



Can Totnes build itself?

Potential local building materials and their availability

Robert Somerville

Introduction

This report, from local architect and builder Robert Somerville, was commissioned to identify the range of possible local building materials available to the Atmos Totnes project. The concept of 'local food' is now widely understood, and the concept that by sourcing locally you reduce carbon emissions, create more local employment, enable more money to cycle locally (the 'local multiplier effect') and reconnect people with local culture and traditions.



All the same arguments can be made for building materials, and Atmos Totnes, in this paper, explores setting, from the outset, a target of at least 80% local materials in the specification for the buildings to take place on site. To the best of our knowledge this would be a national first. The potential for the creation of a range of new enterprises, processing materials, offering apprenticeships and training, and offering the opportunity of inward local investment to get them underway, is enormous.

Atmos Totnes has set out, from the start, to be "the heart of a new economy", and by applying this process, literally, from the foundations of the project, it will be breaking new ground and creating a replicable and scalable model of meeting local needs through local production. We feel that Atmos can model a new approach to development, one that maximises both energy efficiency and community benefit.



www.atmostotnes.org



Robert Somerville has a degree in Architecture from Cambridge University and a distinction in Building Technology with the Chartered Institute of Building. Robert worked for two London Boroughs in the 1980's as a Building Surveyor, employing conventional building systems. His love of the English countryside led him to volunteer at the Weald and Downland Open Air Museum, and it was there that he experienced the sights, smells, sounds and joys of pre-industrial construction using local natural materials. For the last 20 years he has lived in South Devon, working alongside skilled craftspeople as a designer and builder...and part of the renaissance of traditional materials and crafts in the U.K.

Natural materials from within 15 miles radius of Totnes

The South Hams and Southern Dartmoor area has a wealth of resources that were harvested/mined and processed on a small scale in pre-industrial times. They would have provided everything needed for the Atmos development except steel products and imported softwood. A few of these sources are still available locally. There are five types of materials that can still be found within a five mile radius and are ready to use, with good prior notification:

- **Crushed stone aggregate and sand**
- **Sub soil for cob**
- **Rough-sawn green timber**
- **Bales of waste sheep's wool from Buckfast spinning mills**
- **Straw bales**



The remainder can be found in their raw state and usually can be extracted and delivered by agricultural equipment. They would then need to be processed and seasoned in some way before use. The larger local estates such as Dartington, Berry Pomeroy and Sharpham would have had sources for most of the following within their boundaries. They could be approached to see if small scale extraction could be arranged. Likewise, there are many small farms with small woods, small quarries, streams and arable fields that could provide the full range of resources.

Raw material	Product	Possible sources	Contacts	Comments
Stone	Stone facing	Existing small quarries	Ivor Talbot. Ben Jones	Often generated on farms when digging out for new barns and tracks.
Boulders	Saddle stones	Fields along the Dart	Ivor Talbot	Boulders surfacing through ploughing
Lime	Lime putty	Small scale clamp burning	Joe Clarke	Large volumes would require lime from the North of England where it is still produced
Slate	External floor slabs	Several local quarries	Richard Smith	Roofing slate used to be produced at Landscope, unfortunately now closed.
Cobbles	External floors and paths	River Dart and numerous streams.	Judy Henderson Richard Parsons	Every winter storm produces a fresh crop
Gravel	For back-fill and bedding	Local quarries	Zig Zag Quarry Stoneycombe Glendining Quarry	

Raw material	Product	Possible sources	Contacts	Comments
Sand	For mortars, renders and plasters	Local quarries and the Dart and numerous streams	Zig Zag Quarry. Stoneycombe Quarry. Glendining Quarry	Traditionally river sand was used with lime, but cement requires a clean graded product
Subsoil for cob	Cob for mass walling	Dartington and local farms	Ivor Talbot	Sub-soil with 15-25% clay content and shillet
Clay for plasters	Base coat plasters, clay slips and clay/straw infill panels	Extensive clay beds in the local area. Also available as processed dry clay in bags	Ivor Talbot	Mixed with sharp sand and tested on panels
Clay for pigments	Natural clay and lime based paints	Extensive in the local area	Pam McDonald	A range of colours from yellow to pink.
Naturally durable timber	Rafters, beams, joists and cladding and roof shingles	Oak, Sweet Chestnut, larch, Douglas Fir, Western Red Cedar	Barton Sawmill. Anton Coaker. Mike Gardner. Paul McDonald Alan Paine. Marleyhead Sawmill. Rattery Sawmill.	Contact with cutting list in the Autumn. Stack and air-dry on site. Needs space
Non durable timber	Studwork and internal boarding and joinery	Spruce, Scots pine, Ash, Willow, as well as the above	As above	Air drying essential. Kiln drying with mobile mini kiln possible for joinery and boards
External Joinery grade timber	Windows and Doors	Oak, Sweet Chestnut, European Larch	As above. Zav Bowden Rob Johns	As above
Floor boards	Heavy use	Oak, Sweet Chestnut, Ash	As above	As above
Straw bales	Straw bale walls and staw/clay slip infill	Local arable farmers	Cornwall Farmers. R.Cooper	Will need to be ordered from a local farmers a year in advance, and stored under cover until needed
Agricultural hemp	Cast lime/hemp shiv infill	Local arable farmers	Michael Rogers	Will need to be processed before use
Sheeps wool	Loose insulation	Buckfast Spinning mills Dartmoor Farmers	Buckfast Spinning Mill. Richard Parsons	Will need to be treated with borax to deal with clothes moth larvae
Thatching reed	Roofing	Sourced from local estuaries	Stewart Arthur Linda Lemieux	Wheat reed is a local alternative

Natural Materials from the region: Devon, Cornwall and Somerset

The wider region includes industrial centres that produce more highly processed goods, particularly kiln-dried joinery timber. Also, distribution companies for globally-sourced mainstream natural building products. Transport is by truck.

Raw material	Product	Possible sources	Comments
Clay	Ready mix powdered top coat plaster	Clayworks in Cornwall	Regional clay used for high quality products
Kiln dried timber	Joinery timber	Beech Brothers	Some may be sourced regionally
Completed Joinery	High performance doors and windows	Rob McLeod	
Processed Natural Building Products	Complete range of imported goods	Mike Wye, Cornish Lime Company	Materials are mostly imported from Europe.

Natural Materials from the UK

This extends the range to include processed sheeps wool, recycled cellulose insulation and some timber board products (although these contain formaldehyde glues). Various processed natural fibre and wood fibre insulation products and natural preservatives are manufactured outside the UK.

Membranes tapes, adhesives, mastics are made from fossil fuel sources. Transport is usually by over-sized lorries that often cannot deliver to site due to the size of Devon roads.



The site itself

Usually materials are available as part of the demolition works. This will be subject to contamination survey for heavy metals, caustic chemical residues and asbestos. Close liaison would be needed with demolition contractors, and a large outdoor space to process and store reclaimed material.

Natural Material	Type	Comments
Clay-rich subsoil	Under floor slabs and excavated from drains and foundations.	Possibly contaminated. Unlikely to be good for cob, but may be tested for use with clay plasters.
Willow and Alder	Trees felled as part of development	Milled and seasoned on site and used for non-heavy-use flooring, panelling and ceiling boards.

Re-usable Material	Type	Comments
Slates & ridges		Potentially high value
Cast iron gutters		Down pipes and fittings in particular
Metal roofing sheets		Useful for temporary covering
Rough-sawn timber	Rafters, purlins, beams, joists and studwork.	Will need de-nailing
Bricks	Lime-mortared 19 th c.	High value
Stone	Lime-mortared	Dressed stones of high value
Dense concrete blocks	Cement-mortared blocks broken for reuse on their flats	For bellow ground work and mass retaining walls
Solid floor slabs	Broken and crushed on site	For hardcore and 20mm to dust which is very useful for building up ground levels, temporary surfaces and back-filling drains.
Floor boards		High value, could be a feature of any refurbishment. Will need de-nailing
Internal doors		Could be a feature of any refurbishment.
Internal joinery		Possibly some high value timber
Internal fittings		Could be a feature of any refurbishment.

Local building sites and the Totnes and Newton Abbot Recycling Centres

There may be other major work in town, or nearby, when work begins that could also generate useful materials. With good will from the local community, there may well be offers of materials available for the cost of collection. The above analysis would apply.

From these lists, it is clear that locally sourced materials could contribute to every aspect of the work to create a benignly habitable building shell:

- Groundworks materials
- Structure
- Insulation
- Roofing
- Plasters and renders
- Finishes
- Joinery
- Landscaping

The one area of limited choice is in natural insulation products, which is limited to straw, sheep's wool and recycled cellulose from newsprint, non of which is suitable for solid floor or solid wall construction. In conclusion, depending on the design and building system, a good target would be 80% of building materials to come from regional sources, with the earth, clay, stone, timber and wool to be sourced within 5 miles.

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