applied innovation

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OUR REF 17100L1

28 March 2017

Boon Goldsmith Bhaskar Brebner Team Architects Ltd
131 Courtenay Street
NEW PLYMOUTH 4310

ATTENTION: MURALI BHASKAR

Email: m.bhaskar@bgbb.co.nz

Dear Murali

72 LAKE TERRACE, TAUPO : SEISMIC STRENGTHENING PRELIMINARY ASSESSMENT

The following letter summarises the preliminary assessment completed on the existing Taupo District Council office buildings with regards to seismic strengthening required to bring the structures up to at least 67%NBS. The Initial Seismic Assessment completed by Beca has scored the structure at 50% NBS (Grade C) for Importance Level (IL) 2. This is a worst case score for the entire structure and only takes into account the original (oldest) structure containing the Council chambers since this would result in the lowest seismic rating. Consequently, the entire structure receives the same score.

However, a further assessment indicates that for an IL2 designation, only the original building would require strengthening. The other subsequent structures/additions would individually score higher than 67%NBS in their current condition.

The proposed strengthening required to bring the original structure up to at least 67%NBS consists of 6 steel portal frames placed strategically throughout the structure and primarily along the perimeter of the building. These portals would need to be double portals to strengthen both floors. Alternatively, a braced frame system could be used but the impact on the use of the structure and the overall cost would be similar. These works would result in fairly extensive secondary works to remove and repair floors, walls, ceilings, and linings and provide connections as required from floor joists, beams and bearers. The portals would also require separate concrete pad footings. A mark-up of the building is attached with indicative portal locations and sizes for strengthening to 67%NBS for an IL2 structure.

It is possible that pending a more detailed analysis of the structure and required strengthening that further strengthening is required (unlikely to be less). For instance, the central concrete core is deemed to be adequate for the bracing in this area. However, this may not be the case, pending a more detailed analysis or pending removal of linings in the vicinity (for refurbishment) and being able to more easily see the structural mechanisms. It may well be that the required strengthening is only marginally cheaper than a new structure and would still result in a lower seismic rating.

Should Council require the building(s) to be rated as IL4 structures, strengthening to all structures would almost certainly be required as this has a significant effect on the %NBS – approximately half of the IL2 score. The strengthening proposed above for an IL2 structure would not be sufficient to bring this building up

above the 67% threshold desired by Council. Further strengthening would almost certainly be cost prohibitive and may prove to be physically impractical due to the extensive works required.

The other more recent structures and additions would likely need to be strengthened as shown on the attached mark-up for IL4 structures. This may include strengthening of the knee joints of 9 existing portals in the transverse direction and the construction of 4 or 5 new portal frames in the longitudinal direction. Again, since individual assessments of the further additions has not been completed, the extent of strengthening required for each individual structure/addition may vary pending a more detailed analysis.

In summary, should IL4 be desired, a new structure is recommended—certainly for the older, original structure but also for the subsequent additions. The resulting performance of a new structure will be much greater than a retrofitted/strengthened older structure and will perform as an integrated system rather than a patchwork of various systems. In addition, the cost of strengthening (in terms of dollars and time) is likely to be marginally cheaper, if at all, and will still result in a reduced capacity structure when compared to new. In the case, of the original building. It is unlikely to be feasible to achieve an IL4 structure at 67%NBS, regardless of strengthening.

Yours sincerely

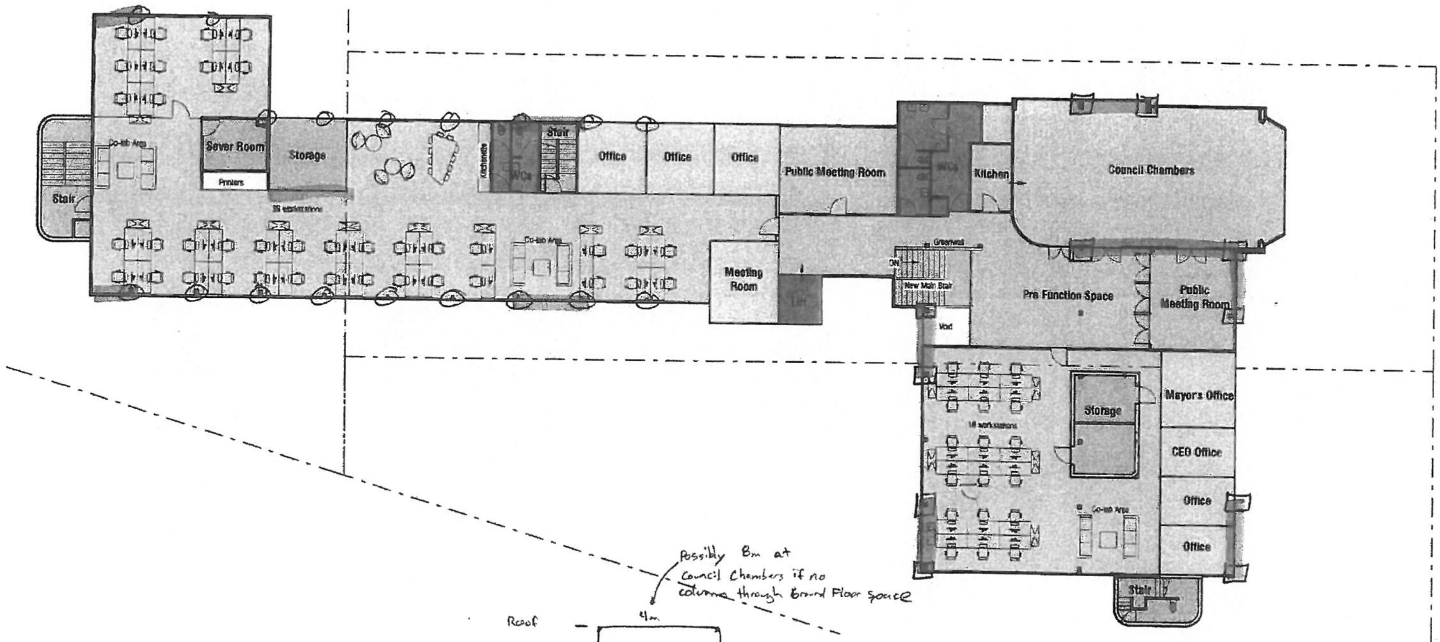
THOMAS BRAND
ENGINEERING MANAGER, CPENG, INTPE
Email: thomasb@cheal.co.nz

Enclosures:

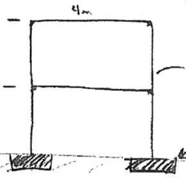
1. Strengthening Mark-up for IL2
2. Strengthening Mark-up for IL4

IL4 – strengthen knee joints on 9 existing portals
– add braced frames/portals in long. direction
(just assume same as portals for original building)

IL4 – unlikely to be achieved for original structure



Possibly 8m at Council Chambers if no column through Ground Floor space



250 PFC Portal Frame

1m SQ.; 500mm DEEP CONCRETE FOOTING

Proposed First Floor - Option 1
Scale 1 : 200 (A3)

0 10m
scale 1:200 A3

Option 1 - Floor Areas approx. only

Ground floor:	1230m²
First Floor:	950m²
Total:	**2180m²**

NOTE. Vertical ciculation spaces only included as floor area once (on the lowest level)

Option 1 - Desk Numbers

Ground Floor workstations:	88
Ground Floor Individual offices:	5
First Floor workstations:	56
First Floor Individual offices:	7
Total (staff):	154

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Job Title: **TDC Building**
72 Lake Terrace, Taupo

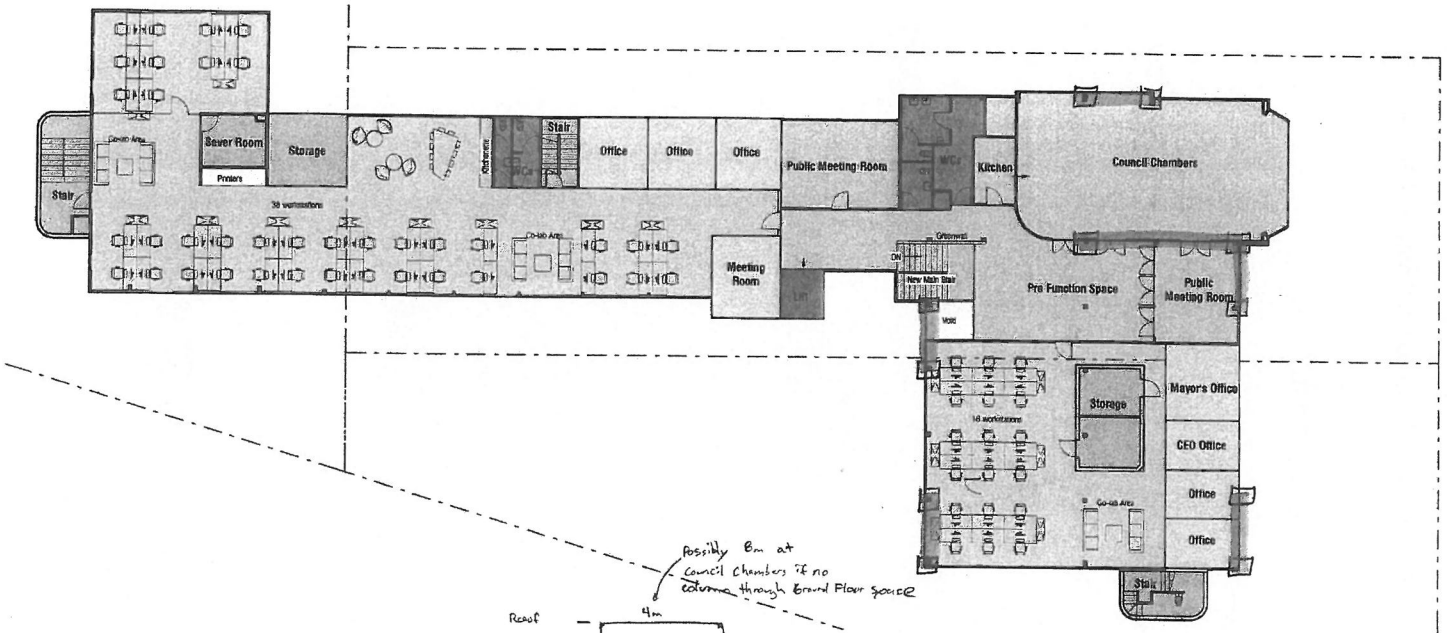
Scale (A3): **As indicated**

Drawing Title: **Proposed First Floor - Option 1**

Rev	Date	Description

Issued for: **CONCEPT**
Print Date: 13-Feb-17 4:23:07 PM

Job No. **6109** Drawing No. **A2.04**

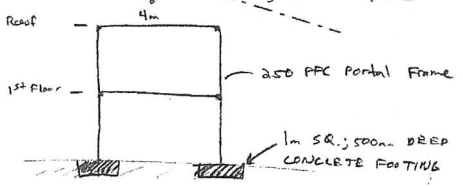


Proposed First Floor - Option 1

Scale 1 : 200 (A3)

0 10m

scale 1:200 A3



Option 1 - Floor Areas approx. only

Ground floor:	1230m²
First Floor:	950m²
Total:	2180m²

NOTE. Vertical circulation spaces only included as floor area once (on the lowest level)

Option 1 - Desk Numbers

Ground Floor workstations:	86
Ground Floor individual offices:	5
First Floor workstations:	56
First Floor individual offices:	7
Total (staff):	154

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Job Title: TDC Building
72 Lake Terrace, Taupo

Scale [A3]: As indicated

Drawing Title: Proposed First Floor - Option 1

Rev | Date | Description

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