

Brian Bowen

*Project designer and resident,
on the design of Wild Sage
Co-Housing,
Boulder, Colorado*

*an interview with Jim Wasley,
UW-Milwaukee*

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Jim Wasley:

Let's flip through the case study first, and then we can just chat about loose ends.

I've talked to Jim about the plan somewhat -the key seems to be that the units are all grouped with east/west axis; there is south light in every single unit and a highly developed strategy of layering space between the rows of units.

Brian Bowen:

The spacing between the units is key- it works to give you solar access to the windowsill on the first floor of the unit to the north, and it also really works for the social programming. It's somewhat of a coincidence, but the spatial layering works really well.

Jim Wasley:

So if it had been even wider it might not have been as nice socially?

Brian Bowen:

Yeah. The compression of the space is actually part of what makes it vibrant. The whole site design goal from a social perspective is to create opportunities for casual social interaction that don't feel obligatory.

So if I'm constantly running into people in a way that makes me feel obligated to talk to them, then that's bad. But like today, walking around here, I could easily say, "Adam, you know what, I'm talking to Jim. I can't talk right now." He'd go, "Okay, no problem." It's all sort of easily managed, and part of



Co-Housing in action. While Brian and I sat on the commons lawn talking, a little girl decided to climb to the top of the tree. Getting up was easy... getting down required a village.

that is that I can sit in my little back patio area and read a book and have somebody walk by and make the choice to either talk to me or not talk to me, and vice versa. Getting that right is the lynchpin... solar access, site drainage, all the other things are really important, too, but...

Jim Wasley:

We're working on a guidebook for people who are interested in developing affordable housing for nonprofits or cities. I want to get your perspective on Habitat's involvement, because in terms of the affordable housing story that's key. We should talk about simple strategies for cost efficiency in general, but the Habitat units are really the affordable housing story that makes Wild Sage unique. So I'm interested in how that worked, what the pitfalls and pluses were...

Brian Bowen:

The story really starts with the city of Boulder, which passed inclusionary zoning a number of years ago.

Once the people said "We want inclusionary zoning," the way that it has been implemented is that 20 percent of every project built in the city has to go towards affordable housing. So if you're doing multi-family projects, 20 percent of the units have to be affordable through the City of Boulder's affordability program. That launched the City of Boulder's affordability program, Boulder Housing Partners.

Passing inclusionary zoning put the politicians and planners in a position where they knew that it was a supported idea. So then they offered incentives to go above 20 percent, and those incentives are typically found in density bonuses, or sometimes in lowered fees for certain things. And you can also buy your way out.

This has happened both ways in the city, actually. There's an interesting case study of this- some of the big, beautiful, expensive condos right downtown across from City Park on Canyon, really multi-million dollar penthouses, right? They have the same 20 percent affordable housing rule that they have to follow. And the city on a couple of them let them buy their way out, and on some of them they didn't.

So instead of just putting money towards the affordable housing program they had to include one unit of affordable housing. The problem is that you then end up with a really cramped penthouse on the third floor of a downtown building dedicated to affordable housing. So you're kind of putting people who have kids, who need a yard and want to be outside and want to have a dog and stuff like that - in this physical context that doesn't suit them at all.

And then you have socially this huge problem in that all of their neighbors are fabulously wealthy. They have no money concerns whatsoever, and so they'll say, "Yeah, the homeowners association should replace the carpeting because we like this one better." And so all of a sudden there's a special assessment for \$25,000.00 that the person can't pay for. It's a really nonfunctional way to do things.

The matrix here at Wild Sage I think is really successful because we do have 40 percent affordable housing first off, which was a mandate by the developer, the Affordable Housing Partners Group, and then we chose to have four of those homes done by Habitat for Humanity. That worked out really, really well for a couple of reasons. One is it gave us a different layer of affordability. The Affordable Housing Program tends to hit people who have, I think, between 80 and 100 percent of average monthly income. So it's affordable but it's more like housing for school teachers and fire fighters and cops and that kind of 'backbone of the city' population.

But it doesn't really reach low enough for struggling, working class single moms, or for people who are just at a slightly less sweet spot on the curve in terms of economics. I think both things are really important.

The other thing, just as an aside about affordable housing, is that it used to be defined as 'initially affordable.' If you were a college student you could buy it because you had low income, and then five years later sell it unrestricted. But all this stuff is income and deed restricted now, so you can

definitely do better economically than you can renting, but you're not incentivized to flip houses.

Because its income restricted, if you make more than a certain amount of money you can't take advantage of that housing. That said, I think the one place that it's a little bit misused- and I don't think it's any way sort of malicious or bad and something we need to address- but especially in Boulder you have sort of well-educated academic intellectual powerhouses who in some ways have a really high earning capacity, choosing instead careers like writing or working very part-time or just having that lifestyle choice.

Which I think is great. But it might not be what needs to be supported by affordable housing through tax dollars. So that's a sort of interesting thing. I don't think it's a real big issue, but it's definitely something that raises eyebrows once in a while. "Are you really the person we're trying to help up by your bootstraps? You went to this really high-end university." I'm not sure.

So we have a good range of units. We have a good range of types of people, families in our affordable housing, single-people in our affordable housing...

In the four Habitat units, Habitat also made exceptions to their way of finding residents, which is the family selection process. Typically they select a family, and they have a committee that does all the interviewing, and they have a bunch of criteria, and applications that they work through. And then you get assigned to a house, wherever the next one is available.

You know well in advance which one you're gonna get, and though you can turn it down, I think, and wait for another one, they try to get you committed early enough that you can spend a lot of time getting your volunteer hours on that house with the community members who are volunteering to help build it. It's a really strong method for community building, but in this case we really wanted people who wanted to be exactly here. People who really wanted to be in Wild Sage; part of this community and

this location and part of cohousing. So the community engaged with the family selection process and did a lot of education about what cohousing is, what it offers.

My understanding is that everybody who was exposed to that was receptive, because they realized the benefits of it- because demographically Habitat families tend to be families with kids; sometimes single moms, single dads, but sometimes full nuclear families and sometimes a bunch of kids- and the ability to open the door and have the kids be happy outside and satisfied socially in a rich and healthy environment with exposure to other stable adults - that's really appealing.

It's appealing to anybody who's got kids. It's got nothing to do with whether you're rich or poor. I think it's harder to access that when you don't have a lot of money.

Jim Wasley:

I don't know a lot about Habitat, but the houses are not just built one at a time. Aren't they really building whole neighborhoods just like this would be?

Brian Bowen:

It really varies. In Habitat the way their structure works is there's Habitat International and there's a bunch of affiliates. Millions of little affiliates all over the place. Each affiliate is essentially only as good or talented or powerful as the people who are there right then. They just do whatever people see as the right thing for their communities. In some ways it's really grassroots, and that's really good. In other ways it's really difficult for them to transfer lessons learned from affiliate to affiliate. They have a hard time learning from one another.

And there's a resistance to it, too, in some ways. The Boulder guys are like, "Oh, we don't want to do what Denver's doing." Even if Denver's doing, for example, the first net-zero energy Habitat for Humanity house in the country. This affiliate was approached with that, and they turned it down. A number of times I've hit them up with that one.

In Boulder there's actually one other Habitat

community over on Violet. You should go check it out because it's an interesting comparison to this. They just sort of did the best that they could with what they knew at the time. They got some property from a donor, and they were happy to have it. And they put the houses on the pieces of property, and that was the process. The neighborhood's not terrible, but it's also not nearly what we've got here at Wild Sage, or in Holiday, in terms of level of innovation and thought. Or affordability. Because they're building single stand-alone homes that have more siding, more exterior surfaces, lower quality building envelopes, no thought toward solar orientation, and they don't have shared mechanical systems that are more efficient or shared solar thermal systems that are more efficient. They're saddled with a lot of the single-family overhead costs.

But there are some Habitats that are doing really well. I spoke with a guy who's working on an affordable housing project with the local Habitat group- I think it's in Montana- using new urbanist principals. He's a Congress for New Urbanism guy. And they're using Katrina Cottages. They're working really hard to implement cohousing style site planning with modular homes for affordable housing, so it's a great layered approach.

But to return to Wild Sage, the Habitat families we got worked great. They were in on the process very early, they attended all the meetings. In some ways they attended meeting more regularly than everybody else because I think they got credit for attending meetings towards their volunteer hours, which is a really smart thing that Habitat did. They contributed. They've been fantastic. They've volunteered, they do a lot of work in the community, they're active on teams. So they had a strong presence in the community before the thing was built, four or five years before the thing was built, and continued on.

One of the families was headed by a woman - I think she had one or two kids at the time - and she was great. She's the iconic Habitat story: She had started volunteering for Habitat, learned a bunch of construction skills, quit what she had been doing and started making a lot more money as a

handywoman. She was the woman could learn anything and do anything. She was in the community for I think four years prior to moving, and only a few months before move-in she had a family crisis. I think she had to go back to the East Coast and live with her mom and take care of her.

So life intervened in the plans, and we lost this wonderful person that we'd been nurturing along and who'd been nurturing us along. And it was a real tragedy. And it opened the door to somebody else. And the family that came in, they were a little bit less on board with the program of cohousing, but at the same time they were great. And actually it turns out he is a building facilities and maintenance guy, so he knows a lot about how to get things done and contract out work and what has to be done to the buildings where, and so he's been really useful and helpful.

Of our four Habitat families, we've got two single parent families, which is the profile. We've got one single mom with one daughter, and that's Ginger Stolmar. I don't know if you guys want names or not.

Jim Wasley: That's a good question, and I'll have to ask everybody for permission to use their names.

Brian Bowen: Right. Yeah, if you ask them I'm sure it's okay, but I'll just give them to you so you know.

Jim Wasley: So Ginger -

Brian Bowen: Yeah, Stolmar. S-T-O-L-M-A-R. She's got one daughter, and she's a teen daughter so she's going through all the teen daughter things here in the community, which is pretty interesting to see. Then there's another woman who's a single mom named Tara King. And she's got two daughters, one preteen and one teen. Then there's Sol Espinoza and Manny, Sol and Manny. And they have one older son, I think it's Sol's son from a previous marriage and he's grown basically, he's in his 20s and went and served in Iraq. And then they've got a new baby named [Navaya](#). He's wonderful. He's about one and a half now.

Living pattern-wise they have slightly less

the average white middle class kind of thing, and a little more of the Hispanic working class kind of thing; more multi-generational habitation of the unit, which is great. It's vibrant. And there's a real strong social atmosphere there. Always a lot of people around, hanging out and doing stuff. Also I think he's got stronger connections to his wider family than most of the people who've just moved here from elsewhere. I'm not sure where he's from originally, but he's a good guy.

And then there's Roberto Rivera, Roberto and [Hilsay](#). They've got two little kids who are four and seven, I think. He's in education and she's an accountant. And actually because of his job in education they do a house swap every summer, so we always end up with somebody different during the summers, who sometimes adds a lot and sometimes is irritating, depending on what's going on. And then they go down to - well, wherever. They freelance their way around Mexico and Central America and South America and just kind of go where they feel like going for three or four months.

Jim Wasley:

Really?

Brian Bowen:

It's really cool. They've got a lot of family all over the place. They'll go to Mexico City and see his mom, and they'll go to, you know, wherever. Just really cool.

We've had two kids in different units, two different affordable units, grow up and move out of the high school age and into college and they're off on their own. One of the things that has been going on lately is that the teen girls in the Habitat units -currently the oldest two children living here- they're both having certain kinds of hard times.

And one of the things that I really love is that we've got good relationships. I personally have a good relationship with one of the girls, but both girls have strong relationships within the community. And so one of them would come over to our house at like 8:00 at night, and just sit at the dinner table and hang out with us for two or three hours if she's mad at her mom or if she's having a hard time or if she's upset. Or if she's bored and she's

grounded or whatever. She'll just come and hang out with us.

And so these kids are at what can be a very big turning point in their lives, getting a lot of really positive adult input from people who are not authoritarian, from people who are not about making them be something they don't want to be. We're all just like the sort of cool uncles who are able to say, "Yeah, you know, I've been where you've been, and there's a few landmines out there. Watch out for these three. These are the bad ones. Just don't do that." So I think we can offer really good support.

Just on a personal level, my wife started doing a lot of training and running to get sort of back to feeling like she was a good runner again after having two babies over five years. She started running a lot of half marathons, and she's been doing really well with that. Until she stress-fractured her hip. Then she was basically laid up. And so she was supposed to be not on her hip at all, on her foot at all, and that left me with a huge workload.

She still had to go to work, and I had to do basically everything around the house, which is a real wake-up call for me because she probably did a lot closer to everything around the house already. So I had to pick up a lot of slack. And after about two weeks of this one of my good friends here, who I'd seen a lot in the parking lot and just kind of walking around here, at his house, sent me this e-mail that said, "Look, now it's your turn to ask for help."

He was like, "You help everybody here in the community. You do so much, and you're just too stubborn to say anything about needing help." He's like, "I can see you. I know you need help. You look tired. You're worn out. I'm coming to your house at 5:30 tonight, and if you have a list of things for me to do, I'll do it. And if you don't have a list of things for me to do, I'm going to start doing what I see needs to be done. Period. This is your come-to-Jesus meeting. I'm coming to your house."

And he came over and he worked on the

house like four hours. And he helped us cook dinner and he played with the kids and he did laundry and swept up, and he just like hung out with us, which totally turned it around for me. And then his girlfriend did that. And then another couple did that. And so we had probably the first section like five meals in a row that people brought over to our house and hung out with us, and then they would do the dishes and start cleaning up other stuff. And that's how we got through it.

And actually one of the women, Ginger, is a housecleaner, and so she said, "Hey, I'll clean your house for discount rates, and you can help me make my mortgage, and I can help you get through." So that's been good. So there's a little micro economics going on, which is really great. But the ability to sort of lean back and fall on the support of your neighbors like this is just irreplaceable. That's the only way we would have gotten through the past two months gracefully. And we did. So it wasn't terrible, and we accepted help, and it otherwise would have been really hard. We would have survived it, but it would have been pretty hard. Because also she got pneumonia, then I got pneumonia.

Jim Wasley: Oh brother.

Brian Bowen: We had a whole layer of stuff going on. And [Gene Nava](#). When Gene had his bike accident we all offered a huge amount of support, There are many, many stories like this. Hopefully over ten years everybody has one, because everybody will go through something in ten years. Hopefully they all reach out and get help.

Jim Wasley: And while we're on the Habitat topic, let's talk about how that played out in the construction. Are there lessons, insights there?

Brian Bowen: I think it actually worked out pretty well. You can have two or three kinds of builders with Habitat. You have really experienced professionals who really know what they're doing who are retired or donating time. Then you've got some hired professionals who are coming in to do work. And then you've got volunteers who tend to be quite meticulous

because they're nervous about building, and they're really sweating a 16th of an inch. They're trying really, really hard. They're slow, but they're genuine and sincere.

So we've got these big multi-family buildings, seven units per building, and obviously the foundations are all one foundation system. It doesn't make any sense to pour them separately or excavate them separately, so some of the trades got combined. The way the GC handled it was, I think, really elegant. They made Habitat a subcontractor to them, which covered Habitat under their insurance for multi-family construction, which saved Habitat a fantastic amount of money and provided, I think, a real benefit to anyone who would have gotten hurt. I don't know of any accidents, but they would have been covered.

The GC took over the pieces that were best suited to them, and Habitat did the pieces that were best suited to them. Construction process-wise we built that building first. The GC excavated it, formed the footings, poured the foundations, laid any basement steel that needed to happen. And they framed the floors of the adjacent units around the Habitat unit. Then Habitat came in and framed their floor over the basement, the first floor. And then Habitat built their first-floor framing, and then the GC built their first-floor framing; and then the GC rolled out his second-floor framing, and then Habitat did their second-floor framing; then Habitat framed their third floor and the GC did their third-floor framing and their roof framing and set all the trusses.

As a result of this sequence, Habitat people were generally never very far off of the ground. They were always very well protected. It meant that their materials were pretty easy to access. They also got to use the GC's equipment, which was really fantastic, because usually Habitat's got some amount of lifts and some amount of stuff like that, but they don't have big-scale things. So when they were loading in drywall, for example, they could use the big cranes and the big equipment to get stuff like that loaded as opposed to carrying it around a lot. So Habitat did the framing. I think

they did all the wiring. I'm not totally sure about that. They did the plumbing. They did insulation, drywall, sheathing, siding.

- Jim Wasley: Now if they did insulation, the rest of the units were wet-pack cellulose? How did that work?
- Brian Bowen: Oh yeah- actually they did only the demising walls' insulation, which is fiberglass.
- Jim Wasley: So it was acoustical insulation?
- Brian Bowen: Yeah, acoustical separation between the units, and it does provide thermal insulation. Because those walls tend to be a little bit more vented. But yeah, they didn't do the wet-blown cellulose. And then I think they did the roofing on their units. The asphalt shingles only. Their units did have a little bit of flat EPDM, but they didn't do that piece. And they didn't do any of the sheet metal work or gutters and some of that stuff. They did the painting. Twice (laughs). Because they didn't read the drawing where it said to paint samples of the color up before it was picked, and so the color that was put in the drawings as a placeholder got painted on the whole building. It looked terrible.
- So they had to face whether they repainted it or not, and they agreed to repaint. And it was awfully nice of them. And then they did all of the interior finishes. They did all the linoleum and carpet, appliances, cabinetry, all that sort of stuff. I think they sourced the same cabinetry to the same supplier because they were getting good discounts that way. But either GE or Whirlpool has a Habitat program so they get all their appliances for free. I think they set the windows, but I'm not sure, but the windows were the same ones as everybody else. So it was just very much figured out item-by-item who should buy it and install it, and it worked out really well I think.
- Jim Wasley: Yeah, that's interesting. And the fact that that building was built first was just a circumstance that didn't somehow figure into the Habitat plan?
- Brian Bowen: No. It would have been a lot better to build the Habitat unit last. Then all of the

other systems would have been figured out. Whenever you start any construction project, especially multi-family or something that's got a lot of repeating units, you sort of change what you're doing as you go a little bit. And everybody learns a little bit and figures out ways of streamlining things. So there are a few things that I think we would have done a little differently.

The fire sprinkler systems were done, of course, by the fire sprinkler contractor, and that was I think the only place where I've seen any kind of issue with construction quality. There were a few places in a couple of the Habitat units where somebody had driven a nail or a screw into fire sprinkler lines; and what happens then is it stays and it holds water and it pressure tests and everything's all fine and good, but then as the nail or screw slowly rusts over the next few years, all of a sudden one day you have sort of an eighth-inch downpour as it shoots that screw out, and you have a massive problem.

Actually, we had a fire in one of the Habitat units after move-in, and the fire sprinklers worked great. The funny thing that people kept saying was, "Oh, we didn't need the fire sprinklers. It was a tiny fire." I was like, "It was a tiny fire because we had the fire sprinklers." That was the whole point. All it was was some candles on a toilet back that got up against a shower curtain, and the shower curtain burned, the fire sprinklers came on, and that was the whole thing. There was a lot of water damage, though.

Jim Wasley: I'm not sure I even know how the systems work. They're localized, so it's just the head that is exposed to heat that goes off?

Brian Bowen: Yeah, that little red thing in the head is a heat sensitive element. So when that thing is exposed to X temperature, 150 or whatever, it goes away and the valve opens. So each head is activated separately. So they're always pressurized. It's a wet pipe system. There are sensors on all the systems, and as soon as a sensor detects flow in the pipes anywhere, it calls the fire department and sets off all the alarms. The smoke detectors are totally separate from that system. They're just hard-wired and run on batteries

as back-up. They're not tied into the system at all.

Jim Wasley: That was one thing that Jim mentioned. He didn't say much other than that the one thing that he thought they had to work with Habitat on was understanding fire separation codes - that they really couldn't just change the drawings as they saw fit, but had to follow the drawings.

Brian Bowen: Yeah, there was a little bit of that. It wasn't too bad, though. Once they figured out what the sacred cows were they steered clear. I think they wanted to delete the topping slabs or something like that between the two units vertically. That would have not satisfied our sound transition coefficient requirements and fire aversion requirements, so... but overall I think it went pretty well.

Jim Wasley: Now that I understand that each Habitat unit affiliate is independent, you can't really make too big a deal about this being unique. It is what it is. Maybe it's been done other places, but it's not like there's a national policy about it.

Brian Bowen: Yeah, nobody would know. That's the thing. Unless you do a lot of research you wouldn't necessarily know if somebody had done something a certain way in a different place. There's not really a good centralization of that information. Some groups that have done a really good job of making a house plans book and sending it around and trying to get that out to help people reduce cost of design and things. But the one book that we were looking at when I was working with the Salt Lake affiliate was from North Carolina, and it was all about being North Carolina architecture. It didn't fit lot types in that city or architectural styles.

Jim Wasley: Let's just talk for a minute about other aspects of the design that in general made this come in at the right price to make the affordable housing component work. Are there strategies that you'd pass on as best practices, good ideas?

Brian Bowen: I think repetition of unit types is always a big piece. We have seven unit types here at Wild Sage, and each one of the unit types had a

very different kitchen and cabinetry layout. One thing that we did at Silver Sage –a lesson learned from Wild Sage – is that at we were able to have three or four of the unit types have exactly the same kitchen layout. Some of the things that really mattered the most, like kitchens and baths, were very repetitive. So we kind of modularized inside some of the units, and that worked out really well. More generally, we always try to use simple building systems, simple shapes, and to reduce surface area.

Jim Wasley:

One thing that struck me looking at the plans last night is that while that you can conceptualize the plan as a series of east/west bars, the roofs are all turned to have the gables run north/south. I'm curious about the decisions as to where you'd use a sloped roof and where you'd use a flat roof and what the architectural goal was, other than just space making to define the courtyard.

Brian Bowen:

A lot of it was space making. Like these two units, the F units. There are only two of them and they both face the green. They wanted a 'modern farm house' look. And do a good job of facing the green.

That's actually one thing in the design I would change. We actually had it this way earlier in the design process, but right now we have too few units facing the green. So units like these two F units have 50- or 60- or 70-foot frontage on the green, whereas the D units, the townhouse units, have an 18-foot frontage north or south. And if we had turned two D units to face the green or done a four-plex that was stacked like the Habitat units, we'd have a lot more people on the green. One of the things that's been a little tough for people occupying those two units is that they don't have as much privacy. They're pretty exposed to the green. If there's a wedding or a party out here, that's very much what they're exposed to.

So that's a little bit of a mistake there I think on the design, but it was primarily driven by trying to maximize the sale price and square footage of those two units as end units for the development strategy.

Jim Wasley: That's interesting. I wouldn't have thought of that. Because I would have thought it was to stick to this idea that everything was gonna have a southern exposure.

Brian Bowen: Yeah, and that was definitely part of it, too. But if you assume that the southern unit would have been lower and one-story, and the northern unit would have been higher and two-story, just reaching over to get its solar access... there were thoughts like that. But right now everything does have a south-facing and a north-facing aspect. The east/west is very limited. Those units have the most east-facing glass of anybody because they face the green- more of an aesthetic thing than anything else.

On the roof shapes, we actually went through a lot of different design possibilities, and we had originally drawn more modern designs. We had some people in the community who were really into it being modern and some people who really wanted it to be sort of Victorian. Some people who wanted it to be sort of Colorado farm house-y. So we had this really broad aesthetic clientele that we had to deal with.

There was a drawing that I did that ended up being the final design that was a perspective from the southeast corner looking at a B unit and then down that yellow pine frontage. And when I showed it to the community, I said "Okay, I think we've got a design that represents what you guys want." And everybody looked at it, and people who wanted modern saw the modern pieces- "That's what we want. That's great!" And the people who wanted traditional saw traditional forms- "Oh, there's some gable roofs over there. That's great!" The people who wanted flat roofs- "That's great." Porches- "Great." So the buildings ended up being aesthetically a little wide, but it all ties together and it works pretty well, I think, because it's not too jarring.

That was all in the context of the neighborhood in the design phase, and Wild Sage was the first block built. Nobody had seen what else was going to be out here, and we all felt like Wild Sage was fairly adventurous for Boulder when we were doing

the design work in terms of aesthetics. It ended up being one of the less adventurous pieces of the whole neighborhood- everything around us has five different colors and corrugated metal and shingles and hog wire. There's a lot of different stuff going on. But that is also one of the reasons that we kept the price down. We had a very simple pot of materials that were affordable.

Jim Wasley: (flipping through the book) Let's just go through the book. We can come back to the metrics. The metrics get back to the fact that I really left Milwaukee in a cloud of dust, and I didn't go back and see if we ever got utility information from Collin. But I don't think we did. At some point we need to track down some utility data.

Brian Bowen: Definitely get that through us. And I'd love to see this analysis once it's done.

Jim Wasley: The premise was a year's worth of utility data. Now if you've got more than a year, I guess what we should do is try to take the most recent so that it's the most shaken out. Unless you know that something went catastrophically wrong and you can flag those things so we get some fairly clean data. We can also try to look at it over a several-year period. Once this is set up it'll be very easy to input that kind of stuff. And the goal will be to sort of update these things periodically because it is just a snapshot and that year might have been an anomaly.

The Leopold, which is our flagship, it was supposed to be carbon neutral, but the first year it wasn't. We had a bad winter with a lot of snow on the collectors, and we learned something. So we'll look at it again next year and see. So that's a year's worth of utility data. I'll make sure I ask what I need.

Brian Bowen: I can get that to you, I think. I've got some of it sitting on my desk right now.

Jim Wasley: And is there a way to pull out the renewable contribution?

Brian Bowen: No. Unfortunately that's been a real problem. We've only got two buildings with solar thermal, and they're centralized systems for all the seven units. And we

haven't really been able to quantify much of a savings on the gas bills from that. Jim and Collin weren't really willing to look at it. They're busy. And I didn't have time either really, so the people who are doing the financial side here at Wild Sage have tried to look at it, but there's no apples to apples because you've got two buildings that are very similar, but with real different occupant loads. So building that doesn't have solar panels has I think got the lowest energy bills of all three. On the other hand, one of the buildings with solar panels is a Habitat building. It's got probably a higher population than the other building so naturally it would have a little bit higher bills. So it's just hard for us to figure out what's going on. In the beginning we had a lot of fiascos in the utility bills... all kinds of noise in the data.

The bills were horrible in the beginning. They had some accounts they had never billed to GC that showed up- "Oh, you owe us \$28,000.00 in energy." "No we don't. That meter was transferred, and you have to go after those guys if you want that money." It was a big mess.

The thing that we can quantify perfectly is the electricity piece. Right now there are four of us who have PV systems. Mine's about to be turned on once Xcel shows up. (Looking out the window) I see new yellow stickers up there. It might actually be on. And because of the way Xcel rules work and electrical codes work, all of the photovoltaic systems are unit-by-unit only. Each unit by those rules has to be separated by a meter, and you can't cross-pollinate once you get past the meters to different shared systems.

So we don't have any shared PV systems, although I'm trying to get together a proposal to do PV on the carport roof. We could get a pretty good system on there that would probably cover most of our shared circuitry, but we have to get that sorted out. I haven't made much progress on that, but it's an idea that's out there. The big problem with that is that it's an HOA and doesn't have a tax liability.

Jim Wasley:

Say that again? HOA - I've got to get this right.

Brian Bowen: Home Owners' Association. Every state has different HOA rules. Colorado's are what they are, and it's just how we own the property. So everybody owns their unit and a share of the HOA essentially. But HOAs are essentially nonprofits (?). We pay tax on any profit that we make off of the common house rentals, which usually is about \$5,000 a year we're making. So that's good, as it pushes down our HOA fees, but we also pay taxes on it.

But we don't pay so much tax that we have a big tax liability that helps us with the subsidization for PV systems that we currently have with the state. A tax credit doesn't help us- we just don't get it. So we're looking at either a PPA or some other kind of way of structuring it so that somebody gets a tax credit that can somehow find its way back to us. But it's something that has to be figured out. I haven't had time to do it yet.

Jim Wasley: That's interesting. Jim was talking about that as well and I didn't catch the reference as to why the tax incentives for PV systems are hard to take advantage of.

Brian Bowen: Yeah, there's basically two pieces right now. There's Xcel's rebate, which is X number of dollars per watt. And that would apply to us. But if you're a residential client there was a tax credit that was available that was up to 30 percent of the system price that used to be capped at \$2,000.00. But now, oddly enough, as of the first bail-out in November some clever Democrat out there stuck in this renewable energy thing that removed that cap. And so now if you pay \$10,000.00 for a system you would get a \$3,000.00 tax credit that used to be capped at \$2,000.00. So if you get a small system like that you can get an extra \$1,000.00 towards it.

If you're doing a \$30,000.00 system, then you're not capped at \$2,000.00 anymore, so there's a big benefit for the bigger systems. On my system it's gonna save me, I don't know, \$1,600.00 or \$1,800.00, something like that. So that's the difference. That's why that hasn't happened really.

Jim Wasley: So right now each of the four systems is just reflected in your own your own utility bills? How does that work?

Brian Bowen: Yeah, so right now the HOA receives all of the gas bills and distributes the gas out by square footage, and there's a complicated formula for how that works and also for what counts as a person and all that kind of stuff. But there's a method for that distribution.

Jim Wasley: So it's one meter per building?

Brian Bowen: Yeah, one gas meter per building and there's a gas meter for the common house. For electricity meters, I think we may have one for all the shared circuits, but it may be different than that. But then there's a meter per unit, and so you've got to have one per unit somewhere in the building, and those bills go directly to the homeowners, except for the common bills.

Jim Wasley: Would metering the gas per unit be cost prohibitive?

Brian Bowen: We did talk about that a lot, and in the end it was a cost issue, and it was also a little bit against the ethic of the community. This is a really common conversation to have in cohousing and especially here. We have it all the time. We always land on the same side, pretty much. It's a question of scrutiny and fairness. Is there any fairness or are we just doing this together? The more scrutiny you apply to the fairness, the less it holds up.

So do I use the common house exactly the same amount as much as everybody else? No. I may use it more or less. Is that fair? Should I pay a different amount for the utilities for that common house or for the construction costs of the common house? How do you create some sort of sense of equity? And then we've got some things that are like the common house, like do you use the green or do you benefit from the green? If you have kids more or if you're older or if your views are on it? How's that all work? And what about the parking lots? If I don't park in the parking lots do I get any benefit from it? Should I pay for them?

What about the hot tub? We've got a hot

tub. We've got a subset of things like the hot tub where the users of the hot tub have gotten together and said, "Okay, we're gonna just pay for it," because we feel that that's generally fair. But the utilities for the hot tub go to the common house, and that's not broken out. We give ten bucks a month or something like that, but it's not really shared out specifically.

We've got a beer brewing club that I'm part of, so we've got a kegerator over there in that room in the common house, and we don't pay anything for the juice that runs that, but we do help to beautify the common house. We take on little projects to help do things. We also do a lot of deep cleaning in the kitchen because to brew beer you have to have a lot of clean space, and so we do a good job of cleaning. Then there's the woodshop. The woodshop team doesn't pay their utilities, and we actually charge people to be in that group so that we can cover tool expenses. We don't distribute the tool expenses throughout.

So the common conversation follows this pattern. Somebody says, "Hey you beer guys, you added this kegerator to the common house. What are you doing? That's driving up the utility bills. Who's paying for that? What's going on? I'm not using that, I shouldn't pay for it." Then somebody else says, "Well yeah, but I don't use the hot tub." And somebody else says, "Well I don't use the shop." Somebody else says, "Yeah, but I never go in the common house." So all of a sudden everybody's got the same exact beef, and there's no way to quantify any of it. If you tried to create it would just leave itself open to charlatanism. You'd have a crooked system instantly.

The speech that I usually give, and I'm one of the people who always comes out on this side and gives a speech, is "look guys, we're doing this together. The whole point we're all here for is to advance our lives and our humanity and these relationships together and to do this wonderful stuff. If it's brewing beer together or if it's sitting in the hot tub together or doing woodworking together or sitting on the green together, those are all the reasons that we moved in here."

"And there's no way we can do the math to break it out. It's against our ethics to break it out. We're sharing. This is sharing, guys. Sometimes when you're sharing you don't quantify how much you've shared. Like if you and I are friends and I've bought you dinner and you've bought me dinner, somewhere in my mind I'm not thinking, 'Well, I think I'm about eight cents ahead.' You know, it just doesn't work that way."

Jim Wasley: And that goes back to the dynamics of this in terms of affordability. The fact that 40 percent of the units are affordable or that you've got some Habitat units, this really hasn't made that conversation any more awkward or fraught?

Brian Bowen: Not typically. One thing is that our buildings are pretty economical to maintain, and our financial structure is really wisely set up so we have good reserves so we never have had to ask people for a special assessment or any kind of donation to get something mandatory to happen. That's really important. Because if we did have to go back to the community and say, "Oh, it's time to reroof. Everybody has to cough up \$20,000.00," some people are just not going to be able to do it. What do you have happen?

I'm actually working on an HOA project right now that's got exactly that situation. Some people are probably getting forced out of their houses, but those are the same people who actually over the past 30 years in this HOA have voted against increasing the reserves every single time. So they just didn't save their money. After 30 years of being in HOA they had \$18,000.00, that was it, to reskin and reroof their buildings. It's completely ridiculous. It's gonna be a \$500,000.00 project, and there's 12 units.

Jim Wasley: And that's not cohousing or Habitat or anything. That just people in a condo association.

Brian Bowen: Yeah, exactly, in a townhouse downtown.

So, generally there hasn't been much of a problem here. We don't have any kind of subsidy for the Habitat or affordable units

in terms of utilities or in terms of HOA fees. That is something that we could do. It's totally possible. It'd just have to be figured out. I think the conversation just never happened, partially because the affordable units and the Habitat units have such lower mortgage rates than everybody else that I think the feeling was that the affordability was already there and that we're not gonna kind of keep doing it.

Jim Wasley: And hopefully the utility bills aren't much.

Brian Bowen: They're pretty light. And our HOA fees are lower than other stuff in the neighborhood. Partially because we do a lot of maintenance ourselves, we're self-run, and partially because the buildings are pretty efficient.

The place where I've seen it come up is on opportunities for social stuff that requires money, so, let's say everybody wants to go to a football game or something like that, and tickets are 80 bucks. Economics is gonna be a player in that decision of whether you go or not. I don't go because I don't care about football, and I'm not gonna pay 80 bucks to sit there.

That's a deliberately made up extreme example. The real example, the real thing that happens is meals. It's a pay-as-you-go kind of system. It's not mandatory. A lot of cohousing communities have mandatory participation in meals systems. Not mandatory eating or attending, but mandatory cooking rotation. So if you choose not to eat that's fine, but you still are required to cook. We don't have that. The way our system works is that typically the person who's the head chef sends out a menu a few days in advance, people sign up, the head chef goes out and buys the groceries out of pocket, so you might spend \$150.00 or \$200.00 or whatever on your groceries.

That goes against your account with the meal system, and you just eat against it essentially. We charge usually about five bucks a person for a meal, and half that if they're under ten or something. In cohousing in general that's actually a relatively high per-meal price. A lot of communities in California work really hard at the \$2.00 or

\$3.00 range, but they're also eating lower quality food. They're working really hard to get to that level, and there's less protein, there's less enjoyable foods. We go for nicer food. Sometimes we'll have barbecued shrimp and we'll have whatever, stuff that's not exactly economically cheap.

But still, five bucks a meal is pretty good. So the two places that causes a hurdle for the poorest families is first off in fronting that money. Not everybody can just walk into the grocery store and spend \$200.00 or \$300.00 on groceries and not have it come back to them over the next week but over the next three or four months. So the system that we created for that is if you need an advance, you can get it. There's a fund that we all donate into - or actually we built up out of the meal system itself.

We made a small profit for a while so that we'd be able to have this fund, and so if somebody needs X amount of money they can go in there and ask for it and get it and buy the groceries with it. It works out great. And that's used sometimes, but more of what we see is - and more from the Habitat families, I think - and probably from some other families, including market rate unit families - is if you've got three kids that are over the age of whatever that have to pay a full price and two adults, you have a \$25.00 dinner, and that just might not be possible.

So we haven't done anything to subsidize that yet, but I kinda think that that conversation is gonna happen sometime in the next year or two because we are reworking - we had a big five-year retreat that I actually organized this spring with another person - and 100 percent of people loved it here. Actually I should give you our results from the surveys and stuff. It might be kind of interesting.

Jim Wasley:

Sure.

Brian Bowen:

One hundred percent of people loved it. We had 100 percent attendance except for the people who were out of town or who had to work and couldn't be there. And that's actually one of the things that really changes a lot, person to person, based on their comments. At the lower pay scale you have

less freedom. If you're punching a clock at a factory, you can't just not be there. You can't walk out for a latte- there's just not a lot of freedom.

Whereas we've got a bunch of people who work from home, and they have nebulous business stuff going on, and you see them at the coffee shops, and they'll be working on their laptop. And they're working, but there's a lot of freedom. There's a wide range in terms of what's available to different people. That's really the only place where I've seen economics kick in.

Jim Wasley: To finish with the metrics, water is something that we were only tracking if we could, but is it possible to get water bills?

Brian Bowen: The water bills are available. They're all centralized and divvied out just like the gas.

Jim Wasley: Jim likes to say that this is heading toward carbon neutrality. Is that realistic or is that a stretch?

Brian Bowen: I think that's a stretch. Just look at my unit for example. I wanted to evaluate the potential of being able to say it was a net-zero energy unit, and so when I looked at my allocation of the gas bill I knew it was more than I use, because we have more water-conserving fixtures and I'm just a miser. And then we have our thermostat set lower than a lot of people. So I feel like we're probably paying more than we use, but that's okay per the sharing conversation again.

And looking at a reasonable amount of gas consumption and trying to offset that with electricity, I needed something like a 12KW, a fairly big PV system which I couldn't even fit on my roof. So I sized my system to meet my actual electrical loads annually. I should be zeroing out on the electricity, but I'm a far cry away from zeroing out on gas. I don't think any of the units here are very close to that. The ones that are doing the best are, of course, the A units- the basement and first floor unit type, just by virtue of having very little surface area exposed and only north and south exposures.

We did do 2 x 6 walls with wet-blown

cellulose, but an inch of foam on the outside of that would have been absolutely appropriate. I'm kind of embarrassed that we didn't do that. I just didn't ever push it.

If we had one more dollar to spend, it'd be on insulation. That would be the thing we should have done. There's actually an insulation company in Denver that'll sell you expanded polystyrene sheets with 1 x 4s let in already, 24 inches on center. We're using it on a net-zero house up in Frazier, Colorado, which is one of the coldest places in the country. We're doing 4 inches of foam on the outside of the building, and it's working great. It's gonna be fantastic. So if we did 4 inches of foam, R 3.5 per inch, it's another R 15-18 on top of the well insulated cavity with no thermal breaks, it would be fantastic. It's not that much more expensive to do it, so we should have pushed that further.

Jim Wasley: Back to the water, you just mentioned something that I didn't even think to - again, the difference between commercial buildings and residential - but low-flow fixtures? Was that part of the plan?

Brian Bowen: It was. It wasn't implemented really that way. We basically did code minimums. We offered water efficiency upgrades, and some people bought Caroma toilets, which is a dual-flush toilet. But not many. And that was really the only thing that was offered. Some of us have gone back through and retrofitted our units. Some of the cheap toilets that we bought originally have been replaced with more efficient toilets, some with nothing more efficient. But it's really up to the homeowner.

And that's one of those things with the sort of shared utility bill thing is nobody's really on the hook for exactly what they use so there isn't a sort of natural economic incentive to push your bills down to benefit in the same way as usual.

Jim Wasley: And this is the basic dumb question I haven't asked because I just assumed, the ecological footprint of the building, whether or not net zero, was the goal in everybody's minds; that this is Boulder and that people would have been pushing to make this efficient. Is that

true?

Brian Bowen: It is true. I mean the community wanted to say it was efficient. We wanted to say it was efficient. The developers wanted to say it was efficient, but really we were working on this project before the net-zero energy term had been coined.

Jim Wasley: That I totally understand. But the water efficiency, I would have thought that there would have been a bigger push.

Brian Bowen: A lot of it came down to dollars in the end and affordability. So we built these things, the buildings, residential square footage for \$85.00 a square foot.

Jim Wasley: That's another question I wanted to ask you. Okay, so that's the cost number, \$85.00.

Brian Bowen: Yeah. So if you add \$2,000.00 for foam on the outside of the buildings and \$5,000.00 for windows and \$2,000.00 for low-flow fixtures everywhere, all of a sudden you've got a \$10,000.00 upgrade package to the building that is all absolutely worth doing. I mean no doubt about it. Cost payback calculations are there. The return on investment's there. It's all low-hanging fruit. And still we were not able to get people to do it. And we did present a lot of that stuff. We tried to get Eagle aluminum-clad windows instead of the vinyl windows. We actually didn't try to get Alpenglass in, but we should have. Higher quality glass.

And the foam. A few things like that didn't ever make it really. So if we had it to do over again - which is what we did at Silver Sage - we definitely improved everything over there a step above what's here across the board, and it was built for a little bit more money. But really if you're gonna spend \$250,000.00 on a unit, and that goes up to \$260,000.00, your mortgage payment increase is not that much, and all of those \$10,000.00 items, that package of items there, really falls within the cost-neutral category. So it all reduces your energy bills by more than it increases your mortgage. So there was no reason to not do that stuff.

So that's a place where the project didn't

succeed, and I would like to do better. At Silver Sage the insulation package that we used was 2 x 6 exterior walls with Icynene. Much tighter buildings. And the developer took off the foam from the outside to save money- so we lost that battle yet again.

That was at the time when the developer was just starting to get their eyes open to advanced green building. They'd always been doing some green building, they'd been doing better than most people as a developer for sure, but now if we were to do both of these projects over again, we would do them as net-zero energy projects. And we would succeed. We'd know how to do it. And we finally have the terminology and the marketing ability to say how much value is added. What wasn't available when these projects were designed was the word zero.

Jim Wasley: I love that.

Brian Bowen: You know, once you just say zero, then people go, "Ooh, zero." Even if you say net zero or almost zero or halfway to zero, as long as you get the word in there. All of a sudden people are like, "Ooh, zero." So yeah, there's a long way to go. I know Jim would like to say that a bunch of the units are what we'd call net-zero ready, so all they need is to have renewables added to them and they would be net-zero energy. And that's maybe kinda true for some of the units, but I don't think it's really true across the board, and it's not supported by the utility bills. Once you get into the utility bill analysis, I think you'll come to the same conclusion.

Jim Wasley: Just looking at the wall sections it's always seemed to me that they're not that high performance. They're what I would consider standard practice - but I don't see anything really special.

Brian Bowen: We felt like they were the minimum. They're 2 x 6, which is what you need, and then cellulose instead of fiberglass. That's really all there is. There's nothing beyond that. We did a caulk-and-seal process, so we have pretty good infiltration rates, but they're not what I would call high-performance walls, unless you were in a climate with a lot less

energy demands than this one.

Jim Wasley: Yeah. And then there's just a couple nagging details that again relate more to the bigger buildings, but - installed ventilation capacity, just to make the parallel - there are bathroom fans and range hoods. And the range hoods are ducted to the exterior at least?

Brian Bowen: Yeah, everything's ducted to the outside, but there is no other source of fresh air.

Jim Wasley: There are no HRVs...

Brian Bowen: Yeah, no ERVs. One person actually did retrofit an ERV in and it works really well.

Jim Wasley: Yeah. I think I was in her unit, that she was selling it? And she made the comment that it was so she could have a cat with her litter box. That's a pretty fancy litter box.

Brian Bowen: Yeah.

Jim Wasley: But other than that really nobody's picked that up?

Brian Bowen: No. In fact some of the whole house exhaust fans have been taken out. Tamarack whole house fans. They were offered as an option, and some of them broke and then were removed. I think there's only been two removed, something like that. But there were only three or four bought, so we didn't have a good success rate with those. Just on this project- I'm not drawing any conclusions off of that for the product.

Jim Wasley: Was there anything special about the bathroom fans?

Brian Bowen: Upstairs we put a timer, on the upstairs bathroom fan so that you could have it turn on automatically some pattern of time. And some people use those. Most of the units have good enough natural ventilation that that's not that useful.

Jim Wasley: Installed heating capacity. That's gonna be buried in the specifications- there's a gas-fired boiler for those six units.

Brian Bowen: One quick story on that is that we did

work with a good mechanical engineer, Liz [Gearing](#), and she designed the systems and sized them, and she had two boilers in each mechanical room, partially because of the desire mechanical engineers to have redundancy, so that if one fails you still have something to go on. It's a good survivability piece, but it's a fairly expensive way of doing it. And anyways, we felt these buildings would coast through 12 hours, no problem, so why do it?

So they designed them to meet the capacity they thought they had, and then Jim and I said, "All right, now we'll just install one instead of both," and they said, "What?" We said, "Yeah, we're just gonna install one instead of both, and we'll make sure there's a place and a way to plumb in the second one, but the second one is future expansion if they need it." And we went through - if you look at the weather data for this winter - we went through a really, really cold, dark phase, and the systems performed fine, way past the design temperature. So we cleared the hurdle of 50 percent. We chopped our mechanical system designs by 50 percent and survived!