

Rethinking the Impossible: Net Zero Water Footprinting Strategies

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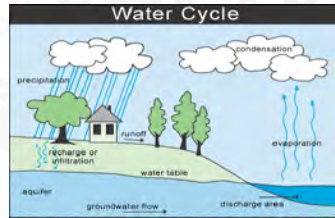


Net Zero Water Balance: Supply

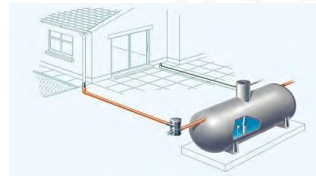
Water
Supply



Municipal Water



Groundwater Well



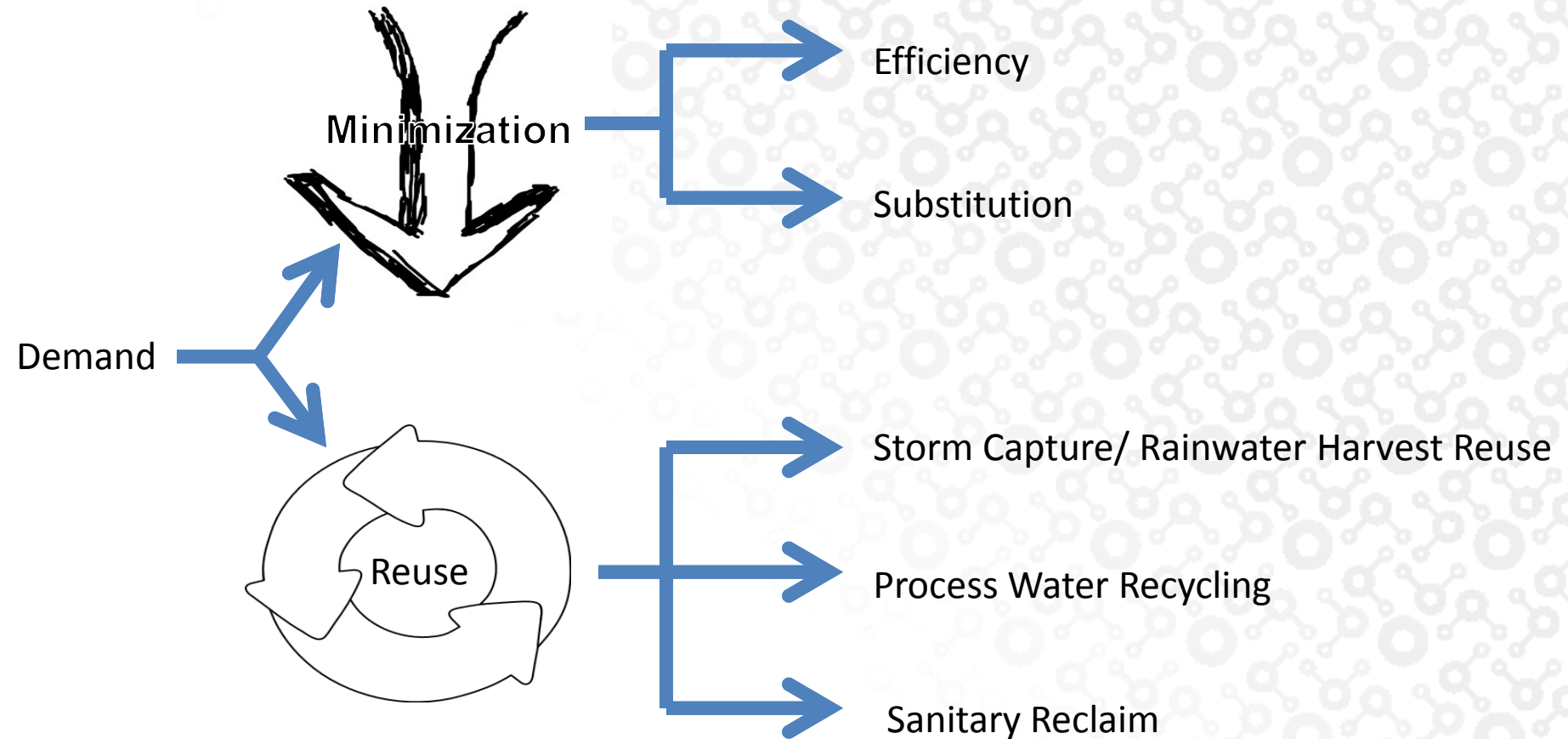
Rainwater Harvest



Condensate Recovery (Arid
Climates)



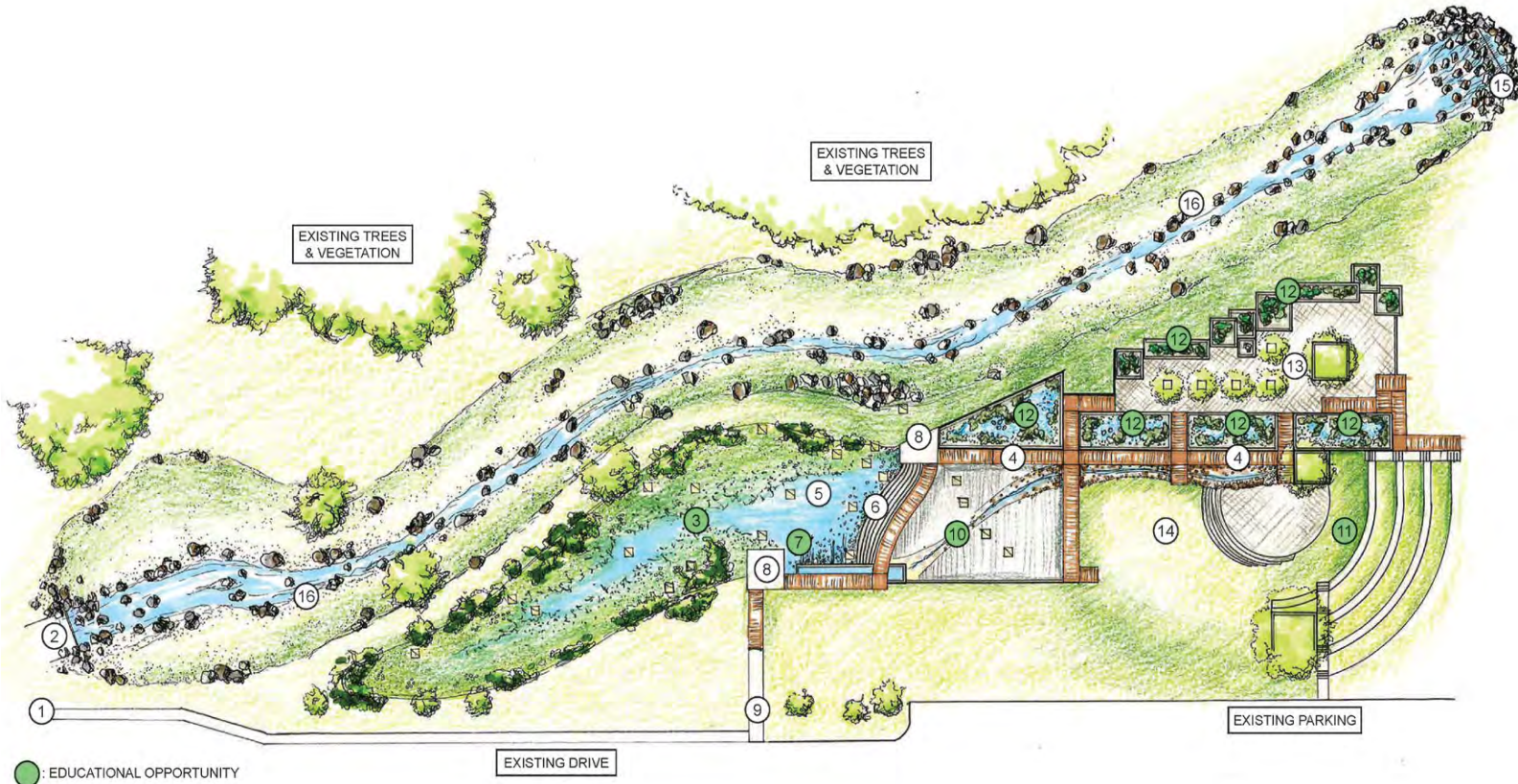
Net Zero Water Balance: Demand





Net Zero Water: Scale Jump

Scale Jump → Localized Aquifer Recharge





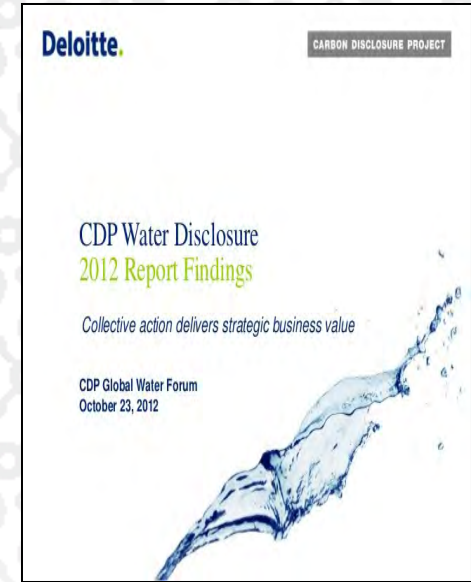
Presentation Learning Objectives

- 1) Examples of how Water Footprinting supports an organization's sustainability planning and reporting initiatives
- 2) Identification of onsite water sources and the various water quality considerations associated with their ends uses
- 3) Knowledge of building and site features to accomplish net zero water

Sustainability Planning and Reporting

Corporate Reporting

- 76% of world's largest 250 companies address water in corporate responsibility reporting (KPMG Survey-October 2012)
- Data disclosures lagging
- Corporate mandates
- Certifications



The CEO **Water** Mandate



Reporting Initiatives

- Global Reporting Initiative
- ISO 14001
- American College & University Presidents' Climate Commitment



www.uswateralliance.org



The Water Footprinting Process

Quantify



Evaluate



Implement



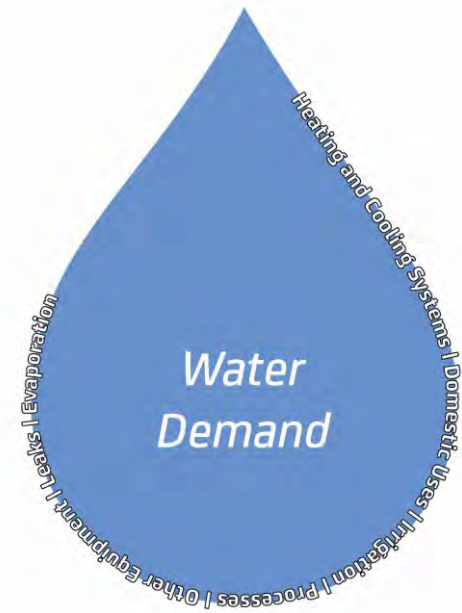
Quantify

Conduct an external/internal process review to determine

- Current sources at facility
- Current uses at facility
- Current disposition of water
- Generates facility water balance and facility water use

Example Facility-Tobacco Processor:

- Tobacco flavoring meters identified as cooling tower met
- Correlation between billed meter locations vs. facility plot plan





Evaluate

Identify opportunities to **minimize**, **reuse** and **replace** water onsite

Examples:

- Low flow fixtures and fittings
- HVAC and boiler steam condensate reuse
- Reject process water (i.e. Reverse Osmosis, Nanofiltration)
- Graywater reuse

Example Facility-Hospital:

- Single Pass Cooling
- Onsite well for cooling tower makeup
- High efficiency Pre-Rinse Spray Valve





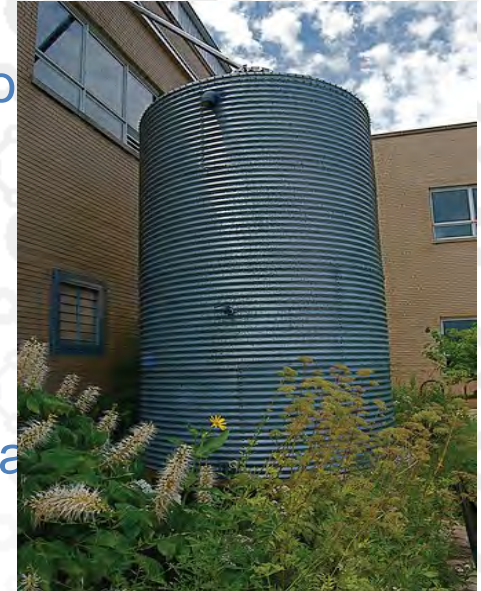
Implement

Water Management Action Plan to move the facility to a net zero water balance:

- Stormwater infiltration basins for onsite groundwater recharge
- Installation of conductivity meters and controls on cooling towers
- Rainwater harvesting for toilet flushing and cooling makeup

Example Facility-Orthopedics Manufacturer:

- Update of existing R/O treatment system
- Infiltrate stormwater to onsite well for non-contact process water, irrigation and fire suppression





Implement

Example Facility-Precision Electronics Manufacturer:

- Submetering program to define water demands/losses by process
- Alternate Rinsing Configurations and Automatic Rinse Controllers
- Low flow aerators on sink faucets

Example Facility-Municipal City Hall:

- Use of harvested stormwater for flushing toilets
- Pretreatment and conveyance system for disconnecting basement sumps



Water Footprinting- Results

Location	Facility Type	Current Annual Use	Potential Annual Savings
Nashville, Tennessee	Hospitals (7)	188M Gallons -total for all hospitals	\$100,000 per hospital and 66% water use reduction
	Tobacco processing and packaging facility	21M Gallons	\$34,000 and 60% water use reduction
Wendell, North Carolina	Precision electronics manufacturing facility	13M Gallons	\$45,000 and 90% water use reduction
Wabash, Indiana	Orthopedics manufacturer	35M Gallons	62% water use reduction
Indianapolis, Indiana	Municipal City Hall	14M Gallons	\$20,000 and 75% water use reduction

Case Study-Net Zero Water Tyson Living Learning Center



Net Zero Water-
Building Scale

- RAINWATER HARVESTING
- POTABLE WATER SYSTEM
- GREYWATER SYSTEM
- WASTEWATER SYSTEM



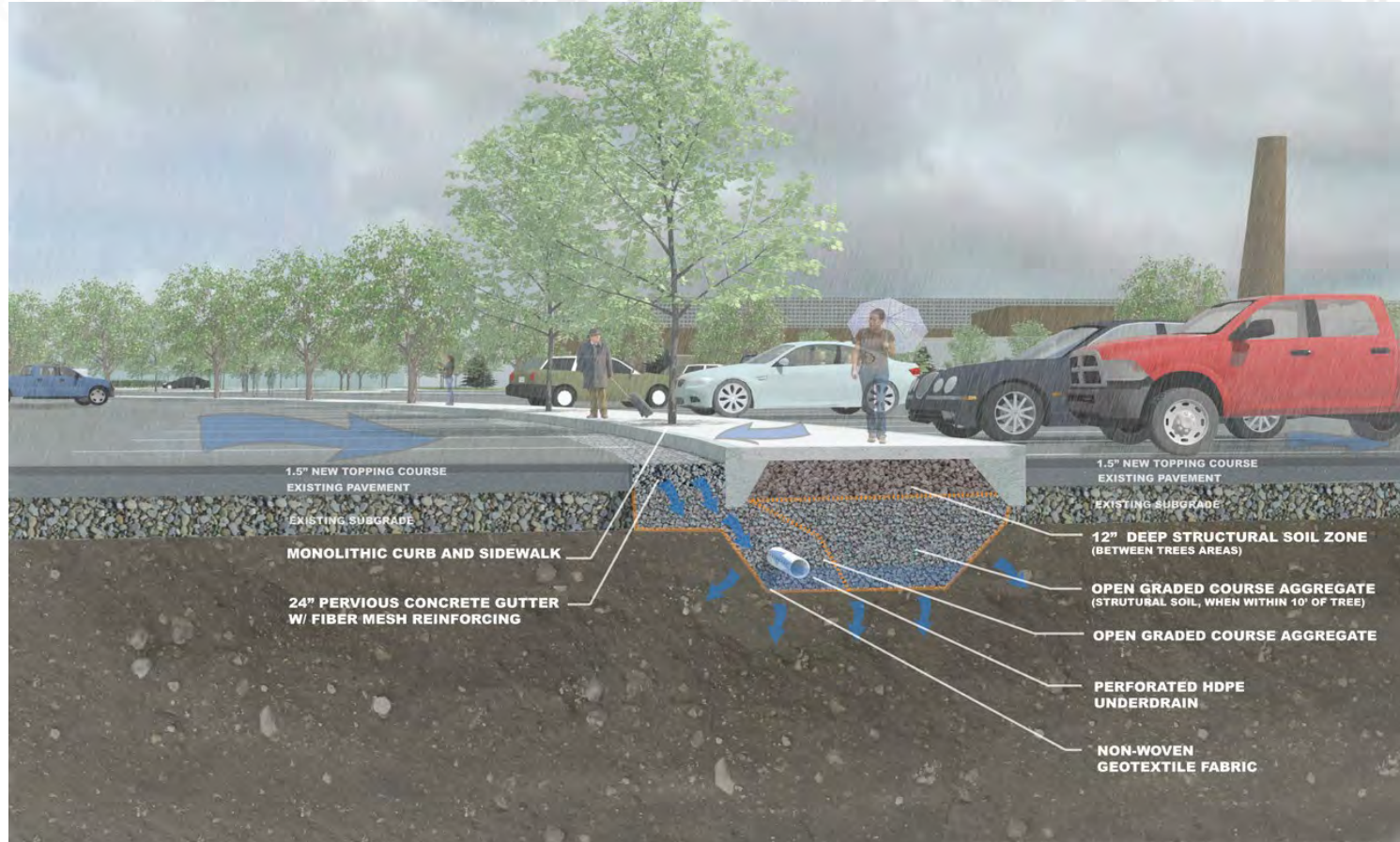
Tyson Living Learning Center- Rainwater Collection System



- Rainwater collection and treatment system (potable drinking water source)
- Water collected on metal roof and stored in in-ground tank
- Water is then pumped through a secondary filtration



Alcoa-Net Zero Parking Lot





Alcoa Net Zero Parking Lot







Berea College-Scaling Up to Net

Legend

- Treated Greywater Disposal
- Greywater Treatment
- Blackwater Treatment Disposal
- Blackwater Treatment
- Rain Gardens



Strategy:

1. Minimize Potable Water Offsite Demand
2. Maintain Predevelopment Hydrologic Cycle
3. Aquifer Supply Recharge Onsite
 - Treated Grey Water
 - Treated Black Water

Aquifer is Nature's Cistern!



Thank you!

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