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REBUTTAL STATEMENT ADDRESSING THE PROOF OF EVIDENCE OF MR MARK MACKWORTH-PRAED (CD 8.39), RELATING TO THE PROPOSED CONSTRUCTION OF THE UNITED KINGDOM HOLOCAUST MEMORIAL AND LEARNING CENTRE, AT VICTORIA TOWER GARDENS, MILLBANK, WESTMINSTER, LONDON, SW1 3JA.

**ARBORICULTURAL REBUTTAL STATEMENT
ON BEHALF OF THE SECRETARY OF STATE FOR HOUSING COMMUNITIES AND
LOCAL GOVERNMENT**

Prepared by Dr Frank Hope

LOCAL PLANNING AUTHORITY REFERENCE: 19/00114/FULL

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Rebuttal statement - Mr Mark Mackworth-Praed.

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1. INTRODUCTION

- 1.1 A detailed analysis of the report produced by Mr Mackworth-Praed forms part of my Proof of Evidence. It should be noted and appreciated that just because I have not addressed every aspect of his Proof of Evidence (CD 8.39) in this rebuttal, it should not be taken that I necessarily agree with what he has said.

2. THE REBUTTAL OF MR MACKWORTH-PRAED'S PROOF OF EVIDENCE.

INTRODUCTION

- 2.1.1 I consider that the Proof of Evidence produced by Mr Mackworth-Praed is highly selective, and does not contain an assessment of all the relevant Westminster City Council (WCC) Tree Manager's submissions. This is especially evident in his lack of comment on her claim that plane roots will go down to at least 5.0 metres in depth at the point where the proposed excavations will be carried out.
- 2.1.2 WCC initially made the claim that inadequate information had been provided. In item 1.4 ("Documents considered") of his Proof of Evidence Mr Mackworth-Praed has made no comment on the possible lack of information provided. His Proof of Evidence shows he felt confident enough to carry out his own assessment of the proposed development, thus effectively accepting that adequate information had been made available.
- 2.1.3 The data in the report produced by Mr Mackworth Praed, which forms the basis of his Proof of Evidence, are not accurate, and his subsequent analyses are fundamentally flawed; they do not comply with British Standard 5837 (2012).
- 2.1.4 Mr Mackworth-Praed attempts to suggest that his data are the most accurate and up to date relating to the trees on the VTG site – this is incorrect. I visited the site on the 6th of August 2020, and attempted to verify the data produced by Mr Mackworth-Praed's assistant, i.e. not by Mr Mackworth-Praed himself. I found the measurements of trunk diameter and crown spreads to be imprecise, and that the difference between them and those produced by Bartlett was so small, that any attempt to use them in a comparative manner would be meaningless.

- 2.1.5 Mr Mackworth-Praed attempts to suggest that the data in his report provided by his assistant should be used by the Planning Inspectorate as the base tree-related evidence. This assertion is incorrect, as the relevant tree-related data are contained in the Bartlett report, which formed part of the planning application. The accuracy of the measurements within the Bartlett report at the time that the planning application was submitted, have not been disputed by WCC, or Mr Mackworth-Praed.
- 2.1.6 Although in item 1.5.4 of his Proof of Evidence, Mr Mackworth-Praed notes that measurement conventions used in his assistant's survey are set out in the notes which preface his schedule, he fails to explain that a high proportion of the figures fall within the 10mm range of error, which means that, even if they were precise, which they are not, they could not be used to provide a realistic comparison with the Bartlett data. In my opinion, the comparative assessments are meaningless.

3.0 THE NON-COMPLIANCE OF MR MACKWORTH-PRAED'S REPORT WITH BS 5837.

- 3.1.1 The use of BS 5837 is critical to the whole of Mr Mackworth-Praed's report and Proof of Evidence. He bases his evidence on the claim that the Bartlett RPA calculations are incorrect, and do not comply with BS 5837. However, this is incorrect, as the Bartlett procedure accurately followed BS 5837, whereas Mr Mackworth-Praed's did not.
- 3.1.2 As Mr Mackworth-Praed has claimed that the Bartlett RPA calculations are incorrect, and that the use of RPAs are so fundamental to the assessment of spatial, and volumetric root development; by not complying with the BS himself, his whole report must, in my opinion, be classed as fundamentally flawed. His RPA figures are inaccurate, and misleading; they do not take into consideration the soil conditions and the actual rooting patterns of the trees on the site.
- 3.1.3 Throughout his report and Proof of Evidence Mr Mackworth-Praed has claimed that BS 5837 makes no reference to the use of intrusive trial excavations in relation to the calculation of tree RPAs. Item 2.1.12 of his Proof of Evidence states:

“It is worth noting, in this context, **that at no point does BS 5837 refer to, or recommend, the use of intrusive trial excavations as a means of seeking to determine the extent of a tree’s root system, or as a means of assessing the likely effects of development upon it.** Similarly, there are no references in the document to, or recommendations for, the use of any non-invasive means of determining the extent or location of a tree’s root system, such as root radar (although this may be due to the latter only having been developed in recent years).” (Emphasis added)

3.1.4 The above statement is clearly incorrect, as item 4.3.1 “Soil Assessment” of BS 5837, states the following:

“**A soil assessment should be undertaken** by a competent person to inform any decisions relating to: (Emphasis added)

- **the root protection area (RPA);** (Emphasis added)
- tree protection;
- new planting design; and
- **foundation design to take into account of retained, removed and new trees.** (Emphasis added)

3.1.5 The RPAs are, by definition, two-dimensional; they do not provide information on soil volume, which is three-dimensional. Any attempt to imply available soil volume from simple circular representations, as carried out by Mr Mackworth-Praed, can only be considered as speculation. Similarly, the use of simplistic RPAs cannot identify the presence of features such as high bulk density, which is an indication of soil compaction. That is why site investigations are imperative when considering the density and depth of root growth, and why simplistic RPAs, as used by Mr Mackworth-Praed, can only at best, provide a rudimentary assessment of tree root growth. Soil investigations provide a means of accurately assessing the root development of trees, and allows the assessment of the extent of RPAs accordingly. Mr Mackworth-Praed failed to use them.

3.1.6 When no site investigation data are available, the only way of attempting to represent density of root growth is to increase or decrease the extent of the area of the theoretical RPAs, as carried out by Mr Mackworth-Praed, which does not provide an accurate assessment as there is no correlation between the two.

3.2 INACCURATE PLOTTING OF THE RPAS.

3.2.1 In item 2.2.3 of Mr Mackworth-Praed's Proof of Evidence he states:

3.2.2 "The depictions of the RPAs on the TCP, initially as circles of the required radii under the BS 5837 formula, are indicated by light broken circles of the relevant colours centred on each tree's trunk. However, in line with BS 5837 advice, these initial circles have been modified, to take account of the obstructions or barriers to root growth represented by the river wall on the east side of VTG, and by the carriageway of Millbank to the west. The areas of the parts of the circles lying beyond these root barriers or obstructions have been added to the remaining part of each circle, which has then been expanded to occupy the required area as defined by the initial calculation. The resulting modified RPA shapes are shown by the heavier solid lines of the relevant colours (lime green for category 'A', and blue for category 'B'), according to tree category."

3.2.3 In the above statement Mr Mackworth-Praed uses his inaccurately calculated two-dimensional RPA measurements; claiming that it is logical to simply add areas lying beyond the river wall on the eastern side of the site, and the carriageway on the western side, to his initial RPA calculations, so as to increase the extent of the RPAs into the site. He does not take into consideration the actual density, and depth of rooting; nor does he consider that there would be ample space in a north-south direction to accommodate the roots. It appears that Mr Mackworth-Praed considers that once any roots reach the wall and carriageway, they would simply stop growing; which in my opinion is untenable.

3.2.4 Mr Mackworth-Praed does not accept any possible additional growth within his initial simplistic RPAs, i.e. he considers that the only way that the roots could have developed was at the periphery of his RPAs, i.e. away from the boundaries of the site. In my opinion, this is totally unscientific and incorrect, and shows a basic lack of understanding of the BS 5837 RPA calculations.

3.2.5 Mr Mackworth-Praed fails to take into consideration the potential depth of rooting, the seasonal rooting habit, and the spatial growth habit of the tree roots. He totally ignores the fact, as identified with the large planes off-site along Millbank, that whole root systems can develop in restricted areas, which bear no resemblance to his simplistic RPA projections. Similarly, it appears

that Mr Mackworth-Praed considers that once the roots of the trees contact the barriers, they simply stop growing, or even die. He totally ignores the fact that the roots would almost certainly grow in a north-south direction for considerable distances, as is blatantly obvious with the trees growing off-site along Millbank.

3.3 THE LATERAL DEVELOPMENT OF THE TREE ROOTS

3.3.1 In item 2.2.5 of his Proof of Evidence Mr Mackworth-Praed makes the following statement:

3.3.2 “Whilst in agreement with the RPAs for the eastern trees being terminated at the river wall on their east side, I do not agree that depiction of the trees’ RPAs as squares reflects a sound arboricultural appraisal of the likely disposition of their root systems, as the nature of root growth is naturally radial from the trunk, thereby being likely to result in a generally circular disposition (subject to underlying obstructions or other factors). I also do not agree that the depiction of the RPAs in this way would result in protection “*for the entire root system and root environment*” for the reasons given above, namely that the RPA for any tree would rarely, if ever, enclose the entirety of its root system, which can normally be expected to extend further than the limit of the RPA, and often considerably so.”

3.3.3 In the above statement Mr Mackworth-Praed is of the opinion that the use of square RPAs incorporating site investigation data, do not reflect a sound arboricultural appraisal of the likely disposition of their roots. By implication he asserts that his simplistic RPA calculations do take into consideration a sound arboricultural appraisal, which I find amazing.

3.3.4 Mr Mackworth-Praed appears to be of the opinion, that the use of a square RPA somehow suggests that the roots would not develop in a naturally radial way from their trunks. I find this unrealistic as all that one needs to do is to look at the base of the trees, and it is obvious that the roots spread out radially whichever way they are portrayed on a plan.

3.4 ROOT DEVELOPMENT ON THE WESTERN SIDE OF VICTORIA TOWER GARDENS

3.4.1 In item 2.2.6 of his Proof of Evidence Mr Mackworth-Praed addresses the root

development on the western side of VTG, claiming that it is incorrect for the RPAs to extend over the carriageway, and that it would be more appropriate to show that no roots are present beneath the carriageway. This statement appears illogical, as throughout his report and Proof of Evidence, he contends that no below ground investigations should be carried out when considering the extent of the RPAs. If his assessment were correct (it isn't) then his simplistic RPAs should have been depicted as full circles in any event.

3.5 ROOTS BENEATH THE PAVEMENT

3.5.1 In item 2.2.10 of his Proof of Evidence Mr Mackworth-Praed addresses the issue of root development under the pavement. Once again, it is critical to note that when plotting his RPAs he did not take into consideration the possible extent, or depth of root development under the pavement. For example, he has completely ignored the fact that trees growing off-site, along Millbank, must have all their root systems in very narrow strips below the pavement, or in a combination of being under the carriageway and pavement. In addition, he has failed to address the fact that when the whole area of possible root development of the trees off-site is compared with the area between the trees within VTG and the edge of the carriageway, the area would be large enough to accommodate all the root systems of the trees. This is clearly unlikely to have occurred, but the area would be quite capable of accommodating all the roots on the western side of the trees. There would be no need for any of the trees to have produced preferential growth within the gardens.

3.6 THE PROTECTION OF THE ROOTS ON THE WESTERN SIDE OF THE SITE

3.6.1 In item 2.2.11 of his Proof of Evidence Mr Mackworth-Praed considers that Bartlett's RPAs would not protect the whole of the tree root systems on the western side of the trees along the pavement. This is clearly incorrect, as all of the roots on the western side of the trees will be either beneath the pavement, or a combination of beneath the pavement and roadway, and no significant excavations will be carried out within this area. The pavement will be left intact, and will act as an effective root barrier.

3.7 THE RATIONALE FOR THE RPAS TO BE EXTENDED EASTWARDS FROM MILLBANK INTO VICTORIA TOWER GARDENS

- 3.7.1 In item 2.2.12 of his Proof of Evidence, Mr Mackworth-Praed attempts to assert that the RPAs of the trees should be extended eastwards away from Millbank, and into the VTG. In my opinion, the location of the large planes off-site, along Millbank, demonstrate that there would be no requirement for additional growth to be produced within the gardens; there is more than adequate soil volume to accommodate all of the roots on the western side of the site.
- 3.7.2 Mr Mackworth-Praed is of the opinion that he has depicted his RPAs in proper compliance with the relevant advice in BS 5837, and asserts that his depiction represents a more correct assessment than Bartlett's. In my opinion, the fundamental fault with Mr Mackworth-Praed's assertion is that his assessment does not comply with BS 5837. I consider it untenable for Mr Mackworth-Praed to claim that his assessment is accurate, and that his figures comply with BS 5837.

3.8 TREE IMPACT PLANS

- 3.8.1 Section 2.3 of Mr Mackworth-Praed's Proof of Evidence covers the production of his tree impact plans. All of his plans are based on the incorrect assessments of his RPAs. In my opinion, they are all fundamentally inaccurate, and do not reflect a realistic picture of the root development of the trees on the site.
- 3.8.2 In my opinion, the failure of Mr Mackworth-Praed to follow basic BS 5837 guidelines and recommendations, and to ignore the implications of using inaccurate data, must bring into question his whole assessment of the potential influence of the proposed development on the plane trees.
- 3.8.3 The Tree Constraints Plan (TCP) in Appendix 2 of Mr Mackworth-Praed's Proof of Evidence, and all his other plans and evidence relating to site features is based on his inaccurate RPA calculations, and misinterpretation of the BS 5837 methodology.

3.8.4 It is important to note that the methodology of Mr Mackworth-Pread in modifying the shape of his RPAs, is at odds with the WCC Tree manager, who is of the opinion that the use of irregular-shaped RPAs (polygons) does not comply with BS 5837. Mr Mackworth-Praed does not consider this disparity in his report, or Proof of Evidence.

3.9 COMPENSATORY ROOT AREA

3.9.1 In item 2.2.5 of Mr Mackworth-Praed's Proof of Evidence, he states:

3.9.2 "In my opinion, what has not been demonstrated in this case is that the requirements of clause (a) above, namely that the extent of the areas lost to encroachment as a result of the excavations for the UKHMLC into the RPAs of the affected trees on either side of VTG can be compensated for by the existence or provision of contiguous rooting volume elsewhere. **There are no available compensatory rooting areas available to the trees contiguous with their RPAs away from the areas of encroachment, as they are prevented from being so by the presence of the River Thames and its retaining wall on the east side, and by the carriageway of Millbank on the west side. I am of the opinion that in the circumstances of this site, the recommendations of para. 5.3.1 (a) of BS 5837 cannot therefore be satisfied.**" (Emphasis added)

3.9.3 In my opinion, the above highlighted statement is demonstrably incorrect. Mr Mackworth-Praed has failed to accept that there will be extensive contiguous root growth in a north-south direction on both sides of the site. As mentioned previously in this rebuttal, once the tree roots reached the river boundary wall, and the carriageway, they would not simply die. The roots would extend in a north-south direction, and continue to grow. This is quite evident by inspecting the trees along Millbank, off-site. The tree roots are in very restricted, narrow areas, and their roots must be either beneath the carriageway or pavement. In any event, the paths are so narrow that the roots will have extended in a north-south direction. In my opinion, this is what will have occurred with the trees within VTG. The areas between the trees and the boundaries, i.e. wall and carriageway, are more than wide enough for the roots to naturally develop in a north-south direction.

3.10 FLEXIBILITY OF THE RPAS

3.10.1 In item 2.5.6 of his Proof of Evidence Mr Mackworth Praed disagrees with my comment relating to a typically accepted flexibility of between 10% and 20% of Root Protection Areas. He states:

3.10.2 “Secondly, Dr Hope’s contention as to 10%-20% of the RPA being “*typically accepted*” as being capable of being impacted upon without risk is also not correct, as the relevant recommendations cited above make clear, in relation to the necessity for adequate contiguous rooting volume to be provided in order to compensate for significant RPA encroachments. In this case, the “*flexibility*” of 10%-20% of the RPA suggested by Dr Hope as being acceptable for encroachment by excavation or construction is simply not available, as has been shown.”

3.10.3 Mr Mackworth-Praed has stated that the 10%-20% flexibility in the use of RPAs is not within the current BS 5837. This is correct. However, Mr Mackworth-Praed confirms that its removal from the previous version was not because of its inaccuracy, but that it was removed because some practitioners used it inappropriately.

3.10.4 The reason why Mr Mackworth-Praed is of the opinion that the 10% to 20% flexibility is inappropriate in this instance has nothing to do with its accuracy. His claim is that it is inappropriate in this instance because there is no available contiguous area for the development of compensatory root growth. This is incorrect as there is more than adequate room for contiguous development in a north-south direction, as previously discussed.

3.11 WILL THE PROPOSED DEVELOPMENT INCREASE THE RISK OF DAMAGE TO THE PLANES BY PESTS AND DISEASES?

3.11.1 In section 1.8 of Mr Mackworth-Praed’s Proof of Evidence he makes some general comments relating to London plane as a species. In items 1.8.5 to 1.8.7 of his Proof he comments on the pests and diseases that could affect the planes within VTG. However, he does not explain that the pests and diseases could affect the trees, even if the development does not go ahead. In fact, they could affect any of the planes growing throughout London.

3.12 THE PRODUCTION OF PLANS

- 3.12.1 In item 2.3 of his Proof of Evidence Mr Mackworth-Praed discusses the production of overlay plans. The plans are based on his inaccurate RPA calculations, and are therefore, in my opinion, fundamentally flawed, and do not provide an accurate assessment of the root protection areas of the trees.
- 3.12.2 In my opinion, all of item 2.5 of Mr Mackworth-Praed's Proof of Evidence is unreliable, as once again he bases his assertions on his RPAs, which I consider to be incorrect. I find that his assertions are unreliable, and do not provide an accurate assessment of the proposed development.
- 3.12.3 I consider the comments in item 2.6, 2.7, 2.8, 2.9, 2.10, 2.11 are based on the inaccurate RPA figures, and assessments provided by Mr Mackworth-Praed. In my opinion, much of what is stated is inaccurate, as the basic tenet of the RPAs is incorrect.

3.13 SITE INVESTIGATIONS

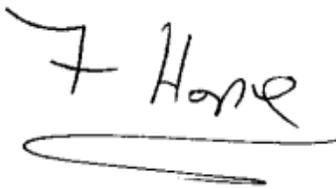
- 3.13.1 Item 3.0 of Mr Mackworth-Praed's Proof of Evidence considers the site investigations carried out for Bartlett, and which formed part of the planning application. Mr Mackworth-Praed disagrees with the assessments.
- 3.13.2 It is critical to note that Mr Mackworth-Praed is of the opinion that BS 5837 does not require any soil, or root investigations, to produce accurate RPAs, which is demonstrably incorrect, and he discounts the data.
- 3.13.3 Mr Mackworth-Praed has not incorporated any site investigation data in his assessments, and uses highly simplistic RPA calculations instead.
- 3.13.4 In my opinion, the comments made by Mr Mackworth-Praed are unjustified, and he would not have used the site investigations in any event.

4.0 CONCLUSIONS

- 4.1 Mr Mackworth-Praed claims to have based his assessment of the impact the proposed development will have on the plane trees at Victoria Tower Gardens on British Standard 5837(2012). Unfortunately, his report fails to comply with the British Standard, and in my opinion, it is fundamentally flawed.

- 4.2 The claim by Mr Mackworth-Praed that British Standard 5837 does not recommend the use of site investigations is clearly incorrect, and exhibits a basic lack of knowledge, and appreciation, in relation to the document.
- 4.3 Having misinterpreted the use of the British Standard Mr Mackworth-Praed has placed almost total reliance on his simplistic, theoretical Root Protection Areas of the plane trees. In my opinion, by ignoring the extensive site investigations, and not complying with the British Standard, his report is largely speculation, which has made his whole appraisal unsound.
- 4.4 Mr Mackworth-Praed has produced a series of plans, and assessments relating to the juxtaposition of the proposed development and the planes, all of which are inaccurate, as they are based on his unreliable simplistic Root Protection Areas.
- 4.5 In my opinion, the assessment carried out by Mr Mackworth-Praed is so inaccurate, that it is effectively meaningless.

Dr Frank Hope

A handwritten signature in black ink that reads "F Hope". The signature is written in a cursive style and is underlined with a single horizontal stroke.

17th September 2020