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#HBRShow19



HOUSE CONSTRUCTION EXPLAINED

**Homebuilding
& Renovating
Show**

Today's Talk –

1. The main considerations
2. Choosing Self build
3. Overview of Construction types
 1. Masonry
 2. Timber frame
 3. SIPS
 4. ICF
 5. Oak Frame
 6. Alternatives
4. How to Choose
5. Construction Stages
6. Summary

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The main considerations

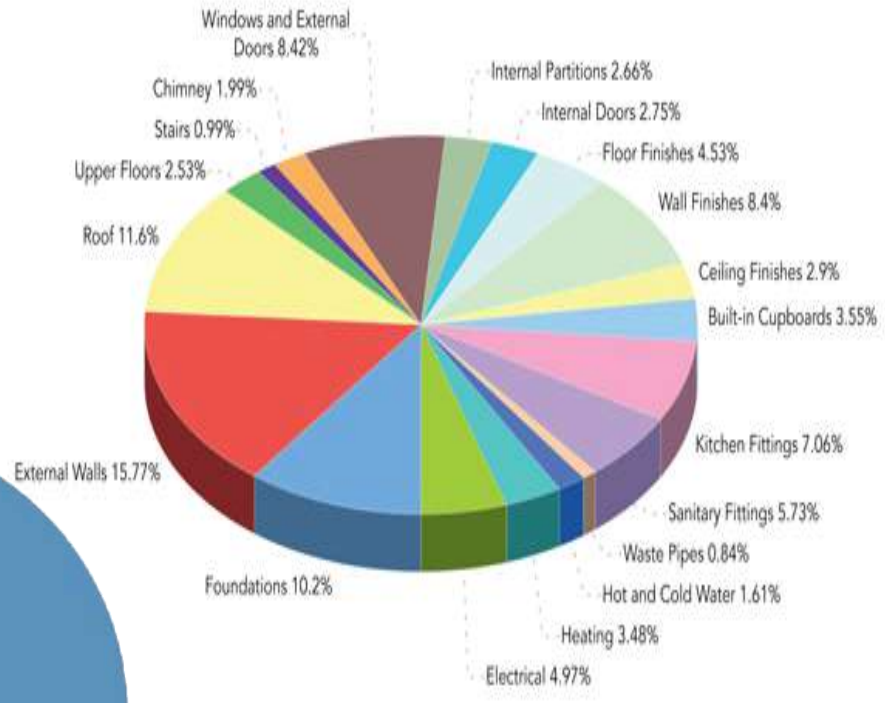
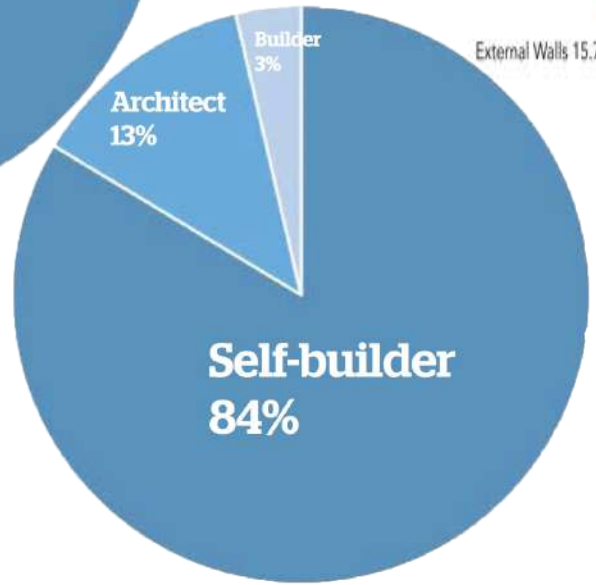
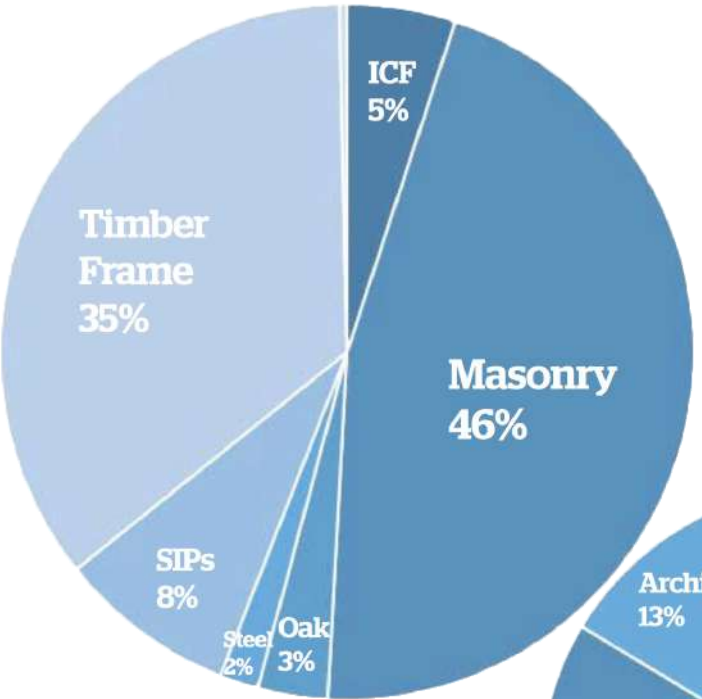
4 Main questions you have to ask yourself –

1. How much involvement are you having in the project?
3. What is your budget?
4. Is energy performance important to you?
5. Is speed of build a factor?

Choosing Self build

Top tips if you are choosing to project manage –

1. How much time and skill to complete the tasks
2. Get the best team around you, work with self build specialists
3. Become the best self builder/client you can – RESEARCH
4. Fix your budget, design and construction method as early as you can



Construction overview

1. Masonry

Details – brick outer skin, with cavity either full or partial fill insulation, aircrete block inner skin. Timber truss roof

Market share - 46% (down from around 70%)

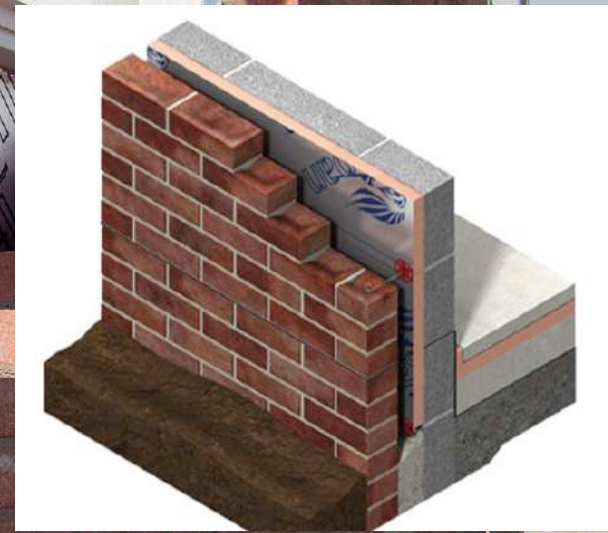
Time to wind & water tight – 20 weeks approx

Cost – cheaper than off site alternatives

Pros – traditional solid and safe. No issues with building fire. Cost effective and its what most architects know.

Excellent thermal mass.

Cons – Very slow compared to off site
Not the preferred option for low energy homes.



2. Timber frame

Details – timber studwork with an external OSB or plywood board nailed to it. Insulation friction fitted between the studs. OSB lined externally with a breather paper & internally with a vapour barrier.

Market share - 36%

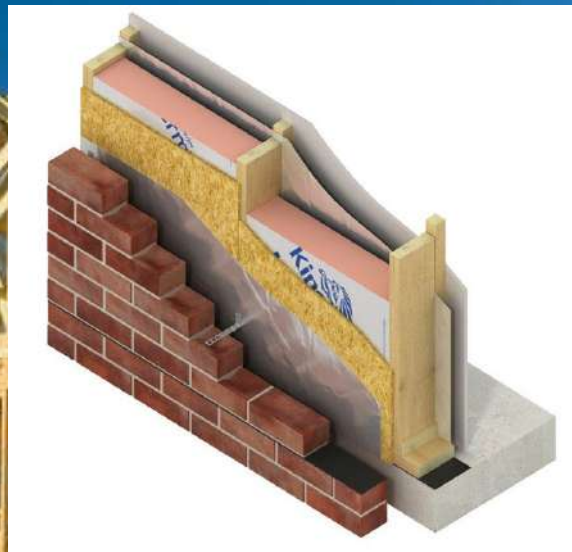
Time to wind & water tight – 10 weeks approx

Cost – open panel system cheapest, comparable to masonry

Pros – fast and cost effective way of building, good insulation levels. Lots of suppliers and choice.

Has been the standard choice in Scotland for many years. No issues with insurance or mortgageability.

Cons – Perceived fire issues, can seem lightweight. Settlement of timber can cause cracking



3. SIPs (Structural Insulated Panel)

Details – 2 skins of OSB are filled with either polyurethane (mix) or rigid polystyrene, infilled with timber to create closed panel. External breather membrane internal vapour barrier. Timber or mini SIPs structural splins. Wall & roof panels are the same.

Market share - 8%

Time to wind & water tight – 6 weeks approx

Cost – 10 - 15 % more expensive than timber frame

Pros – fast and cost effective if designed to panel sizes, excellent insulation levels. Airtight, ideal for farbric first or Passive House.

Huge spans, no roof trusses – vaulted ceilings. No issues with insurance or mortgageability.

Cons – Perceived fire issues, requires crane for roof. More expensive than alternatives



4. ICF (Insulated Concrete Form)

Details – Lightweight hollow interlocking blocks, usually made from polystyrene. Dry stacked, reinforced with steel rebar and filled with concrete (floor by floor). Lego blocks for grown-ups

Market share - 5%

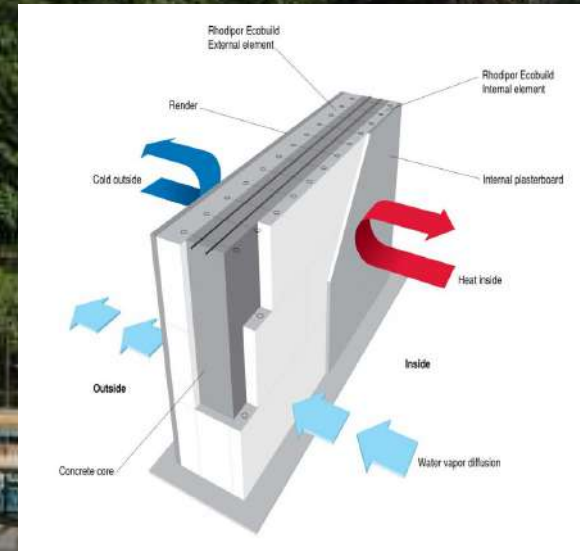
Time to wind & water tight – 10 weeks approx

Cost – 10 - 15 % more expensive than masonry.

Pros – fast and cost effective especially if you stack the blocks yourself. Excellent insulation levels. Airtight, ideal for fabric first.

Ideal for basements. Rigid and solid. No issues with insurance or mortgageability.

Cons – The pour is critical (burst blocks), more expensive than block. Alterations, extensions can be difficult. No full house solution.



5. Oak Frame

Details – Green Oak frames are cut and shaped off site, & erected by experienced team on site. Structural frame is then encapsulated with an insulated envelope, often SIPs.

Market share - 3%

Time to wind & water tight – 10 weeks approx

Cost – The most expensive method.

Pros – can be relatively quick to erect kit & encapsulated. Perfect for more traditional designs. Can expose timber internally & externally. High performance given the right encapsulation.

Can use part frame in exposed areas.

Cons – expensive and you are doubling up on structural frame. Frame will move and shrink due to high water content, requires cleaning with Oxalic acid once erected. Specialist designers.



6. Alternatives

Straw bale

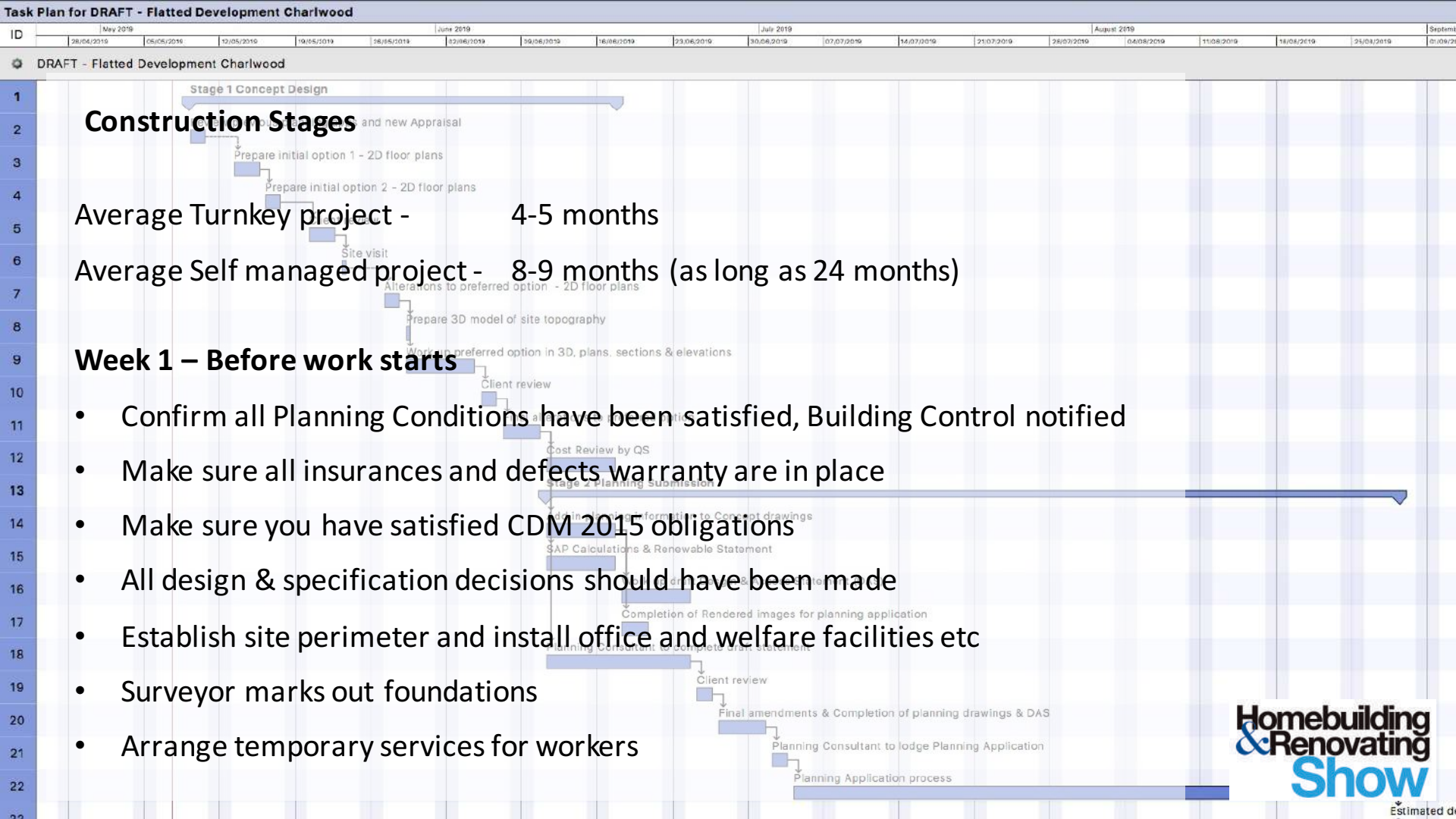
Steel frame

CLT

How to Choose

1. Do your research & decide which construction method best suits your requirements – budget, speed, thermal performance etc
2. Then select and get at least 3 quotes from manufacturers of that construction method (builder or factory). Look around their factory, visit ongoing sites, speak to clients. Also check Companies House.
3. If you are using off site manufacturing, try and find a company that has everything in-house. i.e. drawings, manufacturing and site teams (not all outsourced).
4. Negotiate a fair price and agree on a fixed cost and timeframe. Make sure you go over the quote to understand all the details.
5. At the end of the day choose a company you feel comfortable with!

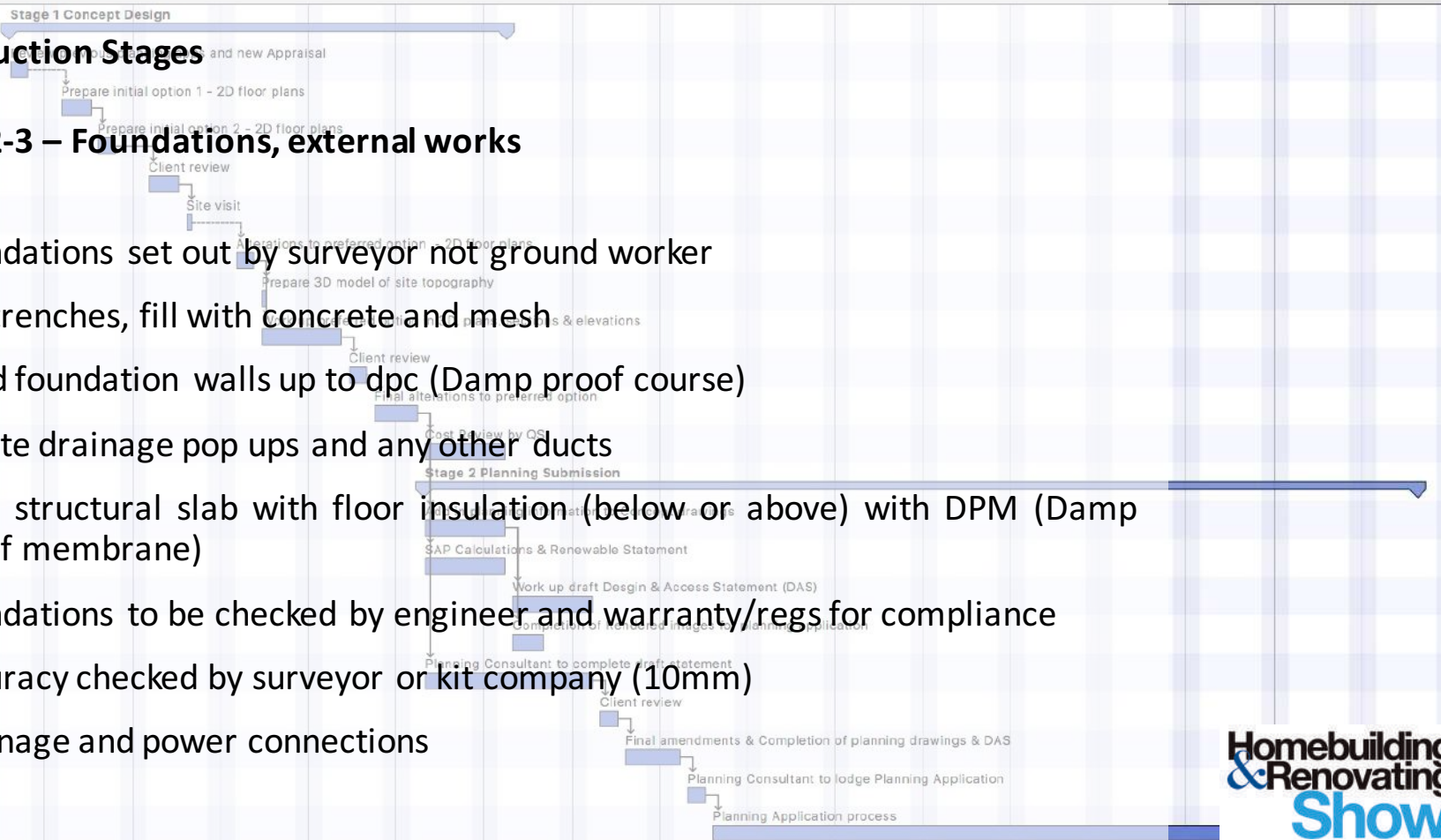




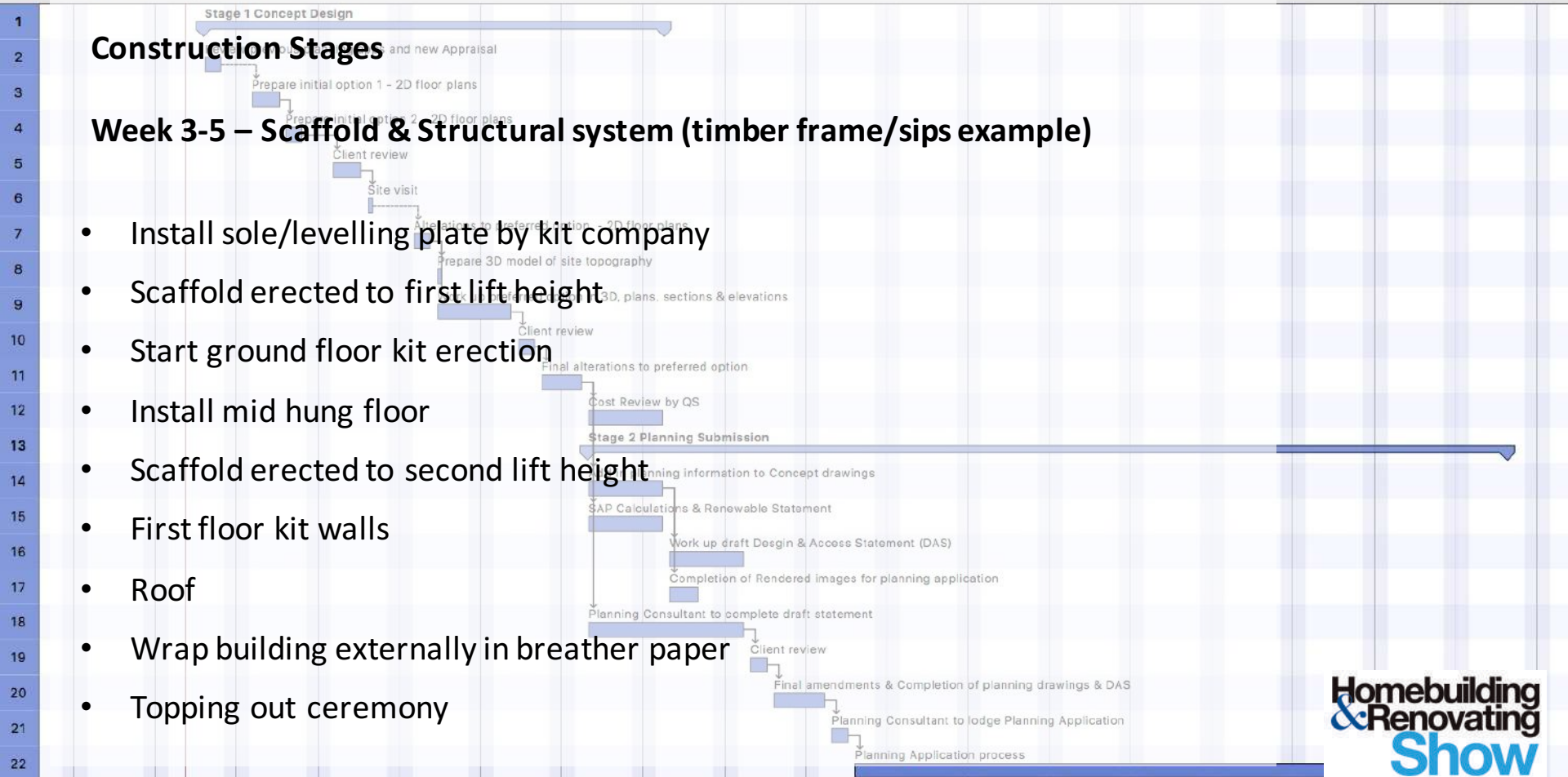
Construction Stages

Week 2-3 – Foundations, external works

- Foundations set out by surveyor not ground worker
- Dig trenches, fill with concrete and mesh
- Build foundation walls up to dpc (Damp proof course)
- Locate drainage pop ups and any other ducts
- Pour structural slab with floor insulation (below or above) with DPM (Damp proof membrane)
- Foundations to be checked by engineer and warranty/regs for compliance
- Accuracy checked by surveyor or kit company (10mm)
- Drainage and power connections



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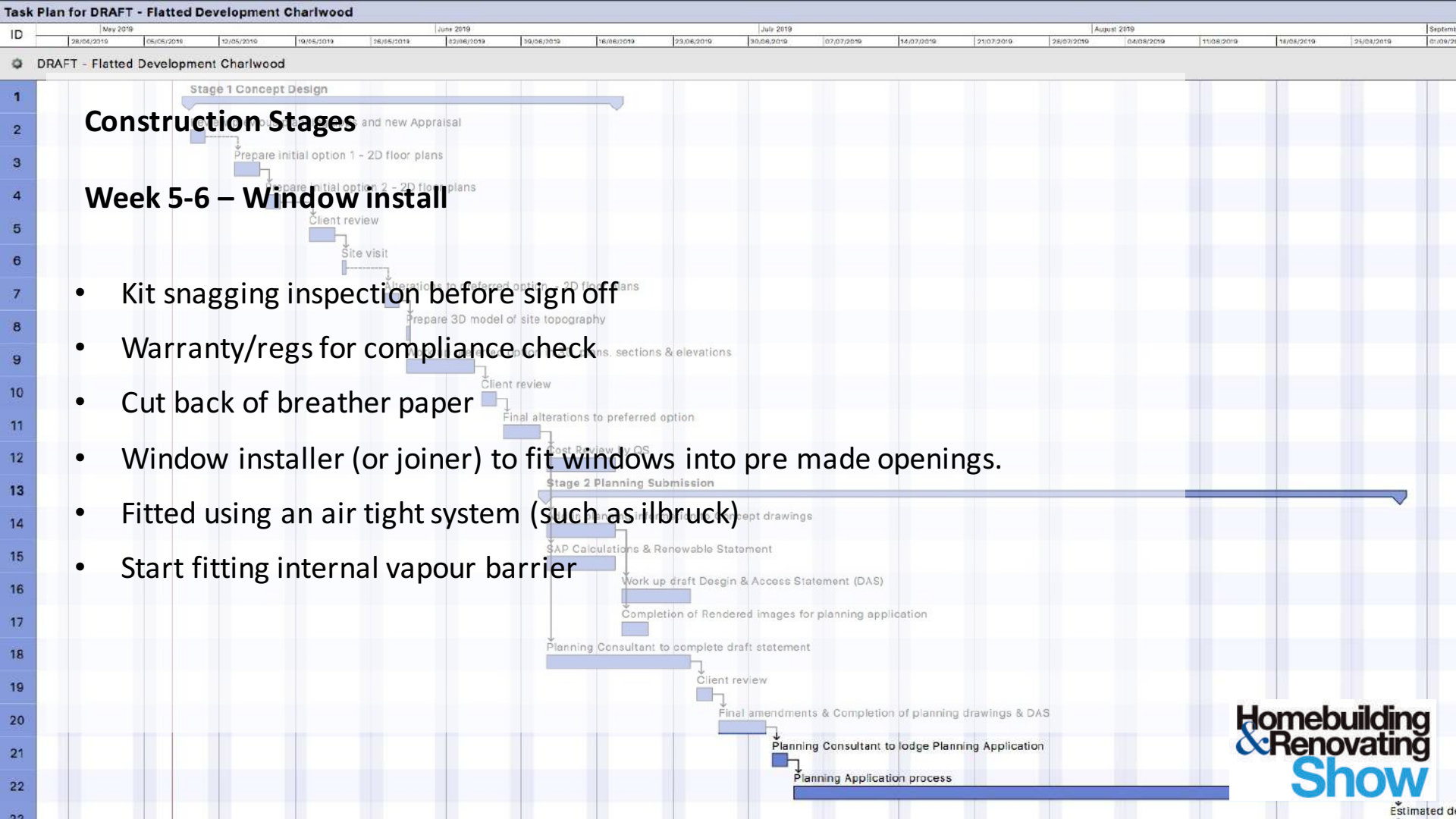


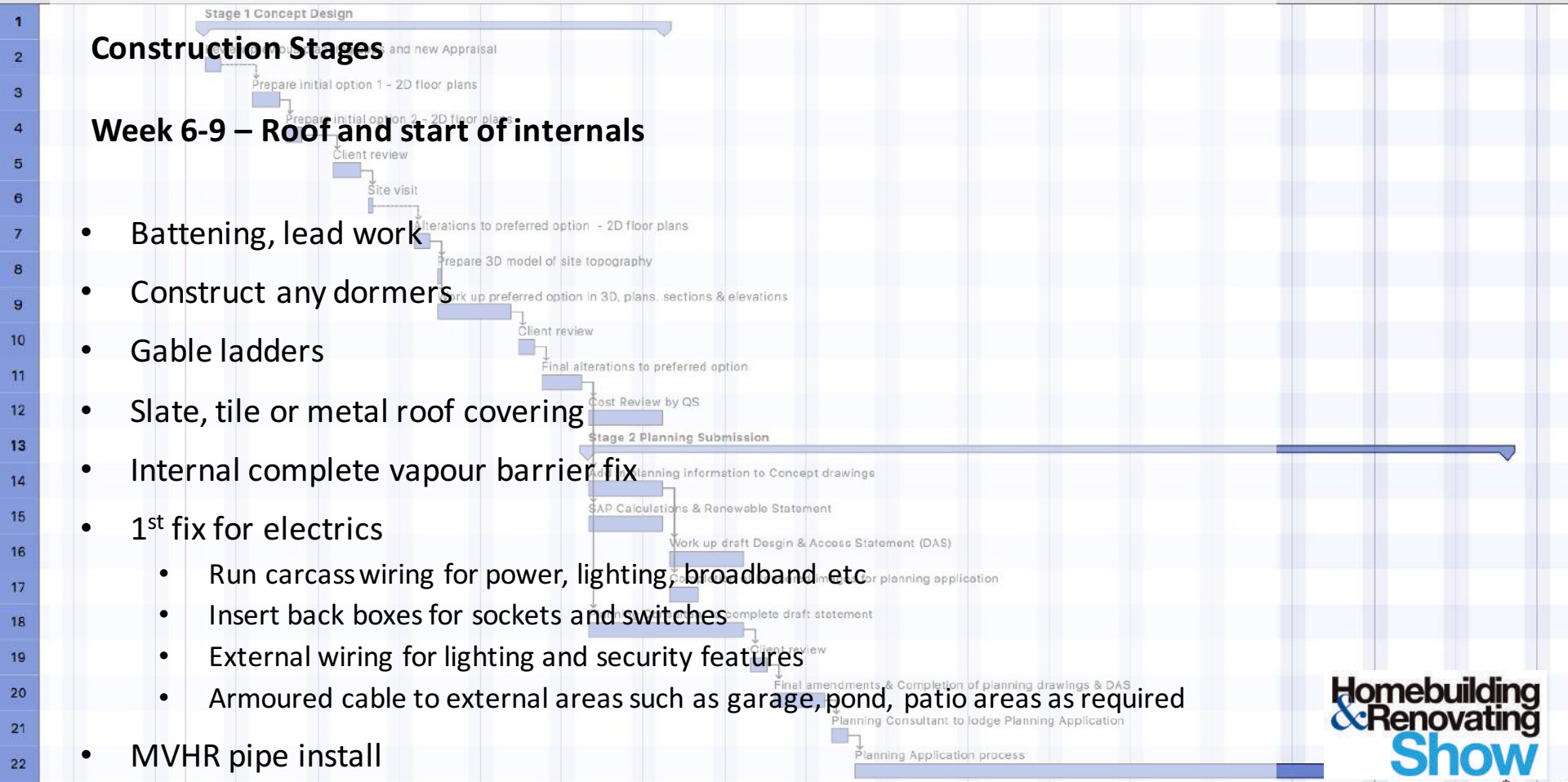
Construction Stages

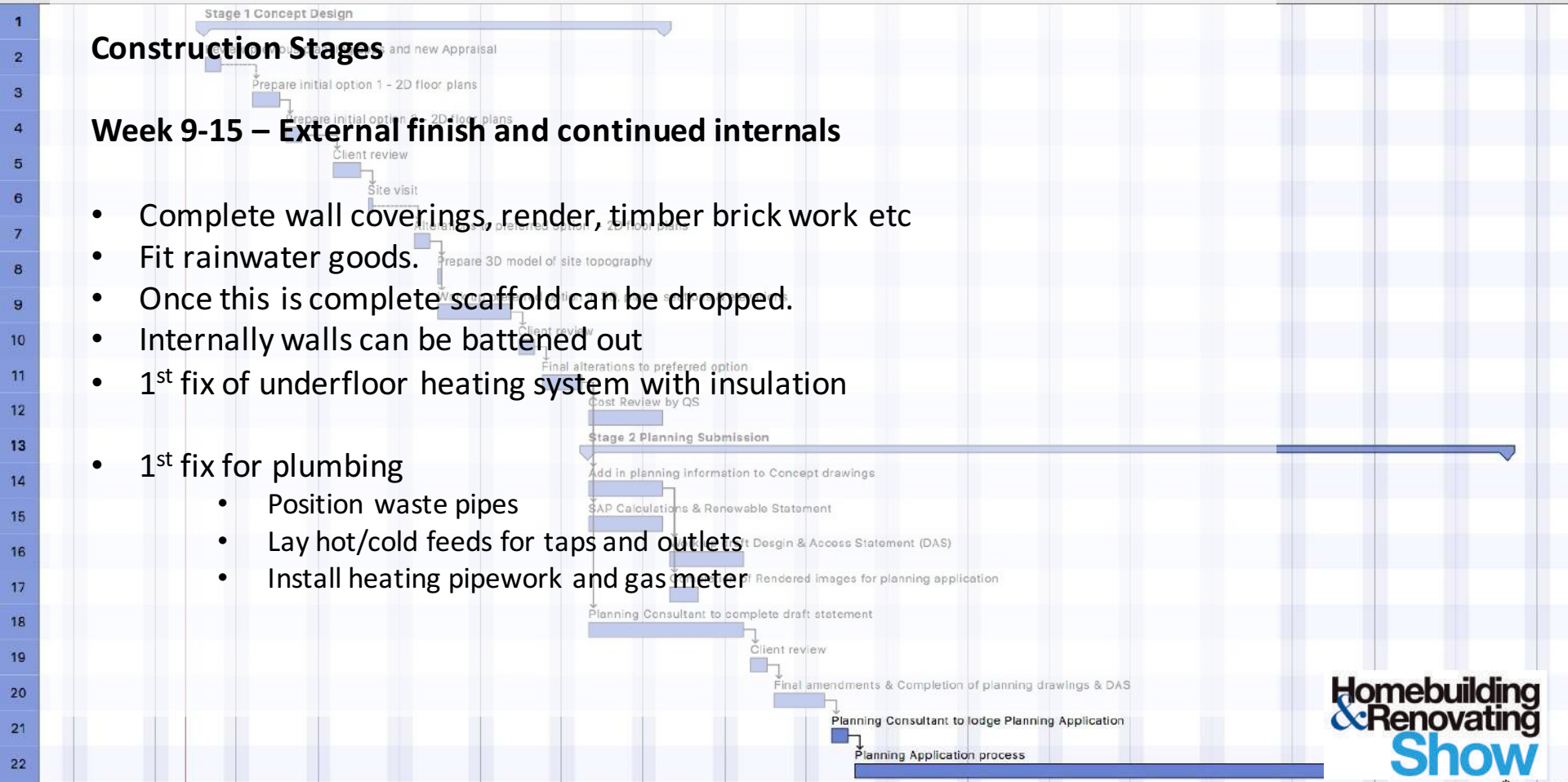
Week 3-5 – Scaffold & Structural system (timber frame/sips example)

- Install sole/levelling plate by kit company
- Scaffold erected to first lift height
- Start ground floor kit erection
- Install mid hung floor
- Scaffold erected to second lift height
- First floor kit walls
- Roof
- Wrap building externally in breather paper
- Topping out ceremony









Construction Stages

Week 9-15 – External finish and continued internals

- Complete wall coverings, render, timber brick work etc
- Fit rainwater goods.
- Once this is complete scaffold can be dropped.
- Internally walls can be battened out
- 1st fix of underfloor heating system with insulation
- 1st fix for plumbing
 - Position waste pipes
 - Lay hot/cold feeds for taps and outlets
 - Install heating pipework and gas meter



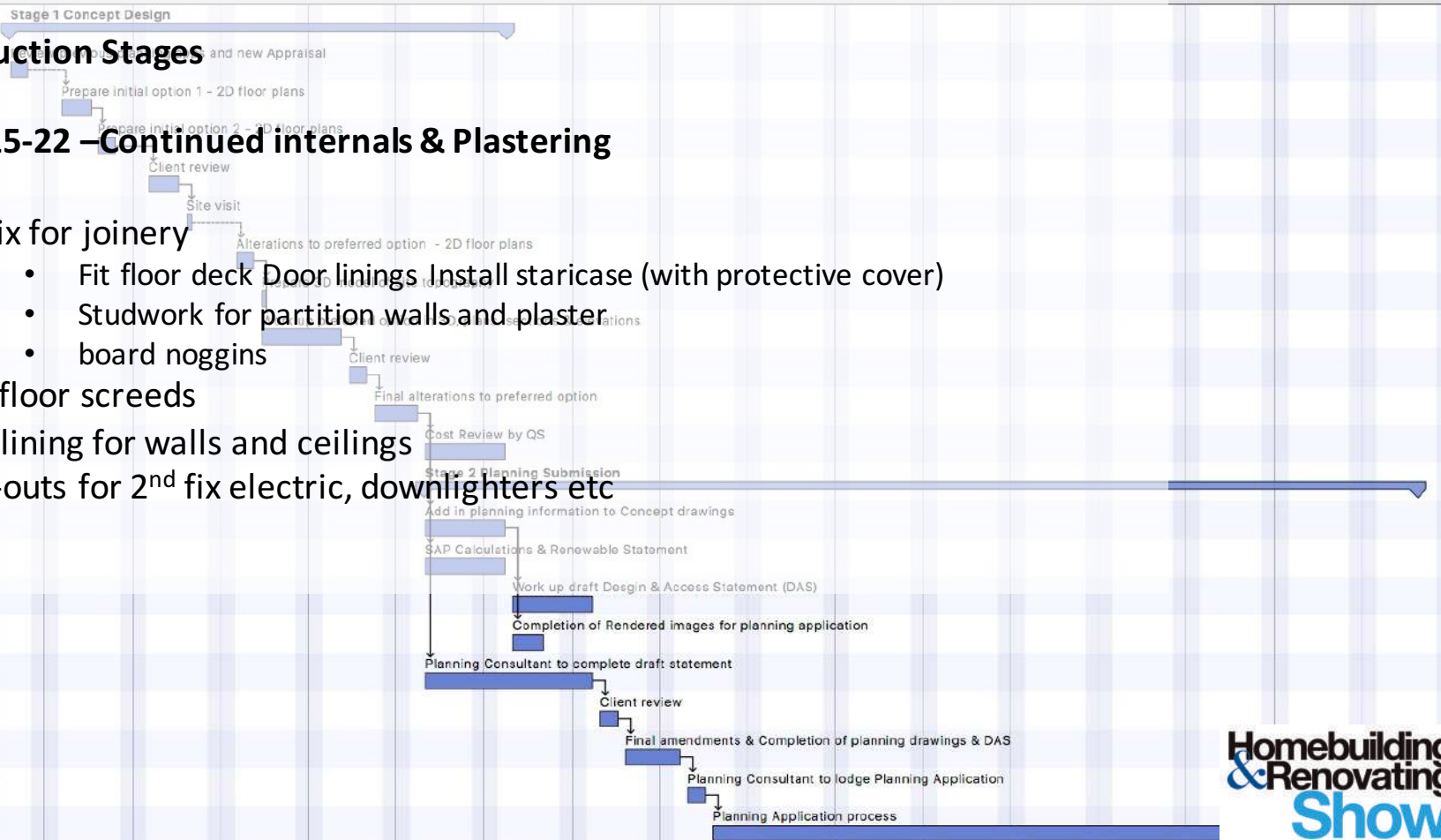
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Construction Stages

Week 15-22 –Continued internals & Plastering

- 1st fix for joinery
 - Fit floor deck
 - Door linings
 - Install staricase (with protective cover)
 - Studwork for partition walls and plaster
 - board noggins
- Lay floor screeds
- Dry lining for walls and ceilings
- Cut-outs for 2nd fix electric, downlighters etc



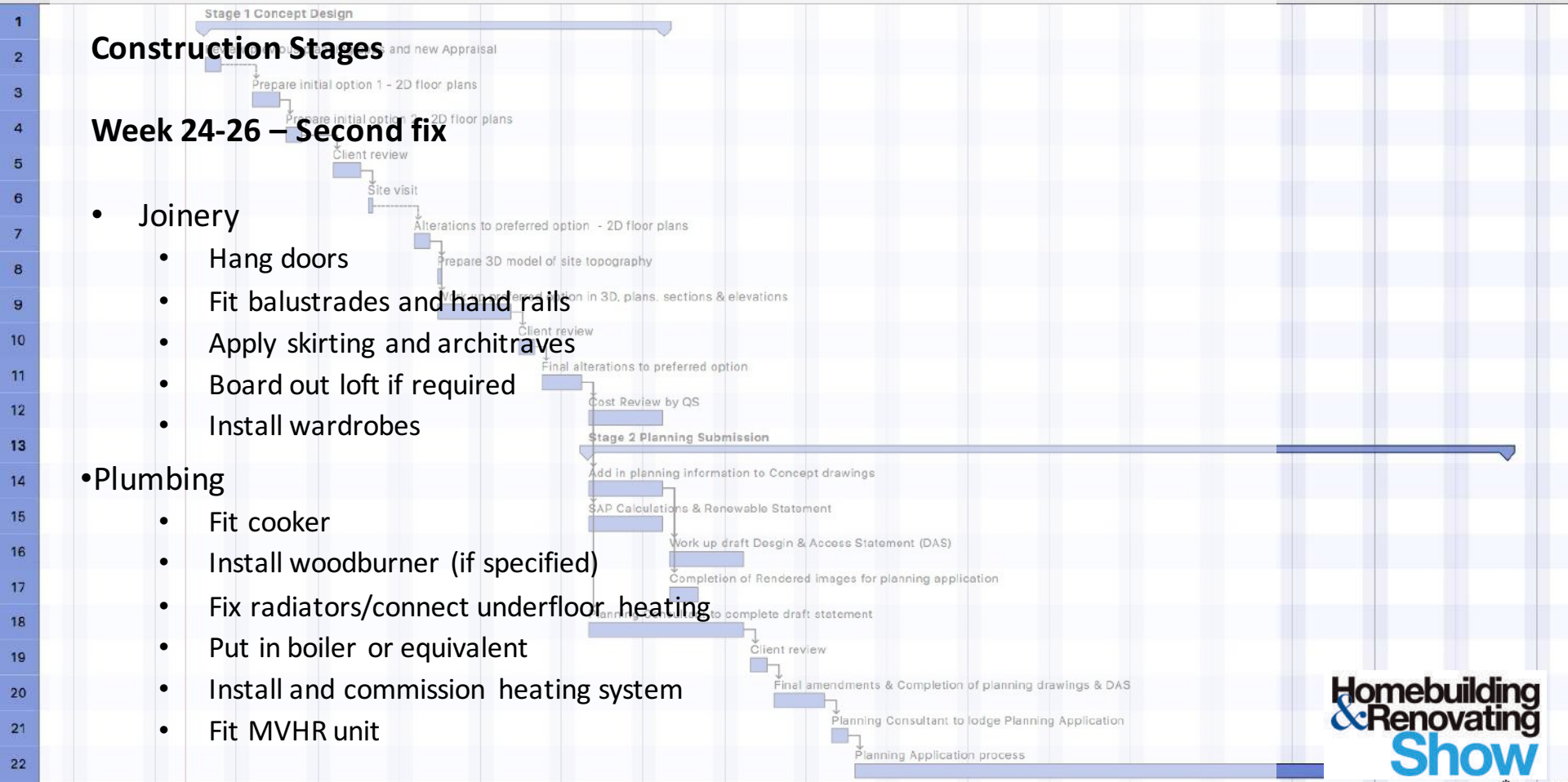
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Construction Stages

Week 22-24 – Internal fit out

- Fit hard wood flooring or tile work
- Install Kitchens
- Install bathrooms





Construction Stages

Week 24-26 – Second fix

- **Joinery**

- Hang doors
- Fit balustrades and hand rails
- Apply skirting and architraves
- Board out loft if required
- Install wardrobes

- **Plumbing**

- Fit cooker
- Install woodburner (if specified)
- Fix radiators/connect underfloor heating
- Put in boiler or equivalent
- Install and commission heating system
- Fit MVHR unit

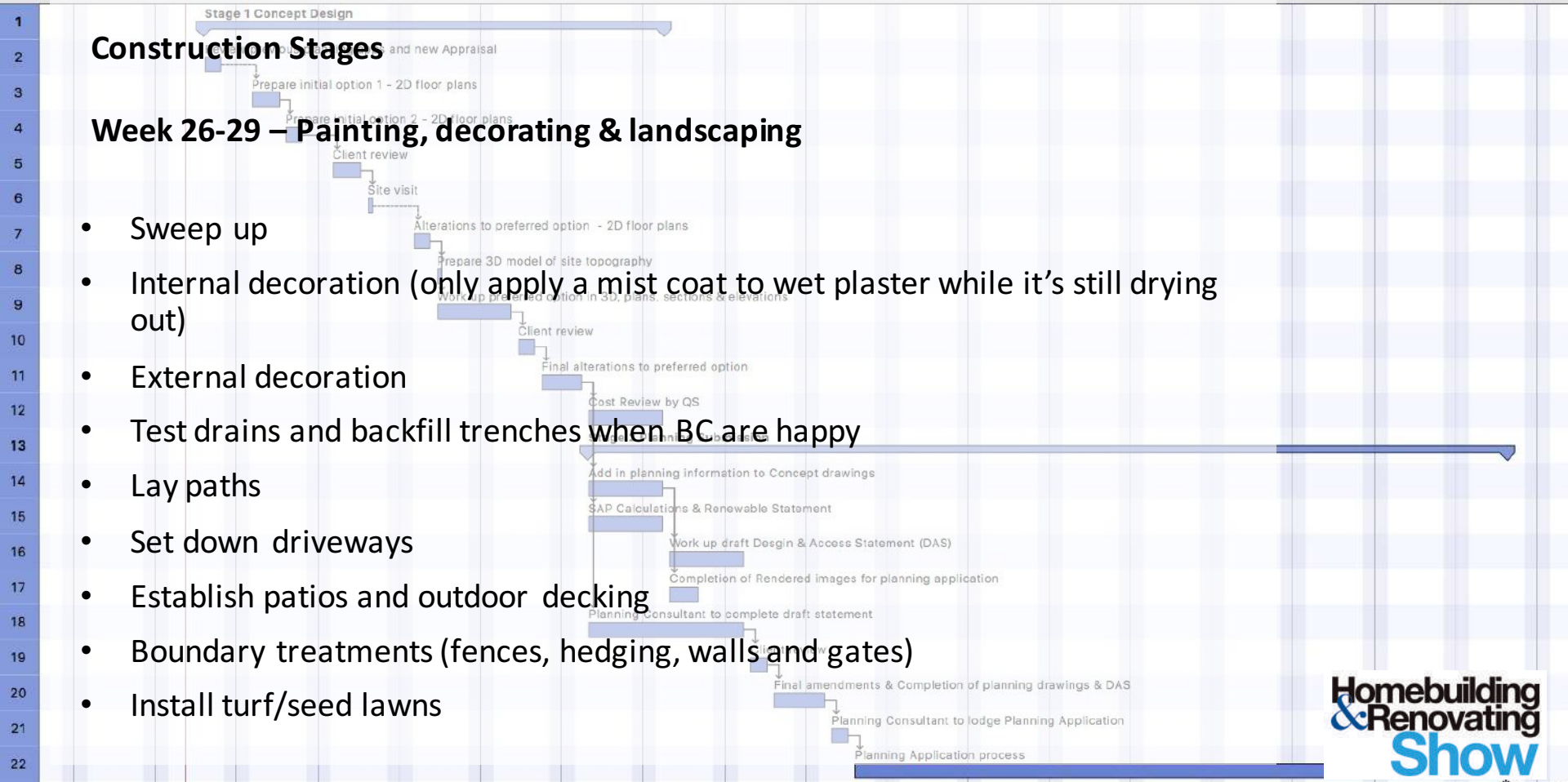


Construction Stages

Week 24-26 – Second fix

- **Electrics**
 - Affix faceplates for sockets and switches
 - Set in place consumer unit fuse board
 - Install internal and external light fittings
 - Fit alarm system
 - AV control system testing
 - Arrange garage supply





Construction Stages

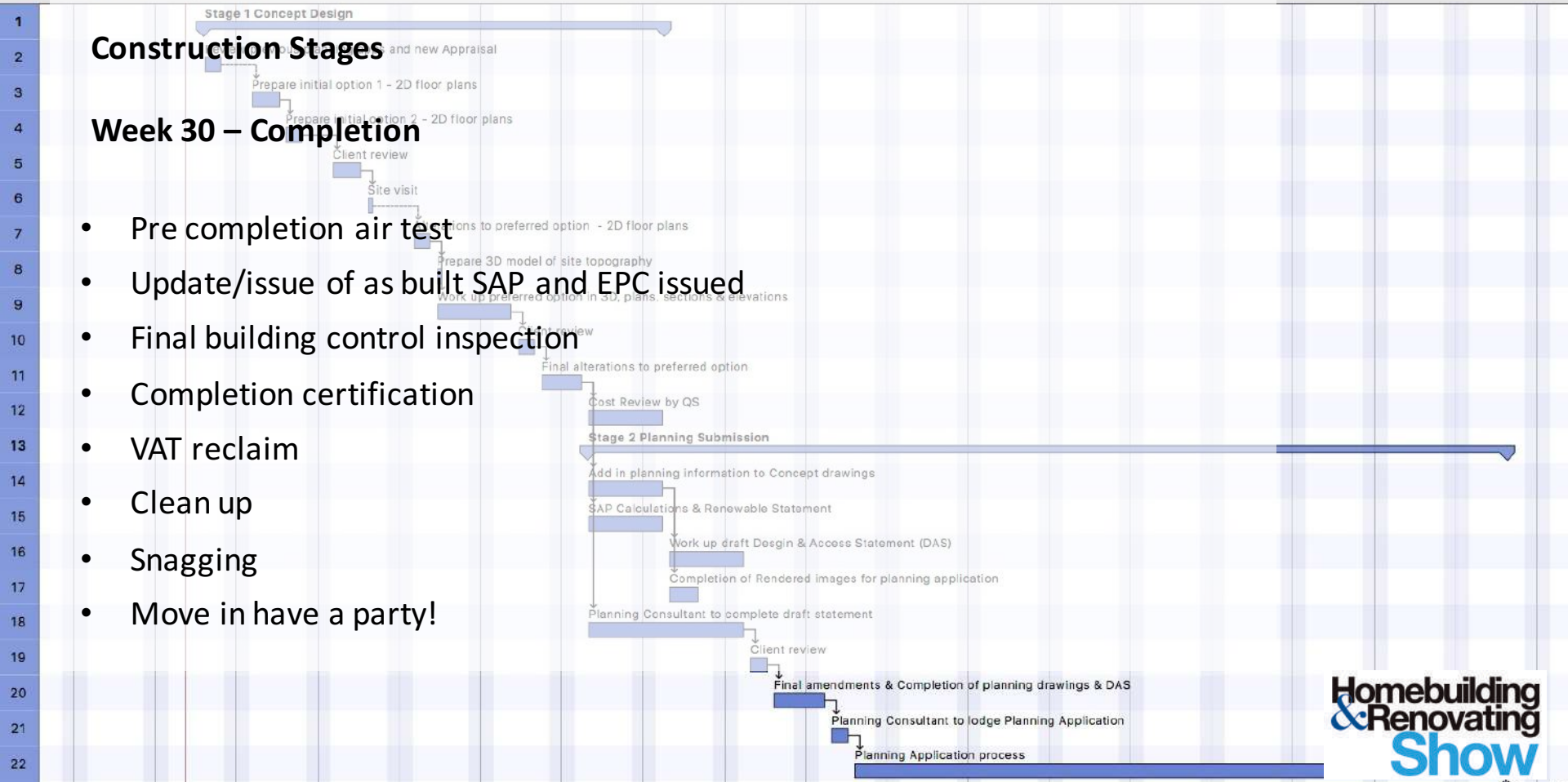
Week 26-29 – Painting, decorating & landscaping

- Sweep up
- Internal decoration (only apply a mist coat to wet plaster while it's still drying out)
- External decoration
- Test drains and backfill trenches when BC are happy
- Lay paths
- Set down driveways
- Establish patios and outdoor decking
- Boundary treatments (fences, hedging, walls and gates)
- Install turf/seed lawns



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Construction Stages

Week 30 – Completion

- Pre completion air test
- Update/issue of as built SAP and EPC issued
- Final building control inspection
- Completion certification
- VAT reclaim
- Clean up
- Snagging
- Move in have a party!



SUMMARY

1. Consider what your priorities are, quality, speed, thermal performance or cost
 2. Agree on your input in the Project Management
 3. Review all available Construction types
4. Decide as early as possible, which type you are going with
5. Do not start on site without all of your insurances and approvals in place
6. Stick to your budget, design and timeline where possible

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