



WORKSHOP ON CLIMATE CHANGE AND
GROUNDWATER – LAW AND POLICY
PERSPECTIVES

Managed Aquifer Recharge with Treated Wastewater

OLD LAWS FOR NEW USES
IN A CONTEXT OF CLIMATE CHANGE

London, 30 May 2015



Defining Terms

- **Managed Aquifer Recharge (MAR):** artificial recharge of groundwater (under controlled conditions) via infiltration or injection of **recycled or natural water** into an aquifer
- Water banking or enhanced recharge
- Aquifer Storage (Transfer) & Recovery (AS(T)R)
- Water treatment technique (mid-1900, e.g. Israel)
- Soil Aquifer Treatment (SAT)

Identifying the issue

- Purposeful **recharge** of surplus water for later use or for environmental benefit vs **discharge** of wastewater into an aquifer
- Conventional sources: Surface water/ urban storm water
- Non-conventional sources: **Treated wastewater/** desalinated water
- Techniques: infiltration, injection, dams, etc.
- Intended use: irrigation, landscaping, drinking water supply
- **Legislation & administration**: water quantity & quality



Climate Change & Variability

- Adaptation (and mitigation) strategy to achieve water security
- Reduce vulnerability to extreme events
- Water reserve in case of droughts
- Storage of excess water from floods
- Efficient water management by reusing treated wastewater
- Reduce pressure on water resources
- Efficiency could help reducing GHG emissions from pumping (energy use)

Legislation Case Studies

- Australia (W.Australia)
- Israel
- Spain
- South Africa
- USA (Arizona)

- Germany/ the Netherlands/ UAE/ Jordan/ Mexico/ India

Main requirements:

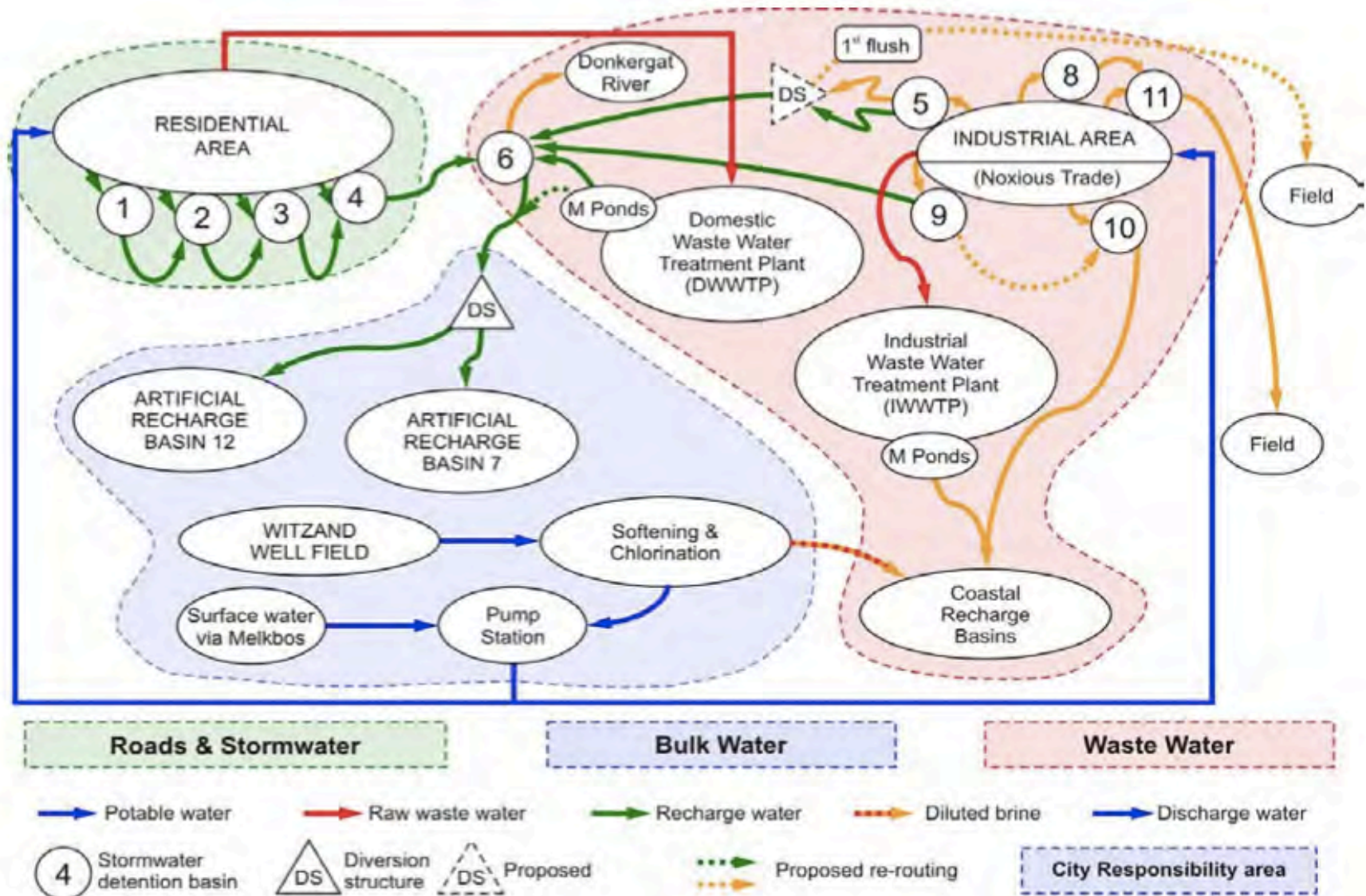
- * Drilling permit
- * Water abstraction permit
- * Recharge facility permit
- * TWW discharge permit
- * TWW reuse permit
- * Assessment and planning

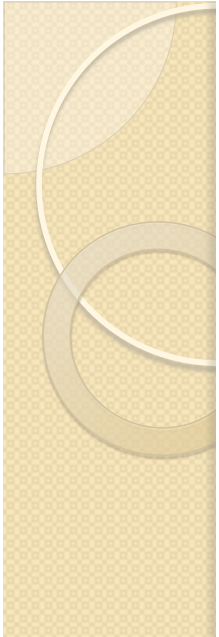


Example: Western Australia

- Water Act, 2007
 - National MAR Guidelines, 2009
 - National Water Reuse Guidelines
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- Western Australia MAR Policy, 2011
 - Rights in Water & Irrigation Act, 1914
 - Licence to take water + licence to construct bores
 - Agreement needed if recharge & recovery by different operators
 - Case-by-case hydrogeological assessment
 - Approved operating strategy
 - Health-related documentation for drinking water

South Africa / Witzand facilities - Atlantis Water Resources Management Scheme





**Artificial recharge basin in
Atlantis, South Africa (2014)**

Water Rights Involved

- Right to **harvest source water**
 - Who owns the effluents?
 - Public : concessions/licensing; Private : negotiated contracts
- Right to **store and recharge treated wastewater to an aquifer**
 - Injection or infiltration? What is the required quality?
 - Excess water storage or recharge of depleted aquifer
- Right to **recover stored or recharged water from an aquifer and put it to final use**
 - Who recovers the water? MAR licence holder or third person
 - Inc. in MAR licence or as separate authorization – where, when & how much?

Integrated Licensing

- Right to **harvest, store and recover** treated wastewater
- **Prerequisites:** EIA, land use & health clearances, quality standards
- **Risk management plan** for MAR system's operations
- Licence **duration & administrative fees**
- Licence **review, variation, suspension, termination**
- Water-related **tariffs & recharge costs**
- **Percentage** of stored water to be recovered (drought plans)



Risk Management Plan

- Protection of human health and the environment
- Prevention of hazards
- Identification, assessment & mitigation of relevant risks
- Water quality (compatibility, temperature) and quantity (balance)
- Attached to the MAR licence and enforceable



Institutional Aspects

- Administration (water, environmt, health)
- Monitoring
- Enforcement

- Central and local authorities
- Consultation of basin organization & WUAs

Conclusions

- Licensing system established by unspecific legislation hinders investment
- GW abstraction & TWW legislation
- MAR scheme by policy & guidelines
 - > Lack of legal certainty
 - > Gaps in mandatory requirements
- Special legislation for integrated MAR licensing
- Promote climate-independent water sources

AIDA is a non-governmental, non-profit, international association of lawyers and non-lawyers active in the field of fresh water resources. Join us!

THANK YOU!

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