WasteWaterEducation 501(c)3

P.O.Box 792, Traverse City, MI 49685-0792 | 231 233 1806

info@wastewatereducation.org

WaterSense PARTNER

Tax ID: 20-0042087 [NW MI Onsite WasteWater Task Force]

MISSION

To increase awareness that water quality is directly linked to the use of appropriate wastewater systems and their management.

Connecting the drops ..... The Case For Sustainability

We aren't in the waste water business,

We're in the clean water business .....

The Joyce Foundation

- Sustainability of Great Lakes water
- Water Use = Energy
- Wastewater Systems are cheaper to operate, maintain, and last longer, if we design for need and suitability
- Engage communities in critical thinking to achieve informed consent

- **Wise water use protects the environment**

Is this sustainable?

Chair: Scott J. Kendzierski, R.E.H.S., M.S.
Director of Environmental Health Services
Health Department of Northwest Michigan
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Vice Chair: Mary K. Clark
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Research Professional and Contributing Author of Water Environment Research Foundation.
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Bill Crawford MSA. R.S. <wcrawford@bldhd.org>

Secretary: Daniel R. Thorell, M.S., R.S.
Environmental Sanitarian
Grand Traverse County Health Department
Environmental Health Division
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Phone:(231) 995-6021

Daniel Thorell <dthorell@gtchd.org>

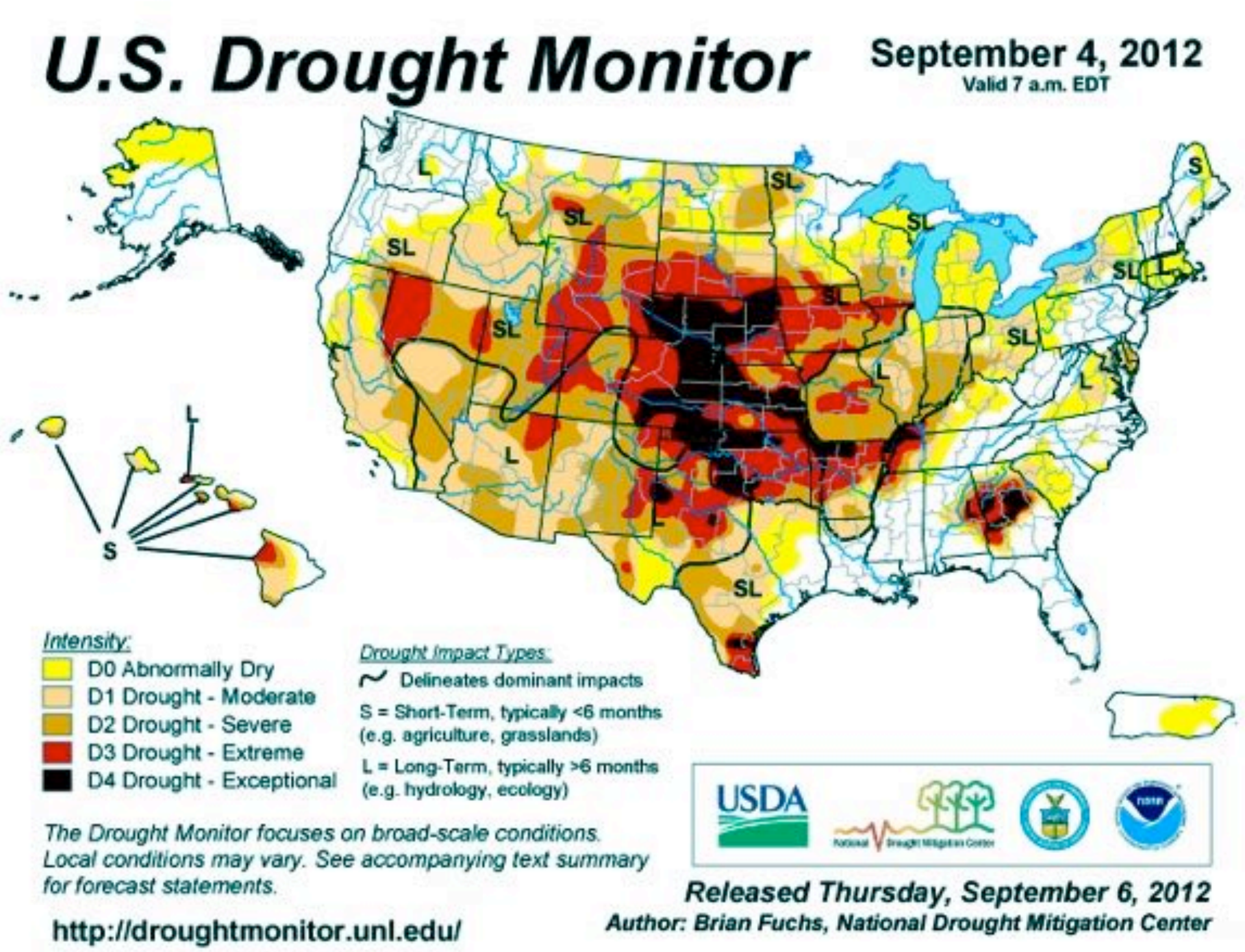
The Planet is Facing A Water Crises

A recent government survey showed at least 36 states are anticipating, or already experiencing, local, regional, or statewide water shortages

Drought Monitor

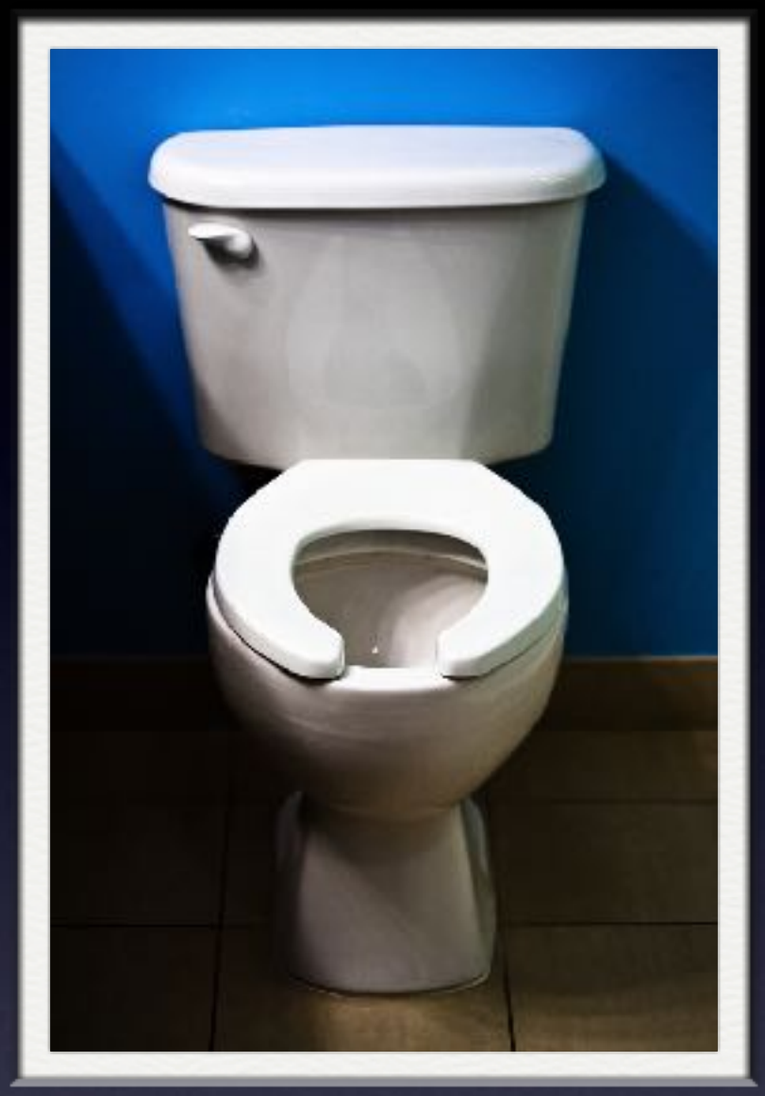
Launch USDM

http://www.drought.gov



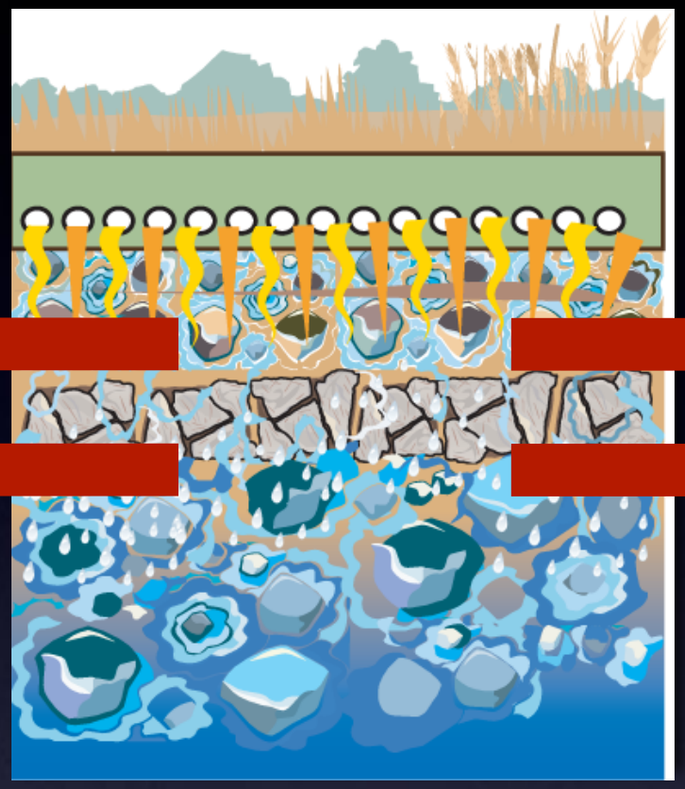

We're for
Water℠

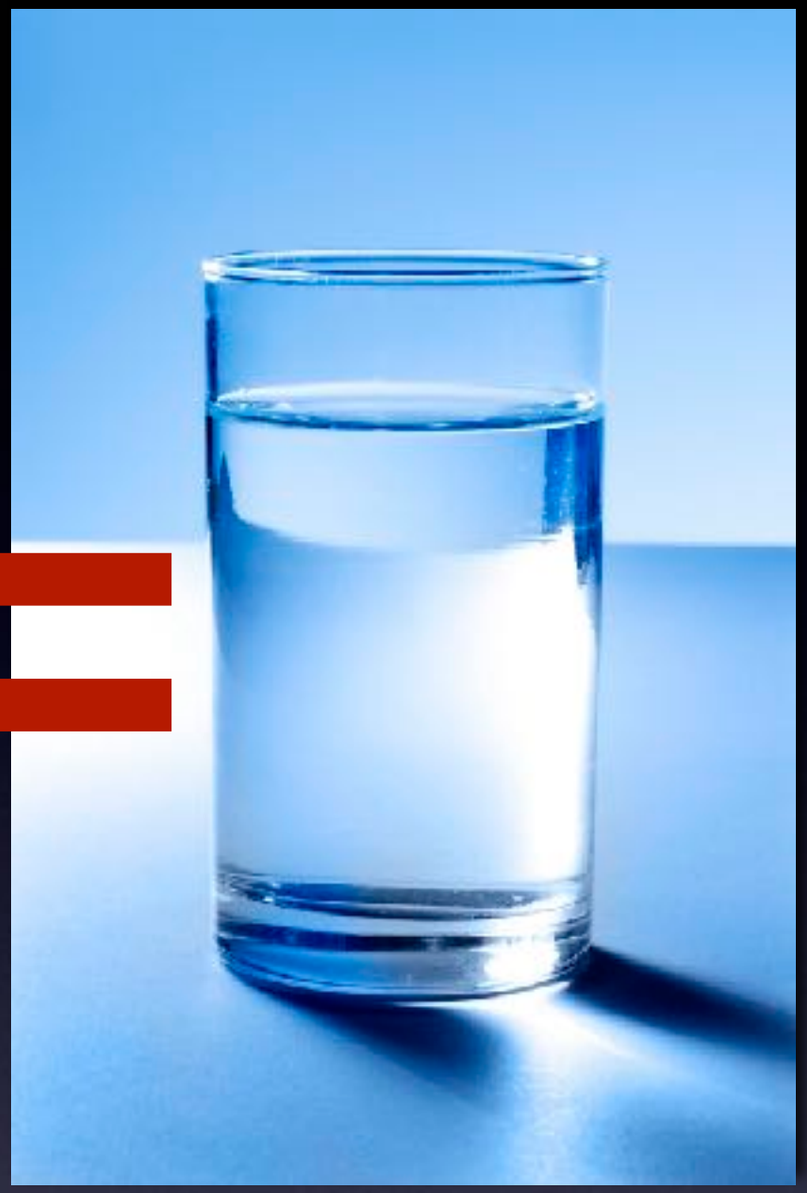
Where Does ‘It’ Go, When You Do?



- Soils
- Groundwater
- Aquifers
- Surface Waters
- Watersheds
- The Great Lakes

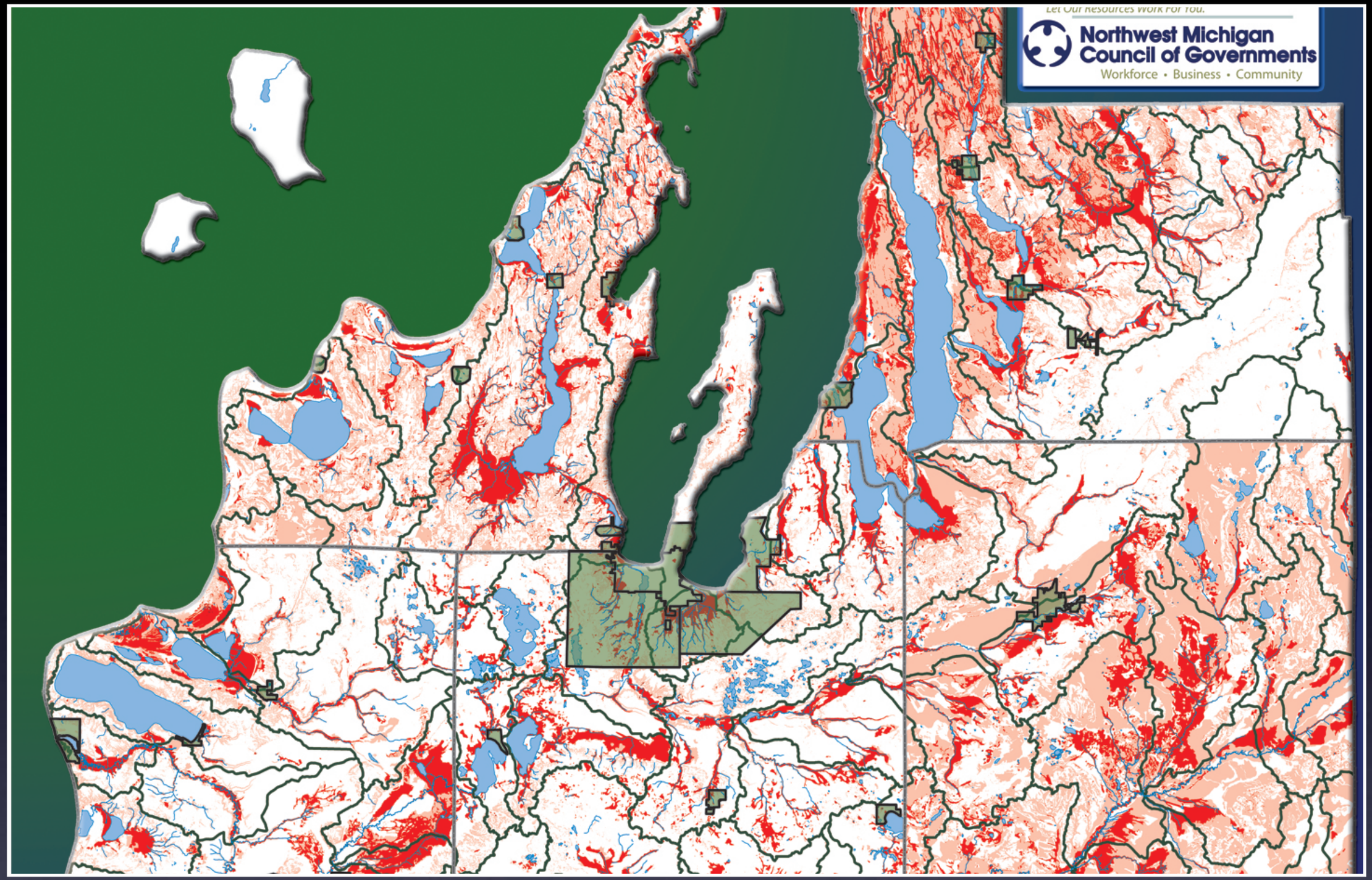
All the water there is, or was, is already here.
You drank from a dinosaur this morning!





Why is this important?

1. Less than **1%** of Great Lakes Basin waters are renewed annually.
2. A majority of us rely on the Lakes or groundwater drinking water wells.



This is what the glaciers blessed us with
a landscape of hills, rivers, valleys, streams
- a conventional collection system nightmare!

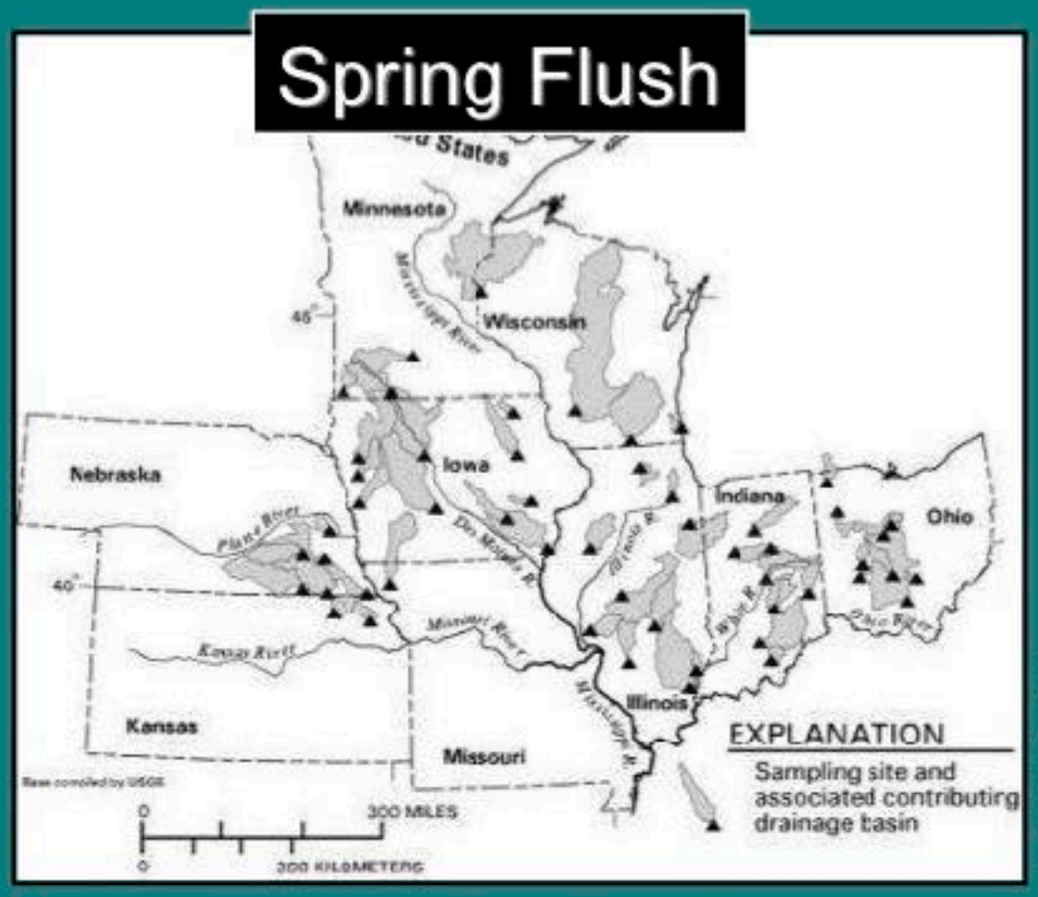

We're for Water
www.waterislife.net
www.liquidassets.psu.edu

Hydrologic Events

Env'l Health Risk of Natural Disasters

Cedar Rapids, IA

Midwest Floods, Spring '08



21 herbicides, 27 degradates, 36 antibiotics in 51 Midwest Streams

USGS

Scribner et al., 2003

http://www.thestar.com/ajax/photoplayer/1293304--photos-flooding-in-england

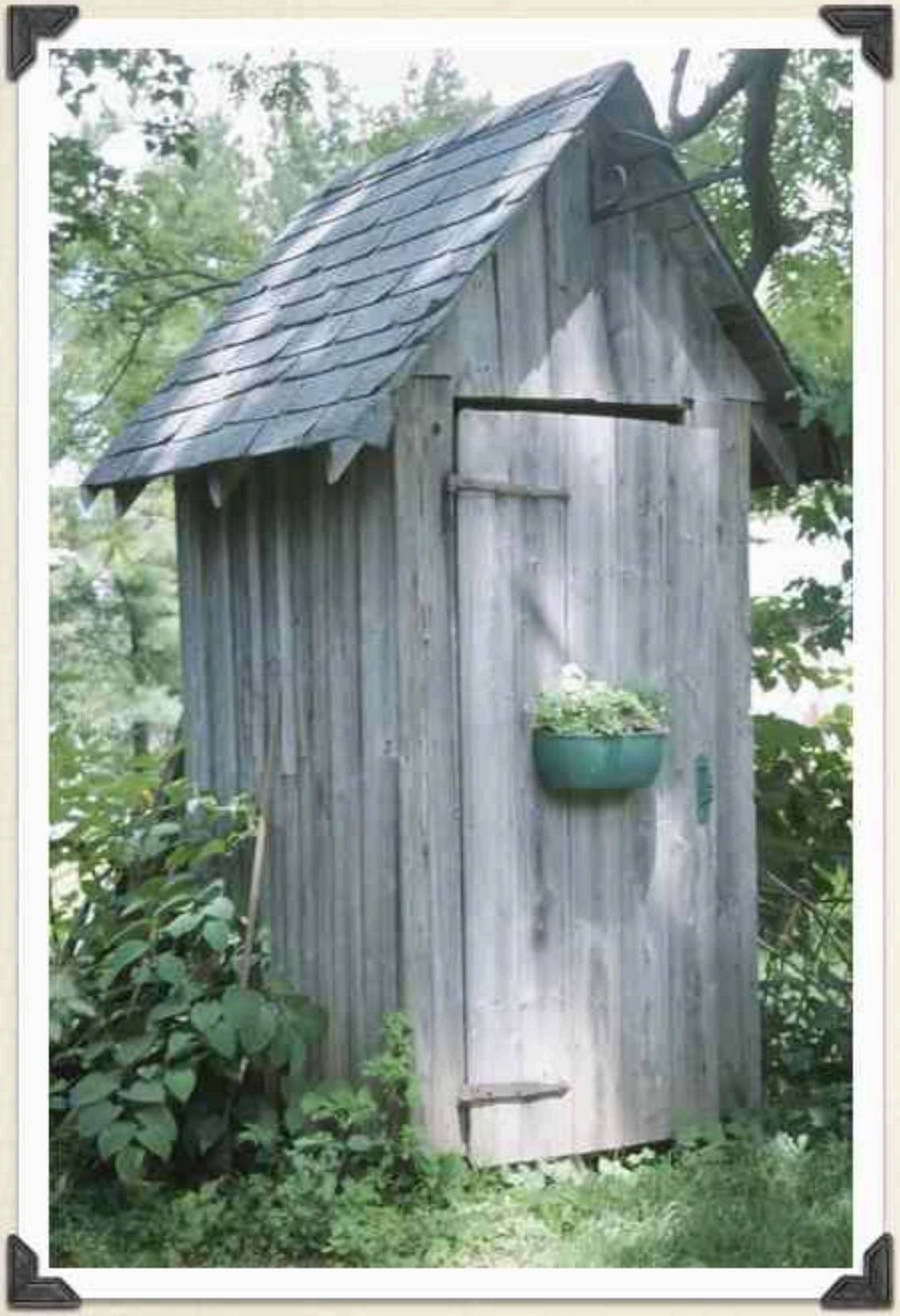
http://www.bbc.co.uk/news/uk-20851043

In the face of potential catastrophic, system-wide failure, built in decentralization makes absolute sense and is being actively pursued by major cities in Europe especially those on the seaboard facing future innundation of major water infrastructure systems as climate change raises sea levels …….

And if we need reminding of why the strongest forces in nature is water ……. make a note of this!

http://www.youtube.com/watch?v=y5MaEVK1fLg

Unsewered areas should not be viewed, or treated, as second class

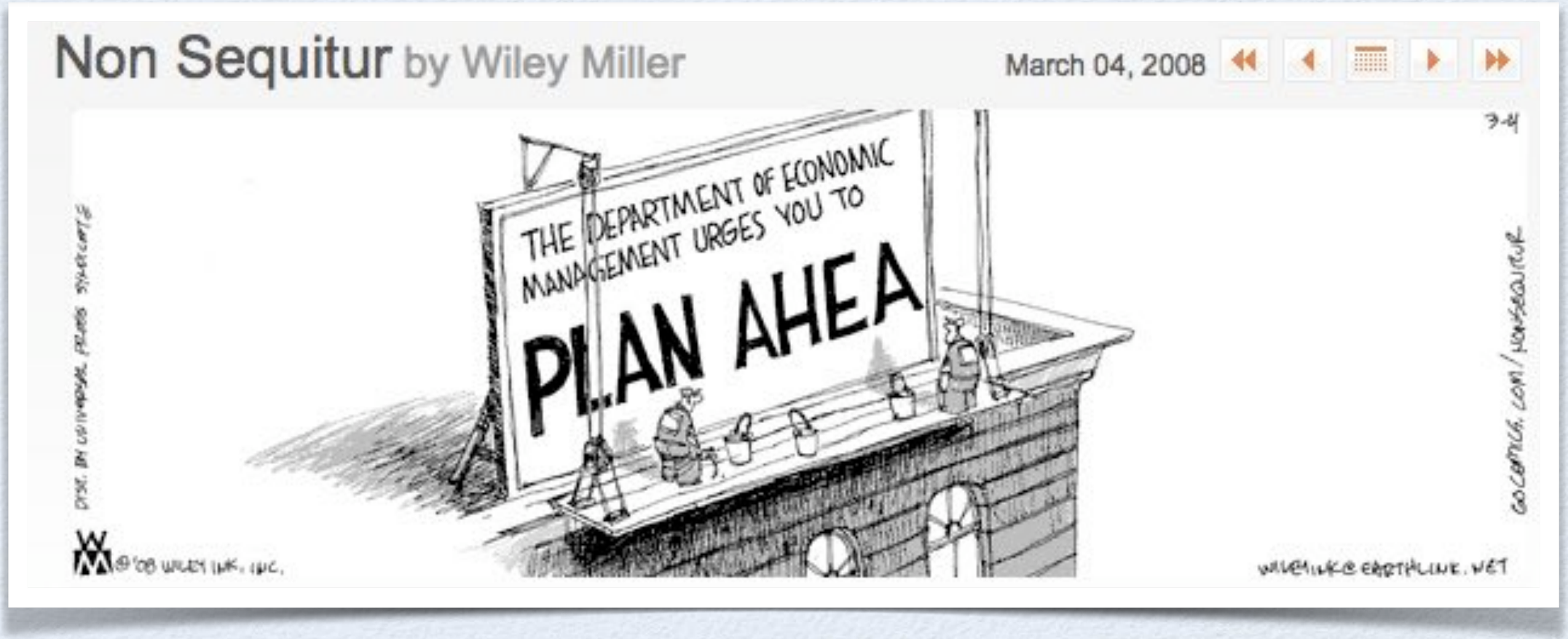


WHAT IS YOUR OPINION ABOUT SEPTIC SYSTEMS?

They are not a backwoods solution until 'the sewer' arrives.

Does the word 'septic' still have any real meaning?

Credit to: the excellent Non Sequitur!!



New Concepts for Rural, Urban and Suburban Water Reuse Using Distributed Systems

Victor A. D'Amato, PE

TETRA TECH

21st Century water management

Aerial view of a typical wastewater treatment plant

Old paradigm

- *–Highly specialized*
- *–Centralized*
- *–Segregated*
- *–Linear*
- *–Extractive*
- *–Inflexible*

New paradigm

- *–Multifunctional*
- *–Decentralized*
- *–Integrated*
- *–Systemic*
- *–Restorative*
- *–Adaptive*

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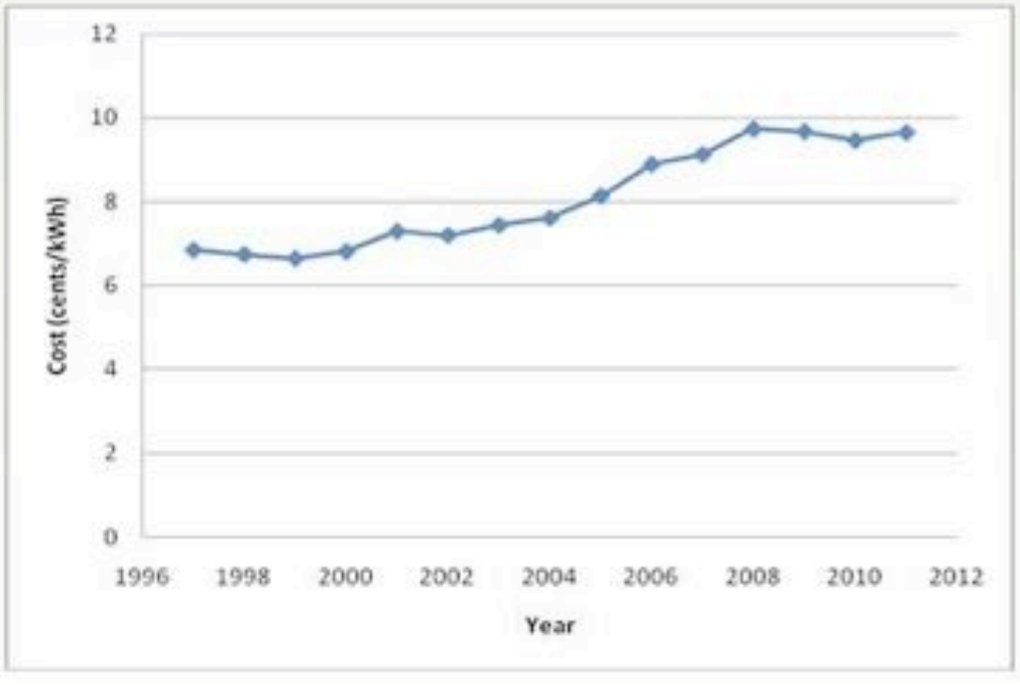
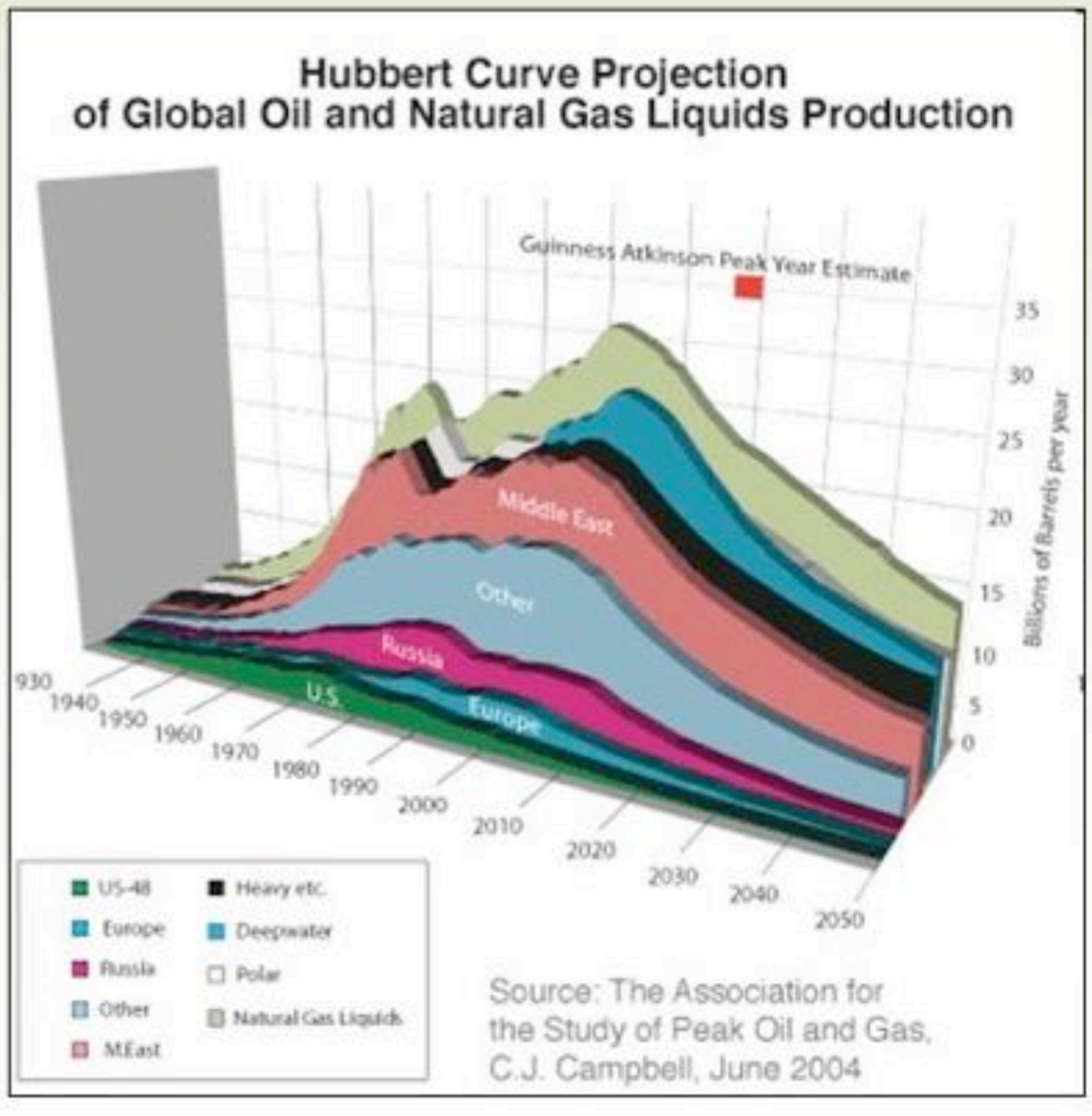
21st Century energy-water challenges

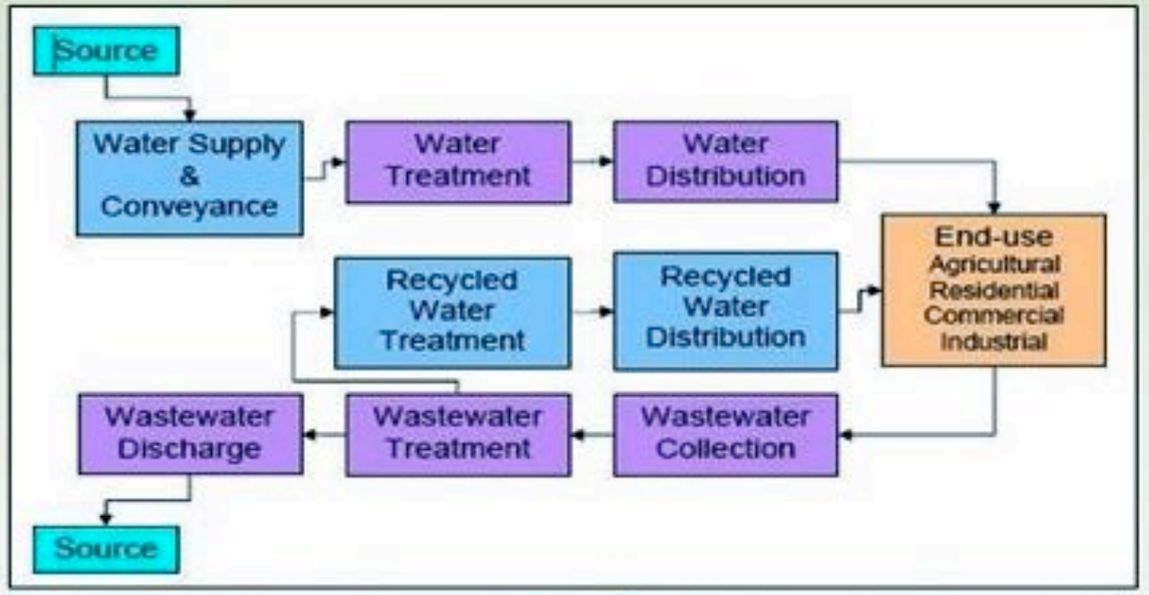
- **Energy supply**
  - Supply constraints
  - Increasing and volatile energy costs





Energy implications of water infrastructure

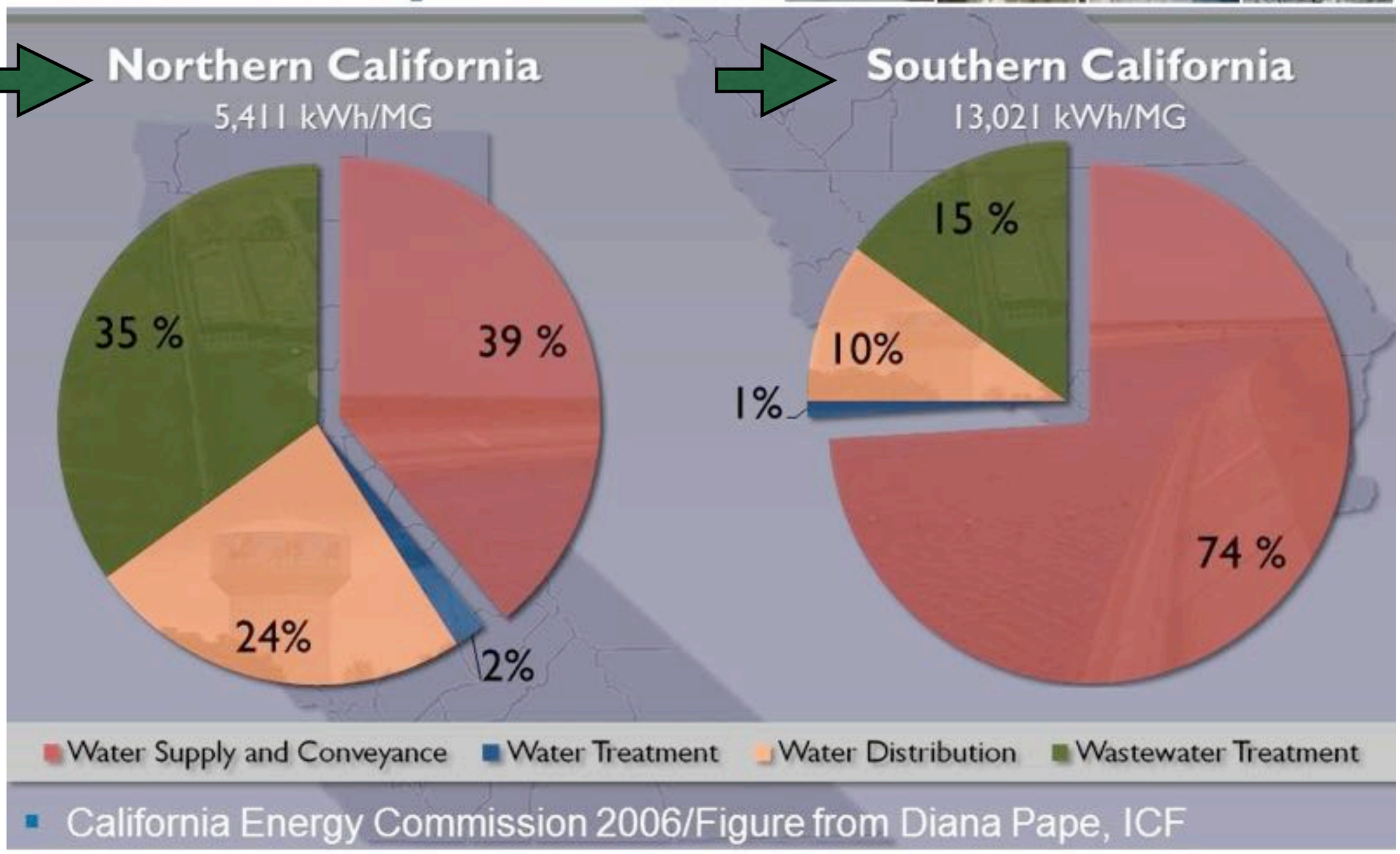
- Recurring (operational) energy demand
- Embedded (life cycle) energy
- Secondary energy impacts
- Recovered energy
  - Biological
  - Thermal
  - Gravitational



Water Use Cycle Segments	Range of Energy Intensity (kWh/MG)	
	Low	High
Water Supply and Conveyance	0	14,000
Water Treatment	100	16,000
Water Distribution	250	1,200
Wastewater Collection and Treatment	700	4,600
Wastewater Discharge	0	400
Total:	**1,050**	**36,200**

The Carbon Footprint of Water, by Bevan Griffiths-Sattenspiel and Wendy Wilson www.rivernetwork.org

Water-related energy use varies by locale



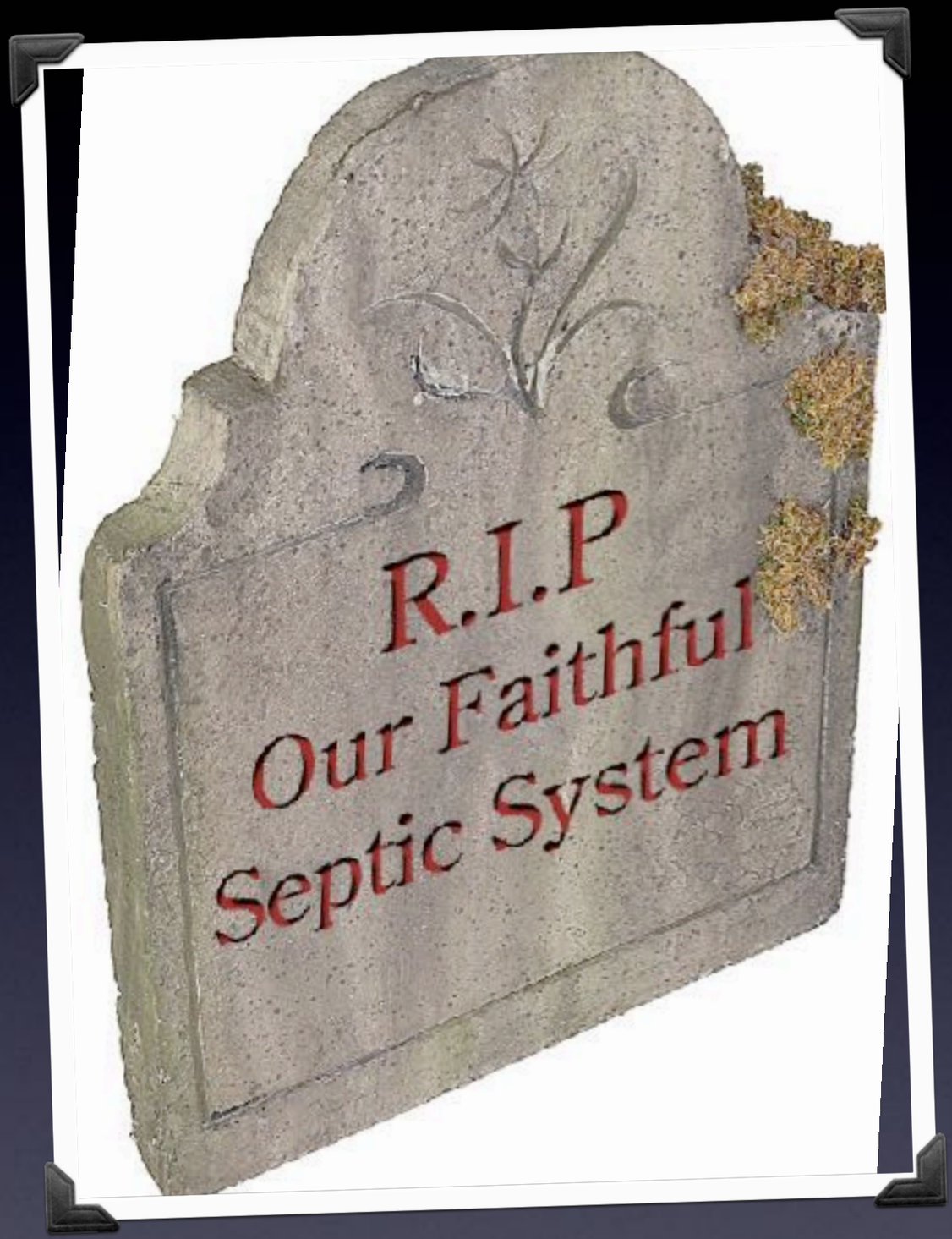
- California Energy Commission 2006/Figure from Diana Pape, ICF

American public water supply and treatment facilities consume 56 billion kilowatt-hours (kWh) per year

— enough electricity to power more than 5 million homes for an entire year.

Furthermore, up to 80% of that energy is used just to move water in both public and private systems

Wastewater treatment is part of The Water Cycle

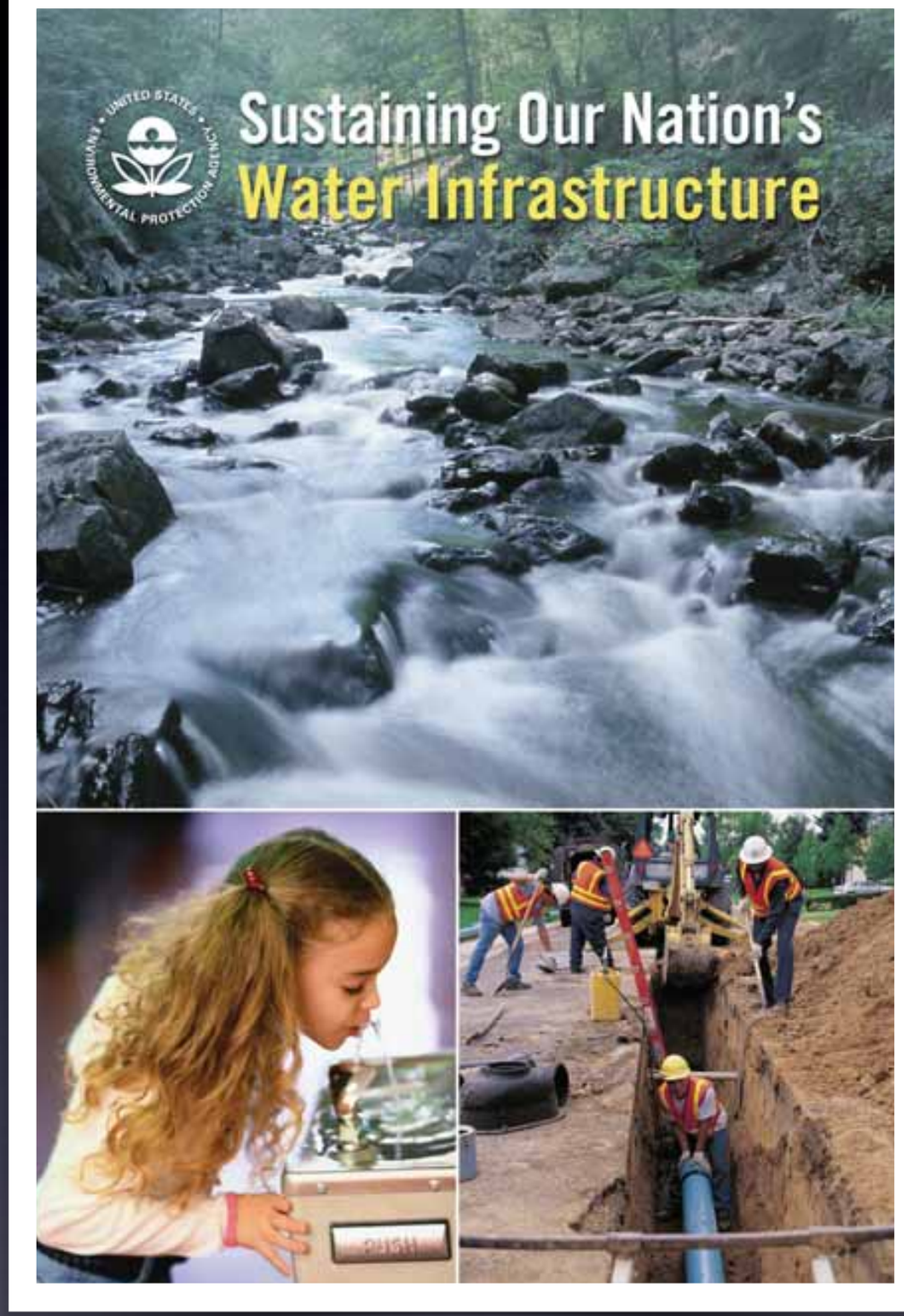


A properly operated and maintained system will last at least 20-30 years.

USEPA: communities of less than 10,000 are better served by, and are better able to afford to maintain, small community sanitary sewering systems which use onsite or cluster technology - <u>especially with an aging demographic.</u>

Surface water integrity is most affected in rural areas by:

- stormwater run off,
- fertilizers and
- Combined Sanitary Sewer Overflows.



WasteWaterEducation.org - free Podcasts

WELCOME TO

ON THE BLACKBOARD COLLABORATE PLATFORM

Blackboard Collaborate 11

USGS
science for a changing world

Pharmaceuticals in the Environment: Better *Defining the Questions we need to Answer*

Herb Buxton
USGS Toxic Substances Hydrology Program

U.S. Department of the Interior
U.S. Geological Survey

If the average repair life of a municipal sewer is 20 years .....

Water and wastewater utilities must plan to invest billions of dollars over the next 20 years, according to estimates from the U.S. Environmental Protection Agency and the Congressional Budget Office.

Nationally, the projected costs range from $485 billion to nearly $1.2 trillion. Each community will need to determine how to pay for this.....

www.liquidassets.psu.edu

If the projected costs range from $485 billion to $1.2 trillion .....

It begs the question .....

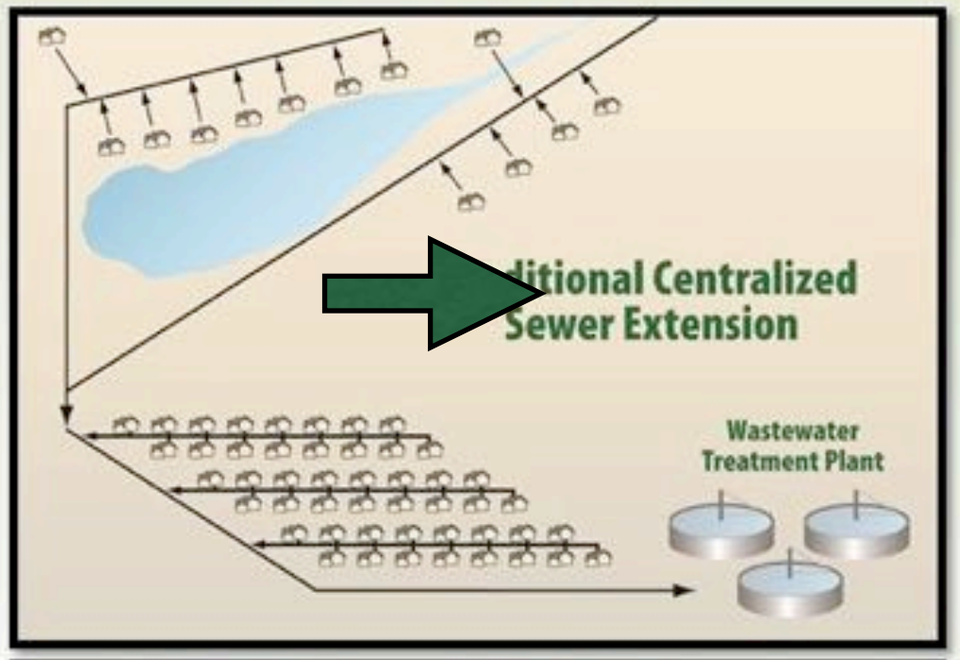
Isn't it time to rethink how we provide water systems?

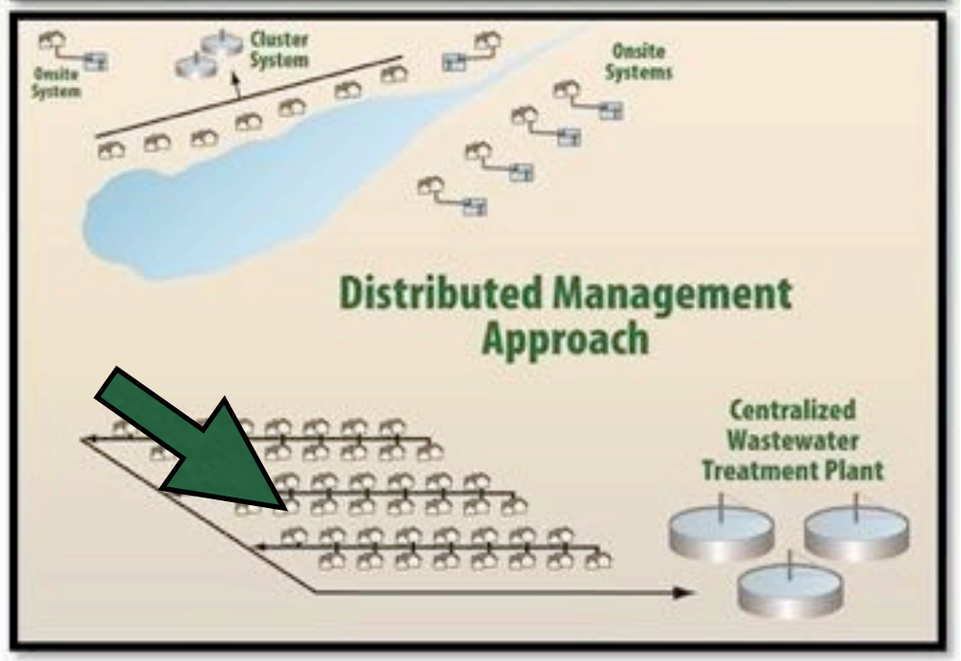
Decentralized systems are not your grandpa's septics!

Economies of scale: is bigger better?

Efficiency

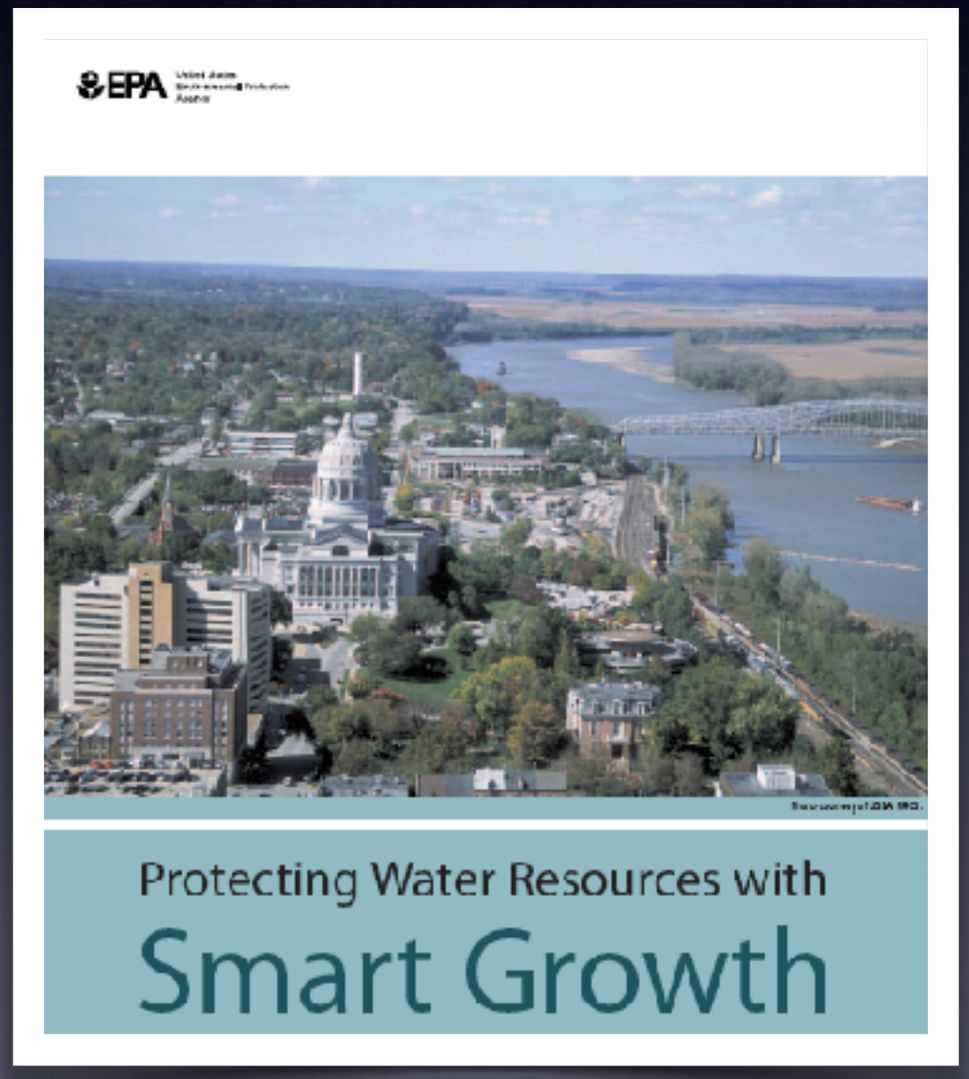
- Treatment close to the source and/or reuse requires less energy
- Urban reuse retrofits more feasible
- Source control is energy efficient
- Smart, clean and green technology
  - Smart
    - Remote monitoring of multiple systems
    - Responsive user feedback
  - Clean
    - Resource recovery within facilities
    - Match water quality to intended reuse
  - Green
    - Efficient eco-mimicking systems
    - Landscape/facility integration
    - Infiltration-resistant collection systems

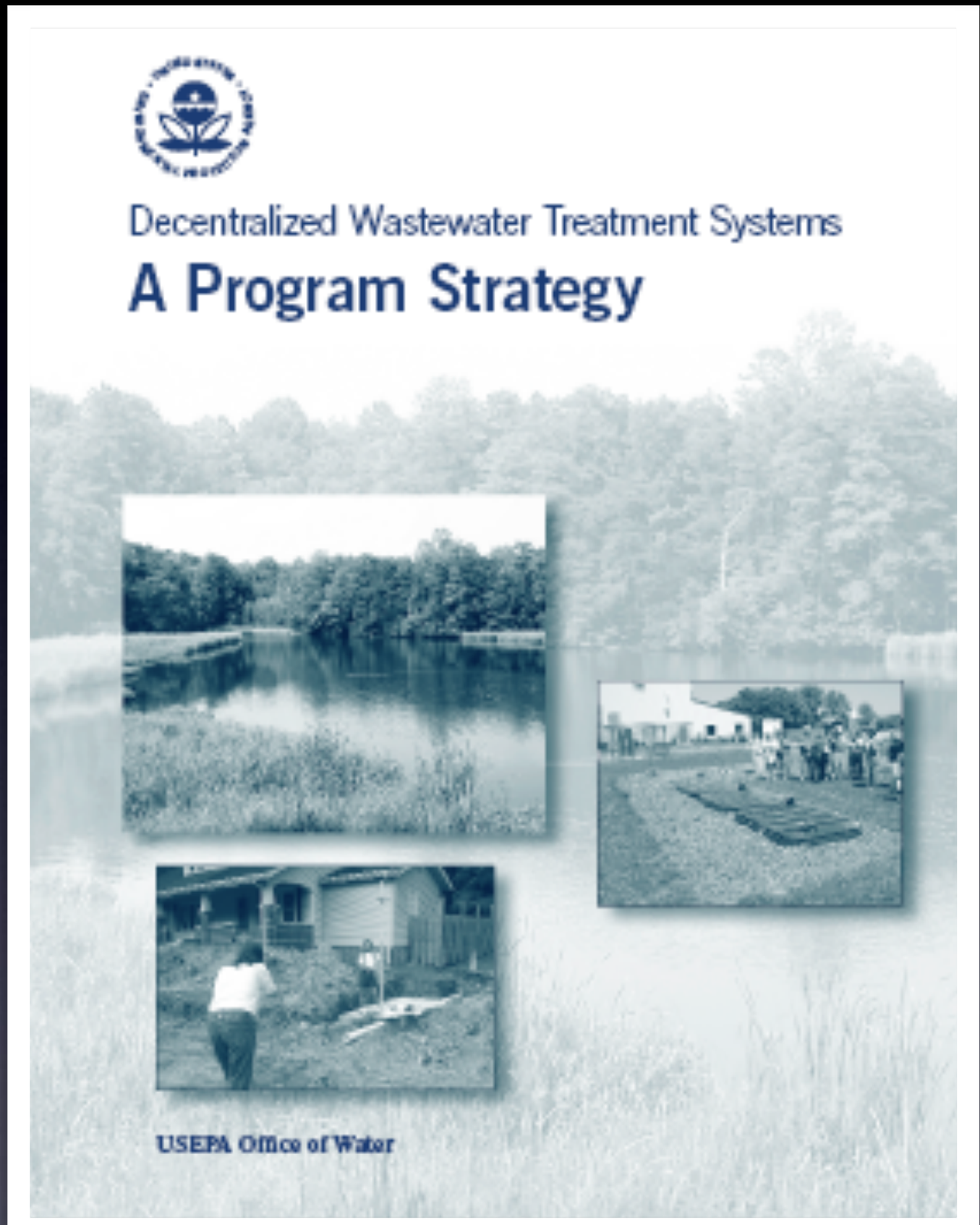




"Vision, without implementation, is hallucination"

- General Colin Powell





Decentralized infrastructure provides REAL community control:

- Lower initial capital costs
- Capacity designed for today's needs- opportunity to expand as demand and income allows
- Lower debt repayment and maintenance costs
- Ability to maximize benefits through integration of water and energy
- Recharging source aquifers
- Reduced need for expensive future repairs and replacement due to over capacity transmission systems

We are borrowing our water from our past.....

Are we stealing it from our future???

Education is key to integrated water resource management and designing systems we can afford.

Water Environment Research Foundation

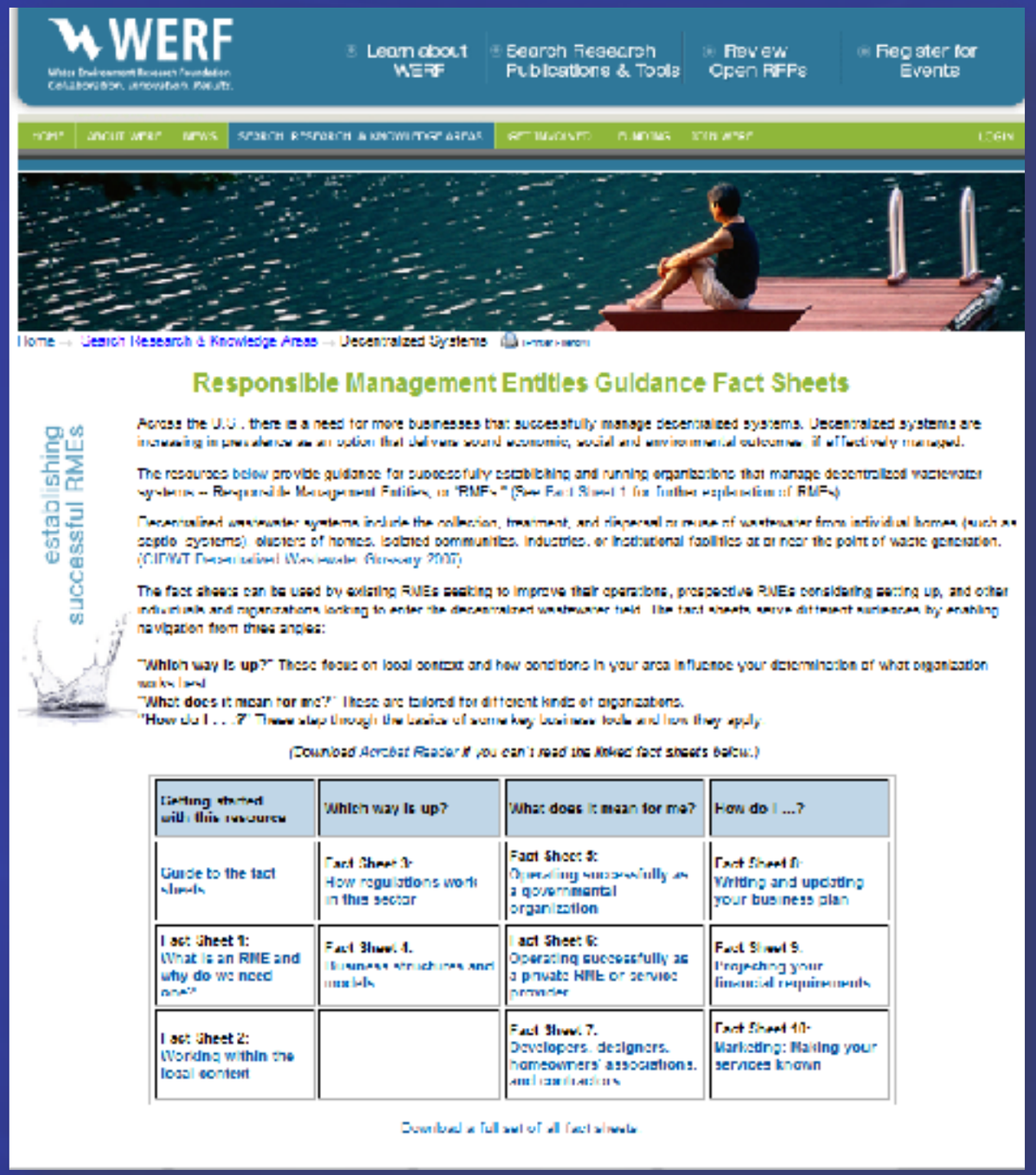
21st Century Tools for Communities

Jeff Moeller, P.E., WERF

WERF
Water Environment Research Foundation
Collaboration. Innovation. Results.

Research Highlights

- **Management, Economics, and Policy**
  - *Business Attributes of Successful Responsible Management Entities*
  - *International Issues and Innovations in Integrated and Decentralized Water Resource Infrastructure*
  - *Overcoming Barriers to Evaluation and Use of Decentralized Wastewater Technologies and Management*



RMEs

Guidance for Establishing Successful Responsible Management Entities

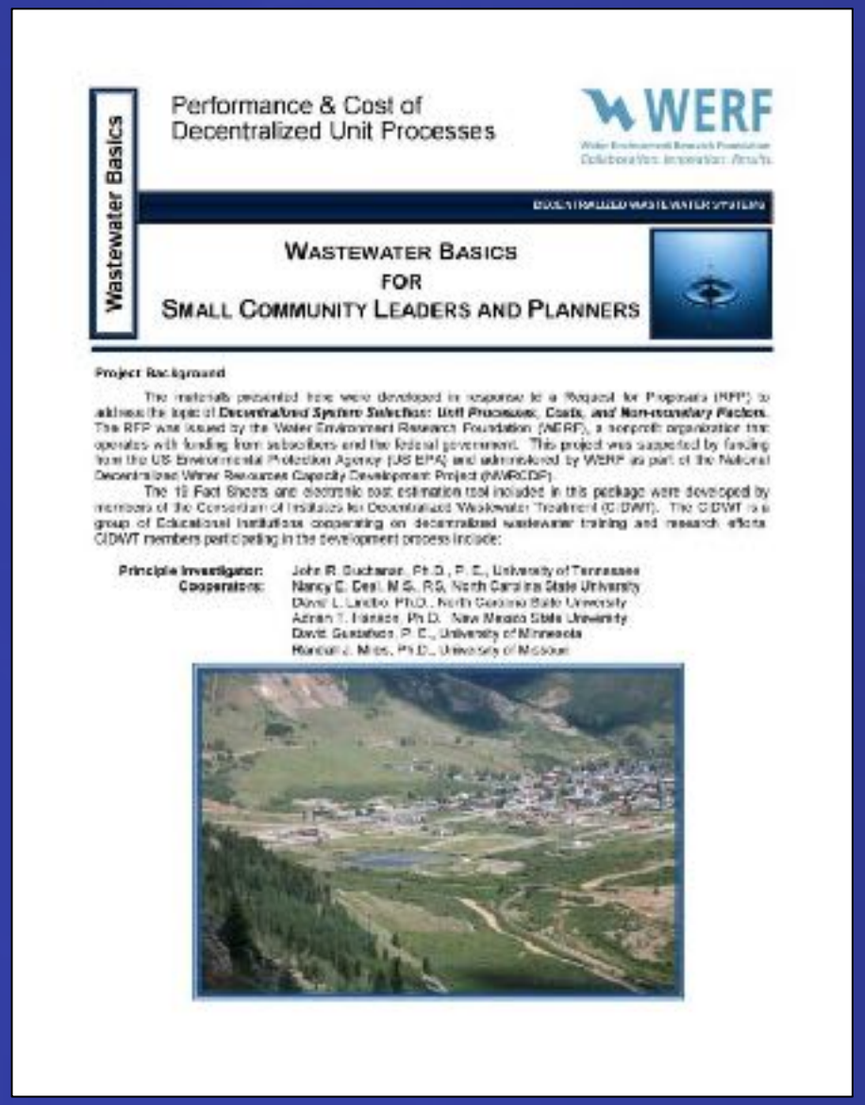
- Professional management ensures performance and reliability of decentralized systems
- Responsible management entities (RMEs) are a successful management model
- A website was created to provide all the resources needed to establish an RME

www.werf.org/RME

Performance & Cost

Performance and Costs of Decentralized Systems

- Provides basic wastewater management information to planners and decision-makers in very small communities
  - Mayor Smith



www.werf.org/decentralizedcost

Products:

- Factbook
  - Wastewater Basics for Small Communities
- Factsheets
  - Collection systems (4)
  - Treatment systems (8)
  - Dispersal/disposal systems (7)
- Spreadsheet
  - Economic model of wastewater options

Outreach

SEARCH

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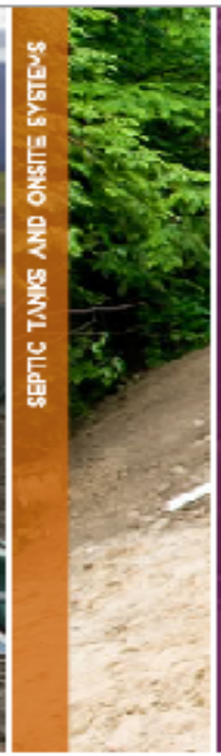
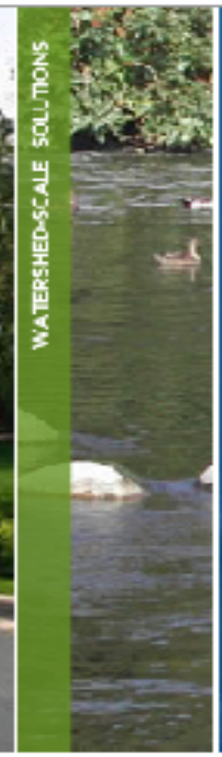
Decentralized Water Resources Collaborative

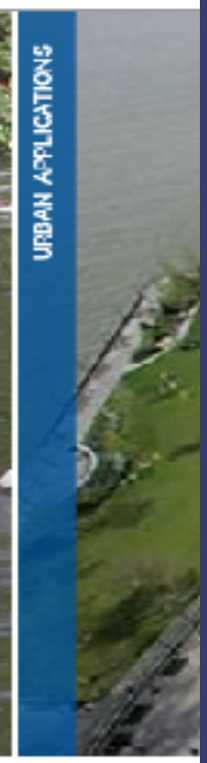
www.decentralizedwater.org

NEIGHBORHOOD AND CLUSTER SYSTEMS

Engineers are making advances in remote sensing and monitoring of unmanned facilities. New treatment technologies such as membrane bioreactors are becoming more economical. Neighborhood and cluster wastewater systems are taking advantage of this technological progress and becoming more attractive as long-term, viable alternatives to traditional centralized wastewater treatment. Decentralized Collaborative is providing information on case studies, monitoring, performance, cost, and other aspects of these systems so we can learn from the past and improve the future.







Keeping it Local

Individual and neighborhood wastewater treatment systems. Rain gardens and green roofs. Water-efficient appliances and landscaping. These are examples of decentralized water technologies in action. These systems can beautify cities and towns, enhance water supply, recover energy and nutrients, provide local reuse opportunities, and improve health and the environment.

The Decentralized Water Resources Collaborative (DWRC)

Featured Projects:

- Influent Constituent Characteristics of the Modern Waste Stream from Single Sources
- New Approaches in Decentralized Water Infrastructure
- Guidance for Establishing Successful Responsible Management Entities
- Hydrologic Bioretention Performance and Design Criteria for Cold Climates

Register for Updates

First Name:

Last Name:

Organization:

Email Address:

Submit

When to Consider Distributed Systems in Urban and Suburban Areas

- Water Environment Research Foundation (WERF) funded research project
  - Identify examples of distributed infrastructure approaches in areas where traditional approach would be centralized
  - Study critical path details and decision processes for how these projects were planned and implemented
  - Set forth information using case studies, tools and other communications pieces that help communities make decisions
- Products
  - Case studies and white papers
  - Excel- based MCDA decision-support tool

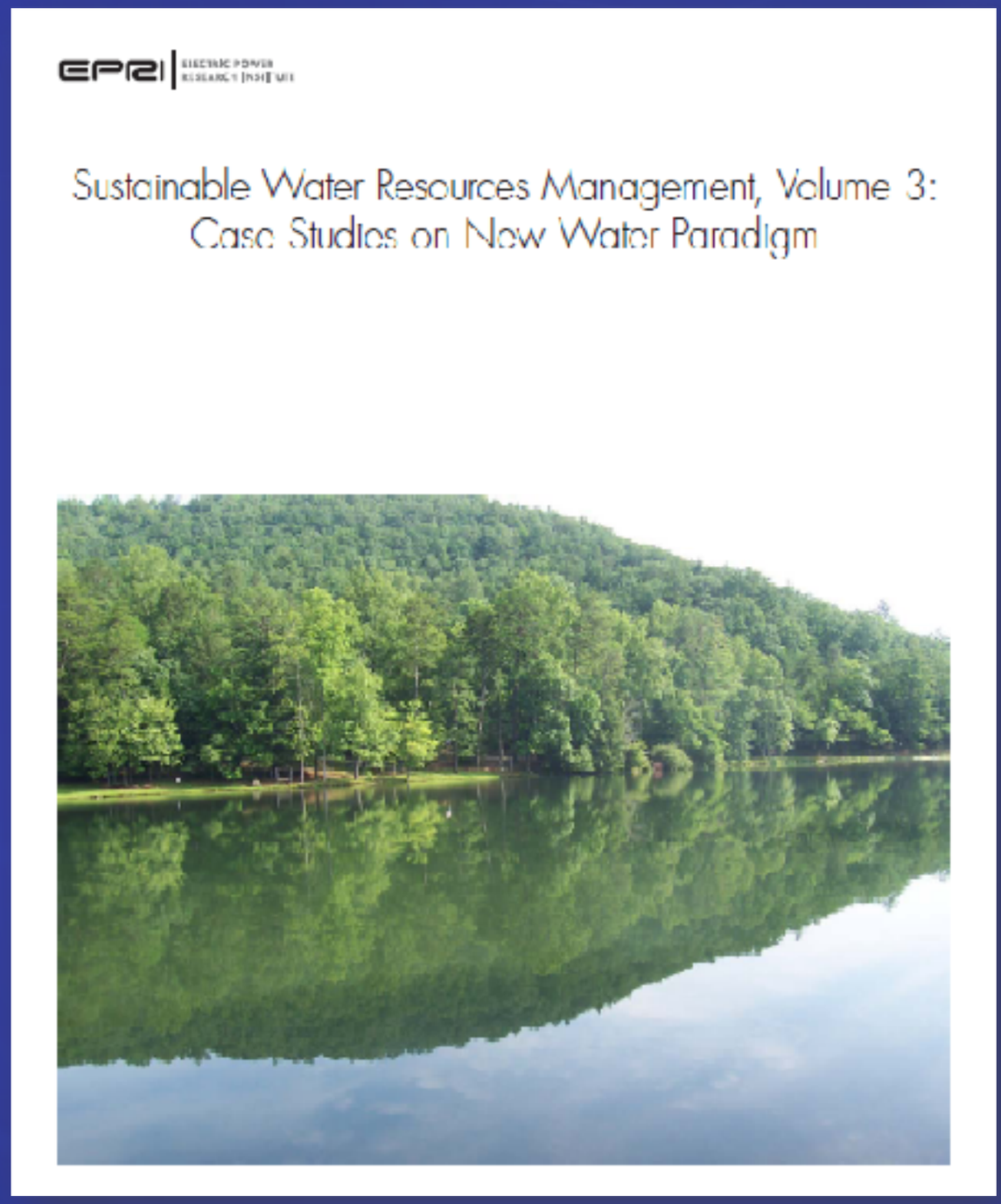
http://www.werf.org/i/c/Decentralizedproject/When_to_Consider_Dis.aspx

New Water Paradigm

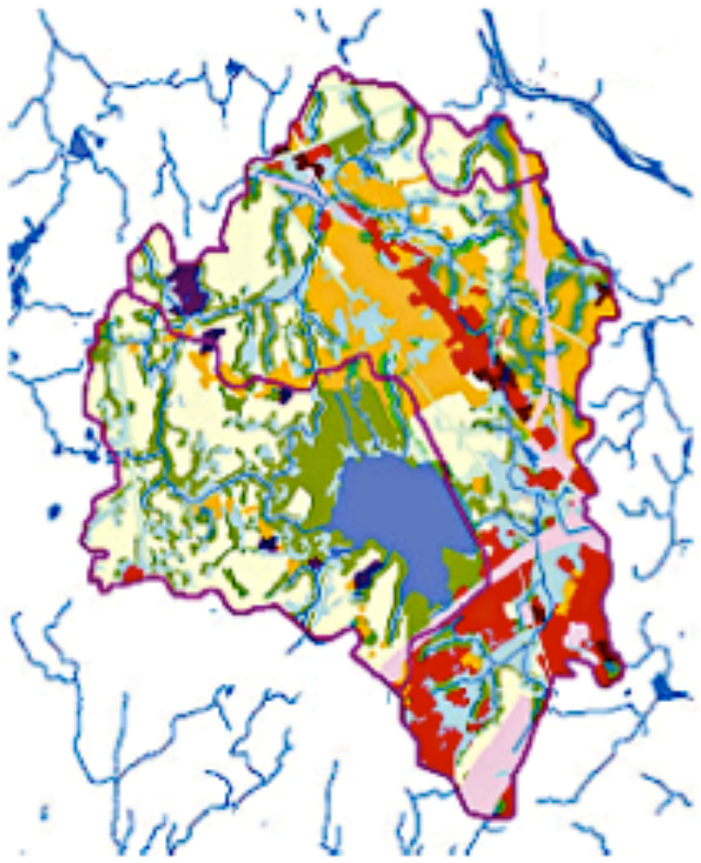
Case Studies on New Water Paradigm

- Creates a platform for communities to overcome challenges through operating under key sustainability principles and practices.

- Uses examples from 2 case study communities (Tucson/ Pima County, Arizona and Northern Kentucky) to offer real world context.



National Decentralized Water Resources Capacity Development Project



Wastewater Planning Handbook

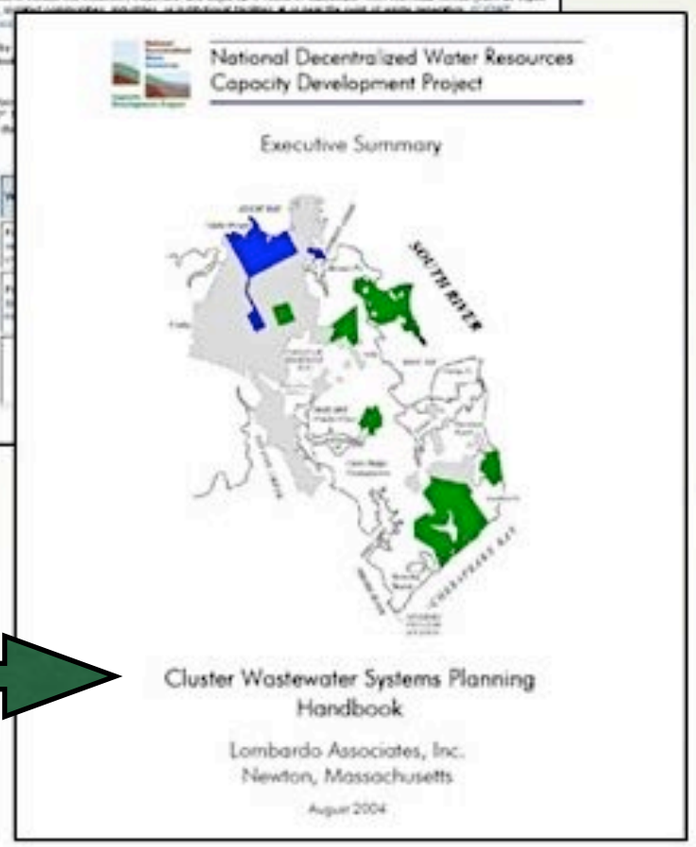
Mapping Onsite Treatment Needs, Pollution Risks, and Management Options Using GIS

University of Rhode Island Cooperative Extension
Kingston, Rhode Island

February 2004

Decentralized Water Resources Collaborative (DWRC)

- Cooperative effort funded by US EPA to support research and development on decentralized wastewater and stormwater systems
  - $16 million for 70+ projects over 13 years
- DWRC partner organizations
  - Water Environment Research Foundation (WERF)
  - Coalition of Alternative Wastewater Treatment (CAWT)
  - Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT)
  - Electric Power Research Institute (EPRI)
  - National Onsite Wastewater Recycling Association (NOWRA)
  - National Rural Electric Cooperative Association (NRECA)



Getting started: matrix

www.werf.org/decentralizedoutreach

- Over 70 projects & products
- Product title – live linked
- Product description
- Year of publication
- DWRC project number
- Target audience
- Tags/keywords

Quick Guide to Research and Products from the Decentralized Water Resources Collaborative (DWRC)

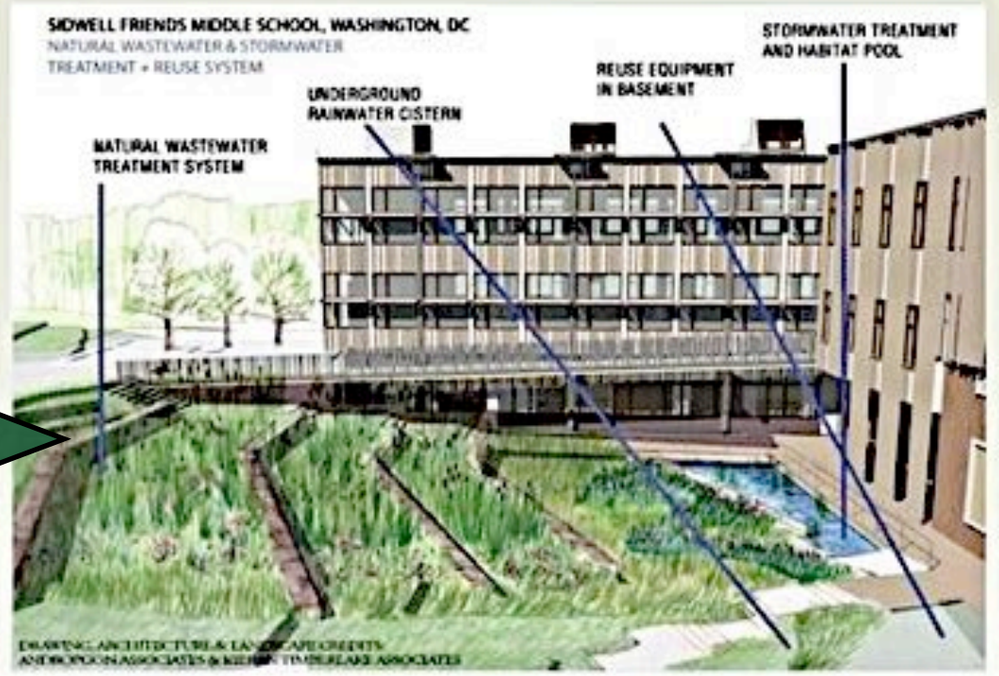
Key to Product Audience:

- Engineers/ Designers
- Scientists/Researchers/ Academics
- Regulators/Elected Officials/NGOs
- Utility Managers/Service Providers/Responsible Management Entities (RMEs)
- Developers
- Planners/Resource Managers
- Vendors/Suppliers/ Installers

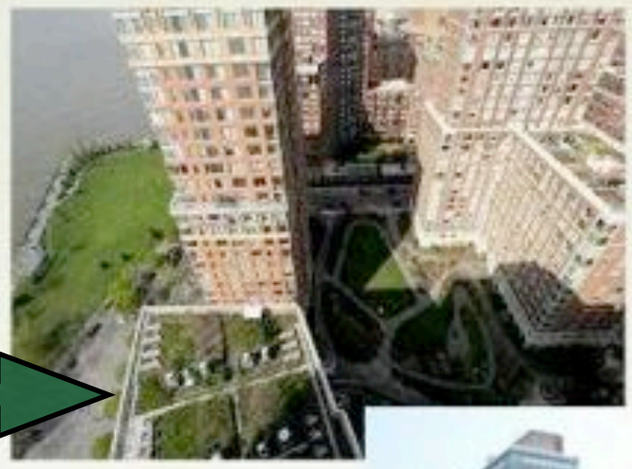
Product Title	Description	Year	Project #	Audience	Tags
ENVIRONMENTAL SCIENCE AND ENGINEERING					
Evaluation of GHG Emissions from Septic Systems	Evaluates data and information on methane and other greenhouse gases from septic systems for more accurate GHG inventories.	2010	DEC1R09		onsite systems, energy and climate change, sustainability, unit processes, planning
Non-Traditional Indicators of System Performance	Describes technologies that can be used in the decentralized field to get relevant real-time information about treatment system performance and water quality.	2010	DEC2R06		emerging applications, regulatory, monitoring, system management, operation and maintenance
Performance and Costs for Decentralized Unit Processes	Provides guidance on the performance of decentralized unit processes and templates for user-directed cost determination.	2010	DEC2R08		unit processes, system costs, performance, decision-making, operation and maintenance
Performance Effects of Water Softener Brine on Onsite Systems: Workshop	Defines research needs to evaluate if there are negative effects to onsite systems from water softener brine, and if so, what can be done to mitigate the problem.	2010	DEC2W09		onsite systems, design, soil treatment unit, unit processes, performance, operations and maintenance, wastewater characteristics
Long-Term Study on Landscape Irrigation Using Household Graywater: Experimental Study (Phase 2)	Provides quantitative data and information to better understand the fate and occurrence of graywater chemical constituents and pathogens and their potential impacts on soil and groundwater quality.	2010	06CTS1C0		water reuse, emerging contaminants, soil treatment unit, wastewater characteristics

Sidwell Friends School, Washington, D.C.

- Highly visible, LEED Platinum
- Integrated design team: Kieran Timberlake Associates LLP, Andropogon Associates LTD, JFW Project Management, CVM Engineers, Natural Systems International
- 3,000 gpd system for wastewater treatment and reuse are exposed and part of the 'working' landscape of the school's entrance courtyard
  - Series of terraced constructed wetland cells
  - Recirculating sand filter
  - Trickling filter
  - Reclaimed wastewater is recycled for toilet flushing and cooling towers
- Stormwater system
  - Rainwater collection
  - Rain gardens with biofiltration
  - Habitat pools for classroom study in the entranceway



Solaire, Battery Park, Manhattan, NYC

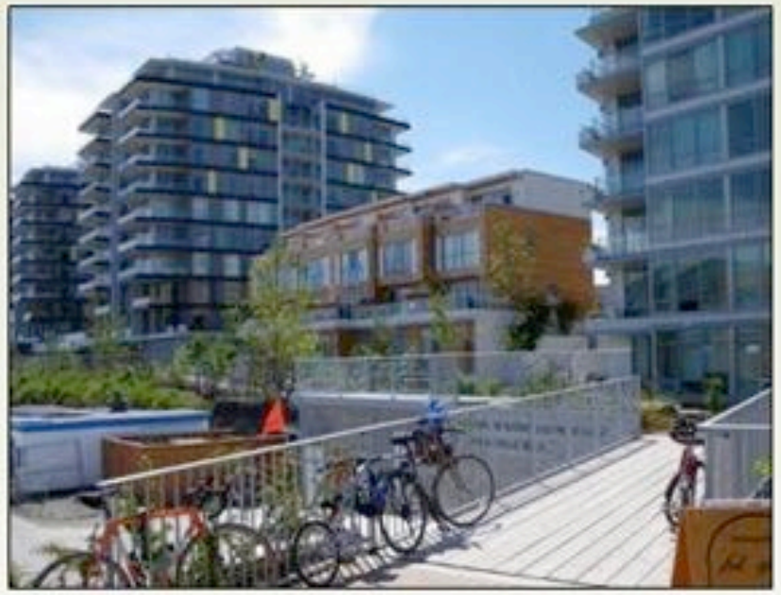


- Decentralized reuse in highly urbanized area
- LEED Platinum
- Green roof filters and captures stormwater
- Wastewater and stormwater treated for reuse
  - Toilet flushing
  - Cooling tower supply
  - Irrigation of park
- 48% reduction in potable water consumption
- 56% reduction in wastewater discharge

Reference – Battery Park City Authority Manhattan Borough, NYC, The Solaire – Alliance Environmental, LLC

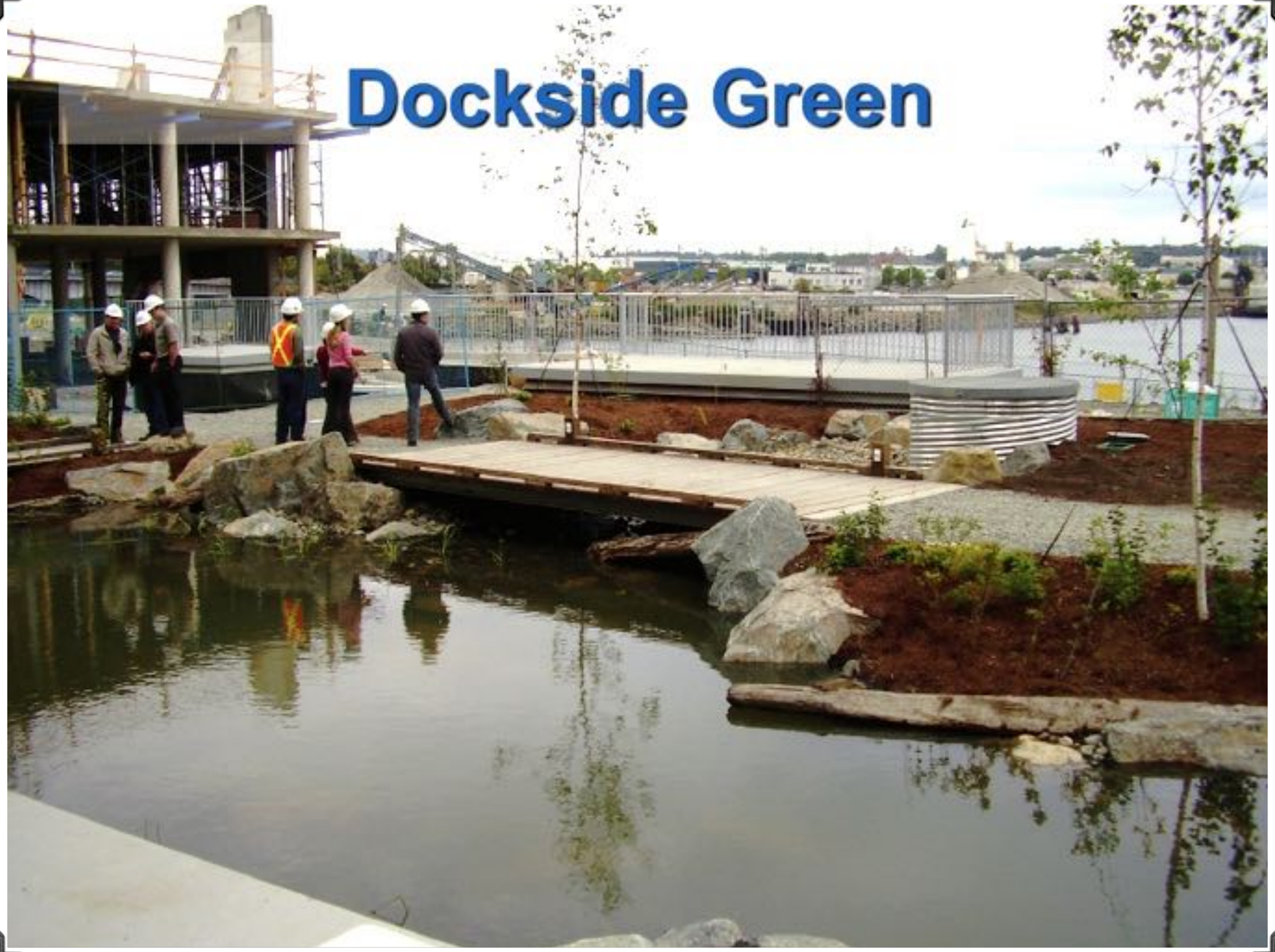
Dockside Green, Victoria, B.C.

- Water-centric brownfield redevelopment based on ***integrated resource management***
- On-site, closed-loop treatment provides ***fit-for-purpose***, reclaimed water supply (augmented by rainwater)
  - Toilet flushing, landscape irrigation, green roof watering, and natural stream/pond
- Stream/pond complex provides residential access, enhancing unit value, ecological function and biodiversity
- On site press for sludge dewatering to produce feedstock for co-located gasification plant
  - Single operations company = reduced staffing, maintenance and commissioning, and travel, reducing impact



Courtesy: Dockside Green and Aqua-Tex Scientific

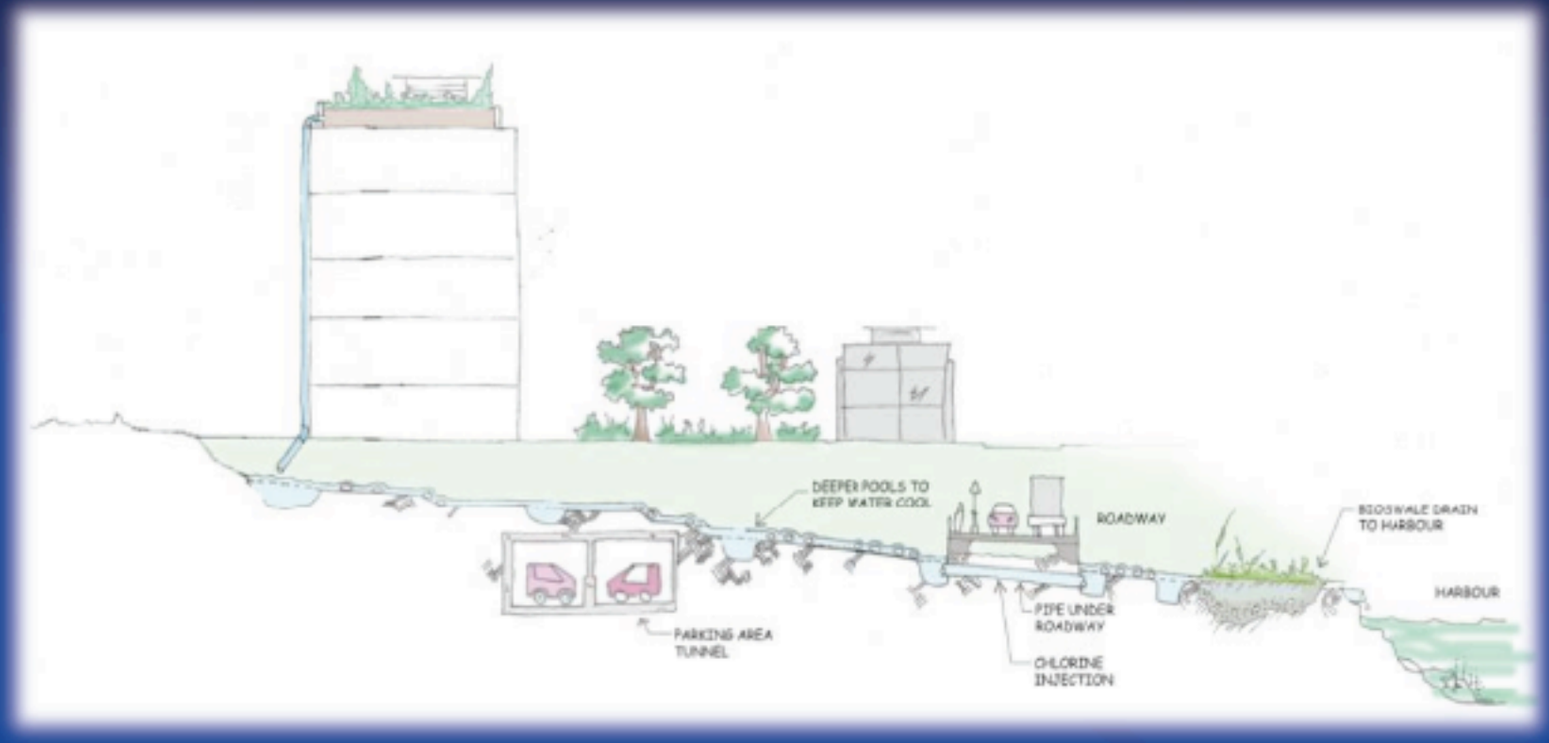
Dockside Green



www.werf.org/distributedwater/

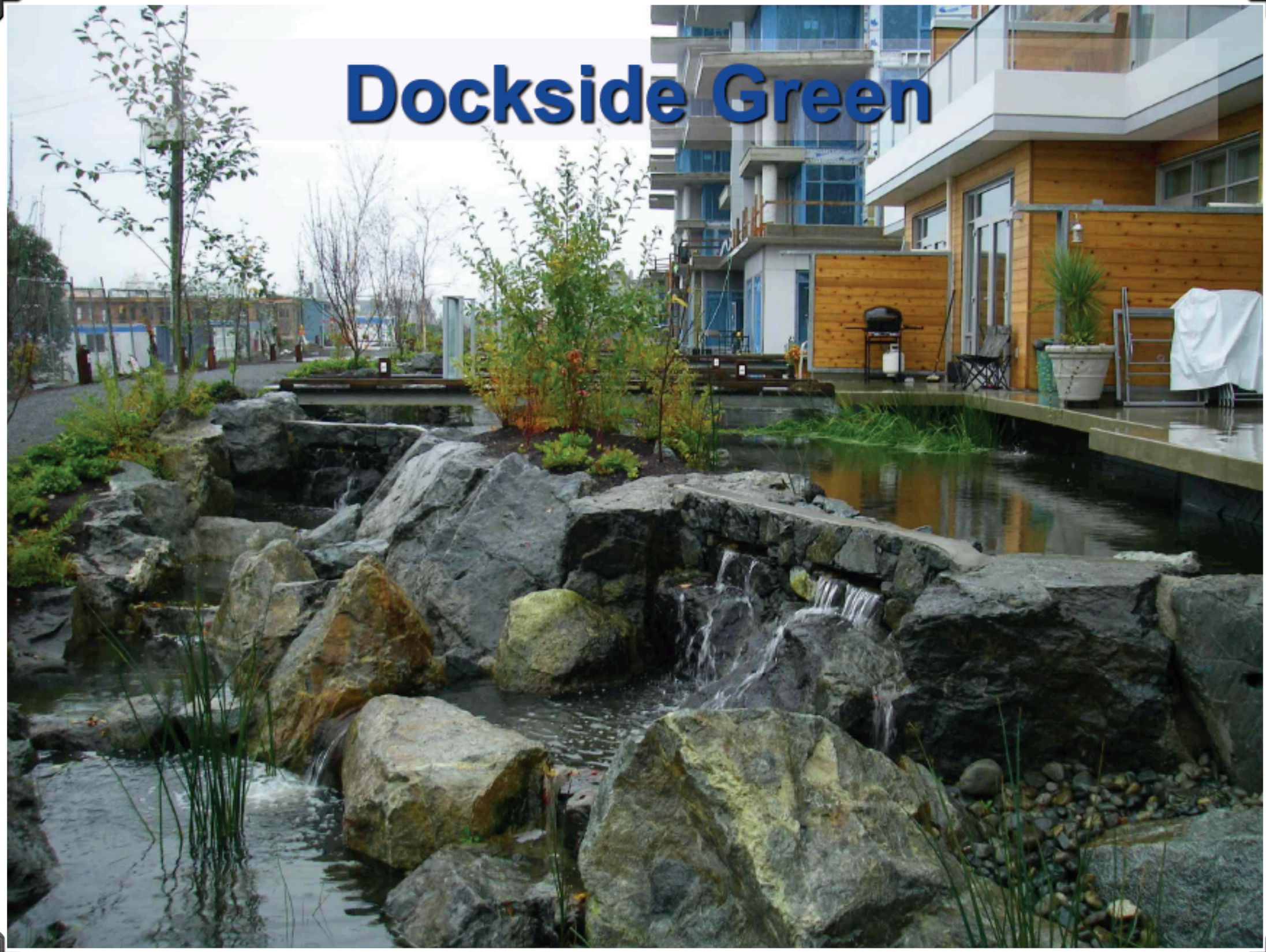
fidelis

Celebrating Water



www.werf.org/distributedwater/

Dockside Green



www.werf.org/distributedwater/

fidelis

Currumbin Ecovillage, Queensland, Australia

- 144 home sites ~7 km from Currumbin Beach on Queensland's Gold Coast, Australia
- ***Closed-loop*** water supply system – disconnected from public water system
- Food producing streetscaping and landscaping
- Intelligent monitoring system (water, gas, electricity) installed at each home

Each house equipped with rainwater tank(s) that supply all potable water used inside the house

- Wastewater centrally treated to Class A+ reuse standards
  - Textile filters, membrane filtration, UV treatment and chlorine disinfection

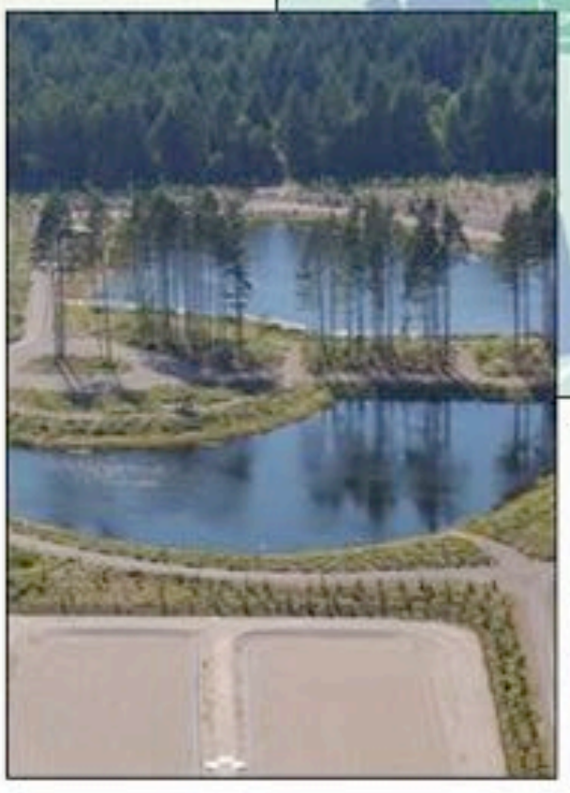
Reclaimed water pumped back to the houses for non-potable uses (> 80 percent recycled water use)

- Toilet-flushing, Garden watering, Car washing, Laundering, Fire fighting

Loudoun Water, Loudoun County, VA

- **Loudoun Water Service Area**
  - Water and wastewater utility for Loudoun County, VA (DC suburb/exurb)
  - Growth pays for growth: developers design and construct facilities to Loudoun Water standards and at no cost to Loudoun Water
- **Shared review and approval responsibilities**
  - Indiv. systems – Local Health review
  - Discharging systems – Loudoun Water & DEQ
  - Cluster systems – Local Health, Loudoun Water, & State Health review
- **Management highlights**
  - RME Level IV (operation) when operating treatment plants for commercial facilities
  - RME Level V (ownership and operation) operating treatment plants for communities
  - Financially self-sustaining via rates and developer paid revenues

LOTT Alliance, Olympia, WA



- **Lacey-Olympia-Tumwater** urban area
- 20-year plan calls for construction of three ***satellite reclaimed water treatment plants***
- Each satellite built in small increments to allow "**just-in-time**" construction for future needs
- **Budd Inlet Plant**
  - 12 MGD advanced secondary treatment with nitrogen removal and UV with 1 MGD fed to reclamation plant
  - Class A Reclaimed Water for irrigation, equipment washdown, dust suppression, cleaning, etc.
- **Hawks Prairie Reclaimed Water Satellite**
  - MBR producing 2 MGD class A reuse water, expandable to 5 mgd
  - Reclaimed water feeds constructed wetland ponds/groundwater recharge basins
  - Public education, recognition, and acceptance of reclaimed water and amenity for visitors

Decentralized Wastewater Stakeholders Decision Model

WERF
Decentralized Wastewater Stakeholder Decision Model

Step 1: Objectives and Their Importance

Reset | Results | Next Step ==>

Objectives	Rate Importance (0 to 5)	Weights
1. Maximize Economic Value		0%
1.1 Minimize Capital Costs	0	
1.2 Minimize Operation and Maintenance (O&M) Costs	0	
1.3 Meet Community Economic Needs	0	
2. Optimize Environmental Benefits		0%
2.1 Improve and Protect Drinking Water Supplies	0	
2.2 Improve and Protect Surface Water Quality	0	
2.3 Assure Water Quantity	0	
2.4 Protect Natural Environment	0	
3. Fulfill Community Objectives		0%
3.1 Quality of Life	0	
3.2 Stability	0	
3.3 Equitability	0	
Total Project		**0.00%**

Minimize Operating Cost – Ongoing costs for running the system and includes many factors such as labor, power, and cost of debt financing. This cost directly affects the user rates because no outside subsidies are available to offset them.

Meet Community Economic Needs – What role does this project play in economically sustaining or enhancing the community? Does it drastically affect property values and does it allow for community-desired commercial business expansion?

Optimize Environmental Benefit

Improve and Protect Water Quality – Most wastewater projects are primarily aimed at protecting water quality by avoiding contamination that denigrates aquatic life and at providing clean water for consumption, ecological improvement, and expanded recreation

Decentralized Wastewater Stakeholders Decision Model

WERF

<== Back | Home | Next ==>

Decentralized Wastewater Stakeholder Decision Model

Step 2: Value the Attributes of Each Objective (Page 1 of 10)

1.1 Minimize Capital Costs

Reducing capital costs may allow a community to make the initial investment to start a project sooner. Decentralized wastewater approaches may help reduce capital costs. Several components of capital costs must be analyzed.

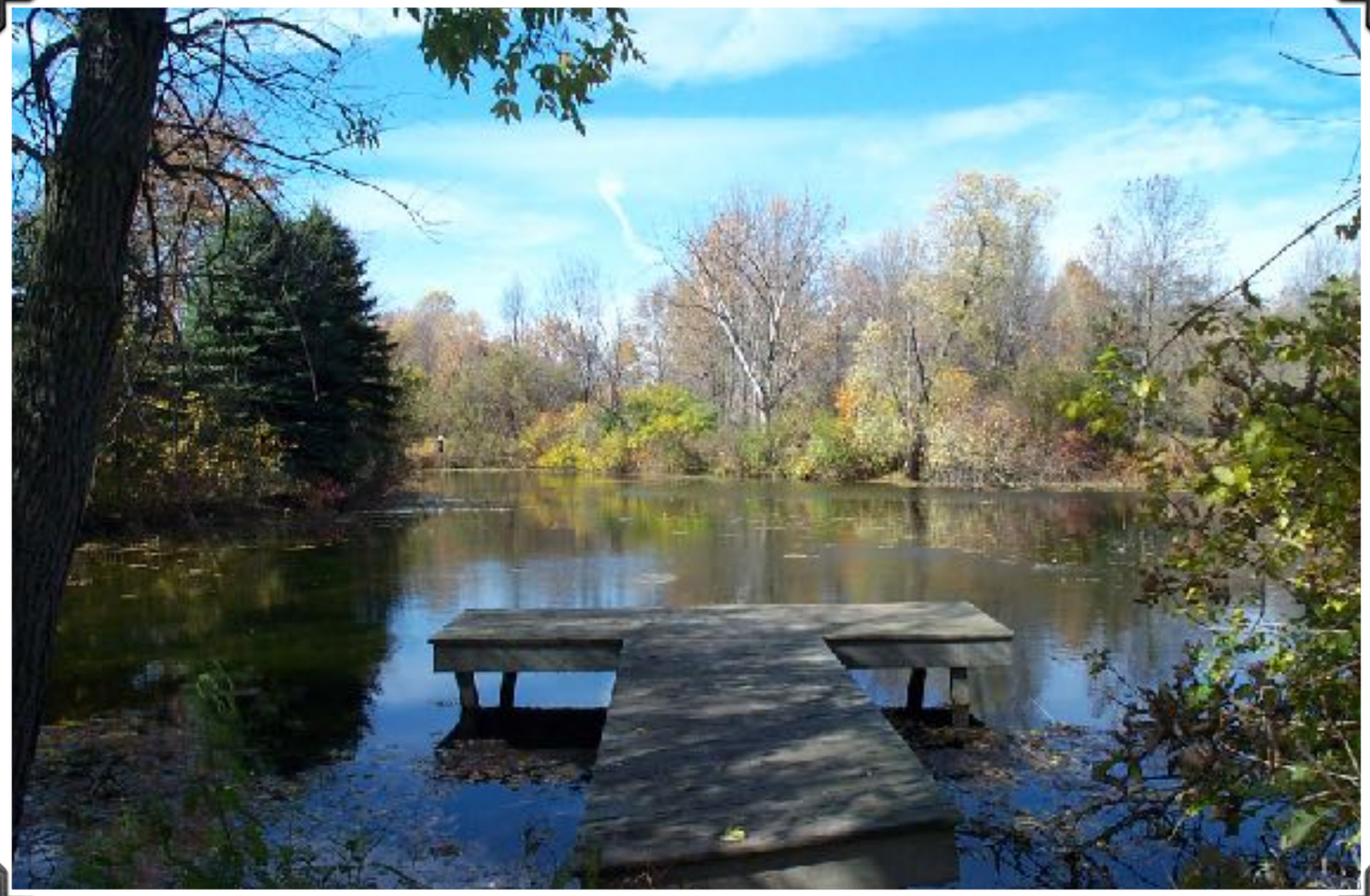
		Strongly Favors Decentralized	Slightly Favors Decentralized	Neutral	Slightly Favors Centralized	Strongly Favors Centralized	Not Applicable
1.1.1. Financing Costs – Can vary significantly over time and between locations and projects; requires careful investigation.	More Info	○	○	○	○	○	◉
1.1.2. Planning and Design - Planning and design costs constitute a larger percentage of the total budget for smaller decentralized wastewater systems. These costs typically are lower for large, centralized projects primarily because of engineers' prior experience with these technologies and some economies of scale, although this will vary significantly depending on the specifics of the project.	More Info	○	○	○	○	○	◉
1.1.3. Construction Inspection – Primarily related to the complexity of the wastewater treatment and collection system, inspection of both centralized sewers and decentralized systems requires fulltime inspectors. The duration of the construction process for decentralized systems, however, typically is much shorter and less disruptive to existing transportation system and community.	More Info	○	○	○	○	○	◉
1.1.4. Land – Composes a significant portion of capital costs unless the land is owned by the municipality or can serve multiple purposes.	More Info	○	○	○	○	○	◉
1.1.5. Phasing – Dividing a project into smaller phases can reduce capital costs.	More Info	○	○	○	○	○	◉
1.1.6. Optimizing Existing Treatment Plant Infrastructure - Small, decentralized approaches can extend the life expectancy of existing centralized treatment plants, thereby reducing capital costs.	More Info	○	○	○	○	○	◉
1.1.7. Optimizing Existing Collection System Infrastructure - Expansion or replacement of collection systems, pump stations, and transmission mains can be reduced by using smaller-scale decentralized approaches.	More Info	○	○	○	○	○	◉

The KML Green Machine:
Using Natural Systems in Treating Wastewater

An Engineered Wetland Wastewater Treatment System

Kettle Moraine Lutheran High School Jackson, Wisconsin

http://www.kmlhs.org/home/environmental-initiatives/waste-water-treatment

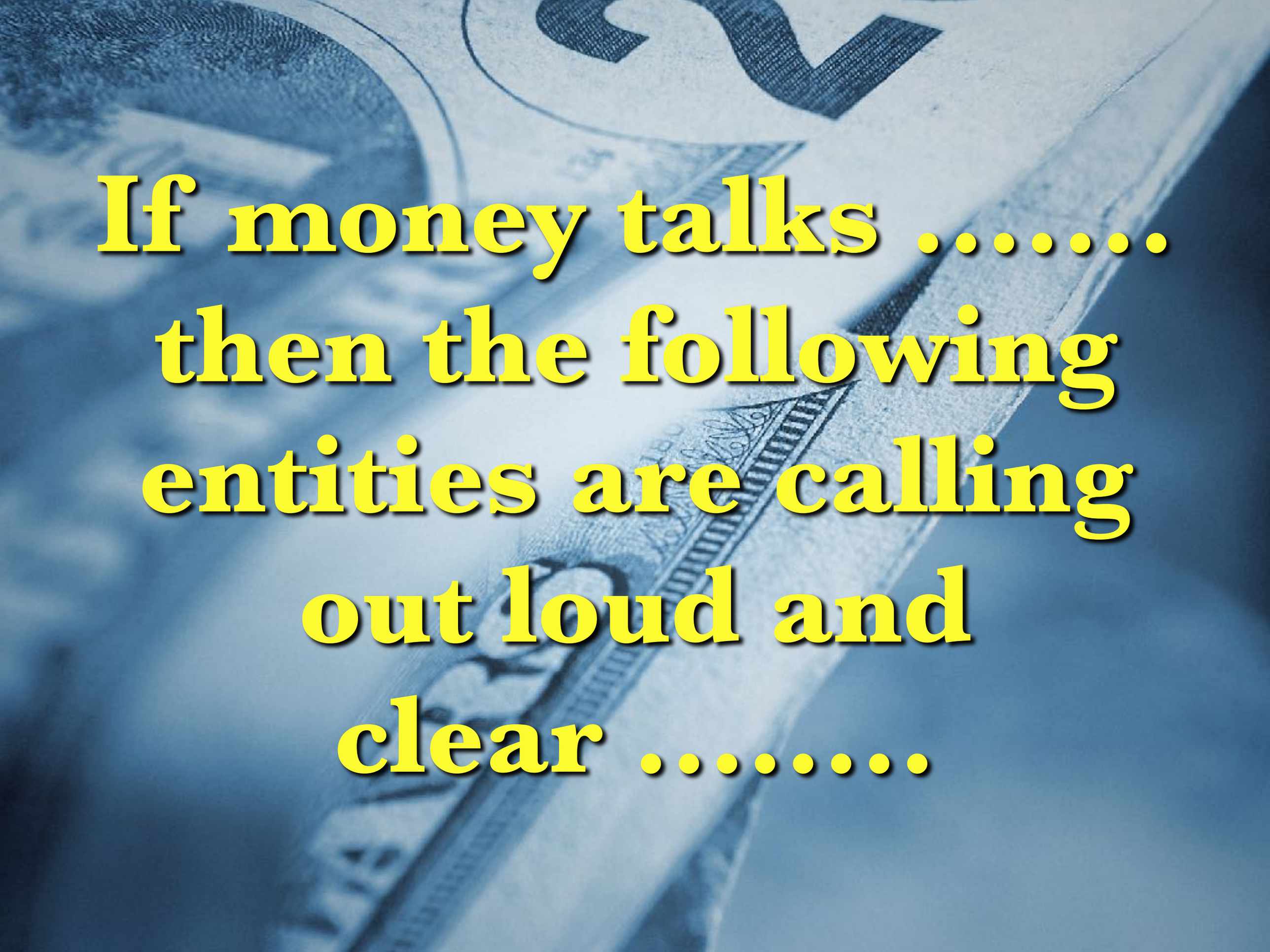


Powered by:
Wind
Solar
Photovoltaic

Wastewater from
2 lined cells goes to an unlined one
where mesic prairie plants develop deep
roots which filter wastewater back to
groundwater

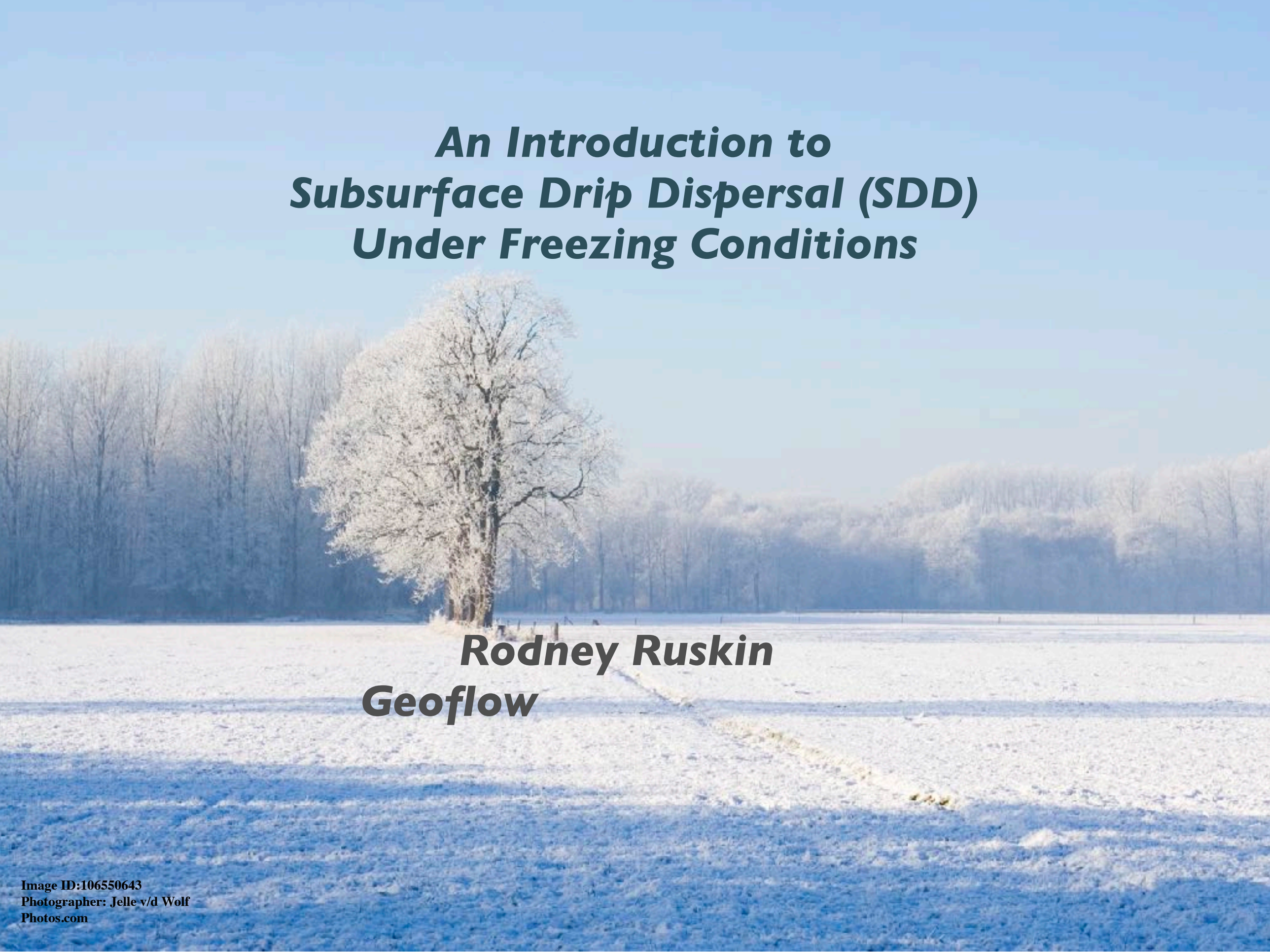
430 Students & Staff

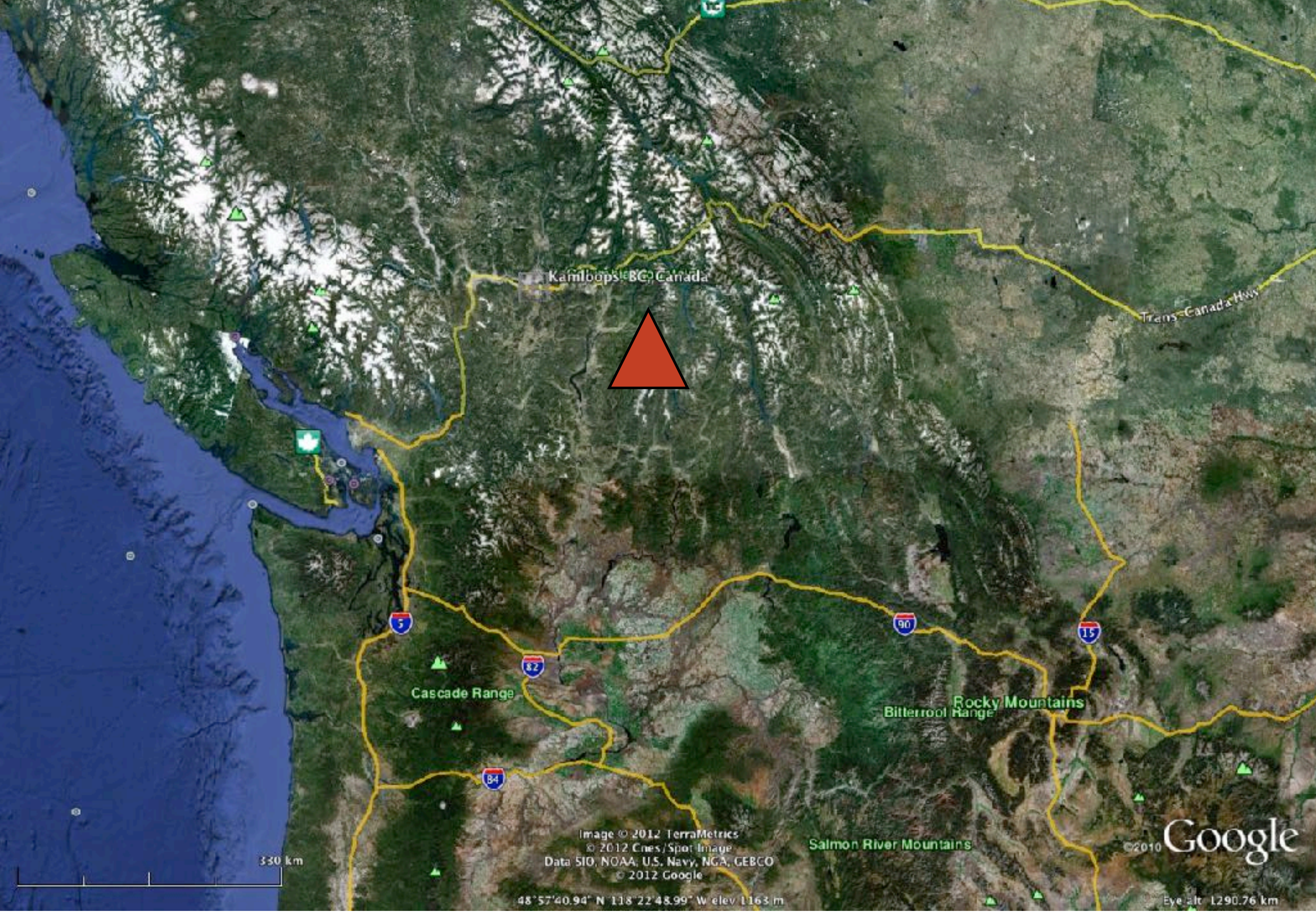
Waste from the kitchen goes directly into a 3000-gallon grease tank, while the remainder of the building's wastewater goes into the 9100 gallon septic tank, specially designed for this project. Water from those two tanks pass into another underground tank (4800 gallon), which filters the wastewater before pumping it to the constructed wetlands.


If money talks ……
then the following
entities are calling
out loud and
clear ……..

An Introduction to Subsurface Drip Dispersal (SDD) Under Freezing Conditions

Rodney Ruskin
Geoflow





Kamloops, B.C. Single Family Home

Kamloops, B.C. Drainfield

Thin snow over a system on its first winter in Kamloops. Temperatures dropped to -20°C with little snow, but no freezing issues.

- Drip Distribution Soil Performance and Operations in a Northern Climate *Rachel M. Bohrer*
  http://www.geoflow.com/wastewater/w_pdfs/bohrer_thesis_full.pdf

- Design & Performance of Drip Dispersal Systems in Freezing Environments
  Scott D. Wallace, P.E.
  http://www.geoflow.com/wastewater/w_pdfs/NAWE%20freezing%20paper.pdf

Conditions of Concern in the Great Lakes Region

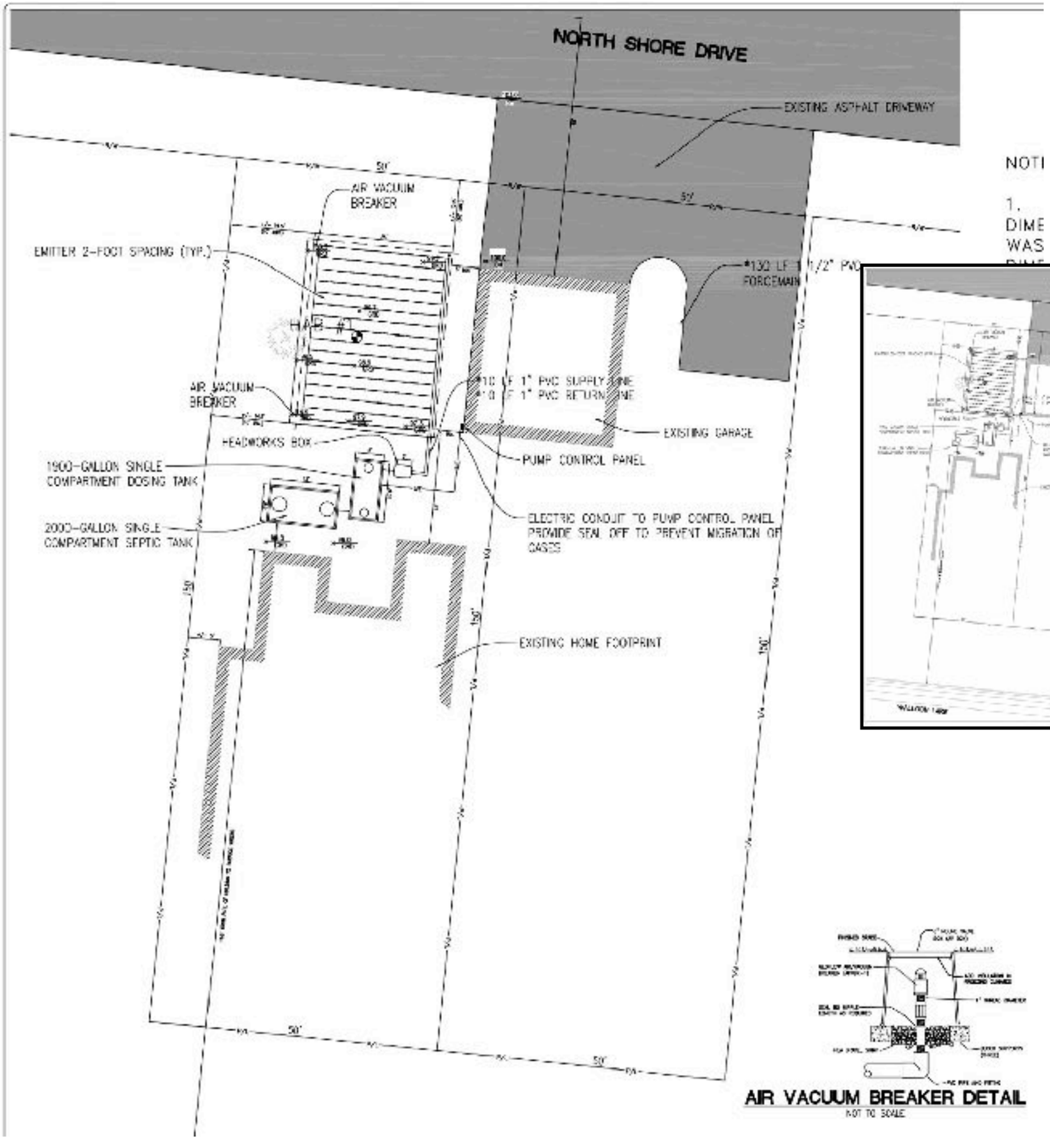
- Freezing
- Ground water separation - mounds
- Coarse soils
- Slope
- Lakeside lots
- Maintenance

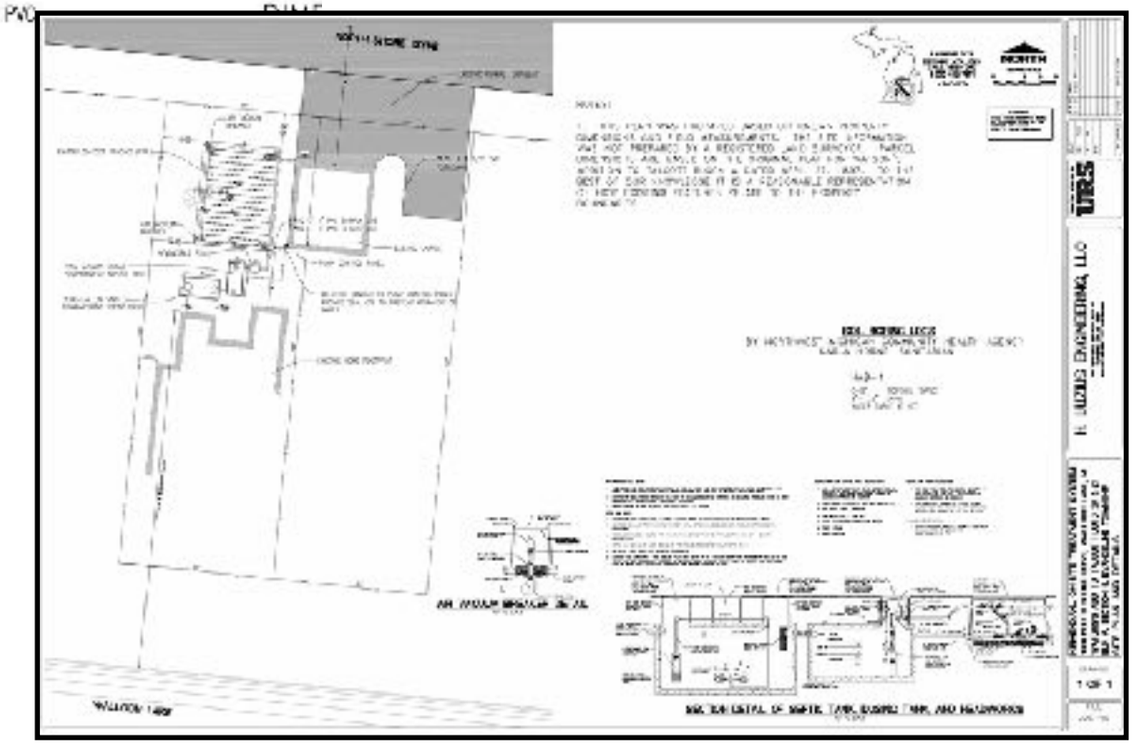
Slopes - Installing

Geoflow Installation lines at Yosemite West

Alpine Club on
Mt. Tamalpais
65% slope

Alpine Club, CA
65% slope





AIR VACUUM BREAKER DETAIL

NOT TO SCALE

Angel Island – S.F. Bay

Angel Island – S.F. Bay

Site Preparation

Complete filling/grading prior to installation of subsurface drip system.

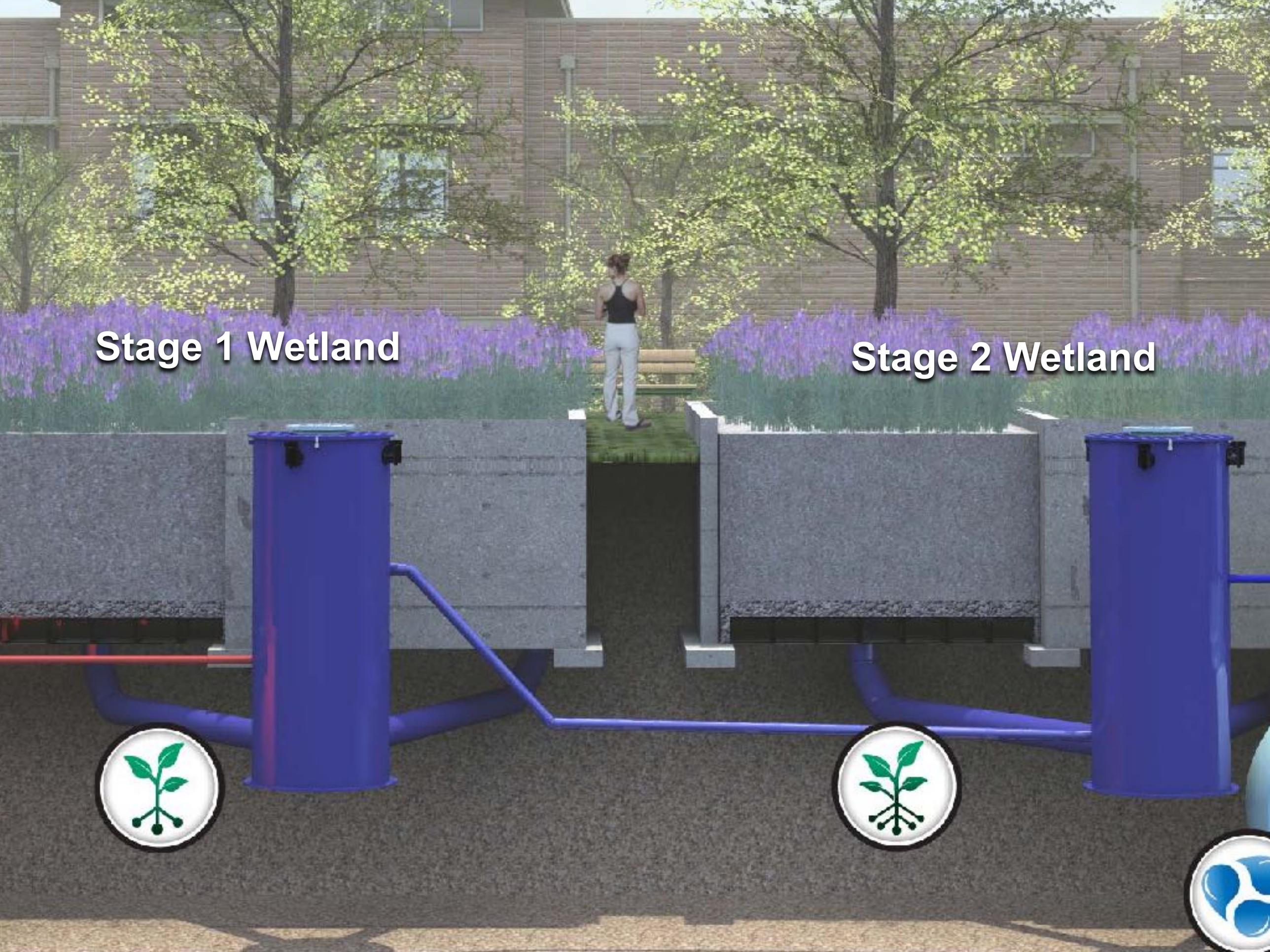
Reuse

New Zealand Vacation Community at Paunui-Tairua
Operates 5,000m3/day (1.3 million gpd) Subsurface Drip Reuse System

Scott Nelles
Living Machine Systems L3C

Living Technology:
Ecosystems as Infrastructure

History of Tidal Wetlands


Stage 1 Wetland
Stage 2 Wetland

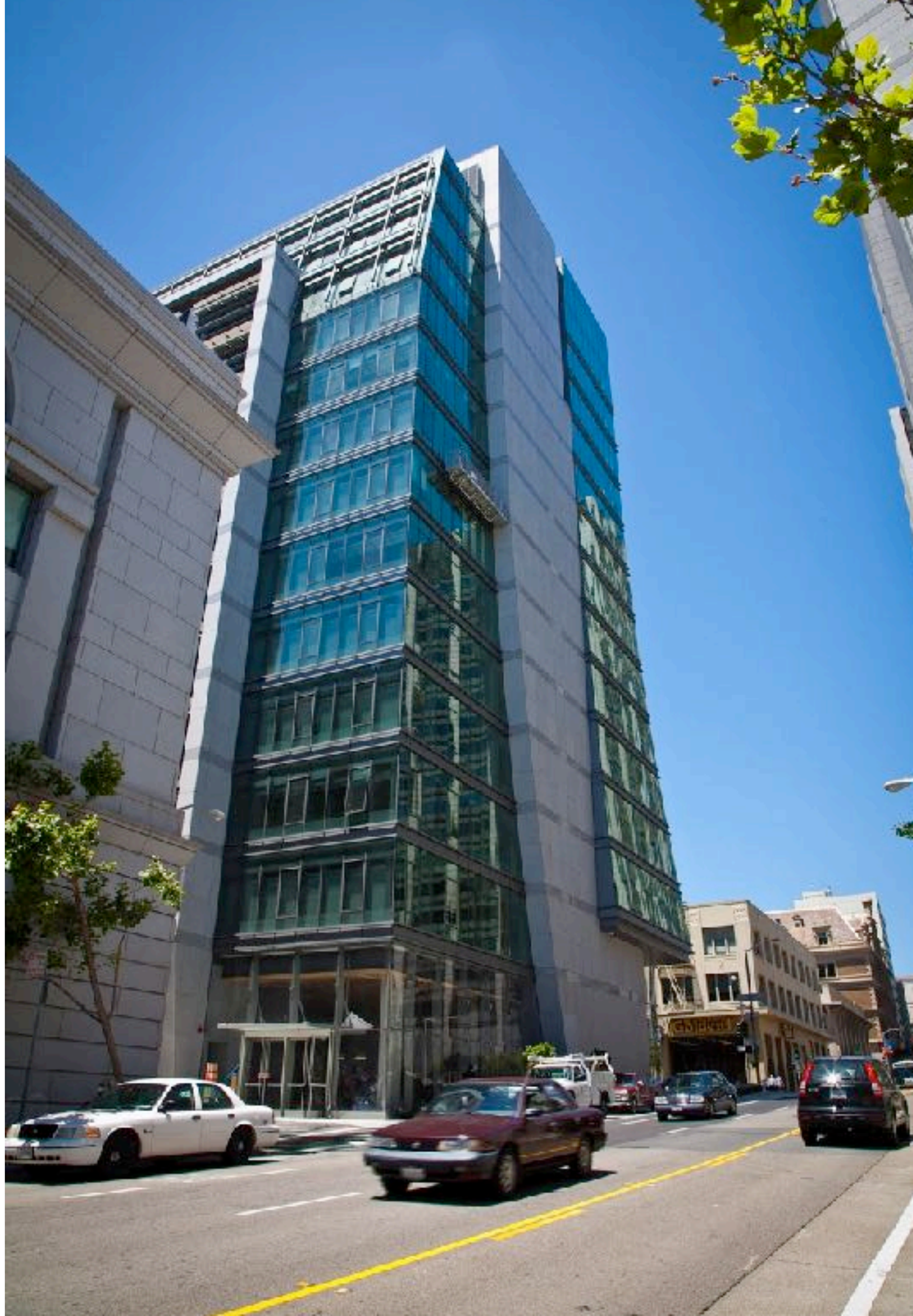
HQ Port of Portland

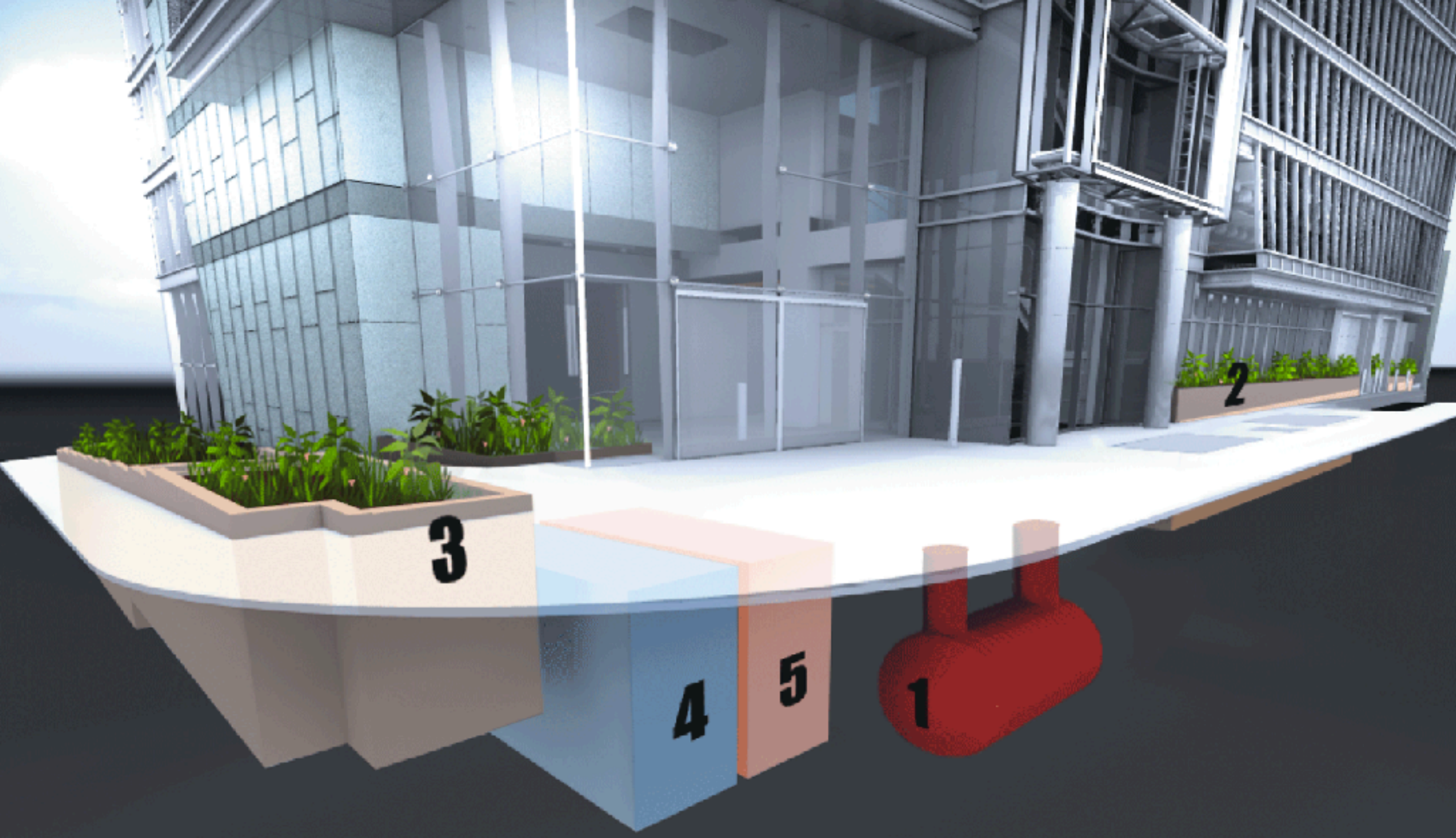
PDX, Oregon

Project Architect ZGF and Reed/Mayer
Landscape Architect

San Francisco Public Utilities Commission (SFPUC):

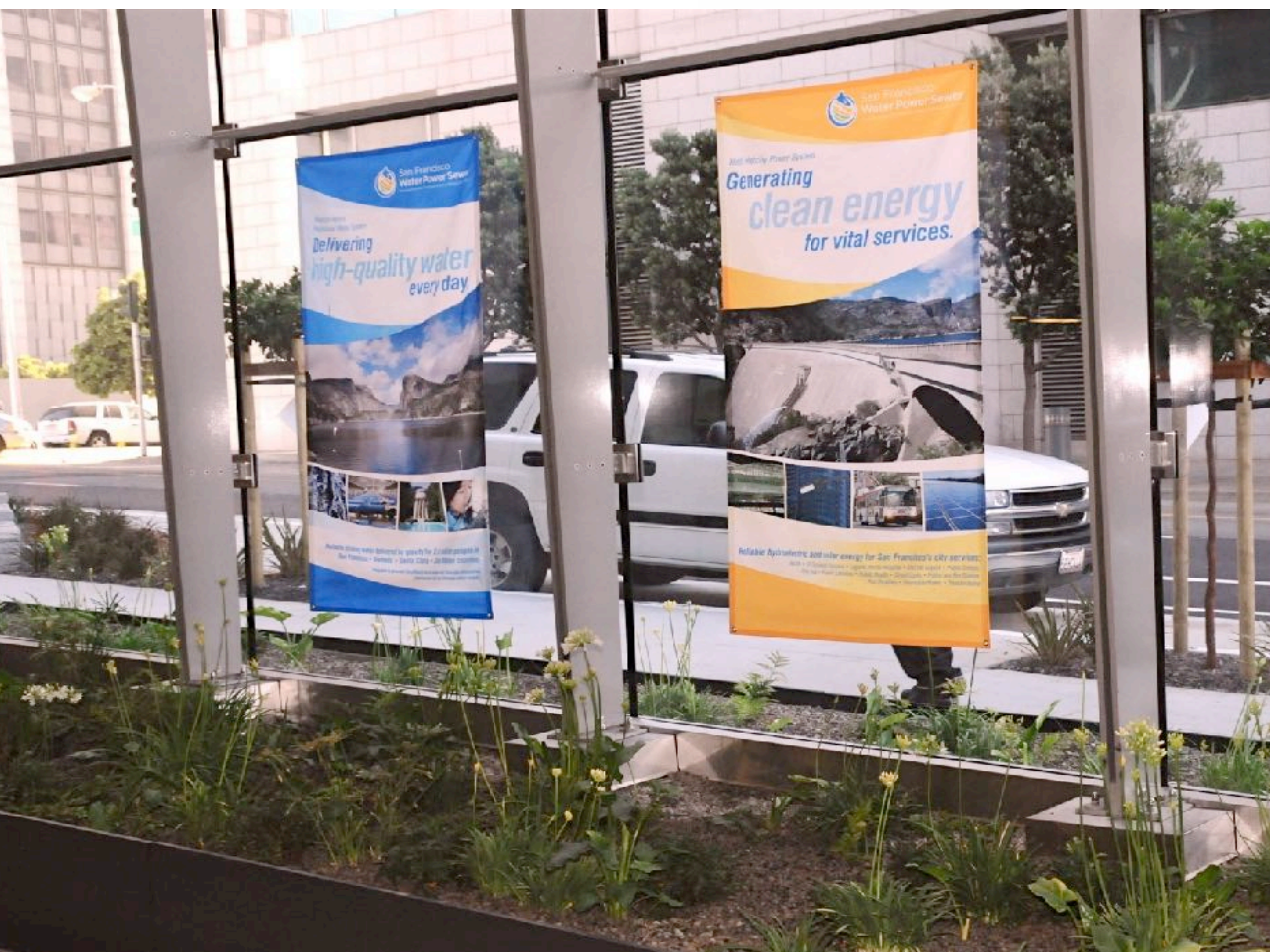
San Francisco, California





San Francisco, CA
San Francisco Public Utilities Commission
5,000 gpd

1. Primary Tank
2. Stage 1 Wetland Cells
3. Stage 2 Wetland Cells
4. Reuse Tank
5. Rainwater Cistern


San Francisco
Water Power Sewer
Delivering
high-quality water
every day
Generating
clean energy
for vital services.

Old Trail School:

Bath, OH

Project Architect Hasenstab Architects

A future distance learning event will showcase ‘The Blue House’ of Organica/ Sustainable Water
www.o-sw.com

Marine Corps Recruit Depot:
San Diego CA

Mezzaluna Springs:
Mixed-Use Development, FL

Design + Rendering by D.I.R.T. Studio

900 Person Community
WWT as Public Space

·47 LOTS
·72 UNITS

·11 LOTS
·20 UNITS

·5 LOTS

APPROX 11.3 ACRES
SOUTH PARCEL 44 LOTS
4 HOMES PER ACRE

·46 LOTS
·COMMUNITY CLUB

APPROX 5.0 ACRES
UPPER FIVE, 12 / ACRE
30 DUPLEX - 60 UNITS

D OVERLAY

·60 UNITS
·COMMONS

Wastewater Education Demo

File Edit View Insert Format Data Tools Help Reuse Tool All changes saved

=(E39+E40+E41+E42+E43)+C44-(E37+E25+E27+E29+E31)

A	B	C	D	E	F

WATER BUDGET

Annual Quantity of Water Reused	**6.24**	Million Gallons per Year
Annual Quantity of Wastewater Treated	**23.18**	Million Gallons per Year

LEED + LBC

Estimated LEED Credits	**1**
LBC - Net Zero Water	**YES**
LBC - Ecological Water Flow	**YES**
LBC - Biophilia	**YES**

ESTIMATED COST RANGE

Living Machine System	$1,096,735	$1,244,126
Rainwater/Condensate System	$0	$0
Reuse/Disposal System	$0	$0
Engineering/Design	$74,050	$103,400

SYSTEM SAVINGS AND OPERATING COSTS

	One Time	Annual Average	Ten Year
Operating Costs		$35,725	$342,826
Water Savings		**$15,087**	**$154,605**
Sewage Savings		**$56,029**	**$574,160**
User Fees		**$168000**	**$1680000**
Annual Fees Avoided		**$0**	**$0**
Additional Benefit		**$0**	**$0**
One Time Costs Avoided	**$875,000**		
		Net 10 Year Savings	**$1,593,412**

REUSE SUMMARY

WATER BUDGET

Annual Quantity of Water Reused	**20.84**	Million Gallons per Year
Annual Quantity of Wastewater Treated	**23.18**	Million Gallons per Year

ESTIMATED COST RANGE

Living Machine System	$1,096,735	$1,244,126
Rainwater/Condensate System	$0	$0
Reuse/Disposal System	$0	$0
Engineering/Design	$74,050	$103,400

SYSTEM SAVINGS AND OPERATING COSTS

	One Time	Annual Average	Ten Year
Operating Costs		$36,604	$349,751
Water Savings		**$83,968**	**$860,467**
Sewage Savings		**$56,029**	**$574,160**
User Fees		**$168000**	**$1680000**
Annual Fees Avoided		**$0**	**$0**
Additional Benefit		**$0**	**$0**
One Time Costs Avoided	**$875,000**		
		Net 10 Year Savings	**$2,292,351**

WE PROVIDE EDUCATION

WasteWaterEducation.org

Get To Know Your Septic Service Provider

Place you service provider's business card here!

Your Septic Service Provider is a wastewater professional who cares about your community, your family, your health, your drinking water supply and the environment.

Do You Need More Information?

Your Septic Service Provider will be happy to provide you with additional education materials, or you can call us: 231 233 1806 or visit our web site

www.wastewatereducation.org

Keep This Folder and Your Service Providers Business Card In Your House File

Your septic, or individual wastewater system is a vital part of your home or business. You wouldn't dream of never changing the oil or tires on your car, or checking to see if you need to repair your roof!

Just because your wastewater system is buried underground doesn't mean you should forget it needs regular care and maintenance too.

Set Up A Regular Check-Up!!

Take a look again at the chart inside and decide what is the best time to call for a pump out or inspection. Don't wait until your system lets you know!!

"Please, don't wait until there is a real problem before coming to talk to us. Environmental health regulations are there to protect all of us, not just to be a nuisance or a hindrance."
William Crawford
Benzie-Leelanau
District Health Department

Area Local Health Departments

Benzie-Leelanau District HD
6051 Frankfort Hwy., Suite 100,
Benzonia MI 49616
Tel: (231) 882-4409 Fax: 882-2204
www.bldhd.org

Leelanau Office
7401 E. Duck Lake Rd Ste. 100
Lake Leelanau, MI 49653
Tel: (231) 256-0200 Fax: 256-0225
Hours: 8:00 AM - 12:00 PM
1:00 PM - 4:30 PM

Grand Traverse County Health Dept.
2650 LaFranier Rd.,Traverse City, MI 49686 Tel: (231) 995-6051
Hours: 8:00 AM - 12:00 PM
1:00 PM - 4:30 PM
www.co.grand-traverse.mi.us/departments/health.htm

The Health Department of Northwest Michigan Administrative Office
www.nwhealth.org
220 West Garfield Ave.
Charlevoix, MI 49720
Tel: (231) 547-6523 Fax: 547-6238

Emmet: John R.Watson Bld.
3434 Harbor-Petoskey Rd., Suite A, Harbor Springs, MI 49740
Tel: (231) 347-6014 Fax: 347-2861

Antrim: 209 Portage Dr.,
Bellaire, MI 49615
Tel: (231) 533-8670 Fax: 533-8450

Otsego: 95 Livingston Boulevard, Gaylord, MI 49735
Tel: (989) 732-1794 Fax: 732-6899

WASTEWATER EDUCATION 501(C)3

YOUR SEPTIC SYSTEM

and how to care for it, so it will take care of you

©2010

WWW.WASTEWATEREDUCATION.ORG

So now you own a septic system, and what you don't know can end up costing you $$$$$
Here are some helpful do's & dont's.

All the water there ever will be .....

Water is the most precious substance on Earth, the stuff of life, the reason we all love northern Michigan so much.

If this is the first time you have owned a property with a septic, or onsite wastewater treatment system, you will need to pay close attention to proper use and maintenance of it just as you do your vehicle.

Your backyard wastewater system is part of the water cycle, part of the ground and surface water resources we all depend on every day for our homes, schools, businesses and agriculture. There is no such thing as 'waste' water. Every drop has been used and reused, over and over again since the beginning of time.

Every time you flush, every time you use the shower or washing machine, every time you run a faucet or let one drip... it is costing you money. Your $'s pay to pump, treat and transport your drinking water. Your $'s pay to service, or repair, your wastewater system. Your $'s pay to repair polluted streams and lakes. Remember this:

Clean Water starts at Home

Things that should never go down the drain

NOT a Good Idea!

Hair

Human or Pet Hair
is one of the strongest and durable items. It clogs pipes, pumps and moving parts in all wastewater systems.

Plastics

If you can't digest it, don't flush it!
Systems are chemically designed to break down organic wastes only.

Cigarettes

Nicotine, tar, benzene,
exist in cigarette butts. Filter trash takes up valuable space in the tank. The same chemical residues that affect your health during smoking pass through to effluent.

Chemicals & Pesticides

Take it to Hazardous Waste Events
If it isn't safe to dump on the ground, it isn't safe to dump down the drain.

Pills & Potions

It's a NO DRAINER!
No one wants to share your medications - but traces are now found in fish and waters. Take your unwanted meds to a collection event or put safely in the trash - **see Page 2!!**

Mother Nature Knows Best!!

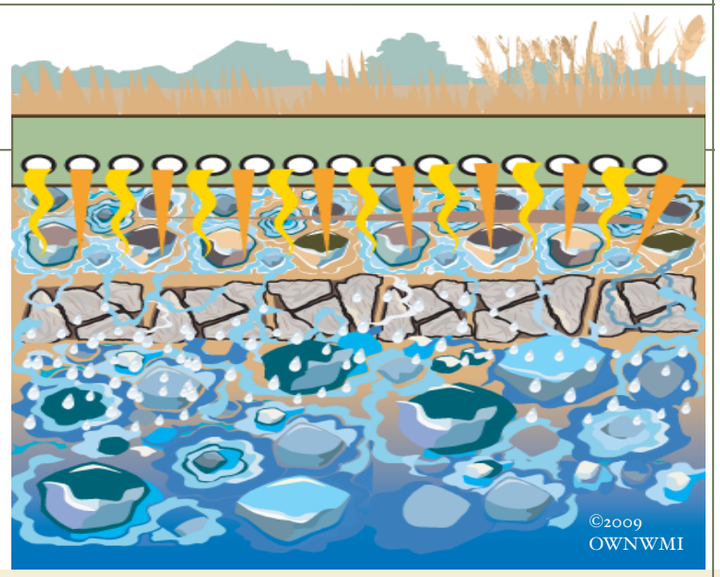
When we talk about wastewater septic systems, what are we REALLY talking about?

And is this really a conversation we like to have? Your service provider would **much** rather have this talk with you **BEFORE** you call him, or her, half an hour before you are at Thanksgiving Dinner, with 30 relatives!

The processes at work in your system and in your treatment field are a fascinating miracle of Mother Nature. Tiny organisms and a host of plants and chemistry are hard at work to clean water and return it to safe use. Some work with oxygen and some without.

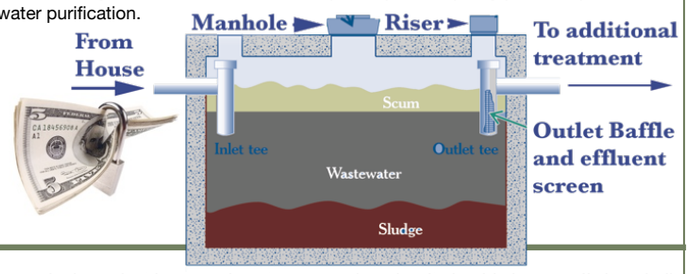
Unfortunately, we humans are equally hard at work doing our best to make their life really difficult. We like our modern conveniences! The US uses 4 times as much water as countries like England or Sweden - and it's not that those folks don't wash as often as us. We also like our chemical cleaning products, personal and household .... we pour just about anything down the drain and a LOT of fat!

So how does a septic system work?
Think of the inside of the septic tank, or primary treatment, as performing the same function as your digestive system. There is no oxygen in there. Gasses are produced when food breaks down and settles to the bottom of the tank - methane, sulphur dioxide for example and nitrous oxide. Nasty stuff!



Water is a renewable, recyclable resource, but all the water there ever will be, goes through you and goes through me!
All the water there ever will be is already here! It's our job to take care of it!

Oils and fats float to the top as scum. When liquid reaches the outlet pipe it flows out to secondary treatment in the soil. This is where the real cleaning and filtering takes place and oxygen is vital to help 'good' bacteria do their job. Just like us, they don't do well if they can't breath. This one-two punch packs a pretty powerful piece of water purification.

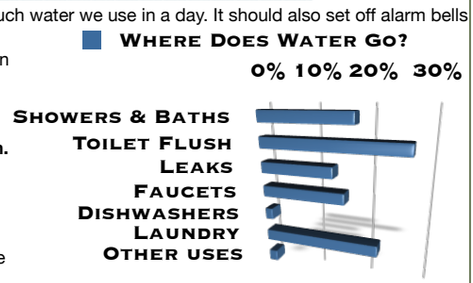


EPA WaterSense PARTNER

www.epa.gov/watersense is a great resource for learning ways to cut your water consumption without really feeling any impact at all, and watch you electricity bill go down.

Wastewater Education is a WaterSense™ Partner.

The graph shows just how much water we use in a day. It should also set off alarm bells in your head and wallet!
All that water = $$$$$$$ down the drain! **If you have your own water well, you are paying for electricity every time the well pump kicks on.** Even on a municipal system, your water use costs $$'s - it takes power to clean, treat, transport clean water in and taking wastewater back to the water cycle. **American public water supply and treatment facilities consume about 56 billion kilowatt-hours — enough electricity to power more than 5 million homes for an entire year. Up to 80% of that energy is used just to move water in both public and private systems.**



FIVE GREAT WAYS TO KILL YOUR SYSTEM

If soils, just like us, need oxygen to breath, neither of us do well under pressure .....

Driving or parking heavy vehicles on top of the drainfield, plowing snow on it in winter, compresses the soil structure, making it impossible for good bugs to have the air spaces they need to work or for water to drain properly.

Magic potions and instant fixes a) don't work, b) can do more harm than good or c) just waste money.
Chickens, yeast or a whole host of other old wives tales, can't possibly do any good inside the harsh, oxygen free atmosphere inside the tank. Strong chemicals can do great damage to the environment when they pass on out to the water table. Too much disinfectant can actually kill the bacteria you need for your onsite system to work properly.

Your wastewater system was designed to treat human, organic, biodegradable materials .....
If you use it as a substitute for going to your local Household Hazardous Waste Day you will find it quite unforgiving!!

Planting water loving plants and trees on, or next to, your system is a wonderful way to clog it solid with roots .....
Human waste is one of the oldest fertilizers in history! When the drainfield is working properly it can safely break down those compounds of nitrogen and phosphorus. But ... water loving plants look on this as a match made in heaven and will thrive on this delicious mix - so avoid willows, and deep rooting perennials and NEVER plant vegetables close by!

Your wastewater system is your responsibility! For a small community, onsite systems provide as good as , if not better, level of treatment than a central sewer at much less cost and much less risk **IF properly maintained.**
USEPA

WHEN TO CALL FOR SERVICE

Your Choice, Your $

You can wait until your system sends a message - a smelly, disgusting mess to have to deal with - or you can schedule a regular pump out based on the following:

I live alone

Generally we advise wastewater system servicing based on how many people live with you or how many bedrooms.
Other factors include how much water you use on a daily basis. On average we all use 125 gallons a day per person

We have children

Do you do a lot of laundry or take a lot of showers?
Think of how a full glass overflows if you pour in more fluid ... Then think of the difference between a trickling stream or a gushing water fall ..... Your septic system can only hold so much liquid, usually between 1200-1500 gallons.

Do You Have a Garbage Disposal?
All solids either need time to settle and break down, or are made of 'stuff' that never breaks down. Either way, solids take up space in the septic tank. More people= more use = less space = get your tank pumper more often.
A steady trickle of incoming fluid is fine, but a gushing torrent of 4 baths, showers or 3 loads of laundry is bound to stir up those solids and can send them out to clog your treatment field.

How Often?

1 - 2 people - 7-5 years
2 - 4 people - 5-3 years
4 - 6 people - 3 - 1 year depending on usage and volume of water used.

We're for Water℠

March 18-23, 2013

Fix a Leak Week

www.epa.gov/watersense/fixaleak

What is WaterSense?

WaterSense is a voluntary public-private partnership program sponsored by the U.S. Environmental Protection Agency. Its mission is to protect the future of our nation's water supply by promoting and enhancing the market for water-efficient products and services.

www.epa.gov/watersense

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WaterSense PARTNER

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MISSION

To increase awareness that water quality is directly linked to the use of appropriate wastewater systems and their management.

Clean Water starts at Home

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