

Net Positive 4-Plex

To design the most universally viable middle-housing option, with the highest density, we choose to design a four-plex on a 50'x100' lot. The 50x100' lot is the most common lot-size in Bellingham, and when we studied lot-orientation we discovered the east-west orientation is most prevalent within the city, so that's what we chose to work with. To make the complex more appealing to a wider audience and needs, we included only a few parking spaces made of permeable concrete. While the construction-cost of this cutting-edge home may be higher than a traditional building, **this middle-housing complex will be like nothing else on the market in Bellingham.**

The inhabitants of the Net Positive 4-plex wouldn't have to pay for any electric bills, their indoor air quality will be better than anything else they could live in, it's resilient to climate change, the finishes are all durable and non-toxic which also means less maintenance and replacing, and they will have smaller water and sewer bills because all of the fixtures will be low-flow or WaterSense certified. There will be very little maintenance required on this home and very few operational costs which reduces the overall the price in the long run, which is helpful for those in retirement or on strict incomes. In short, the homeowners get much more "bang-for-their-buck." Most middle-housing options also don't prioritize private outdoor space, however we chose to make a key feature from stimulating outdoor living, because usable outdoor space is not only the least expensive square footage you can buy, but also key to enjoying where you live. We all need sunlight and nature! The four-plex units are split in an untraditional way, to allow everyone to have a private yard and entry, while still maintaining the look of a single-family-residence from the street.

Net Positive 4-Plex was also designed to be flexible for any kind of family. The first floor has a zero-threshold entry and shower, all doorways are 2'10" or larger and there are wide walkways. Thus, the first floor is accessible for guests with mobility impairments and can be converted into a studio or one-bedroom for the owner, if needed. The two middle units (#2 & 3) can easily have a dividing wall installed to turn the living area into an ensuite bedroom. The second floor was designed to maximize storage while allowing a variety of uses for each bedroom. The north bedrooms can fit a king-sized bed and still fit a desk if needed, while the southern bedrooms can easily fit an extra desk in the bonus cut-out and a full-sized bed. Both bedrooms can work as offices, bedrooms, bedroom/office combos, kid's rooms, etc. Additionally, each unit has different minor characteristics that make them unique from each other while still having generally the same layout. This allows for slight variations in unit purchase prices, to allow for more financial diversity.

In terms of insulation, this four-plex is made with an R-48 SIP (structural insulated panel) roof, R-29 SIP walls, R-23.6 ICF (insulated concrete form) foundation, as well as R-20 underslab insulation. Separating the units are 12" staggered-stud sound walls with extra insulation to ensure acoustic privacy. The thermal insulation combined with aerobarrier air sealing, means the complex is extremely air-tight and efficient. SIPs are also known to be very sturdy and have even withstood hurricanes when all the stick-built homes around them were torn down. On top of that, SIPs are made to order, and scraps are recycled back into the production process by the manufacturer, which means less jobsite waste. Further, SIPs are stacked efficiently in the trucks for transport and are manufactured locally, reducing the project's transportation-related emissions. Both with interior and exterior selections, all of the products chosen are durable and eco-friendly. From solid wood cabinets, doors and trim, to engineered flooring, to low-/no-VOC paints and finishes, we prioritize locally made products and products that are compliant with GreenGuard standards. Some choices made to reduce this project's embodied carbon are the use of a different drywall with lower impact, the use of ICFs and a switch to 3" slab instead of 4" to reduce the required concrete. We use locally sourced and manufactured products, and we did not include a garage which is always a big producer of embodied carbon with too little utility. After the project is completed, we will also use the BEAM tool to calculate the embodied carbon.