



USAID | **JORDAN**
FROM THE AMERICAN PEOPLE

USAID Water Reuse and Environmental Conservation Project

Proposed Aqaba Integrated Waste Management Facility and Sanitary Landfill

08 May 2014
Implemented by AECOM





AGENDA

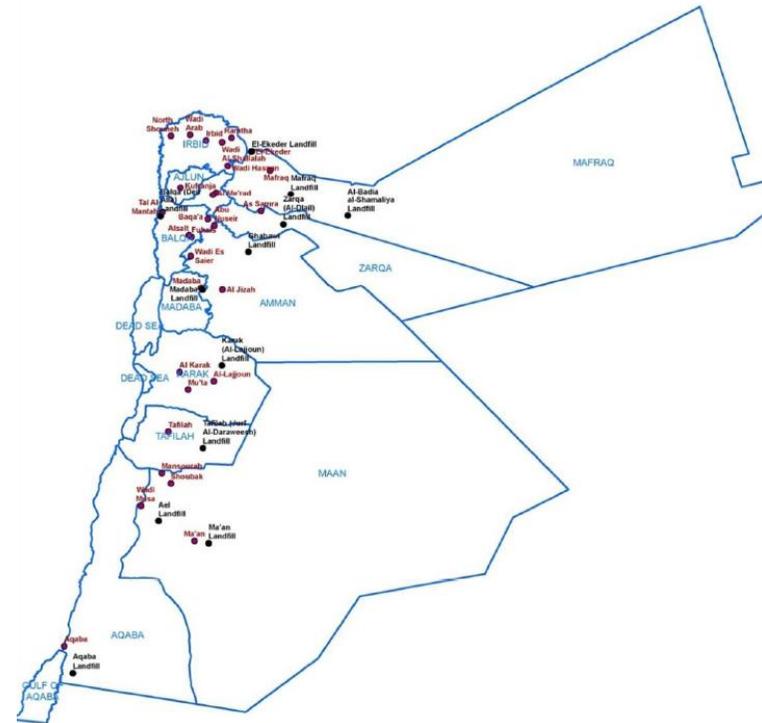
- USAID and GoJ goals
- Design Standards
- Facts and Figures
- Activities and progress
- Challenges
- Next steps





USAID AND GoJ GOALS

- Protect human health and safety
- Protect the environment





USAID AND GoJ GOALS

- Help communities generate income through recycling and energy recovery from waste
- Help mitigate climate change impacts through improved solid waste management practices
- Design to USEPA “Subtitle D” Standards
- Incorporate technology appropriate to local climate





DESIGN STANDARDS

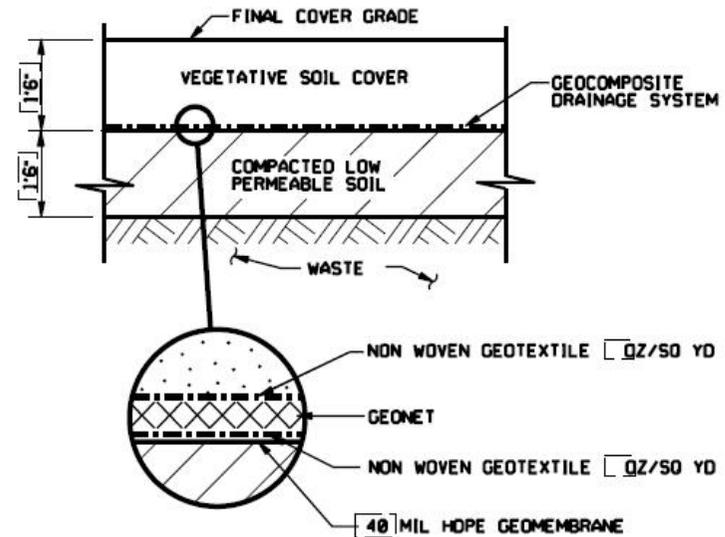
- USEPA Subtitle “D” - Intended to minimize waste moisture content
 1. Water leaches contaminants from waste
 2. Water could transport contaminants in environment
- Incorporates 7 systems to protect human health, safety and the environment





DESIGN STANDARDS

1. Final cover system
 2. Surface water management system
- Both minimize moisture addition from precipitation by:
- a) Maximize run – off
 - b) Minimize infiltration



FINAL COVER- (TYPE B COMPOSITE LINER)
NTS



DESIGN STANDARDS

3. Leachate collection system removes liquid from landfill
4. Base liner minimizes potential for liquid to leak out of landfill into the environment





DESIGN STANDARDS

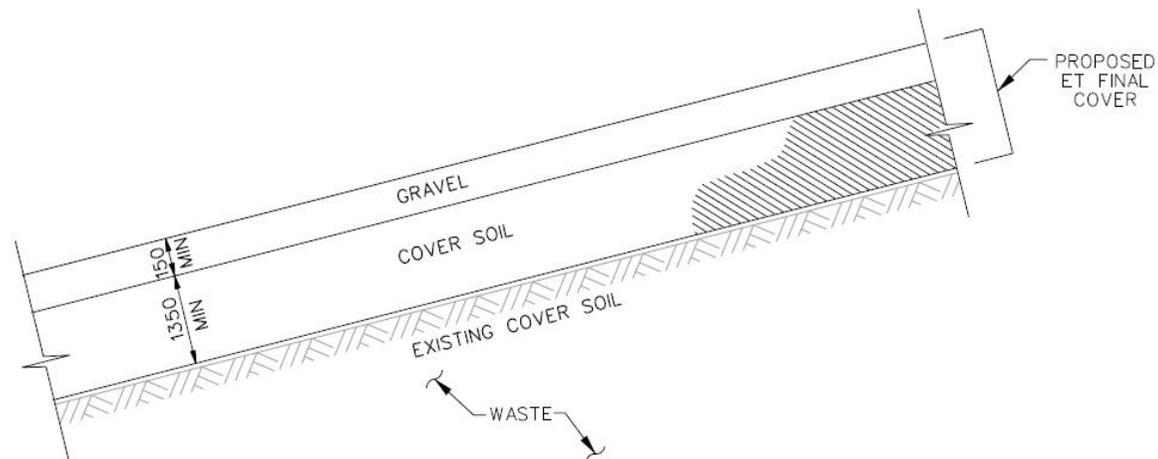
5. Landfill gas collection system minimizes escape of air pollutants to atmosphere
6. Access control system minimizes unauthorized disposal
7. Monitoring system verifies performance of other systems and compliance with regulations





DESIGN STANDARDS

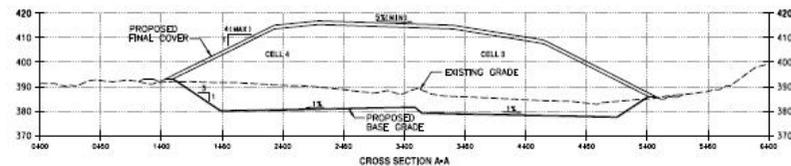
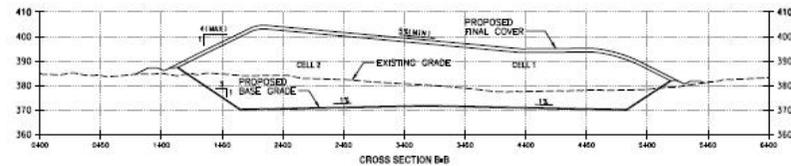
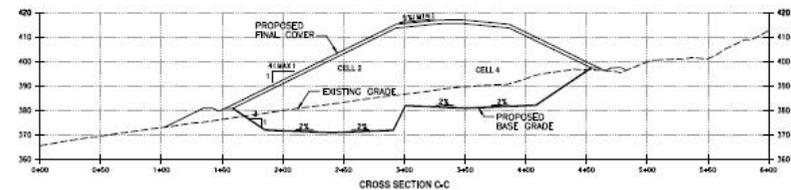
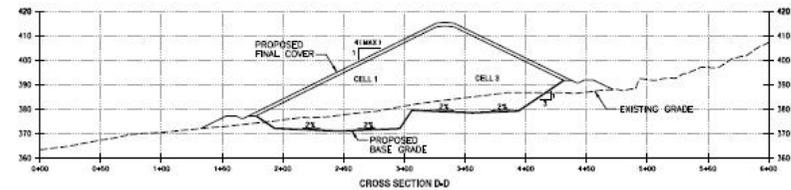
- Jordan's arid climate provides opportunity for equal performance at lower cost
- Example: Evaporative cover system





FACTS AND FIGURES

- Provide 20-years of solid waste disposal capacity
- 2,123,000 m³ total volume with recyclable materials recovery
- 14 km southeast of Aqaba (25 km by road)
- Adjacent to existing landfill

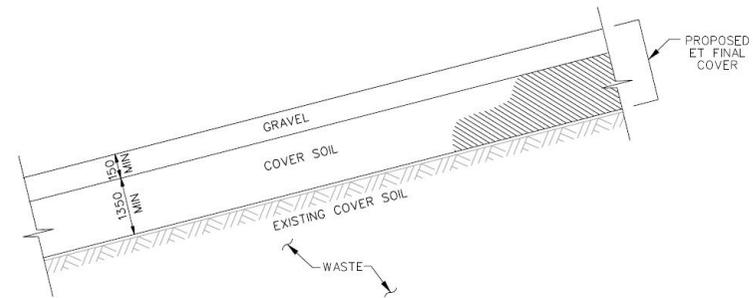




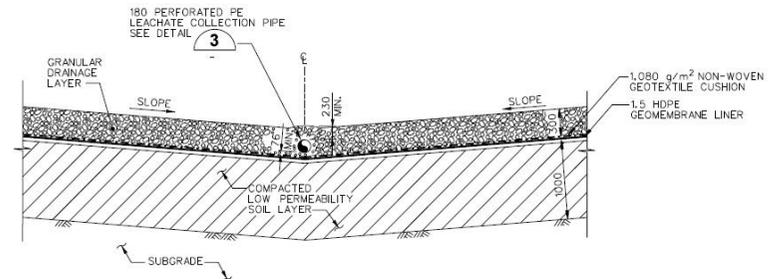
FACTS AND FIGURES

Landfill Design Features

- Evaporative cover
- Composite base liner
- Leachate collection



EVAPO-TRANSPIRATION (ET) FINAL COVER SYSTEM 4
NTS



NOTES:

1. COMPACTED LOW PERMEABILITY SOIL LAYER SHALL BE COMPACTED TO A MAXIMUM HYDRAULIC CONDUCTIVITY OF $K=1 \times 10^{-7}$ CM/SEC.
2. GRANULAR DRAINAGE LAYER SHALL HAVE A MINIMUM HYDRAULIC CONDUCTIVITY OF $K=1 \times 10^{-1}$ CM/SEC.

COMPOSITE LINER SYSTEM AND LEACHATE COLLECTION SYSTEM (TYP) 1
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FACTS AND FIGURES

Potential sources of income

- Landfill gas collection for energy
- Recyclable materials recovery
 1. Current methods are inefficient and hazardous to workers

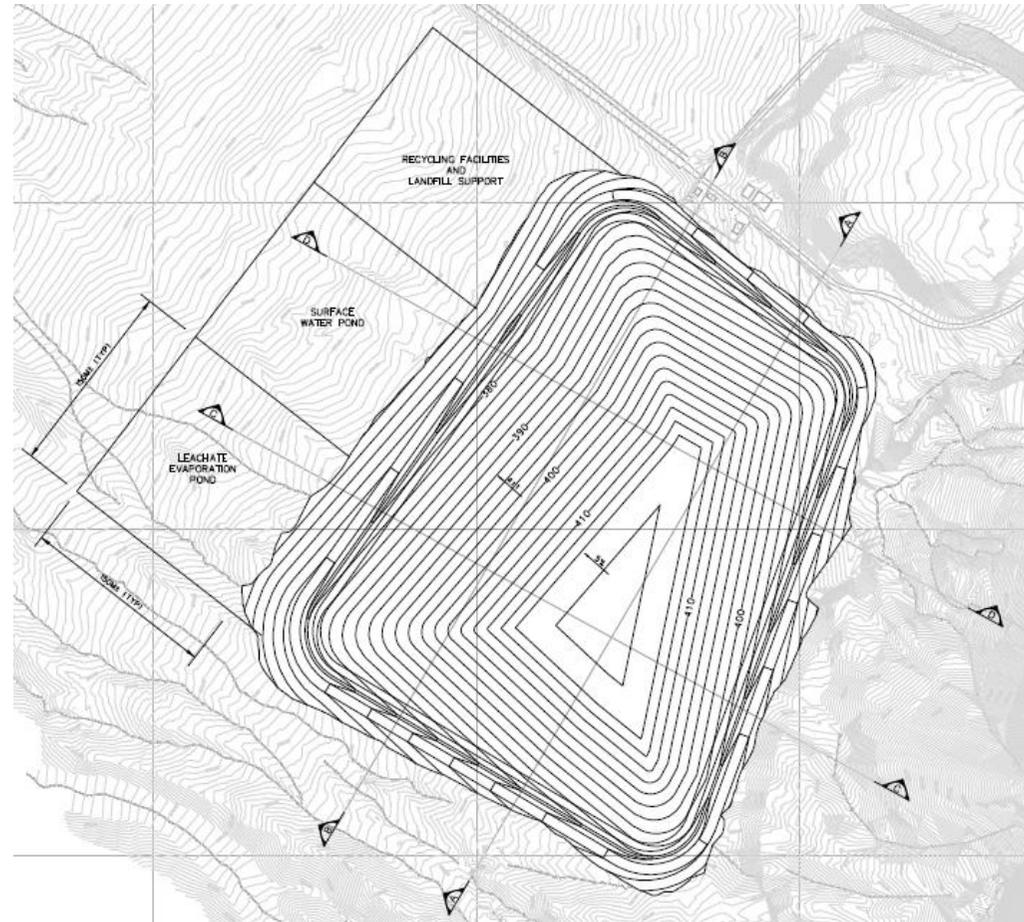




ACTIVITIES & PROGRESS

Completed:

- Needs assessment
- Topographic survey
- Geotechnical investigation
- Waste characterization
- Feasibility study
- Conceptual design





CHALLENGES

- Implementing aggressive recyclable materials recovery
- Committing to increased cost of higher standard of environmental protection provided by proposed design
- Developing methods to increase revenue and offset increased costs





NEXT STEPS

- Final design
- Engage potential stakeholders
- Implementation

