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Your ref:
Our ref: 1-38-2963

15th May 2012

Dear Mr. Bevan,

Re: The Old Rectory, 1 Church Street,
Little Gransden, Sandy, SG19 3DU

Thank you for your instructions, contained in e-mails *passim* to attend and inspect at the above. I am instructed, in essence, to :

A) advise on the involvement or otherwise of the tree in subsidence damage at the above
B) and to advise on the appropriateness of SCDC placing and confirming a TPO on a cedar tree at the above.

A) *The involvement or otherwise of the tree in subsidence damage at the above*

1) DOCUMENTS
I have to hand:
Technical Report – Crawford & Co. to Chubb Insurance Company
Level Monitoring report - Crawford & Co.
Site Investigation from MATLAB
OCA Landscape Planning Report
Report by Writtle Park accompanying section 211 notification by Mrs.Seabright
Two reports commissioned by the Parish Council, one by Dr.Giles Biddle,OBE and the other by Richard Jackson Ltd.

2) SITE VISIT
I made a site visit on 11th May. Present at the start of my inspection were : Roz Richardson (SCDC), Simon Chesher (Crawfords Loss Adjusters), Mrs.Seabright (Owner). All three persons left the site after completion of introductions, a short discussion on the nature of the cracking, building works to the cellar, past vegetation

management, clarification of location of the trial pit, and an internal inspection of the ground floor of part of the building. I report as follows.

3) REPORTED MATTERS

TECHNICAL DOCUMENTS

Data	**Source**
Soil condition report	Mat Lab
Root analysis report	European Plant Science Laboratory
Loss Adjuster report type	Interpretative
Geotechnical report	Mat Lab
Monitoring records	Crawford & Co.

EXTRACT OF MATTERS REPORTED BY DOCUMENTS

Factor	**Trial pit/ borehole**	**Depth (m)**	**Comments**
Cracking			No formal report received.
Date of onset			No report received.
Footings/Soil	TP1/BH1	0.27 (footing)	Slab (reported verbally by Simon Chesher) over sandy clay, overlying, at about 1.5m BGL, moist brown sand.
P.I. range	All		12%-39%
Desiccation	BH1		Borehole dry on completion. (Date of investigation 22nd March 2010)
Roots	TP1/BH1	0.27-3.5	*CEDRUS* : abundant starch (='live')
	BH1	To 3.5	Roots reported.
Drains			No report received.
Monitoring			Level monitoring records to hand for period 23.03.2010 to 20.12.2011

MATTERS REPORTED VERBALLY

Factor	**Comments**
Cracking	Simon Chesher pointed out the damage internally. The cracking is to the rear left flank of the Rectory, extending to some internal walls. He considered the damage to be consistent with slight movement of a limited part of the left flank wall's footings and those of the immediately adjacent parts of the house.
Date of onset	Mrs. Seabright informed me that no vegetation has been removed in the vicinity of the left flank wall of the Rectory in the last ten years; and that the cellar area to the rear left corner of the property, whilst identical in footprint to the pre-existing structure, which comprised a half cellar, was extended downward to form a full cellar in 2011. The claim was notified to insurers in 2010.

4) DISCUSSION and APPRAISAL

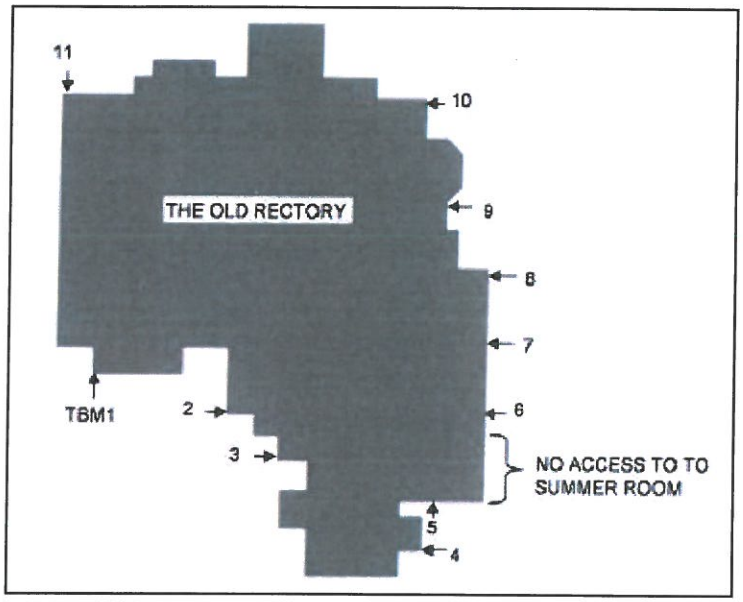
Mechanism

A consideration of the matter of trees and the subsidence of buildings requires some discussion of the processes involved. *Transpiration* is the process by which water is lost to the atmosphere from living plants. This process demands water uptake from

the soil into the roots, from where it passes into the vessels of the plant, and is conducted to various parts of the plant and is finally lost to the plant mainly through pores in the leaves. This process can dry clay soils so that they shrink and allow foundations resting on them to sink or move. (This can be termed 'indirect damage'). There is a higher risk of this happening in very low rainfall periods. The buildings constructed on those footings may then crack. Removal of trees involved in subsidence almost always arrests further cracking, whereafter the previously dried clay will, usually fairly rapidly (i.e. within a season or two) return to its normal proportions by the natural action of rainfall, and consequently will lift the footings back to the position they were in prior to the damage, thus closing or nearly closing the cracks. Redecoration internally is often all that is then required. What may be termed 'direct damage' is caused by physical pressure of parts of a tree, such as roots or trunk, on a structure, and this can occur on any soil type.

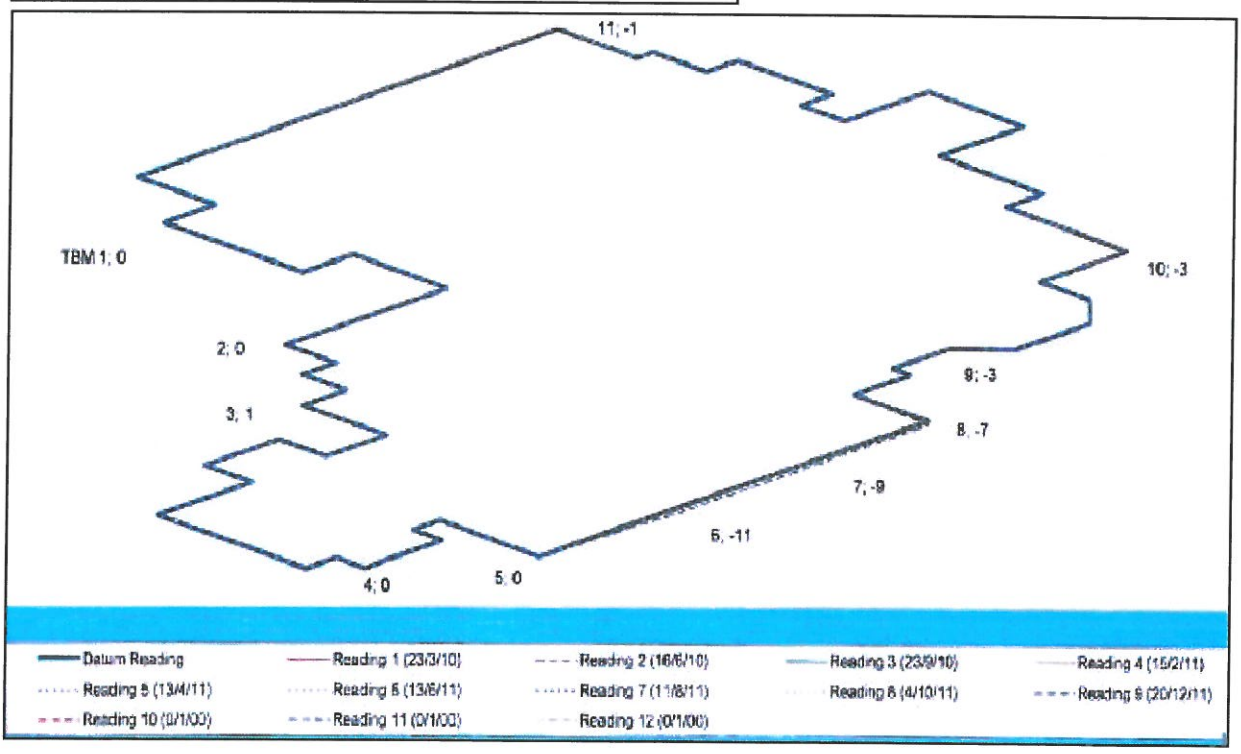
Footings

The footings were noted to be extremely shallow and possibly could have been affected by evaporation alone. On heavily-worked agricultural clay soils, obvious cracking related to drying can open up to a metre or so in depth during droughts, but this depth of cracking is rarely seen in other circumstances. An impermeable cap covered the trial pit location and this was sunk, naturally enough, adjacent to the footings. This would have effectively retarded or prevented simple evaporation. It can therefore safely be concluded that a root system would have been needed to cause any soil drying below the footings.

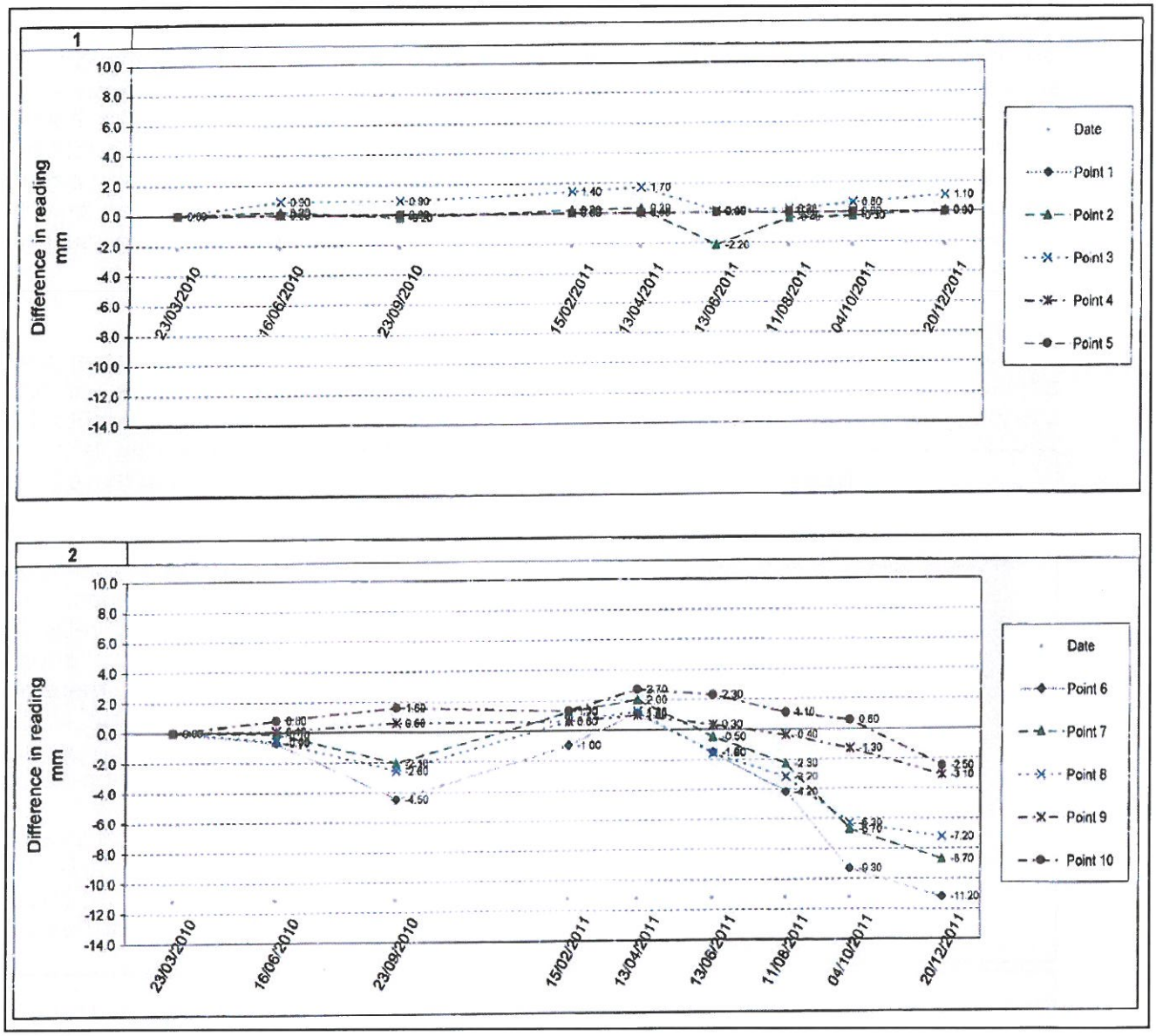


Monitoring

Level monitoring (station numbers left, summary below –



graph below) confirms a seasonal pattern of damage with levels rising in winter and falling in summer : it can safely be concluded that vegetation is involved in the damage.



State of borehole

The borehole is reported to be dry and open on completion, suggesting that drain failure is unlikely to be significant in the damage. (The pattern of movement indicated by level monitoring confirms that the damage is not caused by drain failure.)

Oedometer results

The oedometer results supplied by MatLab indicate desiccation to a depth of about 1.25m below ground level in BH1.

Root identification

The root identification indicates that vegetation near the property – the cedar (4 on plan) has developed roots close to or under the footings. There is no evidence that indicates that any other vegetation is involved in the damage, nor, from the writer's

experience is there any significant likelihood that other trees are involved. See table below.

Tree data

Please read the table in conjunction with the plan (appended). All dimensions are approximate and are in metres.

NO.	TREE (trunk dia. mm)	HT.	RANGE	COMMENTS / ACTION
1	Atlantic cedar (920)	17	19	
2	Irish yew (MS*)	5	10	*multi-stemmed
3	Irish yew (MS)	6.5	10	
4	Cedar of Lebanon (1590)	22	18	
5	Wellingtonia (1495)	24	19	Bark dead or missing on about 40% of base. Safety inspection recommended.
6	sycamore (650)	15	31	
7	horse chestnut (950)	10	24	
8	horse chestnut (1250)	15	13	

5) NOTIONAL REMEDIAL MEASURES

Pruning

Pruning to trees to reduce soil drying near buildings is generally unreliable unless repeated frequently. Although transpiration will be reduced temporarily by a *severe* pruning, it will very rapidly recover as new leaves grow, which can in summer be a matter of a very few weeks. Research has demonstrated that a 50% loss of leaf does not reduce the water uptake by as much as 50% as remaining leaves generally transpire greater amounts than previously. A single heavy pruning will not succeed in my view in remedying the situation reliably : it would also mutilate the tree. Sometimes a single pruning may be followed by a period of normal or wet weather, which may allow more credit to be given to the pruning as having effected a 'cure' than is strictly due. 'Hortlink' project 212 'Controlling Water Use of Trees to Alleviate Subsidence Risk') has indicated that the reduction in water use following heavy pruning of trees is lost after two seasons.

Root Barrier

A root barrier has been considered, and rejected, as a practicable solution. The depth of root penetration by the cedar is considerable (to at least 3.5m below ground level). The barrier would likely need to extend to 4m+ BGL. Maintaining stable sides to trenches this deep would be extremely difficult if not effectively impossible in this substrate (sand). The following points are relevant :

- The trench could be dug with a small mechanical excavator: there is good access. The interface of the barrier with any services in the area would have to

be carefully engineered, and attention given to careful and adequate compaction of the soil, on the outer side of the barrier particularly.

- In the long term root barriers can be ineffective. Barriers can be torn or pierced during installation. The soil loosening created by root barriers can provide an easy path for roots to follow downward on the tree side of the barrier until they reach the underside of the barrier. However, if re-compaction of the backfill is thorough this can prevent root development for a considerable time.

- Best results are obtained where a property can be isolated by encircling by a root barrier, or where the linear extent of the barrier is considerable. In this case the barrier, to be even notionally effective in prospect would need to lie between tree 4 (and tree 5) and the house for a distance of about 60m or so, and at a 15m radius from trees 4 and 5. To avoid disrupting the patio any barrier would need to lie rather too close to the cedar and Wellingtonia to be sure of preserving important root concentrations.

- Roots could grow over the top of any barrier it does not stand just proud of the ground surface. A requirement for the barrier to stand above GL leads to some obvious and some less obvious ramifications. It can be unsightly for a barrier material (one brand is blue on one side and grey on the other) to protrude above GL.

- A step can form in summer between the side being desiccated and shrunk by tree roots and the side undesiccated. This might be some minor nuisance in this case.

- A yearly check on any roots that may have overpassed the barrier if this is flattened or becomes buried, for example, in leaf debris, would need to be made. This it appears would be easy in the case.

Underpinning

Underpinning or other structural repairs are in detail beyond the scope of this report to assess for applicability but it appears perfectly possible to install a relatively small amount of underpin to support the affected section of external and internal walls from the underlying sand which is apparently about 1.5m below GL, at least at the location of BH1. The underpin could roughly match the cellar footings and include transition beams up to existing unaffected house foundations. The costing of any scheme for repair would allow a comparison to be made between repairing the property and removing the tree as possible solutions (and see 9) below)

Heave

Heave, as far as tree/building relationships are concerned, is the (usually upward) movement of structures founded on clay soils, this becoming of general relevance when damage also occurs, when clay soil absorbs moisture after it has been desiccated, often by tree roots. Such desiccation can cause problems if a tree that has caused the desiccation is removed, or even heavily pruned, or a root barrier is installed, as once drying by roots has gone, swelling of the subsoil can occur, forcing some structures upward. Heave can only occur in certain fairly precise circumstances. For there to be even a potential for heave, an adjacent building must (in whole or in part) at least postdate the tree or have been previously distorted by the action of the tree, then patched and repaired, perhaps over many years, and there must be a significant persistent moisture deficit in a shrinkable soil below the

property. Only one of these factors definitely applies : the tree may pre-date parts of the existing structure, for example, and most relevantly, the deepening of the cellar (effectively a downward extension). However no damage has been reported to the cellar and it is almost certainly founded on the underlying sand, to which no swell potential applies. The Mat Lab oedometer report indicates a swell potential of 3.3mm at the borehole location, which I note it is recommended should be treated as a range indicator of between 0 and 20mm of potential for uplift at the surface. A swell potential of less than 20mm has been calculated : in the writer's experience the actual moisture deficit of 3.3mm is negligible, and, effectively, no destructive heave potential applies. In other words, at worst, the structure will rise to no more than the amount it has dropped since 2010 if the influence of the cedar is negated, either by removal or repair or other measure. Level monitoring can be used to determine when recovery (upward movement) has ceased.

B) *The appropriateness of SCDC placing and confirming a TPO on a cedar tree at the above*

6) The relevant legislation enabling local authorities to make Tree Preservation Orders ('TPOs' below) is the Town and Country Planning Act, 1990. Current Regulations are The Town and Country Planning (Tree Preservation)(England) Regulations 2012. Guidance on making TPOs is provided in 'Tree Preservation Orders - A Guide to the Law and Good Practice 2000' a DETR (as was) publication, frequently referred to as 'the blue book'. An amendment, 'Tree Preservation Orders - A Guide to the Law and Good Practice-Addendum – May 2009' by DCLG contains information on applications but does not modify the 2000 advice on the making of TPOs. Similarly the 2012 Regulations are silent on the making of TPOs.
Relevant sections - 3.2 and 3.5 - of 'the blue book' state:

> **Amenity**
> 3.2 The Act does not define 'amenity', nor does it prescribe the circumstances in which it is in the interests of amenity to make a TPO. In the Secretary of State's view, TPOs should be used to protect selected trees and woodlands if their removal would have a significant impact on the local environment and its enjoyment by the public. LPAs should be able to show that a reasonable degree of public benefit would accrue before TPOs are made or confirmed. The trees, or at least part of them, should therefore normally be visible from a public place, such as a road or footpath, although, exceptionally, the inclusion of other trees may be justified. The benefit may be present or future; trees may be worthy of preservation for their intrinsic beauty or for their contribution to the landscape or because they serve to screen an eyesore or future development; the value of trees may be enhanced by their scarcity; and the value of a group of trees or woodland may be collective only. Other factors, such as importance as a wildlife habitat, may be taken into account which alone would not be sufficient to warrant a TPO. In the Secretary of State's view, it would be inappropriate to make a TPO in respect of a tree which is dead, dying or dangerous.
>
> **Expediency**
> 3.5 It may be expedient to make a TPO if the LPA believe there is a risk of the tree being cut down or pruned in ways which would have a significant impact on the amenity of the area. It is not necessary for the risk to be immediate. In some cases the LPA may believe that certain trees are at risk generally from development pressures. The LPA may have some other reason to believe that trees are at risk; changes in property ownership and intentions to fell trees are not always known in advance, and so the protection of selected trees by a precautionary TPO might sometimes be considered expedient.

Site Visit

3.7 Before making a TPO the LPA officer should visit the site of the tree or trees in question and consider whether or not a TPO is justified. Any person duly authorised in writing by the LPA may enter land for the purpose of surveying it in connection with making or confirming a TPO,19 although the LPA may in the circumstances decide to carry out the visit without entering the land. They may consider that the risk of felling justifies the making of a TPO before they have been able to assess fully the amenity value of the tree. This should not, however, prevent them from making a preliminary judgment on whether a TPO would appear to be justified on amenity grounds, nor from making a more considered assessment before the TPO is confirmed.

7) THE TREE and LOCATION

The tree in question is a cedar of Lebanon (*Cedrus libani*) 22m in height and 1590mm in trunk diameter at 1.5m above ground level. It is, thus, large and is clearly partly visible from public places. In support of this I noted that the tree is prominently visible from Church Street, and from the B1046 to the N of the site, from which it dominates the view on approach to the village.

The **green** line superimposed on the aerial view above indicates positions on public roads from which the tree is clearly visible. The **orange** line indicates positions on public roads from which the tree is largely invisible, although there are, from certain positions in this zone, glimpse views of the tree through a screen of other trees or vegetation.

7) A formal assessment, carried out under a simple evaluation system devised for the purpose and widely used in TPO assessment, has returned an outcome indicating that a TPO is appropriate. The system, 'TEMPO' was devised by Julian Forbes Laird, BA (Hons); Dip Arb (RFS); MICFor; MEWI; MArborA. The site sheet is reproduced below. NB : I have given the tree a score of 2 under item Part 1 (d) as trees of this species, by the time they reach the age and trunk size of the subject tree, have often suffered severe limb loss owing to snow-loading, gale damage, etc. The tree in question has lost a limb or two but this has not significantly affected the form of the tree.

TREE EVALUATION METHOD FOR PRESERVATION ORDERS - TEMPO

SURVEY DATA SHEET & DECISION GUIDE

Date: 11th MAY 2012 Surveyor: JOHN CROMAR, DipArb(RFS), F.Arbor.A

Tree details
TPO Ref (if applicable): Tree/Group No: Species: Cedrus libani
Owner (if known): SEABRIGHT Location: SG19 3DU - THE OLD RECTORY

REFER TO GUIDANCE NOTE FOR ALL DEFINITIONS

Part 1: Amenity assessment

a) Condition & suitability for TPO; where trees in good or fair condition have poor form, deduct 1 point

5) Good	Highly suitable
3) Fair	Suitable
1) Poor	Unlikely to be suitable
0) Dead/dying/dangerous*	Unsuitable

Score & Notes: 5

** Relates to existing context and is intended to apply to severe irremediable defects only*

b) Retention span (in years) & suitability for TPO

5) 100+	Highly suitable
4) 40-100	Very suitable
2) 20-40	Suitable
1) 10-20	Just suitable
0) <10*	Unsuitable

Score & Notes: 4

**Includes trees which are an existing or near future nuisance, including those clearly outgrowing their context, or which are significantly negating the potential of other trees of better quality*

c) Relative public visibility & suitability for TPO

Consider realistic potential for future visibility with changed land use

5) Very large trees with some visibility, or prominent large trees	Highly suitable
4) Large trees, or medium trees clearly visible to the public	Suitable
3) Medium trees, or large trees with limited view only	Suitable
2) Young, small, or medium/large trees visible only with difficulty	Barely suitable
1) Trees not visible to the public, regardless of size	Probably unsuitable

Score & Notes: 4

d) Other factors

Trees must have accrued 7 or more points (with no zero score) to qualify

5) Principal components of arboricultural features, or veteran trees
4) Tree groups, or members of groups important for their cohesion
3) Trees with identifiable historic, commemorative or habitat importance
2) Trees of particularly good form, especially if rare or unusual
1) Trees with none of the above additional redeeming features (inc. those of indifferent form)

Score & Notes: 2

Part 2: Expediency assessment

Trees must have accrued 9 or more points to qualify

5) Immediate threat to tree	
3) Foreseeable threat to tree	
2) Perceived threat to tree	
1) Precautionary only	

Score & Notes: 3

Part 3: Decision guide

Any 0	Do not apply TPO
1-6	TPO indefensible
7-11	Does not merit TPO
12-15	TPO defensible
16+	Definitely merits TPO

Add Scores for Total: 18

Decision: DEFINITELY MERITS A TPO

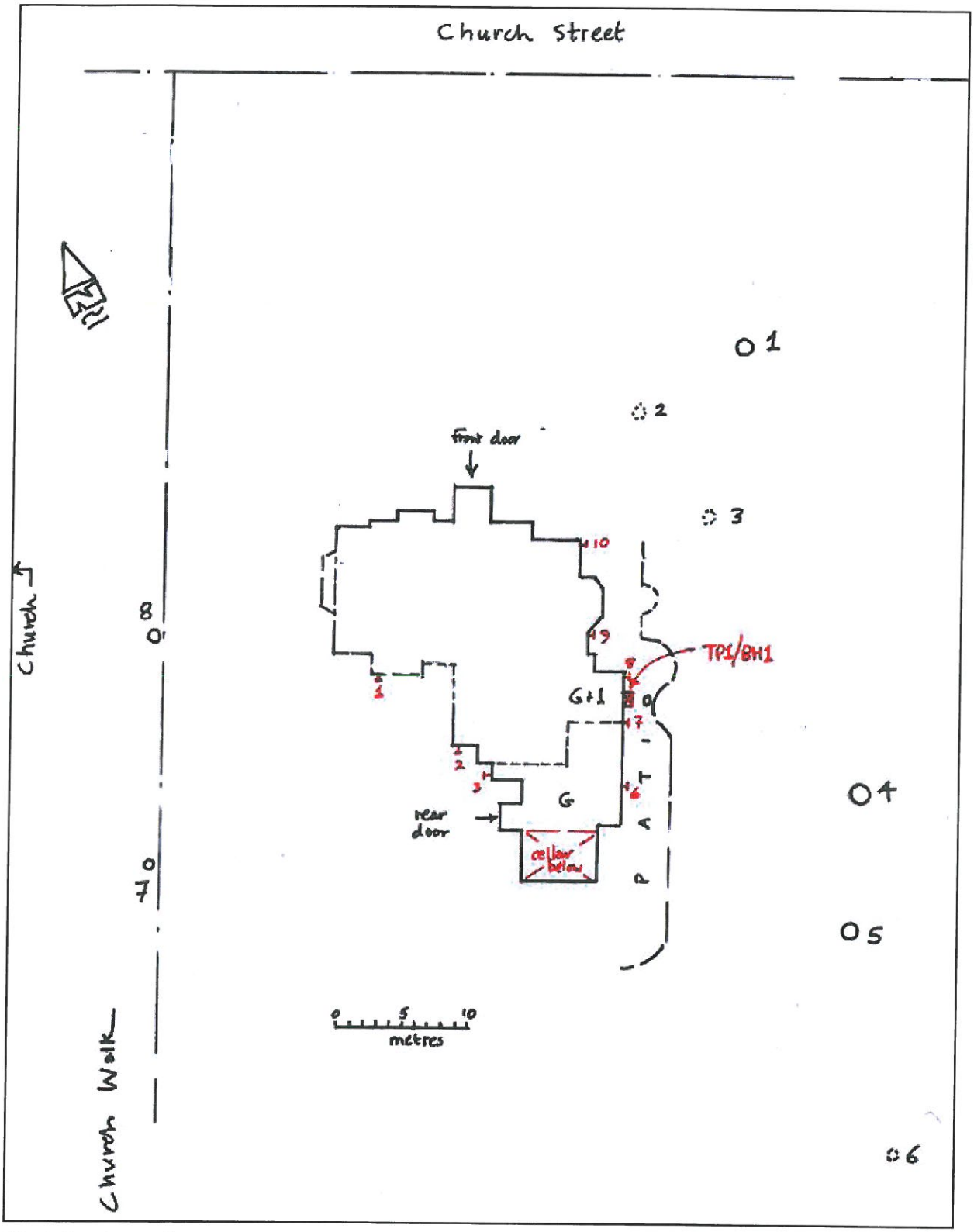
8) CONCLUSION
On the above basis I conclude that SCDC has appropriately made a TPO and may reasonably confirm the Order in respect of the Cedar of Lebanon (4 on plan).

9) The quantum of what element of any repair of the property would fall payable by the Council should the tree be retained is not something upon which I can advise. Loss adjusters acting for your insurers would typically determine this with their counterparts acting for the insurers of the damaged structure. It is of note that compensation under the relevant Act is payable for losses *consequent* to refusal of consent to fell, not for costs arising before such refusal.

If I can be of further assistance, or any point needs clarification, please do not hesitate to contact me.

Yours sincerely,

John C. M. Cromar
enc
PLAN and PHOTOGRAPH



Sketch plan, drawn to 1:400@A4. Please read in conjunction with tree data table above. N.B. I have marked only the level monitoring stations I saw on site.

PHOTOGRAPH