"The Value of Green Space"

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Rain Bird Workshop 25th Feb. 2010
– Creating Sustainable Urban Green Space

Urban Green Space

Urban Green Space

What does it contribute to the well being of a city?

1. Microclimate modification
   - Cooling, shading and wind speed reduction
2. Positive effect on hydrological cycle
3. Pollution control – air quality
4. Physical health – recreation and sport
5. Mental health

Urban Green Space

What does it contribute to the well being of a city?

Key Reference:

"*Irrigation of Urban Green Space: A Review of the Environmental, Social and Economic Benefits*", Co-operative Research Centre for Irrigation Futures (CRCIF), Technical Report No.04/08, April 2009. Fam,D., Mosely, E., Lopez, A., Mathieson,L., Morison, J and Connellan, G. (2008)

Social, Environmental and Economic

Irrigated green space

Essential or a luxury?

Australian Turf Industry

Value: $3 billion

Employment: 80,000

Reference: Australian Turf Industry Strategy Plan 2008-2011, **Turf Australia and Horticulture Australia Ltd (HAL).**

Benefits of Irrigated Turf

Environmental

i. **Temperature moderation**
ii. **Erosion control and dust prevention**

Environmental impact – Runoff from non vegetated areas

Benefits of Irrigated Turf

Environmental

i. **Temperature moderation**
ii. **Erosion control and dust prevention**
iii. **Pollution entrapment**
iv. **Hydrology – infiltration and reduced runoff**
v. **Safe, non flammable, area**

Safe area: Victorian bushfires, Feb 2009.

Benefits of Irrigated Turf

Social

i. **Physical health**
ii. **Mental health**
iii. **Community pride**
iv. **Safe surface**

Benefits of Irrigated Turf

Sports turf – Social benefits

- Sport has a crucial role in connecting and strengthening communities
- Builds community connectedness and resilience
- Develops and maintains social and friendship networks
- Key social spaces
- Community hubs
- Builds skills of individual

Ref: A. McKenzie, 2009. Department of Planning and Community Development, Govt. of Victoria

Benefits of Irrigated Turf

Economic

- Low capital cost
- Revenue from sports events
- Businesses involved in servicing sports activities
- Reduced health costs

Example

Golf course revenue: $600,000
Water use: 80 ML
Productivity: $7,500 per ML

Sports Turf – Services provided

Active recreation = Community health

Example

Sports field: 1.5 ha
Use: AFL and cricket
Teams: AFL – 4 . Cricket – 2
Water use: 6 ML per year
Total "User hours" for year: 24,000
Water productivity: 4,000 User hours per ML
Water cost per "User hour": $0.60 (Assumes water cost $1.50 per kL)

Turf surfaces – Performance and Safe Use

Benefits of Urban Trees

(1) Environmental

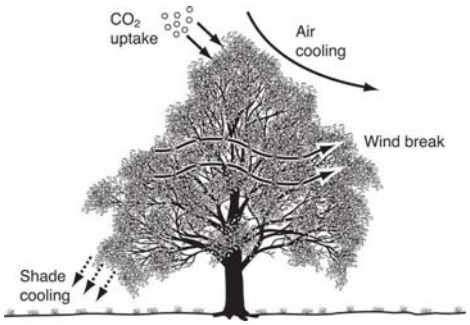
(2) Social

(3) Economic

Benefits of Urban Trees 1. Environmental

a) Temperature modification through Shading and Evaporation
   - Reduced temperature 2 °C to 8 °C
b) Air quality
   - Pollution reduction, Oxygen production
c) Carbon dioxide sink

Role of Trees – Environmental modification



Benefits of Urban Trees 1. Environmental

a) Temperature modification
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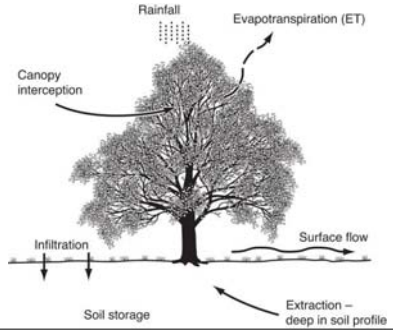
d) Hydrology – runoff

Role of Trees Important element in the urban hydrologic cycle



Benefits of Urban Trees 1. Environmental

a) Temperature modification
   - Shade, Evaporation
b) Air quality
   - Pollution reduction, Oxygen production
c) Carbon dioxide sink
d) Hydrology – runoff
e) Wind modification and screening
f) Habitat

Benefits of Urban Trees 2. Economic

a) Reduced energy costs
   E.g. Heating and cooling costs reduced by 7% to 47% (CRCIF Report)
b) Improved streetscape value
c) Improved residential property value
d) Tree services - arboriculture

Economic Benefit of Urban Trees

- Energy savings (cooling and heating)
- Air quality improvement (pollutant uptake and avoided power plant emissions)
- Carbon dioxide reductions
- Stormwater runoff reduction
- Property value increase from urban/street trees
- Extra life of paved surfaces due to shading

Economic Benefit of Urban Trees

Reference: Brindal and Stringer (2009), TreeNet 2009.

Benefits	Annual $ Value
(1) Household **Energy: $64; Aesthetics: $65; Capital appreciation: $72**	$201.00
(2) Local Govt **Stormwater: $6.50; Repaving savings: $180**	$186.50
(3) Community value **Air quality: $$34.50; Reduced CO2: $1.00; CO2 sequestration: $1.40**	$ 36.90
Total	**$424.40**

Whole of life economic benefit: $25,500.

***Assumes tree life of 60 years.**

Benefits of Urban Trees 3. Social

a) Mental health
b) Physical health
c) Connection with nature
d) Recreation – higher use value of green space

How much water is needed for irrigated green space?

Nationally

Australia 400 GL (Out of total water consumption of approx. 18,700 GL per year) (Ref: ABS) Represents around 2.1 %

Golf – Out of the 400 GL

Nationally uses 125 to 150 GL

Urban water usage for sports grounds

1.2 % of all urban water use (Ref: MAV 2007)

What is the Value of Open Space Irrigation Water?

What do you get for 1 ML (1,000,000 Litres) ?

✓ **Maintain about 2,500 m^2 of turf**
✓ **Maintain 200 trees per year (5,000 L/tree)**

What is the value ($) of this water?

Use of Potable Water for Irrigation

Use of Potable Water for Irrigation
Some issues

- Limited supply
- Decreasing yield
- Increased demand
- Seasonally/climate dependent
- Increasing cost
- Low priority in water use
- Water restrictions
- "No potable for irrigation" policies

Planning for sustainable irrigated green space - What's involved?

1. Determine required site outcomes
2. Site and landscape design, including plant selection, to achieve outcomes – according to water use efficiency principles
3. Secure water source ("fit for purpose" water)
4. Prepare water budget
5. Design efficient irrigation system
6. Manage irrigation efficiently

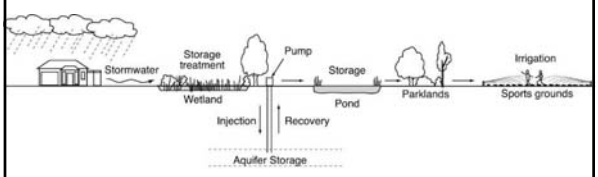
Developing Water Management Strategies for Public Open Space

Guidelines for Water Use Efficiency Site planning

- Site landforming to optimise rainfall
- Use of local species
- Use of low water use species
- Shapes and spaces designed to allow efficient watering
- Hydro-zoning to allow each area with different water requirements to be watered effectively

Sustainable Irrigated Site

Integration of rainfall harvesting, storage and utilisation of stormwater



Narrow & Irregular Shapes - No

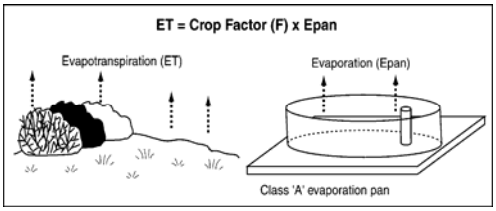
Water Budgets

Need to know how much water is going to be required.

1. Planning
and
2. Irrigation scheduling

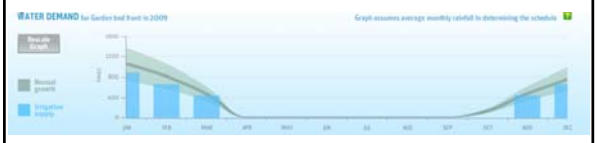
Evaporation Rate

Bureau of Meteorology (BoM) data



Water demand graph for Low Water Use plants

Water demand graph for High Water Use plants



Water demand graph for Mulch options

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Water demand graph for Irrigation options

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Tank Selector

Takes into account:

(a) Tank size
(b) Roof rainfall collection area
(c) Water demand by garden zone
(d) Month of tank installation

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Water Budgets for Nominated Climate Scenarios

(1) Long Term climate data

(2) Modified Long Term climate data – takes into account last 10 years

(3) Wet year (E.g. 1989)

(4) Dry year (E.g. 2003)

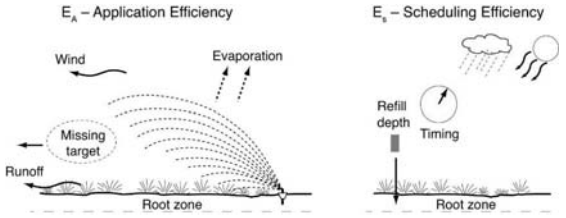
(5) No Rainfall year

Example: Parkland Water Budgets - Melbourne

Climate Scenario	(1)Long Term	(2) Modified Long Term	(3) Dry Year	(4) Wet Year	(5) No Rainfall
Water Budget	30.0 ML	35.2 ML	40.1 ML	22.9 ML	73.1 ML
Evaporation	1215 mm	1215 mm	1171 mm	1091 mm	1215 mm
Rainfall	650 mm	542 mm	493 mm	793 mm	0 mm

Efficient Irrigation - Components

Getting value out of every drop



Guide to efficiency gains - Example

Turf Grass	Irrigation System - Type and condition	Water Application Rate - ML/ha
Cool season	Sprinkler – Poor condition	10 ML/ha
Cool season	Sprinkler – Good condition	8 ML/ha
Warm season	Sprinkler – Poor condition	7 ML/ha
Warm season	Sprinkler – Good condition	5 ML/ha
Warm season	Subsurface drip Irrigation (SDI) – Well designed and suited to site and soil type	4.0 to 4.5 ML/ha

Performance evaluation:

Uniformity of application testing (DU%)

Industry Best Practice: DU 75%

Summary

(1) Irrigated green space is valuable

(2) Sustainable sites require sound planning and appropriate horticulture

(3) Water source should be sustainable in quantity and quality

(4) Irrigation should be performance based both in terms of design and ongoing management