



WATER PETAL CASE STUDY MOMENTUM IN MASSACHUSETTS

There's a quiet revolution underway in Massachusetts. Beginning with the Smith Bechtel Environmental Center, which achieved Living Building Challenge (LBC) certification in 2014, project teams and regulatory authorities have engaged in productive conversations regarding both rainwater harvesting for potable use and the on-site treatment and disposal of grey and blackwater. Smith Bechtel broke trail, reports Charley Stevenson of Integrated Eco Strategy, on a path to compliance that has since been used by three new buildings also pursuing the LBC. The Smith Bechtel team's efforts laid the groundwork for incremental regulatory successes, resulting in some serious momentum for progressive water policy within the state.

SYSTEMS

Though the four Massachusetts projects – Smith Bechtel Environmental Center, Class of 1966 Environmental Center, Hitchcock Center for the Environment, and the R.W. Kern Center - have deviated slightly in their water systems approach, there are core strategies that they all have found successful given their climatic context.

RAINWATER HARVESTING

With the exception of Smith Bechtel, which relies on a well for its potable demand, the projects harvest and treat rainwater for potable use.

GREYWATER REUSE

In all projects, greywater is collected and reused for interior irrigation where needed, then recirculated through a constructed wetland before being infiltrated into the soil.

BLACKWATER TREATMENT

All projects use Clivus composting toilets to aggressively reduce water demand. At Bechtel the solid compost is spread on site; composted liquid (leachate) is hauled to a municipal facility for secondary treatment.

SMITH BECHTEL ENVIRONMENTAL CLASSROOM

SIZE 5,500 SQUARE FEET

WATER USE INTENSITY (WUI)
5.6 GALLONS/SF/YEAR

AVERAGE WUI*
12.88 GALLONS/SF/YEAR

CLASS OF 1966 ENVIRONMENTAL CENTER

SIZE 7,000 SQUARE FEET

HITCHCOCK CENTER FOR THE ENVIRONMENT

SIZE 8,500 SQUARE FEET

R.W. KERN CENTER

SIZE 15,000 SQUARE FEET

CLIMATE

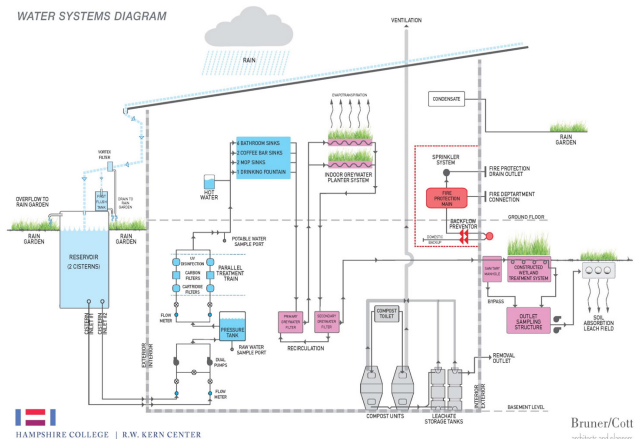
HUMID CONTINENTAL

45 inches of rain/year

121 days of precipitation/year

**Average WUI by building type according to Seattle 2030 District data*

WATER SYSTEMS DIAGRAM



HAMPSHIRE COLLEGE | R.W. KERN CENTER

Bramer/Cott
architects and planners



WATER PETAL CASE STUDY POLICY SOLUTIONS

RAINWATER HARVESTING

The Smith Bechtel team initially investigated harvesting rainwater before deciding that a well water system was more economical for their needs. However, the project served to acquaint regulators with the systems and critical issues involved with rainwater harvesting. As a result, subsequent projects enjoyed a far easier permitting process. In fact, by the time Charley met with Mike McGraff, the regional supervisor for water permitting in Western MA, about the Class of '66 project, Mike was able to suggest a path to permitting – one, as it turned out, that already existed.

Mike recommended that the team fill out form WS 37, unused since the 1950s when unregulated water supplies were brought into the municipal fold. Typically, such supplies were large forested areas that drained into reservoirs measured in acres and foot-acres respectively; the form made no provisions for much smaller roof-top catchment areas and comparatively tiny cisterns. Mike directed the team to simply modify the form to reflect much smaller units, observing that there is really no practical difference between harvesting water from a roof or from a forest floor, provided that the water is treated and tested properly.

GREYWATER HARVESTING

Current Massachusetts code requires that if you can connect to the municipal system, you must do so. However, the state offers a pilot program to test alternative treatment strategies. Through this program, all of these Massachusetts projects use a variety of natural strategies to process greywater, including constructed wetlands and slow sand filters.

Though there is an element of experimentation to this program, there is no compromise when it comes to safety: Charley described the treatment requirements as “a belt, suspenders and duct tape around the waist” approach. Doubling down on these systems helped reassure regulators, allowing their projects to serve as ongoing practical demonstrations. If these systems prove to be over-engineered, future projects may enjoy relaxed standards.

BLACKWATER TREATMENT

The State of Massachusetts allows on-site blackwater treatment as well as ground application of composted solids. However, current code does not allow treatment or application of composted liquids, or ‘leachate’, on site. Therefore, projects with composting toilets must contract with licensed haulers to move leachate to a sanctioned facility. The project teams plan to collaborate with their local regulators to develop compliance pathways that acknowledge the value of leachate and solid compost as a nutrient-rich resource that can safely be applied on site.

PROCESS

The project teams approached the regulatory process with a motto of “no surprises”. They prefaced technical requests for permitting with a transparent conversation about the client’s priorities and the requirements of the Living Building Challenge, making it clear that they were constrained by these mandates they had been given. This set up a collaborative dynamic: the project team must strive to adhere to the rule set of the LBC; regulators must adhere to the mandates dictated by code. Their shared task, then, is to seek common ground within these dictates. Without this preamble, requests to permit non-compliant systems can appear presumptuous to regulators, as though the team believes their approach to be superior to code. By collaborating, project teams are able to benefit from regulators’ considerable expertise.

LESSONS LEARNED

- Collaborate, don’t dictate: put yourself on the same team as the regulators
- Take advantage of pilot programs, and be prepared to accommodate redundancies
- Work with regulators to creatively apply existing permitting paths