

Xilinx Asia Pacific Headquarters Singapore

Project

6-Story Headquartered Building with 1 Level of Basement Car Park at Changi Business Park

Client

Xilinx, Inc.

Assignment

Design & Construction Oversight

Introduction

Xilinx Asia Pacific Pte Ltd (XAP), a subsidiary of Xilinx Inc. is expanding their operations in the region and proposed to build their new Asia Pacific Headquarters at Changi Business Park. Xilinx Inc is a fabless semiconductor business and is the leader in programmable logic devices with 50% of the world market share. Ever since it was listed as a Fortune 100 Best Companies to Work For, it has continued to strive for this benefit for its employees. In the brief to DeHart Consulting, space efficiency and sustainability is a core design consideration. As DeHart Consulting (DCI) is familiar with designing and building manufacturing operations workspaces, having designed several other similar spaces, it was an added value which DCI can provide to Xilinx with confidence.



Building data

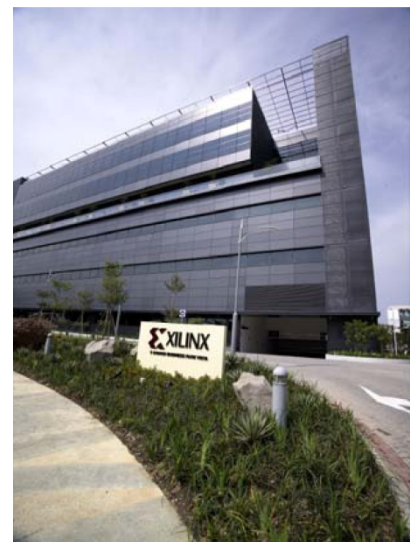
The building is designed to house 3 main activities:

- 1) Warehousing
- 2) Test Floor and Labs
- 3) General Offices

In general, the offices and circulation areas and facade are designed to Grade A office requirement with quality finishes. The building façade is fully clad in aluminum composite panels and double glazed low emissive curtain walls, thus reducing heat into the building. The building is rectangular with 6 stories and 1 level of basement car park. It has a gross floor area of 222,000 sq ft and a total build area of 290,655 sq ft. It is equipped with the latest BAS and facility management system, environmental controls and initiatives with power and air conditioning back-ups.

Four labs were designed for semiconductor final testing, engineering, and reliability testing. They were designed to RH45-55 21 degrees \pm 1.5 degrees with anti-static vinyl floor tiles. DCI was responsible for analyzing production rates, capacity, and engineering requirements to assure that the resulting design was capable of meeting the needs of XILINX's 5-year forecast and new product development plans.

The warehouse is air-conditioned with RH control at 21 degrees \pm 1.5 degrees and designed to accommodate the capacity for all products manufactured by Xilinx for world-wide distribution. The building is a conventional reinforced concrete structure with a typical floor to floor height of 4.5m. The warehouse is 6.2m high.



Parking

Approximately 200 lots of underground car parking space are provided. Most of the parking is hidden from the surface so that the whole development resembles a town centre.

DeHart Initiatives

The warehouse is designed with automation in mind with direct material handling conduits to the production floor. Smart features such as air flushing, light management system and intelligent environmental features provide a productive working environment. The use of interior windows with views of water features and selection of locally made materials give the environment a tropical feel.

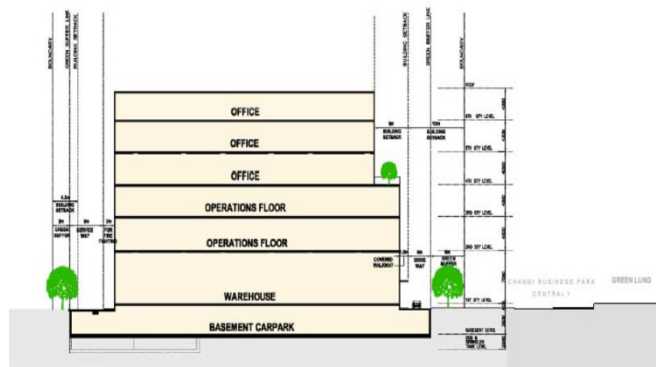
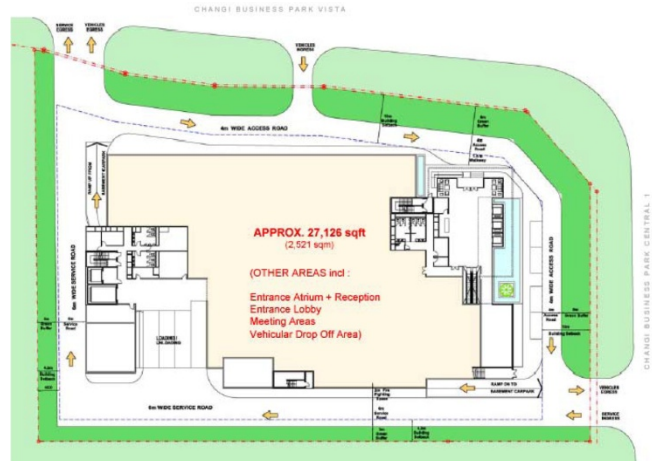
The Deal

XAP proposed method of delivery is as follows:

1) **Stage 1** – To directly engage a group of local and overseas consultants to carry out frontend design and feasibility study to determine the design and cost of constructing the headquarters in Singapore.

The Team engaged by XAP are:-

- SOM – Program Manager
- Bovis Lend Lease – Management Contractor and Program Leader
- RSP – Architect and Structural Consultant
- SquireMech – Mechanical and Electrical Consultant
- DWP – Interior Designer
- DLS – Quantity Surveyor
- DeHart Consulting – Industrial Design Consulting



BLL and DLS provided a cost estimate based on the design generated by DCI. XAP submitted the program, proposal and cost to the Board of Directors (BOD) for approval.

2) **Stage 2** – Subsequent to BOD 's approval, DCI completed Design Development for over 75,000sf of industrial space. Xilinx negotiated with DCI on a contract and were supportive and impressed with our design and specification of all facilities and control systems.

The project was awarded **Platinum Green Award** by Building & Construction Authority of Singapore, the first ever for a privately developed industrial facility.

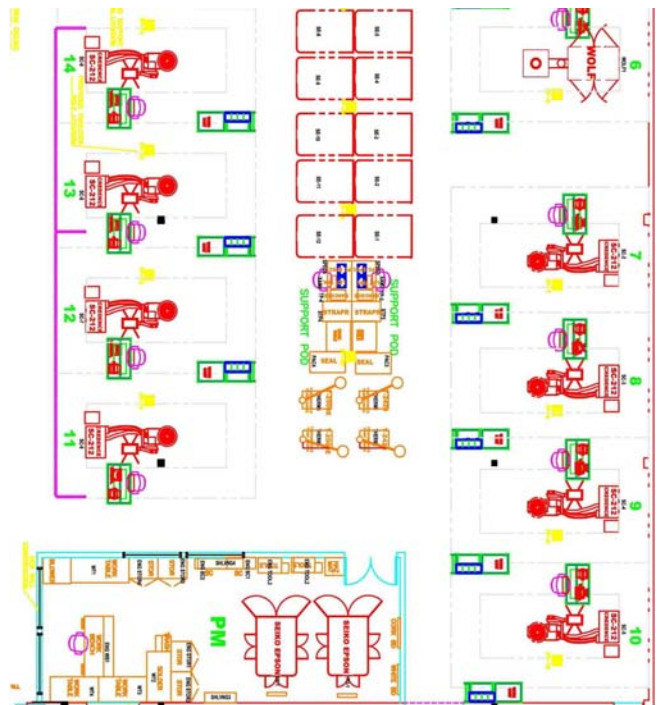
Operational Features

Tasked to ensure the incorporation of worldwide demand projections to Xilinx's headquarters, DCI proposed features that enabled a mere 1.1% increase in construction investment but reaps an expected \$500,000 savings each year.

Selected features include:-

Modular Production

DCI analyzed the footprints for a wide array of possible production equipment and proposed a modular production footprint that allowed operations the flexibility to exchange equipment without changes in floorplan or facilities. This



arrangement of sectionalized equipment footprints also enabled energy-saving lighting designs that were computerized to enable alternating lighting depending on the light flow in the building.

Novel Utility Delivery

DCI designed a modular utility pole that standardized the delivery of power, data, gases and vacuum as needed by each production module. This innovation reduced space requirements and facility costs, while improving worker safety and productivity.

Manufacturing Process

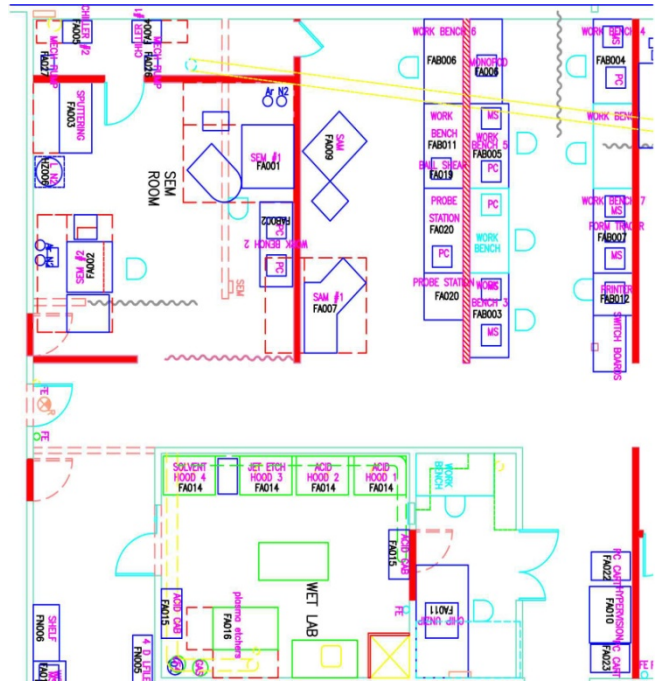
DCI proposed to incorporate convection furnaces into the manufacturing process to reduce batch sizes and improve process control. This eliminated individual bake-out ovens and reduced overall product cost.

Integration of Vertical Conduits

Conventionally, all material handling is done by human transport in facilities of this kind. However, our design incorporated floor-to-floor vertical lifts to transport materials without the need for additional labor. This reduced product costs as well as space requirements.

Engineering Support

DCI worked with the Operations and R&D engineering groups to develop access routes, equipment, and easements to assure the availability of needed infrastructure to engineering, while minimizing the compromise of operational efficiency.



About DeHart Consulting

DEHART CONSULTING consultants have served a wide variety of small and medium sized manufacturing companies throughout the United States. Our clients are involved in a number of different industries from electronics to sporting goods. Outlines of selected previous projects and testimonials of clients can be found at our web site at www.dehartconsulting.com.

DCI has worked with the full spectrum of companies from start-ups backed by Venture Capital companies like Menlo Partners and Fidelity Investments, to multi-national corporations such as Fujitsu and MCI Telecom. The firm specializes in the design, evaluation, and implementation of World Class Supply Chain environments, both captive and outsourced. These concepts have as their foundation the belief that a company's supply chain must be aligned to its technologies and market environment.

DCI's world-wide reach enables it to provide its services cost-effectively by providing services closest to the area of interest. The company has design engineering teams and contractors in Brazil, Belarus, and India as well as the US.

On the factory floor, we help clients re-design their manufacturing processes to shorten lead times; eliminate plant bottlenecks; and improve product quality. We help clients convert manufacturing processes from traditional systems, to world-class systems. We also have expertise in simplifying manufacturing computer systems and MRP. We are experienced in the design and implementation of ISO certification and related quality programs.

In virtual factory environments, DCI's consultants were designing outsourced factory processes before "outsourcing" became famous. We specialize in helping our clients align their support processes with their customers and developing seamless communication environments throughout the supply chain.

The firm's office is located in Camarillo, California.