



**CHC AFFORDABLE HOUSING**  
**ECLIPSE APARTMENTS PROJECT**  
**AT CNR BRAYBROOKE AND PAGET STREETS**

**BRUCE ACT**

CHC Affordable housing is a not-for-profit development company that delivers affordable properties – for both sale and rent – to the ACT community.

Established in 1997, we pride ourselves on the quality of our developments, and are dedicated to delivering well-located, functional and flexible housing options to both our purchasers and renters alike.

To achieve this, we have partnered with some of Canberra's leading builders and architects to create properties that are redefining the concept of "affordable".

Our mission is to provide affordable housing for people on low or moderate incomes. Our aim is to be the best affordable housing provider in the country.

Our Eclipse development in Bruce is a project of around 200 units, our brief to the architects and builders was to create a project that could deliver both the economic outcomes as well as the environmentally sustainable principals desired by our clients.

Below is a testimonial and photos from the project manager who is outlining his achievements in our project at Eclipse Apartments in Bruce, ACT. We recognise and pleased with the reported achievements.

The use of Dincel Construction System in the Eclipse project has achieved our organisation's objectives, the environmental advantages to the project played an important factor in our decision making process for the project, these items included;

- The Dincel polymer material is certified to be VOC free and consist of heavy metal stabilisers free, ethylene based ( not carbide based) Rigid PVC with no plasticizers , Low VCM<0.5 ppm.
- Dincel provides custom lengths which virtually eliminates construction waste and its relevant costs. The majority of Dincel walls have been installed without steel reinforcement. The basement retaining walls and Dincel blade columns has been used without horizontal steel bars which allows Dincel polymer, vertical steel bars and concrete can be totally recycled at end of 100 years Dincel life cycle by simply crushing the Dincel components.

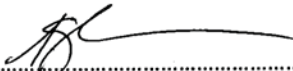
- Dincel formwork enabled up to 50% cement replacement, higher use of flyash in the concrete mix therefore both the cost of the structural concrete is lower and we are utilizing in flyash being a waste product from the power industry.
- Dincel load bearing wall construction system allowed the use of 150 mm slabs in lieu of conventional 200 mm thick slabs with mesh type of reinforcement. The significant reduction in concrete and steel quantity in floor slabs with virtually no steel in Dincel walls in association with 50% cement replacement as compared to traditional building methods represent lower embodied energy efficiency hence significant equivalent reduction in CO2 emissions. We are of the opinion that we have achieved the similar or better savings than the Swinburne University peer reviewed case study is available at Dincel web site at the document called "Energy Efficiency in Building Construction – Embodied Energy" <http://www.dincelconstructionssystem.com/documents/Part%201%20Energy%20Efficiency.pdf>. The reported savings consist of 75 tonnes of equivalent CO2 emission at the finish date of construction.
- Dincel is waterproof as certified by CSIRO, this means that the structure will have an increased life span as compared to traditional construction methods; this will also translate to lower maintenance costs and therefore lower body corporate fees for our low income clients.
- Waterproof Dincel is tested to have 180 times less vapour transmission and certified to be VOC free .Dincel prevents thermal bridging which promotes condensation and fungus development. Dincel with natural and/or mechanical ventilation eliminates condensation. PVC material's hygienic properties qualifying hospital use supports the product does not support mould-fungus-vermin and bacterial growth. Dincel Wall possessing all these attributes represent itself as a solution to sick building syndrome and Indoor Air Quality
- With the virtual removal of brick and block layers from the site and utilisation of Dincel Construction System, the project has been able to substantially reduce the overall construction programme by around 30%; further onsite material wastage has been further reduced.
- Savings achieved through the use of Dincel Construction System will mean that our non for profit company will allow a greater number of units to be built in future projects for people on low to moderate incomes.
- The following principles of Green Building Council of Australia at Built Environment achieved at Eclipse Apartments
  - **Cement and steel minimisation**
  - **Innovation:** lightweight Dincel System incorporates snap-clip joints which eliminate significant construction accident potential whilst achieving significant increase in construction speed. The use of first time up to 50% cements replacement. Very low construction wastage. Hygroscopic Conventional material science is based on the breathability principles due to their capillary nature. Dincel eliminates the associated problems of materials with porous nature. Refer <http://www.dincelconstructionssystem.com/faq.php?section=SUSTAINABILITY> [QUESTIONS#11](http://www.dincelconstructionssystem.com/faq.php?section=SUSTAINABILITY)
  - **Indoor Air Quality**
  - **Low embodied energy use** (approx. 40%) at the time of construction.

- **Operational Energy:** Crack-Joint free Waterproof-air tight Dincel eliminates air leakage which represents 25% saving in heating and cooling energy. Dincel provides thermal mass in association with insulated walls.
- **Emissions:** 40% less CO2 without even accounting full life cycle analysis
- **Transportation:** A semi-trailer full Dincel represents only 4 tonnes of additional load which represent major reduction in fuel usage.
- **Management:** Dincel allow entire structure to be built by one trade only. Dincel walls consisting purpose in-built service spacers allow power and water reticulation to be done at any stage of construction without affecting the construction critical path. This is another innovation in construction management.

Eclipse Apartments complies with every aspect of the Green Building Council of Australia's sustainability principles. At CHC Affordable Housing we hope this proven CHC model to be an example to other Australian States for them also achieving environmentally and economically Sustainable Housing for Australian and World Community. We have provided this letter to express our support to benefit our society by informing the industry of our achievement which is the purpose of CHC Affordable Housing.

CHC is committed to ensuring compliance with both national community housing standards and ACT affordable housing regulatory requirements , these requirements and standards have a need to be accountable to tenants , the community and government for the effectiveness of service and the use of public funds and by doing so to enhance the credibility of community housing. The Eclipse development has benefited by using the Dincel Construction System, our clients will also benefit in the long term through lower maintenance costs.

Yours faithfully  
**CHC Affordable Housing**



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**Kel Glover**  
Chief Operations Officer  
14<sup>th</sup> August 2012

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**REFER PHOTOS AND PROJECT MANAGER'S TESTIMONIAL BELOW**

# Construction Programme = 77 Weeks

## Reduced by 26 Weeks



Eclipse Apartments, Braybrooke & Paget Streets, Bruce, Canberra, for CHC AFFORDABLE HOUSING

- 200 Apartments.
- 6 blocks up to 6 storeys, single level car parking.
- 30,000m<sup>2</sup> suspended slabs.
- 17,000m<sup>2</sup> Dintel walls/columns.



Finishes: Metal Cladding, Stone, Bricks and Painted Render.



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Internal Dintel Walls



Plasterboard Finished Internal Dintel Walls





**Loadbearing Dintel Walls**



**Mesh Reinforcement, 150 Slabs Unmatchable for Cost and Speed Advantage**



**Internal Loadbearing Unreinforced 110mm Dintel Walls**



**Dintel Lift and Stair Shaft Walls**



**Dintel Basement Columns and Walls**



**Dintel Columns Supporting Roof**

31<sup>st</sup> July 2012

**TO WHOM IT MAY CONCERN**

**RE: DINCEL CONSTRUCTION SYSTEM ON APARTMENT DEVELOPMENT  
BRUCE, CANBERRA**

The project consisted of 200 apartments in a configuration of six (6) Buildings of up to 5 storeys placed on the podium level covering a single level basement.

My sole purpose as a Project Manager is to aim at delivering projects on time and on budget.

After considering other alternatives the Dincel Construction System was selected for the vertical building elements consisting of facades, party, lift-stair shafts, shear walls, basement walls and columns in both basement and superstructure being integrated with the 150mm thick slabs above the Post Tensioned podium level.

The Dincel system offered construction cost savings consistent with the savings shown in the Case Study Costing Analysis available on the Dincel website.

The savings achieved in this project can be summarised as follows:

1. All party walls consisted of 110mm Dincel and 200mm Dincel used in façade, basement, stair, lift shafts and basement's blade columns.
2. Due to the load bearing Dincel Construction System design principles and acoustic certification, we were able to adopt floor slabs being 150mm thick only incorporating top and bottom mesh with stock length bars over the walls. Party walls utilising Dincel are designed without vertical or horizontal bars. This compliments steel suppliers standard fitments and the cost of purchasing does not need to include scheduling and bending costs which save around \$100/tonne to the cost of reinforcement purchasing.
3. The use of mainly mesh reinforcement in floor slabs above the podium level reduces the time of steel placement significantly. This way, 150mm thick slabs with top and bottom mesh only becomes the most cost and time efficient construction method when compared to any other flooring system including the PT option.

The project consisted of 27 slab pours having 150mm thick slabs with mesh reinforcement. The difference between the mesh slab and PT slab is minimum 2 days resulting in 54 days saving in this activity alone.

I would estimate the time saving difference between the mesh slab and a slab consisting of conventional steel bars alone would be no less than 5 days for each slab pour.

The construction speed gap between mesh and PT slabs would naturally be more in a buoyant construction market in comparison to our current market at the date of this letter.

4. Altering the basement columns from conventionally formed to 1100 x 200mm Dincel blade columns, with no conventional column tied reinforcement resulted in reductions to both formwork and reinforcement costs. 1100 x 200mm Dincel blade columns work with any carparking layout to suit the Australian Carparking Standard.

The client/developer may consider referring to the project's architect or Dincel for advice at the planning stage for minimum car parking widths to utilise Dincel Walls for lengths of blade columns greater than 1100mm in car parking areas to eliminate conventional pad footings along with significant reductions in steel and more importantly significant cost savings at the transfer slab level.

5. Dincel Walls are utilised as deep beams at party walls to eliminate the load transfers onto the podium slab thus significantly reducing slab thicknesses, reinforcement and PT in the podium slab. This resulted in 500mm reduction in bulk excavation for the entire basement area which was 8,500m<sup>2</sup> in area on this project. Additionally, this reduces all wall and column heights, another significant cost saving.
6. Holcim Concrete provided concrete mixes developed for Dincel Walls consisting of 50% use of flyash, deletion of plasticisers and a reduction of 50% in cement use so the project benefitted from the cheapest concrete mix available to use within Dincel wall panels.
7. Waterproof Dincel basement walls do not require membrane, horizontal steel and construction joints; we have a wall 120m long with no joints. The excavation behind the Dincel basement wall was no more than 250 to 350mm.
8. The Dincel system has significantly improved O H & S issues, reduced size, number and usage of cranes, reduced number of site personnel which in turn reduces site accommodation.
9. Both the Client and Architect are satisfied with the quality and performance of the Rockcote system applied on the Dincel façade walls.

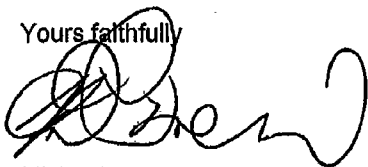
As project manager for this project I have managed to reduce the construction programme by 26 weeks from 77 weeks of the planned construction programme involving detail excavation and all structural items consisting of vertical elements and floor slabs. This also represents significant savings in preliminary costs as well. I am confident that after this first major project with Dincel, I will further improve the cost and time savings for any project adopting the Dincel Construction System principals. The project had 30,000m<sup>2</sup> of flat slab formwork and 17,000m<sup>2</sup> of Dincel wall panels.

Dincel should be treated as a building system rather than comparing it with other wall systems. I highly recommend developers who wish to save significant time and money to view the Dincel document titled "COSTING ANALYSIS" which is available on the Dincel website. The product is supported by professional engineers from the Dincel Group. I have found the Dincel team to be a highly experienced and very accommodating in working with the construction team, and the client's own engineer, as witnessed on this project.

I highly recommend using the Dincel Construction System in multi-level apartment construction as the time and cost savings cannot be compared to any other known methods in the construction industry.

I will be very pleased to speak with any potential user of Dincel Wall to share my experiences on the advantages of this unique construction system.

Yours faithfully



Michael Owen  
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