# NET ZERONGATER TOPIC

Christopher Nielson AIA NCARB LEED AP

#### Bruner/Cott

architects and planners

Chris Chamberland PE LEED AP



### **LEARNING OBJECTIVES**

Introduce design strategies that explore a philosophy towards water usage and how our relationship with this precious resource is changing.

Identify specific net zero water technologies and systems for rain water catchment and filtration.

Explore onsite ground water management, grey water treatment, and human waste composting without connecting to the local sewer/storm water.

Discuss how active engagement with local and state regulatory agencies can create pathways towards water conservation and impact the future of building codes and DEP guidelines.



INTRODUCTION TO THE LIVING BUILDING CHALLENGE<sup>SM</sup> 3.0

A Visionary Path to a Regenerative Future



INTERNATIONAL LIVING FUTURE

#### PETALS



#### IMPERATIVES

LIMITS TO GROWTH URBAN AGRICULTURE

HABITAT EXCHANGE

HUMAN POWERED

NET POSITIVE WATER NET POSITIVE ENERGY

CIVILIZED ENVIRONMENT

HEALTHY INTERIOR ENVIRONMENT

BIOPHILIC ENVIRONMENT RED LIST EMBODIED CARBON FOOTPRINT

RESPONSIBLE INDUSTRY

LIVING ECONOMY SOURCING

NET POSTIVE WASTE HUMAN SCALE + HUMANE PLACES UNIVERSAL ACCESS TO NATURE + PLACE EQUITABLE

INVESTMENT

JUST ORGANIZAITONS BEAUTY + SPIRIT

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YMATRIX	3.0 SUMMARY MAT	LANDSCAPE + INFRASTRUCTURE	RENOVATIONS	BUILDINGS				
and the second second	01. LIMITS TO GROWTH	1	The State of State		PLACE			
	02. URBAN AGRICULTURE	SCALE JUMPING	and the second second	SCALE JUMPING				
	03. HABITAT EXCHANGE	SCALE JUMPING						
	04. HUMAN POWERED LIVING							
	05. NET POSITIVE WATER	SCALE JUMPING			WATER			
	06. NET POSITIVE ENERGY	SCALE JUMPING			ENERGY			
	07. CIVILIZED ENVIRONMENT				HEALTH & HAPPINESS			
ONMENT	08. HEALTHY INTERIOR ENVIRONMENT				norrine33			
	09. BIOPHILIC ENVIRONMENT							
	10. RED LIST			1	MATERIALS			
PRINT	11. EMBODIED CARBON FOOTPRINT	SCALE JUMPING						
	12. RESPONSIBLE INDUSTRY							
٩G	13. LIVING ECONOMY SOURCING							
2	14. NET POSITIVE WASTE							
PLACES	15. HUMAN SCALE + HUMANE PLACES			1	EQUITY			
ATURE & PLACE	16. UNIVERSAL ACCESS TO NATURE & PLA		Sector and					
	17. EQUITABLE INVESTMENT	SCALE JUMPING			H Washert			
	18. JUST ORGANIZATIONS							
	19. BEAUTY + SPIRIT				BEAUTY			
N	18. JUST ORGANIZATIONS				BEAUTY			

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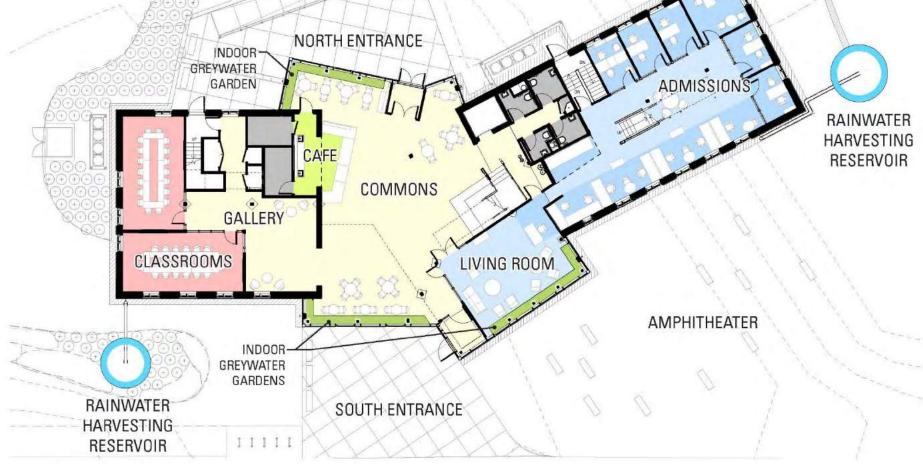
### WATER AND LANDSCAPE



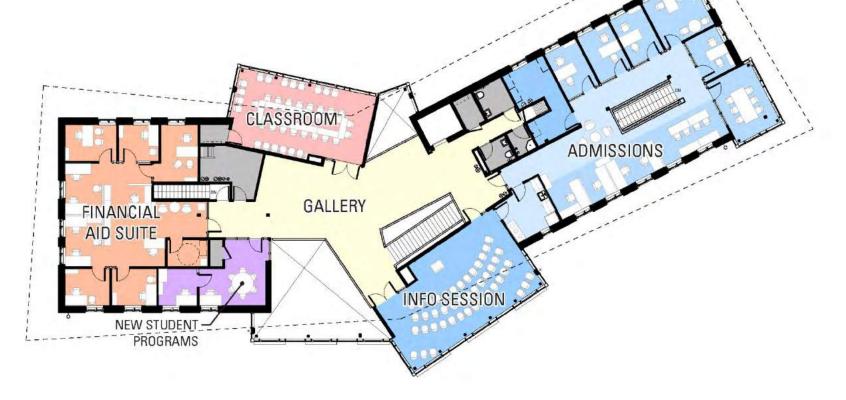
Bruner/Cott

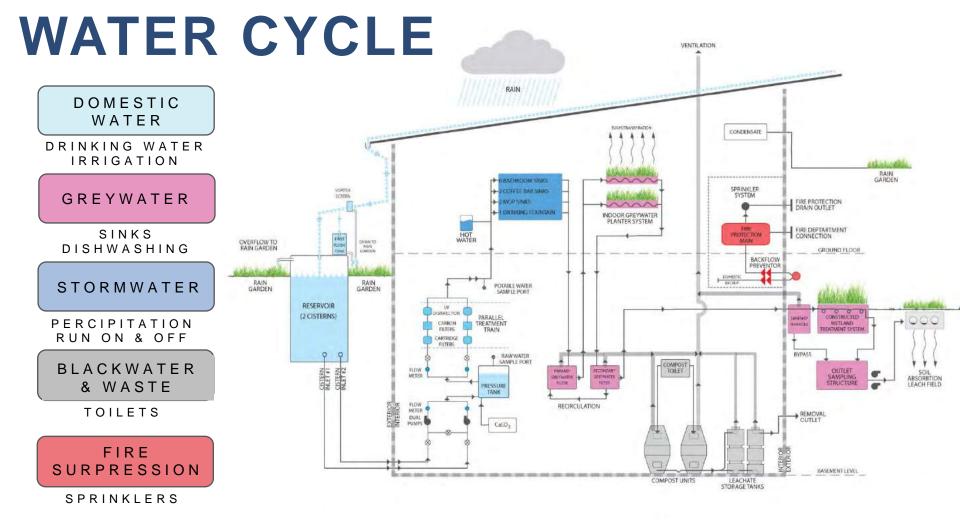
architects and planners

### **GROUND FLOOR**

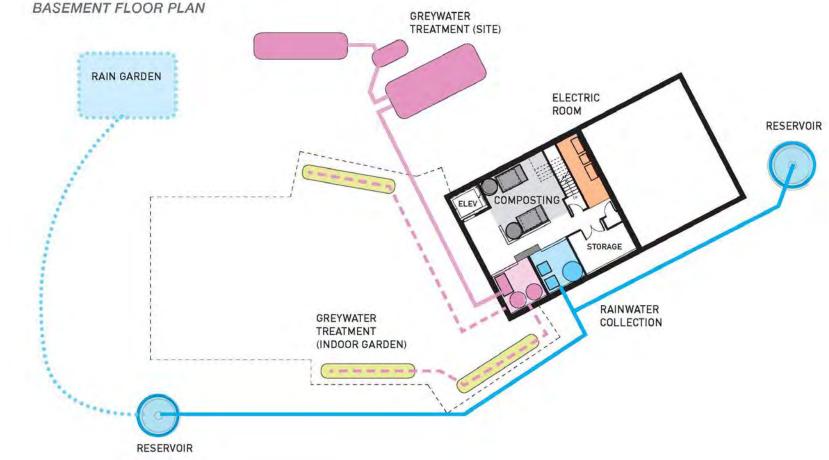


#### **SECOND FLOOR**





### WATER CYCLE



### WATER BUDGET & MODELING

Default Ferure Uses									
Fixture Type/Group	Duration	Lises/Day							
	(200)	FITE							
lay Faucet (metered) restrooms	17	3							
entfree tage Hand sink (Jennit Gesthing) -	10								
Water Fountain	5	15%							
How hile (installion w? (sch(strift))	\$25	1							
Equipment Type/Group	Duration (sec)	Uses/Dev							
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Caffee Brewer		3074							
Espresso/Cappuchino Maker		30%							
ES a Www.shier	1	2							
Custodial floor sink		2							

Riestinom Los Giffee bat hend sh

Bottle Fille Coffee Brewe Espresso/Capprichine Richwardte Custodial flater sink

> Bantraom Low Water Fountain

Dottio Filler Coffee Brower Espresso/Cappeiching Distantiality Custodial flave siek Hose bit (londwape) Total Flow Finture gal/mo-Total loterior Equipment gal/mo = Total gal/mo = Landscape Equipment patrico-

Water

Water Fainkai How bib flandscope

Using/Manth ~ FTE:

Flow Foctures

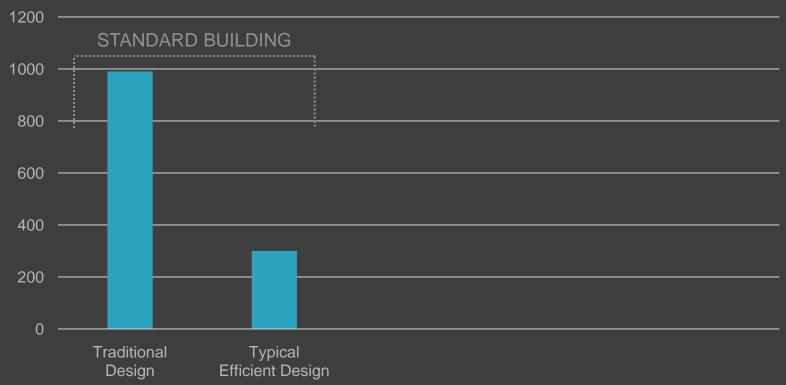
Fotal mes. Flow Fistures

Equipment

46		Fictures									0	Decupant hour	s by Month	based on o	peratione	schoolule o	f eccupane	y per móö	m)		
Duration	Lises/Day		Fixture Type/Group		Rate		0	copanta		Jan	Feb	Mar	Дрт	May	Iun	Jul	Aug	Sep	Oct	Nov	Der.
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10			coffee the hand sink			0.083	51	ared Learnin	ng Spince	10,362	17.292	20,064	17,792	20,724	8,696	10,362	8,646	20,724	17,292	20,724	11,790
5	195		Water Fountain		1.1	07.079		ampatore		450	490	450	450	458	450	450	450	450	450	450	450
150	1		Mose hib (Iandscape)		10.	.20	-In-	In Sessions	-	7.591	2.597	2.597	2,587	2,597	2,597	2,597	2,597	2,597	2,597	3;597	2,597
Duration	Uses/Dev		Equipment Ty										815	815	815	815	815	835	815	#15	815
(sec)	-		Bottle Filler										25.024	29,185	17,308	19,024	17.372	27,946	25.449	30,154	19.681
-	20%		Coffee Brewe										3,128	3.675	2,164	2.375	2.172	3,495	3.181	3.769	2,460
	30%		Espresso/Cop										104	118	72	27	20	116	103	126	39
	2		Dishwashet		5-8	GAL	/DAV	P	BUDG						14		14	340	10.4		
	2		Custodial floe		5-0.	GAL	JUAT		Joba	and a second sec			15.5								
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					30					- 44											
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46	61	.65	56	66	39	42	39E	63	57	68	44	-847	2								
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1,914	2,246	2,927		2,360	1,757	1,843	3,760	2,288	2,163	2,398	1,876	25.074	74								
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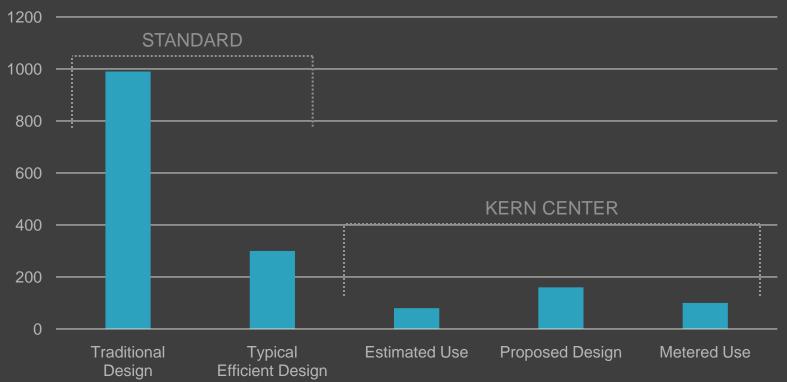
### WATER BUDGET

#### DAILY WATER USE (GALLONS)



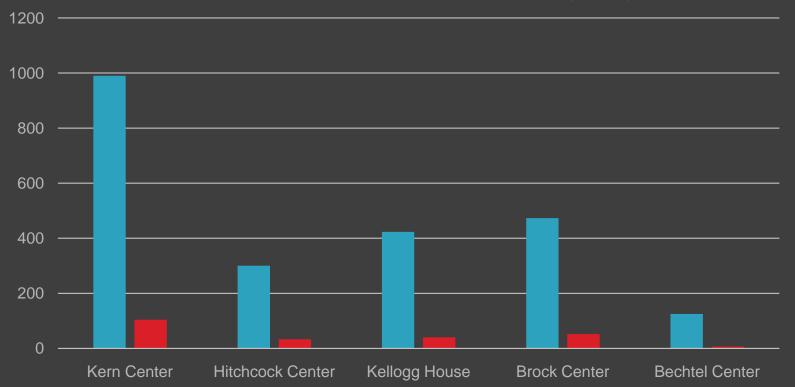
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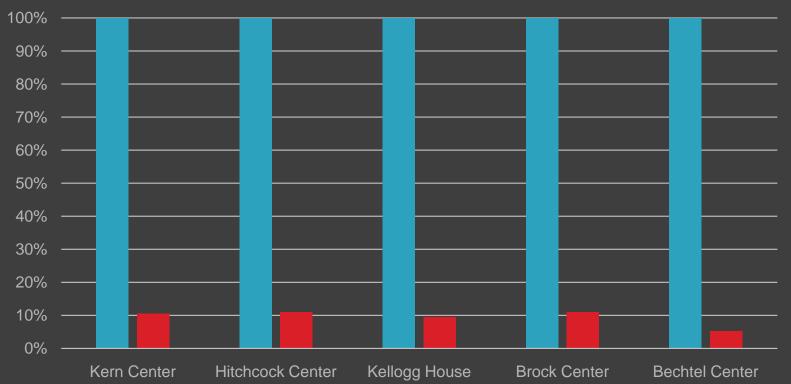
### WATER BUDGET – LBC PROJECT

#### TYPICAL DESIGN VS ACTUAL USE (GPD)

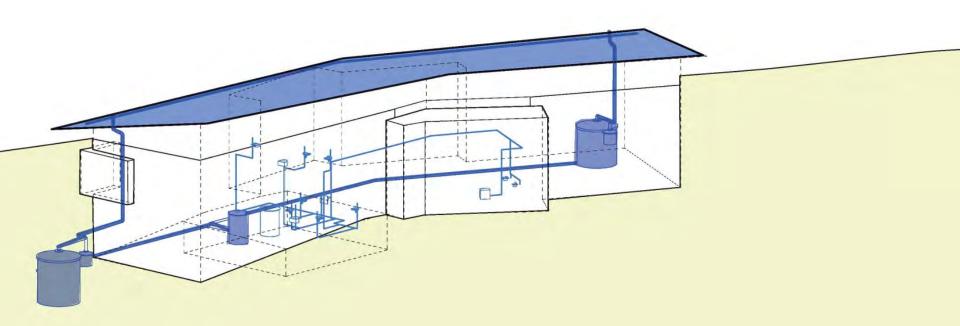


### WATER BUDGET – LBC PROJECT

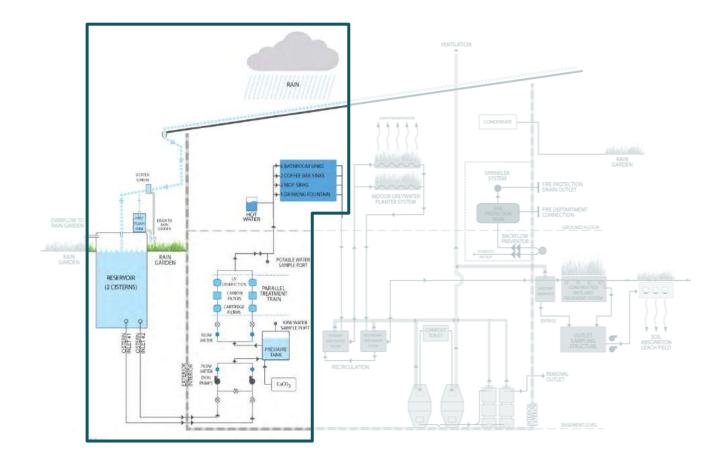
#### ACTUAL USE AS % OF STANDARD DESIGN



### **RAINWATER HARVEST**

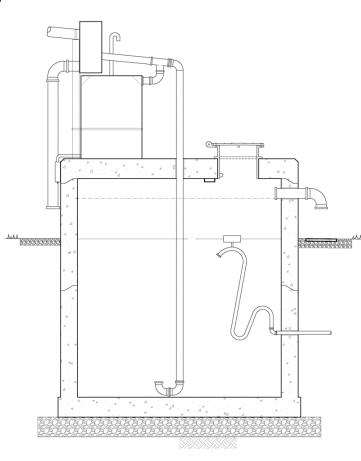


#### **RAINWATER HARVEST**



### **RAINWATER CAPTUF**

- ROOF (WATERSHED AREA)
- DOWNSPOUTS
- DEBRIS SCREEN
- FIRST FLUSH



### **RAINWATER TREATMENT**



### LESSONS LEARNED RAINWATER HAR

#### **BY PREDECESSORS**

- REGULATORY PATH BLAZED BY OTHERS
- BORROWED CONCEPTUAL DESIGN
- SEEING COMPONENTS IN REAL LIFE
- AVOIDED REJECTION OF UV REACTOR



# LESSONS LEARNED RAINWATER HAR

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#### **REGULATORY COMPLIANCE**

- DRINKING WATER REGS A HEIRARCHY
- OVERSIZED UV REACTOR







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#### **BY PREDECESSORS**

- REGULATORY PATH BLAZED BY OTH
- BORROWED CONCEPTUAL DESIGN
- SEEING COMPONENTS IN REAL LIFE
- AVOIDED REJECTION OF UV REACT

#### **REGULATORY COMPLIANCE**

- DRINKING WATER REGS A HEIRAR
- OVERSIZED UV REACTOR
- TURBIDITY MONITOR REJECTED
  - HIGHER PERFORMING UNIT
  - DRINKING WATER CERTIFIED
    ... IN EUROPE





