

D.P. Griffiths, B.Arch., Hons 1. (Wales), RIBA.
Chartered Architect & Project Manager.

3 Saint Johns Close, Cefn Coed,
Merthyr Tydfil, Mid Glam. CF48 2PE

Website – www.philipgriffiths.co.uk

E Mail – Philip@philipgriffiths.co.uk

Telephone – 01685 370812

Mobile – 07903 306936

Mr. David Powell,
High Street Baptist Chapel,
Lower High Street,
Merthyr Tydfil.

09.11.2020

15.11.2020

Dear David,
Re: Proposed Remodelling of Chapel Hall.

Long Rafter Length - Rear Roof over Toilets.

In my report letter of the 05.11.2020 I spoke of the Toilet Roof being a short term and a long term problem, unfortunately following my further research and discussions with the technical department at Redland Tiles I have to advise the roof is not fit for purpose and becomes a problem.

It is thus pointless appointing a builder to work on the roof as despite there being a few 'rocking tiles' the problem is not workmanship but one of defective specification to cope with the rainwater flows as outlined below:

- A second roof has been cut at an angle of 16.95 degrees spanning above the original roof of the school room and the low pitch roof over the toilets. I cannot gain easy access to the roof space but would suspect the timber sizes and geometric roof structure configuration used may not meet structural requirements of Trada (Timber Research and Development Association) and during storm conditions the roof would be flexible enough to rise and fall under wind suction. This is not however the main problem.
- The roof orientation faces south, and in storm conditions mainly from the south west a wind tunnel effect is created as the wind is funnelled between the adjacent gable end walls of the hall and the chapel.
- The roof pitch measured internally in the male toilets is 16.9 degrees although this will need to be confirmed externally. The Redland Mini Stonewold tile used which also needs to be confirmed as the tile used is designed to be installed down to 17.5 degrees as an absolute minimum and is not guaranteed by Redland below that pitch.
- However, the main problem is a combination of the length of roof and the rainfall from the adjacent chapel gable wall falling back on the roof. Referred to as Long Rafter Length.

Long rafter length.

Redland say that over 10 m long and Marley for their equivalent tile state over 6 m long a runoff problem occurs near the eaves. The toilet roof is 8.9 m long and thus close to the design limit – and additional rainwater loadings from adjacent walls theoretically pushes it above the design limits of the tile.

The tile problem is that the side grooves in the small tile lack the flow capacity to channel water at the lower end of the roof without it back flowing into the roof space. Possibly evidenced by the roof only leaking during heavy inclement rain.

The adjacent gable walls.

In a storm rainwater is hitting the high gable wall of the chapel which acts as a vertical roof throwing water back onto the main roof. The rear toilet roof is an area of some 64 m² the adjacent wall above this roof is 40 m². The roof is thus asked to drain 104 m² which would greatly extend a theoretical rafter length. The problem is compounded as the wall water is then concentrated onto a triangular quarter of the roof. Thus, water from 40 m² runs over 16 m² of roof already carrying its own storm water.

See attached sketch.

The new waterproof paint skin on the gable wall has probably exasperated the problem as water is now sheeting off where previously it soaked into the wall.

- **Fixings** – We have requested from Redland a Spec master fixing specification to shown how the tiles should be fixed. We have to date not received a reply, and suspect that the roof has been the subject of previous complaint to Redland.

There is no evidence that this fixing specification has not been used, although I would be surprised if the correct fixings have been used. In storm conditions the tile elements of such a long roof un-clipped would also rise and fall and such a flexing motion would create a further ingress of water. Fixings are not however the main problem, but all these factors often combine into the failure.

If a secret valley abutment flashing had been used, then the problem may not have occurred.

Conclusion.

From observations of previous building work carried out in the School Room Roof, as evidenced by lathe and plaster ceilings having been pulled down and replaced with suspended ceilings etc., even the original slate roof may have had a history of rainwater ingress.

Roof as existing Stays.

If the 16.9 degree upper roof had to stay, we could cut a secret lead valley down the adjacent gable walls, although it would need to be wide enough to carry the volume of water and thus be not 'secret'.

Although 8.9 m rafter length on a south west storm facing roof in Merthyr is still to close the maximum allowed 10 m rafter length. I advise that the existing 16.9-degree roof be replaced and there are two alternatives:

1. Roof as a pitched Hip Roof. See drawings 05D, 06B & 07A.
2. Roof as a pitched roof and a lower flat roof. See drawings 05C, 06A & 07.

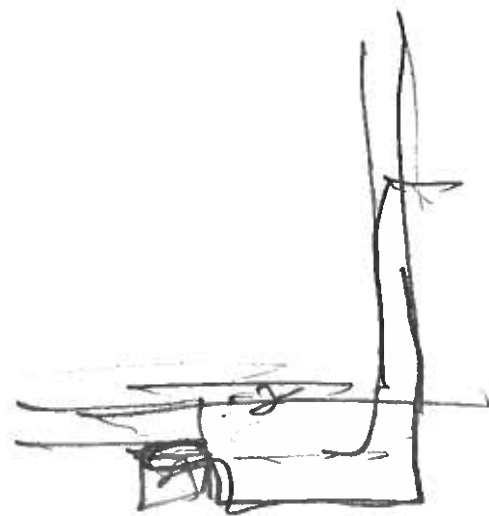
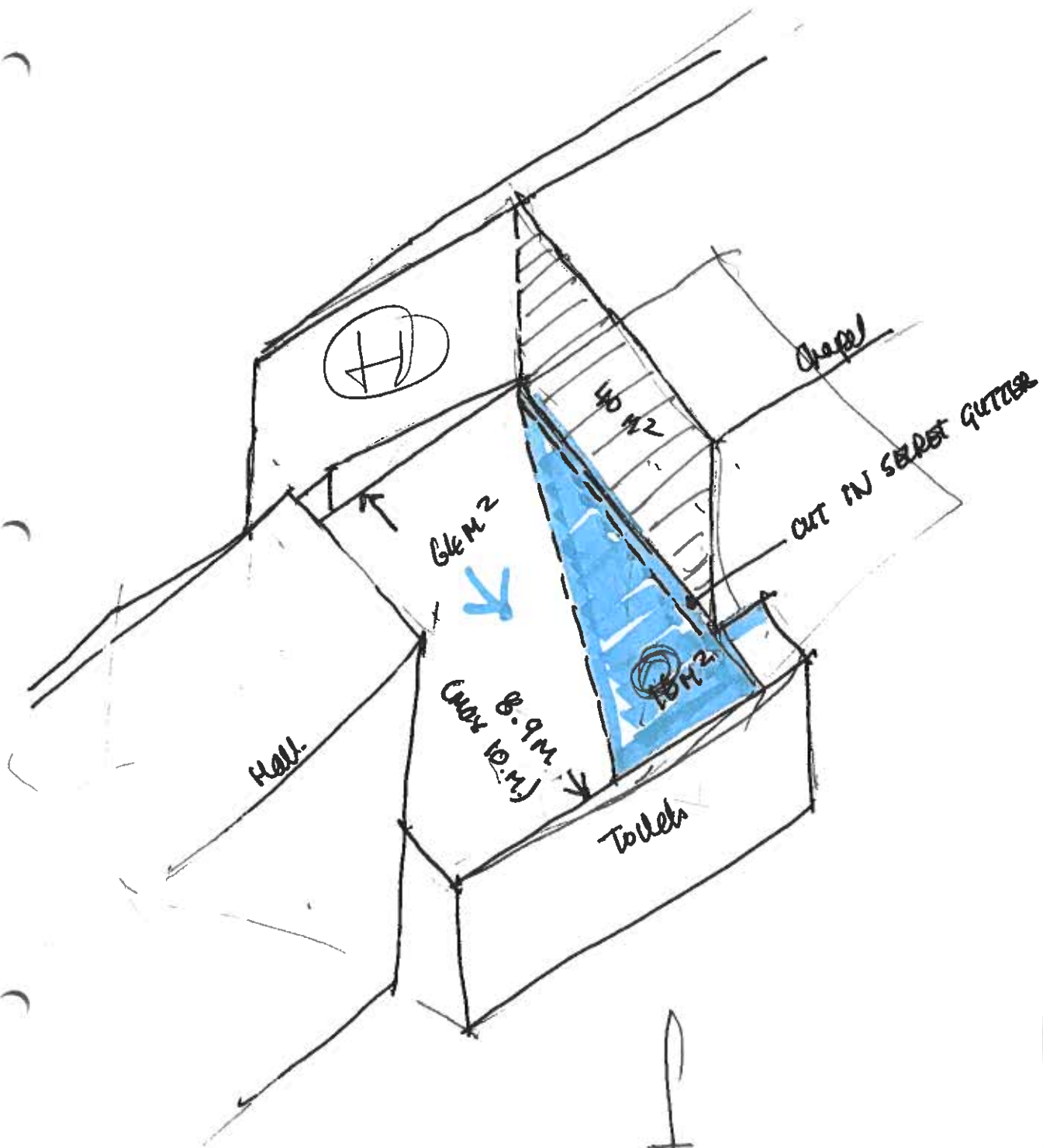
Both solutions would need a secret valley. The roof design chosen will obviously be down to cost and Listed Building Consent. I also propose to use Velux daylight tubes – see attached details. Hopefully, the planning application will acknowledge the benefit of daylight.

We will need to meet to discuss the relative merits. Both drawings are quick roughs to illustrate the alternative designs. I have introduced a cross into the wall of the hip roof, which could be illuminated to passing advertise the chapel to passing 'foot traffic'.

Yours truly,

A handwritten signature in black ink, appearing to read 'Phil Griffiths', written in a cursive style.

Philip Griffiths.



2m

Philip Griffiths – Architect.

D.P. Griffiths, B.Arch., Hons 1. (Wales), RIBA.
Chartered Architect & Project Manager.

3 Saint Johns Close, Cefn Coed,
Merthyr Tydfil, Mid Glam. CF48 2PE

Website – www.philipgriffiths.co.uk
E Mail – Philip@philipgriffiths.co.uk

Telephone – 01685 370812
Mobile – 07903 306936

05.11.2020

15.11.2020

Mr. David Powell,
High Street Baptist Chapel,
Lower High Street,
Merthyr Tydfil.

Dear David,
Re: Proposed Remodelling of Chapel Hall.

Rear Roof over Toilets - Short Term Problem.

I have today ladder access inspected the roof and confirm that it is probably a Mini Stonewold concrete tile suitable for use in a 17.5-degree roof pitch and laid at the recommended 100 mm head lap for low pitch and severe exposure. The roof is 16.95 degrees and although below 17.5 deg. ~~but that should not prove an issue.~~

The water entry looks to be windblown entry driven up the head lap. There is an area of slightly cocked / rocker tiles which would cause water entry in a storm. Saying that with continuous felt it should not appear. There are however old roof lights which would have previously penetrated the felt line and it is probable that water is dripping through at the old roof light junction.

You mentioned that the roof is new. Can you confirm when and by whom it was done?

I advise that this contractor be contacted and be offered the opportunity to carry out the remedial works and mastic stick the bottom of the lead flashing over the render storey cornice.

To this end I will just ask Bernard Williams to look at the easing of the windows.

Rear Roof over Toilets – Long Term Problem.

The south roof over the office and toilet (school room) was originally cut as a symmetrical 25 degree cut roof with a lower pitch cat slide roof over the latter toilets. This roof arrangement has been built over with a 16.95-degree roof laid from ridge line to eaves forming an asymmetrical roof arrangement. The lower pitch to the rear south roof thus limited the choice of roof finishes to a few types of concrete tiles, such as the Mini Stonewold concrete tile probably used. (We have not jacked any tiles out to check manufacturer and type).

Apart from the limited area of water entry caused by the rocking tiles discussed above the roof seems to be fit for purpose in that it maintains a water-proof shell. However concrete tiles are four times heavier than slate and the existing roof structure although strengthened by repair would I suspect not meet structural requirements of the current building regulations. Timbers are generally over spanned.

No alarm as we propose to strengthen within the proposed works.

The roof finishes are not original, and a problem may arise if the funding is conservation based with strict requirements for exact period specifications which would not include concrete tiles and bastardised roof pitches.

I have designed and will also price the alternative pitched hip roof and or a flat roof solution over the toilets. I will have to list and discuss the existing asymmetrical roof arrangement in my Heritage Statement and will include the alternative roof design drawings within the LBC application to gauge the opinion of planning. I will shortly have the roof drawings to discuss with yourselves.

However, I can but advise that if I was the conservation officer, I would require removal of the 16.95-degree roof skin over.

Philip Griffiths.

Phil Griffiths