

EPIC CASE STUDY

YAS ISLAND LANDSCAPE PROJECT

ALDAR PROPERTIES & ABU DHABI URBAN PLANNING COUNCIL · YAS LINKS, ABU DHABI

Five plots at Yas Links, each with its own tank and meter, planted at the start of an Abu Dhabi summer: the worst time of year to establish anything.

2.46
L/M²/DAY AVERAGE
vs 12 to 14 typical

~80%
WATER SAVING
vs typical irrigation systems

4 of 5
PLOTS INDIVIDUALLY TANKED
and metered, 83 m² each

EVIDENCE LEVEL
MEASURED · Per-cell metering over 9 months · plot-by-plot planting schedule

Cell 3 planted with Oleander, Atriplex and Pennisetum, Yas Links, Abu Dhabi, 4 January 2012.

PROJECT RECORD

INVITED BY	Aldar and the Abu Dhabi Urban Planning Council
LOCATION	Yas Island Links, Abu Dhabi, UAE
INSTALLED	Installation began February 2011, completed by March 2011
SCOPE	Five self-contained plots of 83 m² each. Four have individual tanks and meters. Four smaller plots added for four trees, also with their own tanks and meters.
WATER SOURCES	Two plots on potable water, two on TSE (Treated Sewage Effluent), the fifth on sea water via a solar-operated pump
PLANTED	Three of the four plots with typical UAE landscape planting, 26 April 2011. The fourth with Platinum TE Paspalum turf, grown from seed, 15 May 2011.
REGIONAL BENCHMARK	Typical landscape areas of shrubbery or turf in this area require about 12 to 14 litres of water per square metre per day

THE PROBLEM

Abu Dhabi's master plans call for large areas of green space. The water to keep them alive is the constraint, not the design.

There is a second problem specific to Yas Island: a high water table and proximity to the sea mean sea water encroaches into traditionally landscaped areas by capillary action. The EPDM liner stops it; nothing can permeate into the EPIC profile from below.

The plots were planted at the beginning of summer. Turf grown from seed is rarely attempted in the UAE at all, because of the difficulty of applying enough water to germinate seed without the plant drying out before it establishes a self-sustaining root system.

WHAT EPIC BUILT

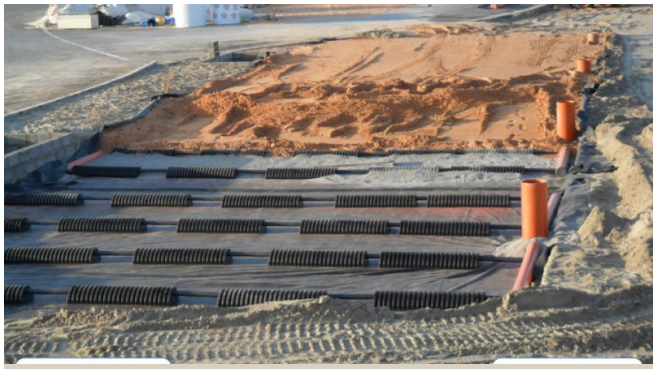
Five self-contained plots of 83 m² each at the Yas Links maintenance building. Four carried individual tanks and meters so that consumption could be monitored separately for different plant types and turf; four smaller tree plots were added on the same basis.

Two plots were supplied with potable water and two with TSE. Three were planted with typical UAE landscape species; the fourth was seeded with the Paspalum turf used on the adjoining golf course.

The fifth plot sits near the sea, supplied with sea water by a solar-operated pump. It is built as two interlinked sub-plots so that two things could be run at once: whether plants can survive on sea water alone, and whether a desalination effect occurs as sea water moves by capillary action from one compartment into the other.



Feb 2011 EPIC chambers and EPDM waterproof liner in place.



Laying the gravel and sand layers.

2.46
L/M²/DAY AVERAGE
VS 12 TO 14 TYPICAL

~80%
WATER SAVING
VS TYPICAL IRRIGATION

4 of 5
PLOTS INDIVIDUALLY TANKED
AND METERED, 83 M² EACH

THE RECORD

Metered water consumption of the four individually metered plots, in litres per square metre per day.

PER-CELL AVERAGE OVER TWO PERIODS, SUMMARISED 29 JANUARY 2012

PERIOD	CELL 1	CELL 2	CELL 3	CELL 4	4-CELL AVERAGE
26 Apr 2011 to 23 Jan 2012	3.66	2.00	2.33	3.10	2.77
2 Nov 2011 to 23 Jan 2012	2.38	1.62	1.81	2.95	2.19
Date palms, litres/tree/day					73.9 (Apr to Jan) · 11.67 (Nov to Jan)

The 4-cell average is the mean of cells 1 to 4. The date palms are in the separately tanked and metered tree plots and are given in litres per tree per day.

FIRST FIVE MONTHS OF THE PROJECT, PER PLOT, AS FIRST PUBLISHED

L / M² / DAY	PLOT 1	PLOT 2	PLOT 3	PLOT 4	AVERAGE
First 5 months of the project	3.63	1.80	1.99	2.44	2.46

Against the 12 to 14 L/m²/day typical for landscape areas here, this average was reported as “a savings of approximately 80% of typical irrigation systems”.



4 Jan 2012 Cell 1 with Pennisetum and Bougainvillea.



4 Jan 2012 Paspalum turf in Cell 4 at Yas Links, grown from seed inside the system.

ALSO ON THE RECORD

- **Turf from seed.** The Paspalum plot was grown from seed inside the system (rarely done in the UAE) and established through the summer.
- **Plot contents.** Plot 1: Pennisetum Green, Sesuvium Portulacastrum, Bougainvillea, Date Palm, Cyperus Alternifolius, Caesalpinia Pulcherrima, Sesuvium Red, Ruellia, Agave. Plot 2: Agave, Nerium Oleander, Ruellia, Atriplex Halimus, Pennisetum Green, Pennisetum Red, Spider Lily, Trees. Plot 3: Atriplex Halimus, Atriplex Canescens, Caesalpinia Pulcherrima, Frangipani, Rhoeo Discolor, Pennisetum Red, Trees. Plot 4: Platinum TE Paspalum Turf.
- **Media and government interest.** The case study records extensive requests from government, media and private organisations to view the site, with coverage in Arabic and English publications including Construction Weekly, AME Info, MEED, Al Fajr, Zawya and Gulf Today.
- **The original brief.** The December 2010 proposal to UPC and Aldar anticipated "water savings of the Epic System in the range of 50-80% less water used than other conventional irrigation systems" and asked that data gathering be set up so results "will meet the scrutiny of any third party".

  Proposal to UPC and Aldar, December 2010



26 Apr 2011 The first day of planting.



Four weeks later.



4 Oct 2011 Five months after planting.



The completed profile, ready for the April 2011 planting.

BUILDING IT, FEBRUARY TO APRIL 2011

Every frame on these two pages is dated. They run in the order they were taken, from bare ground to the planted trial.



3 February 2011 BEFORE

The graded lot beside the clubhouse before any work. Bare compacted sand, the villas behind.



27 February EXCAVATION

The excavation opened and brought to level, gravel base in, string lines set.



1 March CHAMBERS

EPIC chambers laid on the geomembrane liner, riser pipes standing at the connections.



2 March THE ARRAY

The array complete across the plot: rows of chambers on the liner, ready for cover.



2 March SAND

Sand spread over the gravel to form the profile the roots grow into.



3 March WATER TEST

The control chamber charged and standing full, tested before backfill.



26 April READY

The finished plots with the control panel in place, planting date on the record.

GROWING IT, MAY 2011 TO AUGUST 2012

The same plots over the following fifteen months. Elapsed time is counted from the 26 April 2011 planting date; the turf was sown separately on 15 May 2011.



22 May 2011 TURF SOWN
Turf establishing on raw sand a week after sowing, the chamber access cover at the edge of frame.



19 June 2011 8 WEEKS
Groundcover taking hold across the cell, drip lines still visible between the plants.



3 October 2011 5 MONTHS
The lawn cell fully established and closed over, edge to edge.



6 October 2011 5 MONTHS
The shrub and groundcover beds closed over in the same week, agave and yucca through.



12 February 2012 9 MONTHS
Mature planting: bougainvillea in flower, oleander and yucca established along the path.



12 March 2012 10 MONTHS
The plot in its setting, mown lawn and chamber lids, with the road and the buildings beyond.



1 August 2012 15 MONTHS
Frangipani and oleander over dense groundcover, through a second Gulf summer.

RECORDS Yas Island landscape project case study; summaries of water consumption at Yas Island, January 2012; plot contents schedule; EPIC installation report on Yas Island; proposal to UPC and Aldar, December 2010; dated site photographs, February 2011 to August 2012.