



Earthship Site Survey

Merkinch GreenSpace, Inverness

March 2009

Proposed purpose of the building

The following possible uses of the building were mentioned:

- visitor centre
- café
- workshops/classes
- BTCV office, tool store, overnight accommodation for volunteers

Location

Merkinch GreenSpace occupies the area to the west of a residential area and to the north of Muirtown basin (Caledonian Canal). It includes an area flooded by high tide (yellow on map) and an area protected by a low dike (white on map). This last part is partly wooded and partly grass playing fields. To the north end of the playing fields is a large raised area; the south bank of this raised area is running almost east-west, which is an ideal orientation for the location of an earthship. An earthship could be built, facing the south, optimal for capturing solar heat; no obstructions, which might reduce solar gain, were visible. Protecting the other three walls with earth fits in the current landscape.



However, flood risks must be considered. We were shown a map by the planning officer with 200 year flood risk areas marked; on this map the raised area was not indicated, but we could derive that the top of the raised area is most likely above the risk line; we think the risk line may be half way up the slope, or a little lower. Current expectations of rising sea levels must also be kept in mind as a risk.

As we are not certain how long the raised area has been there and what it is made of, we suggest that tests are carried out to established the stability of the ground. Earthships are usually build without foundations, so we need to be sure the soil is stable.

If an earthship is to be independent from additional heating all year round, the size of an earthship is limited by the amount of sunlight the building can capture though its south-facing windows. Because all rooms must have large south-facing windows, a large building would extend in the east-west directions. The proposed area would easily accommodate a building of 75 sq.meter, i.e. approximately 14 m east-west length. A larger building would require considerable 'adjustments' to the current landscape; either the building would be longer in the east-west direction (that may impact on the surrounding residents, who have a right of way to access the backs of their properties) or it would be higher, if we chose a two-level design.....



An earthship is usually protected from temperature fluctuations by berming up or digging into a slope. The visual impact of an earthship from the east, west and north is therefore very low. However, access to the roof would be very easy; this may not be an advantage in an area where 'unauthorised' access is a risk (damage and/or contamination of water catchment area).

The visual impact from the south should not be a problem as there are no houses nearby on that side. However the risk of vandalism, when the building is unoccupied, should not be underestimated.

Car parking and access

The nearby car park may not be sufficient for the planned use of the building. It would be in keeping with the sustainability aspects to encourage visitors to come by other transport. However, the authorities may require a minimum number of car parking spaces, to prevent visitor car parking becoming a nuisance for the neighbouring residents. We would suggest extending the current car park instead of creating a new car park closer to the building, because this last option would be visible from the nearby residences.

Access for visitors should be provided by a good quality footpath, which is also wheelchair accessible. It should be considered that, in practice, such a path will probably also be used by delivery vehicles to your premises and residents who have access rights to the rear of their properties. Also emergency vehicle access and work traffic (e.g. BTCV vehicles) may need to use this path. Either a separate road needs to be provided, or the footpath must be able to withstand such traffic.

Systems

Power

The requirement for electrical power will need to be assessed in relation to the size and use of the building and whether you require the building to be self-sufficient in this respect. As the building is close to public services, a grid connected power system is an obvious option; this would remove the need to purchase and maintain batteries.

Electrical power from photo-voltaics

The location is as good as can be in Scotland for photo-voltaics (PV): we do not expect any obstructions that could block sunlight. However, the risk of theft is large, because 1) access will be easy via the roof, 2) the price of PV panels makes them a likely target. The risk can be reduced by making access as difficult as possible (this will affect the visual impact). On the other hand, PV is the low maintenance option for generation electrical power.



Electric power from wind

Again, this location is quite good, with clear views to three directions: east, south and west. The houses on the north will cause turbulence, which can only be overcome by a considerably higher mast. The noise from a wind turbine may be considered a nuisance by the neighbouring residents. It may be possible to position the wind turbine(s) some distance to the west to alleviate this, but then the risk of tampering increases.

Electricity from hydro is not feasible at this site. Tidal power is an obvious thought at this location, but it may not be practical because it would most likely have an impact on nature and it is not a well developed technology. However, we should not discourage an experiment in this direction.

Water supply

Earthships are capable of collecting all the required water on the roof of the building, and store it in underground tanks. However, as this building will have a public use (even use

by employees and volunteers should be considered 'public use' as opposed to domestic use) the water quality will need to be tested frequently. These tests are quite expensive and very stringent; rainwater is one of the cleanest water sources, but acidity is usually very slightly higher than recommended for human consumption; bird droppings and air pollution may affect the water quality. We recommend (reluctantly) using mains water for use inside the building and considering a demonstration self-sufficient rain water system for gardening and washing of tools and equipment. A mains water connection should not be hard to achieve.

Sewage

Earthships are normally configured with grey and black water beds, which should be large enough to 'consume' all waste water. With the intended use in mind this may not be easy to realise. For example, if the building is used as a café, water consumption and therefore the amount of waste water will be quite large and this would require larger grey and black water beds. If the building is used by overnight guests, we cannot be sure that all guest will use biodegradable soap/cosmetics – such chemicals may damage the plants, which digest the sewage.

Because the municipal sewer is not that far away, planning and/or SEPA may insist in connection to the public sewage system.

Therefore we would like to suggest considering a demonstration grey water bed, which would have an overflow (or diversion when full) to the mains sewer. This would probably satisfy the authorities and it would demonstrate grey water re-use while the grey water bed does not need to be capable of disposing of all grey water. In that scenario the black water (toilet) could go direct to mains sewer and/or composting toilets could be considered.



From south



From east



From north-west



From west