

# Technical Guidelines on Organic Waste & Garbage Treatment



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**Waste Strategy and Projects Department  
Dubai Municipality**

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## LIST OF ABBREVIATIONS & DEFINITIONS

AESEAS	Environment Sustainability and Environmental Assessment Section
BOD	Biochemical Oxygen Demand
CEN	European Committee for Standardization
COD	Chemical Oxygen Demand
DET	Department of Economy & Tourism
DM	Dubai Municipality
EC	<b>Environmental Clearance</b>
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NOC	No Objection Certificate
OHSMS	Occupational Health and Safety Management System
PPE	Personal Protective Equipment
SCR	Selective Catalytic Reduction
TOC	Total Organic Carbon
VOC	Volatile Organic Compounds
WDS	Waste Disposal Service
WSPD	Waste Strategy and Projects Department
WTS	Waste Treatment Section
Disposal	Refers to any or combination of the following means or processes where waste is subjected to or rendered for: <ul style="list-style-type: none"><li>• Direct tipping into landfill;</li><li>• Incineration, burning or combustion in a controlled manner for the purpose of getting rid of waste material;</li><li>• Final deposit at any DM waste treatment complex or landfill;</li></ul> The process of segregation and recovery of the materials for the purpose of recycling or reuse is not considered a disposal
Disposal Site	The site with defined area and boundaries is intended as the final depository of waste. It may be a final depository site of a lined or unlined landfill or any dedicated facility for waste treatment. In the case of waste intended for export, the name of the receiving state or locality shall be referred to as the disposal site.
Environmental Standards	Within the context of this document and pursuant to the Local Order on the Environment Protection Regulations in the Emirate of Dubai, are the specified values of environment quality indicators or allowable limit of pollutants in the waste stream when discharged into a segment of the environment, beyond which, it can cause pollution and impair the quality of the environment.
Non-hazardous waste	is a waste or mixture of wastes that does not pose a substantial threat to public health or the environment and is safer to handle, store, and dispose of compared to hazardous waste. However, it can be harmful to the environment if left untreated. This category includes everyday household items like food waste, paper, cardboard, plastics, glass, metals, and textiles, as well as non-toxic industrial waste, uncontaminated construction and demolition debris, organic waste like yard trimmings and agricultural residues, and certain electronic waste.

Hazardous waste	A waste or a mixture of wastes containing one or more properties of a hazardous substance, i.e., being toxic, infectious, corrosive, flammable, oxidizing, radioactive, reactive, or explosive which, at certain concentration or conditions and improper handling, can cause substantial harm to human, properties or to the environment.
Landfill	An area generally used for the disposal of solid wastes by burial. It is either an ordinary unlined landfill or an engineered landfill with basal lining of an impervious material and fitted with a leachate collection system
RASID	Dubai Municipality has introduced the RASID waste management monitoring system to regulate operations of registered waste management companies by streamlining and monitoring waste management transportation and associated activities – from collection through transit and till disposal, from analysis review to end-user solutions and by controlling illegal and unauthorized dumping practices.
Recyclables	Waste materials that are broadly classified, within the context of this Policy, as “recyclables”, which contain valuable materials meant for recycling or reuse. Recyclables include, for example, papers, plastics, cartons, wood, metals, glass, tires, textiles, lead-acid batteries, Hybrid and Electric Vehicle Battery (EVB) such as Li-ion and NiMH & other EVB, automobiles, WEEE, and many other similar discarded used products.
Unwanted material	Any material/goods declared by their owner to be unwanted and require disposal, or of which a decision for their destruction/ disposal is issued by a competent authority, or that proper disposal requires special care
Treatment (of waste)	An induced change, normally carried out in a treatment facility, in the physical or chemical composition of the waste so as to make it less hazardous, less in volume, and acceptable for final disposal
Waste	Any material disposed of because it is no longer needed. It includes general wastes, hazardous wastes, difficult wastes, and other wastes as classified by the Waste Management Department.
Wastewater	All spent water is discharged from any activity of man or industrial process. For the purpose of this document, it is further classified into 2 types, namely: a) domestic wastewater and b) trade wastewater.
Waste Generator	Any person or party who produces the waste material and/or the Occupier and/or Owner of the premises or facility where the waste is generated. The waste generator is also the “Owner of waste.”
Waste Collection	Collection within the meaning of this guideline is the loading, transport & any interim storage of waste for the purpose of transportation to a waste disposal and/or treatment plant.

## 1 INTRODUCTION

In general, this guideline underscores adherence to the specified legal and regulatory framework, ensuring that Organic Waste & Garbage Treatment activity is conducted in compliance with established laws, circulars, and guidelines. This serves to standardize practices across the industry, promoting sustainable waste management practices, safeguarding public health, and preserving the environment within the Emirate of Dubai.

The guideline encompasses detailed operational procedures, safety protocols, contractual obligations, and permit requirements to ensure that waste management practices are conducted responsibly and sustainably within Dubai. Hence, this Technical Guide is intended to deliver:

- a) General provisions such as mandatory training for all personnel involved in Organic waste & Garbage handling and disposal,
- b) Organic waste & Garbage disposal provisions and permitting requirements,
- c) Procedures and requirements of different organic waste & garbage facility types and their operators.
- d) Specific requirements to conduct Organic Waste & Garbage Treatment activity within Dubai.

Sample forms and permits are presented in the Annexes.

## 2 LEGAL FRAMEWORK, CIRCULARS, AND GUIDELINES

The relevant provisions of the following laws and regulations were used as guidance and references in the preparation of this technical guideline.

- Circular No. (1) of 2020 On the Comprehensive Inventory of the Recyclable Waste Data in the Emirate of Dubai
- Federal Law (No.) 24 of 1999 and modified by Federal Law (No.) 11 for 2006 regarding Protection & Development of the Environment.
- Local Order No. 11 of 2003 on Public Health and Safety of the Society in the Emirate of Dubai
- Local Order (No.) 61 of 1991 on the Environment Protection Regulations in the Emirate of Dubai
- Local Order (No.) 7 of 2002 on Management of Waste Disposal Sites in the Emirate of Dubai; as amended by Local Order No. (5) of 2003
- Executive Council Resolution (No.) 58 of 2017 Concerning the Approval of Fees and Fines of Waste Disposal in the Emirate of Dubai
- Executive Council Resolution No. (14) of 2015 Amending the Schedule of Public Hygiene-related Violations and Penalties Attached to the Implementing Bylaw of Local Order No. (11) of 2003 Concerning Public Health and Community Safety in the Emirate of Dubai
- Procedures and guidelines for implementing and implementing Administrative Order No. 30/2003, in accordance with Local Order No. 11/2003
- UAE Occupational Health and Safety Management System (OHSMS) National Standard
- Technical Guideline No. 4. on Duty of Care
- Technical Guideline No. 5. on Waste Classification
- Technical Guidelines (97) for Personal Protective Equipment – Foot Protection HSE from the Health & Safety Department
- Technical Guidelines (98) for Personal Protective Equipment – Hand Protection HSE from the Health & Safety Department
- Technical Guidelines (99) on Safety Signs at Work from the Health & Safety Department
- Technical Guidelines (59) for Personal Protective Equipment – Eye and Face Protection HSE from the Health & Safety Department

The related circulars and posted information bulletin of this guideline are posted on Dubai Municipality's website – [www.dm.gov.ae](http://www.dm.gov.ae) link to the Waste Department.

The Duty of Care Program is a management tool that controls the waste generated in Dubai. The regulation requires that all transfers of waste are appropriately recorded in order to assist in tracking the quantity generated and movements of waste. Waste treatment & recycling facilities must, therefore, ensure that the required signatures accompany the transfer of waste both into

and out of their site and that there is an adequate description (source, quantity, and type) of the waste which contains all the information necessary for safe handling, treatment, recovery, or disposal.

### 3 SCOPE AND COVERAGE

These Technical Guidelines apply to both waste generators and waste operators involved in activities concerning waste treatment and recycling facilities licensed by the Department of Economy & Tourism (DET) to conduct 1080005 - Organic Waste & Garbage Treatment activity in the Emirate of Dubai, including Free Zone Authorities as applicable.

### 4 WASTE DISPOSAL AND PERMITS FOR NON-HAZARDOUS WASTE

For non-hazardous organic wastes, which primarily come from municipal solid waste (MSW) and other organic wastes, waste generators must utilize Dubai Municipality-approved collectors, transporters, and treatment facilities for collection and disposal. Commercial establishments generating MSW and general waste must provide details of their waste management contracts with Dubai Municipality-approved service providers during the renewal of their licenses.

For other unwanted materials or wastes that do not fall under the above category, an online permit procedure should be followed if they are non-hazardous.

The procedure for securing an online permit for the treatment and recycling of unwanted or other such waste materials must be conducted through the DM Waste Treatment Section (DM-WTS) by requesting a [Permit of Waste Disposal](#) through the Waste Disposal Service (WDS) to send the waste materials to a DM-Accredited Recycler or a facility operated by DM as shown in Annex 1: Request for Permit of Wastes Disposal. The WDS can be accessed at the Dubai Municipality's website – [hub.dm.gov.ae](http://hub.dm.gov.ae) - upon login with a UAE Pass/ User Management ID and password.

The WDS system conveniently allows applicants to file disposal requests 24/7, view request status, and print the WDS upon approval, including online payment of disposal charges. The following steps summarize the process of applying for an online WDS:

1. The Waste Generator logs in using Google Chrome at [hub.dm.gov.ae](http://hub.dm.gov.ae) as a business with UAE pass/DMUM ID and clicks on “Apply for Service” - “Request for Permit of Wastes Disposal (Hazardous/ Recyclable/ Unwanted Materials)” and chooses “New Permit” with all the necessary attachments for each type of waste as will be described in the next sections.
2. **File attachments should be in PDF format.** (Ex. BL.pdf, photos.pdf)
3. **Total amounts of waste to be declared in the disposal request shall be in metric tons with the estimated quantity for the wastes that have been accumulated,** including the estimated waste amount to be sent to the facility during the validity period of the permit (three months from the date of issuance).
4. **The applicant will be informed through e-mail and SMS** once the application is approved by the WDS system.
5. **The exact address of the facility where waste is generated and stored shall be specified in the waste location details** in the application.
6. The “Permit of Disposal/Destruction” can be obtained by logging in to the WDS account and clicking “Download Permit”.
7. The payment (amount in AED) can be paid by an approved transporter with a valid NAFITH (smart gate) and RASID (GPS) account in DM-designated or accredited sites & facilities.
8. Alternatively, the fee can be paid by the owner of the waste (waste generator/applicant) who wishes to obtain a “Destruction Certificate” as proof that the waste has been accepted and disposed of at any DM-controlled waste treatment site. Similar to the permit process, the waste generator/applicant must log in at [hub.dm.gov.ae](http://hub.dm.gov.ae) as a business with UAE pass/DMUM ID. Click “Apply for Service” - “Request for Permit of Wastes Disposal (Hazardous/Trade Wastes/Unwanted Materials”, choose “Disposal Certificate” in the request Type, select WDS permit on the drop-down list, get details and pay the corresponding fee online.

### 4.1 Additional documents for Unwanted Materials Disposal Permit

For Unwanted Materials disposed at DM-operated facilities, the following summarizes the required documents and specific requirements:

1. Attach photos of the waste including:
  - Photos of waste inside the container;
  - Photos of the container;

- Photos showing all the waste (example: photo of waste packed in pallet);
  - Photos of the area where and how the waste is generated and stored.
2. For all Expired/Unused goods or products which are declared waste and unsuitable for use in their original form, the owner of waste must provide the following documents:
    - Material Safety Data Sheet (MSDS) or documentary proof that the material is non-hazardous (e.g. test report) if applicable.
    - Shipping/importation documents, including:
      - Bill of Lading;
      - Bill of Entry (Customs Declaration);
      - Certificate of Country of Origin;
      - Packing List;
      - Purchase Order;
    - Certificate of Manufacturing & Expiry Dates<sup>1</sup>.
  3. For **items confiscated by Dubai Customs, Dubai Police, or any governmental authority** at the DM facility (unwanted materials), the applicant shall submit **confiscation documents from Dubai Police and/or any other government agency with a Court and/or Public Prosecution Order**.
  4. For **Abandoned/Unclaimed goods or products in Port Customs**, the applicant shall submit a **Dubai Ports World declaration letter for abandoned cargo**.

### 4.2 Recyclable Unwanted Materials

For **Unwanted Materials intended for recycling** at DM-accredited facilities & recyclers, the following is additionally required:

1. **Additionally, photos of the waste labels, including manufacturing and expiry date;**
2. **Documentary proof of the material is non-hazardous ( MSDS/lab test report or published data on the material);**
3. **Application Form for Permit/NOC for Waste Processing/Recycling (Acceptance Letter)** using the format provided by the chosen recycler and

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<sup>1</sup> Note: Any product, goods, or merchandise being applied for disposal will be assessed based on the submitted documents.

as shown in Annex 3. A list of DM-approved recyclers is available on the DM Website,

<https://www.dm.gov.ae/municipality-business/waste-dept/>.

4. A copy of the WDS permit shall be submitted to the DM-accredited recycler to set the schedule of transport and to obtain a collection receipt and Destruction Certificate from the recycler for recording<sup>2</sup>.
5. After completion of the recycling/reprocessing of recyclable waste materials, **the waste generator/applicant must log in using Google Chrome at [hub.dm.gov.ae](http://hub.dm.gov.ae) as a business with your UAE pass/DMUM ID. Click “Apply for Service” - “Request for Permit of Wastes Disposal (Hazardous/Trade Wastes/Unwanted Materials”, Choose “Disposal Certificate” in the request Type, select WDS permit on the drop-down list, get details, and upload the recycling certificate.**
6. The DM Accredited Recyclers are required to submit a monthly **Comprehensive Material Recovery Report (MRR)** of the recyclable waste materials being processed by their facility to the Waste Treatment Section (WTS) every second (2) day of every month as per Circular No. (1) of 2020 On the Comprehensive Inventory of the Recyclable Waste Data in the Emirate of Dubai.
7. **Disposal fees are set by the facility operator.**
8. Samples of permits for the disposal of unwanted materials to DM-accredited recyclers can be found in Annex 4.

## 5 OPERATORS OF ORGANIC WASTE & GARBAGE TREATMENT FACILITIES

The following provisions apply to companies with a valid license for 1080005 - Organic Waste & Garbage Treatment activity from DET or any third party engaged through a formal contract and who have attained prior authorization requests on behalf of the contracting party from the WSPD. The decision to accept or reject applications of a similar nature is at the sole discretion of the WSPD.

All facilities must comply with the **Post Environmental Clearance (EC) Compliance Monitoring and Reporting** which involves both Regulatory Monitoring (i.e. primarily site inspection of the facility performed by the DM-Environmental Sustainability department) and as applicable, self-monitoring in the form of Emissions Inventory reporting or submission. Facilities with emission sources are required to submit source descriptions, activity data and pollutant

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<sup>2</sup> Note: The applicant must add the remark that they undertake that only the above declared wastes will be sent for recycling and that together with the recycler they will be jointly responsible for the safe handling, recycling, and final disposal of any waste by-product.

concentrations via the interactive online platform (<http://www.dubaiairenvironment.dm.gov.ae/>), in accordance with the compliance conditions of the EC. A user account to access the **online platform should be requested by contacting DM- Environmental Sustainability and Environmental Assessment Section (AESEAS) via [Emission\\_Inventory@dm.gov.ae](mailto:Emission_Inventory@dm.gov.ae)**.

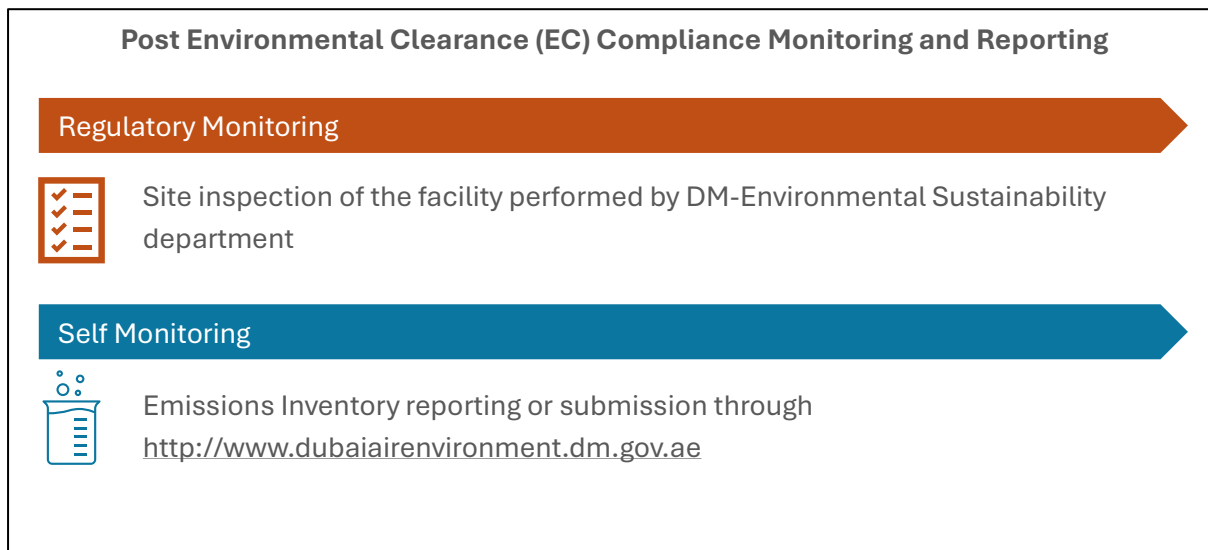


Figure 1 Post EC Compliance Monitoring and Reporting

Moreover, facilities must ensure that any appointed laboratory involved in the monitoring is accredited by EIAC<sup>3</sup>, for the specific tests. In Addition, WSPD requires a 3rd party audit annually: waste audit, environmental audit and safety audit.

In alignment with the WDS procedures, and as mentioned previously in section 4, all DM Accredited Recyclers are required to submit a monthly comprehensive MRR of the recyclable waste materials being processed by their facility to the WTS every second (2) day of every month as per Circular No. (1) of 2020 On the Comprehensive Inventory of the Recyclable Waste Data in the Emirate of Dubai.

## 6 ORGANIC WASTE TREATMENT

### 6.1 General Provisions

Biological treatment involves composting alongside other organic materials for the creation of soil products (i.e., aerobic treatment) and anaerobic digestion. To optimize the usability of the final products, it is crucial not to accept waste containing organics tainted with potentially harmful chemicals (e.g., PCBs, chlordane, pesticides, heavy metals, and metalloids) and/or pathogenic

<sup>3</sup> List of Accredited Laboratories: <https://eiac.gov.ae/directory>

substances and microorganisms (e.g., prions, viruses, bacteria, and parasites) that cannot be neutralized by the process or may pose health or environmental risks. This may encompass specific clinical waste, other clinically derived waste, diseased carcasses, or contaminants categorized as hazardous or industrial wastes. With regard to biological treatment processes, the following specific conditions must also be considered.

### 6.1.1 Waste Receipt, Unloading, Processing, and Storage

- Visually evaluate, weigh, and document incoming waste loads;
- Maintain records of the total quantity of waste and each received and processed. These records must be available for inspection.
- Proper weighing scales must be available at the facility, and calibration certificates must be maintained for inspection.
- If bulk transport is used, maintain suitable weighbridge receipts for all inward and outward movements.
- The facility should be equipped with an ANPR (Automatic Number Plate Recognition) system connected to Dubai Municipality.
- The facility should have CCTV cameras installed.
- Reject or, if the facility is equipped to process the waste, segregate potentially hazardous materials or wastes identified, including infectious waste, and manage as a hazardous or infectious waste, as applicable;
- Analyze suspected hazardous materials before acceptance so that they are segregated relative to compatibility and so that they can be adequately treated and disposed of;
- Provide adequate storage for waste not immediately treated or disposed of;
- Implement good housekeeping procedures;
- Ensure adequate training on the health and safety of the staff according to their activities and responsibility levels;
- Consider the use of enclosed/covered areas for waste tipping, shredding, compacting, and other processes;
- Install catch fences and netting to trap windblown litter.
- A digital process flow diagram of the treatment process must be available.
- A mass balance (in %) of all input and output streams must be available.

### 6.1.2 Contaminated & Leachate Run-off

Leachate and run-off emerging from waste storage and biological processing zones could carry organic substances (biochemical oxygen demand BOD),

phenols, nitrates, phosphorous, dissolved metals, and various contaminants. In instances where treated wood is involved, wood preservatives like creosote and chromated copper arsenate, along with their degradation byproducts, might be present. If permitted to migrate, leachate has the potential to pollute soil, surface water, and groundwater, leading to possible repercussions such as eutrophication and acidification of surface water, along with the contamination of water supplies. Suggested approaches for managing contaminated run-off encompass:

- When choosing the site, consider the proximity of waste handling and storage areas to water supply wells for people and animals, irrigation canals, and surface water bodies that support aquatic life and the ability to prevent contaminated leachate and drainage from entering surface and groundwater;
- Install a drainage layer underneath the processing area to provide adequate leachate drainage from composting organics. This may consist of a bed of coarse material such as wood chips, or alternatively, the processing platform may permanently incorporate a drainage layer designed to withstand the loading, working and removal of material. For small-scale compost facilities or in dry areas, an adsorbent material can be incorporated into the compost and at the base of the pile;
- The material processing or storage areas of the facility should have a leachate barrier system that forms a secure barrier between the groundwater, soil, and substrata and the composting or stored organics, as well as systems for collecting and treating leachate.
- Design and maintain the slope and orientation of windrows and/or leachate drains such that free drainage of leachate to a collection drain is facilitated, and ponding of leachate is avoided; shape the piles and windrows to maximize run-off and hence reduce infiltration.
- Store leachate in a lined earthen basin or in aboveground storage tanks;
- For anaerobic digestion, maximize recycling of wastewater to the reactor;
- Measure total organic carbon (TOC), chemical oxygen demand (COD), nitrogen (N), phosphorus (P) and chlorine (Cl) levels in the inlet and outlet flows from an anaerobic digester. When better control of the process is required, or a better quality of the waste output, monitoring of additional parameters may be necessary;
- Operate an anaerobic digester under thermophilic digestion conditions in order to increase the pathogen destruction, biogas production rate (hence higher energy recovery) and the retention time;
- For composting, maintain ideal composting conditions such as:

- Carbon: nitrogen (C:N) ratio between 25:1 and 35:1;
- Moisture content of 50 to 60 % of total weight during treatment (and less than 50 % for marketing following screening);
- Balance between particle size and void space to promote rapid decomposition. Void space should be sufficient to achieve a 10 to 15 % oxygen level within the pile in aerobic systems;
- Optimum temperature levels can range between 32°C and 60°C. Pathogen destruction can be achieved by attaining and maintaining a temperature of 55°C for three days in a vessel composting system or 15 days in a windrow system;
- pH of between 6 and 8.

### 6.1.3 Air Emissions

Air releases may encompass both direct stack emissions and fugitive emissions linked to biological processes, including those arising from the combustion of biogas. Direct air emissions comprise bioaerosols, particulate matter/dust, ammonia, amines, volatile organic compounds (VOCs), sulfides, odours, and more.

To curb, reduce, and regulate air emissions stemming from biological treatment, the following measures are suggested:

- Design drop-off points to minimize queuing of vehicles;
- Remove, treat, or dispose of all biological/malodorous wastes in an expeditious manner;
- Use odour-neutralising sprays where necessary;
- Provide respiratory protection equipment to the personnel who require it according to their tasks;
- Use negative pressure in processing buildings and appropriate air filtration (e.g., biofilter) to remove odour.
- Use mist spray to keep down dust, especially during and prior to loading or other handling procedures;
- Use windrow turning equipment that is specially designed to minimize air emissions, as opposed to wheeled loaders or conveyor loaders that drop wastes into piles;
- For highly odorous wastes, use a closed feed bunker constructed with a vehicle sluice; for less odour-intensive wastes, use automated and rapid action doors (opening times of the doors being kept to a minimum) in

combination with an appropriate exhaust air collection device resulting in under pressure in the treatment hall;

- Enclose leachate drains to reduce the emission of odours;
- Minimize the amount of water added to compost (e.g., by covering compost material) to avoid anaerobic conditions that can cause hydrogen sulfide odours if the compost mixture contains sulfur-containing materials.

Biomass and biogas combustion emissions depend on the type of biomass material and combustion method and can include particulate matter, nitrogen oxide (NO<sub>x</sub>), sulfur oxide (SO<sub>x</sub>), carbon monoxide (CO), hydrogen sulfide (H<sub>2</sub>S), and VOCs. When using biomass or biogas as a fuel source for power generation, reference should be made to the required guidelines for emissions values and the selection of appropriate emissions prevention and control techniques.

### 6.1.4 Noise and Vibration

- Construct a buffer zone between the facility and the external environment or locate facilities away from sensitive receptors;
- Maintain site roads in good condition to reduce noise and vibration from vehicle movements;
- Use acoustic screens around fixed/mobile plant and equipment;
- Select equipment that has low noise emission levels;
- Fit silencing equipment to plant, e.g. baffles/mufflers;
- Use buildings to contain inherently noisy fixed plant equipment (e.g., locate waste shredder in the tipping hall, and enclose tipping hall on all sides) and consider the use of sound-insulating materials in construction.

### 6.1.5 Fire Safety

Biodegradable wastes may undergo aerobic degradation, generating heat that, under specific conditions, could lead to spontaneous combustion. Some wastes may contain ashes and easily ignitable materials, prone to ignition when exposed to wind or flammable substances. Landfills, through anaerobic digestion, produce methane, which can ignite if it encounters an ignition source within or outside the landfill. Methane in landfill gas may also accumulate in underground spaces, potentially posing an explosion risk along geological discontinuities.

Advised measures for preventing and controlling fires include:

- For composting, avoid conditions that can lead to spontaneous combustion (e.g., moisture between 25 – 45 % and temperatures above about 93°C. This can be achieved for example by keeping windrows less than about 3 m high and turning them when the temperature exceeds 60°C) ;
- Collect biogas for use or treatment (e.g. energy recovery or flaring);
- Provide a fire alarm system, including temperature sensors in the waste being treated;
- Design the facility for access by firefighting equipment, including clear aisles among windrows and access to an adequate water supply.

## 6.2 MSW Incineration Facilities

### 6.2.1 Air Emissions

Incineration's air emissions are contingent on the unique composition of the waste and the presence and efficacy of air pollution control systems. Pollutant releases may encompass carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), particulate matter, ammonia, amines, acids (HCl, HF), volatile organic compounds (VOCs), dioxins/furans, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), metals (Hg), and sulfides, among others, contingent upon the waste makeup and combustion conditions. To mitigate, reduce, and manage air emissions, the following measures are recommended:

- Conduct waste segregation and/or pre-sorting to avoid incineration of wastes that contain metals and metalloids that may volatilize during combustion and be difficult to control through air emission technology (e.g., mercury and arsenic);
- Follow applicable national requirements and internationally recognized standards for incinerator design and operating conditions, mainly rapid quenching of the flue gas after leaving all combustion chambers and before entering any dry particulate matter air pollution control device, as well as combustion temperature, residence time, and turbulence. Standards for stationary incinerators, which include temperature and afterburner exit gas quenching (i.e. rapid temperature reduction) requirements, are preferred in order to nearly eliminate dioxins and

furans; sensors for detecting and reporting emission values directly to the authorities.

- Introduce wastes into the incinerator only after the optimum temperature is reached in the final combustion chamber;
- The waste charging system should be interlocked with the temperature monitoring and control system to prevent waste additions if the operating temperature falls below the required limits;
- Minimize the uncontrolled ingress of air into the combustion chamber via waste loading or other routes;
- Optimize furnace and boiler geometry, combustion air injection, and, if used, NO<sub>x</sub> control devices using flow modelling;
- Optimize and control combustion conditions by the control of air (oxygen) supply, distribution and temperature, including gas and oxidant mixing; the control of combustion temperature level and distribution; and the control of raw gas residence time;
- Implement maintenance and other procedures to minimize planned and unplanned shut-downs;
- Avoid operating conditions in excess of those that are required for efficient destruction of the waste;
- Use auxiliary burner(s) for start-up and shut-down and for maintaining the required operational combustion temperatures (according to the waste concerned) at all times when unburned waste is in the combustion chamber.
- Use a boiler to transfer the flue-gas energy for the production of electricity and/or supply of steam/heat, if practical;
- Use primary (combustion-related) NO<sub>x</sub> control measures and/or selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) systems, depending on the emissions levels required;
- Use flue gas treatment system for control of acid gases, particulate matter, and other air pollutants;
- Minimize the formation of dioxins and furans by ensuring that particulate control systems do not operate in the 200 to 400 °C temperature range; identifying and controlling incoming waste composition; using primary (combustion-related) controls; using designs and operation conditions that limit the formation of dioxins, furans, and their precursors; and using flue gas controls;

- Consider the application of waste-to-energy or anaerobic digestion technologies to help offset emissions associated with fossil fuel-based power generation<sup>4</sup>.

### 6.2.2 Ash and Other Residuals

The combustion of solid waste generates ash and other remaining material after incineration. Solid wastes may also be generated from wastewater treatment using flue gas treatment (FGT). The following measures are recommended to prevent, minimize, and control solid waste from incineration:

- Design the furnace to, as far as possible, physically retain the waste within the combustion chamber (e.g. narrow grate bar spacing for grates, rotary or static kilns for appreciably liquid wastes), and use a waste throughput rate that provides sufficient agitation and residence time of the waste in the furnace at sufficiently high temperatures, including any ash burn-out areas, in order to achieve a total organic carbon (TOC) value in the ash residues of below 3 wt. % and typically between 1 and 2 wt. %.
- Manage bottom ash separately from fly ash and other flue gas treatment residues to avoid contamination of the bottom ash for its potential recovery;
- Separate remaining ferrous and non-ferrous metals from bottom ash as far as practicably and economically viable for their recovery;
- Treat bottom ash on or off-site (e.g., by screening and crushing) to the extent that is required to meet the specifications set for its use or at the receiving treatment or disposal site (e.g., to achieve a leaching level for metals and salts that is in compliance with the local environmental conditions at the place of use);
- Bottom ash and residuals should be managed based on their classification as hazardous or non-hazardous materials. Hazardous ash should be managed and disposed of as hazardous waste. Non-hazardous ash may be disposed of in an MSW landfill or considered for recycling in construction materials<sup>5</sup>.

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<sup>4</sup> The possibility of applying waste-to-energy technologies depends on a number of issues which may include the project design specifications established by local government as well as laws applicable to the generation and sale electricity. Also, it should be noted that recycling options may often save more energy than what is generated by incineration of mixed solid waste in a waste- to-energy facility.

<sup>5</sup>[EPA](#)

### 6.2.3 Water Effluents

Cooling systems produce cooling tower blowdowns. Moreover, the treatment of flue gas gives rise to wastewater that necessitates proper treatment and disposal. To manage and mitigate water effluents effectively, it is imperative to treat wastewater from flue gas treatment, employing techniques such as filtration, coagulation, precipitation, and filtration to eliminate heavy metals while also neutralizing the solution.

## 7 OCCUPATIONAL HEALTH AND SAFETY

The most significant occupational health and safety impacts typically associated with

workers at waste management facilities occurring during operations include:

### 7.1.1 Accidents and injuries

- Workers are especially susceptible to accidents involving trucks and other moving equipment. Recommended measures include the implementation of traffic management systems and the presence of traffic controllers;
- Accidents may involve slides from unstable disposal piles, cave-ins of disposal site surfaces, fires, explosions, being caught in processing equipment, and being run over by mobile equipment;
- Other potential injuries include those resulting from heavy lifting, contact with sharps, chemical burns, exposure to infectious agents and potentially contaminated substances (i.e. fuel and foul sewage);
- Especially in MRFs, Employees are in close proximity to a variety of hazards, including equipment with moving parts (e.g. conveyor belts, blades, balers, and compactors);
- Risk assessments of hazards should be conducted with common risks at MRFs, including manual handling; slips, trips, and falls; being hit by moving, flying, or falling objects; contact with moving machinery; and needles/sharps. Each risk assessment should identify the hazards, decide who might be harmed and how, evaluate the risks, decide on precautions and control measures (i.e. suitable training, regular housekeeping, and PPE), and implement the findings. The risk assessment should be reviewed and updated as necessary.

### 7.1.2 Chemical exposure

- Smoke, dust, and bioaerosols can lead to injuries affecting the eyes, ears, and respiratory systems;
- Provide workers with appropriate protective clothing, gloves, respiratory face masks, slip-resistant shoes for waste transport workers and hard-soled safety shoes for all workers to avoid puncture wounds to the feet. For workers near loud equipment, noise protection should be included. For workers near heavy mobile equipment, buckets, cranes, and at the discharge location for collection trucks, include provision of hard hats;
- Provide adequate personnel facilities, including washing areas and areas to change clothes before and after work, as well as praying rooms;
- Ventilate enclosed processing areas (e.g., dust in waste size reduction areas, VOCs driven off by high temperatures during composting);
- Monitor breathing zone air quality in work areas at processing, transfer, and disposal facilities. Direct-reading instruments that measure methane and oxygen deficiency are of primary importance; these include combustible gas indicators, flame ionization detectors, and oxygen meters;
- At waste, anaerobic digestion & landfills, volatile organics should also be analyzed in the biodegradation gases being collected and/or vented;
- In waste handling, sorting, and composting facilities, monitoring for organic dust is needed;
- The site should be a designated 'no eating /drinking & smoking area.

### 7.1.3 Exposure to pathogens and vectors

- For composting, maintain aerobic conditions and proper temperatures in the windrows. Isolate workers from spore-dispersing components of the composting process, such as mechanical turning (e.g., by using tractors or front-end loaders with enclosed air-conditioned or heated cabs). Aeration systems are preferred over manual turning;
- Maintain adequate temperature and retention time in biological treatment systems to achieve pathogen destruction (e.g., 55°C for at least 3 consecutive days in most compost situations and 55°C for 15 days in windrows);
- Provide and require the use of dust masks or respirators under dry and dusty conditions (e.g., when compost is being turned). Charcoal-filled respirators also reduce odor perception;

- Provide prompt medical attention for cuts and bruises. Cover open wounds to prevent contact with the incoming loads or feedstock;
- Fully enclose the waste management site with fencing so that no livestock or wildlife is able to come in contact with the waste, which contains significant potential to enable the spread of livestock and zoonotic disease, as well as spillover disease to wildlife. Provide daily cover of wastes to minimize the attraction to birds, which can become infected with avian influenza and other bird diseases that can then be carried off-site.

To mitigate those risks, it is also necessary to develop a Hazard Management Plan (HMP) in line with the UAE Occupational Health and Safety Management System (OHSMS) (where applicable) to minimize the risk of injury from such hazards. Moreover, contingency plans in the event of equipment failure & Emergency procedures plan need to be considered. Fire safety requirements are also crucial, such as installing a ceiling sprinkler system alarm and fire hoses, which should be in place on-site. This equipment should be clearly marked and tested at appropriate intervals to confirm integrity. Site personnel should be made aware of their location, trained in their correct use, and know when it is safe to use them. Further Environmental impacts and mitigation measures are discussed in Annex 5.

## 8 REFERENCES

European Waste Framework Directive 2008/98/EC

European Committee for Standardization (CEN) or U.S. EPA leaching procedures)

UNEP. 2000a. Secretariat of the Basel Convention. Technical Guidelines on Hazardous Wastes: Physico-Chemical Treatment/Biological Treatment. Basel Convention series/SBC No. 02/09. Geneva: UNEP.

UNEP. 2000b. Secretariat of the Basel Convention. Technical Guidelines on Wastes Collected from Households. Basel Convention Series/SBC No. 02/08. Geneva: UNEP.

UNEP. 1997a. Secretariat of the Basel Convention. Technical Guidelines on Specially Engineered Landfill (D5). Basel Convention Series/SBC No. 02/03. Geneva: UNEP.

UNEP, Secretariat of the Basel Convention. 1997b. Technical Guidelines on Incineration on Land. Basel Convention Series/SBC No. 02/04. Geneva: UNEP.

International Finance Corporation. (1998). Environmental, Health and Safety Guidelines for Waste Management Facilities. Retrieved from <https://www.ifc.org/content/dam/ifc/doc/1990/waste-mgmt.pdf>

International Finance Corporation. (2007). Environmental, Health, and Safety Guidelines for Waste Management Facilities. World Bank Group. Retrieved from <https://www.ifc.org/content/dam/ifc/doc/1990/waste-mgmt.pdf>

Basel Convention. (1994). The Framework Document 1994 on the preparation of technical guidelines for the environmentally sound management of wastes subject to the Basel Convention. Retrieved from <https://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/TechnicalGuidelines/tabid/8025/Default.aspx>

Environmental Protection Agency. (1995, April). EPA's Environmental Justice Strategy: Implementing EO 12898.

## ANNEX 1: REQUEST FOR PERMIT OF WASTES DISPOSAL

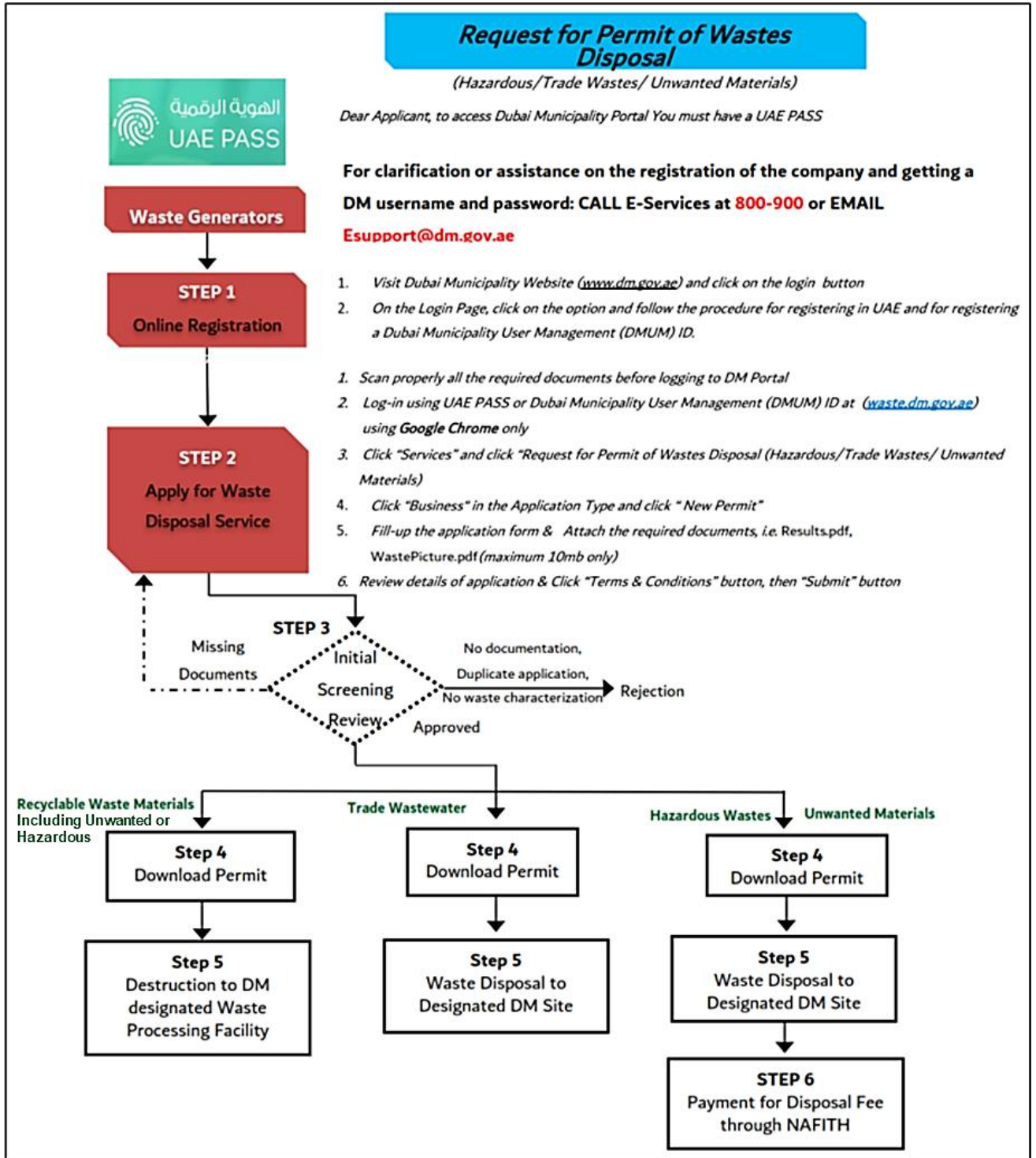


Figure 2: Online registration & request for permit of waste disposal procedures.

## ANNEX 2: WASTEWATER DISCHARGE LIMITS

Table 1 Dubai wastewater discharge limits according to the Environmental Standards and Allowable Limits of Pollutants on Land, Water, and Air.

INDICATORS		*Maximum Allowable Limits for Discharge to		
		Sewerage System	Land as for Irrigation	
<i>Physico-Chemical</i>	Units		Drip	Spray
Biochemical Oxygen Demand	mg/l	1,000	20	10
Chemical Oxygen Demand	mg/l	3,000	100	50
Chlorides	mg/l		500	350
Chlorine – residual	mg/l	10	Not less than 0.5 mg/l after 30 min contact time	
Cyanides as CN	mg/l	1	0.05	0.05
Detergents	mg/l	30		
Fluorides	mg/l		1	1
Nitrogen, ammoniacal	mg/l	40	5	1
Nitrogen, organic (Kjeldhal)	mg/l		10	5
Nitrogen, total	mg/l		50	30
Oil & Grease – Emulsified	mg/l	150		
Oil & Grease – Free oil	mg/l	50	5	5
pH (range)	units	6 – 10	6.0 – 8.0	6.0 – 8.0
Pesticides, non-chlorinated	mg/l	5		
Phenols	mg/l	50	0.1	0.1
Phosphorous (P)	mg/l	30	20	20
Sulfates, total	mg/l	500	200	200
Sulfides as S	mg/l	10	0.05	0.05
Surfactants	mg/l			
Suspended Solids (SS)	mg/l	500	50	10
Temperature	°C	45 or > 5 of ambient		
Total Dissolved Solids (TDS)	mg/l	3,000	1,500	1,000
<b>Metals</b>				
Total Metals	mg/l	10		
Aluminum (Al)	mg/l		2	2
Arsenic (As)	mg/l	0.50	0.05	0.05
Barium (Ba)	mg/l		1	1
Beryllium (Be)	mg/l		0.1	0.1
Boron (B)	mg/l	2.0	2.0	2.0
Cadmium (Cd)	mg/l	0.3	0.01	0.01
Chromium (Cr)	mg/l	1.0	0.1	0.1
Cobalt	mg/l		0.1	0.1
Copper (Cu)	mg/l	1.0	0.2	0.2
Iron (Fe)	mg/l		2.0	2.0
Lead (Pb)	mg/l	1.0	0.5	0.5
Magnesium (mg)	mg/l		100	100
Manganese (Mn)	mg/l	1.0	0.2	0.2
Mercury (Hg)	mg/l	0.01	0.001	0.001
Molybdenum (Mo)	mg/l		0.01	0.01
Nickel (Ni)	mg/l	1.0	0.2	0.2
Selenium (Se)	mg/l		0.02	0.02
Silver (Ag)	mg/l	1.0		
Sodium (Na)	mg/l		500	200
Zinc (Zn)	mg/l	2.0	0.5	0.2
<b>Bacteriological</b>				
Fecal Coliforms	MPN/100 ml.	500	20	

## ANNEX 3: APPLICATION FORM FOR WASTE PROCESSING/RECYCLING

Table 2 Application Form for Permit/NOC for Waste Processing/Recycling

APPLICATION FORM FOR PERMIT/NOC FOR WASTE PROCESSING/RECYCLING			
<b>COMPANY DETAILS</b>			
Waste Generator	(Company name)		
License No.		P.O. Box	
Contact Person		Designation	
Contact Info	Telephone & Mobile	Email	
<b>WASTE DETAILS</b>			
Waste Description			
Source/Process			
Waste Location (Address of Company)			
Packaging Details/ Number of Packages			
Total Weight (tons)			
<small>*The company and wastes details shall be the same in the online Waste Disposal Service request</small>			
<b>RECYCLER DETAILS</b>			
Company Name		License No.	
Address of Recycling Facility			
Contact Info	Telephone & Mobile	Email	
Recycler Reference No.			
<b>ACKNOWLEDGEMENT OF RESPONSIBILITY</b>			
We hereby acknowledge that any misdeclaration, and/or breach of conditions hereof or of applicable environment protection regulations will warrant sanctions or fine as deemed appropriate.			
<b>For RECYCLING Company:</b>		<b>For Waste Generator (Company Name)</b>	
<p>I acknowledge that the declared material applied and on the photos attached for recycling in our facility will not cause any form of pollution either on ground, water or environment during the processing of the wastes.</p> <p>I acknowledge that it is our responsibility to ensure that the material received will be fully destructed and unusable from its original form and will not be distributed in the market.</p> <p>A monthly material recovery report (MRR) will be submitted to Waste Treatment Section (WTS) for processing of waste.</p>		<p>I acknowledge that the wastes stated above was generated by us and is factually described by this application. I hereby certify that the named materials are properly classified, described, packaged, marked and labelled and are in proper condition for transportation.</p> <p>I hereby guarantee that the waste will be delivered to the Dubai Municipality Approved Recycler without loss or alteration.</p>	
(name) (designation)		(company stamp & signature & date)	
(company stamp & signature & date)		(company stamp & signature & date)	

## ANNEX 4: SAMPLE UNWANTED MATERIALS DISPOSAL PERMIT

Table 3 Sample Permit for Disposal of Unwanted Materials to DM Accredited Recycler

Waste Operations Department		إدارة عمليات النفايات
Waste Treatment Section		قسم معالجة النفايات
تصريح التخلص من المواد غير المرغوب فيها Permit for Disposal /Destruction of Unwanted Materials		
Ref No	WDS-240424-44327	Date
25/04/2024		
<b>Application Details</b>		بيانات التصريح
Company Name	:	اسم الشركة
License No.	503092	رقم الرخصة
Mobile No.	(+971) .....	رقم الهاتف المحمول
Email	@gmail.com	البريد الإلكتروني
<b>Waste Details</b>		تفاصيل النفايات
Waste Description	Wheat And Products /wheat flour	وصف النفايات
Source/Process	Import Shipment	المصدر / العملية
Waste Location	531 - DIC -SAIH SHUAIB 2	موقع النفايات
Package Type	Palette	نوع الحزمة
Qty per package	880	
Total Weight (Metric Tons)	22	الوزن الإجمالي (طن متري)
Applicant Remarks	We undertake that only the above declared wastes will be sent for recycling. We and the recycler will be jointly responsible for the safe handling, recycling and final disposal of any waste by-product.	ملاحظات مقدم الطلب
<b>Approval Details</b>		تفاصيل الموافقة
Classification	For Recycling - Food Material Unfit for Consumption	التصنيف
Disposal Location	Al Maha Organic Fertilizer Industries & Recycling LLC (Dubai Industrial City):	موقع التخلص
Remarks	Any misdeclaration of this WDS application will render this permit invalid and shall warrant sanctions or fine as deemed appropriate. Your COMPANY must WITNESS the destruction of materials to ensure that it will not be returned to the MARKET. NOTE: For any Destruction Certificate request please submit recycling certificate by uploading on the WDS system, Click request disposal certificate in the request type, then WDS ref no from the dropdown list, then click get details. This PERMIT is not a substitute to other regulatory permits, and its issuance does not exempt YOUR COMPANY from securing other government approvals, and preclude other agencies/departments from enforcing their rules and	ملاحظات
This document is electronically approved without a signature. To verify the authenticity of this document please visit <a href="https://waste.dm.gov.ae/Admin/DocumentVerification/VerifyDocu.html">https://waste.dm.gov.ae/Admin/DocumentVerification/VerifyDocu.html</a> and enter the Document ID : WDS-240424-44327 and Verification Code : 757756 , or alternatively scan the QR Code		هذه الوثيقة معتمدة إلكترونياً بدون توقيع، و للتحقق من صحتها يمكن زيارة الرابط أدناه <a href="https://waste.dm.gov.ae/Admin/DocumentVerification/VerifyDocu.html">https://waste.dm.gov.ae/Admin/DocumentVerification/VerifyDocu.html</a> بإدخال رقم الطلب WDS-240424-44327 و رمز التأكيد 757756 أو مسح QR Code المصادق

## ANNEX 5: ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Table 4 Environmental Factors and Mitigation Measures

Particulate Matter (PM)	Odour
<ul style="list-style-type: none"> <li>• Paving roads on site.</li> <li>• A bowser is used to spray water onto haul roads and waste storage and processing areas during dry and dusty conditions.</li> <li>• Utilize wheel-washes on incoming and outgoing vehicles.</li> <li>• Align building openings to minimize exposure to prevailing winds.</li> <li>• Install plastic curtains or roller shutter doors over building openings.</li> <li>• Keep station doors closed during operating hours, except when trucks are entering or exiting.</li> <li>• Install misting systems over tipping areas to “knock down” dust particles.</li> <li>• Implement speed limit restrictions on site haul roads.</li> <li>• Cover loads of waste that have the potential to emit significant dust during transport.</li> <li>• Undertake dust monitoring at specified locations on and off-site, if applicable.</li> <li>• Provide all site staff with PPE, including high-visibility clothing, FFP3 masks, and safety glasses.</li> </ul>	<ul style="list-style-type: none"> <li>• Enclose or cover loads of waste.</li> <li>• Refuse to accept certain highly odorous wastes.</li> <li>• Remove any other odorous waste from the premises as soon as practicable.</li> <li>• Increase the distance between the odor source and the receptor.</li> <li>• Practice “first-in, first-out” waste handling practices.</li> <li>• Regularly inspect and monitor waste handling areas.</li> <li>• Frequently clean/wash down waste handling areas.</li> <li>• Install ventilation systems with air filters or scrubbers.</li> <li>• Plant vegetative barriers, such as trees, to absorb and disperse odors.</li> <li>• Install plastic curtains or roller shutter doors on entrances and exits to contain odors when doors are opened to allow vehicles to enter or exit.</li> </ul>
Water and Soil Pollution	Noise and Vibration
<ul style="list-style-type: none"> <li>• Locate plants outside local flood zones, if applicable.</li> <li>• Cover the waste - use rain-tight and leak-tight HGVs and containers.</li> <li>• Keep surface water free of run-off contamination from waste, mud, and fuel/oil.</li> <li>• Implement impervious surfaces (i.e. paved surfaces) and engineered drainage systems. Ensure that there are sealed systems in place for potentially contaminated leachate from stored waste, so that it is collected separately from surface water.</li> <li>• Use secondary containment around temporary storage areas, i.e. fuel.</li> <li>• Collect soil samples on-site and within immediate locations to establish baseline conditions.</li> <li>• Monitor the composition of the surface water (e.g. sampling at agreed locations, upstream/downstream of the site, on a monthly/quarterly basis).</li> <li>• Monitor the flow and composition of foul water/sewer discharge.</li> <li>• Undertake site walkover (including nearby surface water courses) at agreed intervals.</li> <li>• Provide all site staff with PPE, including steel-tipped boots and gloves.</li> </ul>	<ul style="list-style-type: none"> <li>• Select quiet working equipment.</li> <li>• Shut down equipment when not in use.</li> <li>• Set a site speed limit of 15km per hour (or appropriate to site conditions and surroundings).</li> <li>• Enclose all waste-handling operations.</li> <li>• Concrete walls and structures should be used, which absorb sound better than metal structures.</li> <li>• Install shielding or barriers, such as trees, berms, or walls, around the facility to block and absorb noise.</li> <li>• Insulate building walls with sound-absorbing materials.</li> <li>• Locate administrative buildings between sources of noise and the community.</li> <li>• Locate sorting plant building openings (i.e. doors) away from receptors.</li> <li>• Keep doors closed during operating hours, except when vehicles are entering or exiting.</li> <li>• Establish operating hours that avoid early morning or late-night operations.</li> <li>• Set facility noise level limits and adhere to them.</li> </ul>

	<ul style="list-style-type: none"> <li>Record incidents of noise or vibration that exceed these limits – these should be diarized so that potential causes can be identified, and procedures put in place to eliminate them.</li> <li>Provide all site staff with PPE, including noise dampening earplugs/muffs.</li> </ul>
<b>Litter</b>	<b>Traffic</b>
<ul style="list-style-type: none"> <li>Covering all incoming and outgoing loads.</li> <li>Implementing daily litter inspections and pick-ups at the facility and on surrounding streets.</li> <li>A perimeter fence must be installed to prevent windblown litter from leaving the site.</li> </ul>	<ul style="list-style-type: none"> <li>Create a robust and formal transport management plan.</li> <li>Design internal and external roads to include highly visible markings, barriers, and signs (i.e. speed restrictions, traffic flow and separation areas between vehicles and pedestrian movements).</li> <li>Drivers should be appropriately trained and licensed.</li> <li>Create acceleration, deceleration, or turning lanes at site entrances and exits (where applicable) to maintain steady traffic flows around the facility.</li> <li>Work with the community to designate inbound and outbound Heavy Goods Vehicles (HGV) traffic routes and ensure that drivers follow these routes.</li> <li>Avoid traffic flows adjacent to noise-sensitive property.</li> <li>Restrict incoming HGV queueing on public streets, i.e., if inadequate space is available on site to accommodate waiting HGVs, use a remote site as a waiting area for HGVs.</li> <li>Where possible, schedule incoming traffic so that it does not coincide with local rush hours.</li> <li>Regularly maintain and service vehicles to ensure they are running as efficiently as possible.</li> <li>Switch off vehicles when not in use (both on-site and visiting vehicles).</li> <li>Provide all site staff with PPE, including high-visibility clothing and steel-tipped boots.</li> </ul>
<b>Flies, Vermin and Birds</b>	<b>Exposure to Potentially Hazardous Equipment and Substances</b>

## Technical Guidelines on Organic Waste & Garbage Treatment

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- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Hiring a professional licensed pest control company with expertise and experience in controlling specific vermin populations.</li><li>• Seal or screen openings that allow rodents and insects to enter the building, such as door and window frames, vents, and masonry cracks.</li><li>• Implement practices that reduce the likeliness of attracting vermin.</li><li>• Provide and require the use of suitable personal protective clothing and equipment.</li><li>• Maintain good housekeeping in waste processing and storage areas.</li><li>• Grade the area properly to prevent ponding (to minimize insect breeding areas);</li><li>• Use integrated pest-control approaches to control vermin levels, treating infested areas, such as exposed faces and flanks with insecticide, if necessary</li></ul> | <ul style="list-style-type: none"><li>• Supplying site staff with all necessary PPE.</li><li>• Displaying brightly colored warning signs around equipment and machinery.</li><li>• Regularly maintain and monitor equipment and machinery.</li><li>• Implemented emergency shutdown mechanisms on equipment and machinery.</li><li>• Keep all areas clean and tidy.</li><li>• Check bunds and tanks for leaks.</li><li>• Check the provision of oil spillage kits and absorbent materials.</li><li>• Ensure tanks and containers are secured against unauthorized access.</li><li>• Provide continuous staff training.</li><li>• Make emergency phone numbers visible and accessible.</li><li>• Provide worker immunization and health monitoring (e.g. for Hepatitis B and tetanus);</li><li>• Clean and wash with disinfectant the cabins of heavy mobile equipment used at regular intervals;</li></ul> |
|---|--|