

Passive House + Living Building: Combining Rigorous Building Standards for Maximum Benefit

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ABSTRACT

Ashley McGraw Architects and Binghamton University are currently collaborating to design and construct a 2800 square foot research station. The project is located proximate to campus on a 70+ acre nature preserve called Nuthatch Hollow, and is being designed to become certified as a Living Building by the International Living Futures Institute. The project team includes two Passive House Certified Consultants, who chose to overlay the Passive House Standard with the Living Building Challenge as a methodology to achieve rigorous energy use reductions in a high performance building.

As a requirement of the Living Building Challenge, the Nuthatch Hollow project must achieve net positive energy, which means 105% of the project's energy needs must be supplied by on-site renewable energy on a net annual basis, without the use of on-site combustion. Meeting the ambitious

Passive House limits on heating and cooling loads, as well as source energy, will allow the Nuthatch project to easily meet the Living Building net positive energy requirements. This approach is more difficult than typical design strategies, but much more valuable in terms of investment and resilience. A PHIUS feasibility study has been initiated and will inform the ongoing design process.

Combining Passive House and Living Building presents some interesting challenges. The strict thermal requirements of Passive House and the material use limitations presented by the LBC "Red List", makes the selection of common building components, like windows, energy recovery ventilators, and insulation materials, into a very rigorous investigative process.

The composting toilets used to achieve the water use limitations of LBC must be designed to ventilate through the building envelope in accordance with Passive House thermal and air tightness requirements. On-site energy storage required for LBC must be located strategically in order to eliminate any negative thermal impacts within the Passive House envelope.

Reuse of the existing building foundation to meet site disturbance limitations within LBC requires specific attention to envelope details to achieve Passive House.

We are learning many valuable strategies through this challenging process. Collaboration is crucial to understand the building use and schedule in order to reduce loads as much as possible. Binghamton University faculty and students are engaged through integrated course curriculum in the vast amount of materials research required. In the face of all of the challenges, we will keep pushing the limits of what can be accomplished, to reach our climate goals for the future of people and planet.

BIOGRAPHIES

Nicole Schuster is a project architect at Ashley McGraw Architects with a strong interest in building science and passive strategies for high performance buildings. She has 10 years of experience with multiple building types and strives for maximum positive impact with each project. Nicole is a licensed architect, president of her local chapter of the American Institute of Architects, a LEED Accredited Professional, and the first architect in Central New York to become a Certified Passive House Consultant. She received a Bachelor of Architecture degree from Syracuse University.

A project architect with Ashley McGraw Architects, **Christina Aßmann** has 14 years of professional experience working on a variety of project types. Her interest in sustainability strategies stems from her upbringing in Germany where her parents instilled a focus on environmental stewardship. Christina's work embraces the integration of design, sustainability and exceeding her client's expectations. She holds the German equivalent of a M.S. in Architecture from the Universität Stuttgart, Germany and a Master in Architecture from the University of Kansas, where she was part of the renowned Studio 804. Christina is a licensed architect, a LEED Accredited Professional and a Certified Passive House Consultant."