(3/3)

Item	Specifications	Remarks
- Vehicle gross weight	About 16,000 kg	To handle carrying loads and long containers
(2) Main dimensions		Dimensions suited to a 160,000 kg arm roll container vehicle
- Total length	About 7,900 mm	
- Total width	About 2,500 mm	
- Total height	About 3,200 mm	
- Wheel base	About 4,700 mm	
- Minimum ground clearance	About 270 mm	
- Minimum turning radius	About 7,600 mm	
- Tires	11.0-20-14 PR	
(3) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and maintenance is easy
- Maximum output	About 220 HP	An engine with an output of 220 HP necessary for a gross vehicle weight of 16,000 kg
- Displacement	Around 12,000 cc	
(4) Attachments		
- Container lift		Single arm type is ample for the carrying loads
- Lift performance	For 15 m^3 containers	A lift that can comfortably handle loading and unloading of 15 m^3 containers
- Container control	By lever in driver cabin	

3.3.2 New Compost Plant Construction Plan

(1) Basic Policies of Plan

The existing Abis Compost Plant has been in operation for some ten years. It has continued to operate smoothly since its establishment, despite facing with various problems.

In this period, the plant's engineers and operators have gained more and more experience and are now able to repair minor breakdowns themselves in the plant workshop.

Planning of the new compost plant shall make full use of the achievements and experiences gained at the Abis Compost Plant, and adopt systems such as hand sorting of reusable materials and open compost fermentation which are suited to the technical levels in the area.

However, because there is no uniform feeding of solid waste at the Abis Compost Plant, the hand sorting workers have much time on their hands, and moreover the hand sorting process is not fully effective due to the fact that waste is fed onto the line intermittently and also because the hand sorting conveyor speed is too fast. Ineffective hand sorting frequently leads to blockage of the homogenizer drum. Another problem is that the storage area is insufficient to cope with seasonal fluctuations in demand for compost. Planning of the new compost plant will be done taking into account these points to be improved.

The required considerations in planning the new compost plant can be summarized as follows.

① The prior removal of large size waste unsuitable for compost production.

② The lowering of the feed hopper to almost ground level in order to enable feeding of waste with wheel loader and do away with the need to raise the load bucket for each feeding.

③ The use of an apron type feed conveyor possessing high uniform feed performance and fitted with a spreader to improve feed uniformity even further.

④ Setting of a slower hand sorting conveyor speed of 10 m/minute in order to enable proper hand sorting.

⑤ Instead of the homogenizer drum, pulverizing and classifying machine shall be adopted in order to perform powerful crushing and prevent unsuitable large size waste from gathering in the homogenizer drum together with large scale compost. This will raise the yield ratio of compost raw material.

⑥ The treatment processes between the waste receiving yard and compost manufacture shall be one line with a capacity of 150 tons/day. This shall be almost equivalent to the 160 tons/day capacity of the existing Abis Compost Plant. The setting of a capacity similar to that of the existing plant will enable the experience of operators gained at the existing plant to be utilized and so allow smooth operation to be expected.

⑦ The establishment of a composting yard and maturing yard both possessing ample space.

(2) Site Layout Plan

① Site Conditions

The plant equipment and buildings layout plan shall take the following points into consideration.

a. The scheduled construction site for the new compost plant is an approximately 60 m wide belt of land sandwiched between Lake Maryut on the north and a surrounding drainage channel on the south. The width of the plant site is thus limited to only 50 m, which means that it will have to be of a long thin shape.

b. The main Desert Road lies about 1 km to the north, and a paved branch road of around 10 m in width leads off from this past the north side of the site. This road shall be used as the access road during the construction work stage of the Project.

② New Compost Plant Formation

The major component elements of the new compost plant site plan are as follows.

a. Buildings:

- Factory Building (including garbage reception hall),
- Administration Building,
- Workshop
- Guard House

b. Primary sorting yard
c. Area for mechanical equipment such as the pulverizing and classifying machine
d. Reusable materials and reject storage areas
e. Composting yard
f. Maturing yard
g. Equipment for final treatment yard
h. In-site roads

③ Major Yard Areas

a. Composting yard

The waste quantity calculated from the material balance is as follows:

130.7 tons/day × 7 days × 4 weeks = 3,659.6 tons

7316.4 ÷ 0.35 (bulk specific gravity) = 10.456 m^3

Of the site width of 38 m, assuming that 35 m is used for compost raw material conveyor ② and that compost is piled to a height of 2 m:

10,456 m^3 ÷ 35 m ÷ 2 m = 149 m

Allowing space for turning of the turning machine and for installation of compost raw material line ② auxillary equipment, the length of the composting yard shall be set at 185 m. The area of the composting yard shall thus be as follows:

Width 38 m × length 185 m = 7,030 m^2

b. Maturing Yard

The maturation quantity and area calculated from the material balance are as follows:

76.8 tons/day × 7 days × 4 weeks = 2,150.4 tons
2,150.4 tons ÷ 0.4 (apparent specific gravity) ÷ 2 m (piled height) = 2,688 m^2

Assuming a yard width of 38 m, yard length will be:

2,688 m^2 ÷ 38 m = 71 m

Allowing an extra 30% to allow movement of wheel loader and dump trucks, yard length becomes:

71 m × 1.3 = 93 m

This shall be set at 120 m to allow extra holding space to handle seasonal fluctuations in compost demand. In that case, the yard area shall be as follows:

Width 38 m × length 110 m = 4,180 m^2

c. Primary Sorting Yard

This shall be large enough to hold half a day's incoming waste. The yard area shall thus be as follows:

75 tons/day ÷ 0.23 tons/m^3 (apparent specific gravity) ÷

1 m (piled height) = 326 m^2

This shall be set at 399 m^2 to include space for collecting rejected materials:

19 m × 21 m = 399 m^2

d. Garbage Reception Hall

This shall be large enough to hold around one day's incoming waste. Moreover, in consideration of wheel loader and other heavy machinery traffic lines, the hall area shall be as follows:

25 m × 20 m + 5 m × 9.5 m = 500 m^2

(3) Outline of Plant Equipment and Specifications

The new compost plant system flow is shown in Basic Design Drawing ASM-G-02 and the plant equipment specifications are indicated in Table 3.3.8.

Points to be considered in selecting equipment outlines and specifications are as follows.

① Waste Receiving Equipment

In order to enable effective operation management of the collection vehicles and a clear grasp of collected quantities, one truck scale shall be installed at the new compost plant and another at the Abis Compost Plant, where the existing truck scale is out of use.

The frame capacity of the truck scales shall be 30 tons in view of the fact that the heaviest collection vehicle load is 21 tons.

There are both load cell and mechanical type truck scales, however because there are no more manufacturers of mechanical types and because breakdowns are rare and parts procurement easy, load cell type truck scales shall be adopted.

Collection vehicles shall be weighed on the load scale located at the plant entrance and then unload their collected waste in the receiving hall.

If items not suited as compost raw material such as tires and willow baskets are included in the collected waste, the waste shall be unloaded in the primary sorting

yard where the unsuitable items shall be manually separated. The remaining waste shall then be transferred to the receiving hall by wheel loader.

② Waste Feeding Equipment

Waste that has been unloaded into the receiving hall shall be shovelled into the hopper by wheel loader, from the bottom of which it will be carried to the hand sorting conveyor by feeding conveyor.

It is planned to attach a spreader to the feeding conveyor in order to further raise the uniformity of waste feeding.

③ Hand Sorting Line and Classifier

Reusable items such as corrugated fiberboard boxes, glass, plastics, metals and cloth etc. shall be separated from the waste that is fed onto the hand sorting conveyor, and thrown down chutes into hand carts.

The hand sorting conveyor shall be planned so waste fed onto it down a chute from the feed conveyor is uniformly spread not too thickly, and the conveyor speed shall kept slow at 10 m/minute in order to enable the operators stationed on either side of the conveyor to carry out the hand sorting effectively.

Items that may prove harmful to the after process shall be screened, placed into hand carts and eventually taken to the disposal site by truck.

The pulverizing and classifying machine (classifier) shall consist of a horizontally set perforated, rotating drum and all items of waste with weak mechanical strength shall be crushed and classified. Waste items with a high degree of mechanical strength will be sent to the extraction mouth.

The waste extracted through the drum perforations provides the raw material for compost and shall be carried along compost raw material conveyors ① to compost raw material conveyor ②, which will drop it into the composting yard. While the waste is carried long compost raw material conveyor B, any metals contained in it will be picked up by the magnetic separator installed above the conveyor.

Waste that is emitted from the end part of the classifier shall be fed onto solid waste conveyor ① and then while being carried along, metals will be picked up by a

magnetic separator. It will then be collected in the solid waste storage area from where it will be carried by truck to the final disposal site.

Reusable material that has been separated into hand carts and metal items that were picked up by the magnetic separator above solid waste conveyor ① will be carried to a binder for binding and then carried by hoist to the shipping area.

④ Composting Yard

Compost raw material that is carried to the composting yard by compost raw material conveyor ② shall be turned by the turning machine and then left to ferment for four weeks. The reasons for introducing a turning machine into the yard are as follows.

- In the case of open pile compost production, a long fermentation period of a few months is required, however agitating the raw material by turning machine creates air pockets which cause a marked acceleration of the fermentation process.

- The turning machine mixes the raw compost raw material and so breaks up lumps enabling a uniform compost to be obtained. Moisture content control shall be carried out by sprinkling from sprinkler heads according to necessity.

⑤ Maturing Yard

Compost that has finished fermentation in the composting yard shall be carried to the maturing yard by wheel loader and truck. There, it will be left to mature for around one month during which time water sprinkling shall be performed in order to adjust moisture content. After the maturation period, the compost will be directly sold to consumers.

For those consumers who require it, fine compost shall be offered after it has been removed of foreign materials in a vibrating screen.

Any reject that remains after the vibration screening shall be returned by wheel loader to the composting yard.

⑥ Cooling Equipment

The heat generated by the gear coupling which drives the classifier shall be emitted into the air through a cooling tower.

Because the water used in the water tower will be circulated within the hydraulic coupling, foreign material must not be allowed to gather in it. Therefore, a water treatment unit is to be attached in order to remove any solids and carry out water softening.

⑦ Moisture Content Control Equipment

Water supply equipment is to be installed in order to enable moisture content control to be performed in the composting yard.

A water pipe will be laid alongside compost raw material conveyor ① and this will be fitted with sprinkler heads at 20 m intervals so as to allow sprinkling by hose.

Water adjustment is not so frequent in the maturing yard and so sprinkling shall be done through hoses linked to fire hydrants whenever required. Water for moisture control purposes shall be kept in a sprinkling water tank and fed by pump. The sprinkling water tank shall be provided near the classifier.

⑧ Drainage System

Wastewater that flows off the conveyor belts etc. shall be collected in a drainage pit provided near the classifier. It shall be sent by drain pump to the composting yard where it will be used for moisture control purposes.

⑨ Fuel Supply Equipment

A fuel tank shall be provided for the site vehicles.
The four wheel loaders, one turning machine and five dump trucks to be provided at the plant will use around 1,300 liters of gasoline per day. The fuel tank shall be designed to hold half a month's supply of this fuel consumption.

In order to make refuelling more convenient and safer, a service tank shall be provided and fuel transfer shall be done by gear pump.

⑩ Electrical Equipment

The scope of electrical equipment shall encompass from the incoming panel in the plant to all equipment beyond. Power shall be supplied through two circuits (normal use and reserve) from the city distribution network (11 kV, three phase, 50 Hz).

An emergency generator is not to be installed for the following reasons.

- An emergency generator is in place at the existing Abis Compost Plant, however this was installed due to the very frequent and long power cuts that occurred when the plant was first opened in 1985. Since then, the power supply situation has greatly improved and power cuts now hardly occur at all, and if they do, this is only for an hour or so once per month.

- Because the new compost plant shall adopt a two circuit power supply system, it will be able to cope with emergency situations.

Table 3.3.8 New Compost Plant Equipment Specifications

(1/3)

Equipment	Q'ty	Specifications	Remarks
1. Waste receiving equipment			
- Truck scales	2	Load cell type Frame capacity 30 tons	
- Personal computer	1	CPU INTEL486 Hard disc 340MB	To be used for collection of incoming waste data and information on plant operation and also for preparation of statistical materials.
2. Waste feeding equipment			
- Hopper	1	12 m^3 capacity	Enough capacity to hold 6 wheel loader loads
- Feeding conveyor	1	Apron type with steel belt Capacity: 10.7 tons/hour Belt speed: 30 m/minute Belt width: 900 mm Length: about 16m	
- Leveller	1	Electrical operation	
3. Hand sorting line and classifier			
- Hand sorting conveyor	1	Rubber belt Capacity: 10.7 tons/hour Belt speed: 10 m/minute Belt width: 1,600 mm Length: about 24m	
- Hand carts	12	With steel hard rubber wheels Capacity: 1 m^3 Dimensions: 1 m × 1 m × 1 m	
- Classifier input conveyor	1	Rubber belt Capacity: 10.4 tons/hour Belt speed: 30 m/hour Belt width: 900 mm Lentgh: about 22m	
- Classifier	1	Pulverizing classifier type Capacity: 10.4 tons/hour	
- Ferrous baler	1	Manual insertion hydraulic press automatic compressor Capacity: 0.7 tons/hour	
- Paper baler	1	Manual insertion power compression automatic baler	
- Textile baler	1	Manual insertion hydraulic press automatic baler	
- Hoist	1	Power hoist and running type Capacity: 1 ton	
- Reject conveyor ①	1	Rubber belt Capacity: 3.7 tons/hour Belt speed: 30 m/min Belt width: 900 mm Length: about 12 m	Based upon material balance (Fig. 3.3.2), capacity shall be: 51 tons/day + 14 hours = 3.7 tons/hour

Equipment	Q'ty	Specifications	Remarks
- Magnetic separator ②	1	Hanging, eternal magnet type with feed conveyor Capacity: 7.4 tons /hour Dimensions: 1,800 mm wide × 2,100 mm long	
- Compost material conveyor ①	1	Rubber belt Capacity: 9.4 tons/hour Belt speed: 30 m/minute Belt width: 600 mm Length: about 22m	Based upon material balance (Fig. 3.3.2), capacity shall be: 131.6 tons/day ÷ 14 hours = 9.4 tons/hour
- Magnetic separator ①	1	Hanging, eternal magnet type Capacity: 9.4 tons /hour Dimensions: 1,100 mm wide × 1,500 mm long	
- Compost material conveyor ②	1	Rubber belt with tripper Capacity: 9.4 tons/hour Belt speed: 30 m/minute Belt width: 600 mm Length: about 19m	The carrying capacity here excludes the waste picked up by magnetic separator ①
4. Composting Yard			
- Turning machine	1	Self running agitator type Agitation capacity: 560 m^3/hour	
5. Maturing Yard			
- Compost feeder	1	Multi spindle screw type with hopper Hopper capacity: 6 m^3 Capacity: 5.7 tons/hour	
- Feed conveyor	1	Rubber belt Capacity: 5.7 tons/hour Belt speed: 30 m/min Belt width: 600 mm Length: about 19 m	
- Vibrating screen	1	Stainless steel screen vibration type Capacity: 5.7 tons/hour	
- Reject conveyor ②	1	Rubber belt Capacity: 1.4 tons/hour Belt speed: 30 m/minute Belt width: 600 mm Length: about 6m	
- Fine compost conveyor	1	Rubber belt Capacity: 3.6 tons/hour Belt speed: 30 m/minute Belt width: 600 mm Length: about 12m	
6. Cooling equipment			
- Cooling tower	1	Closed circulation type Capacity: 210,000 kCal/hour minimum Dimensions: 2,700 × 1,900 × 2,100 mm	
- Water treatment unit	1	Automatic type Capacity: 20 ℓ/minute Dimensions: 800 × 400 × 1,300 mm	
- Cooling pumps	2	Centrifugal pump Lifting capacity: 450 ℓ/min Pump head: 27 m	
- Circulation drum	1	Stainless steel assembled type Capacity: 1 m^3 Dimensions: 1,500 × 1,500 × 1,000 mm	

Equipment	Q'ty	Specifications	Remarks
7. Moisture content adjustment equipment			
- Pump ①	1	Centrifugal pump Lifting capacity: 70 ℓ/min Pump head: 15 m	
- Pump ②	1	Centrifugal pump Lifting capacity: 50 ℓ/min Pump head: 15 m	
- Spraying tank	1	Stainless steel assembled type Capacity: 10 m^3 Dimensions: 4,000 × 4,000 × 1,000 mm	
8. Drainage System			
- Pump ③	1	Hand pump Lifting capacity: 0.1 ℓ/operation	
- Pump ④	1	Centrifugal pump Lifting capacity: 50 ℓ/min Pump head: 15 m	
9. Fuel supply equipment			
- Fuel tank	1	Steel plate Capacity: 20 m^3 Dimensions: diam 2,200 mm × length 6,000 mm	
- Fuel pump	1	Gear pump Lifting capacity: 30 ℓ/min	
- Service tank	1	Steel plate Capacity: 200 ℓ	
10. Electrical equipment			
- High tension incoming panel	1	Self supporting steel plate outdoor type	To be established alongside the road near the workshop
- Transformer	1	Oil immersed, self cooled outdoor type Capacity: 1,000 kVA 11 kV/380 V three phase 50 HZ	
- Motor and distribution panel	1	Steel plate self supporting outdoor type	
- Field operation panel	1	Steel wall hanging type or standing type	

(4) Plant Operation Heavy Machinery

Wheel loaders and dump trucks are the items of heavy machinery that are required for plant operation. The purposes of use and required quantities of such machinery are as shown in Table 3.3.9.

Table 3.3.9 Purposes of Use and Required Quantities of Heavy Machinery for Compost Plant Operation

Type of Heavy Machinery	Purpose of Use	Required Number	Remarks
Wheel loaders	* For primary sorting	1	2 m^3 class
	* For hopper insertion	1	
	* For waste transfer	1	
	* For waste transfer between composting yard and maturing yard	1	
	Total	4	
Dump trucks	* For waste transfer between composting yard and maturing yard	2	8 ton class
	* For waste disposal	3	
	Total	5	

The specifications for each item of heavy machinery are as indicated in Table 3.3.10.

Table 3.3.10 Compost Plant Heavy Machinery Specifications

Item	Specifications	Remarks
1. Wheel loader		
(1) Main specifications		
- Type	2 m^3 class	
- Drive	2 m^3 class wheel loader	
- Bucket	Minimum 2 m^3 class	
- Gross weight	10,000 kg	
(2) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and maintenance is easy
- Output	Around 120 HP	Suitable for a 2 m^3 class wheel loader
- Fuel tank	150ℓ	Normal for a 2 m^3 class wheel loader
(3) Transmission		Normal specifications
- Gear range	Forward 3 stage, backward 3 stage, automatic	
(4) Performance		(Specifications suited to a 2 m^3 class wheel loader)
- Maximum speed	Around 30 km/hour	
(5) Main dimensions		(Specifications suited to a 130 HP bulldozer)
- Total length	About 7,000 mm	
- Total height	About 3,000 mm	
- Total width	About 2,500 mm	
- Wheel base	About 2,500 mm	
- Tread	About 2,000 mm	
- Minimum ground clearance	About 300 mm	
2. Dump truck	8 ton class	
(1) Main specifications		
- Vehicle type	8 ton dump truck for gravel	
- Handwheel position	Left hand side, forward	Because right hand traffic is standard in Egypt
		Because gross vehicle weight is 15 tons
- Drive	4 × 2 rear drive	
- Maximum carrying capacity	18,000 kg	
- Gross weight	About 15,000 kg	In order to handle 18,000 kg loads over poor roads
(2) Main dimensions		Dimensions suitable to a 15 ton dump truck
- Total length	About 6,800 mm	
- Total height	About 2,500 mm	
- Total width	About 2,900 mm	
- Wheel base	About 3,700 mm	
- Minimum ground clearance	About 250 mm	
- Minimum turning radius	About 6,300 mm	
- Tires	10.00–20–14PR	
(3) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and maintenance is easy
- Maximum output	About 210 HP	Required for a gross vehicle weight of 15 tons
- Displacement	Around 11,000 cc	An engine with an output of 210 HP
(4) Attachments		
- Paint	Rust proof	In order to cope with running over disposal site roads

(5) Building Plans

① Building Planning

The building plans, functions and floor areas of each building are as shown in Table 3.3.11.

Table 3.3.11 Planned Areas of Rooms in Each Building

Building	Room	Standard Area	Planned Area	Remarks
Factory building	Waste receiving hall	Enough space to hold two day's incoming waste	500m^2	
	Reusable material retrieval area	20 × 20 m	400m^2	Ground floor area: 900 m^2
	Hand sorting area	Decided from area required for hand sorting	150m^2	
	Electricity room	Decided according to electrical equipment arrangement	71m^2	
	Site manager's room	10-15m^2/person	14m^2	
	Cafeteria	1.2-1.5 m^2/person	20m^2	
	Locker room	1.2-1.5 m^2/person	16m^2	
	Showers	1.2-1.5 m^2/person	17m^2	
	Kitchen		9m^2	
	Toilet		9m^2	
	Corridor		34m^2	First floor area: 340 m^2
		Total floor area	1,240m^2	
Administration building	Plant manager's room	25-30 m^2/person	29m^2	
	Administration office	4.5-5.5 m^2/person	31m^2	
	Site work division office (1)	4.5-5.5 m^2/person	15m^2	
	Site work division office (2)	4.5-5.5 m^2/person	19m^2	
	Cashier room	4.5-5.5 m^2/person	16m^2	
	Laboratory		15m^2	
	Rest room	1.2-1.5 m^2/person	16m^2	
	Warehouse		16m^2	
	Toilet		15m^2	
	Kitchen		3m^2	
	Corridor		41m^2	
		Total floor area	216m^2	
Workshop	Maintenance and repair room	12 m × 12m	144m^2	
	Engineer room	4.5-5.5m^2/person	16m^2	
	Staff room	4.5-5.5m^2/person	8m^2	
	Tools and parts store		64m^2	
	Toilet		8m^2	
		Total floor area	240m^2	
Truck scale building	Staff room	4.5-5.5m^2/person	18m^2	
	Toilet		2m^2	
		Total floor area	20m^2	
Guard house	Guard room		13m^2	Including sleeping area

② Cross Section Plans

a. Factory Building

The cross section plan for the factory building shall be drawn up with consideration given to the following points.

- The height of the factory building shall be decided in consideration of the feeding conveyor and the compost material conveyors etc.
- The floor height in the hand sorting area shall be 5 m so as to provide room for movement of the heavy machinery used for waste removal etc.

b. Administration Building

- Ceilings for the site manager's room, administration office, cashier room, rest room and corridor etc. shall be acoustic panel on plasterboard and ceiling height shall be 2.5 m.
- Floor height shall be decided in consideration of space for beams and equipment to be installed.

c. Workshop

- Ceiling height shall be 5 m in consideration of the height of machinery to undergo maintenance and repair, and also in consideration of the hanging height of the overhead traveling crane.
- Ceiling height of the engineer room, staff room and toilet shall be 2.5 m.

③ Structural Plans

a. Basic Policies

The basic policies for the structural plan of each of the buildings shall be as follows:

- Buildings shall be designed so that they can be both safe and durable.
- Design shall take local environmental and soil conditions into consideration.
- Locally procured building materials shall be used as much as possible.
- Selection of type of structure (steel frame concrete or steel frame etc.) shall be made in consideration of works processes.

b. Foundation Design

Judging from the results of boring on the scheduled construction site, a ground bearing capacity of only 5 tons/m^2 can be expected at the foundation setting depth of 2-3 m from the ground surface.

Because the bearing pressures of the major heavy machinery and buildings included in the plan exceed 5 tons/m^2, pile foundations shall be adopted as the foundation type.

Foundations where the bearing pressure is less than 5 tons/m^2 shall be direct foundations.

c. Superstructure Design

Building structures in Egypt are generally made with columns, beams and reinforced concrete slabs, and walls are usually made from brick or concrete slabs.

Of the buildings included in the Project, the administration building and workshop shall be of reinforced concrete structure in view of their respective sizes. Concerning the factory building, in consideration of the processes and the fact that pillar span will need to be 10-20 m in order to provide space for waste transfer by heavy machinery and the installation of conveyor belts, the superstructure including columns, beams and binders shall be of a steel frame structure.

d. Seismic Force

There are no records of earthquakes occurring in the area around Alexandria where the Project facilities are scheduled for construction. However, following the earthquake which hit the suburbs of Cairo in 1992, a certain degree of seismic force has come to be taken into account for building design. The standard shearing force coefficient in Egypt is given as about 0.1, and this value shall be adopted in the building designs for the Project.

e. Dead Load

The dead load or each building shall be given as the dead weight of the building structural materials, finishing materials and inside fixed equipment.

f. Live Load

The live load to be applied for the structural design of Project facilities shall be in accordance with that specified by Japan's Building Standard Acts.

g. Wind Load

Wind load will not be a dominant external force on the administration building and workshop, both of which will be of a reinforced concrete structure. However, the influence of wind load on the factory building which will be roughly 14 m high and of a steel frame construction will be great, and so an examination of safety will need to be made.

Design load shall be calculated as the design velocity force from the maximum wind velocity measured in the area of the site, and set in accordance with Japan's Building Standard Acts.

④ Building Facilities Plan

a. Basic Policies

- The building facilities plan shall reflect the local characteristics of the construction site area, meteorological conditions, living customs and necessary facility conditions
- Facilities with easy control and maintenance shall be adopted
- Instruments, devices and those parts shall as far as possible be standard parts which can be procured locally

b. Air Conditioning and Ventilation Equipment

The areas to be installed with air conditioning and ventilation equipment are as shown in Table 3.3.12. The equipment specifications shall be decided in accordance with the design conditions described in Table 3.2.9.

Table 3.3.12 Air Conditioning and Ventilation Equipment Installation Locations

Building	Room	Air Conditioning	Ventilation
Factory building	- Hand sorting area		○
	- Electricity room	○	
	- Chief's room	○	
	- Cafeteria	○	
	- Locker room		○
	- Showers		○
	- Kitchen		○
	- Toilet		○
Administration Building	- Manager's room	○	
	- Administration office	○	
	- Cashier room	○	
	- Weighing room	○	
	- Office (1)	○	
	- Office (2)	○	
	- Rest room	○	
	- Warehouse		○
	- Toilet		○
	- Kitchen		○
Workshop	- Maintenance and repair room		○
	- Engineer room	○	
	- Staff room	○	
	- Tools and parts store		○
	- Toilet		○

c. Lighting and Outlets

Lighting mainly consisting of fluorescent lamps and outlets shall be placed appropriately in each room. The lighting fixture specifications (numbers, watts, arrangement etc.) shall be decided in accordance with the design illumination intensities described in Table 3.2.9.

d. In-plant Paging Equipment

In-plant paging speakers shall be installed in each room in order to make plant operation more convenient and to raise work efficiency levels. Paging shall be made from the administration office in the administration building.

e. Fire Alarm Equipment

Smoke detectors shall be installed in the maintenance and repair room of the workshop and on the ground and first floors of the factory building where floor

height is large, in order to early fire detection and faster extinguishing. Furthermore, heat sensors shall be installed in the other rooms.

The equipment receiver shall be installed in the administration office of the administration building and also be linked to the announcement system in order to secure an adequate safety level.

f. Fire Extinguishing Equipment

1) Indoor Equipment

4 kg and 10 kg ABC powder fire extinguishers shall be placed in all the necessary areas.

2) Outdoor Equipment

A 100 mm diameter water pipe for use in the event of fire in the major plant equipment shall be laid along the wall on the inside of the perimeter fence, and fire hydrants shall be installed at 50 m intervals. A fire hydrant box containing 30 m of hose (with connections and nozzles) and a 4 kg ABC powder fire extinguisher shall be placed near each fire hydrant.

⑤ Finishing Outline

Except for certain items which are not available locally, finishing materials for the Project buildings shall as far as possible be procured in Egypt. The following points shall be taken into consideration when selecting materials.

- A high degree of durability
- The quality standard of materials shall be in accordance with Egyptian standards or be of an equivalent level
- In order to ensure good quality of work execution, materials which are commonly used in Egypt and for which local construction workers have ample experience in using shall be selected.

The major interior and exterior finishing materials to be used are as indicated in Basic Design drawing ASM-B-11.

(6) Plan for Provision of Tools for Plant Equipment Maintenance and Repair

The tools to be needed for maintenance and repair of the compost plant operation equipment and heavy machinery shall be provided in the workshop. The list of the tools is as shown in Table 3.3.13.

Table 3.3.13 Plant Equipment Maintenance and Repair Tools

(1/3)

No.	Item	Specifications	Q'ty
(Machine Tools)			1
1	Bench	1,800 W × 1,900 L × 200 H	1
2	Vice		1
3	Electric grinder	Grinder diameter: 150 mm	1
4	Portable electric grinder	Grinder diameter: 150 mm	1
5	Bench drill		1
6	High speed cutter		1
7	Electric welding machine		1
8	Gas cutting set	Rubber hose, regulator and cylinder	2
9	Portable electric drill		3
10	Copper cutter		1
11	Chain block	Lifting capacity: 1 ton	2
12	Journal block	Low lift, lifting capacity: 1 ton	1
13	Working lamp	300W	2
14	Electric drum	30m	1
15	Hand lamp		2
16	Portable vent fan	With plastic duct	1
17	Anvil		1
18	Step ladder		1
19	Ladder		1
20	Tool box		2
21	Tool shelf (with doors)	1,800 W × 900 L × 500 H	1
22	Tool shelf (open type)	1,800 W × 1,200 L × 450 H	1
23	Socket wrench		1
24	Torque wrench		1
25	T-type wrench set		1
26	Ring spanner set		1
27	Spanner		2
28	Pipe wrench	L = 450 mm	1
29	"	L = 250 mm	1
30	Monkey spanner	L = 500 mm	1
31	"	L = 400 mm	1
32	"	L = 250 mm	1
33	"	L = 150 mm	1
34	Impact wrench		1

No.	Item	Specifications	Q'ty
35	Spanner set		1
36	Open end spanner	For conveyor tension adjustment	1
37	Cutting plier		1
38	Plier		2
39	Hammer	Stainless with wood handle	2
40	Center punch		1
41	Screw driver	Plus: 100 mm	1
42	"	Plus: 150 mm	1
43	"	Plus: 300 mm	1
44	Screw driver	Minus: 100 mm	1
45	"	Minus: 150 mm	1
46	"	Minus: 300 mm	1
47	Gear puller		1
48	Bar		1
49	File	Flat: L = 300 mm	1
50	"	Circle: L = 300 mm	1
51	File set		1
52	Saw	For steel, L = 250 mm	1
53	Chisel	Flat	1
54	"	Cape	1
55	Grease filler	Manual	2
56	Powered grease filler	Electric or compressed air	1
57	Oil filler	Manual, 2 ℓ	2
58	"	Manual, 2 cc	2
59	Wire brush		10
60	Cable cutter		1
61	Compressor	For tire repair (with pressure gage)	1
62	Heater	For tire repair	1
63	Hydraulic tire removal machine		1
64	Shelves system for spare parts and tools		1
65	Lathe	Swing: 500 mm	1
66	Steel plate cutter	t = 1-6 mm	1
(Tools for Maintenance)			
1	Insulated cutting plier	L = 150, mm	1
2	"	L = 200 mm	1
3	Long nose plier	L = 125 mm	1
4	"	L = 150 mm	1
5	Terminal tool plier		1
6	Wire peeler	L = 150 mm	1
7	"	L = 200 mm	1
8	Screw driver set	Large size	1
9	Screw driver set	Small size for precision devices	1
10	Electric knife		1
11	Soldering set	15 W	1
12	"	30 W	1
13	"	60 W	1
14	"	100 W	1

(3/3)

No.	Item	Specifications	Q'ty
15	Insulated rubber gloves		3
16	Insulated rubber mat		1
17	Insulated rubber boots		3
18	Safety belt		3
19	Tool box		1
20	Handlamp		2
21	Portable O_2 monitor		1
22		Steel, 20 m	1
23	Scale		1
24	Stopwatch		1
25	Thermometer	Max. 100 °C	3
26	Portable watt meter		1
27	Portable tester		2
28	Insulation tester	500 V	1
29		1,100 V	1
30	Voltage detector	High	11
31		Low	11
32	Portable AC ammeter	Clamp	1
33	Dryer	0-200°C	1
34	Balance	Max. 100 g	1
35	Balance	Digital, max. 200 g	1
36	Sieve		1
37	Rubber gloves		5
38	Plastic container	50 ℓ	5
39	pH meter		1
40	Blower		1

3.3.3 Final Disposal Site Operation Equipment

1) Equipment to be Introduced

In order to carry out scattering and rolling compaction of solid waste and also load, carry, scatter and roll compact of covering earth for the final disposal of waste, bulldozers, landfill compactors, back hoes and dump trucks are required. It is also necessary to prepare motor sprinklers in order to prevent the outbreak of large quantities of dust.

2) Final Disposal Work Loads

The amounts of work to be required for carrying out the final disposal of 100 tons of solid waste is as follows.

① Waste Shovelling and Levelling

Because solid waste can be easily compressed when carrying out loading and shovelling, a unit weight by volume in a loose state of 0.35 tons/m3 shall be assumed. Assuming an levelling thickness of 0.6 m, the volume of waste created after shovelling and levelling will be:

100 tons ÷ 0.35 = 286 m^3

② Waste Rolling Compaction

In order to sufficiently compress the waste, it is necessary to roll compact each layer five times so that its volume can be reduced by one thirds after the roll compaction process:

Volume after roll compaction = 286 m^3 ÷ 3 = 95 m^3 or
Thickness after roll compaction = 60cm ÷ 3 = 20cm

③ Covering Earth Loading

Covering earth is brought in from outside the site and loaded into a temporary storage area by dump truck. Assuming a percent swell and shrinkage (f) of 0.75 between its loose state and after roll compaction state, the loading quantity works out to as follows. Incidentally, an earth covering of 0.5 m is laid over a waste layer of 3 m as a rule:

95 m^3 ÷ 3 × 0.5 m = 15.8 m^3 (after roll compaction)
15.8 m^3 ÷ 0.75 = 21.1 m^3 (loose state)

④ Covering Earth Haulage

As in the case of the covering earth loading, a loose state volume of 21.1 m^3 shall be assumed.

⑤ Covering Earth Shovelling and Levelling

The volume of covering earth to be shovelled and levelled will be 21.1 m^3

⑥ Roll Compaction

After roll compaction, the volume of the covering earth will be reduced to 15.8 m^3 (f = 0.75).

3) Work Capacity of Equipment per Hour

The work capacity of each item of equipment per hour can be calculated using the following formula:

① Bulldozer Shovelling and Levelling Efficiency

The volume of earth work per operating hour is calculated using the following formula:

$$\text{Earth work volume} = \frac{60 \times q \times f \times E}{Cm} (\text{m}^3/\text{hour})$$

q : excavation and shovelling load per cycle
(7.8 m^3 for waste, 2.2 m^3 for earth), $q = 0.6\ LH^2$
L : blade length, L = 3.6 m
H : blade height;
Waste H = 1.9 m, Covering earth H = 1.0 m
f : earth conversion factor
[pre-rolling compaction (loose state) = 1.0]
E : work efficiency (0.85)
Cm : cycle time (minutes)
Excavated and shovelled earth levelling:
Cm = 0.030 l + 0.79 (minutes) (2.29 minutes)
ℓ : mean excavated and shovelled earth distance (m) (ℓ = 50 m)

② Compactor Work Efficiency

a. Waste Shovelling and Levelling

Using the same formula used in the case of the bulldozer:

Blade length 3.6 m, H = 1.9 m, q = 7.8 m^3

b. Roll Compaction (Compaction)

The following formula is used in order to represent the earth work volume as the compaction volume (m^3/hour):

$$Q = \frac{V \times W \times D \times E}{N} (\text{m}^3/\text{hour})$$

Q : earth work volume per operating hour (m^3/hour)
V : compaction speed (m/hour) (3,500 m/hour)

W : effective compaction width per compaction (m) (2.04 m)
D : finished thickness (m) (0.2 m waste, 0.25 m earth)
N : Compaction frequency (five times)
E : work efficiency (0.7)

③ Back Hoe Work Efficiency

The earth work volume per operating hour is calculated using the following formula:

$$\text{Earth work} = \frac{3{,}600 \times q \times f \times E}{Cm} (\text{m}^3/\text{hour})$$

q : excavated earth per cycle (m^3)
f : earth conversion factor (after roll compaction) (0.75)
E : work efficiency (0.65)
Cm : required time per cycle (seconds)

a. Excavated earth per cycle (piled earth) (q)

$q = q_0 \times K$

q_0 : struck standard bucket capacity (m^3) (0.7 m^3)
K : bucket coefficient (0.98)

b. Required time per cycle (Cm)

The required time per cycle shall be set at 30 (seconds) as standard.

④ Dump Truck Haulage

The volume of earth hauled during one hour of operation is calculated using the following formula:

$$\text{Hauled earth volume} = \frac{60 \times q \times f \times E}{Cm} (\text{m}^3/\text{hour})$$

q : estimated earth volume (piled volume) per truck (7.3 m^3)
f : earth volume conversion factor (Table ___)
Cm : time per cycle (seconds)
(in-site haulage; ℓ = 1 km, Cm = 15 minutes)

4) Work Times Required in Disposal of 100 Tons of Waste

Half of the waste shovelling and levelling shall each be performed by bulldozer and landfill compactor.

The work times required in the disposal of 100 tons of solid waste, when calculated using the above formulas, are as shown in Table 3-3-14.

Table 3.3.14 Work Times Required in Disposal of 100 Tons of Waste

Work Item	Equipment	Work Volume (m^3)	Work Capacity (m^3)	Required Time (hours)
Waste shovelling and levelling	Bulldozer	143	174	0.82
	Landfill compactor	143	174	0.82
Waste roll compaction	Landfill compactor	95	200	0.48
Covering earth loading	Back hoe	15.8	41.0	0.39
Covering earth haulage	Dump truck	15.8	19.7	0.80
Covering earth shovelling and levelling	Bulldozer	21.1	49	0.43
Covering earth compaction	Landfill compactor	15.8	250	0.06

5) Required Quantity of Equipment

The required numbers of each item of equipment, assuming a 7 hour working day, are as shown in Table 4.4.21.

Table 3.3.15 Required Quantity of Final Disposal Site Operation Equipment

	Operational hours per 100 tons	Hours in operation	Units required	Units
Bulldozers	1.25	15.3	2.2	2
Landfill compactors	1.36	16.6	2.4	2
Back hoe	0.39	4.8	0.7	1
Dump trucks	0.80	9.8	1.4	2
Motor sprinkler	–	–	–	1

[Planned solid waste treatment quantity: 1220 tons (per working day)]

Based upon the results of the above calculations, two bulldozers (moist earth bulldozers), two landfill compactors (20 tons), one back hoe (0.7 m^3 class), two dump trucks (11 tons carrying capacity) and one motor sprinkler shall be procured

for operation of the final disposal site. The work volume exceeds the work times of the bulldozers and landfill compactors, and so this will need to be covered through a little overtime work.

6) Specifications of the Equipment to be Provided

The specifications of the final disposal site operation equipment to be introduced under the Project are as shown in Table 3.3.16.

Table 3.3.16 Specifications of Final Disposal Site Operation Equipment

(1/5)

Item	Specifications	Remarks
1. Back hoe	0.7 m^3	
(1) Major specifications		
- Type	0.7 m^3 class back hoe	
- Drive	Crawler type	
- Bucket	0.7 m^3	
- Gross weight	About 19,000 kg	
(2) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and has no difficulty in maintenance.
- Output	About 125 HP	Required for 0.7 m^3 class back hoe
- Fuel tank	300 ℓ	Common for 0.7 m^3 class back hoes
(3) Hydraulic system		
- Pump	Two piston pumps	(Suitable specifications for a 0.7 m^3 class back hoe)
- Motor	Two throw type for crawler belt and swing	
- Pressure oil tank	130 ℓ	
(4) Crawler belt		(Suitable specifications for a 0.7 m^3 class back hoe)
- Crawler belt	Hydraulic sealed crawler belt	Possesses high maintenance performance
- Width	600 mm	
- Length	4,000 mm	
- Tread	2,000 mm	
- Bearing pressure	0.45 kg/cm^2 maximum	
(5) Performance		(Suitable specifications for a 0.7 m^3 class back hoe)
- Maximum speed	5 km/h	
- Swing speed	10 rpm	
- Maximum excavation depth	6,500 mm	
- Maximum cutting height	9,000 mm	
- Maximum loading height	6,500 mm	

Item	Specifications	Remarks
(6) Dimensions		
- Shipping front	About 9,500 mm	
- Shipping height	About 3,000 mm	
- Total width	About 2,500 mm	
- Minimum ground clearance	About 450 mm	
(7) Attachments		
- Lights	Boom light, frame light	
- Seat	Suspension seat, seat belt	Required for operator protection
2. Dump truck	11 ton class	
(1) Major specifications		
- Vehicle type	11 ton class dump truck for soil haulage	
- Handwheel position	Left handle, front	Because right hand traffic is standard in Egypt
- Drive	6 × 4 rear drive	Because gross vehicle weight is 25 tons and poor roads are forecast
- Maximum carrying capacity	11,000 kg	
- Vehicle gross weight	About 25,000 kg	Because gross vehicle weight is 25 tons and poor roads are forecast
(2) Major dimensions	Dimensions suited to a 21,000 kg compactor	
- Total length	About 7,500 mm	
- Total width	About 2,500 mm	
- Total height	About 3,300 mm	
- Wheel base	About 4,500 mm	
- Minimum ground clearance	About 250 mm	
- Minimum turning radius	About 6,900 mm	
- Tires	11.0-20-14 PR	
(3) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and maintenance presents no problems.
- Maximum output	About 290 HP	Required for a 21,000 kg vehicle
- Displacement	Around 16,000 cc	An output of 290 HP can be produced.
(4) Special attachments		
- Paint	Dust proof	Because trucks will run over waste disposal site roads
3. Bulldozer	130 HP for low ground pressure use	
(1) Major specifications		
- Type	130 HP, low ground pressure type	
- Drive	Crawler belt type	
- Blade	Straight tilt 3,500 × 1,000	Suited to earth shovelling
- Gross weight	About 15,000 kg	

(3/5)

Item	Specifications	Remarks
(2) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and maintenance presents no problems.
- Output	130 HP minimum	
- Fuel tank	240 ℓ	130 HP bulldozer
(3) Transmission		
- Gear range	Forward 3 stage, backward 3 stage	
(4) Crawler belt		(Specifications suited to a 130 HP bulldozer)
- Crawler belt	Hydraulic sealed crawler belt (swamp shoe)	Possesses high maintenance performance
- Width	850 mm	Because low bearing pressure is necessary
- Length	3,000 mm minimum	
- Tread	2,000 mm	
- Bearing pressure	0.3 kg/cm^3 minimum	
(5) Performance		(Specifications suited to a 130 HP
- Maximum speed	10 km/h	bulldozer)
(6) Major specifications		
- Total length	About 5,200 mm	
- Total height	About 3,100 mm	
- Total width	About 3,000 mm	
- Minimum ground clearance	About 500 mm	
(7) Attachments		
- Lights	Headlights × 2	
- Seat	Suspension seat, seat belt	Required for operator protection
- Canopy	ROPS	Required for operator protection
- Engine hood	Side cover	Solid waste specification
- Radiator guard	Heavy duty	Solid waste specification
- Inlet port	Extended screener	Solid waste specification
- Hose sleeve	Metal	Solid waste specification
4. Landfill compactor	20 tons	
(1) Major Specifications		
- Type	20 ton class landfill compactor	
- Drive	4 × 2 rear drive	
- Blade	3,500 × 2,000	
- Gross weight	20,000 kg minimum	
(2) Engine		
- Type	Direct spray cooling type	Because this type is common in Egypt and maintenance presents no problems.
- Output	Around 200 HP	Suitable for a 20,000 kg class compactor
- Fuel tank	240 ℓ	Normal for a 20,000 kg class compactor

Item	Specifications	Remarks
(3) Transmission		
- Gear range	Forward 4 stage, backward 4 stage Automatic	
(4) Wheels		(Specifications suited to a 20 ton class compactor)
- Type	Chopper wheels	
- Radius	1,300 mm	
- Width	1,000 mm	
- Chopper blades	20×300mm×150mm chopper blades	
(5) Performance		(Specifications suited to a 20 ton
- Maximum speed	30 km/h	class compactor)
(6) Major dimensions		
- Total length	About 7,000 mm	
- Total height	About 3,500 mm	
- Total width	About 3,000 mm	
- Wheel base	About 3,000 mm	
- Tread	About 2,500 mm	
- Minimum ground clearance	About 500 mm	
(7) Attachments		
- Lights	Two headlights	
- Seat	Suspension seat, seat belt	Required for operator protection
- Canopy	ROPS	Required for operator protection
5. Motor sprinkler	10 m^3 carrying capacity class	
(1) Major specifications		
- Vehicle type	10 m^3 carrying class motor sprinkler	
- Handwheel position	Left handle, front	Because right hand traffic is standard in Egypt Because vehicle gross weight is 20 tons and running over poor roads is forecast
- Drive	6 × 4 rear drive	
- Maximum carrying capacity	10,000 kg	
- Vehicle gross weight	About 20,000 kg	In order to cope with 10,000 kg loads
(2) Major dimensions		Dimensions suited to a 21,000 kg
- Total length	About 9,000 mm	compactor
- Total width	About 2,5000 mm	
- Total height	About 3,400 mm	
- Wheel base	About 5,800 mm	
- Minimum ground clearance	About 250 mm	
- Minimum turning radius	About 8,000 mm	
- Tires	11.0-20-14 PR	
(3) Engine		
- Type	Direct spray cooling diesel	Because this type is common in Egypt and maintenance presents no problems.

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Item	Specifications	Remarks
- Maximum output	About 290HP	Required for a 20,000 kg vehicle
- Displacement	Around 16,000 cc	An output of 290 HP can be produced
(4) Attachments		
- Tank	Oval, 10 m^3 capacity	Oval type is strong and commonly used
- Sprinkler bar	One to rear of vehicle	
- Pump	550 ℓ/min, head = 35 m	Needed to obtain full sprinkling effect
- Paint	Dust proof	Because vehicle will operate on disposal site roads

3.3.4 Basic Design Drawings

The basic design drawings used for the Project are as shown below.

Collection and Haulage Vehicles and Equipment Procurement Plan

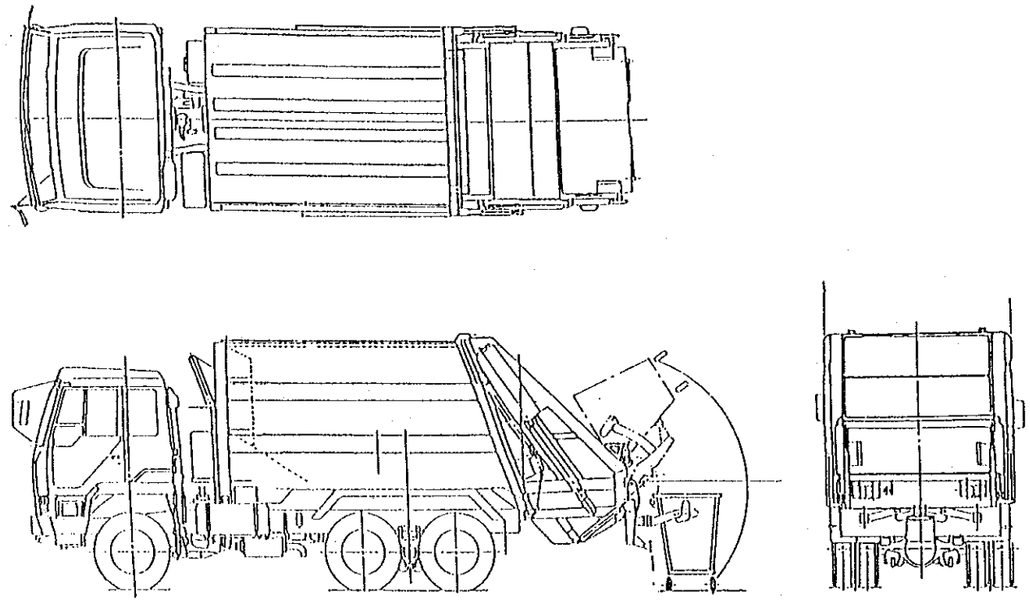
ASM-V-01 Typical Drawings of Garbage Collection Vehicles

Compost Plant Construction Plan

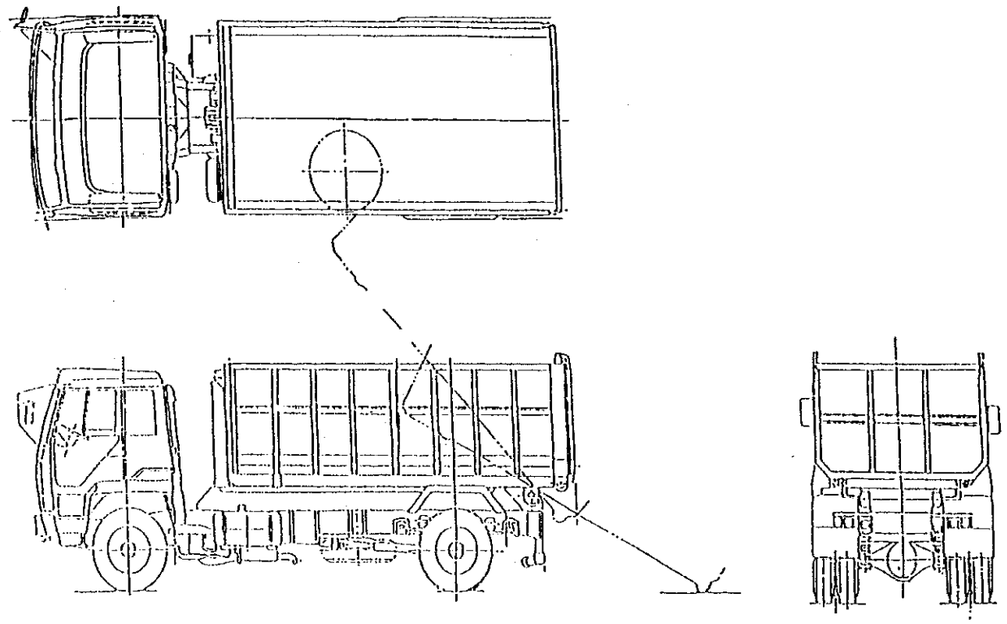
ASM-G-01 Overall Plan of New Compost Plant
ASM-G-02 Flow Diagram of New Compost Plant
ASM-B-01 Plan of Factory Building
ASM-B-02 Elevation of Factory Building
ASM-B-03 First Floor Plan and Section of Factory Building
ASM-B-04 Plan of Administration Building
ASM-B-05 Elevation of Administration Building
ASM-B-06 Plan of Workshop
ASM-B-07 Elevation of Workshop
ASM-B-08 Layout of Truck Scale Station
ASM-B-09 Plan and Elevation of Truck Scale Station
ASM-B-10 Plan and Elevation of Guard House
ASM-B-11 Finishing Schedule

Final Disposal Site Operation Equipment Procurement Plan

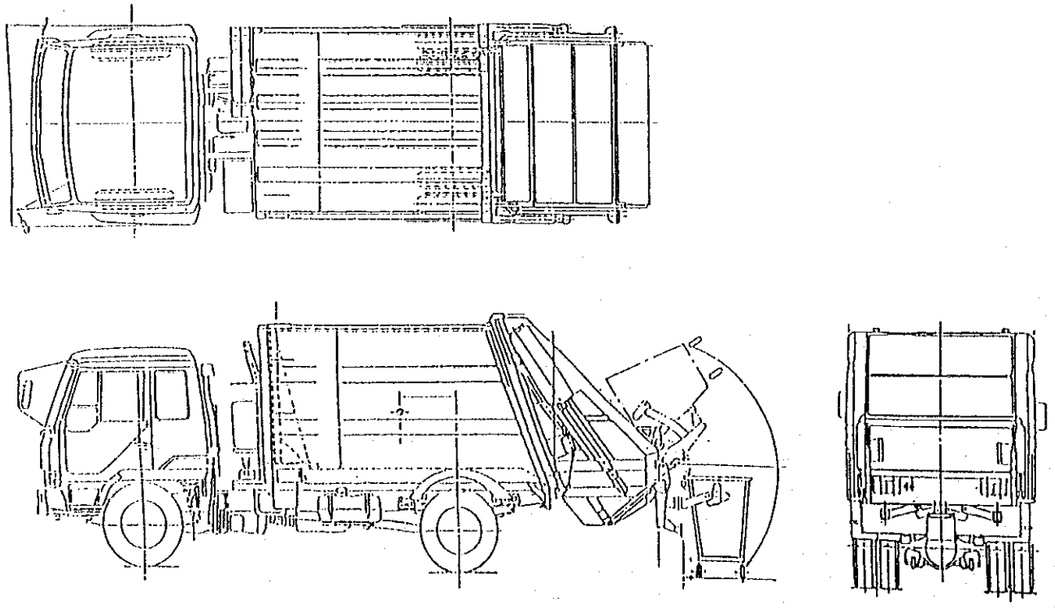
ASM-V-02 Typical Drawings of Vehicles for Final Disposal Site



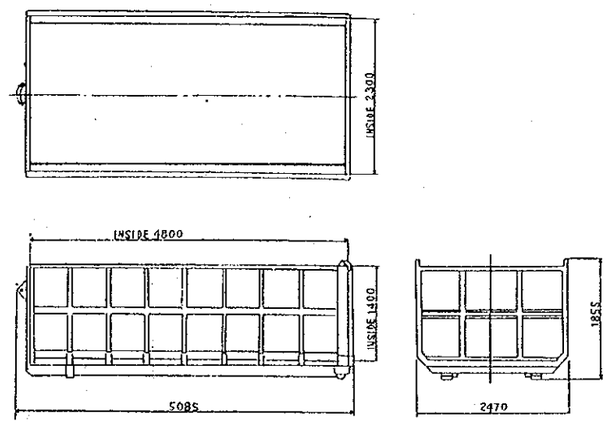
15m³ Compactor Truck



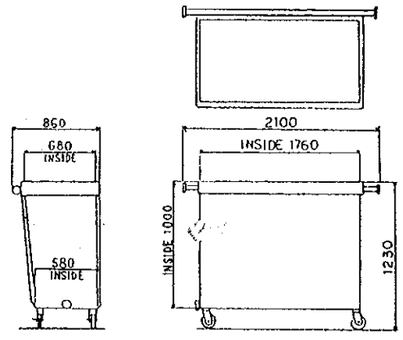
15m³ Arm Roll Container Truck



10m³ Compactor Truck

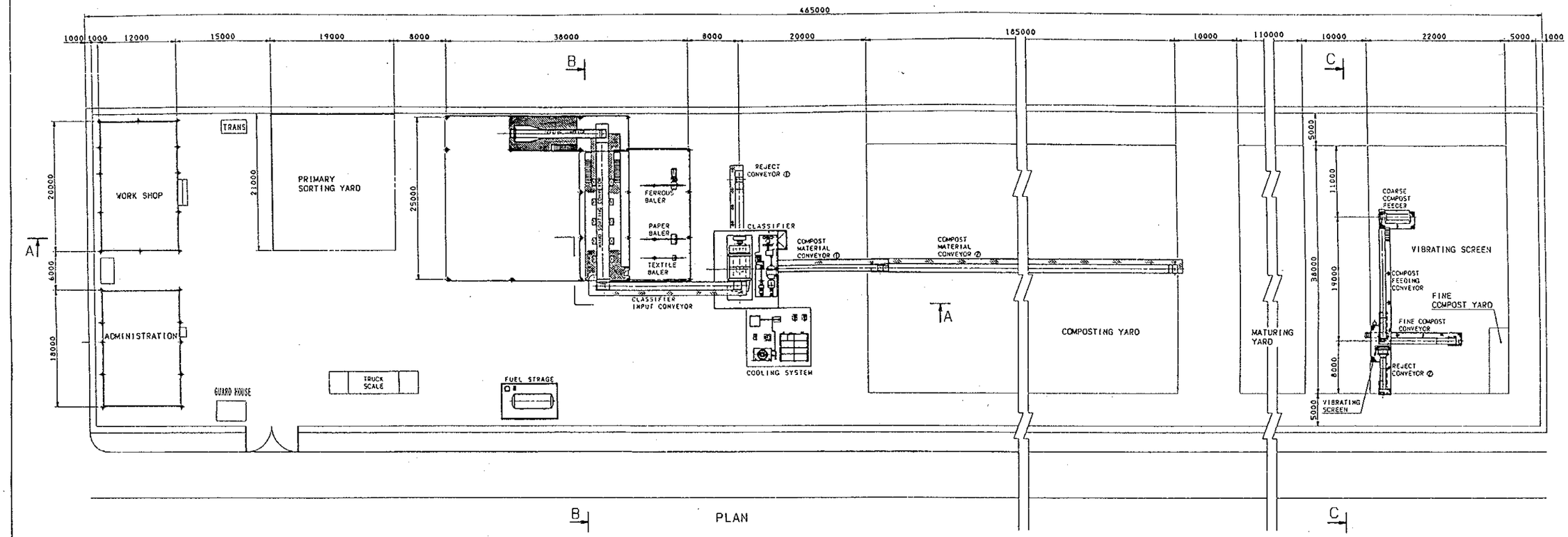


15m³ Container

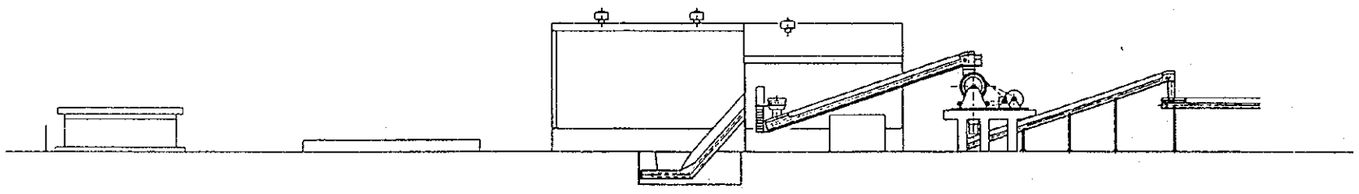


1m³ Container

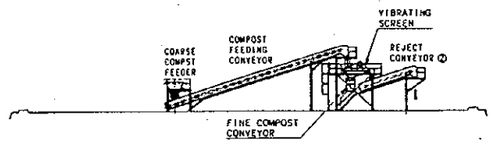
THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
TYPICAL DRAWINGS OF GARBAGE COLLECTION VEHICLES	SCALE — DRAWING NO. ASM-V-01
YACHIYO ENGINEERING CO., LTD	



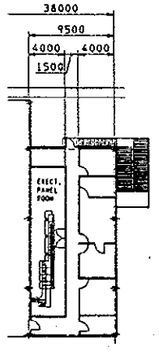
PLAN



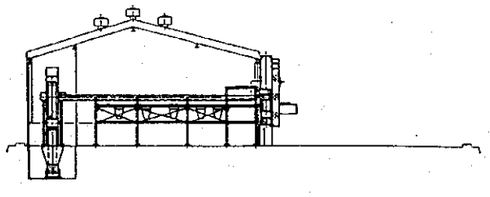
SECTION A-A



SECTION C-C

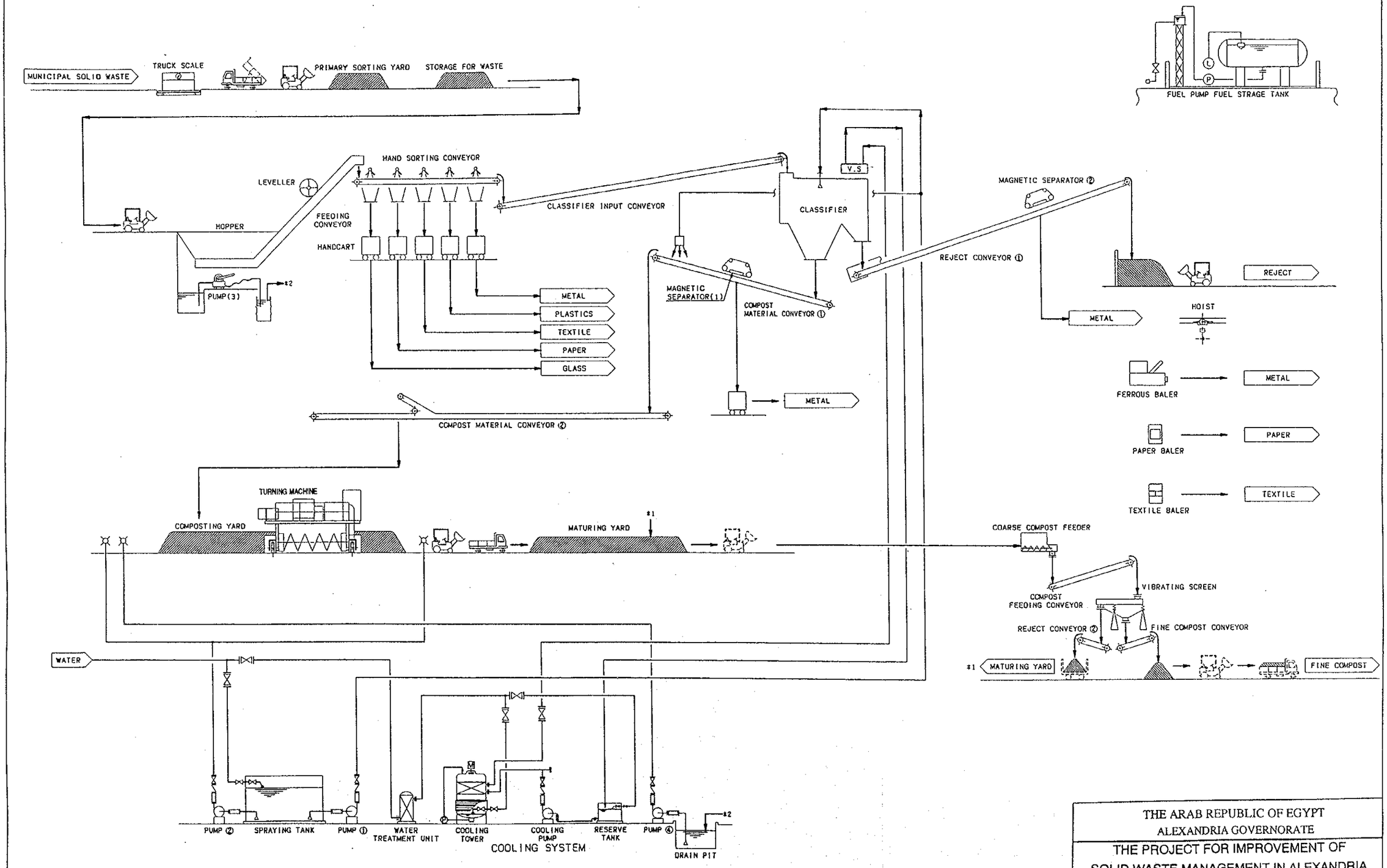


CAFETERIA & ERECT.ROOM
2F FACTORY BUILDING



SECTION B-B

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
GENERAL PLAN OF NEW COMPOST PLANT	SCALE 1:600 DRAWING NO. ASM-G-01
YACHIYO ENGINEERING CO., LTD	



THE ARAB REPUBLIC OF EGYPT
ALEXANDRIA GOVERNORATE

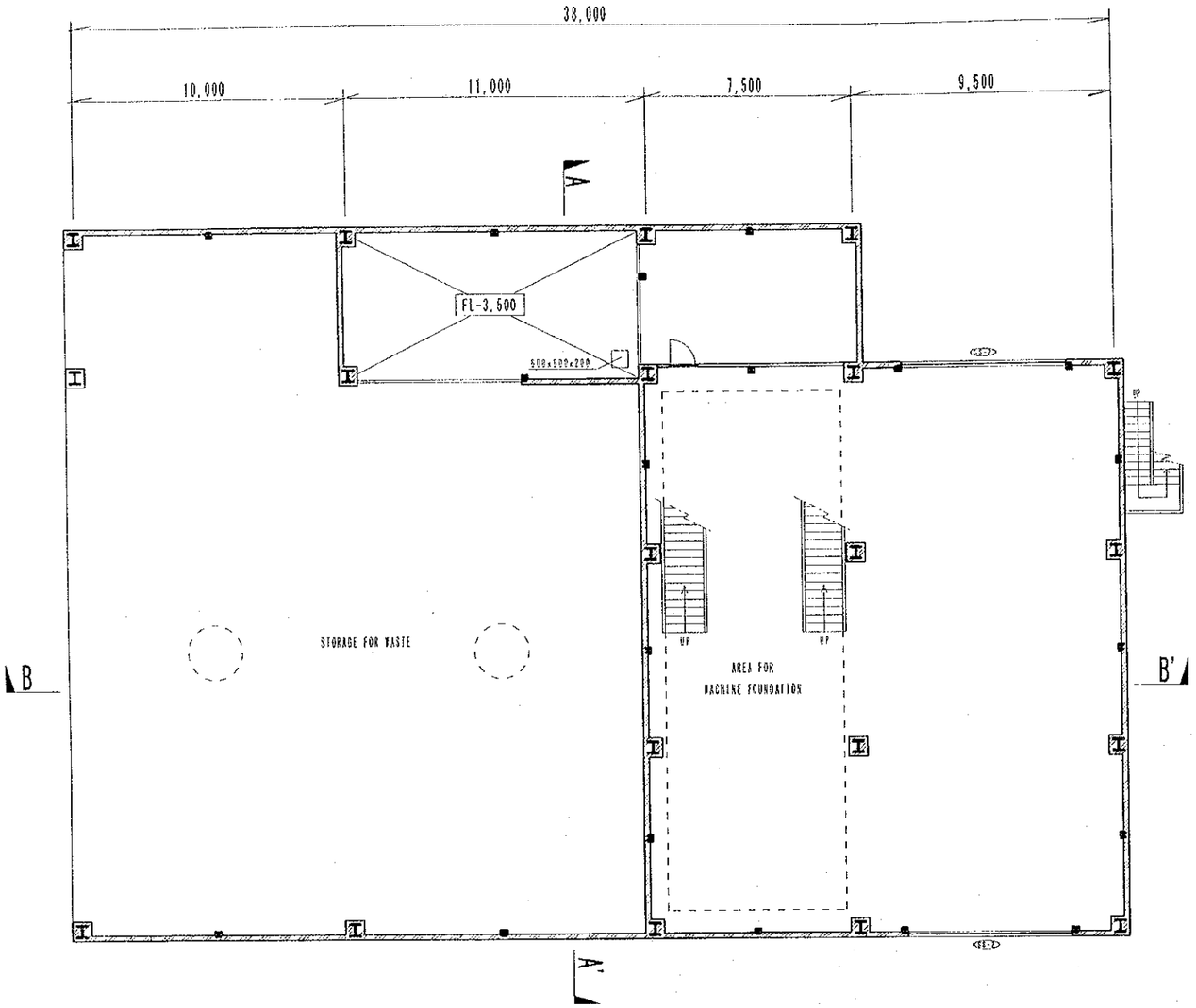
THE PROJECT FOR IMPROVEMENT OF
SOLID WASTE MANAGEMENT IN ALEXANDRIA

FLOW DIAGRAM OF NEW COMPOST PLANT

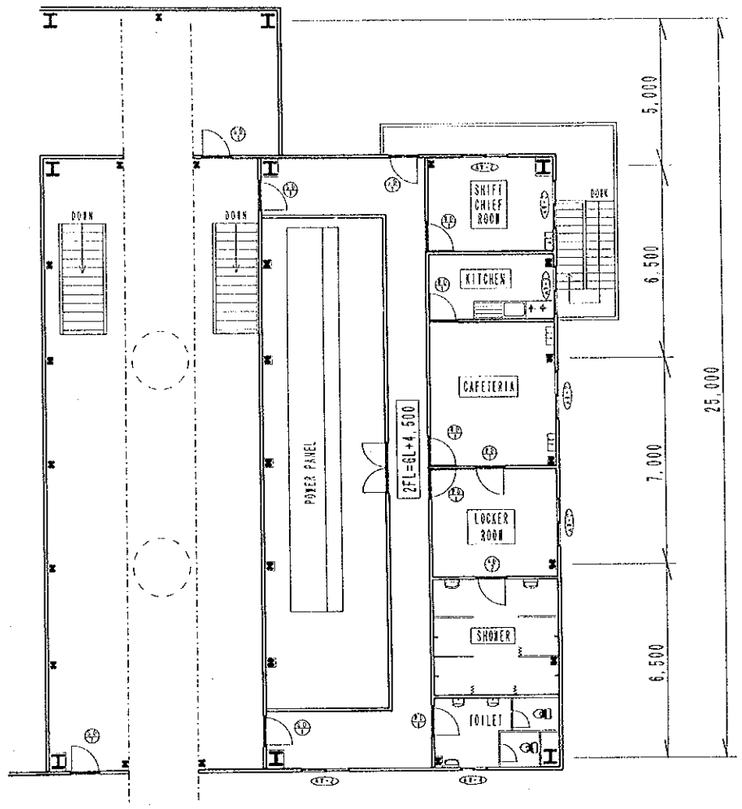
SCALE —

DRAWING NO. ASM-G-02

YACHIYO ENGINEERING CO., LTD



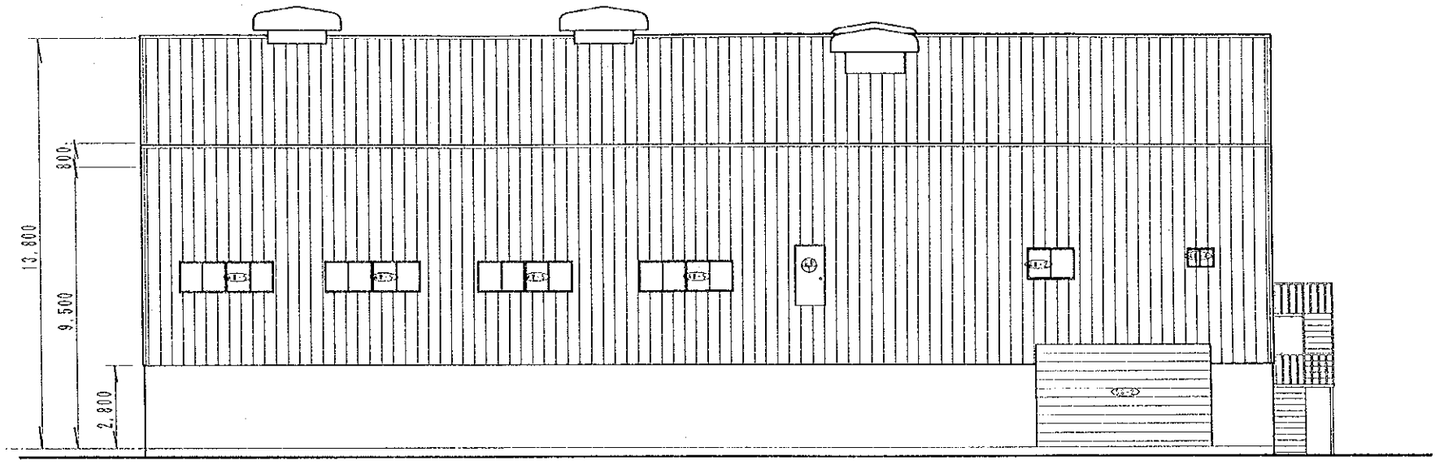
1F PLAN

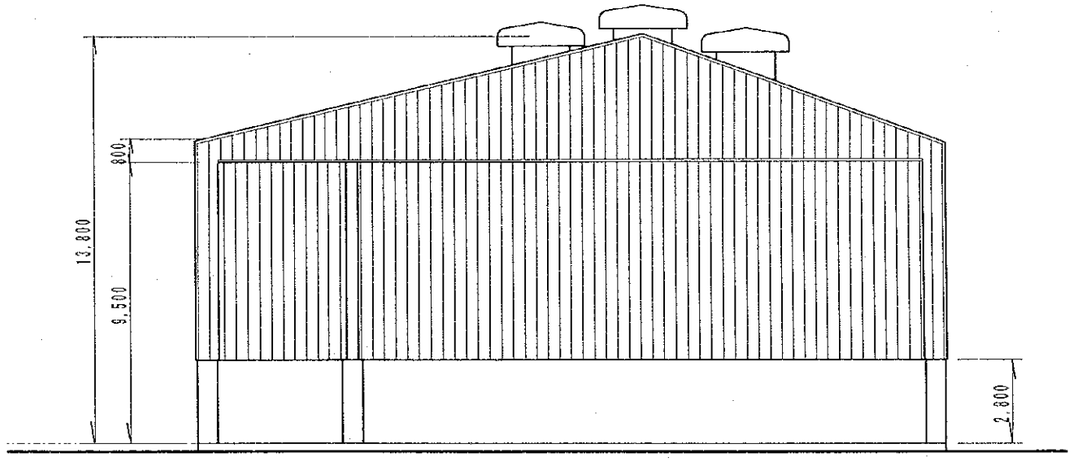


2F PLAN

FACTORY BUILDING 1:200

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
PLAN OF FACTORY BUILDING	SCALE 1:200 DRAWING NO. ASM-B-01
YACHIYO ENGINEERING CO., LTD	

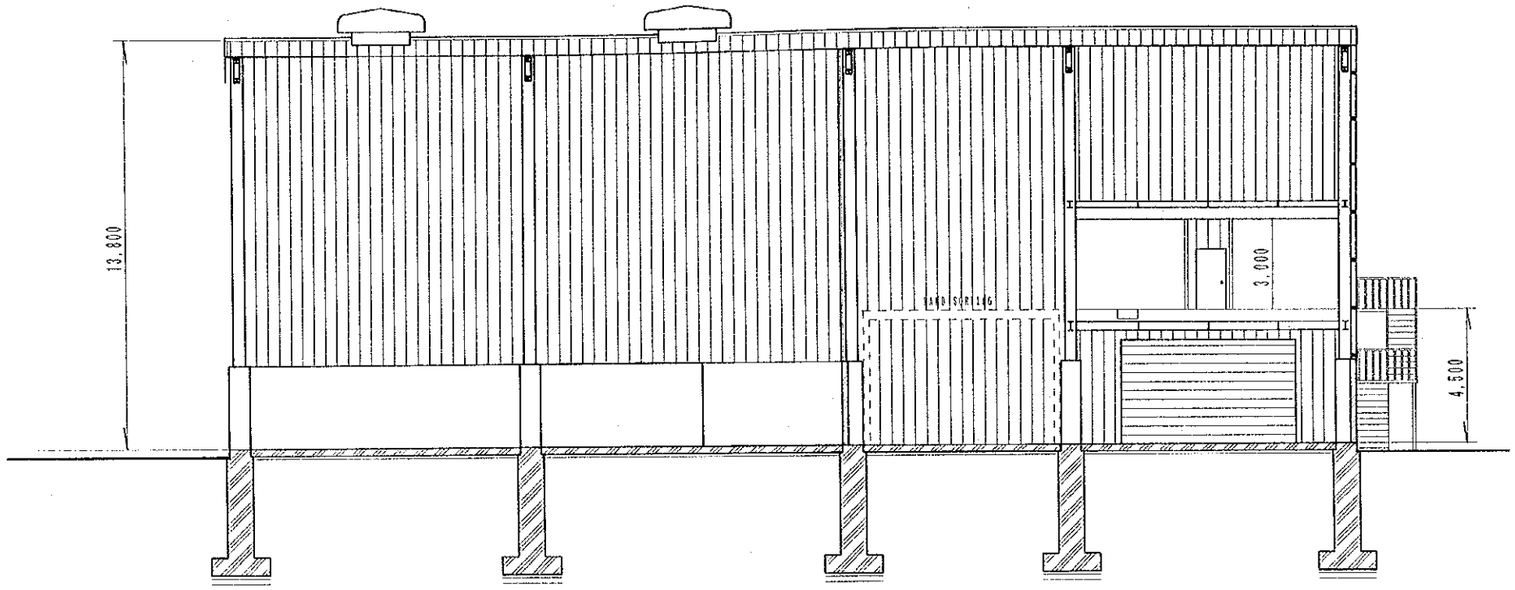




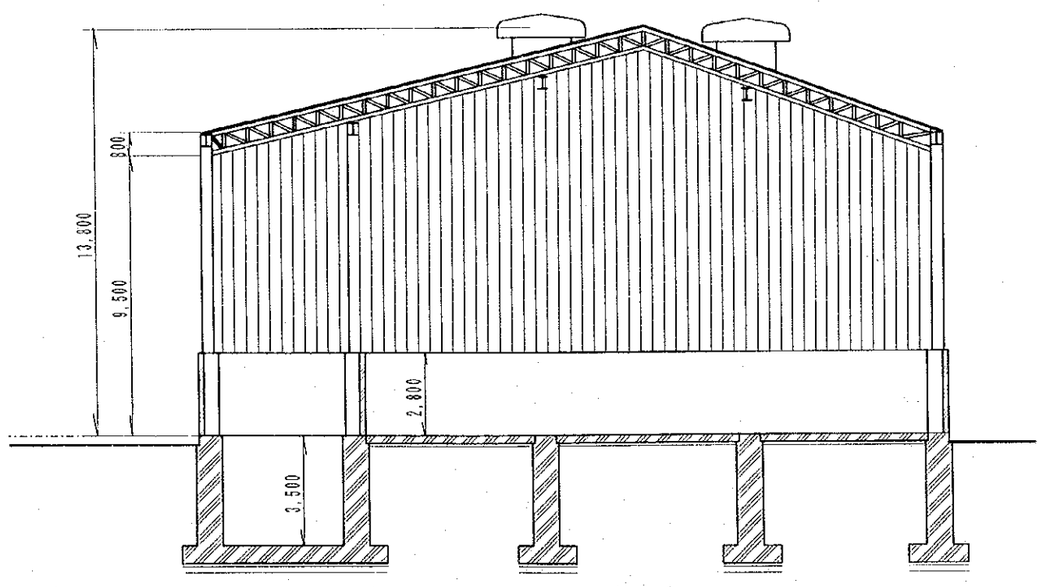
ELEVATION 1:200

FACTORY BUILDING

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
ELEVATION OF FACTORY BUILDING	SCALE 1:200 DRAWING NO. ASM-B-02
YACHIYO ENGINEERING CO., LTD	



B-B' SECTION 1:200



A-A' SECTION 1:200

FACTORY BUILDING

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
SECTION OF FACTORY BUILDING	SCALE 1:200 DRAWING NO. ASM-B-03
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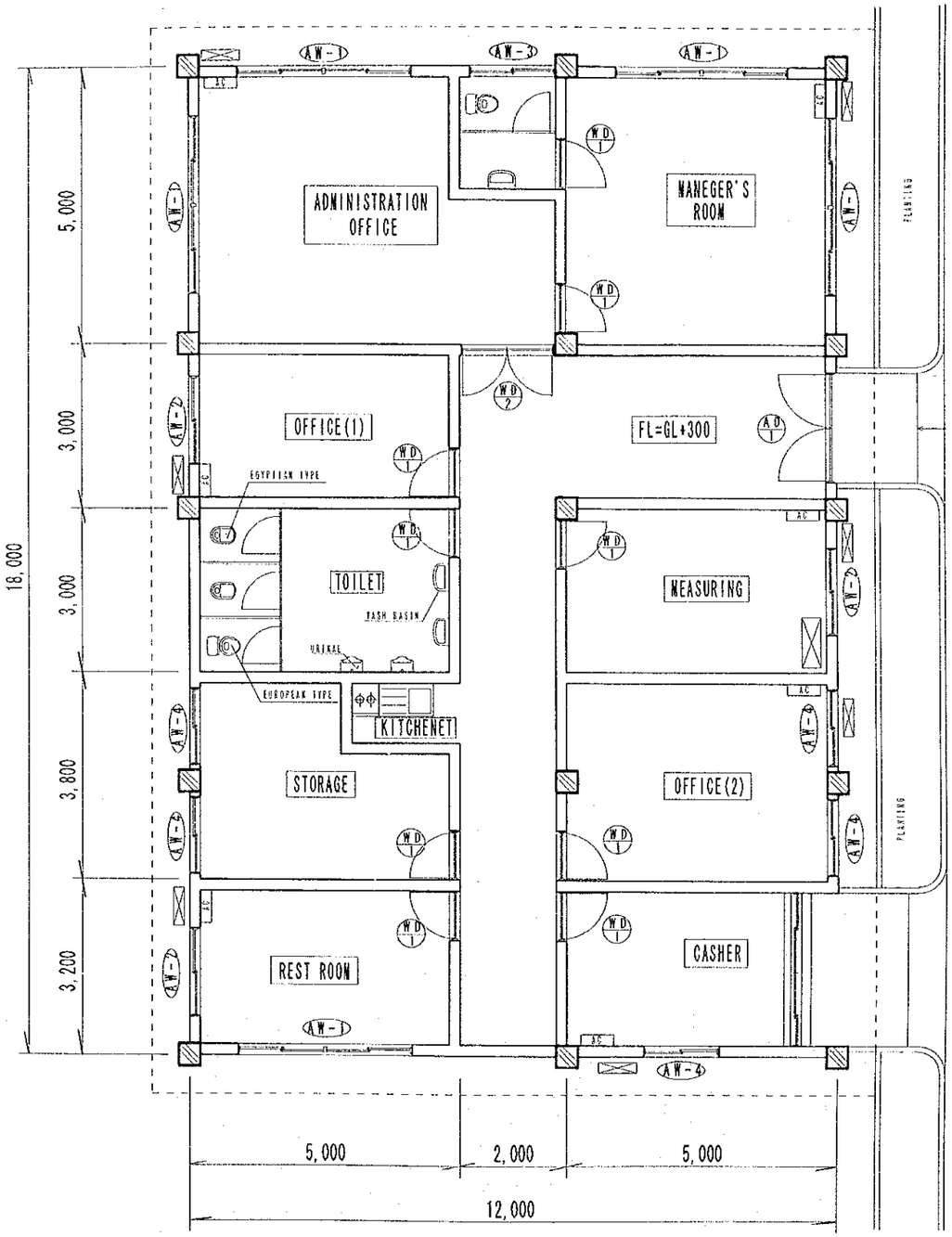

PLAN 1:100

ADMINISTRATION BUILDING

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
PLAN OF ADMINISTRATION BUILDING	SCALE 1:100 DRAWING NO. ASM-B-04
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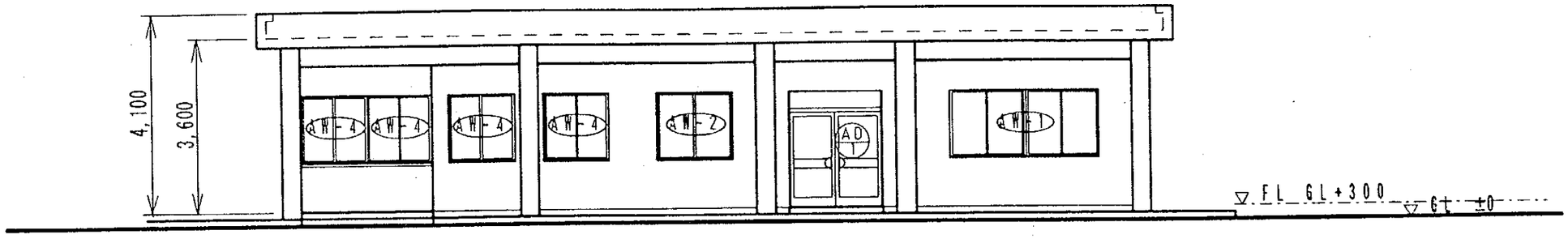

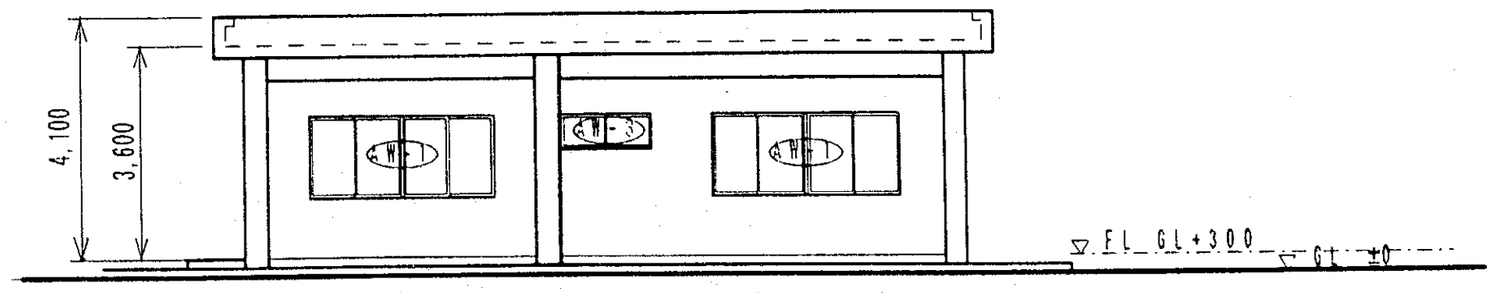

ELEVATION 1:100

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
ELEVATION OF ADMINISTRATION BUILDING	SCALE 1:100 DRAWING NO. ASM-B-05
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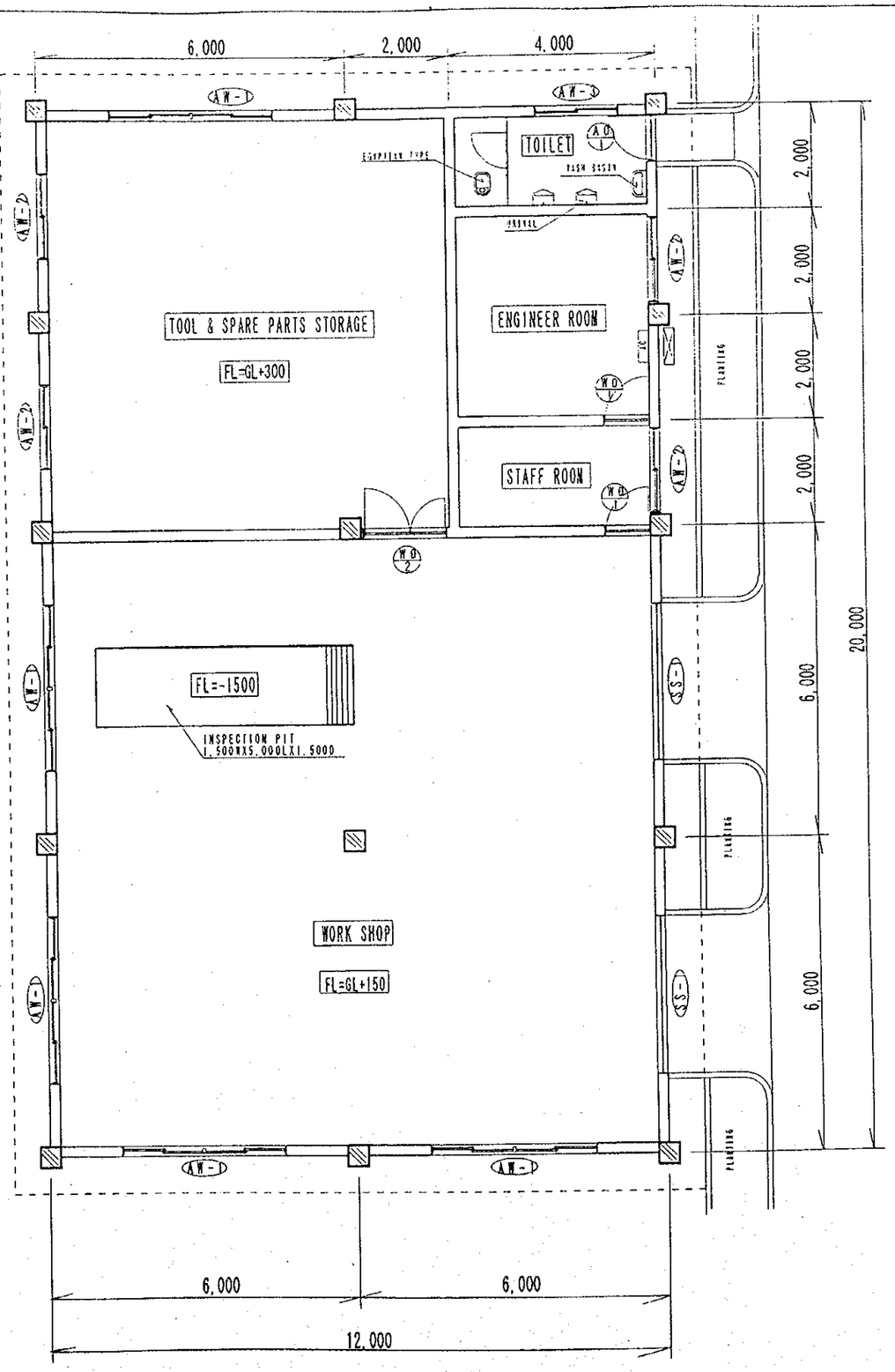
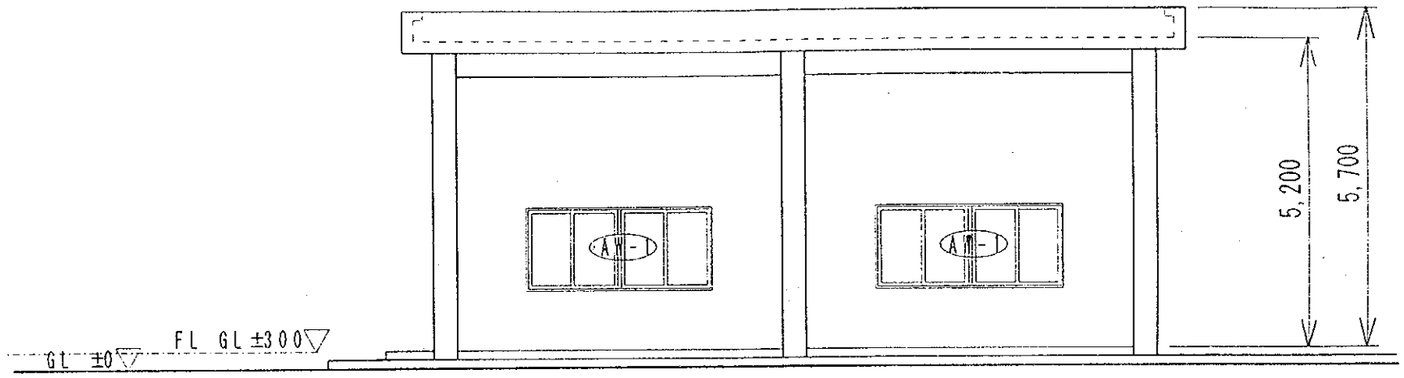
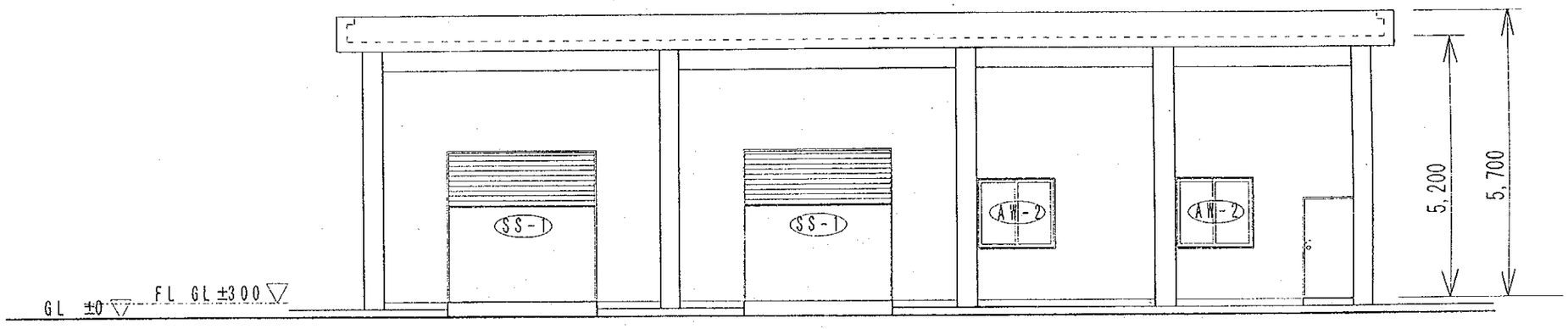


PLAN 1:100

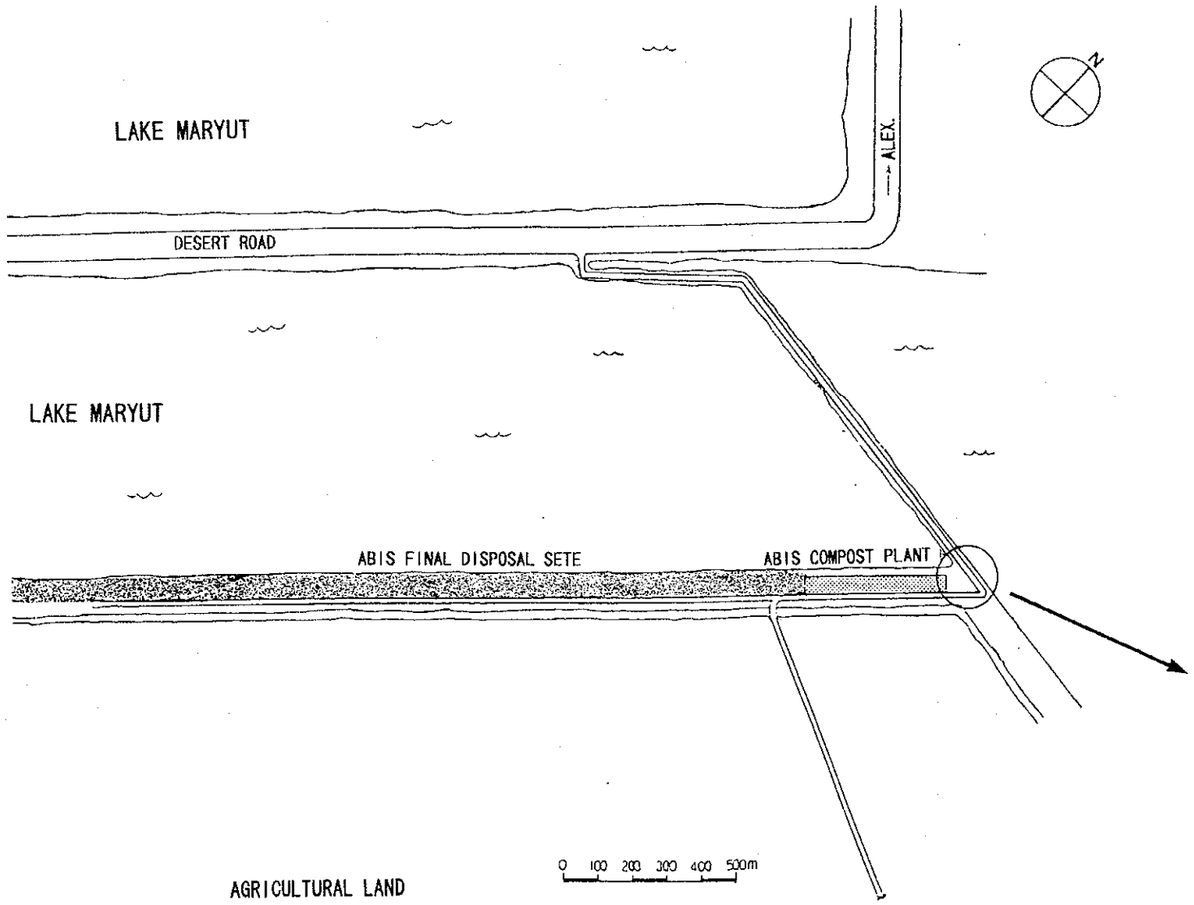
THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
PLAN OF WORK SHOP	SCALE 1:100 DRAWING NO. ASM-B-06
YACHIYO ENGINEERING CO., LTD	

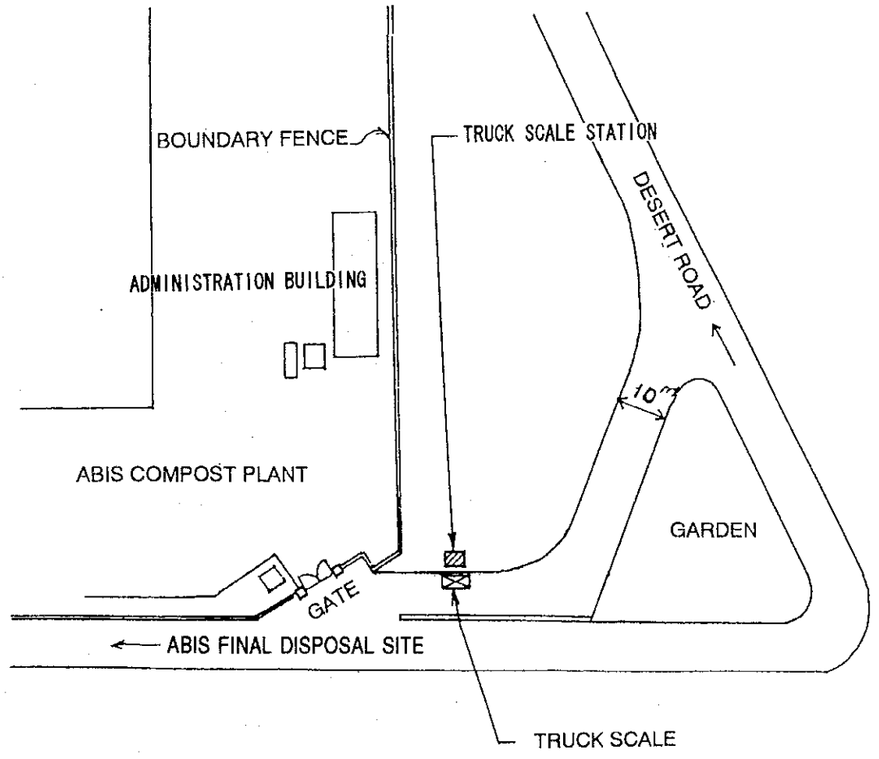




ELEVATION 1:200

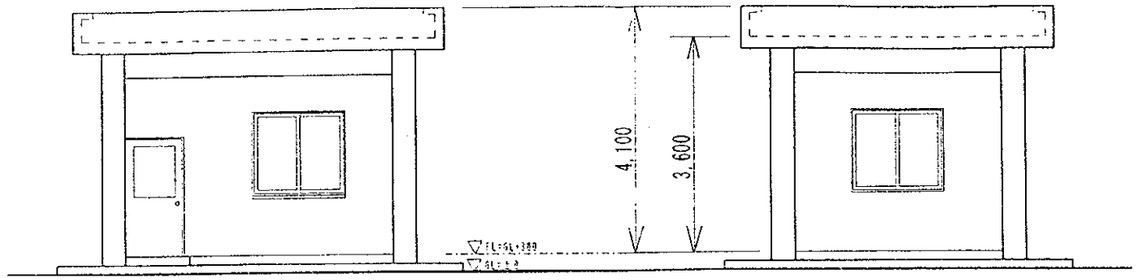
THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
ELEVATION OF WORK SHOP	SCALE 1:200 DRAWING NO. ASM-B-07
YACHIYO ENGINEERING CO., LTD	





LAYOUT OF TRUCK SCALE STATION

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
LAYOUT OF TRUCK SCALE STATION	SCALE: —
	DRAWING NO.: ASM-B-08
YACHIYO ENGINEERING CO., LTD	



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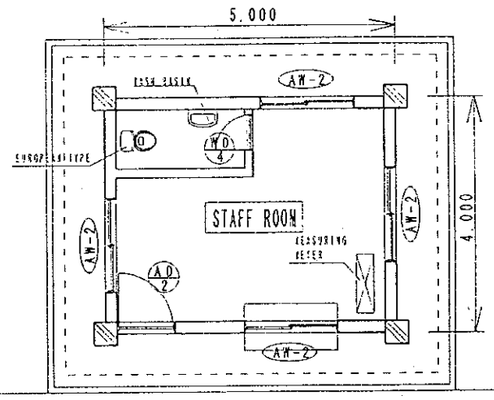
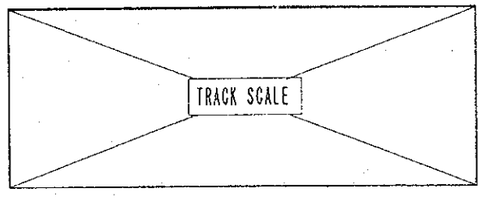


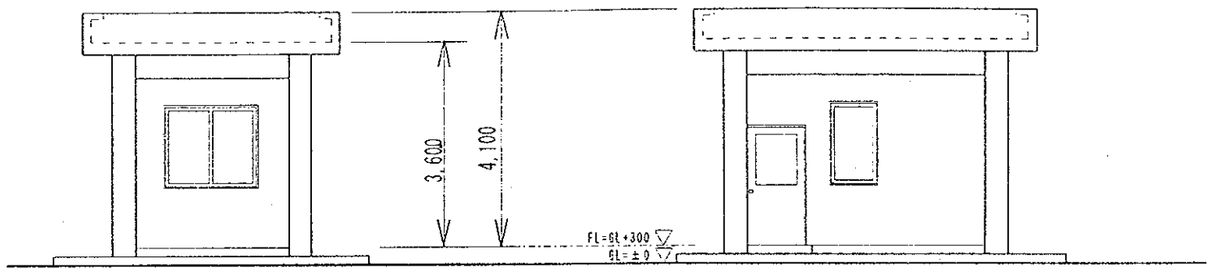


ROAD

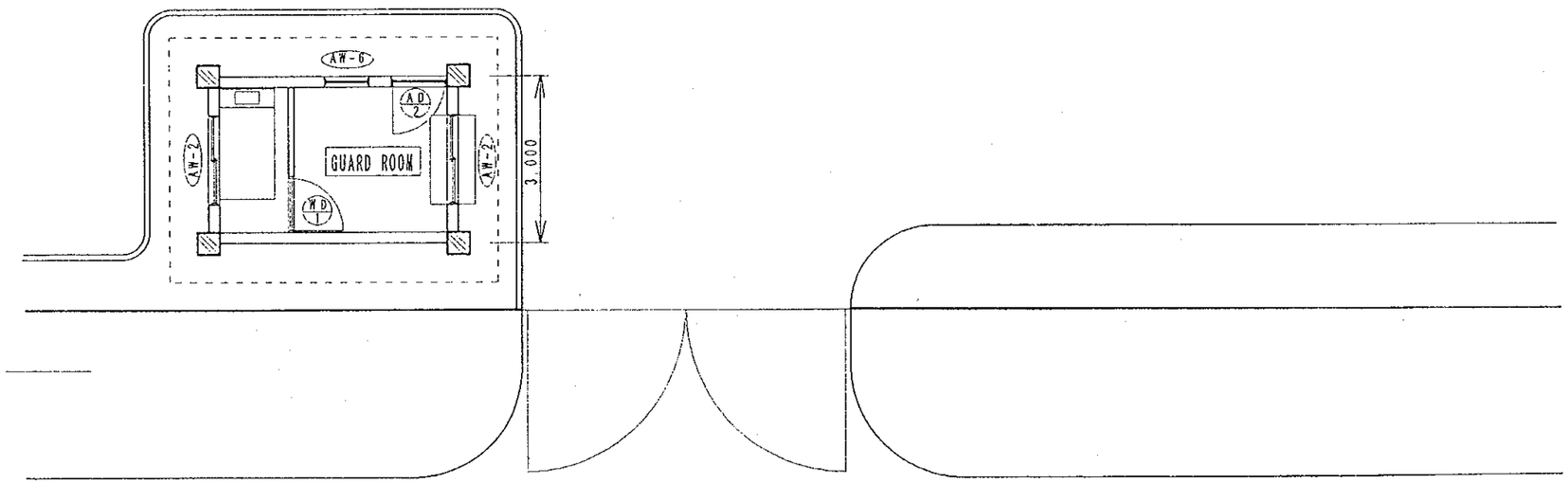
PLAN 1:100

TRACK SCALE STATION

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
PLAN AND ELEVATION OF TRACK SCALE STATION	SCALE 1:100 DRAWING NO. ASM-B-09
YACHIYO ENGINEERING CO., LTD	



ELEVATION 1:100



PLAN 1:100

GUARD HOUSE

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
PLAN AND ELEVATION OF GUARD HOUSE	SCALE 1:100 DRAWING NO. ASM-B-10
YACHIYO ENGINEERING CO., LTD	

Finishing Schedule

Administration Building

Finishing & Accessories			Room	Remarks
Building	Floor	Terrazzo Tile	Manager, Admi.office, Office, Rest room, Cashier, Corridor, Kitchenette	300x300x30mm
		Steel trowel finish on concrete	Measuring, Storage	
		Mosaic Tile	Toilet	50x50mm
	Skirting	Marble Stone H=100mm	Manager, Admi.office, Office, Rest room, Cashier, Corridor	
		Emulsion Paint	Measuring, Storage	
	Wall	Emulsion Paint	Manager, Admi.office, Office, Rest room, Cashier, Corridor, Measuring, Storage	
		Ceramic Tile up to FL+1.2m and Emulsion Paint	Toilet, Kitchenette	100x100mm
	Ceiling	Acoustic Panel on Plaster Board	Manager, Admi.office, Office, Rest room, Cashier, Corridor, Kitchenette	
		Cement Board	Toilet	
	Other	Wood Counter	Cashier	on Oil Paint
		Wood Toilet Partition	Toilet	on Oil Paint
	Exterior Wall	Tartasha Spraying		on Concrete Mortar
	Ext. Skirting	Tartasha Spraying H=300mm		on Mortar
	Roof	Cement Tile on Asphalt with Heat Insulation t=50 mm		
	Dog Walk	Broom Trowel Finish		on Concrete
Plumbing		Water Closet	Toilet	
		Wall Hang Urinal	Toilet	
		Wall Hang Lavatory	Toilet	
		Electric Water Heater	Kitchenette	
		Gas Range	Kitchenette	
Electrical		Fluorescent Lamp	All Room	
		Fire Alarm System	All Room	
		Paging System	All Room	
Mechanical		Wall Hanging Air Conditioner	Manager, Casher Admi office, Office, Rest room, Measuring	
		Toilet Fan	Toilet	
		Ceiling Ventilating Fan	Kitchenette	

Guard House

Finishing & Accessories			Room	Remarks
Building	Floor	Terrazzo Tile	Guard, Rest room	300x300x30mm
	Skirting	Marble Stone H=100mm	Guard, Rest room	
	Wall	Emulsion Paint	Guard, Rest room	
	Ceiling	Acoustic Panel on Plaster Board	Guard, Rest room	
	Other	Wood Counter	Guard room	on Oil Paint
	Exterior Wall	Tartasha Spraying		on Concrete Mortar
	Ext. Skirting	Tartasha Spraying H=300mm		on Mortar
	Roof	Cement Tile on Asphalt Waterproofing with Heat Insulation t=50 mm		
	Dog Walk	Broom Trowel Finish		on Concrete
Electrical		Fluorescent Lamp	All Room	
		Fire Alarm System	All Room	
		Paging System	All Room	

Work Shop

Finishing & Accessories			Room	Remarks
Building	Floor	Steel Trowel Finish	Storage, Work Shop	
		Terrazzo Tile	Staff, Engineer room	300x300x30mm
		Mosaic Tile	Toilet	50x50mm
	Skirting	Marble Stone H=100mm	Staff, Engineer room	
		Emulsion Paint	Storage, Work Shop	
	Wall	Emulsion Paint	Staff, Engineer room, Storage, Work Shop	
		Ceramic Tile up to FL+1.2m and Emulsion Paint	Toilet	100x100mm
	Ceiling	Acoustic Panel on Plaster Board	Staff, Engineer room	
		Emulsion Paint	Storage, Work Shop	on Concrete
		Cement Board	Toilet	
	Other	Wood Toilet Partition	Toilet	on Oil Paint
		Inspection Pit	Work Shop	
	Exterior Wall	Tartasha Spraying		on Concrete Mortar
	Ext. Skirting	Mortar Trowel Finishing H=300mm		
	Roof	Cement Tile on Asphalt Waterproofing with Heat Insulation		
	Dog Walk	Broom Trowel Finish		on Concrete
Plumbing		Water Closet	Toilet	
		Wall Hang Urinal	Toilet	
		Wall Hang Lavatory	Toilet	
Electrical		Fluorescent Lamp	Staff, Engineer room, Storage	
		Hanging Fluorescent Lamp	Work Shop	
		Fire Alarm System	All Room	
		Paging System	All Room	
Mechanical		Wall Hanging Air Conditioner	Staff, Engineer room	
		Toilet Fan	Toilet	
		Wall Mounted Ventilating Fan	Work Shop	

Truck Scale Station

Finishing & Accessories			Room	Remarks
Building	Floor	Terrazzo Tile	Staff Room	300x300x30mm
		Mosaic Tile	Toilet	
	Skirting	Marble Stone H=100mm	Staff Room	
	Wall	Emulsion Paint	Staff Room	
		Ceramic Tile up to FL +1.2m and Emulsion Paint	Toilet	
	Ceiling	Acoustic Panel on Plaster Board	Staff Room	
		Cement Board	Toilet	
	Other	Wood Counter	Staff	on Oil Paint
		Wood Toilet Partition	Toilet	on Oil Paint
	Exterior Wall	Tartasha Spraying		on Concrete Mortar
	Ext. Skirting	Tartasha Spraying H=300mm		on Mortar
	Roof	Cement Tile on Asphalt Waterproofing with Heat Insulation t=50 mm		
	Dog Walk	Broom Trowel Finish		on Concrete
Electrical		Fluorescent Lamp	All Room	
		Fire Alarm System	All Room	
		Paging System	All Room	

Factory Building

Finishing & Accessories			Room	Remarks
Building	Floor	Steel Trowel Finish	Sorting, Storage	on Concrete
		Expanded Joint	Sorting, Storage	Asphalt Caulking
		Steel Trowel Finish on steel deck	Hand sorting area, Corridor, Power panel room	on Concrete
		PVC tile	Chief, Kitchen, Cafeteria, Locker	on Concrete
		Mosaic Tile	Toilet, Shower	50x50mm
	Skirting	PVC skirting	Chief, Kitchen, Cafeteria, Locker	H=100 mm
	Wall	Exposed Concrete	Sorting, Storage	Up to H=2.8 m
		Corrugated Galvanized Steel Siding	Sorting, Storage	Above H=2.8m
		Emulsion Paint on mortar	Chief, Kitchen, Cafeteria, Locker, Corridor, Panel	on concrete block
		Ceramic Tile	Shower	on concrete
		Ceramic Tile up to FL+1.2m and Emulsion Paint	Toilet	on concrete block
	Ceiling	Acoustic Panel on Plaster Board	Chief, Cafeteria, Locker	
		Cement Board	Kitchen, Corridor, Shower, Toilet	
	Other	Equipment Pit	Storage	
		Equipment Foundation	Sorting area	
	Exterior Wall	Corrugated Galvanized Steel Siding		Above H=2.8m
		Exposed Concrete		Up to H=2.8 m
	Ext. Skirting	Mortar Trowel Finishing H=300mm		
	Roof	Corrugate Galvanized Steel Sheet		on Steel Truss
	Dog Walk	Broom Trowel Finish		on Concrete
Plumbing		Water Spraying Cock	Storage	
		Water Closet	Toilet	
		Wall Hang Urinal	Toilet	
		Wall Hang Lavatory	Toilet	
		Shower set	Shower	
		Electric Water Heater	Shower	
		Gas Range	Kitchenette	
Electrical		Hanging Fluorescent Lamp	Storage, Power Panel	
		Fire Alarm System	All Room	
		Paging System	All Room	
Mechanical		Wall Hanging Air Conditioner	Chief, Cafeteria	
		Toilet Fan	Toilet, Shower	
		Wall Mounted Fan	Kitchenette	
		Roof Ventilating Fan	Storage	

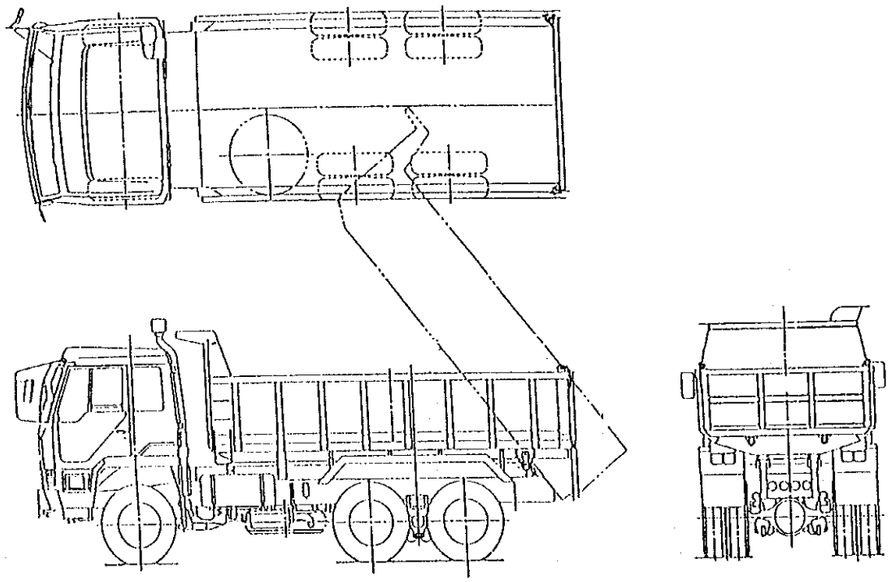
THE ARAB REPUBLIC OF EGYPT
ALEXANDRIA GOVERNORATE
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA

FINISHING SCHEDULE

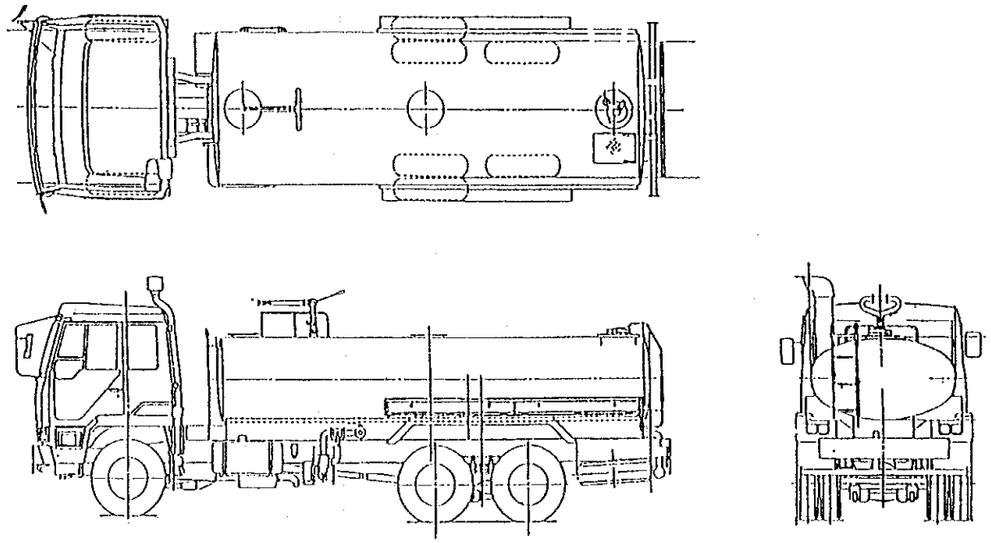
SCALE: —

DRAWING NO.: ASM-B-11

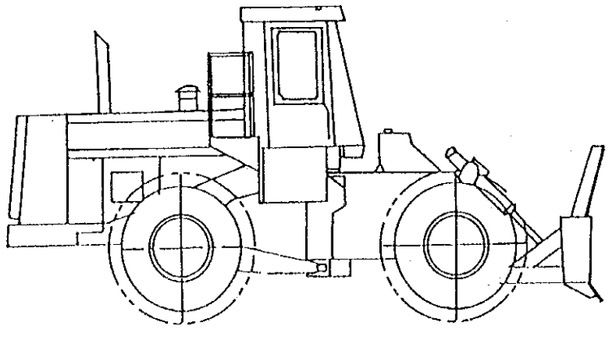
YACHIYO ENGINEERING CO., LTD



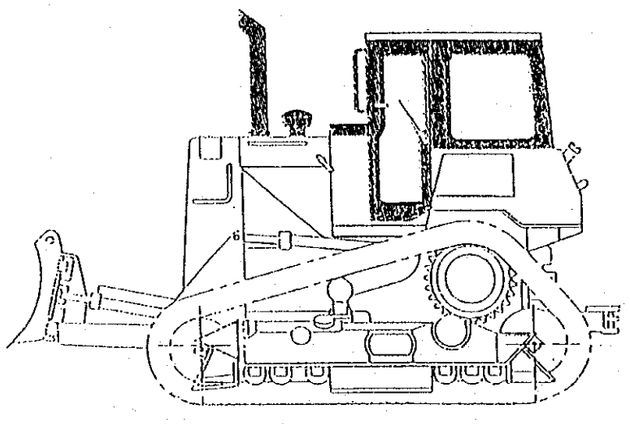
Dump Truck(11ton load type)



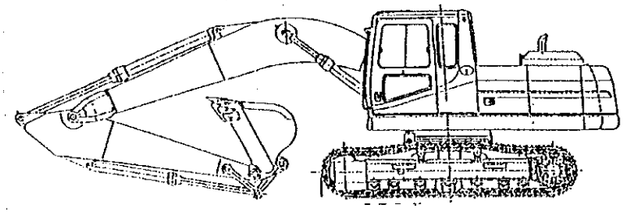
Motor Sprinkler(10m³ load type)



Landfill Compactor(200HP)



Bulldozer(130HP for marshlands use)



Back Hoe(0.7m³)

THE ARAB REPUBLIC OF EGYPT ALEXANDRIA GOVERNORATE	
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA	
TYPICAL DRAWINGS OF VEHICLES FOR FINAL DISPOSAL SITE	SCALE — DRAWING NO. ASM-V-02
YACHIYO ENGINEERING CO., LTD	

3.4 Implementation Plan

3.4.1 Implementation Method

The Project shall be carried out in accordance with the guidelines of the Japan's Grant Aid System. The Project will move to the implementation stage after it has received the recognition of the both governments and the signing of E/N. Thereupon, the Government of Egypt will select the Japanese consulting firm to start detailed design work. Upon completion of the detailed design, the Japanese contractor, which has been selected in the tendering process will commence the Project facilities construction or equipment procurement work. The basic items and major points for consideration in work execution are as stated in the following sections.

(1) Project Implementation Body

The supervising and responsible organizations on the Egyptian side are the Alexandria Governorate, while the General Follow-up Department Alexandria Governorate, which will act as the executing organizations of the Project. The execution setups within the General Follow-up Department are as stated previously (see Section 2.3.1). The Government of Egypt needs to select a project manager for the Project in order to maintain close links and hold discussions with the Japanese consultant and contractor and so ensure the smooth execution of the Project.

(2) Consultant

The Japanese consultant shall execute an agreement with the Alexandria Governorate to carry out the detailed design and supervision of work involved in the construction of facilities and procurement of equipment under the Project. Furthermore, the consultant shall prepare tender documents and be in charge of implementing the tendering process.

(3) Contractor

The Japanese contractor selected in the open tendering process will be responsible for the Project facilities construction and equipment procurement works in accordance with the Japan's Grant Aid Programme.

The contractor will also need to give consideration to continued communication and coordination with the Government of Japan after the construction work is completed because it is thought that supply of spare parts and handling of breakdowns will be

required after the actual facilities construction and equipment procurement has been completed.

(4) Necessity of Dispatch of Technical Experts

The Project components are roughly divided into facilities construction and equipment provision, however for the construction of the compost plant, specially skilled experts who are familiar with the required earth works, building equipment and installation of the various mechanical and electrical equipment will be needed. Because it is difficult to find such engineers in Egypt, it will be necessary to dispatch engineers, who are familiar with equipment installation and operation adjustments etc., from the related equipment manufacturers.

(5) Points to Note During Implementation

In consideration of the fact that the new compost plant construction site lies close to a lake and drainage canal, and that the main road (commonly known as the Desert Road) that links Alexandria and Cairo is to be used as the plant access road, special attention needs to be paid to the following factors.

1) The adjacent lake is a seawater lake used for fishing. All construction related staff must therefore refrain from disposing of construction waste materials into the lake and make an effort to prevent pollution.

2) The Desert Road, which will be used as the access road to the construction site, is a highway. Construction vehicles therefore need to take care when entering and leaving the site and also avoid a hindrance to general cars and vehicles.

3) Because heavy machinery such as cranes will be used and some work will be done at heights, measures need to be taken in order to prevent accidents that may cause injury to engineers, laborers and operators.

3.4.2 Construction Conditions

The construction conditions in Egypt can be summarized into the following points.

(1) Aside from special engineers required for civil engineering and building work and the installation of mechanical and electrical equipment, general engineers, skilled laborers, normal operators and light operators can be easily found in Egypt.

(2) Except for compost plant mechanical and electrical equipment, collection and haulage vehicles and disposal site operation equipment, the general equipment and materials required for construction purposes can be easily procured in Egypt.

(3) Alexandria Port, which is a free port possessing good unloading facilities and is frequently visited by regular liners from Japan, is appropriate for use as the disembarkation port in Egypt.

3.4.3 Construciton and Supervisory Plan

(1) Basic Policy on Work Supervision

In the event when the Project is executed in accordance with Japan's Grant Aid System, the following requirements must be noted in carrying out the detailed design and work supervision.

- Understanding of background conditions up to implementation of the work plan
- Thorough grasp of the contents of the Basic Design Study Report
- Understanding of the Japan's Grant Aid programme
- Grasp of the contents of the E/N signed by both the Japanese and the Egyptian Governments between
- Compatibility of the Project with the technial cooperation if experts are to be dispatched to provide technical assistance.

In consideration of the above, the contents, responsibilities and points to note regarding the detailed design and work supervision can be summarized as follows.

1) Scope of Consulting Work

Following the signing of E/N, the consultant will enter into a consultancy agreement with the Alexandria Governorate within the scope indicated in the E/N. The scope of the consulting work is summarized as follows.

① Detailed design work:

- Execution of detailed design and preparation of drawings and documents for tendering
- Obtaining of the consent of the Alexandria Governorate for the tender drawings and documents
- Execution of tendering, assessment and report of tender results, and supervision of procurement and construction contracts
- Confirmation of the scope and progress of the work to be undertaken by the Egyptian side prior to the commencement of Project-related construction work

② Work supervision

- Issue of notice to commence the work
- Preparation of pre-work report
- Discussions with the parties involved in construction work prior to the commencement of the work
- Obtaining of approval for the work schedule plan and the holding of work schedule meetings
- Obtaining of approval for the work drawings
- Witnessing of the inspection of equipment and materials, witnessing of construction work and issue of relevant instructions as and when deemed necessary
- Inspection of interim progress of the work, inspection for final handing-over and issue of final acceptance certificates
- Preparation of monthly progress reports throughout the construction period
- Conducting of all necessary work for final handing-over
- Preparation of final report and implementation of project completion procedure

2) Important Points to Note

① Detailed Design

a. Reconfirmation of Equipment and Materials Procurement Conditions

Reconfirmation shall be made on the conditions of procurement for construction equipment and materials, collection and haulage and vehicles and disposal site operation equipment clarified in the basic design stage. In particular, it is expected that the construction equipment and materials will be procured locally where possible, so it is important at this stage to check whether or not they meet the requirements/specifications set by the basic design.

b. Preparation and Explanation of Order Documents

Order documents shall be in line with the objectives of the Project facilities and it will be necessary during the field survey for the detailed design to hold sufficient consultations with officials of the Alexandria Governorate in order to obtain its approval for tender drawings and documents, which will include detailed design drawings.

② Work Supervision

a. Progress Control

The work schedule for the Project currently being forecast is as shown in the Project Implementation Schedule.

As previously mentioned, the Project is to be implemented in accordance with Japan's Grant Aid System, and an implementation schedule which shows proper understanding of this fact needs to be prepared during the detailed design stage. Strict progress control must then be taken to ensure that all Project activities are implemented in accordance with the implementation schedule.

Because the progress of work is greatly influenced by delivery times of imported equipment and materials, control of machinery manufacture, import and delivery deadlines shall be exercised.

b. Quality Control

The materials and equipment to be procured in Egypt may not be of uniform quality, forcing some alterations to the materials specifications relating to the materials which are established as part of the detailed design. In case of

alterations, proper quality control of the new materials shall be conducted to ensure that original design requirements are met.

c. Supervisors

Supervisors should arrive at the Project site as soon as the commencement notice is issued to the contractor. At least one full-time supervisor responsible for the construction must be stationed on the site during the period of work. Moreover, when special supervisory technology is required concerning machinery, equipment and electrical equipment, specialist staff shall be dispatched to take appropriate action whenever the site supervisor requests so.

Moreover, Japanese experts will need to carry out the witnessed inspections of the procured equipment and materials before they are packed and shipped.

3.4.4 Equipment and Materials Procurement Plan

(1) Equipment and Materials Sources

The construction equipment and materials that can be procured locally, are good in quality and can be delivered on time at a reasonable cost shall be used for the Project. Almost all of the civil and building materials, and around 60% of the building facilities can be procured in Egypt. However it is thought that almost all the final disposal site operation equipment and collection and haulage vehicles will need to be imported from foreign countries. Egypt still has little experience in the manufacturing of collection and haulage vehicles and final disposal site operation equipment, and indeed almost all such vehicles and equipment currently in operation in Egypt have been imported through foreign assistance..

Table 3.4.1 Equipment and Materials Procurement Sources

	Locally Procured Items	Items Procured from Japan	Items Procured from Third Country
Civil and building work	Aggregate, cement, concrete blocks, wooden forms, steel, paint, wooden fittings etc.	Water stop, waterproof agent, calking compound etc.	–
Building facilities	Ventilation fans, gas hot plates, basins, piping, lighting appliances, power lines, fire extinguishers, road lights etc.	Switches, distribution panels, cables, air conditioners, wall lightning rods, paging systems, fire alarm equipment etc.	–
Mechanical and electrical equipment	Receiving hoppers, hand sorting conveyor, hand carts, hoist, submersible pumps etc.	Special conveyors, crush fractionation machine, iron retrieval bailer, compost feeder, cooling tower, power distribution equipment etc.	Turning machine and landfill compactor

3.4.5 Implementation Schedule

(1) Scope of Work

If the Project is executed under the Government of Japan Grant Aid System, after E/N conclusion is completed by the two countries, the Project shall be advanced over three stages; ① preparation of detailed design drawings and documents, ② tender and construction contracts, and ③ equipment and materials procurement and facilities construction work. The following sections provide an outline of each stage. Moreover, the Project Implementation Schedule is illustrated in Fig. 3.4.1.

1) Detailed Design Work

As mentioned previously (3.1.7), execution of the Project is to be divided into equipment and materials procurement (Phase 1) and facilities construction (Phase 2). Concerning the detailed design for Phase 1, the Japanese consultant shall immediately conclude a consultant contract with the Alexandria Governorate and commence the work after conclusion of the E/N.

Based upon the results of the Basic Design Study and Detailed Design Study, the consultant shall prepare tender drawings and documents (specifications and detailed design drawings).

During the first and last stages of the detailed design, close links shall be kept with the related organizations on the Egyptian side, and their approval of the final product shall be obtained before tendering takes place.

Concerning the detailed design for Phase 2, the Japanese consultant shall immediately conclude a consultant contract with the Alexandria Governorate and commence work after conclusion of the E/N for the detailed design.

Based upon the results of the Basic Design Study and Detailed Design Study, the consultant shall prepare tender drawings and documents (specifications and detailed design drawings).

During the first and last stages of the detailed design, close links shall be kept with the related organizations on the Egyptian side, and their approval of the final product shall be obtained before the detailed design is completed. Following this, E/N for the construction and supervision of the work execution shall be concluded and the consultant shall conclude a consultant contract on its powers of agency for the tendreing process and works supervision with the Alexandria Governorate. When this is done, the tender shall commence.

However,before tender for Phases 1 and 2 can begin, the Presidential Office of the Arab Republic of Egypt needs to approve of the E/N and notify its approval through the Ministry for International Cooperation to the Government of Japan. The expected work periods required for completion of the two Project phases are as follows:

- Phase 1: about 2 months
- Phase 2: about 4.5 months

2) Tender and Construction Contracts

The consultant shall act in lieu of the Alexandria Governorate in carrying out the tender announcements, registration and screening of tender participants, staging of explanation meetings and the distribution of tender drawings and documents. It shall then leave a period for tender preparation, hold the actual tender, and quickly examine the results after it receives all the tender prices and drawings and documents in order to expedite the conclusion of contracts between the Alexandria Governorate and the Japanese contractor.

The tender shall be carried out in the presence of those concerned and the contract shall be awarded to the tenderer which has presented the lowest price and acceptable tenderer contents. The successful tender will then conclude the necessary contract with the Alexandria Governorate.

It is expected that around 1.5 months will be required between tender and conclusion of construction contract in both Phase 1 and Phase 2.

3) Facilities Construction and Equipment and Materials Procurement

After conclusion of the construction contract, the authorization of the Government of Japan shall be obtained and actual work will commence. Judging from the Project scale and facilities contents, provided that procurement of the construction materials and equipment goes smoothly and that the Egyptian side conducts its part of the work normally, the following work periods for equipment procurement and facilities construction are forecast:

- Phase 1 works : 8.5 months
- Phase 2 works : 18 months

Moreover, the consultant shall conduct consultations with the contractor prior to the commencement of the respective works.

It shall ensure that the contractor provides guidance and supervision of local transportation of equipment and materials, execution methods and works processes etc., and carry out process control and quality control and ensure that the work is completed within the period stipulated in the E/N.

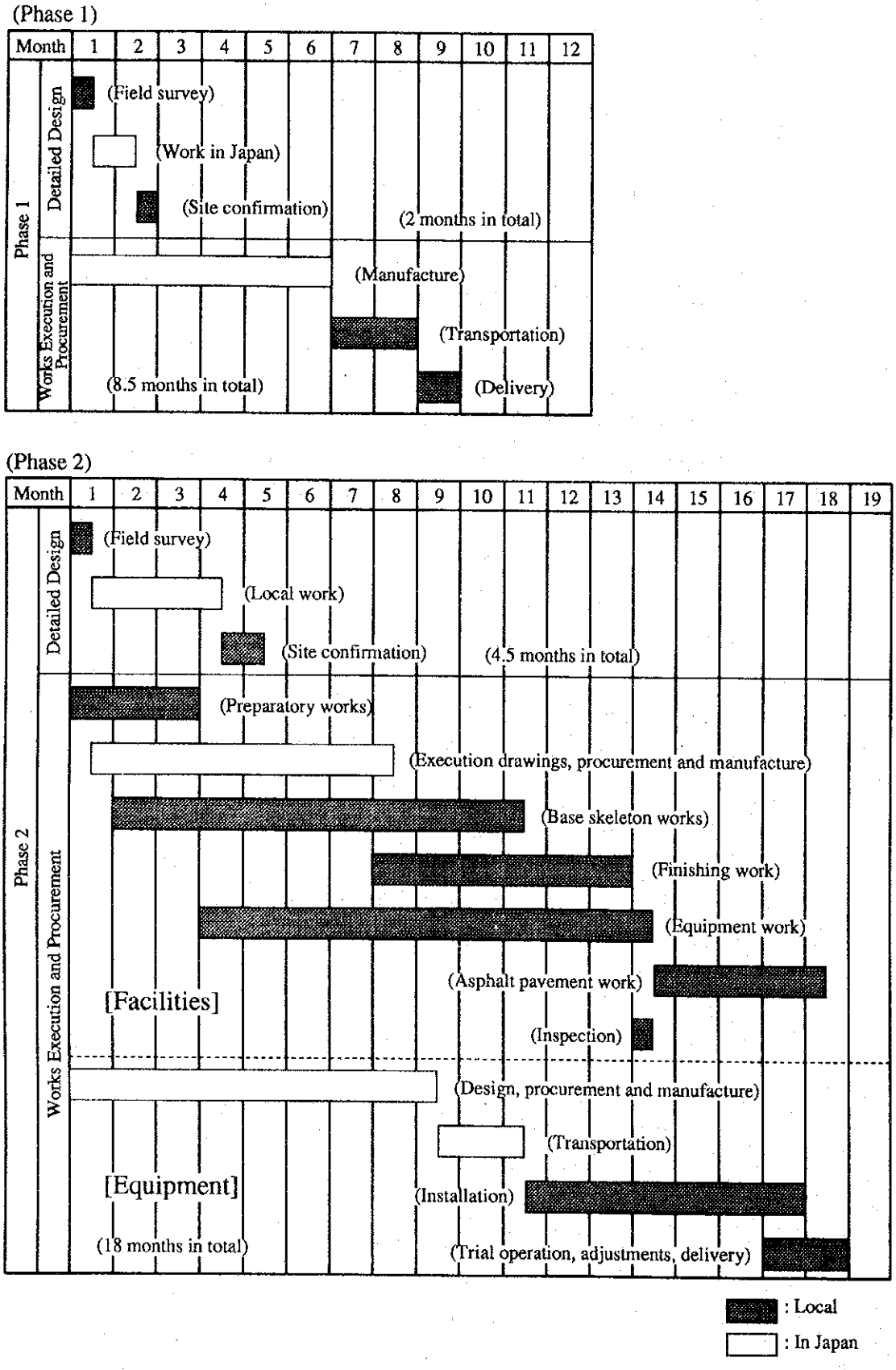


Fig. 3.4.1 Project Implementation Schedule

3.4.6 Scope of Work

(1) Work Assignment

The Governments of Japan and Egypt will undertake the following work to complete the Project.

1) Work to be undertaken by the Government of Japan

(a) Procurement of collection and haulage vehicles and final disposal site operation equipment

(b) Construction work of the new compost plant

2) Work to be undertaken by the Government of Egypt

(a) To remove and transfer the structures within the scheduled site and secure the land for construction purposes (equipment and materials store areas, temporary offices, ground levelling etc) prior to the commencement of construction work by the Japanese side.

(b) To cover the cost of opening an account at a Government of Japan authorized foreign exchange bank and all other expenses necessary for the implementation of the Project not covered by the Grant.

(c) To take measures to ensure the speedy unloading of equipment and materials to be provided under the Project, provide exemption of tariffs regarding the import of reexport of Project equipment and materials, corporation tax on the Japanese consultant and customs charges etc., and also to take steps to ensure the convenience of Japanese nationals dispatched in the course of Project execution.

(d) To gain the approval of the Government of Egypt and present necessary materials for Project execution.

(e) To secure water and power supply lines to the construction site and procure general items of furniture.

(f) To secure land for surplus soil disposal, set surveying reference points and obtain approval for boring and actual surveying.

(g) To quickly obtain permission for staff to enter publicly and privately owned land to be used in the course of Project execution.

(h) To obtain approval for Project execution and witness and confirm the execution of works.

(i) To take the necessary measures to ensure the cooperation of residents and control of traffic.

(j) To secure a budget for and carry out the proper operation and maintenance of equipment and facilities provided under the Project after the Project works have been completed.

(2) Costs to be Borne by the Government of Egypt

The work to be done by the Egyptian side are as follows:

1) Site reclamation
2) Constructoin of boundary fence around the site and gates
3) Extension of utility services to the site
4) Planting trees around the site (if necessary)
5) Provision of furniture and curtains etc.
6) Customs clearance charge
7) Bank commission charge

The estimated cost for items 1) to 3) is approximately 2,740,000 LE.

(3) Estimate Conditions

1) Estimation point : end of October 1994
2) Exchange rate : US$ 1 = LE 3.38
3) Construction period : the periods for execution of detailed design and construction (including procurement of equipment and materials) shall be as indicated in the Project Implementation Schedule.
4) Other : the Project shall be carried out in accordance with the Government of Japan Grant Aid System.

CHAPTER 4

PROJECT EVALUATION AND CONCLUSION

CHAPTER 4 PROJECT EVALUATION AND CONCLUSION

4.1 Benefits of the Project

The benefits that can be expected through implementation of the Project are as indicated in Table 4.1.1.

Table 4.1.1 Current Solid Waste Management Situation and Effects of Project Implementation

Current Situation and Problem Areas	Remedial Measures Under the Project	Project Effects and Level of Resulting Improvements
1. Collection and Haulage Of the collection and haulage vehicles possessed by Middle District, which is the political and economic center of Alexandria city and the area of densest population, only a mere 30% are in operable condition. The waste collection rate, although supplemented through nighttime collection work, is only around 80%. The remaining 20% of uncollected waste is unlawfully dumped and lies scattered around the district. This is causing an extreme deterioration of the sanitary environment of the district. Present collection in Middle District consists of primary collection, in which waste from residential areas is collected door to door by handcarts and taken to containers (2 m^3) situated on street corners, and secondary collection in which compactor vehicles mechanically load the waste from the containers. However, collection efficiency levels are extremely low due to insufficient numbers of containers and poor operation rates of the collection vehicles caused by deterioration. The renewal and replenishment of vehicles and containers is an issue that requires urgent attention.	Because all the collection vehicles currently operating in Middle District are due for renewal, the Project shall include a plan for procurement of collection vehicles based upon the premise that all vehicles are to be replaced. As Central District is currently regarded as the district with the worst level of collection in Alexandria, the Project shall aim to raise the collection rate there to 100%. The present system of primary collection by handcarts to containers and secondary collection by compactors shall be continued, however in order to make the collection system more efficient, 21 compactors of 15 m^3 capacity and 18 compactors of 10 m^3 capacity shall be incorporated into the vehicle fleet and stationed along appropriate collection routes. Moreover, the size of containers shall be reduced to 1 m^3 and their numbers shall be increased so that they are placed at intervals of around 100-200 m. Furthermore, 15 m^3 containers shall be placed where possible along the district trunk roads and waste discharged into these shall be efficiently collected by a total of 10 arm roll vehicles with 15 m^3 capacity.	The provided vehicles will enable a comprehensive form of collection to be carried out. The project will benefit the total population of Middle District (715,000) and in particular the some 140,000 citizens or share of the population which is currently not provided with a waste collection service (20%). The positioning of 1 m^3 containers throughout all areas of the district will enable waste to be easily carried to each container and solve the problems of scattered waste due to container overflow and also unlawful dumping. This will lead to an improvement of the living environment and also a higher degree of public sanitation. The increased level of collection efficiency will do away with the need for nighttime collections and so lead to lower operating costs. As an indirect effect of the Project, it is hoped that the collection system introduced into other districts within the city and so lead to a better and cleaner living environment throughout the whole of Alexandria.

Table 4.1.1 continued

2. Intermediate treatment The sole solid waste intermediate treatment facility in Alexandria is currently the Abis Compost Plant. This plant, which has a treatment capacity of 160 tons/day, was constructed in 1985 through loan aid from the World Bank and since then has continued to operate smoothly for almost 10 years. The role of compost as a means of reducing solid waste quantities, which have been increasing in recent years in line with a rapid rise in the populations of Egypt's main cities, and in doing so reduce the burden of waste haulage to increasingly remote disposal sites is becoming more and more important. Furthermore, compost has come to be considered as a soil improvement material for aiding the national policies of desert reclamation and farmland expansion. Indeed, compost plant construction has been made one of the major targets within the environmental sector of the Third 5-year Plan. In Alexandria, the existing disposal site will become full by 2000 and the city will be forced to secure a new disposal site located more than 30 km from the city center for use after 2001. Moreover, the Abis Compost Plant has been unable to meet the growing demand for compost from farmers of reclaimed land for each of the past five years. Farmers in the Alexandria area who are unable to purchase compost at the Abis Compost Plant are going as far as compost plants in Cairo and Giza in order to obtain compost.	A compost plant with a capacity of 150 tons/day shall be constructed at a site some 4 km to the west of the Abis Compost Plant in order to promote waste quantity reduction and meet the growing demand for compost from farmers. The new plant shall be planned in such a manner so as to enable business know how and engineering techniques already obtained during experience of operation of the Abis Compost Plant to be fully utilized. Moreover, the new plant shall be provided with an improved receiving yard and hand sorting line in view of the problems found in these areas at the existing plant. Care will also be taken to improve the working environment at the new plant. Furthermore, truck scales shall be provided for the new compost plant and the Abis Compost Plant in order to enable better management of collection vehicle operating levels and also to allow a better understanding of waste collection, treatment and disposal quantities.	Because it will become possible to provide intermediate treatment of 150 tons/day or 30% of the total waste discharge volume of Middle District (506 tons/day), this will allow stabilization of the collection and haulage work load to be achieved. It will be possible to reduce the quantity of waste for disposal by 82 tons/day (30,000 tons/year), or the equivalent of 20% of disposal waste from Middle District. The compost supply will increase by some 40 tons/day (roughly 12,000 tons/year), which will be enough to allow soil improvement to be performed on a land area of roughly 1,300 fedan (about 560 ha). A major contribution will be made to raising the future level of intermediate treatment technology within the waste management sector of Alexandria. If the Abis Compost Plant should for some reason or other be forced to stop operations, the existence of a plant with roughly the same capacity will still allow intermediate treatment to be continued.

Table 4.1.1 continued

3. Final Disposal The disposal sites currently in use are those at Abis and Ameriyah. The remaining useful lives of the disposal sites are six years at Abis (until the end of 2000) and seven years at Ameriyah (until the middle of 2001). Following that, the next scheduled disposal site will be no nearer than 30 km from Alexandria city center. Due to a lack of equipment for sanitary landfill purposes, disposal at both existing sites is carried out in the form of open dumping. This leads to the spontaneous combustion of the disposed waste which creates clouds of dark smoke and foul odors which in turn has detrimental effect on the surrounding environment. Heavy machinery at both plants is currently limited to just one bulldozer each. However, the bulldozer at Abis Disposal Site has reached six years of age and the hinderance of work caused by its frequent breakdowns means that its renewal is necessary. Moreover, because there is absolutely no equipment for performing earth covering, the introduction of heavy machinery for earth excavation and loading and dump trucks for earth haulage is indispensable.	In order to allow sanitary landfill disposal through proper earth covering to be performed, one back hoe, two dump trucks, two bulldozers, two landfill compactors and one motor sprinkler shall be provided.	By allowing sanitary landfill disposal through daily earth covering to be carried out, the Project will contribute to the prevention of secondary pollution caused by the scattering of waste, foul odors and spontaneous combustion. By limiting the detrimental environmental effects to a minimum through execution of sanitary landfill methods, it will become easier to obtain the necessary understanding of residents when securing land for new disposal sites in the future.

4.2 Conclusion

In consideration of the following points, the implementation of the Project through the provision of Japan's Grant Aid is judged to be both highly significant and appropriate.

(1) Benefits derived from the Project

The population of Middle District in Alexandria (715,000) will directly receive the benefits of the Project plan to procure waste collection and haulage vehicles and equipment. Of this, the 140,000 low income residents for whom a waste collection service is not currently provided will particularly benefit. The compost plant construction plan will indirectly benefit the whole population of Alexandria city when it is considered that it will lead to a reduction in the quantity of waste and increase agricultural yields through soil improvement. The plan to procure final disposal site operation equipment will also benefit the whole population of Alexandria in that it will enable sanitary landfill disposal to be performed and thus lead to a general improvement of the city environment.

(2) Coordination with National and Local Plans and Foreign Assistance Projects

The Project components coincide with the major objectives of the environmental sector of the Government of Egypt's Third 5-year Plan. Moreover, the Project has been compiled based upon the priority work areas proposed in the JICA F/S and in accordance with the objectives of the targets of the JICA master plan.

The contents of other solid waste management improvement projects that have been implemented through assistance from other foreign nations or international organizations have been limited to the partial provision of collection and haulage vehicles, and do not overlap with the Project components.

(3) Urgency of the Project and Scale of Facility Construction and Equipment Procurement

Implementation of the Project is urgently required in consideration of the following points.

- It is required in order to prevent deterioration of the sanitary environment in Alexandria caused by the scattering and unlawful dumping of waste due to insufficient collection equipment and vehicles.

- It is vitally important to reduce quantities of waste due to increasing waste generation volumes and future disposal site remoteness. It is equally important to provide an alternative compost plant due to the increasing demand for compost following the promotion of the national policy of farmland area expansion and the aged deterioration of the existing Abis Compost Plant.

- It is highly necessary to prevent the occurrence of secondary pollution such as air pollution and harmful insects caused by spontaneous combustion and foul odors at the existing final disposal sites.

Regarding the scale of facilities and equipment to be introduced under the Project, this is considered appropriate for the following reasons.

- The scale of collection vehicles and equipment is appropriate when the deterioration and collection efficiency of the vehicles etc. currently operated by Middle District are considered.

- The scale of the new compost plant is considered to be appropriate at 150 tons/day because, if it is made 300 tons/day, overall compost production of Alexandria will be trebled and there are doubts as to whether or not the extra compost could be sold off and it is too early to consider a plant capacity in excess of that of the existing compost plant (160 tons/day).

- The scale of final disposal site operation equipment is appropriate for carrying out the sanitary landfill disposal by daily earth covering of waste carried into Abis Disposal Site.

(4) Operation and Maintenance of Facilities and Equipment after Project Implementation

Regarding operation and maintenance activities after completion of the Project, it will be possible to secure the necessary manpower through staff reshuffling within the related departments and divisions of Alexandria Governorate without necessitating any increases in staff numbers.

In terms of maintenance technology levels, the existing staff possess experience in the maintenance of collection and haulage vehicles provided through past European and American assistance projects. Moreover, the existing compost plant has now been in operation for almost 10 years, and the disposal sites have

previously had experience in sanitary landfill disposal through earth covering. It is thus considered that the related staff on the Egyptian side possess ample technical experience and know how in order to conduct adequate operation and maintenance activities.

As to the question of maintenance and repair costs, the compost plant should be able to cover such costs through revenue made from the sale of compost and reusable material. Moreover, it will be possible to amply cover collection and haulage vehicle maintenance and repair costs within the bounds of the Cleansing Fund budget.

4.3 Recommendations

The Project will fulfill an important role as being the touchstone for future solid waste management improvement activities in Alexandria. In order to support the improvements made by the Project, the following undertakings are required from the Government of Egypt and the Alexandria Governorate.

(1) To continue, as long as is necessary, the furnishing of personnel costs for the solid waste management system in Alexandria after completion of the Project.

(2) To take the necessary budgetary measures and secure a self financing base in readiness for the future renewal of collection and haulage vehicles and equipment, new compost plant facilities and final disposal site operation equipment (total solid waste management costs in 2001, including depreciation, will be roughly 46 million LE).

(3) To take measures for the wider utilization of compost on farmland and the promotion of compost selling.

(4) To compensate any deficits that may occur in the solid waste management system accounts.

(5) To secure land for a final disposal site for use after 2001.

(6) To make execution report including the following items in order to clarify the objectives of the new compost plant construction and to ensure the plant's long term operation:

- Compost production and retailing performance
- Reusable material retailing performance
- Plant accidents or trouble
- State of retail contract conclusion
- Financial situation of the plant
- Data on solid waste quality and composition

APPENDICES

APPENDIX 1

MEMBER LIST OF SURVEY TEAM

1-1 Basic Design Study Team

Team Leader	Hideo MIYAMOTO	First Basic Design Study Division, Grant Aid Study & Design Department, JICA
Garbage Treatment Planner	Hidetoshi KITAWAKI	Associate Professor, Urban Engineering Department, Faculty of Engineering, University of Tokyo
Garbage Treatment System	Hiroshi SAWACHI	Manager, Management Dept. Facilities Division, Management Beau Department Osaka City Government
Facilities Planner I Project Manager	Kango MITO	Yachiyo Engineering Co., Ltd.
Facilities Planner II	Takashi ONOYAMA	Yachiyo Engineering Co., Ltd.
Equipment Planner	Masahiro TAKEUCHI	Yachiyo Engineering Co., Ltd.
Garbage Treatment Planner	Noboru SAEKI	Yachiyo Engineering Co., Ltd.

1-2 Draft Final Report Explanation Team

Team Leader	Kiyoto KUROKAWA	First Basic Design Study Division, Grant Aid Study & Design Department, JICA
Garbage Treatment Planner	Hidetoshi KITAWAKI	Associate Professor, Urban Engineering Department, Faculty of Engineering, University of Tokyo
Facilities Planner I Project Manager	Kango MITO	Yachiyo Engineering Co., Ltd.
Equipment Planner	Masahiro TAKEUCHI	Yachiyo Engineering Co., Ltd.

APPENDIX 2

SURVEY SCHEDULES

1. Basic Design Study Team

No	Date	Day	Weather	Stay	Movement	Contents of Work
1	Aug. 5	Fri	Fine	Frankfurt	Tokyo 18:00 to Frankfurt 18:00 (JL407)	Depart Japan (3 govt. members: Miyamoto, Kitawaki, Sawachi; 4 consultants: Mito, Onoyama, Takeuchi, Saeki)
2	Aug. 6	Sat	Fine	Cairo	Frankfurt 14:00 to Cairo 19:20	Arrive in Cairo (3 govt. members; 4 consultants)
3	Aug. 7	Sun	Fine	Cairo	Cairo to Alexandria	• Courtesy call and meeting with Japanese Embassy and JICA Egypt Office • Courtesy call to Ministry of International Cooperation (MOIC), Minutes of Discussion • All team members move to Alexandria
4	Aug. 8	Mon	Fine	Alexandria		• Courtesy call to the Alexandria Governorate • Visit the General Follow-Up Department, presentation of Inception Report, explanation, discussion • Internal meeting of Study Team
5	Aug. 9	Tue	Fine	Alexandria		• Survey of the Abis Compost Plant, • Survey of the Abis Final Disposal Site, Ameriyah Final Disposal Site, proposed site for the final disposal site (2 locations) • Survey of the status of compost use—visit and interview of large scale farm • Preparation of natural conditions survey, data collection
6	Aug. 10	Wed	Fine	Alexandria		• Survey of waste collection work conditions • Visit to Central Workshop, Sub-central Workshop, Middle District collection truck garage, survey of maintenance and operation • Discussion with General Follow-Up Dept. • Preparation for natural conditions survey • Survey of market for compost, data collection
7	Aug. 11	Thu	Fine	Alexandria		• Minutes of Discussion with General Follow-Up Department, MOIC • Preparation for natural conditions survey, data collection
8	Aug. 12	Fri	Fine	Alexandria		Holiday (Kitawaki to Cairo)
9	Aug. 13	Sat	Fine	Alexandria/ Cairo	Alexandria to Cairo	• Signing of M/D • Two govt. members (Miyamoto, Sawachi), one consultant (Mito) to Cairo • Three consultants (Onoyama Takeuchi, Saeki) continue survey in Alexandria • Gov. member Kitawaki returns to Japan (Cairo to Tokyo via Paris)
10	Aug. 14	Sun	Fine	Alexandria/ Cairo		• Two govt. members (Miyamoto, Sawachi) and consultant Mito report to Embassy and JICA, courtesy call to MOIC • Natural conditions survey (volume, content of garbage) and discussions
11	Aug. 15	Mon	Fine	Alexandria		• Two govt. members (Miyamoto, Sawachi) return to Japan (Cairo to Tokyo via London) • Survey of Middle District collection vehicle garage • Inspection of natural conditions survey (surveying)

No	Date	Day	Weather	Stay	Movement	Contents of Work
12	Aug. 16	Tue	Fine	Alexandria		• Survey (part 1) of the state of repair of collection vehicles and compressor equipment at the Central Workshop • Survey of construction, public work and compressor plant equipment markets (construction cost survey)
13	Aug. 17	Wed	Fine	Alexandria		• Survey of construction, public work and compressor plant equipment markets (construction cost survey) • Survey of the state of garbage collection in Middle district • Natural conditions survey (volume, content of garbage) and discussions
14	Aug. 18	Thu	Fine	Alexandria		• Survey of maintenance status of collection vehicles and state of collection at the Beautification Dep. of the Middle Dist. • Survey of status of shore cleaning operations • Survey of current condition of Abis Compost Plant • Natural conditions survey (site surveying, geologic surveying) and discussions • Natural conditions survey (volume, content of garbage) and discussions
15	Aug. 19	Fri.	Fine	Alexandria		National Holiday
16	Aug. 20		Fine	Alexandria		Holiday • Data analysis
17	Aug. 21	Sun	Fine	Alexandria		• Survey of conditions of Abis Compost Plant • 2nd survey / data collection of the Central Workshop • Financial surveys of Middle District's budget, activities of ADS Survey of compost markets, production of materials for technical cooperation
18	Aug. 22	Mon	Fine	Alexandria		• Basic Plan for Haulage with Middle District Beautification Dept. • Technical discussion with General Follow-Up Department • Survey / data collection for financial situation of Alexandria Governorate
19	Aug. 23	Tue	Fine	Alexandria		• Hearing at Alexandria Branch of the Agricultural Ministry • Discuss on final disposal site operation equipment • Survey of compost market • Inspection for natural conditions survey (topographic survey)
20	Aug. 24	Wed	Fine	Alexandria		• Plans for additional boring surveys • 1st discussion of plans for compost plant facilities • Survey of compost market • Obtaining data on financial balance and ADS activity status of Middle District. • Hearing of the financial situation of Middle District

No	Date	Day	Weather	Stay	Movement	Contents of Work
21	Aug. 25	Thu	Fine	Alexandria		• Participation • Survey of compost market • Inspection of natural conditions survey • Visit to Alexandria Water Authority • Discussion on the possibility of alternative site for new compost plant with Alex. Governorate
22	Aug. 26	Fri	Fine	Alexandria		Holiday • Data analysis
23	Aug. 27	Sat	Fine	Alexandria		• 2nd discussion of plans for compost plant facilities • Survey of traffic volume • Market survey • Visit to Ministry of Agriculture, discussion on compost market development • Preparation of field report
24	Aug. 28	Sun	Fine	Alexandria (Onoyama to Cairo)	(Onoyama) Alexandria to Cairo	• Hearing on reusable materials from the Abis Compost Plant • Management of extra boring work and civil and building design of compost plant • Visit to agricultural cooperative and Manula Agricultural company , exchange of ideas on marketability of compost • Survey of alternative site for new compost plant (consultant Onoyama to Cairo)
25	Aug. 29	Mon	Fine	Alexandria (Onoyamao London)	(Onoyama) Cairo to London	(consultant Onoyama returns to Japan) • Arrangement of garbage generation and quality survey results • 1st discussion of civil and building facilities of compost plant • Survey of check sheet for collection vehicles in the Abis Final Disposal Site office • Preparation of field report
26	Aug. 30	Tue	Fine	Alexandria (Konoyama on plane)	(Onoyama) London to Tokyo	• 2nd discussion of civil and building facilities • Visit to the Hariru and Tawajia Zawarad Agricultural Coops, hearing on the marketability of compost
27	Aug. 31	Wed	Fine	Alexandria		• Planning of final disposal site operation equipment • Researching markets for compost • Discussion with Alexandria side on the specifications of collection vehicles and location of containers (consultants Onoyama arrives in Japan)
28	Sept. 1	Thu	Fine	Alexandria		• 1st discussion on final disposal site operation equipment • Time/Motion survey for collection vehicles • Survey of the local construction industry • Visit to the Statistics Bureau, General Agricultural Cooperation of Alex, surveying of general information for social/economic activity • Discussions with Alexandria side on the proposed site for new compost plant
29	Sept. 2	Fri.	Fine	Alexandria		• Holiday

No	Date	Day	Weather	Stay	Movement	Contents of Work
30	Sept. 3	Sat.	Fine	Alexandria		• Submission of draft field report (third for compost plant) (second for collection vehicles) (second for final disposal site operation equipment) • Discussion with Alexandrine side on location of containers
31	Sept. 4	Sun	Fine	Alexandria		• Market survey • Survey of quarry site • Visit East District ,examination and discussion of alternative site
32	Sept. 5	Mon	Fine	Alexandria		• Examination of alternative site, discussion with Alexandria Governorate side on final decision • Examination of East District collection vehicles • Market survey • Presentation of field report
33	Sept. 6	Tue	Fine	Cairo	Alexandria to Cairo	• Final discussion on alternative site (consultants Mito, Saeki and Takeuchi to Cairo)
34	Sept. 7	Wed	Fine	Cairo		• Report to Embassy and JICA office in Egypt • Team member Saeki returns to Alexandria
35	Sept. 8	Thu	Fine	London (Saeki: Alex.)	Lv. Cairo 9:00 (BA154) Ar. London 12:15	Consultants Mito, Takeuchi, leave Egypt Team member Saeki discusses alternative site with Alexandria Governorate side Survey of alternative site
36	Sept. 9	Fri	Fine	In flight (Saeki: Alex.)	Lv. London 19:45 (JL402)	Travel day (Mito, Takeuchi) leave London Saeki surveys alternative site
37	Sept. 10	Sat	Fine	(Saeki: Alex.)	Ar. Tokyo 15:30	Mito and Takeuchi arrive in Japan. Saeki makes final discussion with Alexandrine Gov. side on alternative site
38	Sept. 11	Sun	Fine	Alexandria		Proposed site for the new compost plant has been finally decided. Saeki receives letter from Central Dept. of Cleansing and Beautification on decision for the new compost plant site
39	Sept. 12	Mon	Fine	Cairo	Alexandria to Cairo	Saeki to Cairo, reports to JICA Egypt office
40	Sept. 13	Tue	Fine	London	Lv. Cairo 9:00 (BA154) Ar London 12:15	Saeki leaves Egypt
41	Sept. 14	Wed	Fine	In flight	Lv. London 19:45 (JL402)	Travel day
42	Sept. 15	Thu	Fine		Ar. Tokyo 15:30	Saeki arrives in Tokyo

2. Draft Final Report Explanation Team

No	Date	Day	Weather	Stay	Movement	Contents of Work
1	Feb. 3 1995	Fri	Rain	Paris	Lv. Tokyo 11:25 (JL405) Ar. Paris 16:20	DF/R Explanation Team leaves Tokyo
2	Feb. 4	Sat	Fine	Cairo	Lv. Paris 16:50 (AF8004) Ar. Cairo 22:15	Explanation Team arrives in Cairo
3	Feb. 5	Sun	Rain	Cairo	Cairo to Alexandria	Meeting with Japanese Embassy and JICA Egypt Office Courtesy call to Ministry of International Cooperation (MOIC), Move to Alexandria
4	Feb. 6	Mon	Rain	Alexandria		Courtesy call to and discussion with the Alexandria Governorate Courtesy call to and discussion with the General Follow-Up Department Survey of proposed site
5	Feb. 7	Tue	Fine	Alexandria		Explanation of DF/R to the General Follow-Up Dept. and discussion Discussion on Minutes of Discussion (M/D) with MOIC
6	Feb. 8	Wed	Fine	Cairo	Alexandria to Cairo	Signing of M/D Reporting the results of explanation and discussions on DF/R to Alexandria Governorate Move to Cairo
7	Feb. 9	Thu	Fine	Cairo		Reporting the results of explanation and discussions on DF/R to Japanese Embassy Reporting the results of explanation and discussions on DF/R to JICA Egypt office
8	Feb. 10	Fri	Rain	London	Lv. Cairo 8:30 (BA154) Ar. London 11:30	Explanation Team leaves Egypt
9	Feb. 11	Sat		In flight	Lv. London 19:00 (JL402)	
10	Feb. 12	Sun	Cloud		Ar. Tokyo 16:00	Explanation Team arrives in Tokyo

APPENDIX 3

MEMBER LIST OF PARTY CONCERNED IN EGYPT

LIST OF INTERVIEWEES

(1/2)

ORGANIZATION AND NAME	POSITION
• **Ministry of International Cooperation: MOIC**	
Mr. Wahib El Miniawy	Advisor of MOIC/Ambassador
Mr. Mohsen M. Sadek	Director of Japan Department
• **Alexandria Governorate**	
Mr. El Sayed El Gawsaki	Governor
Mr. Ahmed Abd El-Shaarawi	General Secretary
Mr. Ahmed Abdel Salam Khalaf	Assistant General Secretary
Mr. Mostafa Hassan	General Manager of Administration & Finance
Mr. Mahsan Hassan	Legal Counsel
Mr. Mostafa El Shamit	General Manager of Legal Dept.
Mr. Ahmed Yousef	Secretary of Alexandria Governor
Mr. Shahan Ahmed El Sayed	Manager of Planning Dept.
Mr. Mostafa El Sayed	General Manager of Financial Affairs
Miss Yosria Mohamed	Budget Manager of Financial Affairs
Mrs. Magda El Bagory	General Manager of Planning and Follow-Up
Mr. Saeed Abe El Wahab	Deputy Minister of Ministry of Agriculture
Mr. Aligude	General Manager of Statistical Dept.
Mr. Fatihi Hassan	Manager of Environmental Affair
• **General Follow-Up Department**	
Mr. Hassan Abdel Aall	General Manager
Mr. Ahmed Hamed El Sayed	Manager of Technical Office
Mr. Kamel Ahmed Fahmy	Manager of Site Follow-Up
• **Central Department for Cleansing & Beautification**	
Mr. El Sayed Mahamed El Tahawy	General Manager
Mr. Mohamed Ahmed Abdallah	Manager of Abis Compost Plant
• **Central Workshop**	
Mr. Safwat Gorbrial	Deputy Manager
Mr. Adel Kamara	Manager of Diesel Equipment
• **Sub-Central Workshop**	
Mr. Hassan Gaballa	General Manager
Mr. Mohamed Ragab	Manager for Middle District Workshop
• **High Institute of Public Health**	
Dr. Olfat El Sebaie	Professor

ORGANIZATION AND NAME	POSITION
• **Middle District**	
Mr. Abd El Magid Ezatt	Manager
Mr. Attala Mohamed	Technical Supervisor
Mr. Mohamed Hassan	General Manager of General Cleansing
Mr. Abd El Kaluby	General Manager of Financial Dept.
• **Association for Development of Society in Middle District**	
Mr. Naeem Salim	Manager
Mr. Kamel Abd Elrahman	Administrative/Financial Manager
• **East District**	
Gen. Ardel El Alfy	Mayor of District
Mr. Baha El Deen Mohamed	Secretary of Mayor
Mr. Nabil El Dardiry	General Secretary
Mr. Amal Nagdi	Engineer
Mr. Ahamed Khalaf	Assistant Secretary General
• **Garage of East District**	
Mr. Ali Mohamed Abdel Alla	General Manager
• **Alexandria Civil Defence Department**	
Mr. Ibrahim Abdel Kader	Adviser of Deputy Director
• **General Agricultural Cooperation of Alex in Bakous**	
Mr. Ibrahim Fahmy	Chairman
• **Ministry of Agriculture, Alexandria Office**	
Mr. Said Abdel Mohamed	Deputy Minister
• **Development Support Communication Center**	
Mr. Ali Salem	General Manager of Technical Affairs
• **Manula Agricultural Dept.**	
Mr. Mohamed Zeein	General Manager
• **Ministry of Housing, Alexandria Office**	
Mrs. Nahid El Bagory	General Manager of Housing Dept.
Mrs. Samiha Ibrahim	General Manager of Comprehensive Plan
• **Japanese Embassy in Egypt**	
Nozomu Takaoka	First Secretary
Nozomu Okibe	First Secretary
• **JICA Egypt Office**	
Tadashi Shinoura	Resident Representative
Hisatoshi Naito	Deputy Resident Representative
Kazuhide Nagasawa	Officer in Charge
Hidetoshi Ishioka	Officer in Charge

APPENDIX 4

MINUTES OF DISCUSSIONS

1 Basic Design Survey

MINUTES OF DISCUSSIONS

BASIC DESIGN STUDY ON THE PROJECT FOR

IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA

IN

THE ARAB REPUBLIC OF EGYPT

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a Basic Design Study on the Project for Improvement of Solid Waste Management in Alexandria (hereinafter referred to as "the Project"), and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to the Arab Republic of Egypt a study team, which is headed by Mr. Hideo Miyamoto, Deputy Director of First Basic Design Study Division, Grant Aid Study & Design Department, JICA, and is scheduled to stay in the country from August 6 to September 8, 1994.

The team held discussions with the officials concerned of the Government of the Arab Republic of Egypt and conducted a field survey at the study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study Report.

Alexandria, August 13, 1994

Mr. Hideo Miyamoto
Leader
Basic Design Study Team
JICA

Mr. Hassan Abdel Aall
General Manager
General Follow-Up Department
Alexandria Governorate
The Arab Republic of Egypt

Witnessed by:

Mr. Mohsen M. Sadek
Director of Japan Department
Ministry of International Cooperation

ATTACHMENT

1. Objective

The objective of the Project is to improve the present conditions of solid waste management in Alexandria.

2. Project Site

The Project Site is Middle District in the Alexandria Governorate. However, the study area is the whole area of Alexandria city. The location of the Project Site is shown in ANNEX-I.

3. Responsible and Executing Organization

- Responsible and Coordinating Organization of the Project:
  Alexandria Governorate

- Executing Organization of the Project:
  General Follow-Up Department and Central Department for Cleansing & Beautification of the Alexandria Governorate

4. Items requested by the Alexandria Governorate

After discussions with the Basic Design Study Team, the following components were finally requested by the Alexandria Governorate.

(1) Construction of compost plant and provision of the related equipment,
(2) Provision of refuse collection and haulage vehicles, and
(3) Provision of operation equipment for the sanitary land fill at the final disposal site.

However, the final components of the Project will be decided after further studies.

5. Japan's Grant Aid System

(1) The Alexandria Governorate has understood the system of Japanese Grant Aid explained by the team.

(2) The Government of the Arab Republic of Egypt will take necessary measures described in ANNEX-II for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the Study

(1) The consultants will conduct further studies in the Arab Republic of Egypt until September 8, 1994.

(2) JICA will prepare the draft final report in English and dispatch a mission in order to explain its contents around middle of November, 1994.

(3) In case that the contents of the report is accepted in principle by the Egyptian side, JICA will complete the final report and send it to the Government of the Arab Republic of Egypt by March, 1995.

7. Important Items requested to the Alexandria Governorate

In order to accomplish the objective of the Project successfully and to maximize the positive effects of the Project in case Japan's Grant Aid is extended, the Alexandria Governorate agreed to take necessary measures for the following undertakings.

(1) to secure financial resources necessary for the implementation of the Project other than those to be covered by the Grant.

(2) to secure landfill sites at an early time where no adverse environmental impact is expected and the haulage distance is reasonable.

(3) to recruit qualified technical personnel for operation and maintenance of the facilities constructed and equipment purchased for the Project.

(4) to clear the piled solid waste in the site and reclaim to the design ground level prior to commencement of the construction.

(5) to undertake incidental outdoor works such as gardening, fencing, gates around the site.

(6) to construct the access road to the site prior to the commencement of the construction.

(7) to provide temporary land for a construction liaison office, warehouse and stockyard during the construction period.

(8) to provide necessary data and information directly related to the detailed design for the Project.

(9) to take necessary actions to expedite the approval for execution of the Project by the Alexandria Governorate.

(10) to give permission required for all the works related to the Project.

(11) to take necessary measures for historical remains which may be encountered during the construction period, if any.

(12) to provide disposal places of the water including silt, clay, etc., discharged during the construction period.

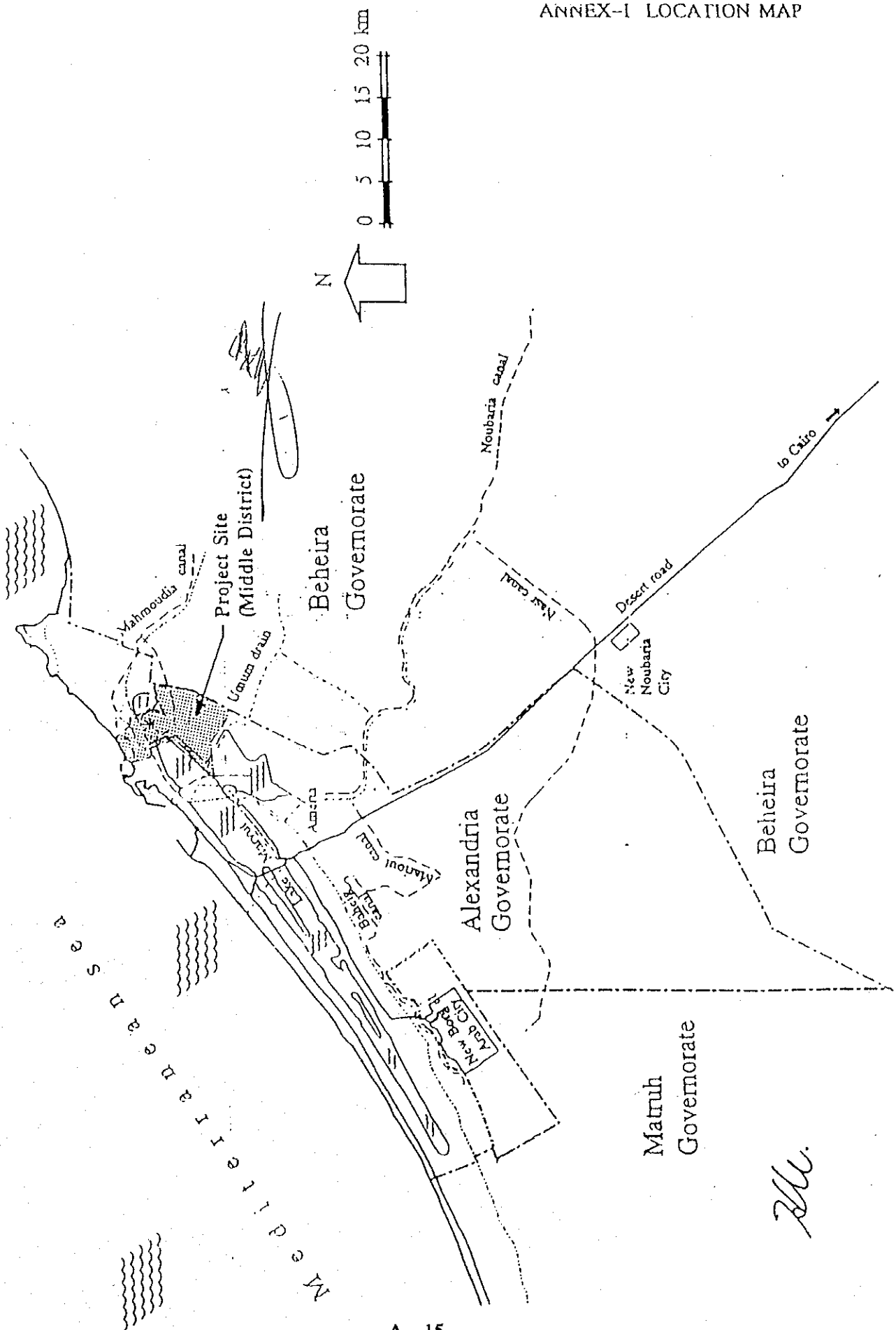
(13) to form a steering committee in the Alexandria Governorate to expedite the Project.

(14) to secure the budget for personnel expenses for operation and maintenance of the facilities constructed and equipment purchased in the Project.

(15) to execute the Environmental Impact Assessment, if required, at its own expenses.

(16) to pay all its efforts to sell compost product to ensure operation and maintenance cost.

ANNEX-I LOCATION MAP



ANNEX-II Necessary measures to be taken by the Government of the Arab Republic of Egypt in case Japan's Grant Aid is extended.

1. to secure land for the construction of buildings and facilities related to the Project.

2. to provide facilities for distribution of electricity, water supply, telephone, drainage and other incidental facilities to the site.

3. to ensure prompt unloading and customs clearance at ports of disembarkation in the Arab Republic of Egypt and internal transportation therein of the products purchased under the Grant.

4. to secure, with respect to the supply of the products and services under the verified contracts that Japanese nationals shall not be subject to any customs duties, internal taxes and other fiscal levies which may be imposed in the Arab Republic of Egypt.

5. to accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contracts such facilities as may be necessary for their entry into the Arab Republic of Egypt and stay therein for the performance of their work in accordance with the relevant laws and regulations of the Arab Republic of Egypt.

6. to maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.

7. to bear all the expenses other than those covered by the Grant, necessary for the execution of the Project.

2 Draft Report Explination Phase

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY
ON
THE PROJECT FOR IMPROVEMENT OF SOLID WASTE MANAGEMENT
IN ALEXANDRIA IN THE ARAB REPUBLIC OF EGYPT
(CONSULTATION ON DRAFT FINAL REPORT)

In August 1994, the Japan International Cooperation Agency (JICA) dispatched a Study Team for Basic Design Study on the Project for IMPROVEMENT OF SOLID WASTE MANAGEMENT IN ALEXANDRIA IN THE ARAB REPUBLIC OF EGYPT (hereinafter referred to as "the Project"), and through discussions, field survey, and technical examination of the results in Japan , has prepared the draft final report of the study.

In order to explain and consult the Egyptian side on components of the draft final report, JICA sent to Egypt a study team, headed by Mr. Kiyoto KUROKAWA, First Basic Design Study Division, Grant Aid Study and Design Department, JICA, from February 4 to February 10, 1995.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Alexandria, February 8, 1995

Mr. Kiyoto KUROKAWA
Leader
Basic Design Study Team
JICA

Mr. Hassan Abdel Aall
General Manager
General Follow-Up
Department,
Alexandria Governorate
The Arab Republic of Egypt

ATTACHMENT

1. Components of Draft Final Report.
The Alexandria Governorate has agreed and accepted in principal the components of the draft final report proposed by the Team.
Main points discussed and agreed by both sides are described in ANNEX-I.

2. Japan's Grant Aid Program
(1) The Alexandria Governorate has understood the system of Japanese Grant Aid as explained by the team.
(See ANNEX-II)
(2) For smooth implementation of the Project, the Government of Egypt will take necessary measures described in ANNEX-II of the Minutes of Discussions signed between the Alexandria Governorate and JICA on August 13, 1994, on the condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Schedule of the Study
JICA will complete the final report and send it to the Government of Egypt by the end of April, 1995.

4. Monitoring and Reporting of the Compost Plant.
The Alexandria Governorate has the responsibility of monitoring progress of all phases of the Project such as allocation of funds, distribution and quality control of the compost, maintenance and utilization of the Plant, manpower development, training based upon the indicators given in ANNEX-III.

5. Important Items requested to the Alexandria Governorate.
In addition to Important Items requested to the Alexandria Governorate in the Minutes of Discussions signed on August 13th. 1994, the Alexandria Governorate agreed to take necessary mesures for the following undertakings.

1) To secure the land for the new compost plant site at the Abis Extension with area of 60m x 800m.
2) To clear the piled solid waste, demolish the existing houses, facilities etc. in the site and reclaim to the design ground level by the crushed lime stone with the depth of at least one meter prior to commencement of the construction after the peaceful eviction of the residents on the site.
3) To construct the road and execute site clearing and levelling for the truck scale to be provided in the Project.
4) To secure eleven places for the 15 m^3 containers to be provided in the Project in Middle District of Alexandria.

6. Other Relevant Issues.
The Alexandria Governorate asked about the possibility to add another plant with the same capacity in the same area in the future.
The Study Team explained that the optimum size of the plant is 150ton/day according to the result of the Study, and future extension should be considered based upon the performance of the Project.

ANNEX-I

After discussion with the Team, both sides agreed to take necessary mesures as follows.

1. The Proper Utilization of the Compost Plant.

The Study Team requested the proper and efficient utilization of the proposed compost plant.

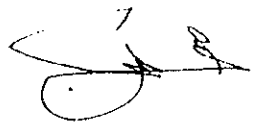
The Alexandria Governorate shall arrange and be responsible for the proper and efficient utilization of the plant.

2. Sales Plan

The Alexandria Governorate shall implement "the Marketing Plan Organic Fertilizers in Alexandria"(Worked out in December 1994.) of the compost with all its might.

3. Subsidy for the Compost Plant.

The Alexandria Govenorate shall prepare the budget for additional salary incurred by the increase of workers in the new Plant.



ANNEX-II

Japan's Grant Aid

1. Japan's Grant Aid Procedures

The Japan's Grant Aid Program is executed through the following procedures.

(1) Application (Request made by a recipient country)
Study (Basic Design Study conducted by JICA)
Appraisal & Approval (Appraisal by the Government of Japan and Approval by Cabinet.)
Implementation (The Notes exchanged between the Government of Japan and the recipient country.)

(2) At the First step, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affirs) to determine whether or not it is eligible for Grant Aid.

If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

At the second step, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

At the third step, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

At the fourth step, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

2. Basic Design Study

(1) Content of the study

The aim of the Basic Design Study (hereinafter referred to as "the Study") conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

1) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the

recipient country necessary for the Project's implementation.

2) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid scheme from a technical ,social and economic point of view.

3) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

4) Preparation of a basic design of the Project

5) Estimatation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the grant aid project.The basic design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project.Therefore,the implementation of the Project is confirmed by all relevant organization of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Study,JICA uses (a)registered consultant firm(s).JICA selects (a)firm(s) based on proposals submitted by interested firms.The firm(s) selected carry(ies) out Basic Design Study and write(s) a report,based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid ?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities,equipment and services (engineering services and transportation of the products,etc) for economic and social development of the country under principals in accordance with the relevant laws and regulations of Japan.Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Note (E/N)

The Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objective of the project, period of execution , conditions and amount of the Grant Aid ,etc., are confirmed.

(3) "The period of the Grant" means the one fiscal year which the Cabinet approves the Project for . Within the fiscal year, all procedures such as Exchange of Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and financial payment to them must be completed.
However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the grant aid can be further extended for a maximum of one fiscal year at most by mutual agreement betweeen the two Governments.

(4) The Grant is used properly and exclusively for the purchase of products.
Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.
When the two Governments deem it necessary, grant aid may be used for the purchase of the products or services of a third country.
However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanse nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of the " Verification ".
The government of the recipient country or its designated authority will conclude contracts in Japanese yen with Japanese nationals.
Those contracts shall be veified by the Government of Japan. The "verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertaking required of the Government of recipient country.
In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

1) To secure land necessary for the sites of the Project and clear, level and reclaim the land prior to commencement of the construction.
2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the site.
3) To secure buildings prior to the procurement in case the installation of the equipment.

4) To ensure all the expenses and prompt execution for unloading ,customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

5) To exempt Japanese nationals from customs duties ,internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therin for the performance of their work.

(7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) " Re-Export "

The products purchased under the Grant should not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

1) The government of the recipient country or its designated authority should open an account in the name of Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank") The Government of Japan will execute the Grant Aid by making payments in Japanese Yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.

2) The payment will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the government of the recipient country or its designated authority.

ANNEX-III

Monitoring of the Project.

It is proposed that Monitoring and Evaluation be in-built in the Project right at the planning stage. Initially the focus will be to monitor the progress of the Project in terms of inputs from the Government of Japan and the Alexandria Governorate.
Major components of the project to be monitored will be:

1. Monitoring of INPUTS by the Alexandria Governorate for the Implementaion of the Project.
   1) Funds allocated,released,utilized for the Project.

   2) Preparartion of the site.

2. Monitoring of EFFICIENCY after completion of the Project.
   A system to check the products in terms of quality / quantity / specifications will be established in Alexandria Governorate.

   1) Production and sales of the compost.
   2) Sales of recycled material.
   3) Troubles or accidents of the Plant.
   4) State of the sales contracts conclusion.
   5) Financial data
      Expenditure and revenue,subsidy,donation etc.
   6) Quality and composition data of the compost.

   7) Training of the manpower for handling the Plant.
      Funds allocated for Training
      Category of staff training.
      Duration of training.
      Place of training.
      Satisfaction of trained people.
        Knowledge.
        Skills how to use the equipment.
        Theoretical lectures or On the Job training.
        Job aids availability.
        Arrangement for the absence/leave of technical staff.
        Maintenance of Log books.
        Responsible person for the Log book.

   8) Manpower development.
      New post created for each section.(e.g.Sales manager,etc.)
      Employed new staff.
      Pre-service training, in-service training.
      New training for existing staff.

   9) Maintenance contracts.
      Break down notice and the action.
      Interval between break down and repairs.
      Number of investigation done during the last 1 year.
      Charged money for the investigation and repairs.

APPENDIX 5

COUNTRY DATA

Country Data for the Arab Republic of Egypt

General Data and Indicators						
Government	Republic	*1	Area	1,001,000 km^2		*1
President	Mohammed H. Mubarak	*1	Population	59,586,000	(1993)	*1
Date of Independance	February 28, 1922	*1	Capital city	Cairo		*1
Race	90% Eastern Hamitic	*1	Major Cities	Alexandria, Port Said		*1
Languages	Arabic, English	*1	Labor force	15,000,000 people	(1989)	*1
Religion	94% Islam	*1	Years of manditory education	3 years	(1992)	*2
U.N. membership	October 1945		% entering primary education	– %	(0000)	*2
World Bank, IMF membership	December 1945	*1	Literacy rate	48.0%	(1990)	*1
			Population dencity	55.0 people/km^2	(1992)	*2
			Rate of population increase	2.3% (1993)		*2
			Average life span:	Average: 60.46 years Male: 58.6 years Female: 62.4 years		*1
			Infant mortality rate (before 5 years)	78.3/1,000	(1993)	*1
			Calorie intake	3,310 kcal/day/person	(1990)	*2

Economic Indicators						
Currency	Egyptian Pound	*1	Trade volume Exports	3,051 million dollars	(1992)	*2
Exchange rate	1US$=3.391 LE	*3	Imports	8,245 million dollars	(1992)	*2
Fiscal year	July to June	*1	Import cover rate	9.4%	(1992)	*4
National budget: Income:	20,546 million dollars (1989)	*2	Major exports	crude oil, petrolium products, cotton fiber, textiles, meat products		*1
Expenditure:	271,391 million dollars (1989)	*2	Major imports	machinery, food products, fertilizer		*1
International ballace sheet	3,360 million dollars (1992)	*2	Exports to Japan	92 million dollars	(1992)	*5
Amount of ODA received	3,538 million dollars (1992)	*2	Imports from Japan	584 million dollars	(1992)	*5
GDP	34,602 million dollars (1992)	*4	Foreign exchange reserves	1,315 million dollars	(1992)	*1
Per capita GDP	630 dollars (1991)	*4	Foreign debts	40,431 million dollars	(1992)	*4
% GDP per sector	Agriculture 18%		Interest rate on debt	15.4%	(1992)	*4
	Industrial 30%		Inflation rate	19.5%		*2
	Service 52%					
% labor force per sector	Agriculture 42%	*2				
	Industrial 21%					
	Service 37%					
Rate of annual economic growth	0.3% (1992)	*4	National Development Plan			*5

*6

Climate (1993 average) point of observation: Alexandria (altitude 20m)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
max temp	18.4	19.3	21.3	23.9	26.6	28.6	28.6	30.6	29.6	27.6	24.2	20.3	25.0 C
min temp	9.1	9.3	10.8	13.1	16.4	20.2	22.0	22.7	21.1	17.6	14.4	10.8	15.6 C
Av. temp	13.8	14.3	16.1	18.5	21.5	24.4	25.9	26.7	25.4	22.6	19.3	15.6	20.3 C
Precip.	54.9	26	12.1	4.2	1.5	0	0	0.3	1	9.3	33.1	55.6	16.5mm
Rain/Dry season													

*1 The World Fact Book (CIA)
*2 Human Development Report (UNDP)
*3 International Financial Statistics (IMF)
*4 World Debt Tables (WORLD)
*5 Saishin Sekai Kakkoku Youran (Tokyo Shoseki)
*6 Alexandria Governorate Statisics Bureau

*7

Total Japanese ODA (Based on promissed amount of financial aid 100 million yen)				
Item / Year	1989	1990	1991	1992
Grant Aid	2,043.46	2,382.47	2,515.30	2,699.97
Technical cooperation	2,146.74	1,989.63	2,050.00	2,194.95
Loans	5,161.42	5,676.39	7,364.47	5,852.05
Total	9,351.62	10,048.49	11,930.47	10,746.97

*7

Japanese ODA to Egypt (net expenditures, units: million US dollars)				
Item / Year	1989	1990	1991	1992
Grant Aid	18.61	19.14	17.05	24.46
Technical cooperation	32.99	45.28	23.99	44.16
Loans	27.5	34.44	578.53	41.97
Total	78.65	98.86	619.57	110.59

*8

Economic Assistance of ODA Countries (net expenditure, units: million US dollars)						
	Grants (1)		Loan (2)	Official Development Aid (ODA) (1)+(2)=(3)	Other official flows and private flows (4)	Economic assistance total (3)+(4)
		Technical assistance				
Bilateral Aid (Main Granting Country)	2,769.50	801.20	0.00	3,570.70	-919.50	2,651.20
1. America	1,611.00	669.00	51.00	2,331.00	-6.00	2,325.00
2. Germany	667.60	32.40	47.30	747.30	-984.10	2,325.00
3. France	165.90	16.90	101.40	284.20	0.00	284.20
4. Japan	68.60	24.50	42.00	135.10	0.00	135.10
Multilateral Aid (Main granting agency)	107.70	0.00	0.00	170.70	163.00	270.70
	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00
Others	1,347.00	97.10	273.20	1,717.30	876.50	2,593.80
Total	4,224.20	898.30	273.20	5,395.70	120.00	5,515.70

*7 Japan's ODA (Annual report)
*8 Geographical Distribution of Financila Flows of Developing Coutries (OECD/OCDE)

APPENDIX 6

COST ESTIMATION BORNE BY THE EGYPTIAN SIDE

COSTS TO BE BORN BY THE EGYPTIAN SIDE

1. Site Preparation (60m * 435m = 26,100m^2)

Excavation	5.50 LE/m^3*26,100m^2*2m =	287,100 LE
Earth transfer	29.81 LE/m^3*26,100m^2*2m =	1,556,082 LE
Filling	9.19 LE/m^3*26,100m^2*2m =	479,718 LE
	Sub Total:	2,322,900 LE

2. Fencing (990m)

Material / work:	37.41 LE/m*990m =	37,035 LE

3. Gate (1 item)

Material / work:	20,378 LE/gate*1 gate =	20,378 LE

4. Electrical Extension (11kV * 1,500m)

Material cost:	115 LE/m*1,500m =	172,500 LE
Construction cost:	(5.50 LE/m^3+4.15 LE/m^3)*0.5m*0.3m*1,500m =	2,171 LE
	Sub Total:	174,671 LE

5. Water Main Extension (diameter150mm*1,500m)

Material cost:	700 LE/6m*1,500m =	175,000 LE
Construction cost	(5.50 LE/m^3+4.15 LE/m^3)*1.0m*0.5m*1,500m =	7,237 LE
	Sub Total:	182,237 LE
	Grand Total:	2,737,221 LE

APPENDIX 7

BORING DATA

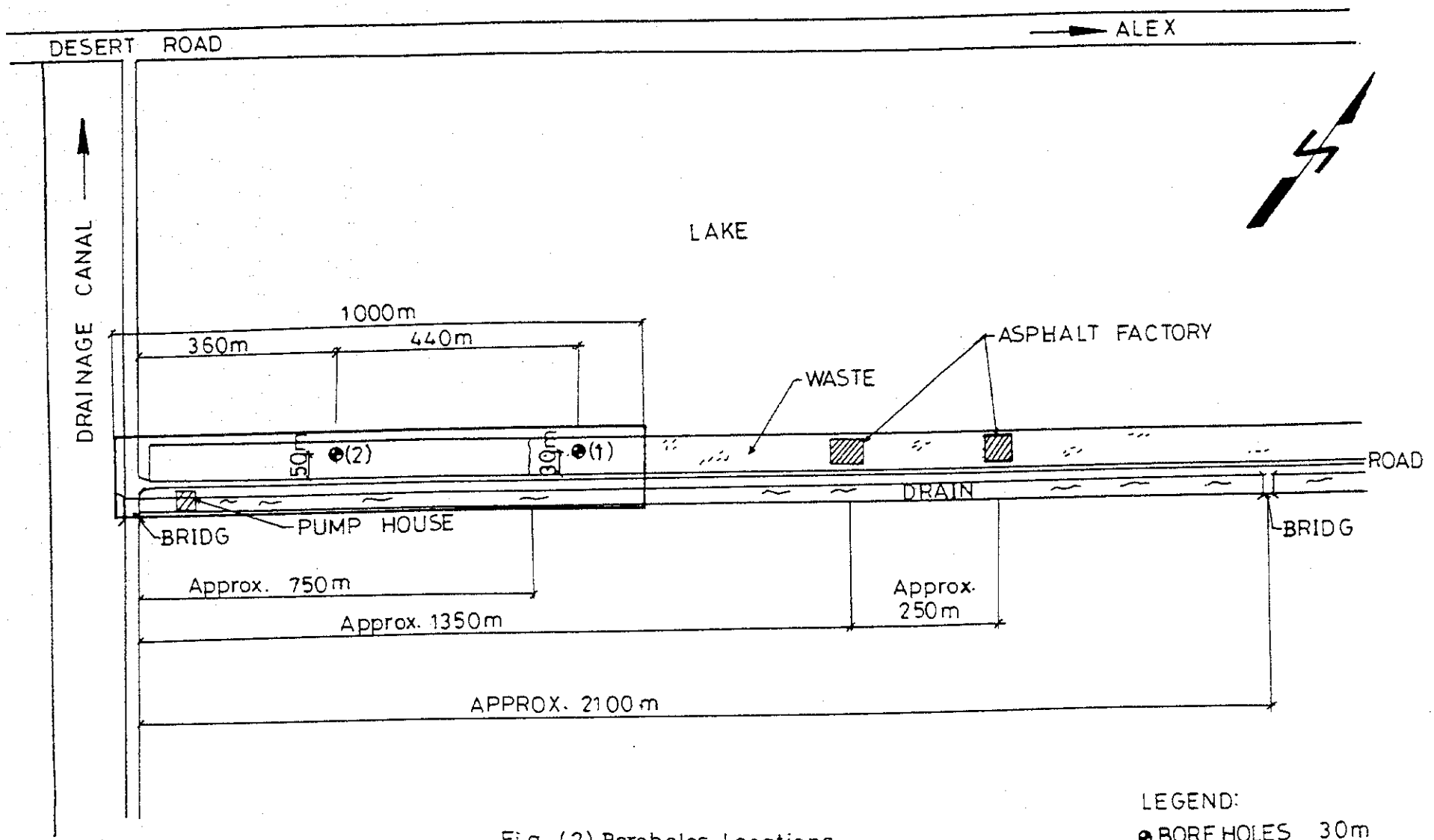


Fig. (2) Boreholes Locations

LEGEND:
● BORE HOLES 30m
SCALE 1:10000

SUBSURFACE GROUND CONDITIONS

According to the results of field and laboratory testing, the soil profile at the site of borings can be described as follows :

Depth (m)	Soil Description
	Borehole No (1)
0.00 - 2.30	FILL (garbish, organic matters, broken stone)
2.30 - 8.45	CLAY, silty, very soft to soft, grey
8.45 - 12.45	CLAy, silty, iron oxides, med. stiff, brown (C = 0.4 - 0.5)
12.45 - 17.60	CLAY, silty, traces of sand, broken limestone, grey (C = 0.5)
17.60 - 18.00	CLAY, silty, iron oxides, sand, very hard, yellowish brown.
18.00 - 20.00	CLAy, silty, iron oxides, sandy pockets, broken limestone, yellowish brown.
20.00 - 22.45	SANd, fine, broken shells, some silt, very dense, yellowish brown (ϕ > 41)
22.45 - 26.50	OOLITIC limestone, yellowish brown (R.Q.D. % = 0.0)
26.50 - 30.00	SAND, med. to fine, slity,some shells, yellowish borwn (ϕ > 41)

Ground Water Table 1.25 m

Depth (m)	Soil Description
	Borehole No (2)
0.00 - 1.45	CLAy, silty, some broken limestone, brown
1.45 - 2.45	CLAy, silty, traces of sand, light grey.
2.45 - 3.00	CLAy, silty, broken shells, very soft, brown.
3.00 - 7.45	CLAy, silty, soft, greyish brown.
7.45 - 8.00	CLAy, silty, soft, brown
8.00 - 9.45	CLAy, silty, iron oxide, traces of sand, brown (C = 0.5)
9.45 - 10.45	CLAy, silty, sandy, yellowish brown
10.45 - 14.00	CLAy, silty, very stiff, broken limestone, sandy pocket, yellowish brown (C = 1.4)
14.00 - 14.45	SAND, some shells, clayey pocket (ϕ = 36-41)
14.45 - 15.45	SAND, some silt, dense (ϕ = 36-41)
15.45 - 19.45	SAND, fine, some shells, silty, dense, yellowish brown (ϕ = 36-41)
19.45 - 22.00	CLAY, silty, brown
22.00 - 30.45	SAND, fine to medium, some shells, silt, dense to very dense, grey.
	Ground Water Table 0.65 m

Project : Solid Waste Management	Date : Sept 1994
Location : Abis , Alexandria	Method : Mechanical
Borehole No: 1	Ground elevation : (10.29 m)
Ground Water table elevation : 1.25 m	

Depth m	Sample Type	SPT or qun	Strata Log	Strata Elev.	Description of Srata
-	o	9			FILL (garbish, organic matters, broken stone)
- 2.0	o			2.30	
-	o	1			CLAY, silty, very soft to soft, grey.
- 4.0	o	1			
-	o				
- 6.0	o	7			
-	o	2			
- 8.0	o	2			
-	o	15		8.45	CLAY, silty, Iron oxides, med. stiff, borwn.
	■	qu (0.8)			
- 10.0	o	18			
	■	qu (1.0)			
-	o	18			
- 12.0	o	21		12.45	CLAY, silty, traces of sand, broken L.S., grey.
-	o	16			
- 14.0	o	40			
-	o	40			
- 16.0	o	24			
	■	qu (1.9)			
-	o	19		17.60	
- 18.0	o	38		18.00	CLAY, silty, iron oxides, sand, very hard, yellowish brown
-	o	49			CLAY, silty, iron oxides, sandy pock-ets, broken L.S., yellowish brown.
- 20.0	o	> 50			

Project : Solid Waste Management	Date : Sept 1994
Location : Abis , Alexandria	Method : Mechanical
Borehole No: 1	Ground elevation : (10.29 m)
Ground Water table elevation : 1.25 m	

Depth m	Sample Type	SPT or qun	Strata Log	Strata Elev.	Description of Srata
-	o	> 50			SAND, fine, broken shells, some silt
- 22.0	o	> 50			v. dense, yellowish borwn.
-	o	R.Q.D.=0		22.45	
- 24.0	o	R.Q.D.=0			OOLITIC limestone, yellowish bown
-	o	R.Q.D.=0			
- 26.0	o	R.Q.D.=0		26.50	
-	o	> 50			SAND, med. to fine, silty, some
- 28.0	o	> 50			shells, yellowsih borwn.
-	o	> 50			
- 30.0	o	> 50		30.45	
-					End of boring
- 32.0					
-					
- 34.0					
-					
- 36.0					
-					
- 38.0					
-					
- 40.0					

Project : Solid Waste Management	Date : Sept 1994
Location : Abis , Alexandria	Method : Mechanical
Borehole No: 2	Ground elevation : (9.87 m)
Ground Water table elevation : 0.65 m	

Depth m	Sample Type	SPT or qun	Strata Log	Strata Elev.	Description of Srata
-	o	2			CLAY, silty, some broken L.S, brown.
- 2.0	o	2		1.45	
				2.45	CLAY, silty, traces of sand, light grey
-	o	1		3.00	CLAY, silty broken shells, v. soft, brown
- 4.0	o	2			
-	o	2			
- 6.0	o	3			CLAY, silty, Soft greyish brown
-	o	3			
				7.45	
- 8.0	o	5		8.00	CLAY, silty, soft, brown
	■	qu (1.0)			
-	o	11			CLAY, silty, Iron oxide, traces of sand, brown
				9.45	
- 10.0	o	9			CLAY, silty, sandy, yellowish brown
				10.45	
-	o	24			
- 12.0	o	26			CLAY, silty, v.stiff, broken L.S., sandy
-	o	27			pocket; yellowish brown
	■	qu (2.8)			
- 14.0	o	40		14.00	SAND, some shells, clayey pocket
				14.45	
-	o	38			SAND, some silt, dense.
				15.45	
- 16.0	o	36			SAND, fine, some shells, silty, dense,
-	o	37			yellowish brown
- 18.0	o	39			
-	o	32			
				19.45	
- 20.0	o	23			CLAY, silty, borwn.

Project : Solid Waste Management	Date : Sept 1994
Location : Abis , Alexandria	Method : Mechanical
Borehole No: 2	Ground elevation : (9.87 m)
Ground Water table elevation : 0.65 m	

Depth	Sample	SPT	Strata		Description of Srata
m	Type	or qun	Log	Elev.	
-	o	22			CLAY, silty, brown.
- 22.0	o	38		22.00	
-	o	42			
- 24.0	o	45			
-	o	> 50			SAND, fine to medium, some shells,
- 26.0	o	> 50			some silt, dense to very dense, grey
-	o	> 50			
- 28.0	o	> 50			
-	o	> 50			
- 30.0	o	> 50		30.45	
-					End of boring
- 32.0					
-					
- 34.0					
-					
- 36.0					
-					
- 38.0					
-					
- 40.0