

# Nutgrove Retail Park, Rathfarnham, Dublin

**P**roject Summary: mixed development consisting Car Park, Multi Storey Building Nutgrove Centre, Nutgrove Avenue, Rathfarnham, Dublin 14

Dublin based developers, Bymac Ltd. are currently developing the old HB site on Nutgrove avenue, Rathfarnham, Dublin. For many years the substantial site was the home of Hughes Brothers, famous throughout Ireland for the manufacture of ice cream. Bymac are best known for their developments of small own door offices and industrial units around the city, but in recent times have diversified into developing both residential and retail park schemes. The development will provide additional services in an attractive suburb of South Dublin which is

famous for its parklands and historical sites.

Building work on the site is currently underway in the form of a mixed development. From a precast concrete design perspective, the project demonstrates an excellent combination of a wide range of precast elements including multi-storey column and beam, portal frames with pitched roof, spandrel, and load-bearing crosswalls.

The development will extend to c. 20,900 sq.m and will be anchored by Homebase' with an external garden centre, 5 retail warehouse units, discount food store, gym, swimming pool, crèche and offices, together with a stand alone restaurant. The entire scheme is scheduled to open by the end of 2007.

The project team took a highly structured approach to the design of the buildings. The Concast Precast Group, were selected due to the optimal precast design solution, reduced time-frame over traditional build, quality and competitiveness. With production plants in Dublin and Carlow, the company were ideally positioned to provide high quality precast structural elements on time and within budget. Concast have vast experience in mixed commercial structures which incorporate office, retail, car parking and recreational facilities. Involvement in similar mixed multi-storey projects, including the Bridgewater Centre in Arklow, allowed Concast to bring considerable know-how to the project.



*Precast frame by the Concast Precast Group*



**Precast portal frame by the  
Concast Precast Group**



### Multi Storey Building

The structure consists of basement car park, three storey superstructure and plant/penthouse area at roof level. The overall size of the building is approx. 60m x 64m in plan and 19.5m in height. At ground floor level there is retailing and two retail warehouse units. Significant loadings of 15 KN/sq.m were required due to the large storage requirements. This was easily accommodated by using precast prestressed units whereby the continuity of the floor was used to transfer loadings to beams and columns. Service opes were cast into the beams to accommodate the services: typically four opes were required with varying diameters of 150mm to 250mm. This was a benefit of the precast system, as it avoided potential wastage of head-height and ensured that the floor to floor height was maximised.

At first floor level there is gym for adults and children, aerobics, fitness centre and swimming pool. The swimming pool area needed special attention due to waterproofing requirements and the additional loadings. Second and third floors consist of crèche with open-air terrace and playgrounds, offices, gym with panoramic views of the swimming pool underneath. At roof level there is plant area and office space in the penthouse. The precast lift shafts and staircases are located in three cores which provide stability for the whole structure.

The column connection typically takes the form of dowel bars projecting from the footing with matching cast in grout tubes in base of the column. This allows the column to be lowered directly over the dowels onto preset levelling shims. The dowels act firstly as locating pins, and secondly, as a pin joint when the grout tubes and base are fully grouted with high strength grout, to form a monolithic connection. The grout tubes used for the connections are kept reasonably

large (typically 65mm diameter) to allow the use of high flow grout rather than requiring pressure grouting.

### Car Park

To maximise the space available, the site has 16,000sq.m of car parking, consisting of underground and ground level precast car parks, to accommodate over 500 vehicles. Open floor areas and easy circulation systems are recognised as priorities in modern car park design. The design was challenging due to the need for particularly high loadings, equivalent to three fire engines, whilst simultaneously minimising the number of columns. Because precast concrete elements are fabricated under factory conditions, critical steps in the construction process overlap, to save valuable preparation and on-site construction times. With such a fast-track schedule, not only is the structure erected faster, it is also finished faster. Special prestressed, precast units with structural screed and continuity reinforcement were designed to maximise the clear span bays, giving flexibility to locate parking places. Ramps, road barriers, spandrel beams and lift shafts were all provided in precast.

### Portal Frames

Two major portal frames were required to cover an area of 9,000 sq.m of retail space. Portal frame construction is a method of building and designing structures, whereby the connections between the columns and foundations were designed to be moment resistant: connections between columns and rafters are designed as pinned.

With portal frames the connections are designed to achieve strength through simplicity. The main objective is to provide a connection that serves as many functions as possible while being simple and quick to secure. The simplest way of meeting this

objective is to design precast structures with pin jointed connections at roof level.

Concast's engineers modeled the structure using 3D software to evaluate the stability of the buildings. The column grid arrangement consisted of 24.0m x 15.0m grid with 12m high columns. Long span transfer beams were used at roof level to support the pre-stressed four degree pitched roof beams spanning at 7.5m intervals.

### Conclusion

Precast concrete is the way forward in construction. It has evolved from simple modular components such as stairs and floors, through to complex multi-storey solutions, which can manage to maintain their simplicity from a production and installation perspective. Careful planning and design enables the use of easily produced components in architecturally challenging designs.

Apart from safety, the most critical aspect of successful precast construction is the initial design concept. At an early stage a close working relationship was developed between Bymac's designers and Concast's team to ensure the most cost effective solution was developed. This ensured that all the advantages of a precast solutions were identified and a precast design approach was adopted from the outset.

### Project Team

**Developer:**

BYMAC Project Managers Limited

**Contractor:**

Cormac Building Contractors Limited

**Architect:** John Duffy Design Group

**Structural Engineers:** Muir Associates

**Precast structural frame system:**

Concast Precast Group

**Precast cladding:** Techrete