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# Centre Point R04 Fitout

## FIXINGS TO EXISTING PT SLABS – DESIGN CONSTRAINTS

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Prepared by Pell Frischmann

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## FIXING METHODOLOGY TO EXISTING PT STRUCTURES IN CENTRE POINT LINK (CPL)

As part of Centre Point Retail Unit 04 fitout package, fixings are required at various locations at the underside of 2nd floor and top of 1st floor CPL slab. This document outlines the existing design constraints and proposes a recommended methodology for installing new fixings along with some approved products and their load carrying capacities.

The existing first and second floors in CPL are post tensioned concrete. The slab tendons run the short length (North to South) of the building and are generally at 13" (330mm) centres.

The first floor tendon profile varies along the length of the run. At its lowest, the design position of the tendon is shown 4" (100mm) above the bottom of the slab (refer to drawing 207).

At second floor, the slab tendons run flat at the top of the slab. The minimum depth of the tendons from the top of the slab is shown at 3 ½" (88mm).

It is proposed to install a number of fixings to the bottom of the second floor slab to support new services. The exact sizes and weights of the services are subject to subcontractor's design and choice of kit. At present we do not have sufficient details to design the fixings required to support the various mechanical units. Adequate allowances are required and detail design will be reviewed upon receipt of contractor information. At this stage we assume these will be a mixture of mechanical and bonded anchors.

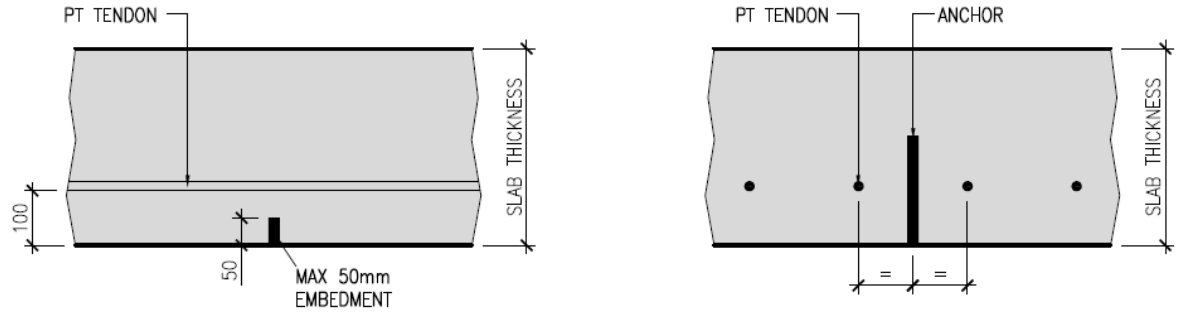
These fixings must not damage the PT tendons. To ensure this is achieved, we propose two options as described below:

1. For lighter load, the embedment of the fixings will be limited to 50mm. These fixings can be placed anywhere in the bottom of the second floor slab. Please refer to Table 1 at the end of this document for technical details of recommended fixings.

2. Where the weights of the installations are such that 50mm anchor embedment is not adequate, the soffit of the slabs will have to be scanned using Hilti Ferroscan equipment or similar to establish depth and position of the tendons. The slabs will then need to be marked to highlight the position of the tensioning cables. The fixings will be positioned to avoid the cable and the embedment depth designed suit the depth of the slab and the fixing loads.

In both cases, the concrete slab is to be drilled into without diamond drill bits, such that in unlikely case of hitting reinforcement bars, drilling could be stopped and alternative fixing position selected without damaging rebar.

Where the position of installations are such that the required fixings would clash with PT tendons, consideration should be given to positioning anchors to avoid tendons and bridging between them using UniStrut (or similar) to support to installations at the required positions. This will need to be coordinated with the architectural layouts as soffits are exposed in areas of the Link Bridge.




Option 1. Anchors placed anywhere to the underside of the slab. Embedment limited to 50mm.

Option 2. Anchors placed within PT tendons. Scan of slab soffit required.

**Figure 1.** Fixing options to CPL soffit

A similar approach will need to be followed for any fixings to the top of the slabs on first floor. In these locations, the cover to the tendons is approximately 3 ½" (88mm). So, to avoid the tendons being damaged by the new fixings, we propose the following:

1. Limit the embedment depth to 45mm. These fixings can be placed anywhere in the top of the first and second floor slabs.

2. Alternatively, the top of the slabs will have to be scanned to establish depth and position of the tendons. The slabs will then need to be marked to highlight the position of the tensioning cables. The fixings will then be positioned to avoid the cable and the embedment depth designed suit the depth of the slab and the fixing loads.

In any case, slab reinforcement must not be cut during the installation of these fixings. Where a fixing clashes with a reinforcing bar, the fixing must be moved. Where the position of the fixings is critical, the slab may need to be scanned ahead of the works to locate the reinforcement bars and the fixings positions designed accordingly.

To our knowledge, anchors of embedment depth deeper than 50 mm are not required. This will be further reviewed upon receipt of contractor information.

| **Hilti HKD Push-in anchors, M8x40** | | |
|---|---|---|
| Effective embedment depth | 40 mm |  |
| Depth of drill hole | 43 mm | |
| Nominal diameter of drill bit | 10 mm | |
| Fixture clearance hole | 9 mm | |
| Minimum spacing | 80 mm | |
| Minimum edge distance | 140 mm | |
| Tensile design resistance, factored | 4.3 kN | |
| Shear design resistance, factored | 5.2 kN | |
| Fastening screws or threaded rods to be grade 8.8. | | |

**Table 1.** Recommended fixings to underside of CPL slab

Tension pull-out tests to be carried out on site for 10 no. of installed anchors in accordance with relevant ETAGs. Test reports are to be reviewed by Pell Frischmann.

Any fixing proposals alternative to Table 1 above must be reviewed and approved by Pell Frischmann before being carried out on site.