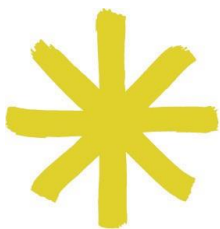




REPORT
NOVEMBER 2019

Building a Little Shipping Container Home in Buffalo, New York

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Introduction: From Tiny House to Little House

Our choice to live in a very small house is based on the belief that we in the United States use a disproportionate share of the world's resources. Our guiding question is "What is enough?" We think smaller is better. Our small house is our way to live effectively and comfortably while reducing our footprint in a step—however small—toward environmental equity.

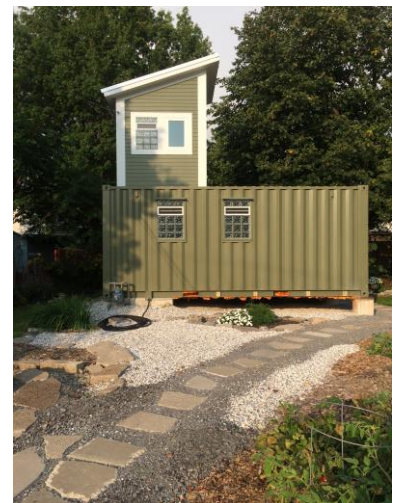
In 2014, we built a 200 square-foot "tiny house on wheels" in Vermont. The tiny house's envelope was metal studs, surrounded on the outside with standing seam roofing and on the inside with plywood. Closed cell spray foam insulation provided a strong, warm, filler to this sandwich. We lived in "Tiny House" for one and one-half years, including one of the coldest winters on Vermont record. We found it comfortably livable, with all we needed. At the time we had use of two additional spaces: a 300 square-foot studio apartment, which was our office/studio and off-season clothing storage space, and a small barn for yard tools, bicycles, and canoes.

In 2015, we began to think seriously about a move to Buffalo. We were frustrated by the long traveling distances from central Vermont to Buffalo, Pittsburgh, and Cleveland to see family, and our commitment to reduce our carbon footprint was being severely compromised by these trips and our two-hour daily commute from one Vermont town to another to go to work. We wanted to sell one of our two vehicles and to use public transportation and bicycles as transportation. These options were impossible in rural Vermont. A city was the ecologically sound solution, with Buffalo the logical choice, close to most of our family.

We saw a vacant lot in Buffalo's Black Rock neighborhood, and it appealed to us, with a green open space across the street we imagined could be farmed. The lot had several trees, and it was for sale. We met with City of Buffalo Zoning and Building staff to discuss our initial thought of moving 'Tiny House' to this lot. Folks at City Hall were receptive, and they encouraged our enquiry! Afterwards we talked with numerous people working in affordable



We lived in this 200 square-foot "Tiny House" in Vermont, just before our move to Buffalo.



"Little House," Summer 2017, a few months after we moved in. At 460 square feet, a mansion!

housing in Buffalo, and we visited urban farms. The welcome we received cemented our commitment to move.

Why a Very Small, Urban House

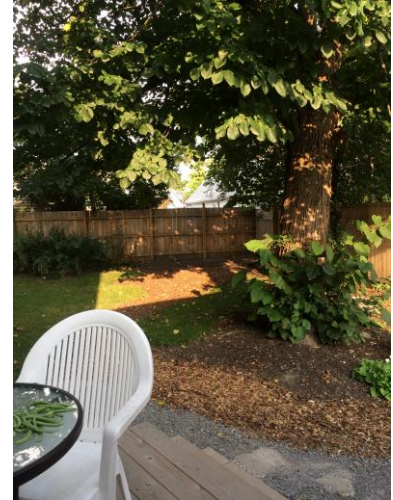
One reason for our choice of location was financial: we had approximately \$100,000 in savings, and our disposable income is too modest for us to obtain a significant loan. Nearing retirement with limited financial resources, we wanted to build with a small budget (we aimed at \$60,000), no mortgage, a little cushion of savings, and long-term low utility and maintenance costs.

Our correlation of “small footprint” with “low cost” was immediately challenged by high per-square-foot building costs—due in large part to the need to dig water and sewer lines (virtually the same cost for any size home). The most expensive components within a home—bathroom, appliances, and kitchen regardless of how minimal, are also hard to reduce below a certain level.

However, we still project long-term savings, based on our small footprint and careful design. Limiting ourselves to a few, small, Energy Star appliances, such as our 24-inch, front-load clothes washer, means low energy bills. We have no clothes dryer and no air conditioner.

An urban parcel reflects the wisdom of density, particularly when combined with public transportation and pedestrian and bicycle-friendly streets. Unfortunately, Buffalo zoning laws require a driveway and a one-vehicle off-street parking space. In our case, street parking is more than adequate, with at least three parking spots along our 50-foot frontage. We would have preferred to use the driveway space as a garden! Having built the driveway to satisfy the law, we still plan to use it as a patio with an arbor, bench and peace pole.

The small roof surface of our home means our lot will absorb rainwater without sending it into Buffalo’s 100-year-old storm sewers. Like many old cities, Buffalo has a system that combines both rain and sewage, and thus exceeds treatment capacity



Our back yard/courtyard, seen from our deck.

whenever it rains more than a trace amount. Absorbing rainwater and snowmelt on-site, rather than funneling it into the sewers, helps prevent raw sewage from overflowing into local rivers and lakes.

Our small house respects the concept of human scale promoted by E.F. Shumacher,¹ Christopher Alexander,² and Jonathan Hale.³ Our modest—admittedly odd-looking—structure, tucked into the back portion of our lot, affords a front yard to encourage a “friendly front space”—akin to, yet more accessible than, a front porch—where neighbors and passers-by gather with us to chat as we work in our front yard and garden. Part of this interaction seems initiated by our home’s novelty, though we hope some of it comes from our presence as we garden without noisy machines.

Growing our food lets us practice land stewardship as we enrich the soil and consume fewer resources transporting food to table. We work our garden by hand, promoting health and keeping our bodies in shape. Several of our neighbors do the same! When neighbors converse—and swap vegetables—we practice neighborhood stewardship. A side benefit may be contributing to a critical mass of visible neighborliness that may discourage—as one neighbor put it—“the open-air neighborhood drug market.”

Building a new house on a vacant urban lot has both advantages and disadvantages. Advantages include the ability to custom-design a very small, sustainable, efficient space, leaving lots of room for gardens and trees. Disadvantages include the need to hook up water and sewer lines. In our case, a good portion of the street and sidewalk had to be excavated, and it is the homeowner’s responsibility to repair the damages to the public parts of these spaces. Our original estimate for water/sewer hook-up was \$6,000, based on Donna’s experience in rural areas. The actual cost was \$17,000. Also, the heavy equipment going to and from the lot made us unable for several months to replace the sidewalk—which created an eyesore and an inconvenient disruption in a neighborhood where many people walk.

Re-Using Materials

Site preparation included breaking up a fair amount of concrete: the existing driveway apron and approximately 40 feet of sidewalk.

Having lived in New England, where driveways and parking pads are often crushed stone, we chose to use these broken pieces set into quarter-inch crusher as our driveway and walkway. (Standard concrete, however, is required on common-use sidewalks, and we were required by the City to replace almost the entire 50-foot span at our expense).

We reused and repurposed other materials, too. We installed new plumbing and light fixtures, believing these would give optimum savings over time, but for other materials we looked for used or defective items if their age or defect would not compromise safety or utility. We purchased used slabs of maple butcher block and solid cherry for countertops (their scrapes and nicks provide a certain character). Our savings for these two slabs was in the \$500 range. The white subway tile in our kitchen was left over from the remodeling of a family member's bathroom.

We purchased a new solid-core panel door with a foot-long gouge on the edge of one side, at a fraction of the cost of an unblemished door. Using it as a pocket door conveniently hides the gouge.

We spent three full Saturdays combing through bathroom tiles at four recycled-materials stores for our entirely-tiled bathroom. As we mixed and matched our choice of greys and whites, we became aware that not all tiles conform to size and thickness standards and we had to be careful to be exact. Had we chosen just any tiles, our installer would have needed to use much more labor and grout, and our costs would have been much higher.

Two of our used purchases were real finds, simply from being in the right places at the right time. Our gently-used enamel European-style radiator cost \$70 (brand new in the \$500 range), and when a new enamel-over-cast-iron Kohler sink for \$40 caught Donna's eye during an unexpected "Let's just see what they have" stop at



Nacho's hard work: broken-up "waste" concrete laid into an 8" deep bed of "quarter inch crusher."



The grab bar extends the length of one wall, providing stability in the shower and doubling as a towel bar. The wall-mount toilet was expensive but worth it for the space savings in this tiny 3 1/2' x 5' bathroom.

ReStore, we scooped it up. Afterwards, Donna found this sink on Kohler’s website, retailing for \$370.

Design Choices: How to Make a Small Space Workable

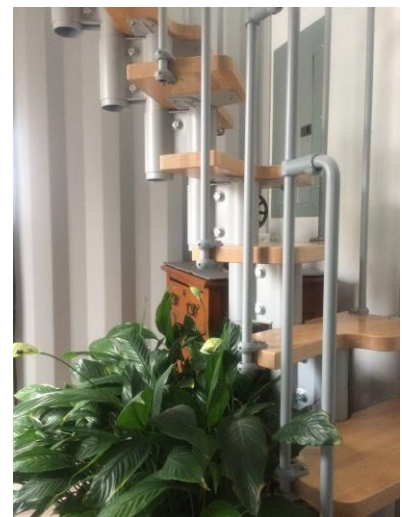
With our main goal being a small ecological footprint, we tried to maximize the integrity of the containers by incorporating their original shape, and their structural strength, into our design. This required site planning—while adhering to zoning laws—as well as interior home design, to make the small space workable. Most container homes we had seen had cut out huge portions of the containers, effectively leaving them only as the exterior shell. Three 20-foot containers placed in an L-shape were more “in line” with our plan. We retained the containers’ integrity and figured out ways to maximize indoor space. The L-shape, strategically placed at an angle on our double city lot, configured generous outdoor spaces for gardens and courtyard with six fruit trees and an ample vegetable garden; and a private rear yard with perennial gardens, deck, and patio. Our conscious effort to use less also included leaving exposed interior parts of containers to reduce building materials for walls, floor, and ceilings.

From our “Tiny House” experience, we knew we would be very happy with a small galley kitchen without microwave, dishwasher, or disposal; a 4 cubic-foot refrigerator tucked under the countertop, and the smallest-size-available chest freezer for surplus garden veggies as winter meals (and, of course, ice cream); tiny 17 ½ square-foot ‘wet bath’; minimal work and storage areas, such as wire shelving as kitchen storage/prep counter, daybed-as-sofa—with custom under-sofa roll-out drawer large enough to hold all off-season clothing—which easily converts to a guest sleeping space; and attractive enamel radiators that double as towel warmers and clothes dryers.

Our home’s being small—460 square feet—is an investment in efficient design to use minimal energy for heating, however our footprint design is not so efficient: relative to habitable volume, surface area exposed to the elements is high. We wrestled with the



We purchased from—and brought unused materials to—Habitat for Humanity’s ReStore. In this photo the enameled cast iron sink and used cherry countertop from ReStore peek from behind the curtain in our laundry area.



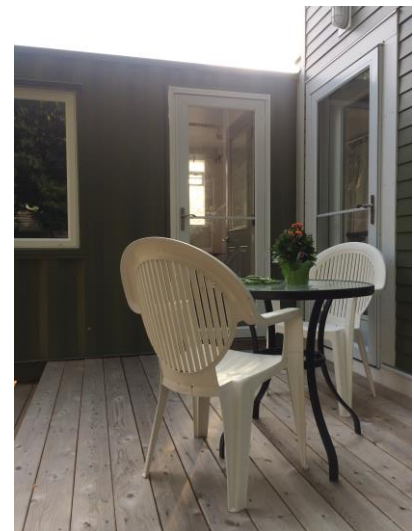
The industrial edginess of exposed interior container walls saved material and labor costs. (Note the alternating tread stairway and electrical panel.)

question: to retain the containers' shape and structural integrity, or to cut and remove an entire wall from two containers? Had we joined them lengthwise, interior space would have been opened, and outer-wall surface-to-the-elements reduced, increasing heating efficiency. Yet this option would have posed its own problems, including costs to alter containers, reduced structural integrity of containers requiring additional interior bracing, and increased overall footprint, which would have reduced garden size and eliminated the private yard. Our containers may act like cooling fins during our winters' harsh westerly winds, but these costs are turning out to be relatively low because of our home's modest square footage.

Setting the house further back on the property than is conventional reflects our design choice to have neither a street-facing door nor drapes on street-facing windows. Our home's two doors are within the interior yard, arrived at via the meandering broken-up concrete path, and street-facing windows are glass block. Thus we intentionally created a welcoming outdoor space, a private/semi-secluded outdoor space, and a sunny and bright—while also private—indoor space.

Donna—an avid proponent of the golden ratio—insisted our windows be of a certain proportion, and positioned to follow architectural regulating lines. This meant more time (and billable hours!) for our architect, but they were worth it, and we are happy with the results.

Our foundation houses utilities and a modest storage area. We initially did not plan a foundation, intending to sit the containers on pylons, similar to our Vermont "Tiny House," which is on wheels with supporting pylons. Our architect convinced us to make a partial foundation—a poured 24' long x 6' wide x 4' high crawl space, really—which added time to draft blueprints, and additional construction costs, but we are glad we agreed. Utilities run through it, and it fits the combination boiler/water heater, thus not encroaching into our living space and assuring water pipe and gas



The courtyard deck offers a quiet back yard respite, nestled into the "L" created by the containers' angles.

line protections from the weather. The foundation is well worth the \$7,000 cost.

We originally intended to divert water from roof and footer drains into a large dry well, below basement grade and filled with stones. Our plumbers and excavators quoted huge costs, and so we opted for “Plan B”: swales. We applied for a City zoning department permit to create swales to divert drainage water to low spots in the yard that would not drain to neighbors’ properties or to the street. The change resulted in a week’s delay, for City approval, but the swales have been effective, with no standing water or water runoff.

With no rain gutters, functional (and, hopefully, visually attractive) drip edges are necessary to protect windows, frames, ledges, doors, and other places where exterior structural components join. Small drip edges per the original design were welded in place. The first significant rainfall proved these ineffective; thus they were redesigned and re-installed. The redesign is functionally much more suitable and more visually attractive, but it added \$500 and unanticipated extra time. Original blueprints showing drip edge installation had been misinterpreted, revealing another example of why it is important to request the architect’s clarification.

As we moved forward, we were forced to make choices. The biggest impact on the carbon footprint of a Western New York home is energy consumed heating and cooling. Our home’s small size reduces this cost. Yet the fin-like design increases it, and we were faced with significant heating/cooling/energy cost considerations. Geothermal—the most energy-efficient choice—uses a heat pump to take advantage of the warmer temperature below the ground. Geothermal systems can also provide inexpensive cooling, but we believe air conditioning is an unnecessary luxury in our climate. We count on our well-insulated envelope, window design and placement, and large trees in ours and neighbors’ yards as cooling mechanisms. We would have liked to use geothermal for heating, but, the up-front cost—close to \$30,000, including radiators—



The 20'x6'x4' crawl space.

seemed prohibitive, along with the need to dig up the entire yard to install the system.

We settled on a very small, very efficient Energy Star combination hot-water-on-demand/boiler unit that tidily tucks into the crawl space, and three European-style white enamel radiators (two double as towel warmers/clothing dryers, and the third we bought used for only \$50.00). Our overall cost for radiators, boiler/hot water unit, and installation by City-licensed contractors, was just under \$15,000—higher in cost yet much more efficient than forced hot air, somewhat less efficient/less environmentally conscious than geothermal, and—though not cheap—about half the cost of geothermal and a reasonable long-term compromise.

Another design choice is the type of insulation, and whether it is on the outside, or the inside, of the containers. Outside insulation requires exterior framing, adding significant cost by having to surround the containers with weatherproof siding and roof. This was too costly, although it would have provided us with one foot of greater interior dimension in each direction.

We researched batt insulation, and spray foam insulation. We opted for spray foam due to its relatively low cost and its exceptional insulating quality. Two-and-one-half inches of closed cell spray foam insulation against the metal provides a vapor barrier. Three inches of open-cell spray foam insulation, between the closed cell and the inner walls, is a necessary moisture retardant.

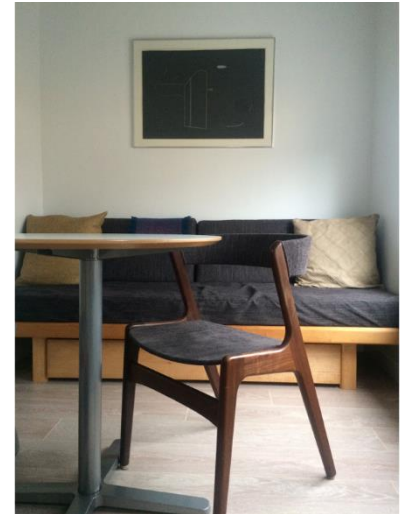
It was only after installation that we learned that spray foam is very ugly stuff, and when considered solely as a material, is not as environmentally friendly as we had thought. We have been reassured that—when applied by competent professionals and covered with proper finishing (wallboard or the like)—spray foam is contained and is not a long-term hazard; yet as we began to read about controversies concerning its impact on the environment and on air quality, its extreme amount of waste, and the considerable clean up of spray foam excess in unwanted places required after

application, we began to doubt our choice, and to kick ourselves for not doing enough initial research.

Using the container as the outside shell lost six inches from ceilings and each interior wall, a critical amount when fitting furniture, such as Donna's sofa. It fit with one inch to spare. Donna justified her need to fit her sofa, recalling architect Walter Gropius's hard-and-fast bedroom dimensions in his Lincoln, MA home to fit furniture designed by Marcel Breuer. Width—according to tour guides—fits the bed, not the other way 'round. Donna's sofa—not designed by Gropius or Breuer—was built at a Cambridge shop, a short walk to the school where Gropius taught.⁴

Flat roofs pool rain, and, in our climate, snow load is a structural concern. Our architect called for container roofs to be slightly bent lengthwise at their centers to shed precipitation off rooftops toward both sides. This was easily accomplished. December 2017's snowfalls revealed the wind patterns; the position of the containers on the property and the slight bend in the roofs promoted sufficient reduced snow load. Bending the rooftops was good, but we have an inkling the lack of snow on the rooftops is mostly due to pure luck. We're westward of, and very close to, Lake Erie and the Niagara River, from which strong westerly winds prevail, and our fairly open-to-the-elements property attracts these breezes that naturally discourage rooftop snow accumulation.

Combining shipping containers with a “stick built” (conventional) structure is not everyday practice. Some design details—which became obvious during construction—had not been anticipated during planning. Our contractor recognized problems on-site while reviewing plans. One unanticipated detail was the join between the stick-built portion and the roof of the adjoining single-story container, with its slight center rise to shed roof water. Our contractor pointed out this design's simple physics: half of any water or snowmelt would route toward—and likely pool against—the wall of the stick-built part of the home! This “revelation” was brought to our attention days prior to insulation being sprayed. Our welder



installed a metal plate to divert water directly to the ground. The nick-of-time insight was invaluable; welding would have posed too great a fire hazard if done after insulation.

We wondered, what parts of the exterior are safe to naturally rust, what parts need to be protected with paint? Though we initially planned to let much of the exterior “age naturally,” our architect and our welder advised, due to our climate’s harsh winters, it’s best to protect parts exposed to the elements. Painted parts of containers require oil-based paints and protectants: tough and durable but environmentally questionable, and though we wanted to use as little paint—and definitely as little environmentally questionable paint—as possible, we broke down and painted exposed areas with relatively volatile oil-based exterior enamel.

A container home is airtight. With windows and doors closed, and with joints between foundation and containers sealed, there is minimal interior-to-exterior air exchange. This tightness, coupled with insulation, provides efficient heating. However, this energy-saving feature also limits air exchange, resulting in a very unhealthy living space.

Designs for sophisticated heat conserving ventilation systems exist, installed in new energy-efficient buildings. However, our HVAC contractors advised us current systems would be overkill in our small space. Our contractor read, in a building journal, of a way to pull fresh outside air into the home and allow it to slowly warm while pushing out stale air: a bathroom exhaust fan which constantly runs at low ebb thus effectively and regularly pulling fresh outside air into the house, and pushing out stale interior air. This fan has two sensors to promote exhaust flow: a motion sensor, and a moisture sensor that cranks up the fan when a moisture threshold is reached, i.e. from showers and from cooking. Too-high moisture can be detrimental as it creates condensation and moisture inside walls, leading to mold growth. When the moisture sensor triggers, fresh low-humidity outside air replaces high-humidity inside air.



This in-construction photograph shows the conventional "stick built" portion of our home (the portion covered in Tyvek). It is a connector between the two stacked containers and the single container. The connector contains the alternating tread stairway leading to the upper of the stacked containers. Situating the single container at a right angle to the stick built portion creates an L-shaped inner courtyard. Note the original colors of the containers, which we painted after the welded "joins" left the exterior charred and visually inconsistent.

Even in the absence of showering or cooking, an appreciable amount of moisture is generated simply by breathing, and it compromises air quality. We hope our fan is both sufficient to ensure healthy air exchange, and this simple arrangement will preclude the need for a more expensive and complicated system. We had planned to measure air quality after living in the home during the months when windows must remain shut, and in November 2018 Nacho called an air quality testing company to enquire. He was told an initial assessment consists of placing monitors in the home to test for contaminants, and writing a report of the findings. However, their equipment is not precise enough to detect specific contaminants, and they do not recommend how to mitigate. We shied away from this vagueness and from the cost estimate—in the \$400–\$500 range—and we’ve yet to explore additional options.

An amenity we would love to have incorporated is radiant floor heat. We both have poor circulation in hands and feet, and cold wintertime floors are not only unfriendly, they are unhealthy. Radiant floor heat is expensive, and we were also concerned with possible down-the-road maintenance and repair costs. We went back-and-forth weighing this option, ultimately nixing it. As appealing as it may have been to have a toasty-warm floor, the thought of a network of water pipes beneath the flooring concerned us: what if the plumbing system fails? How is a water leak economically repaired? What is the longevity of a radiant heat system? And, in practical thinking, could we afford the initial cost? Instead we put in three layers of floor insulation. The top layer—sustainably produced naturally insulating cork flooring on the first floor—is surprisingly warm underfoot, affords a pleasant sound barrier (assurance-tested by four children and nine adults in our little home for a family party) and makes up for the lack of the radiant heat luxury. A bonus was the cost for this significantly discounted discontinued color.

There were other choices we made during our build in which we had to weigh short- and/or long-term environmental drawbacks or

benefits, such as covering floors and other interior spaces. Well after our purchasing the containers—during painting and finishing—Donna called a polyurethane manufacturer to question using their environmental award-winning product to protect the exposed upper-level shipping container floor. Their representative was the first person who apprised us of harsh pesticide applications to shipping container floors. He instructed Donna how to interpret the information printed on the metal plate fastened to the outer door of each container, especially what the codes on the plate stand for. We knew the containers had been painted with oil-based paint, but what we had read had not given any indication of its potential harm after application. We had neither heard nor read about containers being routinely sprayed with toxic—and purportedly long-term off-gassing—pesticides. The home was days away from move-in, and at that point we were out of time and money to do anything about the pesticides! After initial panic, we had discussions with our builder and an entomologist, and we researched the topic online. We confirmed—as is often the case when one obtains a bit of knowledge—that covering the two lower floors with insulation, subfloor, and finish flooring is a more-than-adequate safeguard; and our three-layer coat of whey-based polyurethane is a reasonable seal for any pesticides that may—or may not—off-gas from our upper container “exposed” floor.⁵

Choosing—and Fitting Into—a Neighborhood

We searched modest city neighborhoods where gentrification had not “taken over,” and also where we would both feel comfortable. We looked at Black Rock, and the East and West sides. Donna—who had been away from Buffalo close to 20 years—is very comfortable in Black Rock, the working-class neighborhood where her great-grandparents and grandparents settled in the 1920s as young immigrants, where her parents grew up, and where she, and other family members, live or had lived.

Donna came to terms with how much her thinking is shaped by a sense of “neighborhood boundaries.”⁶ Her parents grew up during

the Depression in Black Rock, then a neighborhood of almost entirely their own ethnicity. A few years after they married they moved to the nearby suburb of Kenmore, where Donna, from an early age, felt like an outsider. A sensitive child, she sensed an empty void she could not put into words in her cookie-cutter manicured neighborhood, exacerbated by the too-frequent taunt, “dumb Polak.” She enjoyed visiting her grandparents in the City. From the age of 12 she frequently escaped alone on the NFTA 20B bus to downtown Buffalo. With her vivid recollections, she felt comfortable in the City’s old neighborhoods with their ethnic and cultural diversity. Nacho, new to Buffalo, had no preconceptions. Believing cities are ecologically sound living choices, specific city location did not matter, provided it was affordable. Having grown up in Colombia and familiar with what poverty does to a community, Nacho wanted to live where he would be an active participant and advocate for all community members. Currently, he works on Buffalo’s East Side. But when he suggested placing the tiny house on the East Side, with its largely African-American population, Donna believed their project might disrespect a culture that was still intact. The maintenance of culture is the only upside, Donna maintains, from a history of many years of redlining based on skin color. Buffalo-Niagara, sadly, is reported to be the seventh-most segregated metro region in the US.⁷ White people moving—not subtly, but with a controversial-looking project already attracting media attention—into a primarily black community might be perceived as an affront.

Black Rock offers walking/biking access to the now-revitalizing Amherst Street business district, Scajaquada Bike Trail, Delaware Park, the Albright-Knox and Burchfield Penny Art Galleries, and the lively Elmwood Village. The Kail Street parcel was a perfect size for our needs and wants, and we envisioned our home integrating into the scale of existing homes on the street. Ours would appear odd for sure, but (hopefully) not as much an anomaly as among bigger homes, as, for example, on the West Side.

A good friend who lives in Black Rock recommended contacting our Councilperson, who spent the good part of an afternoon with us discussing ideas and getting to know us over coffee at a neighborhood café. He listened intently, asked questions, and proposed a community meeting for us to present our idea and to obtain feedback from neighbors.

The meeting was held at a restaurant at the corner of our street. Neighbors voiced their feelings. Nacho briefly and shyly introduced us, and our proposal. Someone bluntly interrupted, “What exactly are you proposing, what will it look like?” Most opposition came from neighbors who envisioned our parking a beat-up shipping container—like you would see at a construction yard or on a railroad car—on the property, that it would be a haven for graffiti, it would be mobile, and we’d eventually pull up stakes, leaving mud and an ugly slab or footers behind.

Donna earnestly replied, “Oh, no, we will plant flowers! We will build on a permanent foundation, we will paint the containers bright white!” to which came the retort, “Oh, great, we’ll be staring at a bunch of huge refrigerators!”

We showed a drawing of our proposed home on the property (with trees and flowers in bloom, as visual encouragement), and our Councilperson pointed out that ours indeed is a new look, which will add to, rather than detract from, the community. He encouraged neighbors: “Here are a couple of people willing to stick out their necks and make an investment in our neighborhood. How about welcoming them?” Neighbors seemed to warm to the concept.

We are surprised by the number of people who ask why we chose Black Rock—still an immigrant neighborhood, though at this point with immigrants (mostly refugees) from an estimated 30 countries, and therefore considerably more diverse than when Donna’s parents were children—which they tell us they are afraid to visit.^{8,9}

Such perceptions and stereotypes, we learned, feed into modern-day redlining. Moving to Buffalo in 2016, we had secured temporary,



This is the drawing we showed our neighbors, and we naively thought it would suffice to obtain our Building Permit, similar to drawings Donna had used to obtain permits in rural New England. Neighbors were put at ease seeing this preliminary sketch. Though enthusiastic and supportive, the City of Buffalo Zoning Department requires three sets of full-size architectural renderings, each sealed with the current license of an architect. This sketch shows our home situated on the property, however with a one-story conventionally built connector. Our architect encouraged us to build a two-story connector, which enabled us to put the stairs in it, rather than cut holes for stairs into both of the stacked containers. In addition to retaining the structural integrity of the stacked containers, placing the stairway in the connector allows for obstruction-free space in lower and upper containers.

affordable, residence in the prosperous suburb of Amherst. It became obvious we needed to spend time near our home in construction, and so we moved to a Black Rock apartment within walking distance. This proved a considerable savings of time, and allowed us to be “on call” for in-the-moment building decisions. We highly recommend living near your in-process construction!

Within weeks moving from Amherst to Black Rock, we received a letter from our automobile insurance carrier explaining our policy was cancelled, with “option” to purchase a new policy of equal coverage, at 30% more cost! Coincidentally that week we heard a ProPublica report about automobile insurance redlining. Their research showed rates in zip codes in lower socioeconomic areas are often considerably higher than in areas with higher-income demographics—even when statistics prove claims are fewer and represent less cost than in higher-income zip codes.¹⁰ Donna then gathered quotes from three major insurance companies, finding that they averaged higher in Black Rock than in Amherst.¹¹

With our suspicion of redlining, we question which other services may also have higher costs in lower socioeconomic areas. In Black Rock we experience curiously slow internet service, and—though we’ve done minimal research, we wonder if internet service providers base services on demographics. We learned, on applications for credit, insurance, and loans, previously closed doors opened when we subtly reword, declaring Donna a “College Professor” instead of an adjunct instructor, and Nacho an “Agricultural Consultant” instead of a farmer.

Another unfair cost—though perhaps unrelated to redlining—is the utility company’s use of estimated billing. Three times in five months we received unreasonably high estimated bills from the fuel company. When Nacho enquired, each time he was given an apology and we were sent an actual bill. One was close to \$100 less than the estimated, all were approximately 1/3 the estimated. Never before—in our collective 70 years receiving fuel bills—has either of us experienced estimated bills so out of whack with real costs. Had

Having very modest financial resources, and after having read recent statistics, we consciously opted in to do what we could to contribute toward an economically healthy Black Rock. The following statistics helped us to cement our commitment: “In 2015, Black Rock’s ... population density of 9,516 per square mile is relatively high compared to Buffalo’s overall density of 6,354 per square mile. Only 25% of Black Rock residents are homeowners, representing 1,612 owner occupied housing units. There are 1,313 vacant housing units, and 46% of the population is considered below the poverty level. The median home value is \$43,660 compared to \$91,401 for the city as a whole.”¹²

we paid these estimates, it would have been the equivalent of an interest-free loan to a very profitable utility company!

Permits and Insurance

Donna has had two homes built in rural areas. Permitting, in a city, we found out the hard way, is different. In July 2016 we went to the City of Buffalo Building department, with our carefully drawn-to-proportion sketch of our home, to obtain our building permit, just as Donna had done in rural Vermont and Massachusetts. We were prepared; we brought our checkbook. Piece of cake, we thought.

We were not prepared for the response, the first of many in this challenging and “more expensive than we initially bargained for” project: “We will be glad to review your plans when we see triplicate copies of your architect’s stamped blueprints.” Our architect? Blueprints? Stamped? We had not calculated this cost, which we knew would be close to \$10,000!

Our search for an architect was serendipitous. Donna and two of her grandchildren were at Buffalo’s Delaware Park when Donna spotted two shipping containers at the “Shakespeare in the Park” site. These are used to house stage lighting, sound system, and a gift shop. Donna and Nacho returned a few days later, to glean ideas, and in the nick of time. An end-of-season crew was dismantling the entire site. A crewmember dismantling the shipping containers mentioned his University at Buffalo School of Architecture professor’s experience building with containers, and he encouraged us with “You gotta give him a call!” We did give him a call, had a productive meeting—and a delicious meal—at Amy’s Place, close to campus, and we sealed the deal.

As we explored costs, we discovered hiring a General Contractor (GC) would put us well over budget. A GC includes up to 20% of the price of the project for project management, a margin we could not afford. We wanted to hire a very good builder who did not have a GC license. We decided to be our own GC.

When Donna saw 20’ shipping containers at Buffalo’s Delaware Park “Shakespeare in the Park” site, she enthusiastically dragged her not-so-enthusiastic grandchildren from the park playground to check them out. A few days later, she and a more-enthusiastic Nacho revisited the site, as an end-of-season maintenance crew was dismantling it. In addition to getting a tip from a crewmember that resulted in their hiring their architect, they learned an interesting bit of Buffalo lore: each summer, the theatre site is carefully assembled, and then dismantled at the end of the summer performance series. Why? “Shakespeare in the Park” sits on Buffalo’s largest sledding hill!

This is not as simple as it seems.

A GC working in the City of Buffalo must be licensed. To obtain a license the GC has to have liability insurance. To obtain liability insurance we had to have our blueprints approved by the City. To have our blueprints approved we had to have liability insurance.

Rather than chase our tails we calmly talked with the City Zoning and our insurance agent. Here we found exceptionally competent people wanting to move our project forward. For insurance, we found the Franz Manno Agency, where our agent was most helpful finding the policy to fit our needs, just under \$8,000 for liability and builder's risk combined, and a "gift" compared to all of the other quotes we received, which were in the \$30,000 range.

A GC must carry workers' compensation liability insurance, the cost of which is more reasonable. Several competent and supportive people at New York State Insurance Fund (NYSIF) helped as we navigated this insurance application.

We had questioned our needing workers' compensation disability insurance; it was a grey area depending on whether our builders were independent contractors or employees, which involves 12 separate criteria. Just before Christmas 2017 we received a notice from a collection agency that we owed over \$500 in disability insurance penalties and interest! After telephone conversations with four different people during Christmas week—one from the collection agency and three from New York State Department of Labor—we were told a letter sent to us in October had been returned because the Department of Labor addressed it incorrectly. It took almost two weeks of speaking with seven people at NY State Department of Labor to finally establish that our builders were not employees, and we did not need disability insurance.¹³

We chose to be our own GC as the only way to avoid paying a high price for the overhead of an established GC, and also we wanted to 'be close' to the entire process. While we accomplished our goal of

We juggled the trade-off between reasonably-priced hard workers who wanted neither to give explanations nor answer questions versus more professional-seeming companies who gave detailed quotations and signed contracts, and whose rates usually were higher. One quote was almost double another for the same work. From working with our primary builders (a family working together doing top-notch work in a professional, highly competent and efficient way), we realized it does not matter the size of a business or whether family or a "purely business" endeavor; it matters the work ethic of the people. Lesson: it is essential to have one-on-one in-person conversations with prospective contractors, prior to hiring.

working with our choice of excellent builders, this came with a learning curve—and, even after all of our homework and help from our competent insurance agent—a significant cost in insurance premiums for liability and workers’ compensation. We continued through the entire building project—July through January—struggling with this piece of red tape.

Our being GC was worthwhile, even with the challenges. Though less costly, and personally more rewarding, than hiring a GC, the time, costs, and red tape of insurance, and our “green” building experience are nevertheless significant considerations, that, for some, may warrant the 20% of project cost for a seasoned GC. We caution anyone who wants to act as GC to weigh the alternatives.

Bringing Together a Team: Architect and Contractors

Working with our architect was pleasant. Upfront he suggested improvements to make our house more structurally sound, such as the added extra space in the form of a “conventional-build” two-story frame structure connecting the containers at the “L.” These changes meant increased costs for plans, materials, and labor, but we appreciate them now that we are living in our home. He smoothed out some in-the-moment rough spots during our design-build process, too. Design-build is flexible, but there can be snags: every change, every enhancement, can add costs to design, to construction, and to time. Some changes require permit approval, and this can take weeks, or even longer.

Importantly, with the City requiring proof of the design by professionals, we know our home’s architectural, engineering, and structural components are sound. Footers, foundation, and piers were designed and built to strict standards.

A challenge of being one’s own GC is the risk of knowing enough to be dangerous. It’s important to acknowledge your personal working style before you begin a building project. Do you like to stick to your plans by the book, following to a “T,” or do you like the “design-build” way of working, modestly tweaking plans along the way?

Donna is most comfortable with “design-build,” having completed her two previous house construction projects with honest and competent contractors with whom she worked in tandem to make competent “design-build” decisions. This way of working requires being available for in-process consult, sometimes at short notice. Our builder was amenable to our on-the-spot alterations, and he was straightforward, honest, thorough, and knowledgeable in letting us know when compromise would be best in the long term. We were confident in his guidance, and happy for the opportunity for latitude as we proceeded. We have found our small in-process alterations amenable to the City inspectors, who were practical and helpful—in no way rigid—confirming plans and providing permits.

Our builder and our architect had collaborated on previous projects. We did not know they’d worked together when we chose these folks; it was an appreciated bonus. Having both builder and architect occasionally on-site to amicably discuss inevitable snags has ensured a robust project.

As GC, our primary challenge was to find specialists for areas such as excavating, heating, and electrical. Being new to Buffalo (Nacho), and returning home from an 18-year absence (Donna), we were naive about the surge just beginning in Buffalo’s housing market, which made it hard for us to find people willing and/or able to work at reasonable prices, within reasonable timeframes.¹⁴

We were at first shocked by the disparities of subcontractors’ quotes. We learned to ask up-front if a subcontractor is licensed in the City, and we now understand that those who work “under the radar” often did not tell us they were not licensed until we asked that specific question, though a tip-off is that their rates are usually substantially lower, while those who work “above board” must cover insurance and license costs by charging more.

Managing the Construction Process

We were not prepared for the considerable amount of clay and mud disrupted by digging the foundation and the length of time it took

before we could replace the entire front sidewalk and the driveway apron and build the driveway.

Site preparation included our going back-and-forth several times to make small changes and to ensure our work was following the requirements of City permits. We were unprepared for the added stress of an additional plumbing inspection, erratic excavators working in deep ditches in the cordoned-off street, and a good chunk of street and the entire 50' span of sidewalk in front of our property dug up. We are thankful for having followed all proper permitting and insurance processes.

Before digging, we had to pre-schedule pouring the foundation for very soon after digging, as exposed cellar walls would be prone to cave in, especially with the very wet weather.

One lesson: do not rush landscaping; it will likely be torn up again and again during construction.

When crawl space was excavated and foundation complete, there was a daunting amount of backfill on our little lot. Lesson: disturbed soil/excavated material takes up much more space and is much more visually insidious than when compacted and under grass. A considerable amount had to be removed, yet we realized one added bonus: the unearthing of quite a few old foundation rocks that offered themselves as aesthetic landscape components.

Neighborhood houses, such as the two removed from our lot in the early 1990s, lacked basements. Most soil from the excavation was “Black Rock clay”—a dense, sticky, heavy, orange-brown muck. Before excavation, Nacho had optimistically imagined this clay could be used as backfill and to create the swales required by our plans to channel water from the foundation. Though we used some, Nacho grossly underestimated the excess clay.

Where to put material dug from the foundation hole, and how far would it have to be hauled? When a basement hole needs to be filled after a demolition, excavators are lucky if the site is nearby. Our

We received wildly disparate quotes from contractors. For example, one electrician quoted \$14,000, a second quoted \$8,500, and a third, \$4,800. Our research, and what we were told by City inspectors, taught us to obtain written proof of City of Buffalo licensure from all subcontractors, and, optimally, at least three written quotations. City inspectors were fair and helpful in letting us know what work must be performed by licensed craftspeople, and what we could do ourselves. This information allowed for transparency when we asked for quotes and hired professionals, and—in the long run—helped to rein our costs.

excavators gave us a tip how to dispose of the excess clay: there is a network of information about demolitions, and for which demolition and when, fill is required. Disposal sites for excavation materials vary with the City's demolition schedule. The day of our excavation there was a foundation hole fill scheduled in our neighborhood. We do not remember the reason, but it was delayed. The opportunity to haul the material a very short distance—thus at low cost—was lost. Though this is technically the excavator's concern, it affects the homeowner through the cost of the excavator's service.

After pouring, a foundation must cure at least two weeks prior to placing heavy weight, such as containers, upon it. During this time our excavators continued a long, deep, and wide ditch from our home two-thirds across the street to the City main lines, into which was placed the sewer pipe, and two feet over (as required by code), a one-inch copper potable water pipe. Our little yard and the street in front of it were obliterated by trenches and piles of clay.

After the foundation was poured, we had to ensure proper installation and inspection of footer drains. Since we had opted to not divert footer drains to a large and expensive dry well, these drains had to be brought into a sump pump installed in the crawl space. The sump pump distributes water to low spots on the property, as calculated by our architect, specified on the blueprints, and approved by the City.

Our concrete contractor recommended, and we installed, a plastic barrier against the foundation's outer walls, which diverts water quickly from foundation walls into footer drains. The key to a dry foundation is to move water away from it as fast as possible, averting the possibility of hydraulic pressure against the walls, as it is logistically difficult to achieve a completely watertight seal around a concrete foundation. Here went an unplanned—though well spent—\$350. Our wet Fall, Winter, and Spring thaws gave proof there is no moisture in our basement.

Once our plumbers had footer drains in place and drainage cover installed, Nacho hauled Corian® chips by wheelbarrow to cover the footer drains and to guarantee required drainage away from the foundation. This was one instance in which a wheelbarrow, a shovel, and a willing person's time proved as efficient as—and considerably less intrusive than—a backhoe. While concrete cured, Nacho hauled and compacted clay into swales and slopes up to the pylons and foundation. We would need to be careful placing the containers, as areas excavated and refilled would not be solid enough to support the weight of the containers and the machines that would place them onto the foundation. We were also fortunate there was no buried, rotting wood to cause both unstable ground and VOC concerns. Nacho borrowed a laser level from the people who poured the concrete, and he and one of our building contractors leveled and grouted custom metal plates onto which the containers would be placed. They were very proud of their work when the containers set in place were spot-on level!

Into the second half of July we confirmed delivery of our three shipping containers from our supplier in New York's Hudson Valley. We had purchased the containers in March, optimistically projecting delivery three weeks out. The weeks stretched to months, and, mid-June, our salesman pressed us: Summer delivery is difficult to schedule, and more expensive than early Spring. Yet the foundation—with its unanticipated hold-ups—had to be in before container delivery, and we had to factor in the two-week curing required for the poured foundation prior to setting containers upon it. The delivery delay added \$300. Lesson: do not jump the gun.

Finally! Containers were scheduled for July 27. Weeks earlier Nacho had secured a telehandler machine to unload them. July 25 the telehandler company called: they would not have a machine for us! Nacho scrambled with “option two,” calling a nearby industrial machine rental company. Their machines seemed in high demand. Coupled with the high demand was skepticism: Nacho's enquiry prompted the company representative to hesitate and question our



ability to complete the work in one day. He was reluctant to commit. A second problem: this company required a certificate of liability insurance, immediately.

Our amazingly competent insurance agent worked all Wednesday afternoon (July 26), back-and-forth with Nacho and with the underwriter who barraged us with questions and concerns: what procedures are in place to unload the telehandler, and then, to unload the containers? Do we have a City of Buffalo permit to close the street and to stop traffic? Who would operate the machine? Does the operator have a license? Do we have an alternate operator?

Nacho and our insurance agent spent the afternoon satisfying the underwriter's most pertinent question: well, no, our operator has no license. He has had plenty of experience running these types of machines, moving containers around shipping yards, moving whole houses, and operating heavy equipment. By day's end we were issued the certificate, Nacho brought it to the supplier just before closing; we were guaranteed a machine 10am Thursday (July 27).

Containers were delivered Thursday. Our supplier had hired two different shippers. One container arrived—on a standard flatbed trailer—early morning. The load was too high to clear our street's cable and TV wires, and as the trailer drove up the street we climbed atop the container to push wires up with push brooms for them to clear. The second and third containers came in a fifth-wheel trailer pulled by a smaller 3500 dual-wheel pickup truck. The pickup was lower to the ground and these containers did not need manual assistance as they were driven up the street.

Our plumbing contractor had left behind the large flat steel plates used to cover the big ditches in the middle of the street. Our contractor placed them close to the foundation to support the weight of the telehandler. The clay in that area had been disturbed and we neither wanted to risk the machine's sinking nor to compromise the foundation. The telehandler was the perfect size, with a reach over the 24-foot foundation to the far end, and it met



the challenge to stack the rear two containers, squeezed between a large tree on one side and a fence on the other. Placing the third container was easy in comparison, it being closer to the street and requiring a relatively short reach of the boom. We made a few adjustments to guarantee the containers' exact placement per the blueprint specs. We were surprised how easily they shifted with a bit of leverage and a big sledgehammer.

Metal plates were needed to fasten containers to concrete pylons; we realized at the 11th hour these had to be convex for water drainage. Previously custom-made flat plates had to be scrapped; new convex plates were a rush order. Lesson: the GC has to be attentive to such details. Careful reading of blueprints would have alerted us to the need for clarification from our architect, and would have avoided Nacho's having ordered the wrong plates. It is a difficult balance between being "in charge" as GC, and trusting that the people one hires are doing what they need to do, because, after all, they are the experts. As GC, we learned to approach this balance with humility and curiosity. Ask questions, do not be afraid to be wrong or to appear less-than-knowledgeable. Everything you learn offers you a better handle on your project. Decisions made on the basis of this learning, and consulting with expert contractors, proved sound.

Our welder—who worked non-stop and maintained enthusiasm through sunny days and through snags and glitches—was so excited about our project he showed up to watch delivery of the containers, taking charge to weld them to foundation plates and the two stacked containers to each other on the spot, ensuring they were more secure than the insurance people—and Nacho—had expected.

The second week of August the crew laid a two-and-one-half inch layer of polystyrene insulation and covered it with subfloor in the two lower containers, and they framed and constructed the stick-built part of the house. No floor insulation is needed in the upstairs container as it sits directly atop the lower one. Thus, two-and-one-half inches were gained in upstairs ceiling height. Similar was the ceiling height gain in the lower of the two stacked containers, due to

Containers on the site garnered immediate attention. The Riverside Review, a neighborhood periodical, published a photo of Nacho standing beside the containers taken July 27, and by August 3 a reporter and a photographer for Buffalo Channel 4 News were at the site interviewing Nacho and our welder. That evening's news was headlined by the story of "the couple building a container house in Black Rock." Our project continues to attract attention. Our property has proven better than speed bumps to slow street traffic where the residential speed limit is chronically disregarded (a child was hit by a car Summer 2017). We had visits from police, not because we were in trouble; they saw the house and were simply curious. Fire crews (with their huge fire truck), Department of Transportation crews, and City maintenance crews have stopped by to talk, to give their thumbs-up, and to reiterate their support.

no need for ceiling insulation. The singular container had both floor and ceiling insulation, and this ceiling is two-and-one-half inches lower than in the other two containers. The framed part of the home went up very quickly. Within just a few days it was fully covered with vapor barrier material. Inside framing (needed to support a layer of insulation) moved fairly quickly as well.

September's weather turned in our favor to offer the few necessary weeks to cut and weld window and door frames; progress was visible with each window cut. This frame welding restored rigidity to the walls and brought into the containers the welcome promise of light.

Our welder expertly cut openings for windows and doors. One brilliantly sunny day, our welder offered an added—and much appreciated—bonus. His expert use of an important tool of his craft went beyond welding when he enthusiastically called us over at the right moment, handing over his welding goggles. We three shared the awe of the solar eclipse, August 21, 2017!



The first few weeks saw a lot of progress.



The conventional "stick built" portion went up quickly. It is a connector between the containers, allowing for our stairway to the second floor without having to cut into two containers.

Late August and early October brought two additional—and most welcome—distractions: the births of two grandchildren! When not painting—or cuddling babies—we worked on the footpath and landscaping. Nacho cleaned debris and removed chunks of concrete from what remained of the original sidewalk and driveway apron which had been broken during water and sewer line excavation by concrete trucks and by the telehandler.

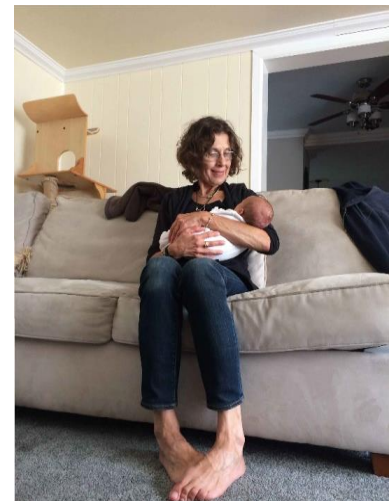
One piece of jagged concrete after another, Nacho made it to the bend in the driveway. We brought in five or six loads of ‘hard pack’ gravel to create a base up to and around the pavestones. We built this a bit higher than grade, thinking it would settle, and it did. Nacho started the driveway with a four-foot-wide path to meet the sidewalk. He had saved the huge chunks of concrete for the driveway, and a neighboring business donated additional chunks of concrete (some of which Nacho hauled four blocks in a wheelbarrow). Nacho dug deep and placed a geotextile layer to prevent clay oozing upwards through the gravel under the pressure of a vehicle’s tires during wet parts of the year. Atop the geotextile he added an eight-inch base of gravel, upon which he positioned concrete pieces and secured them with yet more gravel between these pavers, completing the smooth 12-inch deep surface.

The weather was turning cooler. We had counted on Fall’s warmth as we painted the outside of the containers, cleaned up the site, and completed the path to avoid what seemed an endless tracking of wet clay caked to our boots. Nacho continued towards the house, positioning broken-up concrete pavestones along the winding pathway and backyard courtyard. He finished literally a day before the first major snowstorm ground all landscaping to a halt. We were very happy when the building inspector both approved and complimented our path and, later, when complete, our driveway!

Along with using broken-up-concrete as pavers, using chipped Corian® for drainage and landscaping turned out to be another happy accident. Our excavators brought in several loads of colorful chipped Corian® as fill and for drainage near the home. Chipped



The very next day after the eclipse—and again six weeks later—came the welcome arrivals of grandchildren: work-stoppers for sure! We happily gave in to the distractions of welcoming Fern Rose and Zoltan Aureliano.



Corian® is made from recycled and/or byproduct of Corian® manufacture, a way to divert it from landfill.¹⁵ It is an excellent drainage material, and it is relatively inexpensive compared to other drainage materials such as crushed stone. Corian® is made in Buffalo; crushed Corian® is readily available. We found it a curiously pretty solution—a kitschy mid-century-modern/retro look to complement the edginess of the containers—as it masks the unsightly clay under the containers and the visible-from-the-street concrete crawl space walls. Donna’s grandchildren Ania and River, along with neighborhood children, are delighted to search for their favourite colors, stuffing their pockets and carting off their found treasures in cupped hands.

Our builders finished the outside of the stick-built portion of the house, expertly installing metal standing seam roof and Hardie Board siding. The structure was looking less like a shipyard and more like home. “Eyelids” were welded to the tops of our window frames, after the initial drip edge treatment proved ineffective. The weather got colder; we wished we’d started painting earlier (but... those babies!). Industrial-quality, oil-based paints work best at mid-range temperatures, not on metal in 85-degree heat, and not at all below 40 degrees, we found via trial-and-error. A year in, we have a few chipping areas, due, we think, to ignoring the temperature requirements for applying the paint.

With outdoor work halted by winter weather, we returned to our search for a licensed plumber and a licensed electrician. While picking up our wall-hung toilet at a plumbing supply warehouse (expensive, at \$900, but worth it due to its space-saving tank-in-the-wall feature), Nacho spotted a tankless water heater display by the brand, Navien. He had researched water heaters, hoping to purchase this brand. We were not able to buy it outright; the manufacturer-supplier agreement permits sales only to licensed plumbers. The supplier contacted an HVAC specialist who provided a written quote, and we hired them to install the heater and to plumb the home to the extent a licensed contractor was



Above, our home-in-progress as seen from the road. Below, Hardie Board siding on the connector is complete, and one of the containers is painted, too. Benjamin Moore Paint Company has exterior paint colors that are exact-match to Hardie Board siding/trim.



required. They completed this work within a few days. The plumbing inspector approved our builder—who is not licensed—to complete the ‘finish’ plumbing, a cost savings for us. Curiously, our first plumber was adamant the Navien tankless heater would not fit into our crawl space. It did fit, easily. This experience taught us the value of more than one estimate—not only for cost savings, but also for willingness to work within our parameters.

We hired an electrician whose rates seemed balanced between affordability for us and profitability for them, and they worked reasonably and efficiently. Our next hurdle was a week’s wait for the electrical inspector’s approval before we could apply spray foam insulation. The electrical inspector’s demeanor reflected his ‘all in due time’ attitude; he explained he often spends his days dealing with the ramifications of unlicensed electricians and contractors working without permits.

With roughed-in plumbing and electrical, we were ready for insulation, which was blown in November 7-9. That week, temperatures dropped below freezing, making spray foam application tricky. We kicked ourselves for not having better researched our options and our bids. This work could have been done earlier, when weather would not have been a factor.

Midway during insulation application Donna panicked upon finding voluminous blobs of waste foam littering the floor, oozing from walls, and outdoors under the containers onto the newly landscaped area. This is apparently par for the course. The estimator had told us to cover things that were in the house because “insulation gets everywhere.” In hindsight, we wish we had known how extreme it is. Had we been aware of the oozing mess of smelly puffballs of glop and the strong chemical smell we may not have been shocked. The company assured us the smell would dissipate in a few days. The next day our contractor entered, unfazed. This was exactly what he expected; he “actually likes the smell.” He calmed our fear, somewhat. The mess was cleaned, and, in a few weeks, after drywall installation and spackling, the smell indeed had dissipated.



Spray foam insulation is messy. This outdoor close-up photograph shows insulation oozing from crevices and the splattered mess over exterior surfaces and on the ground. The insulation company promised to come back when the weather was above freezing, and they did! We were pleasantly amazed with the care they took.

Outside was another matter. The spray foam installers erroneously assumed we were going to “skirt” the space between the containers and the ground. Not so. Donna had incorporated this area into the home’s ‘design element,’ and she had spent many hours—and about \$300 in crushed Corian®—covering the clay under the containers and leveling this space. After insulation application, the Corian® was littered with thousands of half-dollar-size medallions of hardened orangey-gold insulation. Donna called the insulation company, whose representative quickly and very professionally asked us what solution we wanted. We needed to talk! A few days later the owner of the company came out to look at the debacle, and we settled on their reimbursing the cost of the Corian®, and setting a date in Spring to cart away the ruined, insulation-splattered Corian®. True to promise, two men came out in Spring and patiently cleaned it all up.

Our building crew of three brothers hung drywall December 18-22. Our little home’s interior was taking shape, ready for the next step: “mud” (aka spackle, or plaster). This would wait until after the Christmas holiday, becoming the first tackle of 2018, as outdoor temperatures plummeted to a zero-degree cold snap with wind chills at minus-20.

Drywall “mudding” requires a warm interior. Stuck with a catch-22—permanent radiators could not be installed until after mudding and painting—we scrambled to borrow portable electric heaters from family and friends. With the warmed interior, mudding began.

Our effort to keep the interior warm to dry the plaster by keeping all windows closed backfired! Wet drywall compound creates humidity. The combination of cold outdoor temperatures, a metal structure, and wet drywall compound quickly created wet interior walls. There was too much moisture in the home. Parts of the container that transfer heat easily, such as top corners, exposed window frames, and glass block windows, also create condensation pockets where water droplets accumulate to quickly form puddles.



Portions of the framed-in interior, before, and after spray foam insulation.



Fearing drywall damage, our contractor called us with a drop-everything imperative: bring in a dehumidifier. This unexpected purchase set us back \$200. We ran the dehumidifier outlet hose directly into the drain that had been installed for the yet-to-be-installed washing machine, and that helped.

During the cold snap, even with the dehumidifier, window frames and two container corners frosted, sweat bled down the walls. Even with conscientious planning by architect and builder, and with the best insulation to avoid thermal bridging, it happened. Here it was a “cold bridge”: the cold finds the path of least resistance, and it hangs on for life.

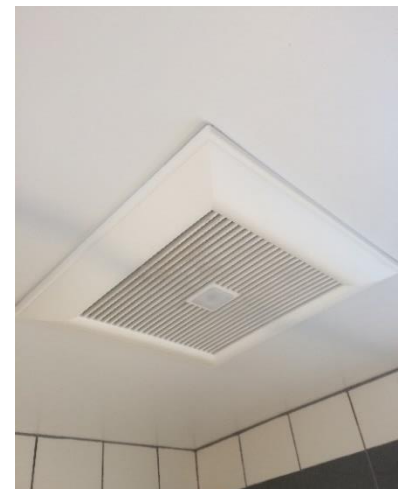
Lessons Learned and Policy Implications

In our quest for a smaller footprint, livable urban space, and affordable housing, there are questions worth asking that we know our project does not answer. Our home is a costly private response to a societal needs; at best it addresses some societal concerns in a modest way. To make a significant impact on affordability, carbon footprint, and overall societal impact, bolder solutions are necessary to more significantly address the true costs, and livability, of viable cities.

Nearing the third decade of the 21st century, we believe it is now the time—economically and environmentally—for private homeowners to ask questions of themselves and of policymakers.

Which home amenities currently considered private are best to be private, and which should be shared? Are there amenities better shared among a small group, and/or best to be made public for the larger population? Can a private homeowner have a shared space in what is generally accepted as their private space, i.e. a facing-the-street garden/arbor? Can multiple private homes share energy-saving utilities to significantly cut costs and show environmental stewardship, such as a geothermal well, or a solar array?

Laundromats are accepted by society, but what about community kitchens and baths (which were available to Buffalo’s Black Rock



Our tiny bathroom's "open plan" has no separate tub or shower, with the need for a floor-and-walls water barrier sheath. The top photograph shows the grey water-tight enclosure prior to tiling. In the photograph below, the powerful little ceiling fan doubles as a distributor of fresh air and a moisture deterrent.

community as late as the 1950s)?¹⁶ What version of a shared-amenity model is viable in 2019? Such sharing exists in some condominium complexes and cohousing communities, where individual homes have a modest kitchen, and the complex has a large kitchen for gatherings and parties.

We suspect many will have difficulty embracing solutions to such questions, even when they may significantly favor increased efficiencies and lower carbon footprints. Our culture is comfortable with shared infrastructure such as roads, bridges, railroad lines, and so on. Recently, car sharing has become popular in some areas. But private homeowners still show little-to-no desire to share heating systems, kitchens, baths, or even tools such as lawnmowers.

It is too early to tell whether building a container home was a long-term good investment for us. We built in a neighborhood where many question the wisdom of investing, yet—based on recent activity such as home sales and businesses moving in—we are, perhaps, part of a critical mass of confidence in this neighborhood’s future.

We welcome this trend, as it suggests our investment will gain in value, but we are concerned it may lead to gentrification. We hope we are part of a positive solution for our neighborhood without contributing to making it too expensive for current residents. Much has to do with policies that are out of our hands; yet as voters and active citizens we must be proactive to ensure community and City leaders enact policies that protect and promote affordable rentals and home ownership in all neighborhoods for all residents, regardless of cultural and socioeconomic status.

Being the first shipping container home in Buffalo has had pros and cons. Our building project was exciting, and we thoroughly enjoyed the challenges. We are experiencing the notoriety of building something unique, however. Our “private rear yard” has not been private. We have been enjoying a beer on our private deck, only to “greet” a stranger literally running into our yard with a camera to



December 2016, shortly before we moved in. The bright circle in the upper window was our attempt at festive holiday decorations—a tiny grapevine wreath encircled in white lights. Note the wires in the upper left quadrant of the photograph: in keeping with the exposed wires in the neighborhood, we opted against burying wires, which would have been an additional cost.

take photographs. People have come into our yard or knocked on our door at all hours asking for a tour, prompting our family to suggest we put up a sign that we are not a museum! Instead, we purchased a post which, now that building and landscaping are almost complete, we will fashion into a Peace Pole, with “peace” carved into it in four languages historically, and currently, spoken in our immigrant neighborhood.

Our initial vision of meeting many people by our having a large garden in our front yard in which we are visibly and often working is a resounding success. Everyone—curious passers-by; uniformed police, department of public works employees; a truckload of big firemen in full regalia and with the fire truck parked out front; folks as young as five; teenagers; parents with babies in tow; people walking, pushing shopping carts, on motorcycles, bicycles, or scooters—have stopped to chat. We’ve gotten the thumbs-up from folks driving by—all kinds of folks—enthusiastically commenting about our home and our garden. Nacho offered zucchini and summer squash to one woman with a far-away accent who complimented the garden. She refused the veggies, requesting the leaves (which Nacho was preparing to compost), explaining they are the delicacy in her culture, while she shared her best recipe to prepare them. (We have yet to try it!)

Once, Donna’s daughter—who lives 450 miles away—called to ask if we knew we were a feature in an article in a local online publication, complete with photographs of our front and back yards and misrepresentations of facts.¹⁷ She had read the article, shown to her by a friend who lives in Buffalo. We had no idea, but there we were, dealing with acerbic comments to the editor that questioned our integrity, due to the misinformation in the article.

We relish talking with those who stop by, and with those who respectfully knock at a decent hour; however we do not give tours, and we question the social graces of people who have peered into our windows and/or who have taken photographs and posted to the media without our knowledge.



River helped oversee the building of our home. Though we appreciated his landscaping and construction input we had to nix his suggestion for sheep to live under the containers. We still may get the chickens he proposed, and house them in a traditional coop. Note the rocks we unearthed during construction. Used in landscaping, they provided the perfect perch as River supervised the crew.

We continue to be concerned spray foam insulation is not an environmentally sound material; we alleviate our guilt telling ourselves its efficiency in energy savings is its environmental benefit, and we kick ourselves when we read articles that present new, innovative, and ecological insulation alternatives.¹⁸

We are contemplating chickens; they are permitted within City limits. We wonder how they might get along with the many neighborhood feral cats, especially one who has perfected the art of the staring contest, in no uncertain terms letting us know he has lived on our property longer than we. He made a daily habit of sunning himself in our back yard in Summer, and he often takes refuge under our home when the weather is inclement.

Aside from the notoriety and curious press, future such projects, we believe, can only be less costly, in both time and money, as we have set a precedent for costs such as insurance (both construction and homeowner's), and property taxes; and for estimates of value such as for our mortgage (for which the requirement of three comparables could not be provided due to the simple fact there are zero comparables, and which took over four months from application date to receipt of loan). Our credit union worked to approve this unconventional mortgage, which we obtained after-the-fact when we maxed our credit card balances with over-budgeted construction materials. Costs were higher than planned—in large part we believe—due to this being the first build in Buffalo of its kind. Costs from unforeseen setbacks, and learnings-in-hindsight would likely be, respectively, much less and fewer, for future such ventures.

All in all, we have been living in our new home almost a year, and we are settling in. Rather than looking like a work-in-progress, the place is really looking like home!



Our home as of January 2019: still a work in progress, though 90% complete!

Sources

¹ Schumacher, E. F. *Small Is Beautiful: Economics as If People Mattered*. New York, NY: Harper and Row, Publishers, 1973. A seminal discussion of sustainable development.

² Alexander, Christopher. *The Timeless Way of Building*. New York, NY: Oxford University Press, 1979. A proposal toward architectural development as an organic process, with people as the core in building living spaces that are connected to the natural world.

³ Hale, Jonathan. *The Old Way of Seeing: How Architecture Lost Its Magic (and How to Get It Back)*. New York, NY: Houghton Mifflin Company, 1994. An enquiry into a lack of beauty in 20th-century buildings; and a discussion of the use of ancient proportions in the pre-20th century built environment.

⁴ Favermann, Mark. "The Gropius House, Historic Architecture: 1938 Bauhaus Home in Lincoln, Mass." ARTES MAGAZINE A Fine Arts Magazine: Passionate for Fine Art, Architecture & Design. April 30, 2014. Accessed January 15, 2019.

<http://www.artesmagazine.com/?p=15465>. An overview of the design of the Gropius House in Lincoln, MA. Especially relevant is the explanation of the house interior being designed to fit its furniture.

⁵ "Shipping Container Flooring and Pesticides." Discover Containers. Accessed April 24, 2018.

<https://www.discovercontainers.com/should-you-remove-the-plywood-floors-in-your-shipping-containers/>. This article explains different kinds of flooring that may be in shipping containers, their possible toxicity due to pesticide applications, ways to determine what kinds of pesticides may have been applied in specific containers, and ways to mitigate any contamination.

⁶ Goebel, Michael. "A Metropolitan World." Aeon Essays. April 24, 2018. Accessed April 24, 2018. <https://aeon.co/essays/intellectual-life-is-still-catching-up-to-urbanisation>. As best summarized in the article "Urbanisation might be the most profound change to human society in a century, more telling than colour, class or continent"

⁷ Sauter, Mike. "16 Most Segregated Cities in America." 247wallst.com/special Report. July 21, 2017. Accessed January 09, 2019. [https://247wallst.com/special-report/2017/07/21/16-most-segregated-cities-in-](https://247wallst.com/special-report/2017/07/21/16-most-segregated-cities-in-america/print/)

[america/print/](https://247wallst.com/special-report/2017/07/21/16-most-segregated-cities-in-america/print/). Demographics by area in each of the 16 most segregated cities in the U.S. Data is stated to be "24/7 wall St. analysis of U.S. Census Bureau data"

⁸ Ibid.

⁹ Ibid.

¹⁰ Angwin, Julia, Jeff Larson, Lauren Kirchner, and Surya Mattu. "Minority Neighborhoods Pay Higher Car Insurance Premiums Than White Areas With the Same Risk." ProPublica. April 5, 2017. Accessed November 25, 2017. <https://www.propublica.org/article/minority-neighborhoods-higher-car-insurance-premiums-white-areas-same-risk>. As quoted, an "analysis of premiums and payouts in California, Illinois, Texas and Missouri shows that some major insurers charge minority neighborhoods as much as 30 percent more than other areas with similar accident costs."

¹¹ Allstate Insurance Company. "Your Personal Auto Quote Premiums Calculated on 11/25/2017." Allstate. November 25, 2017. Accessed November 25, 2017. <https://purchase.allstate.com/onlinesalesweb/app/auto/quote>. Quotation for 'Economy' automobile insurance for a 2018 Subaru Impreza in Zip Code 14207.

Allstate Insurance Company. "Your Personal Auto Quote Premiums Calculated on 11/25/2017." Allstate. November 25, 2017. Accessed November 25, 2017. <https://purchase.allstate.com/onlinesalesweb/app/auto/quote>. Quotation for "Standard" automobile insurance for a 2018 Subaru Impreza in Zip Code 14207.

Allstate Insurance Company. "Your Personal Auto Quote Premiums Calculated on 11/25/2017." Allstate. November 25, 2017. Accessed November 25, 2017. <https://purchase.allstate.com/onlinesalesweb/app/auto/quote>. Quotation for 'Enhanced' automobile insurance for a 2018 Subaru Impreza in Zip Code 14207.

GEICO. "Reference Number: 375165O4604085." <https://www.geico.com/>. November 25, 2017. Accessed November 25, 2017. <https://www.geico.com/>. Quotation for automobile insurance for a 2018 Subaru Impreza in Zip Code 14207. (Note: this citation is for the home page of GEICO; actual link was not copied when researched, and the information provided is from the quotation generated at time of enquiry [25 November 2017])

Progressive Insurance. "Quote#812710382."

Progressive.com. November 25, 2017. Accessed November 25, 2017.

<https://autoinsurance1.progressivedirect.com/0/UQA/Quote#/RatePackageDetails>. Quotation for automobile insurance for a 2018 Subaru Impreza in Zip Code 14226.

Progressive Insurance. "Quote#812711093."

Progressive.com. November 25, 2017. Accessed November 25, 2017.

<https://autoinsurance1.progressivedirect.com/1/UQA/Quote#/RatePackageDetails>. Quotation for automobile insurance for a 2018 Subaru Impreza in Zip Code 14207.

¹² Ibid.

¹³ New York State Department of Taxation and Finance. "Employer's Guide to Unemployment Insurance, Wage Reporting, and Withholding Tax." NYS-50:1/14:Employer's Guide to Unemployment Insurance, Wage Reporting, and Withholding Tax:nys50. January 2014. Accessed January 15, 2019.

https://www.tax.ny.gov/pdf/publications/withholding/nys50.pdf?_ga=2.54713512.2011891745.1547577368-373650811.1547577368. Page 46. Per our enquiry 09

January 2017. Employer's Guide to Unemployment Insurance, Wage Reporting, and Withholding Tax.

¹⁴ "Buffalo (zip 14207), New York." Best Places. Accessed January 10, 2019.

https://www.bestplaces.net/housing/zip-code/new_york/buffalo/14207. Real Estate demographic information for zip code 14207. Includes information for housing by year built, median values, property taxes, average rent, vacant housing, and value of owner-occupied homes.

¹⁵ "DuPont™ Achieves Zero Landfill Status in Building

Innovations Business. Collaboration Drives Recycling and Eliminates More than 81 Million Pounds of Annual Waste." Willis. Representing Global Brands Across North America. Accessed January 15, 2019.

<http://www.4willis.com/corlan/aiming-for-zero.php>. An industry publication giving press coverage to DuPont's achievement of zero landfill status by reusing and recycling certain byproducts, including corlan, of their manufacturing process.

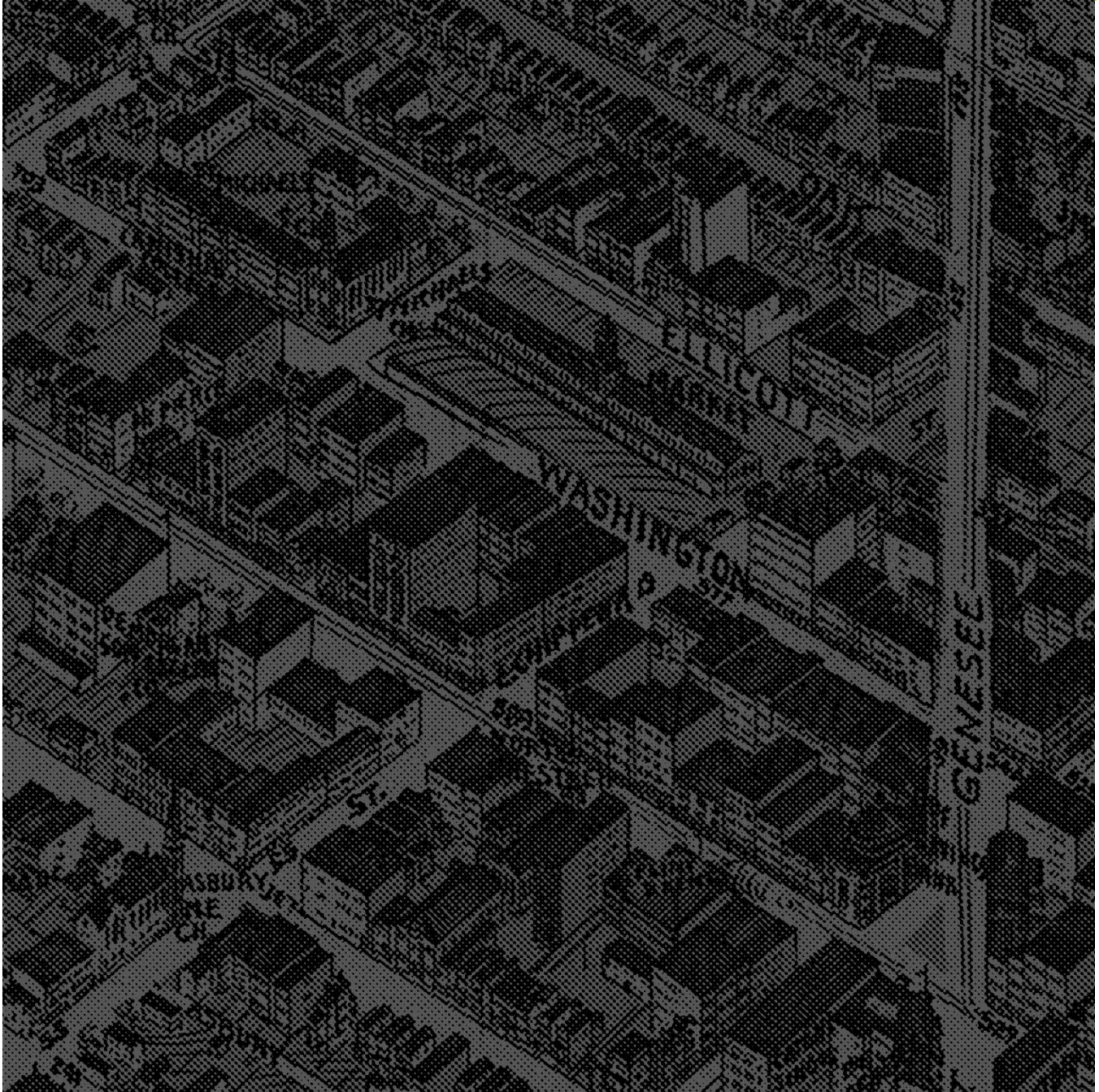
¹⁶ House, Sophie. "Pay Toilets Are Illegal in Much of the U.S. They Shouldn't Be." CityLab. November 19, 2018. Accessed January 09, 2019.

https://www.citylab.com/perspective/2018/11/pay-toilets-should-have-another-chance-world-toilet-day/576169/?utm_source=newsletter&silverid=%%RECIPIENT_ID%%&utm_campaign=citylab-daily-newsletter&utm_medium=email. Explanations for the U.S. having banned pay toilets in the 1970s, and arguments for now reinstating them.

¹⁷ Straubinger, John. "Black Rock Shipping Container House." Buffalo Rising. January 26, 2018. Accessed January 15, 2019.

<https://www.buffalorising.com/2018/01/black-rock-shipping-container-house/>. This Buffalo Rising article was published without our knowledge, and some inconsistencies and misrepresentation of facts resulted in undue criticism.

¹⁸ Miller, Perry. "7 Eco-friendly Insulation Alternatives for a Green Home." Inhabitat. January 04, 2019. Accessed January 10, 2019. <https://inhabitat.com/7-eco-friendly-insulation-alternatives-for-a-green-home/>. Pros and cons to ecologically sound home insulation alternatives.



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