P R O P O S E D N E W B U I L D I N G

FOR THE

COURTENAY CHAMBERS LTD.

WELLINGTON N. Z.

Clere and Williams
F.R.I.B.A. A.R.I.B.A.
Architects and Structural
Engineers.
Members Concrete Inst. London.
157 Featherston, St.,
WELLINGTON.

SPECIFICATION

EXCAVATOR. Excavate for foundations, piers foundations and for floors to the depths and sizes shewn on the drawings. Bottom of trenches in all cases shall be fairly levelled to receive the concrete and shall be kept clear of all loose earth etc., and shall have sufficient working room on each side. All surplus spoil shall be removed by the contractor from the site. Well ram the earth to all foundations.

C O N C R E T E .

PROPORTIONS. Concrete used throughout the works shall consist of one part of cement, two parts of sand and four parts of shingle or approved broken stone 1 - 2 - 4. One batch of concrete shall consist of 3½ cubic feet of cement, seven of sand and fourteen of gravel. This clause does not mean that the sand shall necessarily be separated from the shingle before mixing, but the separation may be demanded should the architect not be satisfied that the parts are the proportions specified, but should sand and stone be delivered mixed, then the proportions shall be one of cement to five of aggregate.

CEMENT used shall be of an approved brand and a briquette of neat cement 1" square in section shall after one day in moist air and six in water bear a tensile stress of 400 lbs. The final set of any cement used shall not exceed two hours. These tests shall be made as frequently as the Architects shall think fit.

AGGREGATE Shall be approved and shall, excepting in foundations, contain no stone that will not pass through a ¾" sieve. For foundations larger metal can be used, but this also shall be approved. Approved packing will be allowed in the foundations but none shall come within two inches of the outside and all parts shall be covered with the concrete hereinbefore specified.

MIXING. All concrete shall be turned over at least twice dry and twice wet (the application and amount of water being left to the discretion of the architects or Clerk of Works) till the aggregate and matrix are throughly incorporated and shall be at once placed in the boxes. All mixing shall be done on a clean banker or as an alternative to the above the concrete shall be mixed in an approved mixing machine. No concrete that has stood outside the boxes for fifteen minutes shall be used.

DEPOSITING. No concrete shall be thrown into a mould from a greater height than six feet. Each beam or floor slab shall be filled in one operation and in every case where the concrete has been deposited it should be kept free from any vibration for at least eight hours.

REMOVAL OF FORMS.& etc. No forms shall be removed until the work is strong ehough to take 50 per cent more than any load it has to sustain, no time being less than two days for walls and seven days for columns.

FOUNDATIONS. Under the building shall be formed of concrete and shall be of the sizes shewn or where not shewn as directed. In all cases they shall rest on an absolutely solid bottom, and should any faulty ground be met with in digging the trenches the Architects attention shall be called to it and then instructions shall be followed an extra sum of 40/- per cubic yard including excavating beigg allowed, should more concrete than is allowed for in the contract be used to fill up the fault. All running foundations shall be reinforced with two ⅜" steel rods

placed continuously where directed with cross pieces wired together at intervals not more than 6' 0" apart. The foundations under wall piers shall be of the sizes and depths shewn and shall be reinforced as hereinafter specified.

REINFORCEMENTS shall be as shewn on the drawings, any part not shewn as re-inforced shall be treated in the same manner as the corresponding parts shewn elsewhere or if there are no corresponding parts, shall be as directed by the Architects or Clerk of Works. These re-inforcements shall consist of No. ¼" wire and of round bar steel free from welds which shall meet the following requirements:- The ultimate strength shall be from 28 to 32 tons per square inch with 20 per cent elongation in eight diameters, with 40 per cent reduction at point of fracture, the steel when cold shall bend round its own diameter without splitting or breaking. All tests considered necessary by the Architects or by the Clerk of Works shall be made at the expense of the contractor. Any scaly rust, paint or other foreign substance shall be removed from all steel. All bars continuous/shall overlap each other at their longitudinal junctions at least 8". Where junctions are necessary in vertical re-inforcements in piers, the re-inforcing rods shall overlap each other 18" and shall be wired together as directed and in places where directed spliced links shall be used.

wall reinforcement ⅜" rods at 12" centres

ANY BEAMS shall have their re-inforcement properly put together before the concrete is placed.

FLOORING. ~~The ground floor and~~ The ground shall be 9"x4" Keepers & 6x2" joists & walls to lift well shall be of concrete 6" thick re-inforced with No. expanded metal laid as directed, and floor shall be screeded and brought to a level finish. The first and second floors shall be formed with concrete 7" thick and re-inforced with ⅜" rods at 5½" centres and carried over beams and into walls These floors shall be brought to a level and even surface. The second floor shall have 1¼ x 1¼ bevelled battens embedded

6x1¼ battens

therein 3' 0" apart to take the wood flooring. (See Carpenter and Joiner)

STAIRS leading from ground floor to second and third floor shall be of concrete re-inforced with two $\frac{3}{8}$" rods to each step, carried into adjoining walls as directed. The surfaces of the risers and treads shall be those cast next the boxing.

CARPENTER AND JOINER.

MATERIALS. All the timber used in flooring and all joinery shall be perfectly dry and all timber shall be absolutely free from any sap-wood. Where not otherwise specified the following timbers shall be used. Principal Rafters and Tie Beams shall be of Oregon. Purlins and rough sarking, ceiling to show room on 2nd floor shall be good O. B. Rimu. Outside doors and frames to same and battens to take flooring, heart of totara flooring to second floor heart of matai.

FLOORING BATTENS to second floor shall be $1\frac{1}{4}$" x $1\frac{1}{4}$" bevelled, sunk flush with concrete every 3' 0" apart.

FLOORING. The whole of the second floor portion excepting lavatories shall be floored with 6" x 1" T. & G. dressed flooring boards, well and closely nailed.

ROOFING. Construct the roofs as shewn on the drawings. Hips shall properly be formed as above specified for roof trusses. The whole shall be framed and ~~properly~~ put together and secured with wrought iron strap bolts $2\frac{1}{4}$ x $\frac{1}{4}$". 8" x 4" purlins shall be spaced at 3' 0" centres and shall be spiked to principals and shall have cleats checked and spiked to principals. Cover the whole of the roofing with 1" rough boarding well and closely laid pressed up tight and double nailed. Cover the whole of the sarking with red edged roofing felt of approved quality, properly lapped and tacked in a workmanlike manner. Trim carefully for all skylight openings where shewn on the plan.

GUTTERS. From the gutters behind the parapets shall be formed with 1" rough dressed H. Totara boxing supported on proper bearers and shall have 2" drips formed every 10' 0" apart. Gutters shall not be less than 9" wide on the flat at the narrowest ends.

WINDOWS. The whole of the sashes shall be of Hopes or other approved style of metal sashes

style of metal sashes, and shall be glazed with white G. glass secured into the sashes in an approved manner.

ASBESTOS SLATES of an approved quality and colour shall be fixed on the whole of the roofing over the main building. These slates are to be laid in a proper and workmanlike manner and the roof left at completion in a complete and water tight condition.

P L U M B E R .

FLASHINGS. All materials shall be of the best quality and the workmanship first class, and step flash where the roofs come into contact with parapets and to skylights etc. with No. 24 gauge galv. lead edged ridging secured with lead wedges.

GUTTERS behind parapets shall be formed of 24 gauge gal. iron lapped rivetted and double soldered with 2" drips every 10' 0" in length and with falls gutters to be carried up under roofing 10". Form proper cess pools and hopper heads for connection between gutters and down pipes. All gutters shall have proper apron pieces.

Gutters behind Verandah parapet shall be of similar material as above specified. Leave the whole of the plumbers work in a complete and watertight and clean condition at the completion of the contract.

C A L C U L A T I O N S re P R E M I S E S for

MESSRS. COURTENAY CHAMBERS LTD.

ALPHA ST. WELLINGTON.

TOP FLOOR SLAB.

Load = 150 75 lbs. for concrete in slab.

Span = $\frac{33}{4}$ = 8' 3".

M = $\frac{225 \times 33 \times 33 \times 12}{4 \times 4 \times 8}$ inch lbs.

= 23000 inch

$\sqrt{23000}$ = 151

Steel required = .00224 X 151

= .338

= ½" rods at 6" centres, breadth of slab with ¼" distributing rods at 18" centres, length of slab.

Effective depth = .03354 x 151

Slab = 5" ¼" 1"

Total depth = 6¼"

Ground floor is of timber and is as shewn on plans.

Secondary Beams.

Span 21' 0".

Load = $\frac{225 \times 33 \times 21}{4}$ ft. lbs.

= 39,000 lbs.

Beam at say 160 lbs. ft. run = 160 x 21 lbs.

= 3360 lbs.

Total load taken by beam = 42360 lbs.

M = $\frac{42360 \times 21 \times 12}{8}$

= 1,334,340

H = $\sqrt{\frac{1334340}{62 \times 63}}$

= $\sqrt{341}$

= 18.4

As = $\frac{18.4 \times 63 \times .43}{100}$

≥ 4.98 square inches metal.

Say 5 bars 1½" diameter.

MAIN BEAMS:

Load = 21' 6" x 21 x 225 lbs.

= 150,075lbs.

Secondary Beams = 3/160 x 21 lbs.

= 10,000 lbs.

Main Beam Say 600 lbs. ft = 600 x 31.6 lbs.

= 18,900 lbs.

Total Load = 179,055 lbs.

M = $\frac{179055 \times 63 \times 12}{2 \times 8}$

= 8,210, 349 inch lbs.

H = $\frac{8210343}{84 \times 52}$

= 36"

As = $\frac{36 \times 84 \times .43}{100}$

= 13 square inches

Say 10 rods at 1½" diameter

COLUMNS:

Top Floor.

Roof Area = 10' 6" x 16

= 168 sq. ft.

Wind Pressure = 30 x 168

= 5,040 lbs.

Trues say = 1000 lbs.

Roofing and Sarking say = 3360 lbs.

Total load = 9,400 lbs.

Add 100 lbs. for column = 10,400 lbs.

Try 8" x 8" Then 10400 = 900 (64 + 15a)

a = minus quantity

By regulation 109 L.C.C. Regulation, steel must be

1% = .64 sq. inches.

Say 4 rods at ⅝" diameter.

COLUMNS FIRST FLOOR:

Load with column from Top Floor	=	10,400 lbs.
Curtain Walls $\frac{19 \times 20 \times 1 \times 150}{2}$	=	28,500 lbs.
Wall Beams $\frac{20 \times 1 \times 3 \times 150}{4}$	=	2250 lbs.
		41,150 lbs.
Add for column	=	2000 lbs.
Floor Load	=	89,500 lbs.
Total Load	=	132,650 lbs.

Try 14" x 14" columns.

Then 132650 = 500 (196 + 15a)

$\therefore \quad a = \frac{34650}{7500}$

= 4.6 sq. inches metal

Say 4 rods at 1¼" diameter.

or 5 rods 2 1/8" = 4.9 sq. inches

COLUMNS GROUND FLOOR:

Total load from first floor		132,650 lbs.
Curtain Walls	=	19.950 lbs.
Wall Beam	=	2250 lbs.
Add for column		8000 lbs.
floor load	=	89,900 lbs.
Total Load Say column 18" x 18"	=	252,350 lbs.
Then 252350	=	500 9324 15a)
	a =	$\frac{90350}{7500}$
	=	12 sq. inches metal

Say 8 rods 1⅜" diameter.

or 10 @ 1¼"