IN THE MATTER	**of applications pursuant to the Resource Management Act 1991**
BY	**Hamilton City Council**
FOR	**Application for consent to demolish a Category B Heritage Building (Municipal Pools) and undertake associated earthworks and site remediation at 30 Victoria Street, Hamilton Central, Hamilton**

STATEMENT OF EVIDENCE (STRUCTURAL)

Colin Barry Jacobson

16 October 2019

1.0 INTRODUCTION

1.1 My full name is Colin Barry Jacobson. I am a Chartered Civil and Structural Engineer (CPEng 122503). I have worked predominately in Hamilton as a consulting civil and structural engineer for 32 years but have worked overseas on at least 10 projects on short term assignments.

1.2 I hold a NZCE (Civil) and Bachelor of Engineering (Hons) Degree. I am a Chartered Member of Engineering New Zealand, a Member of the New Zealand Structural Engineering Society (SESOC) and a Member of the New Zealand Society of Earthquake Engineering (NZSEE).

1.3 I was employed by BCD Group Ltd in Hamilton as the Civil Engineering Manager until my retirement on 30 August 2019 but since 2 September 2019 I have been retained by BCD Group Ltd as an Engineering Consultant.

1.4 Prior to commencing work with BCD Group Ltd in May 2015, I was a Senior Engineer/ Associate Director at AECOM NZ Limited for 28 years, based in the Hamilton office.

1.5 I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and have complied with that practice note in preparation of this evidence. I agree to comply with it in presenting evidence at this hearing. The evidence that I give is within my area of expertise, except where I have stated my reliance on other identified evidence. I have considered all material facts that are known to me that might alter or detract from the opinions that I express in this evidence.

2.0 SCOPE OF EVIDENCE

2.1 I have been retained by Hamilton City Council - Planning Guidance Unit to provide structural engineering advice relating to the consent application by Hamilton City Council - Community Facilities (the applicant).

2.2 I am familiar with the local area and made a specific visit to the site on the 29th August 2018. This included the opportunity to enter the site to view the pool complex in detail.

2.3 The purpose of this statement of evidence is to address matters raised in the application relating to structural engineering and consideration of submissions in this regard.

2.4 In preparing this evidence I have reviewed the following:

a) Municipal Pool – Victoria Street, Options Report, WSP Opus, 20 August 2018 *(Options Report)*

b) The WSP/Opus structural report (Report to Inform Resource Consent – Appendix G) dated 25 October 2018

c) The WSP/Opus response to the s92 Request for Further Information (WSP Opus letter dated 14 January 2019)

d) The WSP/Opus Structural Assessment of the Grandstand at the Municipal Pool dated 4 October 2019

2.5 My evidence covers:

a) Background (section 3.0)

b) The WSP/Opus Structural Report dated 25 October 2018 accompanying the Resource Consent application (section 4.0)

c) Grandstand Retention option (Section 5)

d) The WSP Opus Grandstand Structural Assessment dated 4 October 2019 (section 6.0)

e) Conclusion (section 7.0)

3.0 Background

3.1 The Municipal Pools are an open-air pool complex located at the south end of Victoria Street. The pool facilities date back to 1912 and so the original pool construction pre-dates the introduction of the first New Zealand Loadings Standard (NZS No. 95) introduced in 1936.

3.2 The Municipal pool complex includes the various in-ground pools and associated changing rooms, boiler house and a grandstand. Various structural upgrades and changes have been made to the pool complex over the years, but structural assessments in 2008 and 2012 (including a seismic IEP) indicated the in-ground pool and the grandstand were rated at less than 34% NBS and so were potentially earthquake prone.

3.3 Based on this information, the pool complex was closed by Hamilton City Council in mid-2012 due to the known structural and safety issues.

3.4 To enable the Hamilton City Council to consider the options available for the pool complex after the complex was closed in 2012, a scoping report was prepared by WSP Opus in August 2018. This report recommended 3 possible options for the site, as noted below:

3.4.1 A new build covered pool complex option on the same site ($7M to $8M cost estimate)

3.4.2 A strengthening/upgrade option for the existing complex ($4M to $6M cost estimate)

3.4.3 Demolish the existing pool complex and convert into a green space ($655K to $750K cost estimate)

3.5 Based on the options presented, the Hamilton City Council applied for a resource consent in October 2018 to demolish the pool complex and convert the site into a green space.

4.0 Resource Consent WSP/Opus Structural Report (25 October 2018)

4.1 As part of the resource consent application, WSP/Opus prepared a structural assessment report for the proposed demolition of the pool complex dated 25 October 2018 (included as Appendix G to the applicant's resource consent).

4.2 I reviewed this structural report and identified a need for further information (a s92 request) regarding the applicant's proposed intent relating to the Victoria Street retaining wall, the foundations supporting the adjacent Celebrating Age building, demolition of the pool facilities and post-demolition on-site stormwater management. These matters were incorporated into the S92 request.

4.3 WSP/Opus provided a response to our s92 request, dated 14 January 2019, and I reviewed their response to determine whether my concerns had been addressed. I

summarised my findings in the BCD Group letter dated 22 January 2019. My conclusions were the structural engineering solutions proposed by the applicant for the demolition of the pool complex were generally acceptable but further assessments/design would be required for some items as part of the preparation of the detailed design stage (building consent) documentation. Refer to Appendix B for this letter.

4.4 In summary, I was comfortable that the preliminary geotechnical and structural design solutions proposed by the applicant to remediate the site and adjacent infrastructure, after the proposed demolition of the Pool Complex, were appropriate. The design solutions proposed by WSP Opus are preliminary designs only at this stage and would need to be reviewed in more detail once the construction drawings and documentation were available.

5.0 Municipal Pool – Grandstand Retention Option

5.1 In response to matters raised through submissions and the processing of the consent in respect of heritage matters, further information was sought from the applicant in respect of the feasibility of retaining and upgrading the existing Grandstand structure.

5.2 This request was made in the context of my review of the original WSP Opus structural reports which appeared to demonstrate that the timber Grandstand structure was in poor condition and does not meet the current seismic requirements. I required additional information to understand the nature and extent of strengthening works that would be needed to ensure the structure is able to support the current code level crowd and seismic loads.

5.3 The applicants structural engineer (WSP Opus) were therefore requested to investigate the feasibility of retaining and strengthening the Grandstand and provide a summary structural report before a final decision was made.

6.0 Grandstand Structure – WSP Opus Structural Assessment (4 October 2019)

6.1 The Grandstand structural assessment report was issued by WSP Opus on 4 October 2019. The report concluded that the Grandstand structure was in poor condition and many of the timber elements would need to be replaced, which would compromise the heritage aspect of the Grandstand. In addition, parts of the structure had a seismic rating of 5% NBS which is significantly less than the 34% NBS limit for a structure to be classified as earthquake prone. Finally, the WSP Opus report noted almost all the Grandstand timber members (rafter, columns, joists and floorboards) are understrength and would need to be replaced to comply with the current loading standard.

6.2 The WSP Opus Grandstand structural assessment also noted that a detailed inspection and assessment of the foundations and subfloor structure was not able to be carried out due to access limitations. However, from an external review, WSP Opus could not identify any robust connections between the Grandstand superstructure and the supporting foundations that would be able to resist uplift forces generated by the design wind and seismic loads.

6.3 I reviewed the 4 October 2019 WSP Opus Grandstand report and the associated DSA structural calculations on 9 October 2019.

6.4 I agree with the Grandstand report's conclusion that the existing Grandstand structure is in poor condition, is structurally inadequate to support the design seismic and wind loads, and significant strengthening would be required if the Grandstand is to be retained. The report does not state what level of strengthening is required if the Grandstand is to be retained but I expect it would need to be to a minimum of 67% NBS.

6.5 The WSP Opus report noted the Grandstand foundations were not able to be inspected. However, I would expect the existing foundations, if they have been built to a similar standard as the Grandstand superstructure, would also be inadequate and would require a detailed structural assessment and strengthening if the Grandstand superstructure is to be retained.

6.6 The WSP Opus Grandstand report does not discuss the risk of liquefaction or slope stability to the ground on which the existing Grandstand is located.

If the Grandstand were to be retained and strengthened, a geotechnical assessment would be required to confirm the risk of liquefaction or slope instability and what (if any) ground remedial works are required to the site

6.7 If the Grandstand was to be retained, the existing structural members which are in poor condition (i.e. decking, joists, columns etc) would need to be replaced with new elements in conjunction with the installation of the proposed strengthening works. This member replacement work, unless equivalent recycled materials were sourced and the strengthening works are “hidden” wherever possible, is likely to result in a notable visual impact on the upgraded Grandstand.

6.8 In summary, I consider the existing Grandstand, from a structural perspective, is in poor condition and will require significant maintenance and strengthening works to upgrade the structure to a minimum of 67% NBS. Considering this and the as yet unknown geotechnical risks associated with liquefaction and slope instability at the site, I consider that, from a structural perspective, demolition of the entirety of the pools complex, including the Grandstand is justified.

7.0 Conclusion

7.1 Based on my site inspection and after reviewing the various WSP Opus structural reports, I consider that the demolition of the Municipal pool complex and associated Grandstand is justified. This conclusion is based on the poor condition of the pool complex and the significant strengthening works that would be required to strengthen the Grandstand structure to a minimum of 67% NBS.

7.2 However, further detailed design and structural assessments relating to the site and remedial works will need to be undertaken by the applicant prior to the finalisation of an application for building consent. I consider that these matters are appropriately addressed through the following proposed conditions.

7.3 On completion of the stabilising embankment, any roadside damage shall be repaired, and the kerb and pedestrian footpath reinstated to match the surroundings.

7.4 *Prior to application being made for building consent the consent holder shall undertake further investigations and detailed design to confirm to the Hamilton City Strategic Development Manager or nominee that the negative skin friction loads on the adjacent Celebrating Age Centre building piles due to the proposed site fill will not adversely affect the structural stability and integrity of the building.*

7.5 Prior to application being made for building consent the consent holder shall undertake further investigations and detailed design to confirm to the Hamilton City Strategic Development Manager or nominee that the site demolition works can be staged to ensure there are no adverse effects on the adjacent properties, including the Celebrating Age Centre building and the Victoria Street footpath.

7.6 Prior to application being made for building consent the consent holder shall undertake further investigations and detailed design to confirm to the Hamilton City Strategic Development Manager or nominee that the existing subgrade beneath the proposed 4m high earth fill batter will be adequate to support the loads of the fill to be placed upon it without undergoing long-term settlement which, if it occurs, would potentially result in settlement/cracking to the Victoria Street footpath.

7.7 *Prior to application being made for building consent the consent holder shall undertake further investigations to confirm to the Hamilton City Strategic Development Manager or nominee whether the proposed cantilevered retaining wall adjacent to the Celebrating Age Centre building will require a foundation shear key to prevent sliding under static and seismic loads*.

7.8 *Prior to application being made for building consent, a detailed site liquefaction check is to be provided to the Hamilton City Strategic Development Manager or nominee to determine an appropriate design to ensure that the proposed 4m high cantilevered retaining wall will not be at risk of settlement and/or rotation in an earthquake and will not affect the structural stability of the adjacent Celebrating Age Building*.

7.9 *The consent holder shall undertake further investigations to confirm to the Hamilton City Strategic Development Manager or nominee whether the buried tank that is to be retained on site will require holes punched through the base of the buried tank to ensure seepage water can drain through the fill material inside the buried tank and into the underlying soils.*

7.10 *The consent holder shall undertake further investigations to confirm to the Hamilton City Strategic Development Manager or nominee that the proposed fill material will be sufficiently free draining to ensure rainwater can soak into the fill and not discharge from the site as overland sheet flow*.

_____

Colin Barry Jacobson

Dated 18th October 2019