



**BRIEFING ON Kuantan Waste Disposal Site**  
23 MARCH 2006

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**OVERVIEW OF Kuantan Landfill Operations**

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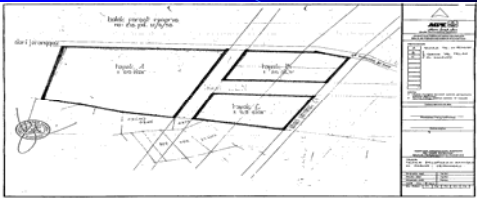
**SITE LOCATION**



- Located in Pahang Service Area 1 (PSA1) catering the District of Kuantan in the State of Pahang
- Approximately 300 km from Kuala Lumpur and 25 km from the City of Kuantan.

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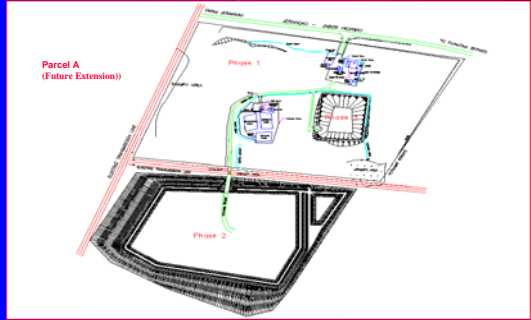
**SITE MAP**



- Total Site Area is 60 Ha :
- Parcel A = 27 ha (Future Expansion)
- Parcel B = 15 ha (Phase 1 & 3)
- Parcel C = 15 ha (Phase 2)

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**SITE LAYOUT : LANDFILL FOOTPRINT**



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### BLOW-OUT PLAN OF LANDFILL FOOTPRINT

Phase 1 : Closed

Phase 3 : Special Cell

Phase 2 : Active Cell for Municipal Waste

### SITE INFORMATION

- Land Owner: State Government
- Site Owner: Kuantan Municipal Council
- Site Operator: Alam Flora Sdn Bhd (Since Nov 1998)
- Start Year: 1993
- End Year : 2005 (Current Footprint)
- Operations Method Adopted by AFSB :
  - Area Method (Sanitary Landfill Standard)
- Upgrade Project :
  - Phase 2 (Level 3 Upgrade)
  - Leachate Treatment Plant
  - Phase 3 (New Sanitary Cell)

### WASTE RECEPTION

- Estimated Total Waste Deposited (1993 – 2003) = 1.3 million tons
- Current Average Tonnage = 500 tpd
- Composition = 60 % domestic waste  
40% Industrial Waste

### ENVIRONMENTAL CONTROL FACILITY

- Liner/Leachate Containment System
  - Phase 1: Insitu Compacted Soil
  - Phase 2: Insitu Compacted Soil
  - Phase 3: Synthetic HDPE Liner
- Leachate Collection System
- Leachate Treatment Plant
- Landfill Gas Management

### FACILITY AND INFRA-STRUCTURE

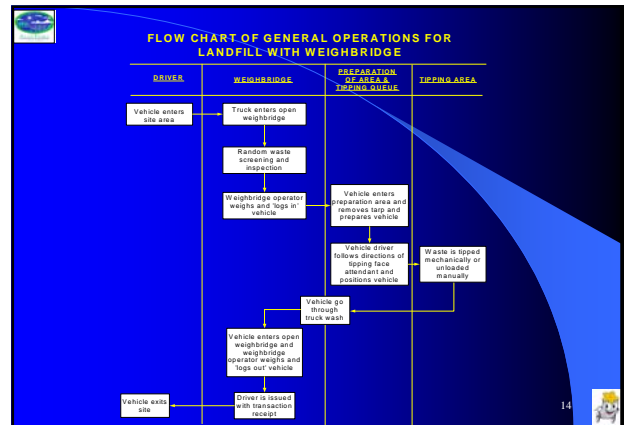
- Access Control Structure;
- Computerized Weighbridge System
- Site Office and Amenities;
- Equipment Maintenance Facility;
- Vehicle Washing Facility;
- Internal Access Road
- Drainage Structure/Network

### MANPOWER

CATEGORY	NUMBER
Landfill Executive	1
Landfill Supervisor	1
Equipment Operator	3
Weighbridge Operator	1
Traffic Attendant/ General Worker	5
<b>TOTAL</b>	<b>11</b>


### EQUIPMENT


IMAGE	CATEGORY	NO.
	D6 Track Dozer	2
	Track Excavator	1
	Backhoe/Loader	1
	Tipper Truck	2
	<b>TOTAL</b>	<b>7</b>



- ### STANDARD OPERATING PROCEDURE
1. Landfill Organization & Management
  2. Roles & Responsibility Of Landfill Personnel
  3. General Operations Procedures
  4. Tipping Fee Payment System
  5. Routine Site Inspection Procedures
  6. Weighbridge Inspection & Operations Procedures
  7. Site Security & Safety Procedures
  8. Site Information & Signs
  9. Bans, Prohibitions & Waste Screening Procedures
  10. Procedures For handling Other Materials

- ### STANDARD OPERATING PROCEDURE
11. Waste Placement & Compaction Procedures
  12. Cover Application Procedures
  13. Extreme Wet Weather Operations
  14. Managing Landfill Scavengers
  15. On-site Road Construction Procedures
  16. Berm Construction & Screening Procedures
  17. Landfill Equipment Maintenance Procedures
  18. Environmental Management procedures
  19. Reporting Requirements
  20. Staff Training & Community Relations

- ### ENVIRONMENTAL QUALITY MONITORING
- Leachate, Surface Water and Ground Water Monitoring To Assess Impact of Landfill
  - Frequency of Monitoring
    - LTP Effluent Discharge: Monthly
    - Surface Water : Quarterly
    - Ground Water : Quarterly
  - Monitoring report submitted to the DOE on quarterly basis
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**SPECIAL CELL FOR LESS HAZARDOUS INDUSTRIAL WASTE**

## PURPOSE

- To safely dispose wastes arising from industrial activities that are not listed as scheduled waste, or are delisted from the Scheduled Waste, and are required by the Department of Environment (DOE) to be disposed off at sanitary landfills which are equipped with liner facility and leachate treatment plant

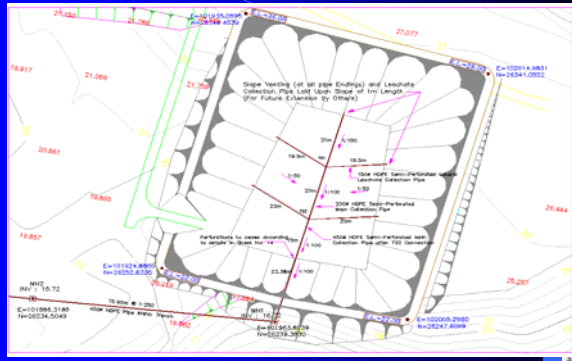
## SANITARY CELL INFORMATION



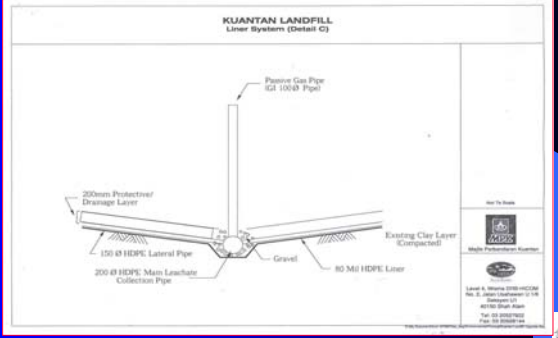

Area : 0.8 ha  
 Construction Period : 2 months  
 Start Year : October 2002  
 Design Life : 5 years  
 Capacity : 21,900 tons

Cell is designed by Alam Flora based on USEPA and relevant Malaysian Engineering Standards.

## SANITARY CELL LAYOUT



## TYPICAL LAYOUT CROSS-SECTION





## PERIMETER BERM




- Berms are constructed to provide the following:
  - Demarcation of sanitary cell
  - protection against landslides
  - compliance to sanitary landfilling design
  - security to the waste deposited within the cell
- Berms are properly compacted, in layers to ensure solidity of the structures.
- Spot-turfing are employed at the external berm faces to ensure erosion from surface water is controlled.

## LEACHATE CONTAINMENT

- Comprises 80-mil HDPE Geomembrane Liner placed in between protective layers of non-woven geotextiles.
  - Minimum requirement of USEPA is 60-mil for HDPE Liners
- The liner materials are chosen based on specific material strengths to ensure reliability:
  - resistance against tears, localised pressure, heat
  - yield potential, bending and stretching ability


### LEACHATE CONTAINMENT



- Liner system is placed on properly prepared surface:
  - free of sharp and protruding objects
  - Surface compacted to receive liner.
  - Original hydraulic conductivity of the site was  $1.23 \times 10^{-6}$  cm/s
- The liner system was installed by specialist liner contractor, ensuring proper anchoring and quality joining/punch-through procedures.

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### INTERNAL & EXTERNAL DRAINAGE SYSTEM



- Cell includes perimeter drainage to avert surface water runoff from entering the cell.
- A drainage system within the cell comprises of the following:
  - a drainage layer comprising of rounded aggregates atop the lined base grade to ensure leachate travels unobstructed to the collection pipe
  - base grade with 2% gradient to ensure leachate flow to the collection pipe

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### LEACHATE COLLECTION AND CONVEYANCE SYSTEM



- Collection system comprises the following:
  - “Fish-bone” system within the cell to collect leachate from the whole base grade area. Consists of a 200mm dia. Main collection trunk, and 150mm dia. Lateral collection trunklines
  - Semi-perforated HDPE pipes wrapped in non-woven geotextiles (as filters) placed in collection ditches within the base grade
  - backfill material atop the pipes to act as filter and provides unobstructed passage for leachate into the pipes

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### LEACHATE COLLECTION AND CONVEYANCE SYSTEM



- Conveyance system comprises the following:
  - solid HDPE pipes from the cell towards the treatment plant embedded in the ground
  - manholes connecting the pipe nodes throughout the system for provision of maintenance works.

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### PASSIVE GAS VENTING SYSTEM



- Gas vents comprise the following:
  - 100mm diameter perforated G.I. Pipe embedded atop the lateral-main trunk junction
  - pipes embedded in adequate backfill material to provide support
- Gas vents are of appropriate length to cater for future cell operations and increasing waste levels.

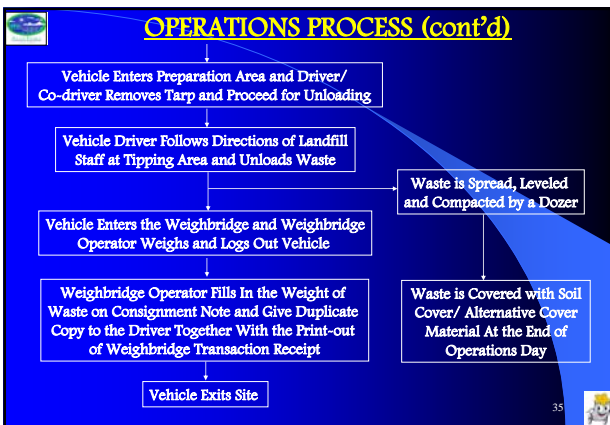
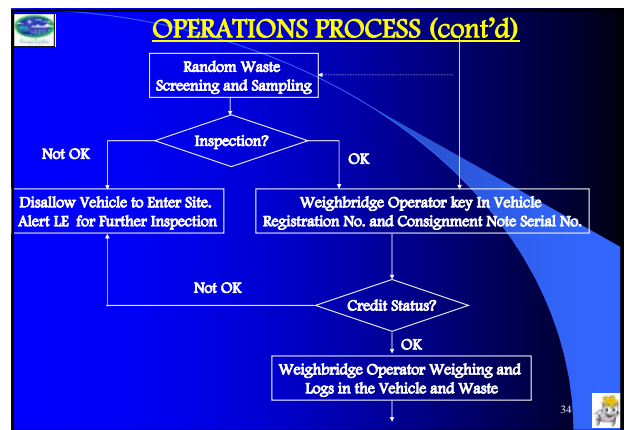
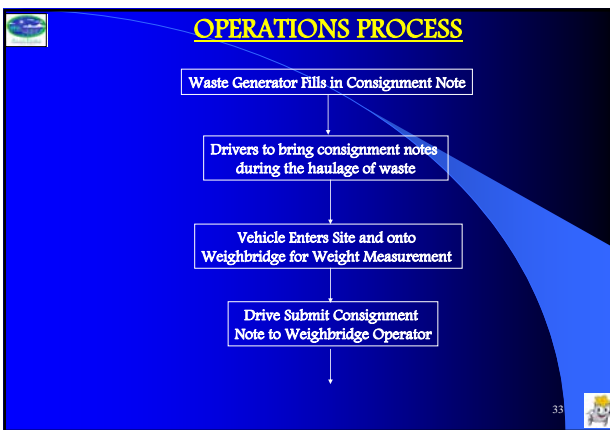
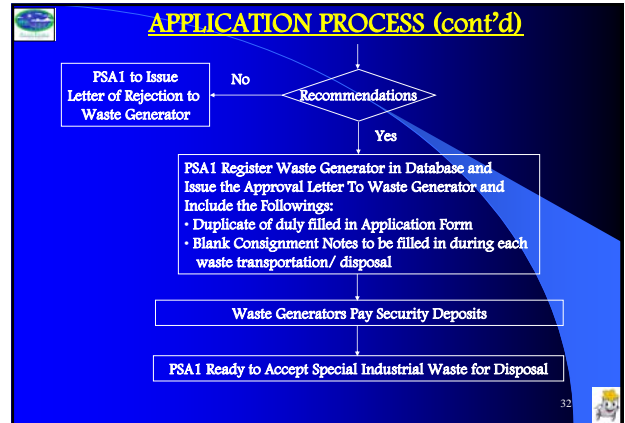
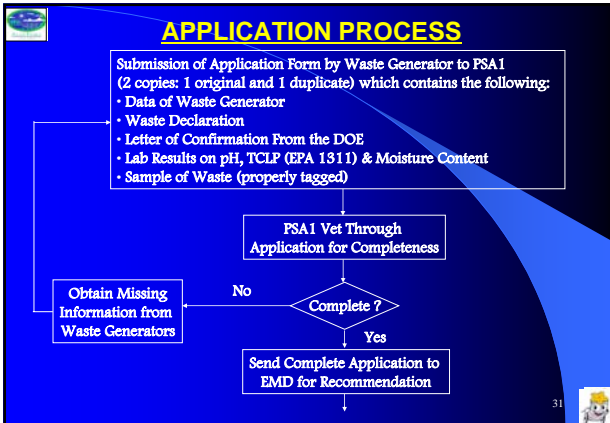
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### CELL OPERATING REGULATIONS



- To dispose waste at this Sanitary Cell, the industrialists are required to comply with AFSB regulations and requirements
  - all customers are to submit credit facility and application form for disposal of special industrial waste
  - Prior approval from the DOE is part of the terms and conditions.
  - prior to AFSB acceptance, the waste generators are required to subject their wastes to a set of tests as part of the qualification process.
- The tipping fee RM200/ton.

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### LEACHATE TREATMENT PLANT



- The existing treatment plant is upgraded and retro-fitted to cater for treatment requirements of the special waste cell.
- The refurbished process will utilize the inherent retention time of the pond system as part of the treatment.
- The specialist contractor will provide a performance guarantee that the discharge quality will meet the regulatory requirements

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### LEACHATE TREATMENT PLANT



- Design Basis
  - Flowrate = 200 cu.m./day
  - BOD = 13,000 mg/l
  - COD = 36,000 mg/l
  - SS = 11,000 mg/l
- Effluent discharge is design to comply with Standard B of EQA

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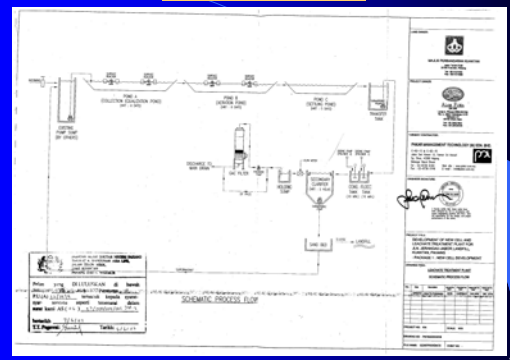
### LEACHATE TREATMENT PLANT




- Unit Process:
  - Collection/Equalization Pond
  - Aeration Pond
  - Physical Chemical Unit Process
  - Secondary Clarifier
  - Sand Drying Bed
  - GAC Filter

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### PROCESS FLOW



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**ALAM FLORA**  
SDN BHD

**Thank You**

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