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Recycling and Storm Water

Engineering and commercial considerations





- ▶ Sources of water in addition to potable water supplies from external provider may include;
 - Rainwater from roof run off (normally a component of stormwater)
 - Stormwater run off (with or without rainwater)
 - Grey water (component of sewage without solids)
 - Sewage flows from development (with or without grey water).
Overall treatment and reuse or selective sewer mining with balance discharged to regional sewer
 - External source of Class A water for third pipe system available from regional water company – use of this supply may be mandated in some cases
 - Groundwater from below the development

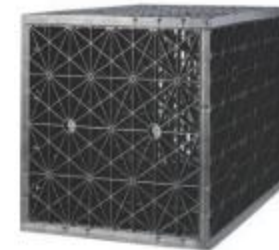


Potential end uses for various classes of water

End Use	Untreated Greywater	Treated Stormwater Class A equiv	10/10/10 (Treated Grey Water)	Class A effluent Equiv treated stormwtr	Untreated Rainwater	Potable
Garden Irrigation	x	x	x	x	x	x
Clothes Washing		x	x	x	x	x
Toilet Flushing		x	x	x	x	x
Cooling Tower		x		x	x	x
Evaporative Cooling					x	x
Fire System		x		x	x	x
Public open Space		x		x	x	x
Shower					x	x
Hot Water Supply					x	x
Bath					x	x
Bathroom Basin					x	x
Laundry sink					x	x
Kitchen sink						x
Bathroom Basin						x
Laundry sink					x	x
Dishwasher						x
Pool + Spa + Outdoor					x	x



- ▶ Rainwater use can be at household level, housing cluster level or whole development level
- ▶ At cluster level or larger – preferable to treat to potable level with filtration and disinfection. Limited application to date. Typical cost \$15 to 20/kL
- ▶ Need economy of scale to treat to potable level because of maintenance and monitoring
- ▶ Significant reduction of stormwater discharge – approx 15% typ.



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- ▶ Extensive application of stormwater for irrigation or parks etc. In Adelaide used with wetland and ASR.
- ▶ Disinfection generally required for uncontrolled irrigation in public areas
- ▶ For third pipe use need to achieve recycled effluent equivalent. Typical system includes detention/wetland or filtration, UV and chlorination. Some projects in operation and many in planning stages
- ▶ Limited application compared to recycled effluent
- ▶ Like rainwater is climate dependent, can improve condition of receiving waters – competes with recycled effluent
- ▶ Typical cost at development scale (say 5000 houses) \$3/kL





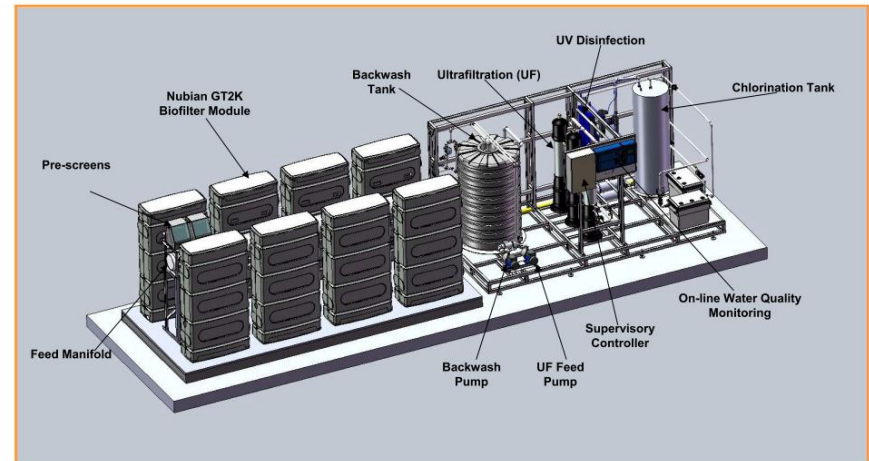
- ▶ Third pipe systems now becoming widely adopted. Some projects operating, many underway
- ▶ Typical treatment following biological, Chem/UF/UV/Chlorine
- ▶ Not climate dependent – reduced environmental discharge
- ▶ Water authority initiated projects – located at existing plant and serving nearby residential developments. \$2kL (existing secondary/tertiary facilities are treated as sunk costs)
- ▶ New growth areas are increasingly being planned with local reuse plants. Can be either on-site treatment or sewer mining depending on demand. \$4 – 5/kL for 5 to 10k developments.
- ▶ Drivers are recycling objectives, government policy and community demand
- ▶ Majority of water authority projects receive government grants
- ▶ Rigorous health department certification requirements





- ▶ Limited application to date apart from property scale (mostly untreated)
- ▶ High rise residential or development clusters
- ▶ Lower treatment requirement but health department maintenance and monitoring requirements increase cost significantly. Neighbourhood scale \$10kL. Property scale treated \$30kL
- ▶ Requires dual sewerage reticulation system

Nubian CGT2





- ▶ Alternative water sources are costly but bring non financial benefits
- ▶ Economies of scale are extremely important
- ▶ Driven by government policy and housing market – public want to be sustainable
- ▶ Householder can probably only cope with two types of externally supplied water (ie potable and Class A) and one on-site water (i.e. rainwater)
- ▶ Each development needs a IWCMC to determine optimum solution
- ▶ Need to rationalise between the various sources available to avoid highly complex systems