The Charles McC. Mathias Laboratory Expansion at the Smithsonian Environmental Research Center (SERC) is a LEED Platinum facility that significantly expands the institution's research and education mission to explore and understand the impact of human behavior on natural ecosystems. The Smithsonian's design directive was challenging: underpin world-class environmental science and expand critical educational outreach with up-to-date facilities that demonstrate leading practices in energy conservation, sustainable design, and ecological sensitivity.

Completed in September 2014 and located on the Chesapeake Bay, the $45M, 92,000SF project replaces substandard, outmoded facilities with both new and renovated labs, offices, classrooms, storage, and social space designed to meet 21st Century standards.

CHARLES McC. MATHIAS **LABORATORY**

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

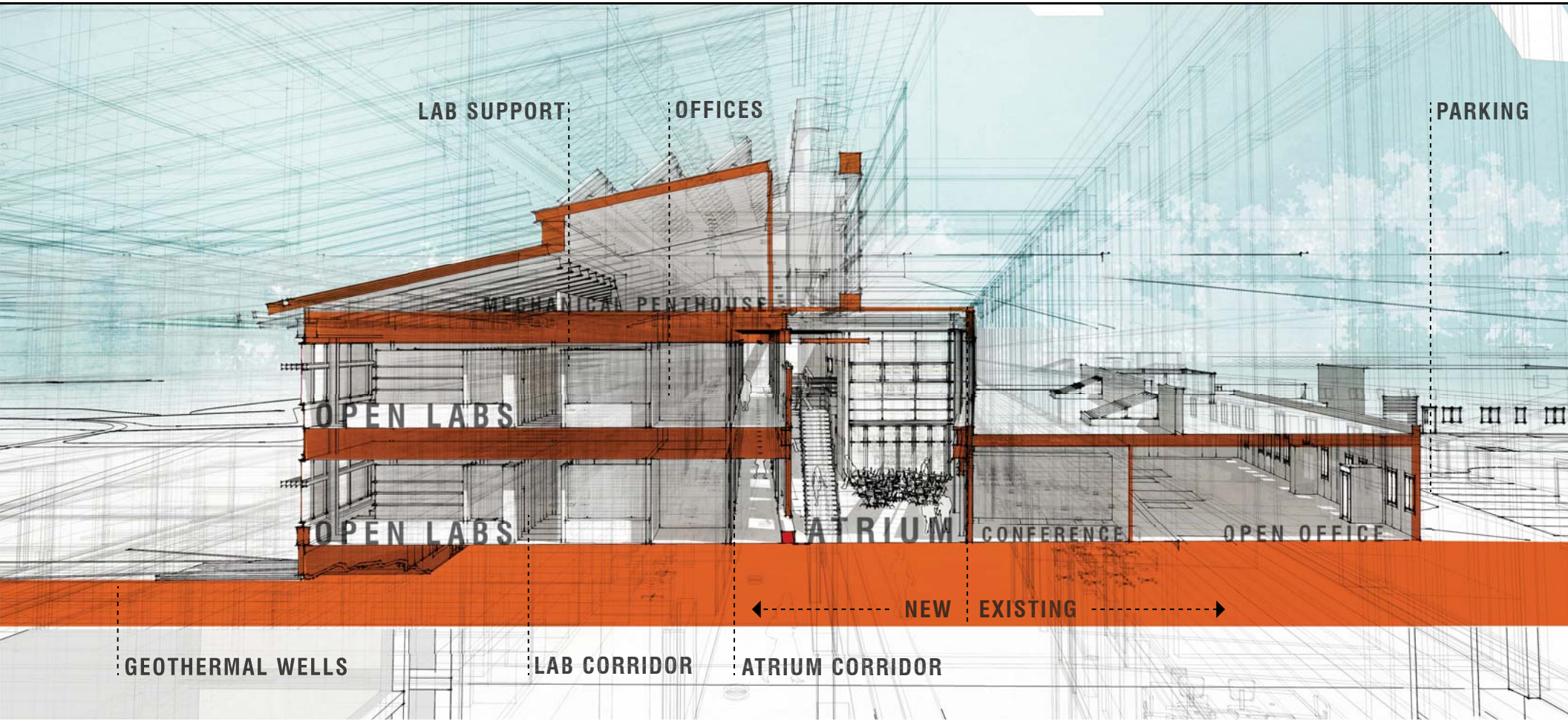
EDGEWATER, MARYLAND

Institutional Architecture

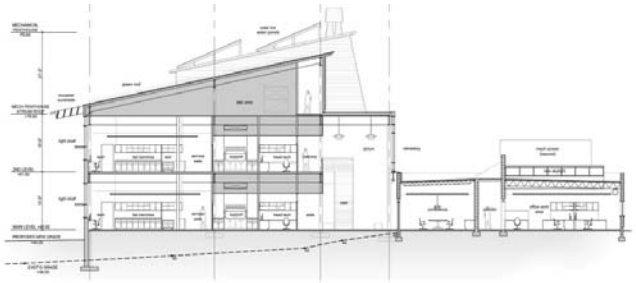
FUNCTIONAL AESTHETICS

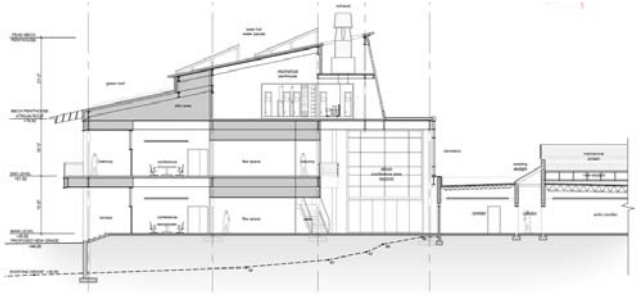
Massing and articulation are driven by both high-tech and low-tech approaches to sustainability as well as site context. The exterior design, which celebrates functional features such as the massive rainwater cistern at the building entrance, is inspired by local rural agricultural structures. Building cladding is a composition of unassuming and humble materials like corrugated metal panel, fiber cement plank, and local brick. The result is a "high-tech shed" to house cutting-edge science focused on our changing climate and ecosystems.

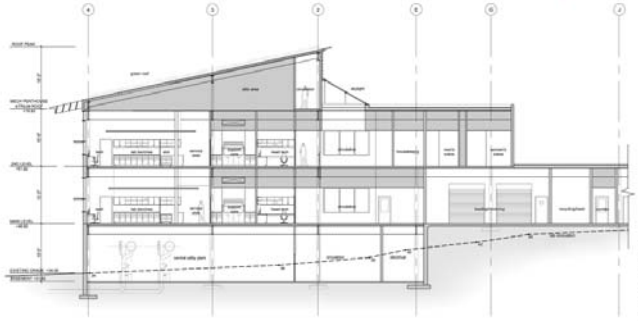
ENERGY EFFICIENCY AND SUSTAINABILITY



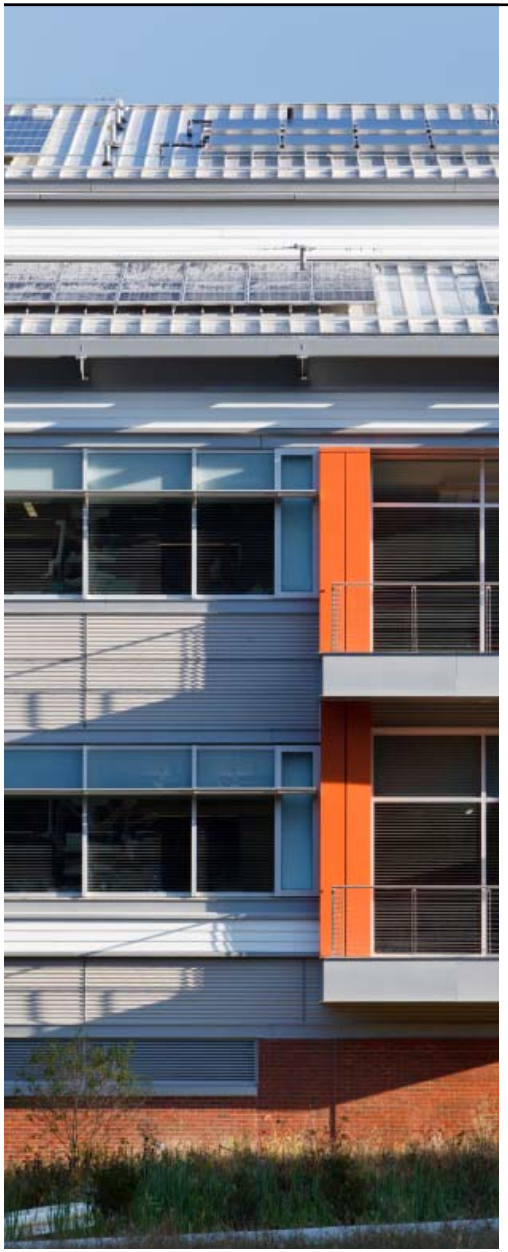
Section Diagrams







INTEGRATED **ENVIRONMENTAL DESIGN**

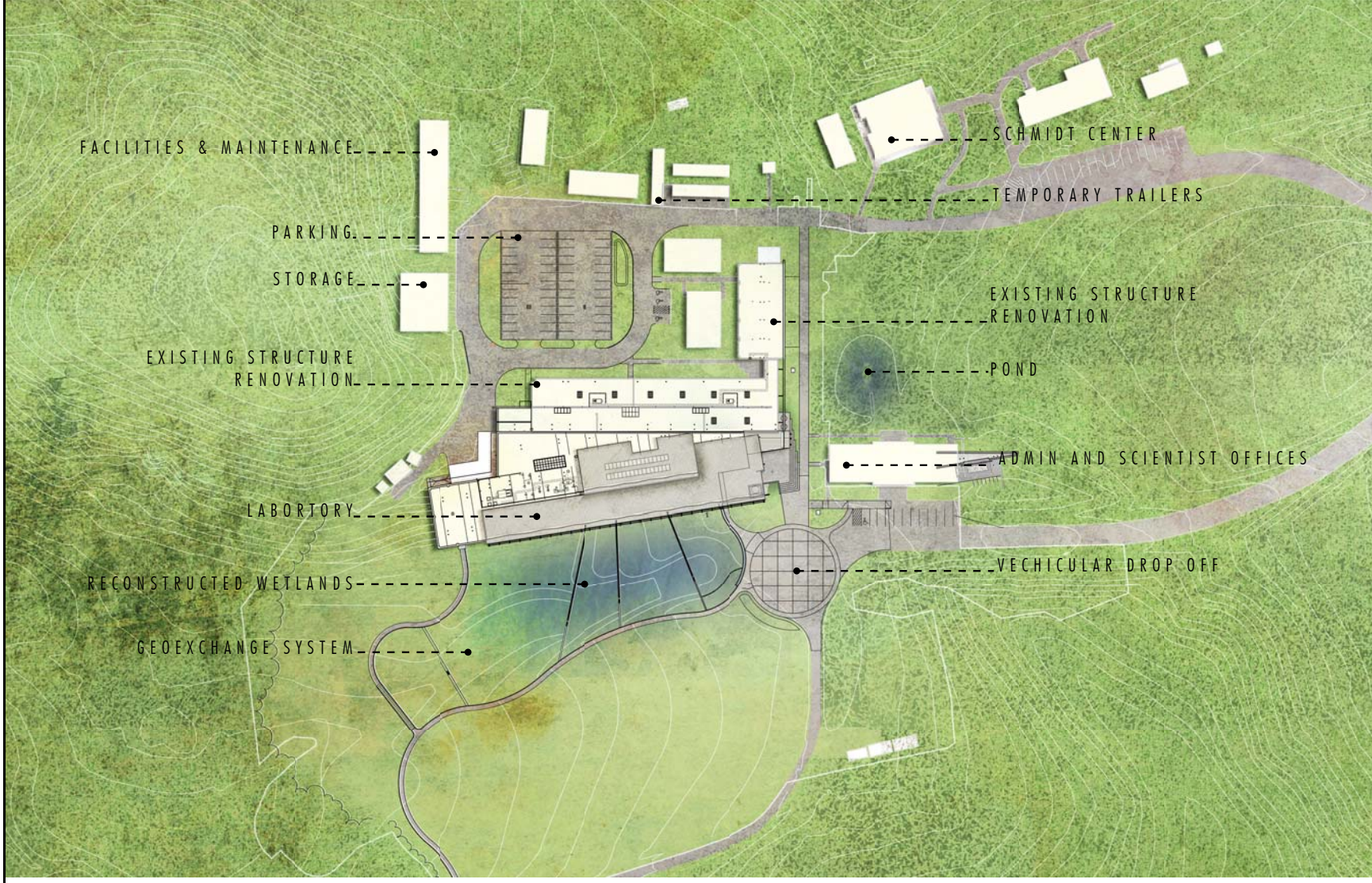


Facade Detail: Articulation of material, light, and form

Facade Detail: Illustrating shading devices and wetlands balcony

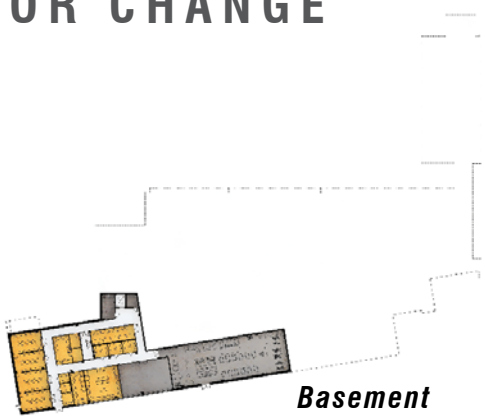
The design is the result of integrating and articulating high-tech components with low-tech strategies for reducing energy use and environmental impact at SERC. Features such as geo-exchange wells, re-constructed wetlands, photovoltaic panels, solar hot water, rain water collection, gray water recycling and on-site treatment, energy recapture, high-efficiency lighting, daylight harvesting, ideal solar orientation, sun-shading devices, low-VOC materials, and even bird-safe glazing are among the best practices in ecologically sensitive and environmentally responsible design. Not only do these features support a reduced impact and carbon footprint, they are articulated to educate occupants and visitors about practical sustainable design.

Site Plan and Diagramtic Floor Plans

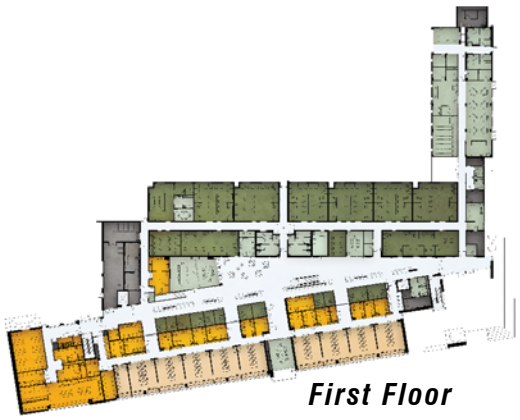


PLAN FOR CHANGE

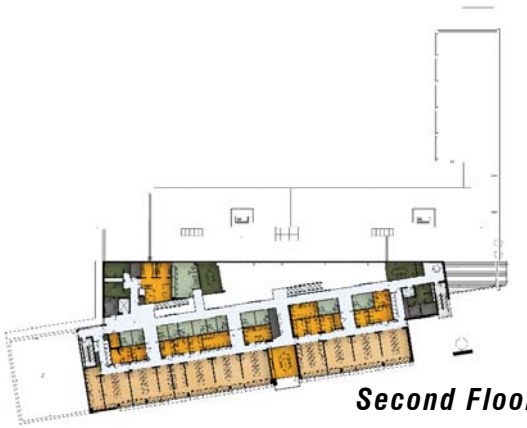
- *CIRCULATION*
- *OFFICE*
- *CONF & MEETING*
- *LAB SUPPORT*
- *LABORATORY*
- *BUILDING SUPPORT*



Basement



First Floor



Second Floor

COLLABORATION BY DESIGN

Informal social interaction among scientists, staff and students is encouraged in the open atrium space, which is surrounded by offices and conference spaces and flooded with ambient light from a North-facing clerestory. Recycled sorghum wall panels frame educational exhibits, a combination that emphasizes the site's historical legacy and ecological research mission.

RADICAL TRANSFORMATION

Existing Conditions: Mathias Lab Exterior

Existing Conditions: Typical Lab Interior

Existing Conditions: Trailers & parking built over wetlands

View of Atrium: A space for structured and informal social interaction

The existing site and lab building were in dire need of an overhaul. The existing laboratory building was no longer suitable for cutting-edge science and badly in need of renovation. Existing temporary trailers were energy hogs and offered crowded working conditions poorly suited to critical climate and environmental science. Research staff were isolated from one another and rarely crossed paths outside of the parking lot. SERC exhibited poor environmental practices, undermining their fundamental goals.

The Mathias Lab Expansion project remedied these deficiencies, radically transforming the site as well as radically transforming the culture. Ample natural daylight and extensive meeting and collaboration space has bolstered morale among researchers, staff, and students.

Reconstructed Experimental Wetlands

Lab Guild Entrances

Repurposed Labs Become Meeting Rooms

OPEN TO NEW IDEAS

Landscape, architecture, and interiors are intended to serve as a living laboratory to generate and explore new ideas. The restored wetlands adjacent to the Mathias Lab feature treatment ponds and weirs that can adjust water flow to study the impact on various flora and fauna. While labs feature a direct visual connection to the exterior landscape, office space, meeting rooms, and building circulation are inwardly focused along the atrium, creating a dynamic heart at the center of the facility. Guild entrances are punctuated with color and over-scaled graphics to reinforce identity, but are internally connected and share vital resources and equipment. Finally, the existing lab building has been repurposed as open offices and conference rooms to accommodate substantial seasonal fluctuations in occupancy as graduate students and visiting scientists inundate the campus during summer months.

Offices & Conference Rooms on the Atrium

INNOVATION & INSPIRATION

The entire facility is based on an “open lab” concept intended to foster interaction, innovation, and inspiration. Different disciplines and specialties organized into research “guilds” that share space and reduce redundant equipment. Furniture, systems, and components are designed to be flexible and modular, allowing for growth and innovation as research and technology evolves. Recycled materials provide the foundation of an ethical interior aesthetic that is meant to inspire, while bright finishes facilitate reduced energy use and even allow for interior plantings to inhabit the core of the Mathias Lab Expansion project, an unorthodox feature in a laboratory environment.

View of Open Lab Looking South: Controlled daylighting reduces energy use while views reaffirm ecological responsibility

View of sample sorting room

LEED **PLATINUM**

The Mathias Lab Expansion received LEED Platinum in 2015, making it the first Smithsonian building to do so and setting a new benchmark in energy conservation and sustainable design for this type of facility. 250 geothermal wells, sitting below an experimental reconstructed wetlands area, provide heat exchange and help the building use 43.4% less energy than a baseline for the building type based on ASHRAE 90.1-2004. Water conservation, grey-water treatment, and re-use of 100% of its potable water reduces overall water consumption by 77.1%.