

Episode 281

What's it like to be an owner builder? – with Tully Gallagher

The show notes: www.houseplanninghelp.com/281

Ben: The first thing I want to know is when did you come up with this idea?

Tully: I came up with the idea probably, 2017 was the first time I thought hey, let's build it for ourselves. We had been looking at building a higher performance home but having someone else do the envelope for us. That ended up falling through in 2017 and we came up with the idea of, what if we just do it ourselves?

Ben: Why did it fall through?

Tully: There ended up being some issues with that builder. He'd sustained a back injury and he was located in a town that was a couple of hours away from us. So, he was going to have to do some building pre-fab style at his location and then bring everything over to our location. Then timing and the injury from him kind of made that not possible.

Ben: So what experience did you have before this?

Tully: Not a whole lot in terms of big construction. I'd done a number of small remodels on the houses and apartments that I'd lived in prior. But in terms of any type of actual big building where it was a full-scale breaking ground to living in a finished project, I had zero experience from that.

I took the Passivhaus Builders' Training in 2017 so, that put me in contact with some pretty good people who actually did it for a living and I leaned on them pretty heavily during the planning phases to just have them give me tips in terms of, 'this is a good idea' or, 'that's a terrible idea; you should think about doing it a different way.'

Ben: So this training, do you think it taught you a lot more than the practical experience of your remodels?

Tully: In terms of the Passivhaus detailing, yes, one-hundred percent. I think that's something that I'd done a lot of my own self-taught learning on Passivhaus before the actual tradesperson training. But that tradesperson training really helped out on the Passivhaus side of things. Just on construction, nailing things together and standing walls up.

Some of the previous remodel stuff had helped but in reality it was just a lot of research and then you've just got to jump in at some point and figure out what works and what doesn't work.

Ben: Is this a carpentry-led route?

Tully: I would say carpentry was probably the thing I was most comfortable with. In terms of the remodels and stuff, I'd done some tiling and things like that but that wasn't necessarily heavy on my mind when thinking about our project. It was more the carpentry and the details associated with being able to achieve airtightness and a lot of insulation and our window install and all of that kind of thing.

Ben: What gave you the confidence that you're going to go ahead and do this?

Tully: A little bit of self-confidence, a little bit of if we're going to build a house like this, we're pretty much the only ones that are going to be able to do it because no-one around here has even heard of Passivhaus let alone built a Passivhaus.

Ben: You've got no choice by the sounds of it.

Tully: It was pretty much like I think we could figure this out and if we're going to do it, we're going to pretty much have to do it ourselves. So, let's go.

Ben: So, we know that you're doing it now. Are you doing everything? What's in? What's out?

Tully: Up until the point where we framed some interior walls upstairs which were non-load-bearing, just the walls for bedrooms, bathrooms and such upstairs, I'd done every single thing with the help of my father and a couple of other people. When we were setting roof trusses it helped to have three or four people.

Other than that, the framing, the window installs, all of the Passivhaus detailing, the air ceiling, the installation of the ERV and all of that, that's been one-hundred percent myself doing it.

Ben: Let's rewind for a moment here. You're doing it all on site but what about the designs? How are you making sure that this is a good design to begin with?

Tully: From the very beginning when we had decided that we were going to build the house ourselves, we said let's keep the form super simple. So, we just have a rectangle that's two storeys and has engineered roof trusses. It's about as easy as it can get from a shape perspective.

Then from the Passivhaus side of things, the training that I took in 2017 was from a company in Denver called Emu Systems. They are trying to develop or standardise construction systems for different climate zones and at that time they were looking for partners to pilot their building system. We ended up finding out that it was a pretty good fit between what they were looking for and what we were doing in our project.

So, the construction system, all the building science, the wall details, the window install and all of that was as a result of working with Emu and their standardised construction system.

Ben: And the site itself, what constraints were there?

Tully: Not a whole lot. It was a property that we owned ourselves. It was relatively flat. It was on top of a hill and we came to find out it's really, really windy here. But for the most part, it was easy digging. We just have a crawl space foundation so, we didn't have to dig really deep and we didn't run into any rocks.

I'd say the biggest thing was, the closest to any type of major home improvement building store is probably about an hour and fifteen minutes away. We do have some local lumber stores and we leaned on them pretty heavily. It was good because they were introduced to some newer products that they hadn't heard about before, but they were able to source a lot of that for us.

Ben: How many buildings are there around you for services and things like that?

Tully: In terms of electrical services or just the population of the town?

Ben: Just for context, if you want to connect to the electricity grid or anything like that, how are you looking? It sounds quite remote.

Tully: Yes. So, the town of Red Lodge is two-thousand people. We're probably four miles outside of town. But we're out the back of a

subdivision so, a lot of the houses around us might have an acre or two lot.

But in terms of being able to connect to utilities, we picked the location of the house based on the fact that we had a transformer a couple of hundred feet away from us. So, installing that electrical line wasn't going to be a big deal. And being able to have the utility company come out and put in a meter was going to minimise cost.

Then from a water perspective, we're on a septic and our own well. We had to have a company come out and drill a well for us, and then we had to install a septic system as well.

Ben: What do you need to think about for those two things, a well and a septic system?

Tully: The biggest thing was looking at whichever requirements you have, either regulatory or county requirements.

We're kind of lucky in that we're building outside of the city limits. In the state of Montana, if you're a homeowner-builder you do not have to pull plumbing permits; you actually don't even have to pull a building permit. The only permits that we need are an electrical permit and sanitation.

So, the septic piece had to be sent into the county and then the county had to approve the design. That all had to occur before we could start constructing it.

One of the requirements when you're looking at being on a well and having a septic system is spacing of the well from the septic tank and your leach field. That was something that we knew going into it, we had to make sure that the well location which was more flexible than the drain field location worked from a spacing perspective.

Ben: How deep does the well go?

Tully: Our well is about a hundred-and-forty feet deep.

Ben: Because you're on the top of a hill, you were saying earlier? I actually have no context for whether that's deep or not.

Tully: Yes. It's probably in line with the other wells around us. Everyone else has a well. I wouldn't say that's overly deep compared to other wells. You've got some that are drilled down to a hundred-and-ten feet; others are down to a hundred-and-seventy feet. So, not terribly deep.

Ben: What's the process with digging the well? Is it very, very narrow, literally just sending a drill down? What else do you need to do?

Tully: You hire a well company. They come out with a rig, they pretty much drill a big hole down to about twenty-five feet and then they drill the small hole down until they hit water.

We ended up hitting water relatively high but the water wasn't clean, meaning it was pretty muddy. So, we had to drill deeper until we got to nice, clean water, and then we isolated that dirtier water whenever they cased the well, which basically means they ran a big PVC pipe down into the well.

So, once the well is drilled, it's probably seventy-five feet or so away from the house. Then you end up having to run a pump into the well and then you run a line into the house and then you have a pressure tank that supplies the pressure to the house and holds a reserve of the water.

Then with the well, you end up having a pressure switch and that's where the electricity that powers the well actually goes into the pressure switch.

Ben: Are you treating the water at all? You've mentioned that you've dug down that extra bit to get to some good stuff.

Tully: Other than some water filters inside the house for drinking water – that's just to make it a little bit cleaner – we don't really have to do anything. The water that we hit really didn't have any smells when we had it tested for chlorides, hardness, TDS and all of those things. It was in line with acceptable water.

So, we're not doing anything above and beyond just putting it into the pressure tank and then having it feed the house.

Ben: And once the septic tank is done, will there be any maintenance or anything that you need to think about?

Tully: Not really. The septic was installed about a month-and-a-half ago. We've got a one-thousand gallon septic tank and that is sized based off how many bedrooms are in the house. So, if you've got three bedrooms, you get a thousand gallon septic tank. If you have four bedrooms, you need a fifteen-hundred gallon septic tank. We just have a thousand gallons.

You've got to keep an eye on it every year, to be able to look into it and make sure that the solids aren't building up too much, and if they are then you have to have a pump truck come in and empty

out the septic tank. But that's really the only maintenance that's involved with it.

Ben: We haven't really talked too much about what you're hoping to get out of the house. We know it's a Passivhaus but it's for the whole family here. So, what were some of the things on the brief?

Tully: I'd say the biggest thing for us was this is our forever home. Even though my wife and I aren't too old and our kids are pretty young – I've got a seven year old and a five year old – we knew that we were moving back to Montana. My parents are quarter of a mile away. We can look down on it right now.

It was a house to be able to bring us back home, have the kids grow up in a small town just like both my wife and I grew up in. And then for it to be the most healthy, comfortable place to live in for the family since we'll be here for so long.

Ben: And your choice of build system; you mentioned it earlier but maybe you can give us some more detail about that?

Tully: When you look at a high-performance building, it seems like there are fifteen different construction systems. Any way that you can think of building a really big, fat, thick wall, people have done it.

For us, it was nice to partner with Emu because they had their construction system picked out. So, I didn't have to think about whether or not I was going to build a traditional interior wall and then have external insulation or what that construction system would look like. Their construction system is a double stud wall. So, going with their system made it nice and easy. I didn't have to think about what I was going to do. All I knew was I had a double stud construction system and then that made all the planning pretty easy.

Ben: It's a Passivhaus system?

Tully: Yes. Our wall insulated thickness ends up being fifteen-and-a-half inches of insulation and then overall wall thickness, once you take into account interior finishing and the exterior siding, it will be close to twenty inches in some parts.

Ben: What is that insulation?

Tully: We use mineral wool batt. A lot of double stud, they'll do a dense pack insulation of either fibreglass or cellulose. In our area no-one really does that. There aren't any insulation contractors that use cellulose and even if they do, the most that they'll dense pack it is

maybe five-and-a-half inches. So, talking about needing a thirteen inch or fifteen-and-a-half inch dense pack, no-one really had any experience with that.

We didn't necessarily want to be guinea pigs. I bought a commercial insulation machine but I didn't necessarily want to make myself the first guinea pig with that amount of insulation. So, going with a batt insulation where the quality control and the engineering and everything of that is done in the factory, that made it pretty easy for us.

We did the insulation install ourselves and the batts worked pretty well.

Ben: What about your airtightness strategy?

Tully: That was something that was definitely looked at really early on when we were taking Emu's construction system and then fitting it into the shape of the house. Really since it's a rectangle, it's pretty easy. We didn't have any crazy junctions.

The only junction that we had to think about was the second storey floor system, how to get the air barrier out and around those floor joists. But it was definitely something that we thought of early on and we picked the materials that we used for that air barrier specifically because they were really easy to work with and they were really strong and robust. They could stand up to if somebody accidentally bumped into them or something accidentally hit it and ripped it. It was pretty easy to repair and get it back to air-sealed.

But for the most part, the detailing of it was pretty simple.

Ben: It does make life a lot easier, doesn't it? Where are you up to at the moment in the build?

Tully: We are finishing the interior stuff right now. We moved in almost a month ago, partly because we wanted to move in, partly because the house that we were renting at the time, we had to be out and rental homes are pretty hard to find in our area. So, we were at the point where we could move in.

When we moved in, the first couple of nights we brushed our teeth in the kitchen sink and we finally got a vanity installed in one of the bathrooms. So, that was a big win. But right now, we are living in it. We don't have interior doors. Those are all on order and should hopefully be here next week. Then it's finishing the window trim and then we're doing a lime plaster on the interior of all the walls.

We just started that install on one of the bathrooms earlier this week and that will be a big undertaking for me just because we have a lot of square footage and I don't have a tonne of experience doing it. But the first results in the bathroom are really cool. So, we're pretty happy with that.

Ben: It doesn't sound to me like there's a danger of work slowing? Sometimes when you move in it can be, 'we'll slow down a little bit.'

Tully: It definitely has a little bit. Knowing that we're in the house right now, if I don't get that one piece of window trim on today and instead I go outside and move around, go to the gym and workout or go up to the mountain and do some skiing, that makes it a little bit easier.

But up until the point we moved in, it was some of the more major things that we were doing. Making sure that we had the hot water system – it was slightly different in that we're using a CO₂ heat pump hot water heater. So, that was different than just being able to plug in an electric resistance water heater, connect electricity to it and have everything up and running.

It's slowed a little bit but I'm okay with that because we're finally in it and we're experiencing what we've been building for the last year and a half or so.

Ben: How have you found time for all of this? No doubt you're going to save money going down this route but was it a play-off between doing work versus actually doing the project?

Tully: One-hundred percent. Before we started the project we were living in Denver, Colorado. I had got a mechanical engineering degree out of school and was working as an engineer in Denver and had been doing that for ten years.

My wife didn't work because she was taking care of the kids but we knew we wanted to move back home. So, we were trying to figure out how do we get back home, what we do for jobs, and it got to the point where I knew I wasn't going to be able to do what I was doing in Denver in Montana for work. It got to the point where we just had to jump.

So, I quit my job and we moved back home to Montana. My full-time job is and was building the house. My wife was able to get a job in town with the school so we at least had some income coming in. But we leapt.

We went from having a very stable income, stable benefits, a pretty consistent life, to moving back home, not having jobs, living in rental houses, and then we were finally able to get in not too long ago.

Ben: Let's talk about actually building this, doing it, having that on your shoulders. What's been the biggest challenge?

Tully: Probably finding time to walk away from it at times. I think right when I started, I want to say for nearly two-and-a-half months, I probably didn't come out to the job site only one day. I was wanting to get things built and it got to the point where coming out every day, I started to become a little bit more easily agitated and I just needed a break.

That's something that was a struggle for me all the way through building, knowing that I want to continue making progress so that we can move in, but at the same time I needed to take a break so that mentally and physically I could recover. That was by far the biggest challenge that I had.

Ben: Would you have done anything differently in terms of that?

Tully: No. It's stressful. I'd like to say that I've had way more stress in the last year-and-a-half than I had in the previous eight years probably combined. But I think I've also lived more and experienced more in the last year-and-a-half both in emotion and physical, actual achievement, than I had in previous years.

I'd had an office job for the most part. I did a little bit of fieldwork. But when you go in and you're on a computer, you can build some really cool spreadsheets or do some cool stuff in software but it's not the same thing as being able to go to work, work hard all day, then leave and look at a forty foot long, nine foot tall wall that you built and stood up that day.

Ben: It is a great accomplishment. But you have all these little challenges along the way. So, is there anything that comes to mind that was just a day when you almost thought, 'how am I going to get over this?' Because I didn't build my own house; I made a lot of the decisions. But even then you get these roadblocks where you just think, 'my goodness,' and then before you know it, you're past that and on to the next one.

Tully: Yes. We had a couple of those. The roof was my nemesis.

We've got a two storey house. We have decently tall floor joists on the main floor and the second floor and then our roof trusses have a two foot energy heel on top of them. So, the ridge of the house is

probably thirty feet off the ground. I'm not afraid of heights but I also don't love being up off the ground.

So, that roof; one, getting the sheathing up there was not the easiest thing in the world. Then once we got the sheathing up there, there was one specific day where we had all the underlayment on, thought we had it stapled down pretty well, it started to get really windy. I was down at my parents' place eating lunch or something and I looked up and I started seeing the underlayment on the roof start to pillow as the wind was picking up. Then all of a sudden one big length of it gave way and it was just flapping all over the place. My heart pretty much sunk right at that point. There was nothing I could do about it.

Once the wind died down, you go up, assess the situation, figure out how you can get it fixed, and then go up and go at it. It was just a slow plugging away of the roof.

We ended up putting a metal roof on the house and I had neither done a metal roof nor installed a metal roof before. But it was one of those things you figure it out. The first couple of panels aren't the prettiest but you put those on the back side of the house where no-one can see it. Then by the time you really figure it out, you've only got about twenty-five percent of the roof left and you'll probably never do it again in your life unless you make roofing your career.

So, the roof was one of those things that I showed up a lot of days and wished I was back at the office.

Ben: So there were sections like that. With all this experience, what has it taught you? Will you use it a lot again or will you change the bits that you do next time or whatever?

Tully: I think from a teaching perspective, even though it took a really long time for me to do it, the planning and the early design work that we did made what I was doing that much easier. Even though it felt really hard at times and it took a really long time, had we not gone through the design and the planning prior to it, I think it would have been way more difficult.

So, from a design phase and early implementation phase, that's the time where it doesn't cost you really much more money to take another month or two months to really get things lined out and understood. So, that was a big learning experience for me.

Then as far as going forward, I'd like to specialise in high performance building envelopes. So, just the envelope and the installation of that system. So, your air barrier, your insulation, your

windows. Pretty much the things that are the most important to high performance building. That's what I would like to specialise in.

And I think the ability to do that in a more pre-fabricated strategy is what I would like to explore. Break up whatever building it is that you need to construct. You break those walls and the roofs and the floors up into smaller chunks where you can build those in a pre-fabricated style in a manufacturing setting and then be able to put those on a truck, take it out to location and then just pick up the big panels and go from a foundation to a finished, dried in home within a week or so.

Ben: Yes, there's a lot of mileage still in this, isn't there? I think it's going to grow a lot. There's less wastage and all sorts of benefits with pre-fabricated, particularly when it's going to be built to such a high quality as well.

Finally, any advice for someone who is going to tackle their build hands-on like you've done?

Tully: Know that it's going to take a long time, especially if you're doing it yourself. Plan and think through things because it's a lot easier to make a mistake during that planning phase than it is when you're actually building it.

I did a tonne of 3D solid modelling for the house in SketchUp. I built the entire framing. All the framing, every single framing member I built in SketchUp before I actually cut any lumbar whatsoever. That helped me think through a lot of the different junctions and how I would frame the window or whatnot.

So, definitely spend the time on that design phase because other than a little bit of extra time, it doesn't cost you much.

Then once you get into it, it's going to take longer than you think it's going to take. It's going to cost more than you think it's going to cost. But if you can be okay with that and know that going into it, it makes it a little bit more palatable.

The engineering part of me thinks that I should be able to get my cost estimates really close and my timeline really close. But I wasn't. So, if you can be okay with that, especially if you've never done it before, you're not going to be able to get everything right and it's going to take longer than you think it's going to take and there are going to be things that pop up that you didn't think about that you're going to have to spend money to buy or to get done, that's a big thing to think of.

The other thing too that I've started to realise, especially as we've gotten more into the finishing stages of things, is that all your finishes end up costing a lot of money really quick and they are the things that are the easiest to change.

So, if you are back and forth between wanting to build the higher performance building and putting some of your budget or more of your budget into good windows, air sealing and extra insulation, there's probably only going to be one time, maybe two times in the life of the house that you're going to have the opportunity to do that. And when you compare it to brand new wood floors or fancy kitchen countertops or what have you from an interior finish, those things really aren't that expensive.

It's really easy to swap out a kitchen countertop; it's relatively easy to change your flooring in your house. So, if a budget constraint comes up and you have to choose between having really nice counter tops or spending the money to put in an additional X amount of insulation and focus on airtightness, I would say really consider that airtightness and insulation piece because you'll probably never do that again or never have the opportunity to do that again. But you can save up for a year and upgrade your kitchen counter tops really easily.

Ben: How about the family? Are they all happy with the house, the journey to get there?

Tully: It's been stressful. The kids are still young enough – my daughter's seven and my son's five – that they thought it was cool every single time we moved to a different rental house in town. And I think we lived in four different rental houses within an eight month time period. So, they thought it was fun. My wife and I, not so much.

My wife was the one in charge of doing all the packing and everything because I was out working on the house. So, she felt the brunt of moving even more.

It's been really nice to finally get in the house because when we were down in Colorado, we owned our home. We had owned the home for eight years. Both the kids were born there. It was something that was ours. We went from that way of living to bouncing around in different rental houses where none of it was ours, all while trying to build our own place. So, now we're finally in it, even though it's not finished and we've got sawdust all over the place and power tools laying around, it's ours. And we know that we're going to be here for a long time.



So, that stress that was there before we moved in has kind of gone away and now it's just trying to figure out how you live in a semi-construction zone. But we're managing.

Ben: Keep going, keep going. Tully, thank you very much for chatting to me.

Tully: You bet, Ben. Thank you very much. Sure do appreciate it.