



SA's online stormwater assessment tool for small-scale development

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Program Partners



LOCAL GOVERNMENT RESEARCH & DEVELOPMENT SCHEME



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Living Adelaide – 30 Year Plan for GA



20% increase canopy cover across metropolitan Adelaide by 2045



Alexandra Ave, Rose Park Source: news.com.au,

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Living Adelaide – 30 Year Plan for GA



P114 WSUD in new developments for water quality, water efficiency and to support public stormwater systems

P116 Provision of stormwater infrastructure to manage & reduce impacts of: (i) run-off from infill (ii) flooding and (iii) pollution



Source: A.King



Source: A.King

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Living Adelaide – 30 Year Plan for GA



85% new housing stock from infill development



East Parkway, Northgate, Lightsview



Bowden Urban Village

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Business as usual will deliver this.....



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Business as usual Underperforming Asphalt



Source: AKing

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Our priority projects:



PP1 - The case for water sensitive urban design – cost-benefit analysis

PP2 – life cycle cost analysis

PP3 – Deemed to comply guideline

PP4 – Online stormwater assessment tool for small-scale development

PP5 - MUSIC Guidelines for SA

PP6 – Review & update of WSUD technical manual



Angas Street, Adelaide adjacent SAPOL
Photo: Water Sensitive SA

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Project Objective



User friendly tool to assess the performance of the proposed WSUD elements of a development against the SA WSUD Policy to:

- increase the efficiency of development application and approval processes
- achieve better outcomes for flood risk, stormwater quality, amenity and microclimate (where possible).



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Definition of small-scale development



Residential developments, including

- additions over 50m²
- single dwellings
- dual occupancies
- unit/townhouse developments excluding those that incorporate the creation of a public road
- apartment blocks

Commercial, industrial and institutional developments of up to 5,000m²



Source: A.King

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SA WSUD Policy



Stormwater runoff quality



Caltex, 734 Marion Rd, Marion Source: Baden Myers



Cooke Reserve, Royal Park. Source: City of Charles Sturt

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SA WSUD Policy



Stormwater runoff quantity and flood management



Compare current Council detention policies. Seek best fit



Bowden Urban Village Source: Water Sensitive SA



Kirkcaldy Avenue, Grange Source: Baden Myers

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WSUD elements able to be assessed



- onsite detention
- onsite retention and reuse of rainwater and stormwater on site
 - rainwater tanks
 - rain gardens
 - vegetated swales and buffer strips
 - direction of flow from impervious ground surfaces to landscaped areas.
- reduced impervious areas
 - site coverage (up versus out)
 - permeable paving
 - green roofs



Christie Walk, Green roof

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Features: Spatial reference



Source: insitewater.net

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Features: Water use demand



Water Efficiency WELS Ratings

Wash WELS star rating

94.3 94.5
 Wash WELS (L/d) Wash Benchmark (L/d)

Tub WELS rating

18.07 21.80
 Tub WELS (L/d) Tub Benchmark (L/d)

Bath WELS star rating

15.28 15.20
 Bath WELS (L/d) Bath Benchmark (L/d)

Washing Machine WELS star rating

22.53 63.70
 Washing M WELS (L/d) Washing M Benchmark (L/d)

Kitchen Tap WELS rating

16.49 16.49
 Kitchen Tap WELS (L/d) Kitchen Tap Benchmark (L/d)

Shower WELS rating

0.00 0.00
 Shower WELS (L/d) Shower Benchmark (L/d)

Shower WELS star rating

19.13 19.13
 Shower WELS (L/d) Shower Benchmark (L/d)

Dishtweeter WELS star rating

5.50 16.79
 Dishtweeter WELS (L/d) Dishtweeter Benchmark (L/d)

Water Results

Internal Water Demand (L/Person/Day)	Benchmark Water Use (L/Person/Day)	Water Saving from efficiency (L/Person/Day)	Water Saving from efficiency (%)	Internal water demand (L/Person/Day)
148.6	163.7	15.0	9.2	141.2

Source: insitewater.net

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Features: Retention & detention storage



Rainwater tanks

Location *

Basement Volume (L)

Connected roof area (m²)

First flush device (L)

Tank freeboard (L)

Rainwater Connections
 Tank based if rainwater is connected
 Tank Laundry

% of apartments or occupants connected to tank *

Rainwater calculator
 click 'calculate' to run the daily water calculator - this runs a daily tank balance simulation using 20 years of rainfall data

Rainfall total per annum (mm)	Irrigation total per annum (mm)	Roof runoff total per annum (mm)
543.5	623.14	596.29

Irrigated garden area (m²)

Other rainwater sites (L/day)

Source: insitewater.net

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Features: Total water use and tank overflows



Rainwater tank results			
Water savings from tank (kL) 40.0	Water Tank Reliability % 100.0 <small>Ind size demand met by the tank – increase tank size or connected roof area to improve reliability</small>	Total water saving (efficiency + tank) kL 92.5	Total water saving (efficiency + tank) % 35.5 <small>Maximum Target > 25%, Best Practice > 40%, Excellent > 65%</small>
This project passes the minimum water saving target	Roof Runoff (kL) 398.3 <small>Water captured by the roof which is available to the water tank</small>	Overflow (kL) 556.2 <small>Water flowing from the roof that is not used or captured by the tank</small>	Overflow % 93.0 <small>% of roof runoff flowing to stormwater system – increase tank volume demand and increase tank size to reduce overflow</small>

Source: insitewater.net

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Features: Stormwater Quality



Stormwater Quality
Please enter all stormwater areas to be run on. This includes driveway, parking, and roof area not connected to the rainwater tank.

Impervious area name	Impervious Area (m ²)	Treatment type	Treatment Size (m ²)	Treatment percentage	Total Nitrogen (TN) reduction
Asphalt <small>e.g. roof not connected to tank, driveway, parking etc</small>	1385	Bioretention (200mm) <small>Select a treatment from the drop-down menu</small>	21	0.015	1423.44
Grass <small>e.g. roof not connected to tank, driveway, parking etc</small>	725	Buffer 20%	58	0.062	328.23
Private pavements <small>e.g. roof not connected to tank, driveway, parking etc</small>	467	Buffer 10%	252	0.050	174.82

Note: treatment larger than 9% of the adjusted impervious area will not increase performance

Source: insitewater.net

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Features: Pollutant reduction relative to targets



Rainwater Tank storm water quality

Water Tank Runoff reduction (%)	Rainwater Tank(s) Total Nitrogen (TN) reduction	Rainwater Tank(s) Total Solids (TSS) reduction
7.0	171.1	96.3
Total stormwater volume reduction from water tank diversion		

Stormwater quality

Total Impervious Area	Total Nitrogen (TN) % reduction	Suspended Solids (TSS) % reduction
3372.0	30.3	39.7
Roof connected to Rainwater Tank + other impervious areas	TN target is 45% retention of typical urban annual load	Suspended Solids target is 80% retention of typical urban annual load

Source: insitewater.net

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Features: Detention calculator



Detention Calculator – Site analysis and Permissible Site Discharge (PSD)

Disclaimer – this section provides a conservative detention tank size for preliminary design purposes only. This section is based on a standard modified rational method APMP (2001). For more refined (and complex) storm-water calculators that reflect the ASMP (2010) guidelines – see our engineering tools section. All drainage designs must be checked by a suitably qualified professional.

Project's Latitude -35.01905809999999 <small>Your latitude from Google Map on page 11</small>	Project's Longitude 138.54369029999998 <small>Your longitude from Google Map on page 11</small>	
1 Hour Rainfall depth for a 10% AEP storm (1-1 in 10 ARI) 27.6	Total Site Area (A in hectares) 0.3284	Post development total impervious area (in hectares) 0.3572
<small>We have loaded ITO data (rainfall depth in mm) for a 1 hour duration storm with a 10% AEP (1-1 in 10 year ARI) for your Council area for a custom or more refined location, data is available from the Bureau of Meteorology.</small>		
Enter base case (pre-development) fraction impervious (ratio) 0.55 <small>Default = 0.25 or 0.4 – refer to local drainage authority guidelines.</small>	Base case (pre-development) design storm 10% AEP (1-1 in 10 ARI) – dt <small>refer to your local drainage authority guidelines</small>	Base case runoff coefficient 0.4025

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Deliverables



- Stage 1 Comparison of current Council engineering requirements**
- Detention scenario analysis report
 - Consultation Report regarding support for nominated "best fit" design criteria

- Stage 2 Stormwater assessment tool and Guideline for Greater Adelaide**
- Determine water quality modelling methodology
 - Stormwater assessment tool
 - Guideline – including deemed to comply options

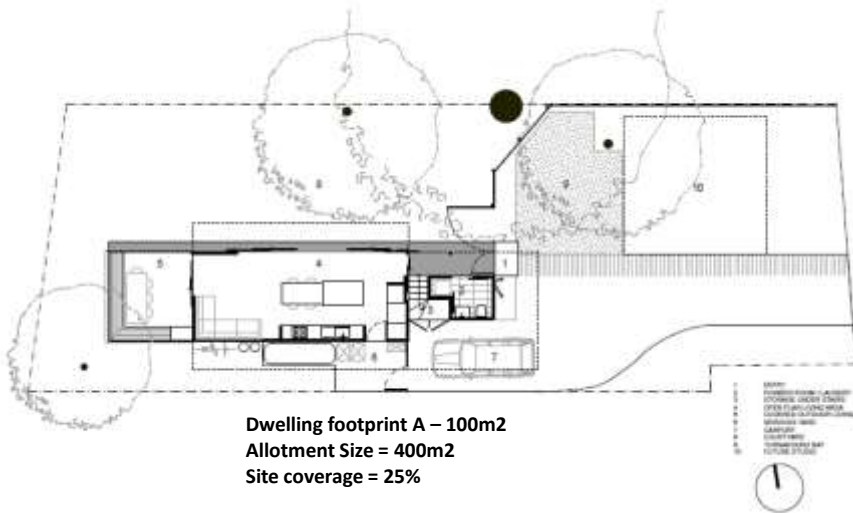
- Stage 3 Online interface for Stormwater Assessment tool & user manual**



The 100m2 house
Source: Levesque & Derrick Architects, lada.com.au

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The 100m2 house



Source: Levesque & Derrick Architects, lada.com.au

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Source: Levesque & Derrick Architects, lada.com.au

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Permeable pavements



Source: www.marshalls.co.uk



Source: Baden Myers

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Source: www.maxiplas.com

Source: rosemarkwatertanks.com.au

Source: www.tightspottanks.com.au/

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The Gen Y Demonstration Housing Project



Designed by David Barr Architect, Image: Robert Frith

The Gen Y Demonstration Housing Project



Image: Robert Frith

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