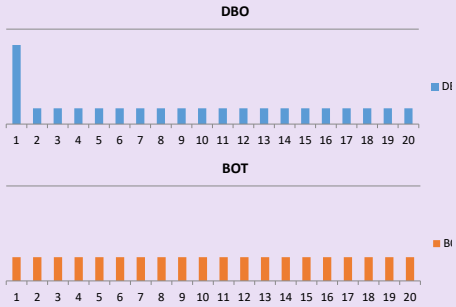


Figure 2 Spectrum of Private Sector Participation

Commented [Kosaka EJ36]: Comment;
Even present 10 years plan is not enough to implement each activity because in many cases activities written in the plan are not tied enough with the annual budget of LGUs. Most of 10 years plan is just written ideal plan and not writing the real situation.

Commented [Kosaka EJ37]: Comment;
(Rewrite) What is the meaning of this "intervention"?

Commented [Kosaka EJ38]: Comment;
This is correct, however, even in case of BOT/BOO, throughout the project period, this prohibitive capital investment in DBO or budget expenditure shall be repaid to the investor from LGU/s.



It shall be mentioned and recognized by LGU/s because some LGUs who doesn't have tech capability wants to contract out all of activities in MSWM stream at once. Such too high reliance on private sector has a lot of risks such as;
-Anytime, private company ceases the operation by their discretion if the project doesn't generate profitable,
-LGUs shall find successors/alternative options immediately but it is quite difficult to find it in particular patented/complex facility,
-Bcs of such reasons, sometimes private company requests LGUs to increase processing cost (T/F) and LGUs shall agree it considering the risks above.
-Thus, LGUs shall keep certain level of intervention ways in the PPP contract such as monitoring, inspection, etc. considering LGU/s are solely responsible for the project.
-Bcs of it, JET recommend LGUs not to contract out all the activities of SWM to private because said intervention level shall be being too lower.
-LGU/s shall have readiness before deliberation of PPP project.

Commented [Kosaka EJ39]: Site?

Commented [Kosaka EJ40]: Request to clarify;
We'd like to clarify the difference of PPP modalities between "Concessions/BOT/DBO" and "Joint Venture".

Types of private sector involvement

Table 4. Types of Private Sector Involvement

Types	Key Features and Benefits
Service Contracts	• Contractor to carry out particular assignment(s) and receive fees from the public sector. • Promotes competition when contracts are bid. • Contracts can be retendered every 1–5 years. • If contract fails, risk is relatively low. • With the relatively short contract duration, if problems occur, it can easily be retendered. • Relatively easy/simple contractual form. • Potential starting point for private sector participation. • Can increase utility's focus on core business. • Potential for efficiency gains in the area covered by the contract.
Management or O&M Contracts	• Contractor to manage a range of activities and receive fees from the public sector. • Promotes competition when contracts are bid. • Contracts can be retendered every 3–7 years. • Can improve service while retaining public ownership. • Potential first step to concession contract and as transitional arrangements for introducing the private sector into • managing infrastructure. • Potential for setting performance standards (with incentives to improve and achieve standards). • Reduced risks to government and contractor. • Can revert to in-house management or contract, may be retendered if problems arise.
Lease	• Contractor to manage a range of activities, pay rents to the public sector, and receive fees from the customers. • Promotes competition when contracts are bid. • Contracts can be retendered every 8–15 years. • Can improve service while retaining public ownership. • Collection risk passed to contractor. • Potential first step to concession contract and as transitional arrangements for introducing the private sector into managing infrastructure. • Potential for setting performance standards (with incentives
Design-Build-Operate	• The public sector owns and finances the construction of new assets, while the contractor designs, constructs, and operates to meet certain performance standards. • Promotes competition when contracts are bid. • Contracts can be retendered every 10–20 years. • Can improve service while retaining public ownership. • Contractor assumes full responsibility for construction and operation. • Potentially large improvements in operating efficiency.

Commented [Kosaka EJ41]: Comment;
This table is talking for general PPP features/benefit for revenue generation projects (airport, port, tall road, etc.) and not talking specific SWM sector, it's mislead-able.
So it is recommendable to specifically explain about SWM sector PPP because "service fee" for SWM PPP is usually paid by LGUs to private in shape of T/F from annual gov. expenditure.
For example, insert a column in right side and explain about SWM-PPP specific features and benefits.

Commented [Kosaka EJ42]: Comments;
It might be much understandable if typical structure can be figured out for each type of contract scheme.

	• Limited (if any) financing risks on the capital to the contractor as a sum will be paid to the contractor for the design and build, and an operating fee for the operation.
Build-Operate-Transfer, Build-Own-Operate, Build-Own-Operate-Transfer, Design-Build-Finance-Own, Design-Construct-Manage-Finance	• Takes over management of design, construction, and operation from the government, but contract term must be long enough to allow return on capital (typically 15–30 years). • Usually for new projects. • Promotes competition when contracts are bid. • Contractor finances, owns, and undertakes construction during the contracted period, after which the facility is transferred back to the public sector. • Mobilizes private finance, which relieves government of the need to fund or raise capital for the investment. This addresses the funding shortfall. • By inserting certain performance standards, potentially large improvements in operating efficiency. • Full private sector incentives across utility. • Attractive to private financial institutions. • Contracts are relatively complex, which need parity in negotiating strength to achieve fair outcome. • There is no revenue stream from the outset, so the contractor assumes a lot of risks. Often, contractors require some form of assurances/guarantees from the public sector.
Concession	• Takes over management of design, construction, and operation from the government, but concession term must be long enough to allow return on capital (typically 15–30 years). • Could be granted for both new and existing projects. • For the case of existing projects, contractor takes risk for the project condition. • Promotes competition when contracts are bid. • Contractor finances, owns, and undertakes construction during the contracted period, after which the facility is transferred back to the public sector. • Mobilizes private finance, which relieves government of the need to fund or raise capital for the investment. This addresses the funding shortfall. • By inserting certain performance standards, potentially large improvements in operating efficiency. • Contractor receives payment from general public/customers. • Full private sector incentives across utility. • Attractive to private financial institutions. • Contracts are relatively complex, which need parity in negotiating strength
Divestiture	• fast option for improving solid waste management, • but substantial effort required if reversal of divesture is • needed.

Commented [Kosaka EJ43]: **Suggestion to insert;**
"at the completion of construction."

Commented [Kosaka EJ44]: Suggestion to insert;
-Relatively easy for retenders in case of default of Operator, compare with BOT/BOO

Commented [Kosaka EJ45]: **Suggestion to insert;**
"in case of BOT/BOOT"

Commented [Kosaka EJ46]: **Comment/Suggestion to insert;**
But private company shall be eligible to recover its initial cost through project duration by T/F. Thus, total government expenditure through project period is mostly same.

Commented [Kosaka EJ47]: **Comments;**
How about the "Joint Venture" mode?

Commented [Kosaka EJ48]: Comment;
What is this sentence meaning?

Commented [Kosaka EJ49]: **Comment/Suggestion to insert;**
But private company shall be eligible to recover its initial cost through project duration by T/F. Thus, total government expenditure through project period is mostly same.

Commented [Kosaka EJ50]: **Question;**
Only this is the difference between BOT/BOO+ and Concession?

Commented [Kosaka EJ51]: **Question;**
What are the meaning of these sentence in "Divestiture"?

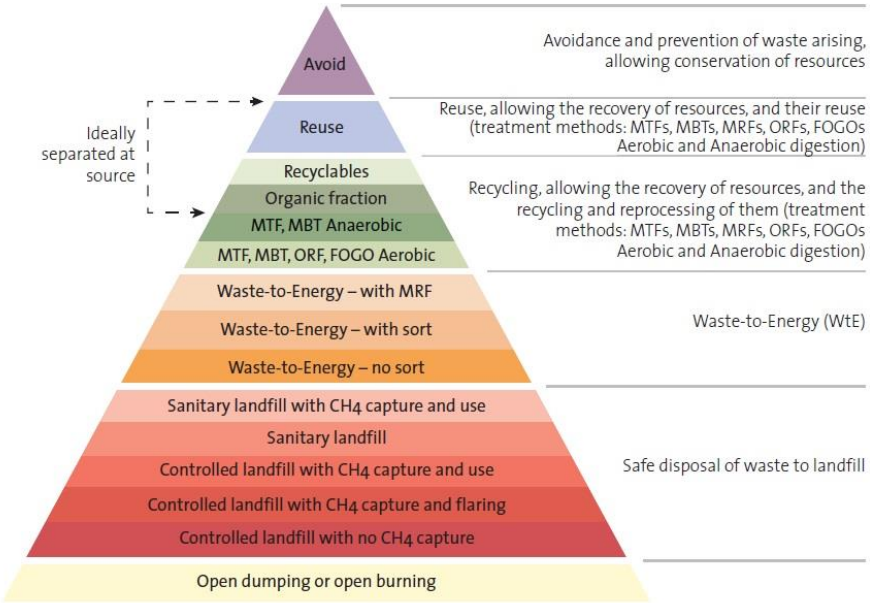
	• Mobilizes private finance, which relieves government of the need to fund or raise capital for the investment. This • addresses the funding shortfall. • Private sector assumes full responsibility for operations. • Potentially large improvements in operating efficiency of utility. • Private company would have clear incentives to achieve full cost recovery. • Could be successful where there is a good track record of private ownership. • Needs strong regulatory oversight.

Source: ADB Toolkit

Commented [Kosaka EJ52]: Comment;
Whose strong oversight?

Possible waste projects per segment of the traditional waste hierarchy

Commented [Kosaka EJ53]: Comment;
We are not aware of "MTFs, ORFs, FOGOs", so please specify.



Source: Harrison

1.4 Rationale for undertaking the PPP option

In general, PPPs are compelling when the private sector can implement the objectives of a project more

effectively or more efficiently than the government can, and it's particularly true when the following apply:

a) Innovative designs available only from the private sector are required;
b) The operation and maintenance of the assets to be used by the project requires skills, systems and processes that are either lacking or are not inherent in the government agency;
c) There is a need to maximize the value that can be captured by the project and that the skills needed for value capture lie within the private sector; and
d) When minimizing life-cycle costs is a dominant consideration.

However, there are also challenges faced by LGUs in developing PPP projects, which include:

- *Cost of preparing feasibility studies and other project development activities*
- *Apprehension in evaluating unsolicited proposals received*
- *Lack of capacity to develop and monitor large infrastructure projects and complex contracts*
- *Difficulty in prioritizing projects considering time frame of LGU office and budgeting cycle*
- *Challenges in attracting private sector interest and competition*

Annex A provides a sample criteria for determining private sector participation in solid waste management.

Commented [Kosaka EJ54]: Comment;
Agrees for all of them.

Commented [Kosaka EJ55]: Comment;
Agrees for all of them.

Commented [Kosaka EJ56]: Comment;
Before FS, gap analysis would be needed to compare present status and future plan of LGUs, so, 10 years MSWM Plan must grasp the waste situation at present and practical future plan.
(Waste Mass flow shall be prepared)

Once gap can be confirmed, prioritization of each activities/projects shall be done.

After that, F/S for prioritized activity/project can be launched.

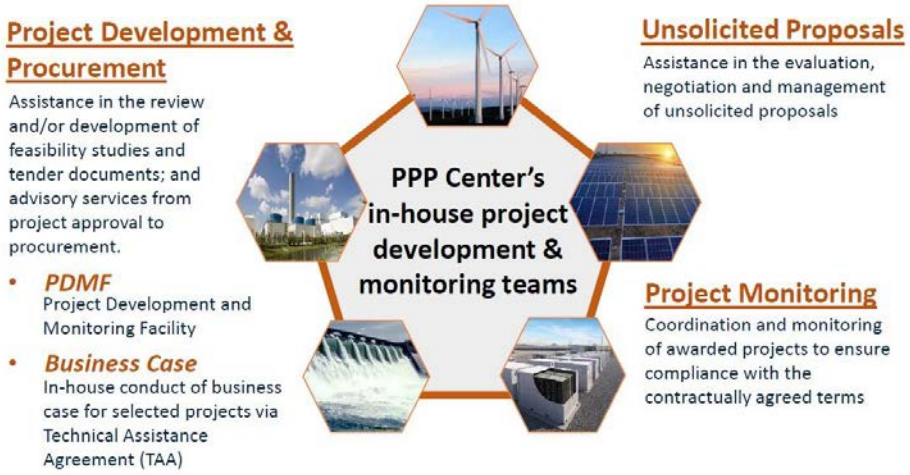
1.5 Support to LGUs

PPP Center

The PPP Center provides support to LGUs through its various services. Such services include project support

(development, procurement, evaluation of unsolicited proposals, monitoring during implementation); project support through the Project Development and Monitoring Facility (PDMF); and capacity development.

Project support



Project support through the PDMF

LGUs can tap the Project Development and Monitoring Facility (PDMF) to finance the use of advisors and consultants for project development, for managing transactions during procurement including those involving unsolicited proposals, and for obtaining independent assessments or advice during any of the phases of project implementation (construction, operation and maintenance, transfer).

The PDMF Service (PDMFS) of the PPP Center manages and administers the PDMF. The PDMFS receives and processes applications for PDMF support. When all requirements for obtaining support are ready, the application is sent to the PDMF Committee for approval. The PDMF Committee is an inter-agency committee composed of NEDA as the Chair and DOF, DBM, and PPP Center as members.

The funds of the PDMF are sustained by having the winning bidder of a PPP project reimburse the cost of transaction advisors used during project development and/or procurement. If the PDMF is used for independent assessment or advisory during project implementation, then the cost of an independent consultant is shared 50-50 by the LGU and the private partner.

Commented [Kosaka EJ57]: **Comments:**
This concept of revolving fund is innovative and could be driver of the project, however, in fact, and both cases, such development cost to be paid by Private investor shall be included in the T/F, thus, this cost will be paid by LGUs through the project period as T/F.

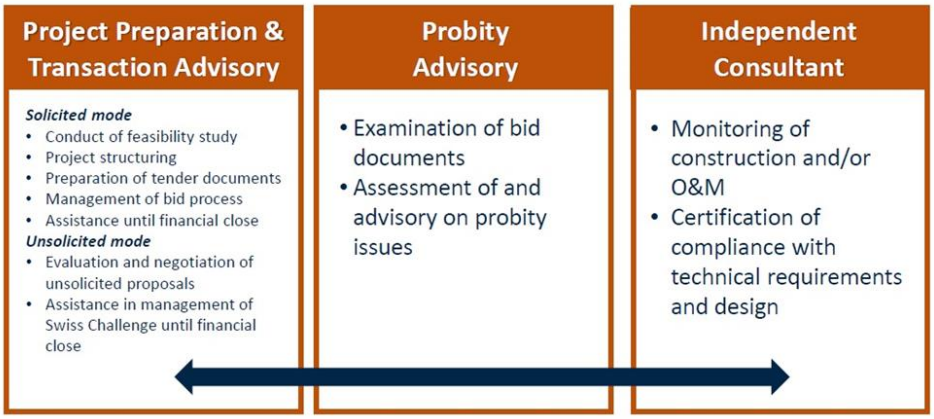


Figure 3 PDMF support

The documentary requirements and the application process for PDMF support is described in detail in the PDMF Guidelines. LGUs needing support for the kinds of consultants and advisors that the PDMF can provide may contact the PDMF through pdmfs@ppp.gov.ph.

Capacity development

The PPP Center also conducts trainings and seminars depending on the development needs and requirements of the implementation agency. Such topics may include:

- Introduction to PPP concepts or PPP 101
- Concept note formulation
- Project prioritization
- Management of unsolicited proposals
- Financial and economic analysis of PPP projects

Commented [Kosaka EJ58]: **Comment;**
For the consulting work to monitor the performance of private company's operator, basically it shall be paid by the LGUs (not to be 50:50) because it is the responsibility of LGUs.
Plus, if private company pays fee to the monitoring consultant, there will be conflict of interest and less transparent.

Commented [Kosaka EJ59]: **Comment;**
Are there resource consultancy list who has the expertise for SWM facility?

Commented [Kosaka EJ60]: **Comment;**
What's this?

Financing Options and Development Assistance

Financing has always been critical in SWM work, both at the national and local levels, and it is a crucial sustainability indicator. LGUs undertaking PPP projects may tap the following existing facilities from both the government and multilateral development partners to provide support from project development to implementation.

Municipal Development Fund Office (MDFO)

The Municipal Development Fund is a special revolving fund for re-lending to LGUs. The Project Technical Assistance and Contingency Fund (PTACF) provides optional financing with low interest rates for LGUs in funding the contingency requirements and technical assistance needed for LGU projects that are financed by MDFO.

Asia Pacific Project Preparation Facility (AP3F)

AP3F's primary objective is to assist developing member country governments and their public sector agencies prepare and structure infrastructure projects with private sector participation, including PPP modalities, and bring them to the global market. AP3F can also provide capacity-related assistance, including for the reform and improvement of policy, legislative, regulatory and institutional practices; and ongoing project performance assistance, including project monitoring and project restructuring.

LGU Guarantee Corporation (LGUGC)

LGUGC mobilizes the resources of private sector financial institutions toward funding local development projects. Its guarantee services include prompt payment guarantee in favor of LGUs, water districts, and/or other government entities for developmental projects to be implemented through PPP where private partners, investors, or financial institutions require such payment assurance.

Asia Infrastructure Center of Excellence (AICOE)

AICOE assists ASEAN countries in building capacity to identify, screen, and prioritize projects for private sector participation, and develop a pipeline of financially-viable PPP projects; and fund project structuring support to prepare PPP transactions for financing.

Commented [Kosaka EJ61]: Comment;
They all are ADB's menu?

Commented [Kosaka EJ62]: Comment;
Provided by whom?

Commented [Kosaka EJ63]: Comment;
ADB?

Commented [Kosaka EJ64]: Comment;
Whose facility?

Commented [Kosaka EJ65]: Comment;
Whose facility?

Chapter 2: Project Concept Note for the SWM Sector

2.1 Formulation of a Concept Note for an SWM-PPP Project

PPP project development typically begins at the level of a concept note. This section identifies the minimum level of information that should be provided to draft a project concept note for an SWM-PPP project.

Prescribed Contents

At the minimum, project concept notes in the SWM sector should consist of the following sections:

1. Rationale of the SWM Project (sector objectives of the project in view of the local SWM context);
2. General Information on the Project (including project objectives, background, and scope);
3. Indicative Timeline (should cover project development, approval, cooperation and implementation).

Rationale of the SWM Project

Depending on their needs and priorities, or the recommendations of previous studies that may have been undertaken, LGUs may choose between different SWM interventions that satisfy their preferred objective/s as aligned with their LGSWMP.

Commented [Kosaka EJ66]: Comment;
Completely agree.

At the onset of drafting a project concept note in the SWM sector, the following should be discussed in order to identify the appropriate SWM intervention and high-level sector objective:

a) current generation of solid wastes and projections on generation in the future in consideration of the local development plan;
b) current management systems (including highlights of the LGSWMP) and facilities;
c) gaps and problems with the current management systems and facilities; and
d) issues the proposed project intends to address.

Commented [Kosaka EJ67]: Comment;
As mentioned repeatedly in previous comments, waste qty and waste composition (by WACS) shall be provided by LGU, otherwise private's proposal is far away from actual situation as well as what LGU needs.

For SWM Projects involving waste processing and diversion such as waste-to-energy, recycling and specia treatment projects, the following should also be discussed in developing the rationale and high-level objectives:

Commented [Kosaka EJ68]: Comment;
Completely agree. They're quite important to study first to know the present condition of SWM in LGU.

a) energy supply requirement that the WtE Project intends to address;
b) economic prospects for recycling;
c) need for special wastes treatment facility considering the presence of source industries, hospitals.

Commented [Kosaka EJ69]: Comment;
We strongly disagree on this.
WTE shall primly address to the sanitary treatment of waste, secondary volume reduction. Energy recovery / utilization is subordinate and additional benefit. So, in the requirement, of course higher output of elec. is desirable (and can be evaluation criteria) but it shouldn't specified in the requirement at beginning and should be proposed by private sector.

Further, power gen cap only can be calculated from input waste quantity, quality and power gen efficiency, without provision of enough data as you mentioned in above a) to d) from LGU, the expected power supply can't be estimated, and nobody evaluate it appropriately.

General information

The general information section should present the project scope such as the major component/s of the pro the expected output/s to be delivered. General information on the SWM project should be anchored on the dis on the SWM gaps and problems that the proposed project intends to address. It should likewise identify:

- Project scope, including the type of waste management service that the project will provide (e.g collection, transport, treatment);
- Description of the geographic coverage and the segment(s) of the population targeted by the project;

- Involvement or the perceived role of the private sector in the project (i.e. project implementation, operation and/or maintenance and other perceived arrangement/s).

Preliminary identification of stakeholders of the project should also be done (including the informal sector which is a key stakeholder in the SWM value chain).

Moreover, at this stage of developing the SWM project concept note, it is important to identify project-specific objectives based on the high-level goals identified in the rationale of the project. Identifying project-specific objectives at this phase will serve as inputs and parameters during the feasibility study stage of the project.

Table 5 provides sample objectives for different types of projects in the sector.

Table 5. Sample objectives per project type

Project Type	**Reference information**	**Sample Objectives**
Collection Services	Service area (geographical info)	Cover ___% of the total area jurisdiction of the LGU
	Waste Sources (residential/ commercial, industrial)	Cover all waste sources within the service area
	Waste Types (general domestic wastes, hospital wastes, industrial wastes, etc.)	Collect all _____ within the service area
Diversion, processing and recovery services	Type of services - waste segregation and diversion to recycling/reuse facilities	- At least 50% diversion rate to be increased - Maximize energy recovery - Treat all special wastes - Minimize waste to landfill
	- Waste to Energy	
	- Treatment of special wastes (e.g. toxic & hazardous wastes)	
Final Disposal Facility	- Volume of wastes to be handled	- Maximize the life of the landfill - Cost recovery / service charge collection
	- Location options and available area	
	- Type of wastes to be handled	
	- Component Facilities (e.g. compaction equipment, WtE, segregation facility, etc	

Commented [Kosaka EJ70]: **Suggestion to add;**
Followings shall be the objective to setup SLFs normally;
- Provide appropriate disposal option to the area,
- Prevention of env. burden from solid waste and its leachate effluent,

Commented [Kosaka EJ71]: **Comments;**
We suggest to add the "Category of SLF in accordance with RA".

Indicative timeline

The section on the indicative timeline should provide an overview of the target dates for various project milestones under the different stages of the PPP cycle (development, approval, procurement, and implementation).

For more information on the specific PPP concepts and processes, please refer to the PPP Center's knowledge products which detail each phase from development to implementation.

Adherence to relevant policies and rules

In addition to fulfilling the objective of addressing solid waste management problems, SWM Projects have to adhere to the relevant policies, rules and regulations of the following types:

a) Permitting and planning policies and rules to be secured prior to project implementation (LGU permits, ECC, etc.) which depends on the size, type and location of the project;

b) Operational standards based on RA 9003 and IRR;

c) Environmental Standards to minimize its impacts on the environmental quality based on the stressors of the different SWM Project types;

d) Health and other occupational safety policies and rules.

Moreover, due to the wide range of solid waste management services/projects, applicable policies/statutes may vary depending on the type of project. For example, for final disposal facilities like SLFs, among the important consideration for the LGU should be the protection of the quality of groundwater and surface waters from leachate and run-off contamination. For WtE projects, on the other hand, the LGU should likewise be concerned about air emissions, among other considerations. *A list of permits and requirements per SWM project type is discussed in Chapter 3 of this guide.*

Determining PPP Service Levels

While SWM projects must adhere to the applicable policies, a PPP project's service levels for the private sector's operational performance are not limited to the standards prescribed by the statutory laws. An example of this is setting of pollutant discharge or emission indicators. The private sector may commit to adhering to a stricter emission standard than what is set by government.

Commented [Kosaka EJ72]: **Comment/Request to clarify;**
"b) Operational standards based on RA 9003 and IRR;"

Which standards do you intend?
What we know is structural and operational standard of SLF.
Are there any other standard for MRF/Compost?

Plus, it should be "Structural (or functional) and operational standard" because if structural standard doesn't reach by EPC contractor, operator never meet it.

2.2 Sample Concept Notes

Quezon City Integrated Solid Waste Management Facility Project

Implementing Agency: Local Government of Quezon City

1. Rationale for the SWM Project

a. Project Objectives

The Project aims to provide the LGU with a sustainable, environmentally friendly, and cheaper waste disposal solution for its current solid waste management challenges.

Commented [Kosaka EJ73]: **Comments;**
Compare with what QC will do by themselves?

b. Project's National and Sectoral Context

The Project is aligned with the local government of Quezon City's 10-year solid waste management (SWM) plan as approved by the Department of Environment and Natural Resources (DENR) pursuant to Republic Act (R.A.) No. 9003 or the Ecological Solid Waste Management Act of 2000. R.A. No. 9003 provides for a systematic, comprehensive and ecological solid waste management program that includes SWM activities such as avoidance, reduction, reuse, recycling, composting and proper disposal of residual waste.

2. General Information

a. Project Scope

The Project will involve the provision of the following infrastructure facilities (collectively referred to as the "Integrated Solid Waste Management Facility"): 1) biodegradable source separated organics (SSO) treatment facility, 2) residual combustible waste (RCW) treatment facility, 3) monofill for fly ash disposal, and 4) other ancillary facilities including continuous emission monitoring system, administration building, scale house, transmission lines, and utility systems and connections.

Commented [Kosaka EJ74]: Comments/Request to provide;
Are there any technical specification required from QC to investor? Or investor proposed such?
Because no regulatory of this disposal site for bottom/fly ash is one of the problems what we're thinking of in Philippines.

b. Project Location

The Project shall be located within any site in Quezon City which shall not: 1) adversely affect the current flow of traffic within Quezon City, 2) result in an increase in haulage costs to the LGU, and 3) disrupt the residents of nearby communities considering the necessary ingress and egress of trucks hauling municipal solid waste to and from the proposed Project site location.

c. Project Background

Quezon City's municipal solid waste (MSW) generation and disposal has been increasing by ~2% annually over the past 10 years. This trend is likely to be sustained with higher projected income and population growth. The Payatas Sanitary Landfill, where Quezon City hauled its waste, was permanently closed in 2013. The LGU has been forced to go further and incur additional disposal costs due to higher transportation and transfer costs. Further, it is anticipated that its current waste disposal facility in Rizal will also be filled by 2022. There is a desperate need to find a long term solution, compliant with environmental rules and regulations.

In response, the consortium composed of Metro Pacific Investments Corporation, Covanta Energy LLC, and Macquarie Capital Limited submitted the Project as an unsolicited proposal (USP) to the LGU in 2015. The USP was evaluated and processed in accordance with Ordinance No. SP 2336, series of 2014, entitled "Quezon City Code Pursuing a Public-Private Partnership (PPP) Approach Towards Development, Providing for the Procedure for Selecting the Private Sector Proponent, Adopting a Contract Management Framework, and Providing Appropriations and For Other Purposes", and its Implementing Rules and Regulations (IRR).

d. Private Sector Involvement

The Project shall be undertaken by the Concessionaire, which shall be the Joint Venture (JV) Company to be established by the LGU and a special purpose corporation (SPC) to be created by the winning private sector proponent. The Concessionaire shall be responsible for the design, financing, construction, operation, and maintenance of the Project and will receive compensation in the form of Tipping Fee from the LGU. Revenues are also expected from sale of power, recyclables, and digestate, among others.

Commented [Kosaka EJ75]: **Just a comment;**
Are they (Investor team as well as QC) sure for this digestate can be sold continuously?
What JET experienced in the projects in Japan as well as FS in SE Asia for the biomethanation of MSW, this digestate utilization/disposal is the biggest issue to introduce, in particular in the urbanized area because methane fermentation can sanitarily treat biodegradable and extract energy, however it can't reduce its quantity (100t/d input makes 100t/d output).
So, the capacity of biomethanation shall be governed by the market acceptability (farm land area x how often they feed liquid fertilizer, and its distance), and if exceeded with it, it will become as organic wastewater which shall be treated by sewage.

3. Indicative Timeline

Milestone	Target Date
Completion of Feasibility Study	N.A.
Approval of Approving Entities	4th Quarter 2018
Bidding Stage	4th Quarter 2018 to 1st Quarter 2019
Award and Contract Signing	1st Quarter 2019

Cebu City Solid Waste Management Project

Implementing Agency: Local Government of Cebu City

1. Rationale for the SWM Project

a. Project Objectives

The Project aims to provide the LGU with a sustainable waste collection and disposal solution for its current solid waste management challenges.

b. Project's National and Sectoral Context

The Project is aligned with the Republic Act (R.A.) No. 9003 or the Ecological Solid Waste Management Act of 2000 which states that local government units (LGUs) shall be primarily responsible for the implementation of the Act. Also, it is also aligned with NSWMC's Resolution No. 669 which adopted in 2016 the guidelines governing the establishment and operation of waste to energy (WTE) technologies for municipal solid waste.

The Project shall be included in the updating of the LGU's 10-Year SWM Plan.

2. General Information

a. Project Scope

The Project is divided into two components, the waste collection and waste treatment.

b. Project Location

The Project site shall be located within Cebu City. It shall comply with the National Solid Waste Management Commission's (NSWMC) Resolution No. 669, s. 2016 guidelines governing the establishment and operation of waste-to-energy technologies for municipal solid wastes. In addition, it shall be: 1) 4 hectares and above of a useable shape suitable to accommodate the waste treatment facility, 2) located in close proximity to existing utilities (such as water, drainage, etc.), and 3) located in close proximity to existing electrical grid and potential energy consumers.

c. Project Background

The City of Cebu is the center of a metropolitan area, Metro Cebu, with a population of approximately 1 million. Along with increasing population, economic growth, and rapid urbanization, one of the major challenges faced by the LGU is SWM. Municipal Solid Waste (MSW) generated in Cebu City was dumped in Inayanwan landfill, which has been closed since 2016 following a court order to cease dumping, and Consolacion landfill between 1998 to January 2018. Currently, the LGU procured a private contractor to haul the MSW in Aloguinsan landfill which is 40 km away from the LGU.

In the recent years, the LGU received unsolicited proposals to develop a WTE project on a PPP basis. The proposals were rejected for the following reasons: (i) the proponent had no credible SWM track record, (ii) there was strong opposition to the project from

environmentalists, (iii) the project capacity seemed to be oversized at 1,200 tons/day, and (iv) its economic rationale was dubious given the lack of tipping fee.

However, the LGU is still actively looking at the possibility of setting up one or several PPPs for SWM, covering collection, segregation, recovery, treatment, recycling and incineration. To date, the LGU, together with a private consultant, is preparing the Pre-Feasibility Study of the Project.

Commented [Kosaka EJ76]: **Comments/Request your opinion;**
This is same what we are given from Cebu City Admin Office. They also intend to cover bottom ash utilization and fly ash disposal.
As stated above, JET's stance is like this "all of these MSWM activities shall not be given to the private because public intervention can't be reached in case of problems".

But if you have any other opinions (as third party aspect) we'd like to hear from you.

d. Private Sector Involvement

The private sector/s is/are expected to design, finance, construct, operate and maintain the Project, 7 years for Waste Collection component and 25 years for Waste Treatment component. The investment of the private partner for the Waste Collection contract may be recovered through availability payment from the LGU. On the other hand, the repayment for the private sector is through a Tipping Fee from the LGU, sales of electricity, and sales of solid recovered fuel (SRF), among others.

Commented [Kosaka EJ77]: **Clarification;**
What's this? Could you let us know?

3. Indicative Timeline

Milestone	Target Date
Completion of Pre-Feasibility Study	3rd Quarter of 2019
Approval of Approving Entities	4th Quarter of 2019
Bidding Stage	1st to 2nd Quarter of 2020
Award and Contract Signing	3rd Quarter of 2020

Chapter 3: Critical elements of a Feasibility Study for an SWM Project

The following chapter identifies relevant information and important considerations that should be discus feasibility study for an SWM PPP project. It is divided into the following sub-sections: (1) identifying information for an SWM project FS; (2) Determining the appropriate project scope; (3) evaluating proposed s (technical, financial, legal, regulatory); and (4) PPP project structuring.

3.1 Baseline information

Baseline SWM data is typically found in an LGU's approved 10-year SWM Plan, or if applicable, an LGU's In SWM Plan. Table 6 identifies the types of information that should be adequately analyzed in developing a f study for an SWM project.

The table is not exhaustive but should give the LGU an idea of the relevant factors that should form the determining project scope vis-à-vis the needs of the LGU. In addition to baseline SWM data, the LGU proponent may consider conducting additional surveys such as willingness-to-pay surveys for households, and surveys, among others.

For more information on the data that should be contained in a 10-year SWM Plan, please refer to the DEN Guidebook for Formulation of Solid Waste Management Plan.

Table 6. General information that should be contained in the FS

Information about the LGU	
LGU profile	• Population and socio-economic profile • Map • Economic profile/land use • Physical characteristics • Existing assets & manpower assessment • LGU Fiscal/Internal Budget analysis
Based on functional phases of solid waste management	
Generation	• Amount, composition and sources of solid wastes generated as statistically determined through the conduct of a waste analysis and characterization studies (WACS). • In general, details on waste generation should be contained in the 10 year local SWM plan submitted to and approved by the National Solid Waste Management Commission.
Collection	• Existing programs on waste minimization and waste segregation • Existing policies on waste containers • Solid waste collection area • Waste sources • Characterization of wastes and LGU policy on waste segregation and handling of special wastes • Designated collection points (household level, MRF or LGU designated area) and the current status of road network from the collection point to the disposal area or MRF • Land use in collection routes • Current type, design and size of collection vehicles

Commented [Kosaka EJ78]: Comments;
Firstly, it is confusable for reader that which point of view do you want to explain in this chapter, LGUs (solicited approach) or private (unsolicited FS)?
It seems LGU side aspect (FS based on solicited approach). If so, it is good for LGUs because it's global standard, but in Philippines there is mostly zero LGU who is preparing this kind of FS for a SWM Project initiated by LGU.
Most cases, LGUs received unsolicited PPP proposal in the aspect of private sector. Which is the objectives of this chapter;
- Providing the solicited project development procedure?
- Providing how to evaluate unsolicited proposal?

Commented [PPPC79]: We note that this is one of the sections of the draft which could benefit from inputs from development partners.

Commented [Kosaka EJ80]: Comments;
Normally, WTP survey for waste collection/processing/disposal for the residents is not easy when we calculate Economic IRR so if possible this should be latter than market surveys.

Commented [Kosaka EJ81]: Comments;
In case if LGUs/private consider the "collection/transport" PPP project, detail description of downstream (e.g. MRF, WTE, disposal site) is not necessary. Only brief introduction is enough. The target scope of the project shall be explained in detail.

Commented [Kosaka EJ82]: Comments;
Of what?

Commented [Kosaka EJ83]: Comments;
Amount of waste can't be obtained from WACS, it should be statistical data such as weighing data.

Commented [Kosaka EJ84]: Comments;
Waste generation detail is definitely NOT contained in 10 years SWMP of LGU. Most of LGUs roughly estimate MSW generation quantity/volume based on per capita (e.g. 0.8kg/head/day x pop).
In the other word, figures listed in 10 years MSWM Plan is not highly reliable, therefore, when LGUs/private estimate the business plan based on these figures, it's recommendable to have more reliable historical data such as weigh bridge data.

Commented [Kosaka EJ85]: Comments;
We don't understand why this is needed.

	• Current odor management • Frequency of collection • Operations and maintenance costs of existing collection services
Diversion and recovery	• Existing diversion rate of solid wastes from waste disposal facilities to be diverted or recovered through reuse, recycling, composting and other resource recovery activities. • Type and amount of recyclable wastes (food waste, paper/cardboard, plastic, textiles, glass, metal, wood, etc.) • Current recycling technologies • Current site for the recycling facilities • Environmental impact of the current facilities • Operations and maintenance costs
Handling and treatment of special wastes	• Amount and type of special wastes within a specific target coverage area • Current facilities (TSD, drop off, transfer stations)/collection practices within the specific target area • Status of implementation of the Joint DOH-DENR Administrative Order 2005-02 in management of healthcare waste • Transport of residual wastes to final disposal facilities (distance to coverage area, travel time, costs, etc.) • Current site of final disposal facilities • Operations and maintenance costs
Disposal	• Geotechnical assessments • Existing standards for disposal facilities • Current dumpsite remediation • Controlled landfill sizing and design guidelines • Existing standards/practice/facilities • Current landfill life and life extension • Lining systems, leachate collection systems and treatment, and lagoon issues, etc. • Environmental impact assessment, management and monitoring • Landfill gas management • Stormwater runoff management • Litter management • Fire and pest management • Informal waste sector • Reporting and compliance register • Operations and maintenance cost

Commented [Kosaka EJ86]: **Comments;**
We think waste diversion ratio is NOT discussed in each facility basis and it is calculated LGU basis in following figure.
"Waste diversion ratio = material recovered / total generated"

Of course, each MRF can has it's recovery ratio as;
"Waste recovery ratio = Total recovered / Total received"
However, in many cases each MRF doesn't measure "Total received" so these data shall be carefully validated.

Commented [Kosaka EJ87]: **Comments;**
LGUs shall have these figures gathered from each junk shops / MRFs but at this moment they don't have.
This is one of the points which JET request LGUs to improve.

Commented [Kosaka EJ88]: **Comments;**
In addition of these, JET suggest to include;
-Other activities within the Disposal site,
-Leachate water management process (e.g. circulation, treatment, how to monitor them, etc.)

3.2 Project scope

Key drivers for determining project scope:

- **Identification of issues and gaps based on relevant information**
- **Identification and prioritization of actions/options**

The scope of the project shall be presented in the feasibility study. In general, it shall include the major comp and expected output/s of the project. This may include the facility, service, and technology components of the together with the participation of the private sector in the project (i.e. rehabilitation of an existing facility).

The scope of the project is established based on various considerations such as the current and projected situ the SWM in the geographic coverage of the project, current waste characterization data, populat demographics, and economic profile of the LGU.

For an SWM project, the scope should discuss comprehensively the value chain components that will be includ project and the respective participation of the private sector for each component.

3.3 Evaluation of Proposed Solutions

a. Technical analysis

Service area, existing city infrastructure and the functioning of the existing waste system are considerations for the screening of feasible technologies. The technical analysis section should include the technical options considered for each component of the project. All options shall be discussed and shall be ranked accordingly. Ranking or ch technical option for each component may be done through technical point criteria and stakeholders' decision others.

Regardless of the result of the ranking, all options should be discussed comprehensively in the FS. In some coun Singapore, a pre-FS of waste quantities, calorific values, capacity, siting, energy sales (if any), costs and financing are carried out to screen possible technology options.

The technical analysis portion should also include discussions on the proposed Minimum Performance Standards and Specifications (MPSS) and the Key Performance Indicators (KPIs), as well as the project's likely environmental and social impacts and the possible mitigating measures for these.

The MPSS presents the minimum technical specifications and performance levels based on the project study, industry standards, service levels, and existing laws. For PPP projects, it is the primary guide when preparing the Detailed Engineering Design (DED) and during the monitoring of key performance indicators.

While a separate environmental impact assessment (EIA) study should be conducted for a proposed SWM project, major environmental and social concerns should be identified in the section on technical analysis as these affect the project's feasibility. SWM projects can have significant environmental and social impacts. Landfills, for example, are classified as environmentally critical projects by the DENR-EMB regardless of a landfill's size or capacity. Insights and information contained in the preliminary EIA study can be used as input to the project FS.

Table 7. Sample MPSS for Collection Coverage Area

Commented [Kosaka EJ89]: Comments;
If these "Key drivers" intend for "solicited approach", it's better to mention it at the beginning.
Because most of LGUs are facing "how to evaluate unsolicited proposal" and they don't have this kind of "in order" approach.

Further, "scope of project" normally contains two aspects;
1) Which part of waste stream LGU wants to cut off and let private partner to work on,
2) In each project, there are (1) scope of work to be done by private partner and (2) scope of work which LGU shall do,

Commented [Kosaka EJ90]: Comments;
Waste stream

Commented [Kosaka EJ91]: Comments;
This is only applying for "solicited approach", which Japanese LGUs normally follow.
In case of unsolicited project FS, proposer proposes what they prefers.

Commented [Kosaka EJ92]: Comments;
Yes, we usually work on this stream as "solicited".

Commented [Kosaka EJ93]: Comments;
Before detailed design, it should be "Contract condition"?

Commented [Kosaka EJ94]: Comments;
In our experience, it's reversed. FS can be the basis of EIA.

Commented [Kosaka EJ95]: Comments;
Collection works concession project?
It should be clearly explained the modality, role of public and private entity. And then, what kind of requirement are defined the contract, we can understand.

Definition	Percentage (%) of actual collection coverage area versus target coverage area, per approved Business Plan (BP)
Benchmark	For the 5th year: not less than 40% of BP projections For the 10th year: not less than 50 % of BP projections For the 15th year: not less than 70% of BP projections For the 20th year: not less than 95% of BP projections.
Measurement Frequency	Annually
Conditions Warranting Penalties	Penalties may be awarded once it is established that the benchmark coverage area within a time period has not been met

Table 8. Sample KPIs for Landfill Operations

Performance measures	**What is measured?**	**How is it measured?**	**Where is it measured?**	**How often is it measured?**	**By whom is it measured?**	**Ba sa**
Quantity of waste received for landfill	Waste quantity per shift; waste quantity per day	Landfill inspection reports; landfill records; vehicle log books; zone inspection reports	Landfill	Daily	Assemblies; Districts	No
Construction of landfill base according to design	Compaction of base soils at optimum measure; Slope of base soils; Placement and sealing of impermeable liners; Placement and slope of leachate collection system	Survey instruments observed to be used during construction; Construction inspection reports	Landfill	During construction	Assemblies	Yes
Construction of landfill cell according to design	Daily delineation of working face boundaries; Survey of coordinates and elevations of daily cell construction, including scope of working face; Continuous on-site availability of design drawings and O&M	Survey instruments observed to be used daily; Marking up of daily progress in cell construction on design	Landfill	Daily	Assemblies	Ye

Commented [Kosaka EJ96]: Comments;
Same like a comment immediately above, modality shall be explained. It seems SLF construction and operation BOO or BOT project. In this case, construction and its financing shall be the responsibility/risk of private however, in case of DBO/Lease, it is not. Without detail explanation, these table sometimes mislead the LGUs' proper planning.

Commented [Kosaka EJ97]: Comments;
Operation?

Commented [Kosaka EJ98]: Question;
What is delineation? Daily soil cover?

	manual; Closure of cell when final design elevation is reached; Respect of maximum angle for side slopes; Respect of minimum requirement for base slopes	drawings; Topographic survey map of completed cell area when final design elevation is reached				

Commented [Kosaka EJ99]: **Comments;**
Closure work should be separate work with operation. Globally, closure works take time for few to several decades depend on the characteristics of disposed waste (e.g. biodegradable waste is too long compare with incineration ash to meet with leachate water quality, until then, closure works are continued.

Source: QC Integrated SWM Plan

b. Financial and Economic Analysis

Financial analysis

Financial analysis examines the commercial viability, profitability and bankability of a project based on indicators such as the Net Present Value (NPV) and Financial Internal Rate of Return (FIRR).

NPV and FIRR are based on a project's cash inflows and outflows over its entire concession period in terms of today's money (i.e. in present values). The NPV of a project is defined as the sum of its net cash flows over time discounted by the Weighted Average Cost of Capital (WACC) or Cost of Equity. Meanwhile, the FIRR computes for the rate that makes NPV equal to zero, or in other words, the rate that equates the present value of revenues to the present value of the costs of the project.

The key task for the financial analysis is representing the commercial viability, profitability and bankability of a project in a financial model. In constructing a financial model for an SWM-PPP project, the said model should also consider the possibility of sharing some facilities with neighboring LGUs, and projected increases or decreases waste generation for the different type of wastes.

The following are some sources of revenue for an SWM-PPP project:

- Availability payments from the LGU (i.e., for a constructed facility);
- Charges or fees imposed to waste generators such as commercial establishments.
- Amount of charges or fees are usually based on the weight of the MSW;
- Tipping fees from the LGU;
- Revenues from sale of recyclables recovered from MSW; and
- Revenues from sale of by-products (e.g., compost, refuse-derived fuel pellets and power) from processing/treatment of MSW.

Viability Gap Funding (VGF) may also be considered. While VGF is not technically a project revenue, this is a cash inflow that can help make a project commercially viable and bankable. For more information on VGF, please refer to the PPPGB's Guidelines on VGF.

Economic analysis

Economic assessment is similar to financial assessment in the sense that both evaluate the PPP project's net benefit. However, the two analyses differ in perspective as financial analysis estimates the net benefit of the project that accrues to the private sector partner, while economic analysis evaluates the net benefits accruing to the economic and social welfare of the country as a whole.

According to the Cities Development Initiative in Asia, the economic assessment of an SWM project should include estimates of willingness to pay for services as a basic benefit yardstick, augmented by cost savings due to public health improvement, livelihood opportunities, more efficient land use, and increase in tourism among others. Special attention should be paid to the large informal sector in waste management and its economy, and how much people are paying for informal waste collection services. Livelihood issues should not be underestimated, but different models of engaging people in a comprehensive waste management system should be explored."

As a standard, the NEDA Board sets the social discount rate at 10% for projects requiring the approval of the Investment Coordination Committee. The SDR reflects the hurdle rate which the economic internal rate of return (EIRR) of a proposed project must equal or exceed for it to become an economically viable investment.

Commented [Kosaka EJ100]: **Comments;**
JET recommend this part should be written more detail.
FS should include project cash flow (equity cash flow as well) which state how to recover Capex and how much T/F (availability payment?) would be proposed to LGUs.

Commented [Kosaka EJ101]: **Comments;**
Clustering should be explained in other part, otherwise it might be confusable.
In JET's aspect, clustering is quite efferent way to put one common facility by LGUs, however, clustering should be determined by LGUs/Province first and should not rely on private to make an agreement (MOA).
Otherwise the project scenario would be collapsed and only host LGU shall have the risks for such waste shortage.

Commented [Kosaka EJ102]: **Suggest to insert;**
and local government

The following are some sample economic benefits for an SWM-PPP project:

- increased health benefits;
- employment generation during construction and operation periods;
- increased market value of surrounding parties;
- cost savings (i.e. from hauling and other O&M expenses);
- kilometer-tons saved (time savings and cost savings);
- improved recycling;
- disposal of residual waste to sanitary landfill;
- biological stabilization of remaining residual waste;
- increased efficiency in the separate collection and composting of biodegradable waste;
- reduced greenhouse gas emissions (US WARM model); and
- savings from reduced fossil fuels.

Table 9 discusses some methodologies for quantifying economic benefits and costs.

Table 9. Methodologies for quantifying economic benefits and costs in the SWM sector

Economic benefit	Methodology for computation	Description
Reduced greenhouse gas emissions	US WARM model	Created by the Environmental Protection Agency, Waste Reduction Model (WARM) to help solid waste planners and organizations track and voluntarily report greenhouse gas (GHG) emissions reductions, energy savings, and economic impacts from several different waste management practices. WARM calculates and totals these impacts from baseline and alternative waste management practices—source reduction, recycling, anaerobic digestion, combustion, composting and landfilling.
	SWM-GHG Calculator developed by Institute for Energy and Environmental Research, Germany	The calculation method used in the SWM-GHG Calculator follows the Life Cycle Assessment (LCA) method. Different waste management strategies can be compared by calculating the GHG emissions of the different recycled (typically glass, paper and cardboard, plastics, metals, organic waste) and disposed of waste fractions over their whole life cycle – from "cradle to grave", in a manner of speaking. The tool sums up the emissions of all residual waste or recycling streams respectively and calculates the total GHG emissions of all process stages in CO2 equivalents. The emissions calculated also include all future emissions caused by a given quantity of treated waste.

Commented [PPPC103]: **We note that this is one of the sections of the draft which could benefit from inputs from development partners. It would be helpful for the LGUs if the Guide could provide potential or common sources of economic benefits and costs, as well as the steps on how are these usually quantified.**

Commented [Kosaka EJ104]: **Comments;**
In the EIRR calculation, quantification of this health benefit (cost for environment) is quite difficult even though willingness to pay so usually we use "with/without scenario comparison". In *without case (as baseline)*, it should be precisely estimate how much LGU shall pay for the activities to comply with existing regulations (in Philippines, firstly LGUs shall recognize that they don't pay for appropriate SLF cost in particular Capex/Opex of appropriate leachate water treatment facility at this moment). Compare with such baseline scenario, in the project (we call it as *"with case"*, e.g. installation of WTE or MRF), aside of project Capex/opex, how much opportunity cost as estimated in "without case" can be saved shall be calculated.
As for the WTE incineration, it converts MSW into ash which reduce 1/25 in volume and 1/5 in tonnage. So it shall consider Capex/Opex for 24 times of disposal capacity as well as annexed leachate treatment facilities can be deducted.

Commented [Kosaka EJ105]: **Suggestion to insert;**
Compare with present MSWM.

Commented [PPPC106]: We note that item 'c' may be debatable as evidenced by the "Not in My Back Yard" phenomenon. We are more comfortable reflecting 'cost savings (i.e., from hauling and other O&M expenses)' as an economic benefit. **However, we are including it in the draft for validation of development partners on whether, in their experience, this is a benefit of SWM projects.**

Commented [Kosaka EJ107]: **Comments;**
As you listed in above, GHG emission reduction is a little bit less priority in the calculation of economic value compare with other benefit such as improvement of environment/health situation nearby existing dumping site, etc. So, it is better to insert other benefits just above of GHG.

c. Legal and institutional analysis

As discussed in Chapter 1, LGUs are primarily responsible for the implementation of the provisions of RA 9003 v
jurisdiction. Under the legal and institutional analysis of an FS, the design of institutional arrangements in the L
be documented (e.g. organizational structure of SWM in the LGU, including its legal and financial bases; hier
authority). Moreover, it should include a clear description of the institutional arrangements for implemen
proposed project.

Commented [Kosaka EJ108]: Same with above. MSW processing PPP is a part of LGU's public service. LGUs shall have primarily responsible even though some parts are contacted out, LGUs shall keep its responsibility in case of default of private contractor to avoid suspension of waste treatment services.

For example, in the case of Quezon City, their PPP Code mandates the creation of the PPP Regulatory Authority. The PPP-RA shall be tasked with performing contract management functions, such as partnership management, performance or service delivery management, contract administration for all PPP arrangements entered into by the City. Said office must first be established prior to the start of construction of the QC WtE project.

Additionally, the legal and institutional analysis section should identify/discuss:

- legal and regulatory requirements;
- roles of oversight agencies; and
- important stakeholders, such as NGOs/civil society, communities and public, affected SWM employees/workers, and the informal waste sector.

The box below identifies required permits for SWM projects under the Philippine Environmental Impact Statement (EIS) system, Table 10 describes the roles of oversight agencies in the SWM sector, while Chapter 7 provides guidanc preparation of a communications plan for various stakeholders.

Commented [PPPC109]: We note that this is one of the sections of the draft which could benefit from inputs from development partners. It would be helpful to identify international standards for emissions, which could be used as reference in developing an SWM-PPP project.

If necessary, we can include an annex for the comparison of different environmental standards, for reference of the LGU.

Categorization and required permits for SWM projects under the Philippine Environmental Impact Statement (EIS) System

Consistent with the Coverage Screening Guidelines and Standardized Requirements in the Philippine EIS System, the following are the categorizations for different SWM project types:

3.2 Power Plants	3.8 Waste Management Projects
3.2.8 Waste-to-Energy – power projects	3.8.2 Sanitary Landfill for Domestic Wastes only
	3.8.3 Compost/fertilizer making
3.2.9 Waste-to-Energy – biogas projects	3.8.4 Materials Receiving and Recovery Facilities (for paper, plastics and other materials)
	3.8.9 Recycling facilities for paper, plastic, and other non-hazardous materials

Environmental certificates and permits to be secured with the EMB for non-hazardous wastes processing/facility projects include:

1. **Environmental Clearance Certificate (EMB Regional Office)** – requirement under the Philippine EIS System - PD 1586 - An ECC outlines **commitments** of the proponent which are necessary for the project to comply with existing environmental regulations or to operate within the best environmental practice that are not currently covered by existing laws.
2. **Permit to Operate (EMB Regional Office)** – requirement under Clean Air Act – RA 9275
3. **Discharge Permit (LLDA or EMB Regional Office)** – requirement under the Clean Water Act – RA 8749
4. **Treatment, Storage and Disposal Registration Certificate (EMB Regional Office)**– requirement under RA 6969 – Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990

During project implementation, the abovementioned permits are subject to a project proponent's continuing compliance to environmental regulations and environmental management plans, and as

Commented [Kosaka EJ110]: Comments;
It's difficult to understand the Inserted table. Right column should be the kind of facility (as 3.2, 3.2.8, 3.2.9, and 3.8 xxx) and left column shall be for example capacity/size screening.

Table 10. Relevant roles of oversight agencies

Oversight agency	Role
National Solid Waste Management Commission	• Review and monitor the implementation of local SWM plans • Coordinate the operation of local SWM boards in the LGUs
DENR-Environmental Management Bureau	• Issues various certificates and permits to SWM projects • Monitors compliance to various environmental statutes
Department of Interior and Local Governance	• Ensure the creation of the local Solid Waste Management Boards (DILG MC 2001-19) and Barangay Ecological Solid Waste Committee (DILG MC No. 2018-112) • Ensure the strict compliance of LGUs with the Ecological Solid Waste Management Act of 2000 (DILG MC No. 2009-168)
Department of Health	• The role of the DOH is to regulate and formulate policies and to provide

Commented [Kosaka EJ111]: Comments;
This is also the item what we'd like to clarify in our Technical Cooperation Project. We agree that EMB-DENR shall be responsible for this, however, how is the responsibility on LGU securing the environmental compliance of concessionaries project?
In many cases, LGUs doesn't recognize their responsibility on this.. So, this description will increase their misunderstanding.

Commented [Kosaka EJ112]: Comments;
We didn't check this, tnx for your information.

	technical expertise to LGUs for the devolved functions of the DOH. The Environmental and Occupational Health Office of the DOH is responsible for preparing the Health Care Waste Management Manual (HCWMM), which is currently used by hospitals, clinics, laboratories, and other health institutions.
Department of Energy	• [For WtE projects, concern is incentives under the Renewable Energy Act, and whether biomass projects will be eligible for a feed-in-tariff]
Office of the Ombudsman	• The Environmental Ombudsman Team may take cognizance of any act or omission committed by any public official, employee, office or agency mandated to protect the environment and conserve natural resources that appears to be illegal, unjust, improper or inefficient, or any malfeasance, misfeasance or nonfeasance committed by any public officer or employee, including co-conspirator private individuals, if said act or omission involves any violation of environmental laws or concerns or relates to environmental protection or conservation (Sec. 13, Art XI of the 1987 Constitutions; Secs. 13, 15 and 16 of Rep. Act No. 6770; Officer Order No. 244, 2. 2012).

Commented [PPPC113]: Internal notes on the development of the draft

Commented [Kosaka EJ114]: **Clarification;**
What is this? We should learn it more.

d. Risk Analysis

In this section, the LGU shall identify potential risks for the scope of the project. Typical risks associated with SWM projects include:

- Political (e.g. New elected government official might cause a change of direction)
- Legal
- Financial
- Quantity
- Environmental and Social
- Operations and maintenance

Commented [Kosaka EJ115]: **Comments;**
This is the biggest risk for the private investor. It shall be taken by LGU side (and guaranteed by NG, etc.) for long-term contract.
LGU and its environmental office shall have long-term stable MSWM policy and it should be published/uploaded so that let the citizens, politicians and investors can understand it.

Commented [Kosaka EJ116]: **Comments;**
Most of succeeded PPP project in SWM, LGUs shall have responsibility for the quantity and quality of waste in the contract.

As best practice, the Generic Preferred Risk Allocation Matrix (GPRAM) which was adopted by the ICC-CC on D 7, 2010, is being used to assign specific risks to the government and/or to the private sector. The GPRAM lists allocation preference and risk mitigation measures for consideration in the development and implementation of the projects.

During project structuring, the party which can best manage the risk shall be assigned to manage it.

Commented [Kosaka EJ117]: **Suggest to insert;**
And corresponding fee/charge shall be paid in case of private risk taking.

3.3 PPP Project Structure

> "Structuring a PPP project" means allocating responsibilities, rights, and risks to each party to the PPP contract. This allocation is defined in detail in the contract. **Project structuring is typically developed through an extended process, rather than by drafting a detailed contract straight away.**
>
> - PPP Knowledge Lab

Structuring a PPP entails the following interrelated activities:

- Establishing the contractual arrangement
- Setting the scope of the private party's participation (which is not necessarily the same as the project sc
- Setting the institutional arrangement for the public party
- Setting up the Minimum Performance Standards and Specifications (MPSS)
- Setting up the tariff structure (if applicable)
- Establishing the financing structure
- Doing a PPP risk assessment
- Allocating the risks between the public and the private partners
- Determining the form or kinds of government support
- Choosing the financial bid parameter

The goal of PPP structuring is to arrive at, for a given project scope, quantity and quality of public service, a com of contractual arrangement, scope of participation of the private partner, risk allocation, and kinds of gov support that makes the project bankable, but at the same time, acceptable to the approving body. It is poss more than one combination can be found. Moreover, during PPP structuring, the PPP financing framework and concession period of the project shall be analyzed and established. A discussion on whether the scope of the project shall be bundled into one or more PPP contracts shall be considered, and the modality of the PPP contract shall also be discussed (Build-Operate-Transfer, Build-Transfer-Operate, etc.).

The following section identifies: (1) sample sector-specific risk allocation; (2) considerations for structuring a PPP; and (3) different types of PPP project structures for SWM projects.

For more information on PPP structuring, please refer to the PPP Center NGA Guidebook.

Risk allocation in the SWM sector

During project structuring, risks identified in the FS are allocated to the party best able to manage it. The follow Study of the Timarpur Okhla Integrated Municipal SWM project in New Delhi, India provides an overview of a sample risk allocation framework for an SWM Project.

Case study 1: Timarpur Okhla Integrated Municipal SWM project

Commented [Kosaka EJ118]: Comments;
If chapter 3.1 and 3.2 are written based on "solicited", we think this is correct.

Commented [Kosaka EJ119]: Comments;
"guaranteed" public service
This public service shall be guaranteed to citizens.

Commented [Kosaka EJ120]: Comments;
What we understand Timarpur/Okhura project risk allocation is heavily one-sided to private sector and it results many problems such as env. compliance and public relation building.
It is better Philippines to learn and find what is the best balance of risk in Philippines SWM PPP projects from other good/bad project experiences.
We can share other projects risk allocation.

Project Description

Delhi generates 7,000 metric tonnes (MT) of Municipal Solid Waste (MSW) daily, which is expected to increase to 18,000 MT by 2021. The present landfill sites that are being utilized for disposing the garbage are approaching their full capacity and even with the envisaged capacity addition, the situation is unlikely to improve.

The Municipal Corporation of Delhi (MCD) has thus embarked on a project to reduce the amount of MSW being disposed in the landfill sites and utilizing the waste for productive purposes such as generation of power from waste. MCD has identified two locations, namely Timarpur and Okhla, for implementing this project.

The following facilities are to be developed as a part of the integrated municipal waste handling project:

1. Plants for converting MSW to Refuse Derived Fuel (RDF), capable of processing 1300 TPD at Okhla and 650 TPD at Timarpur.
2. A bio-methanation plant capable of handling of 100 TPD of green waste at Okhla.
3. A water recovery plant capable of handling up to 6 MLD of treated sewage at the Okhla site for recycling into process water and cooling water.
4. A Power plant with a generation capacity of 16 MW at Okhla.
5. Transportation of RDF from Timarpur to Okhla for combustion in the boiler of the power plant mentioned above.

Project Risk Allocation Framework

Risk Type	Sensitivity	Risk Period	Primary Risk Bearer	Comments
Delays in land acquisition	High	First year	Government	In case NDMC failed to handover the land after signing the concession agreement, NDMC was liable to reimburse the Development Costs incurred by the developer.
Delays in linkages	High	Throughout	Government	As per the agreement signed with NDMC, NDMC shall ensure the provision of a sanitary landfill site for the disposal of refuse and inert material. However, as on date, MCD does not have an engineered landfill site. The site at Narela is under development and the other dumping grounds of MCD have already reached their full capacity. Therefore, the scientific disposal of refuse and inert material is a risk the NDMC shall have to

Commented [Kosaka EJ121]: Comments:
Definition of "Primary risk bearer" in this table is same with all of this guide? Anyhow it's better to explain more detail otherwise it confusable.

				manage.
Regulatory, administrative delays	Low	Pre project period	Timarpur-Okhla Waste Management Company Private Limited (TOWMCL)	
Construction Risk		0-2 years	TOWMCL	In the event the construction of the plant is not completed within 24 months from the date of financial closure, TOWMCL shall be liable to pay NDMC Rupees 100 per ton of MSW that is being disposed by NDMC at the MCD landfill site, for each day of delay in the construction of the Plant.
Change in Scale Risk	Low	Throughout	TOWMCL	Solid Waste during the Term of this Agreement would be accommodated at the Plant either by an increase in working hours or by putting in place additional capacities at the sole cost and expense of TOWMCL. NDMC shall not incur any liability in this respect.
Market Risk	Low	Throughout	TOWMCL	There are two saleable end products from the plant – Electricity and Organic fertilizer. In terms of revenue potential, the sale of power contributes a major share of the expected revenue. A Power Purchase agreement has been signed with DERC for purchase of electricity generated from Integrated Waste Management Plant.
Operations Risk				
1. Repairs of weigh bridge.	Moderate	Throughout	.TOWMCL	In case TOWMCL is unable to get the weighbridge repaired within 24 hours,

Commented [Kosaka EJ122]: Comments;
I don't understand why this regulatory (government related) delay shall be the risk of private company.
These risks of regulatory approval issued by government shall be taken by government side considering its a part of public service as well as easiness to obtain.

Commented [Kosaka EJ123]: Comments;
We agree that delay of construction risk shall be shouldered by private contractor however detail conditions shall be deeply evaluated. Most of cases, this 2 years (24 months) of construction period of WTE has subject conditions required for government side such as land acquisition, EIA, building permit etc. 24 months of construction is a bit shorter than global standard if it includes design phase thus government shall review the conditions of these risk carefully.

Commented [Kosaka EJ124]: Comments;
This is the one of the reasons why this Timarpur-Okhula plant is now facing problems. Now TOWMCL is increasing its receiving QTY compare with the capacity what they agreed in the contract.
If they agreed in this clause, TOWMCL shall do so.
However, in the context of SWM, local government shall be carefully set the contract quantity and should not let private side to take this risk otherwise private operator shall do unreasonable (unstable) operation. It might cause some failure in the facility and/or environment.
WTE is quite sensitive facility to operate continuously. Indian government, Jindal (investor) and Chinese technical provider (Hangzhou Boiler) did not know well about this.

Commented [Kosaka EJ125]: Of electricity and compost?

Commented [Kosaka EJ126]: Comments;
This risk shall be firstly taken by private, it's reasonable.
However, in case if market risk would be realized and TOWMCL will decide to early terminate of the contract (by make deficits for continuous years), LG shall decide to find successor or keep TOWMCL to operate by increasing the tariff.
In many cases, it is difficult to find successor of these kind of "highly one-sided PPP" and complex plant operator. As the result usually LG shall agree such increasing of T/F.
What we'd like to say for this is, market study shall be carefully reviewed and it is better to ensure off-taker's capability.

Commented [Kosaka EJ127]: Comments;
Is it operation phase? I think throughout means "throughout of the project period".

Commented [Kosaka EJ128]: Comments;
It also seems a bit hard requirement for TOWMCL.
We think these "one-sided" conditions are proposed by TOWMCL as unsolicited way to let LG ease to make an early decision.
But we suggest LG to consider more reasonable, practical and amicable way to solve these conditions (for example, in the technical requirement, they have to have 2 lines of ...

				TOWMCL shall be liable to pay a penalty to NDMC at the rate of Rs.10,000/- per day (Rupees Ten Thousand per day) and NDMC shall have the right to get the weighbridge repaired on its own, but at the cost and risk of TOWMCL.
2. Determination of rejected waste	Moderate	Throughout	TOWMCL	If determination of any Rejected Waste is made after the relevant consignment had been accepted and mixed with the stored MSW at the Site, then TOWMCL shall bear all costs associated with the transportation of such Rejected Waste to the Landfill.
3. Supply of minimum quantity of Waste	Moderate	Throughout	New Delhi Municipal Corporation (NDMC)	If NDMC is not able to deliver the agreed MSW quantity for a period of six consecutive days, it shall pay TOWMCL for each day of such failure after the six day period, as pre agreed compensation.
4. Provision of landfill site for the disposal of residual / rejected waste	High	Throughout	NDMC	The Residual Inert Matter shall be accepted at the Landfill made available by MCD at no cost to TOWMCL and/or to NDMC. However, if such a Landfill is not made available by MCD due to any reasons whatsoever, or at a later date MCD refuses to accept Residual Inert Matter generated by the NDMC MSW Quantity, then NDMC shall cause the Landfill Site to be made available for the purposes of this Agreement at its own cost and expense (including payment of all levies, charges and taxes

Commented [Kosaka EJ129]: **Comments;**
This is a bit difficult to understand because flow chart of the project is not clearly explained.
We deem it as "TOWMCL is responsible for the quality of RDF (derived from MSW) and if it doesn't meet the requirement of RDF combustion facility, refusal shall be taken care by TOWMCL."
It is also natural however quality of MSW from LG to TOWMCL at the reception of RDF facility, this is better to discuss and agree a certain standard otherwise it could be the seed of litigation.
LG has to change their policy of MSWM in time to time (e.g. recent plastic bans) so it can not be controlled by private. So, MSW provision quality/quantity shall be guaranteed by LG.

Commented [Kosaka EJ130]: **Comments;**
It seems agreeable. This is also needed to discuss depends on the capacity of furnace, size of pit (retention time) as well as availability of present landfill site as the buffer.

				whatever) and as per the requirements and conditions as prescribed under Applicable Law. In case if any tipping fee is charged by MCD for the disposal of waste on the landfill provided by MCD, the expenses for the same shall be borne by NDMC.
Financial Risk				
1. Revenue Streams	High	Throughout	TOWMCL	Major financial risk results from the realisation of carbon credits, as the project cash flows bank on the same. there is no mention of any guarantee from either NDMC or MCD to provide for the funds in absence of realisation of revenue from carbon credits. The risk of non realisation of revenue from carbon credits is thus borne by the developer. Another financial risk may result from the upward movement of interest rates.
2. Financing the project	High	0-5 years	Government	NDMC agreed to enter into agreement with the lenders to enable the financing of the project. Usually, the developer must ensure the financing of the project.
Force Majeure	High	Throughout	TOWMCL	Upon termination of the Agreement due to a Force Majeure Event, NDMC shall not be liable to pay to any Termination Payments to TOWMCL. All Termination Payments shall be as made good by Insurance only under the provisions of

Commented [Kosaka EJ131]: **Comments;**
It is understandable for the stance of LGU.
However, I think this is really sustainable arrangement of PPP?
Project operation rely on carbon credits and other unconfirmed elements still contains high risk of cessation of plant.
If we're the third party consultant of this project, we suggest the sales of CER and other unconfirmed matter (such as compost, etc.) shall be a kind of bonus to be shared between public and private (e.g. 7:3) and LGU shall pay reasonable operational cost to the private company as the treatment fee to avoid such risk.

Commented [Kosaka EJ132]: **Comments;**
It is also unclear this background.
In case if debt portion is non-recourse PPP project, banks shall secure the right to replace the private company. Such multi-agreement including LGU is commonly applied. But it seems that this is not it..

Commented [Kosaka EJ133]: **Comments;**
Number of risk items in Force Majeure should be minimized and can be so by the experience.
In Japanese contract there are many specific risk allocations which are originally categorized in force majeure. It should not be easily consider as force majeure and not let all them on to the private sector.

				Insurance obligations of TOWMCL. In case of losses and damages, NDMC will not be liable in respect of any losses, damage cost, expense, claims, demands and proceedings relating to or arising out of occurrence or existing of any Force Majeure Event.
Change in Law	High	Throughout	TOWMCL	If TOWMCL has to bear any additional expenditure over and above their agreed project expenditure on account of change in law, NDMC shall reimburse 100% of the amount, or make changes in the agreement provided such additional cost is not more than 5% of the project cost.
Transfer and Hand back of project facilities	Medium	On completion or termination of contract	TOWMCL	If at the end of the term of the agreement or in the event of the termination of the agreement, NDMC decides not to take over the operations of the plant then in that case the developer shall be required to provide the site free of all encumbrances at its own cost.

Source: PPP in India

Commented [Kosaka EJ134]: **Comments;**
Why change in law is private responsibility? Incresible.

Commented [Kosaka EJ135]: **Comments;**
It seems amicable. But increase of operational cost shall be principally borne by public sector.

Commented [Kosaka EJ136]: **Comments;**
We should read this more to make more practical comments.
However, this document has the tendency to let private side take a huge risk.
In addition, we don't think Timarpur-Okhla project is succeeded. There are many information of "succeeded projects" but very difficult to obtain the information of "un-succeeded" projects.
There are quite many "un-succeeded projects" hidden under a "succeeded projects".
In Japan, we experienced them and build present system which enables that once LGU decide to put WTE in its plan, the facility will be built and operated on time.

We suggest to insert "issuer and issued year" of this document.

Considerations in structuring an SWM-PPP project

Apart from allocation of risks, the following are specific issues that tend to confront practitioners while developing SWM-PPP projects:

Commercial considerations	• Project site/ availability of land and clearances • Assurance on waste quantity and quality • Available SWM technologies incl. WtE • KPIs and performance standards • Environmental and social factors, including manpower transitioning
Technical considerations	• Investment requirements • Financing and bankability • Repayment scheme to the private sector (sale of byproduct which can be cement, fertilizer, alternative fuels, power, tipping fee or waste treatment processing fee, etc.) • Length of contractual agreement • Requirement of government subsidies or contractual guarantees • Renewable energy incentives • Construction, technology, and operating risk • Importance of qualification criteria in mitigating performance risk
Power considerations	• Sale of power • Relevant permits, approvals and procurement processes • Power Supply Agreement • Qualified third party

According to the MSW India Toolkit, as a principle, local governments "should minimize uncertainty by providing reliable **inputs** and **information** (including waste quantity and quality, land availability, manpower and assets, clearances etc.) while passing on the risks relating to outputs (such as technology, operations, performance and service delivery) to the private operator."

For more information, please refer to the India MSW toolkit, which discussed in-depth possible structuring o deal with the issues mentioned above.

Commented [Kosaka EJ137]: **Comment;**
Isn't this wrong? I think this is "Technical".

Commented [Kosaka EJ138]: **Suggest to insert;**
Balanced by what private can do and public wants

Commented [Kosaka EJ139]: **Suggest to insert;**
Regulatory readiness,

Commented [Kosaka EJ140]: **Comment;**
Isn't this wrong? I think this is "Commercial".

Commented [Kosaka EJ141]: **Suggest to insert;**
And its security

Commented [Kosaka EJ142]: **Comment;**
Only this is technical consideration in this row.

Commented [Kosaka EJ143]: **Comment;**
Why only this is categorized aside of commercial/technical? It can be included in technical and/or commercial.

Commented [Kosaka EJ144]: **Comment;**
We absolutely opposite on this as the Japanese expert on SWM/WTE.
Even in the India, they don't understand the optimum level how much LGUs can minimize its scope of MSWM. Present tendency in India and other countries including Philippines is that LGUs want to let private sector as much as possible if private say "I can do" without appropriate due diligence.
It is important to consider how much LGUs have to and/or are able to keep its role in MSWM and portions to contract out to private sector, in this process, only solicited approach can be applicable. Most of LGUs is not ready for unsolicited proposal.

Sample project structures

Typical structure for privately financed waste project

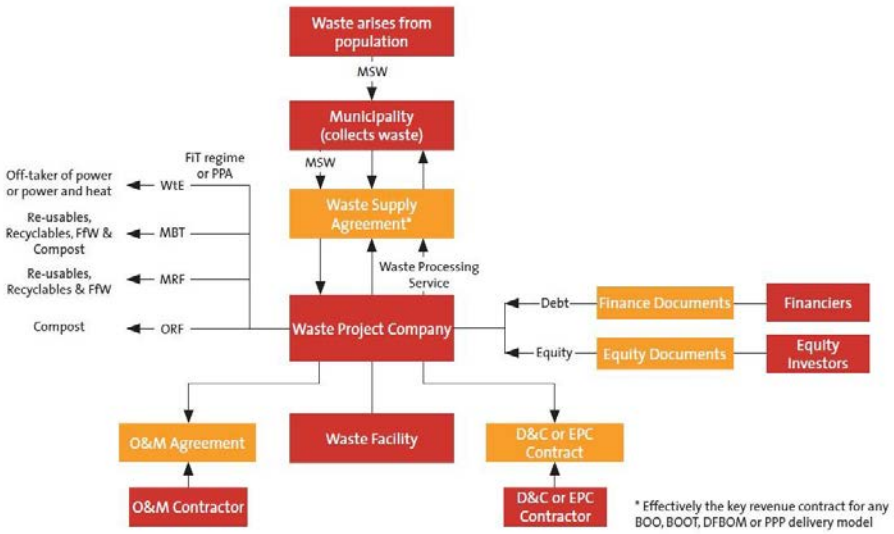


Figure 4. Typical structure for privately financed waste project.
According to Harrison, the key revenue contract for the PPP delivery model is the waste supply agreement.

Source: Harrison

[This section can include case studies which illustrate project structures of different types of SWM-PPP projects]

Commented [Kosaka EJ145]: **Comments;**
1. "Waste supply agreement" shall be "waste processing agmt.
2. D&C means Design-Build?

Commented [Kosaka EJ146]: **Comment;**
Who is him? Year, document name, etc. should be needed.

Commented [PPPC147]: We note that this is one of the sections of the draft which could benefit from inputs from development partners.

Chapter 4: Approval

The objective of the approval process is to ensure that projects meet the criteria for approval set forth by the approving body. For SWM-PPP projects, these are the criteria set by the Local Sanggunian, based on the local JV or PPP Code.

The user may refer to Section 3 of the LGU P4 Guidelines and Annex 1 of the PPP Center JV Guidebook for discussion on the various legal opinions that provide the basis for LGUs to formulate ordinances that would govern PPPs including Joint Ventures. In general, the PPP Center JV Guidebook shares with Local Government Units (LGUs) useful instructions and practical insights in pursuing PPP projects through the JV agreement.

[This section is to be further expanded to include discussion on how projects should be evaluated by the local sanggunian (e.g. economic benefits/costs, safeguards)]

Commented [Kosaka EJ148]: ??

Commented [PPPC149]: We note that this is one of the sections of the draft which could benefit from inputs from development partners. It would be helpful for LGUs to be given pointers on how they should approach the evaluation of SWM-PPP projects (i.e.. what are the considerations for approval/disapproval of a project).

Chapter 5: Procurement

The goal of the procurement process is to choose the private partner in an open, competitive, fair, and efficient manner, and within the expected timeline. The said process may vary depending on whether the project is implemented under the BOT law framework or as a JV.

Commented [Kosaka EJ150]: Comment;
We don't know the difference of them at this moment.

Projects implemented through the BOT Law

Under the BOT Law framework, PPP projects can either be procured as a **solicited project** (via single-stage or two-stage bidding) or as an **unsolicited proposal** (via a Swiss challenge). For more details on the BOT procurement process, you may refer to the BOT Law (RA 7718) and its IRR, and the Guidebook on BOT Projects.

Projects implemented through Joint Venture Agreements

For JV projects, there are three procurement options:

- competitive selection (for solicited JVs),
- competitive challenge (for unsolicited JVs), and
- the alternative JV selection process.

The three procurement options for JV projects are discussed in detail in the Guidebook on Joint Ventures for LGUs. **At the moment, the PPP Center does not recommend the use of the alternative JV selection process for SWM-PPP projects.**

Chapter 6: Implementation

Project implementation refers to the fulfilment of the obligations and the delivery of the outputs in accordance with the terms and conditions of the contract that were agreed between the IA and the private partner. **Implementation starts when the PPP contract has been signed, and all conditions precedent have been accomplished including the achievement of financial close.**

When all these are met, the LGU issues a notice to proceed to the private partner. Figure 5 illustrates the activities that are undertaken from the start of the PPP contract to the end.

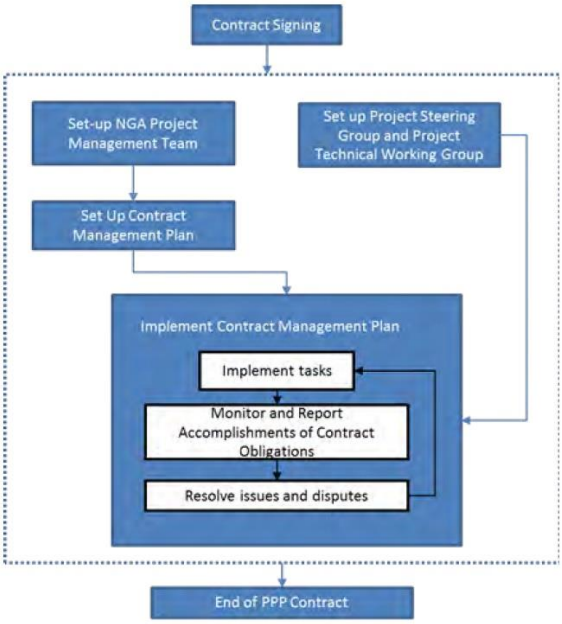


Figure 5 Project Implementation Flowchart (excluding project variation)

Objectives of Project Implementation from the LGU's perspective

- Timely execution of all parties' obligations and of the delivery of outputs
- Achievement of the targets for the project's key performance indicators during the operation and maintenance period
- Amicable resolution of project issue and disputes
- Proper management of procedures in handling variations in the signed contract and the project
- Proper management of revenues, and other financial accounts
- Proper turn-over of the service facilities after the end of the concession period

Key to the success of the above objectives is having and executing a good project monitoring framework.

Roles under the Implementation Stage

LGU as the Implementing Agency

- Primarily responsible for awarding, managing, and executing the PPP contract, and ensuring the attainment of the objectives of the PPP project
- Designate a unit for the implementation and monitoring of its PPP projects (the "Implementation Unit")
- Ensure the creation of the Project Steering Group (PSG, whose members are composed of representative/s from Implementing Agency, Project proponent and other relevant government authorities.
- Ensure the creation of the Technical Working Group (TWG), whose members are composed of representative/s from Implementing Agency, Project proponent and other relevant government authorities."
- Provide periodic progress reports and other relevant documents to the PPP Center
- Prepare reports on public and private sector spending and contingent liabilities following the DBM-PPPC JMC No. 2018-01
- Report to the DENR, other government agencies, as may be necessary

Commented [Kosaka EJ151]: **Suggest to insert;**
Provision of Processing Fee

Project Proponent

- Set up PPP Implementation Team
- Deliver conditions precedent for the start of construction
- Achieve financial closure
- Construction and/or operation and maintenance of the PPP project
- Turnover of the PPP Project
- Provide PPP Center copy of progress reports and other relevant documents

Commented [Kosaka EJ152]: **Comment;**
This is required not only private but also (or more harder) LGUs.

- Designate a PM to (i) manage the execution of its PPP contract, and (ii) generate, process, and share information for monitoring the implementation of its PPP project
- Together with the IA, create a PSG
- Together with the IA, create a TWG
- Submit the necessary documents to regulatory authorities for tariff changes, if applicable
- Prepare operations manual
- Assign Pollutions Control Officer to monitor compliance to environmental issues

PPP Center

- Monitor implementation of PPP project
- Provide assistance in addressing potential bottlenecks and issues
- Support the implementation of the project's communication plan
- Provide assistance of hiring of IC through the PDMF, if applicable
- Report on the status of the project to various oversight government agencies
- Provide assistance in assessing the proposed project variations and in facilitating the implementation of the same once approved"

Independent Consultant

The PPP Center recommends that the SWM-PPP contract include a provision on the use of an Independent Consultant during project implementation. The appointment of an Independent Consultant or Engineer for the construction phase and/or operation phase of the PPP project aims to ensure successful and timely delivery of projects through the provision of efficient, transparent, and fair technical services to the contracting parties. Hiring

of an IC/Engineer may done through R.A. 9184 or through the PDMF. The cost of the Independent Consultant is customarily shared 50-50 between the NGA and the private proponent. The IC's roles are to:

Commented [Kosaka EJ153]: ???

- Provide independent technical advice to the parties
- Perform the following responsibilities, as may be required under its service contract:
  - Review and evaluate relevant documents, and recommend necessary actions
  - Assist in the management and monitoring of the PPP project
  - Prepare contract management plan and inception report
  - Review the draft operations manual prepared by proponent

For more information on project implementation, you may also refer to the PPP Center's other knowledge products, which include topics on: Setting up a Project Management Team (PMT); Setting up the Project Steering Group (PSG) and the Project Technical Working Group (PTWG); using a Contract Management Plan, a tool that will be used by the PMT to plan the accomplishment; and managing contract variations.

Development of operations manuals

In addition to certificates and permits issued by the DENR-EMB, operations manuals are normally developed as a guide in the implementation of SWM Projects (See also NSWMC's Technical Guidebook on Solid Wastes Disposal Design, Operation and Management).

Critical in such operations manuals are the following:

- **Timeline** – when the manual will be drafted and approved;
- **Identifying the roles and Responsibilities of the parties in implementing the operations manual;**
- **Procedure for the Approval of the Operations Manual** – IA with recommendations of the Independent Consultant;
- **Establishment of a system to evaluate an SWM-PPP project's performance** - pursuant to the PPP contract, the monitoring and evaluation of Minimum Performance Specifications and Standards (MPSS) and Key Performance Indicators (KPIs) should be among those discussed in an operations manual for a project developed under a PPP scheme.

Moreover, the reporting requirements to various oversight agencies, such as the National Solid Waste Management Commission, should also be considered in the manual.

Reporting requirements

[List of reporting requirements to be included]

Commented [PPPC154]: Internal notes on the development of the draft

Chapter 7: Special issues in SWM-PPP projects

[To be included in this section:

- Social acceptability of an SWM project (recommendation – adequate communications plan, appropriate environmental management plans)
- Informal waste economy (recommendation – waste pickers, etc. must be taken into account in the SWM value chain)
- Safe closure of disposal sites]

Commented [PPPC155]: Preliminary list of special issues in SWM-PPP projects and internal notes on the development of the draft

References

[Citation to be done in Chicago Manual of Style]

Commented [PPPC156]: Internal notes on the development of the draft

Republic Act 9003 and its IRR

ADB, 2017 Integrated Solid Waste Management for Local Governments, A Practical Guide

Giresh Mohan, Ujjawal Kumar Sinha, Meva Lal. Managing of Solid Waste through Public Private Partnership Model. International Conference on Solid Waste Management 2015.

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Enrico C. Mina. Case Studies on Health Care Waste Management of Selected Public and Private Hospitals in Metro Manila. Occational Paper No. 14. Graduate School of Business, Ateneo de Manila University.

Municipal solid waste - Toolkit for PPP in Municipal SWM developed by the Department of Economic Affairs, Ministry of Finance (DEA) and Ministry of Urban Development (MoUD) with the support of the Government of India ADB PPP Initiative

World Bank - https://ppp.worldbank.org/public-private-partnership/sector/solid-waste/sample-contracts-waste-disposal-treatment-recycling

QC Integrated SWM Plan

CDIA Guidelines for Preparation of Pre-FS for SWM

Annexes

Annex 1: Sample criteria in determining private sector participation in SWM

This section was gathered from the QC Integrated SWM Plan prepared by AECOM through TA-8566 REG: Mainstreaming Integrated Solid Waste Management in Asia.

Public Sector Perspective

Four groups of criteria can be considered when choosing between privatisation options:

Financial criteria.

State owned utilities can place a variety of financial pressures on the public purse, which governments may wish to

reduce:

- Subsidies to loss making utilities to finance existing operations
- Funding of substantial new investment to increase capacity and improve service quality.

Commented [Kosaka EJ157]: **Comment;**
We agree on them.

The greater the public sector deficit, the more important financial considerations are likely to be as a motivating factor towards privatisation. Privatisation options may relieve some of the pressure by:

- Reducing or gradually eliminating subsides and cross-subsidies, through greater efficiencies of private sector operation, and the phasing of tariff increases up to cost recovery levels. Such increases may prove politically easier to implement under private rather than public operations.
- Attracting finance to meet new investment needs, thereby avoiding the need to incur additional public expenditure.
- Generating cash revenues through the private sale or flotation of public assets. The funds can be used t a reduction in public sector debt or to fund alternative projects.

Commented [Kosaka EJ158]: **Comment;**
This is a bit wrong in SWM PPP. LGUs shall pay T/F through the project period for the private capex recovery.

Efficiency of service criteria.

Public owned utilities may have relatively low levels of efficiency, since there are poor incentives for cost reduction. Introducing private expertise and management methods can improve efficiency in a number of different ways:

- Increasing productive efficiency linked to reductions in operating costs even without substantial new investment.
- Stimulating innovation driven by the adoption of new technologies in the context of an investment prog
- Improving the quality of service, as long as targets are clearly set by the public sector.
- Raising accountability to customers, brought about by the market context.
- Increasing tariff/fee collection efficiency, as a result of the profit motive of the private operator.

Commented [Kosaka EJ159]: **Comment;**
New tech has still risks so it is better to consider whether such new tech can apply for public service.

Ideological criteria.

Commented [Kosaka EJ160]: We agree on this.

Where governments are undertaking a wide range of policies involving deregulation and pro-market reforms, privatisation will be enthusiastically embraced. In this context, it is viewed as a means of increasing private participation in the economy and may be used to encourage wider share ownership. Where governments do not espouse to a free market political philosophy, privatisation may be undertaken more reluctantly primarily as a means of funding new investments or improving the efficiency of public services. In these cases privatisation is likely to be accompanied by special measures to ensure continued public control.

A desire to retain maximum public control may lead governments to adopt contractual forms of privatisation as opposed to asset sales. However, asset sales need not entail a loss of public sector control. The government can retain a controlling stake and use the proceeds of privatisation to achieve wider social goals.

Administrative criteria.

Two aspects of the privatisation process will create a significant administrative burden:

- Preparation. Assembling information on the state of the existing infrastructure assets, assessing the quality of the competing bids, providing reliable revenue and cost forecasts for the operation of the contracted services.
- Regulation. Ongoing costs of regulating the activities of the private operator, on both price and non-price performance parameters.

Private Sector Perspective

Private operators will consider the balance between risk and return when selecting between possible investment opportunities.

Potential risks may include:

- Commercial risk from the operation and maintenance of the service, subject to demand, cost and revenue volatility.
- Project risk from uncertainties in forecasting costs and revenues attached to investment responsibilities.
- Country risk from exchange rate volatility, which may affect profitability for foreign operators.
- Regulatory risk from unexpected alterations in the regulatory conditions, such as political interference.
- Force majeure risk from damage to assets owned by the private operator, as a result of natural disasters.

Potential factors affecting the return on investment include;

- Bidding costs. Preparing the bid and participating in the selection procedure, compared to the probability of winning the contract and the resulting revenue stream.
- Cost reduction potential for efficiency gains, and whether the resulting profits can be retained by the operator.
- Revenue expansion through increasing the size of the market and the associated flow of revenues.

In general for private operators:

- Service and management contracts lie at the low level risk, low reward end of the spectrum.
- Lease contracts and concessions offer a somewhat higher level of risk, but offer the opportunity to increase revenues through demand growth.
- BOT and BOO contracts are high risk, with limited scope for demand growth.
- Private sales and flotations also carry significant risk, but may allow high returns depending on the terms of the regulatory regime.

Annex 2: Unique provisions in an SWM-PPP contract

[Note: ongoing PPP Center review of local and international SWM-PPP contracts for identification of good pract

Commented [Kosaka EJ161]: Comment;
It's our pleasure to read this in near future.

Commented [PPPC162]: We note that this is one of the sections of the draft which could benefit from inputs from development partners.

Page 43: [1] Commented [Kosaka EJ128] Kosaka EJEC 1/25/20 4:12:00 PM

Comments;

It also seems a bit hard requirement for TOWMCL.

We think these “one-sided” conditions are proposed by TOWMCL as unsolicited way to let LG ease to make an early decision.

But we suggest LG to consider more reasonable, practical and amicable way to solve these conditions (for example, in the technical requirement, they have to have 2 lines of weigh bridge so that in case of fault, at least 1 line can be operational, etc.).

Harder condition makes project difficult and difficult.