

**BEFORE COMMISSIONER DAYSH APPOINTED BY NEW PLYMOUTH DISTRICT COUNCIL**

**UNDER**

the Resource Management Act 1991 ("RMA")

**IN THE MATTER**

of an application under section 88 of the Act by **KD HOLDINGS LTD** to the **NEW PLYMOUTH DISTRICT COUNCIL** for land use consent application to construct a six-storey mixed use building and remove a notable tree at 45, 49 and 51 Brougham Street and 33 Devon Street West, New Plymouth.

**STATEMENT OF EVIDENCE ANDREW DESMOND LOVAT FRASER ON BEHALF OF KD HOLDINGS LTD**

**1. INTRODUCTION**

- 1.1 My full name is Andrew Desmond Lovat Fraser. I am a chartered civil structural engineer and hold Bachelor of Civil Engineering from Canterbury University. My experience covers 40 years of consultancy and contracting experience principally in New Zealand; with the last 24 years based in New Plymouth, and as the owner of Red Jacket (my engineering business) since 2003.
- 1.2 This evidence is given in support of the land use consent application ("the application") lodged by KD Holdings Ltd ("the applicant"), to construct a six-storey mixed use building and remove a Notable tree at 45, 49 and 51 Brougham Street and 33 Devon Street West, New Plymouth.
- 1.3 I am authorised to give this evidence on behalf of the applicant.

**2. INVOLVEMENT IN THE PROJECT**

- 2.1 My involvement in the application has included making an engineering assessment of the existing stone retaining wall bordering the Huatoki Awa - considering and advising in respect of foundations for the building and the issues concerning the Notable tree and relevant geotechnical considerations - and in respect of the impact of additional floors and effects of dewatering.

2.2 I have also reviewed the material produced with the application relevant to my expertise, including the application and assessment of environmental effects dated 4 September 2020. The application includes my Notable Tree Report dated 14 October 2019 and recommendations therein (included as Appendix K in the application); including advice on the effects of the eastern downslope to the stream, and the proposed pile foundations on the existing Notable tree roots.

### **3. CODE OF CONDUCT**

3.1 I confirm that I have read the Code of Conduct for expert witnesses contained in the 2014 Environment Court Practice Note and that I agree to comply with it. I confirm I have considered all the material facts that I am aware of that might alter or detract from the opinions I express. Unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

### **4. PURPOSE AND SCOPE OF EVIDENCE**

4.1 In this matter, I have been asked by the applicant to provide evidence summarising my conclusions in respect of my earlier report and further investigations.

4.2 I confirm that I have read the submissions on the application and the Council Officer's Section 42a Report. The assumptions, assessment and conclusions set out in my abovementioned report dated 14 October 2019 remain valid.

4.3 Except where my evidence relates to contentious matters, I propose to only summarise my conclusions set out in my expert technical report dated 14 October 2019 - and in respect of the matters referred to in paragraph 2.1 above.

4.4 My evidence is structured as follows:

- (a) Summary (Section 5);
- (b) The Application (Section 6);
- (c) The Application Site and Receiving Environment (Section 7)
- (d) Council Officer's Report and proposed conditions of consent (Section 8); and

(e) Concluding comments (Section 9).

## **5. SUMMARY**

5.1 The key engineering related issues in my opinion are:

(a) Existing Notable tree and stone wall, and the impact on the building foundations and dewatering from additional storeys.

5.2 By way of a summary, my detailed analyses and assessments enable me to confidently conclude that:

(a) The effects of these potential issues are mitigated by removing the overburden above the stone wall, designing a suspended concrete floor over the stone wall, and designing bored piles or screw piles to support the building that minimise the impact of vibration; all of which are considered as having minimal to nil adverse effects in my opinion.

(b) The potential effects of dewatering within the excavation for the basement of the building (if required) are mitigated by the water table being below the basement excavation level; and, that water ponding within the excavation during construction will be minor and can be removed; all of which are considered as having minimal to nil effects in my opinion.

5.3 Further detail is set out below.

### **Existing Stone Retaining Wall**

5.4 I was responsible for making an engineering assessment of the existing stone retaining wall bordering the Huatoki Awa.

5.5 I have assessed the condition of the existing stone retaining wall adjacent to the left bank of the Huatoki Awa which lies outside the property boundary of the applicant's site in question.

5.6 The stone wall is in good condition overall, assessed from my visual inspection, and does not appear to have rotated outwards or settled in any way.

5.7 The stones around the Notable tree roots have moved slightly with the mortar joints opening and, as this is a local effect only, the movement has had minimal impact on the overall wall condition; and, further, the joints can be simply repaired if required.

- 5.8 I have also relied on the advice of Tonkin & Taylor's Geotechnical Interpretive Report, December 2019 included as Appendix J in the application (T&T report) in the following comments on slope stability and foundations.
- 5.9 The T&T report stated the factor of safety for slope stability of the eastern slope, containing the stone wall, does not meet design criteria for a 50-year design life; and I have chosen one of their options of designing a suspended concrete basement floor over the area of influence of the slope to ensure a stable building platform is provided.
- 5.10 The T&T report also stated that local instability as a result of movement of the stone wall is likely over the 50-year design life of the building, and I have chosen one of their options of designing low impact piles, such as screw piles or bored piles.
- 5.11 I was also responsible for making an engineering assessment of the existing Notable tree and the impact on the foundations proposed for the new building (contained in the above-mentioned report of 14<sup>th</sup> October 2019).

### **Building Foundations**

- 5.12 The proposed building foundations in the location of the tree roots will be designed to support a suspended slab and ground beams with piles.
- 5.13 The regular nature of the building layout will dictate the location of the piles at the gridline intersections, which will likely coincide with the irregular root locations; meaning it would be very difficult, and unlikely, for the piles to miss the tree roots and leave them undamaged,
- 5.14 The piles could be adjusted around the roots. However, because of the intensive nature of the root system, the same outcome as in paragraph 5.13 above would apply.
- 5.15 Expert Arborist Mr Bruce MacDonald noted that if the roots were damaged the tree could potentially become unstable, because the tree is positioned on the steep stream bank where these roots provide the necessary anchoring for the tree.
- 5.16 The Notable tree is within the slip plane identified by T&T's report, where the main geotechnical considerations were that the tree roots would be disturbed by instability of the eastern slope, and that any resulting loss of support could destabilise the tree.

- 5.17 The tree would likely fall beyond the slip plane because of its height, which could result in potential damage to the neighbouring buildings.

### **The Notable Tree**

- 5.18 Mr MacDonald has identified that the tree is coming to the end of its effective life span and should be removed at some time in the relatively near future.
- 5.19 This means any decision on the tree should be taken in context with the design life of the proposed new building of at least 50 years in my opinion.

### **Summary regarding Notable Tree**

- 5.20 I have assessed the existing tree, and, in my opinion, it is not practicable to keep the tree for the following engineering reasons:
- 5.21 The extensive root system will be damaged by the proposed piles and foundation beams.
- 5.22 The tree is located above the existing potential slip plane that extends down to the Huatoki Awa, and removing the tree would mitigate potential damage to neighbouring buildings; and
- 5.23 The relatively short remaining life of the tree is inconsistent with the design life of the proposed new building.

### **Additional Floors Impact on Foundation Excavations**

- 5.24 I was responsible for assisting the applicant to respond to the Council's further information questions on 21 April 2020, covering the impact of additional floors on the foundation excavations, and the effects of dewatering during construction.

### **Impact of Additional Floors**

- 5.25 The additional floors will increase the gravity and lateral loads of the proposed building, which will result in larger ground beams and deeper piles being required.
- 5.26 For the larger ground beams, there will be a relatively small increase in cut volumes to accommodate the increase in foundation sizes.
- 5.27 The cut/fill volumes are predominately dictated by the building superstructure and not the foundations; therefore, a small increase in cut volume from the foundations will have minimal effect on the cut/fill volumes.

### **Effects of Dewatering**

- 5.28 The basement finished floor level is proposed to be at RL 9.2m and the normal ground water level was measured at RL 6.5m; being 2.7 m below the basement floor.
- 5.29 The ground water level may rise temporarily during winter or periods of heavy rain.
- 5.30 The ground beams are below the finished floor level and above the measured ground water table.
- 5.31 When the soil is excavated for the ground beams, there is the minor potential for water ponding from the elevated ground water table - which could require dewatering.
- 5.32 Dewatering is not likely to be needed in my opinion, however, as a raised ground water level will be temporary - and the ground beams excavation will only be exposed for a short time before concreting.

### **6. THE APPLICATION**

- 6.1 Details of the application are well described in the evidence of others and the section 42a report and I agree with the description and will not repeat this information or want to clarify or add further evidence.

### **7. THE APPLICATION SITE AND SURROUNDING ENVIRONMENT**

- 7.1 The application site and surrounding environment are well described in the evidence of others and the section 42a report and I agree with the description and will not repeat this information or want to clarify or add further evidence.

### **8. COUNCIL OFFICERS REPORT AND CONDITIONS**

- 8.1 I have reviewed the Section 42A Report for the application and proposed consent conditions.
- 8.2 In my opinion my earlier report and subsequent evidence already address all relevant matters in the context of my expertise in that regard, and I have nothing further to add.

**9. CONCLUSION**

9.1 My conclusions are set out in section 5.0 of my evidence above, as summarised in paragraph 5.2.

**Andrew Fraser  
Red Jacket**

**10 February 2021**