

**Author:** Christine Hawley of Christine Hawley Architects  
**Research Output 2:** Pangyo Housing Competition

**Co-Author:** Andrew Porter

**Output Type:** Design

**Competition Design Entry for Building:** Pangyo Housing Competition

**Function:** Housing

**Location:** Pangyo, Korea

**Funding Body:** Korean Housing Corporation

**Dates:** December 2005 – February 2006

**Value of Award:** \$30,000

**Area:** 36,750 m<sup>2</sup>

## 300 Word Summary

Pangyo Housing, Korea: a \$30,000 limited competition entry (other competitors: Ken Yeang, Ben Van Berkel, MVRDV, Schiskowitz and Kovalsky, Mark Mack) for 350 mixed-type family units reflecting issues of sustainability and including vehicle, pedestrian and landscape planning, for the Korean Housing Corporation, 2005–2006.

### Questions/Aims/Objectives

(1) To develop a range of housing typologies to address evolving contemporary lifestyles.

(2) To locate 350 units with supporting infrastructure and achieve a fixed range/density on a terrain with multiple curvature/steep inclines varying  $\pm 30$  m N/S and  $\pm 27$  m E/W.

### Context

Historic developments in the USA/Europe have tackled the problem of building on precipitous sites, but these have been single dwellings responding to isolated topographic conditions. This proposal looks at standardizing 350 units each within highly differentiated terrain. This site presented particular technical problems since the regulatory framework governing density/access/orientation assumes optimum conditions – flat land.

### Methods

These included: (1) Full 3D modelling of the site; detailed examination of construction positions, permissible orientation, vehicular/pedestrian access; exploration of sectional options, mono-aspect planning, environmental control. The challenging site presented these usual investigations with three particular difficulties. (2) Access: major earthworks excluded through cost allowed only marginal adjustments to height/infill. (3) Open space/density: the precipitous site discounted many of the usual options for building location. (4) Variation/economy: a range of spatial typologies had to be organized with the most economic footprint.

The design responded as follows: (1) Producing innovative solutions to volume house-building and the particular challenge of standardizing a range of typologies within a highly complex terrain. (2) A horizontally and vertically interlocking block offered a varied model of six types, using double-height space to maximize views and moderate environment. (3) Environmental control was enhanced by inclined glazing and mobile stackable sunscreens.

### Dissemination/ Esteem

This was a limited competition including Ken Yeang, Ben Van Berkel, MVRDV, Schiskowitz and Kovalsky, Mark Mack.

### Authorship

Christine Hawley and Andrew Porter contributed equally to the research and design.

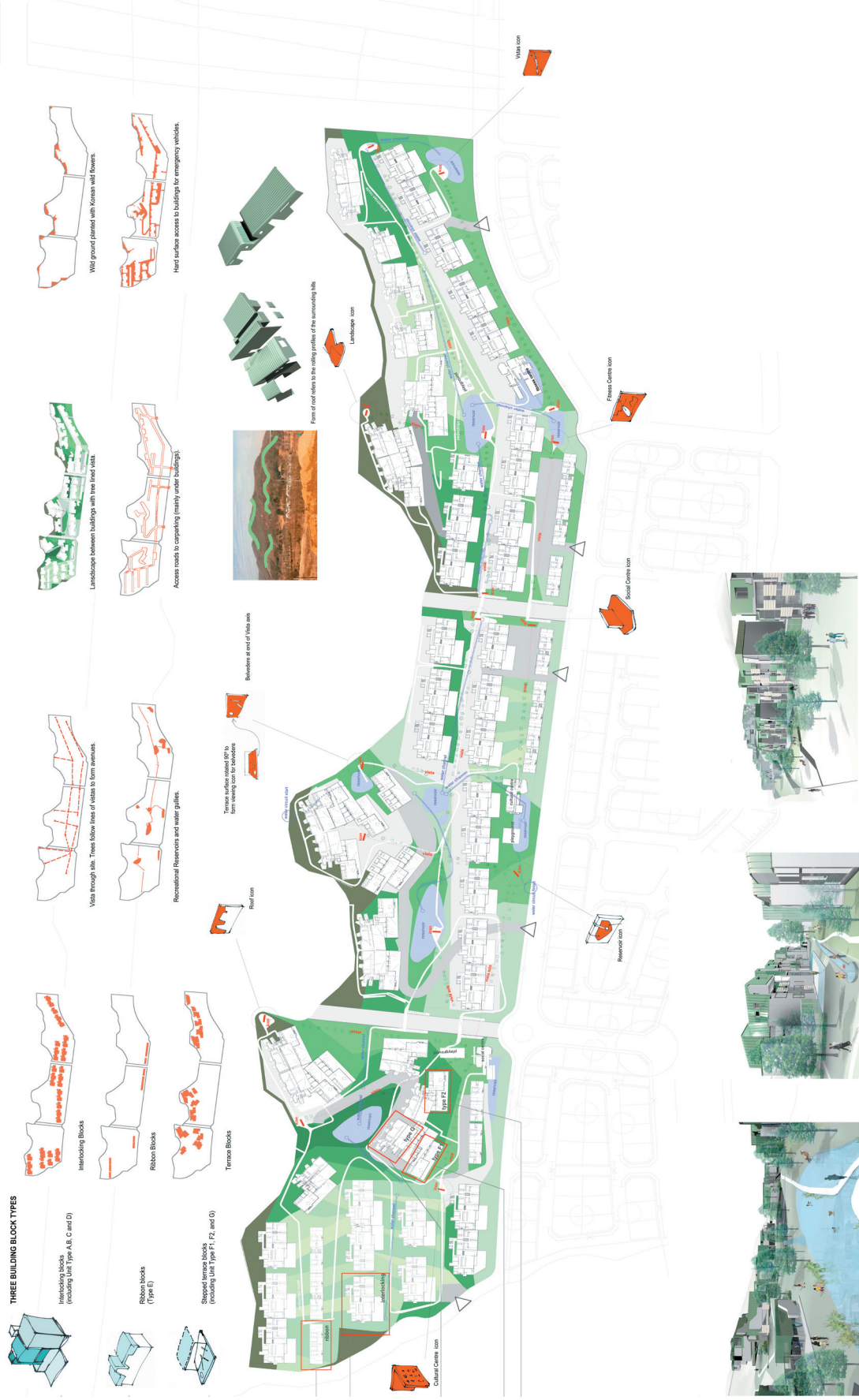


Image 1

## General Description

Pangyo Housing, Korea was a \$30,000 limited competition entry (other competitors: Ken Yeang, Ben Van Berkel, MVRDV, Schiskowitz and Kovalsky, Mark Mack) for 350 mixed-type family units reflecting issues of sustainability and including vehicle, pedestrian and landscape planning, for the Korean Housing Corporation, 2005–2006.

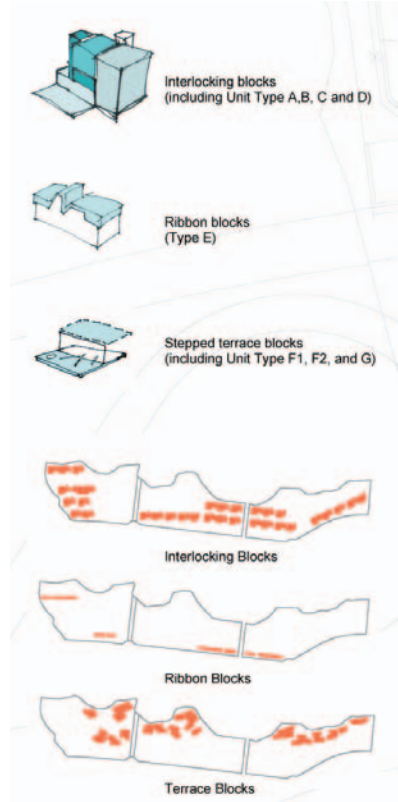


Image 2

## Research Questions/Aims/Objectives

- (1) To develop a range of housing typologies to address evolving contemporary lifestyles.
- (2) To locate 350 units with supporting infrastructure and achieve a fixed range/density on a terrain with multiple curvature/steep inclines varying  $\pm 30$  m N/S and  $\pm 27$  m E/W.

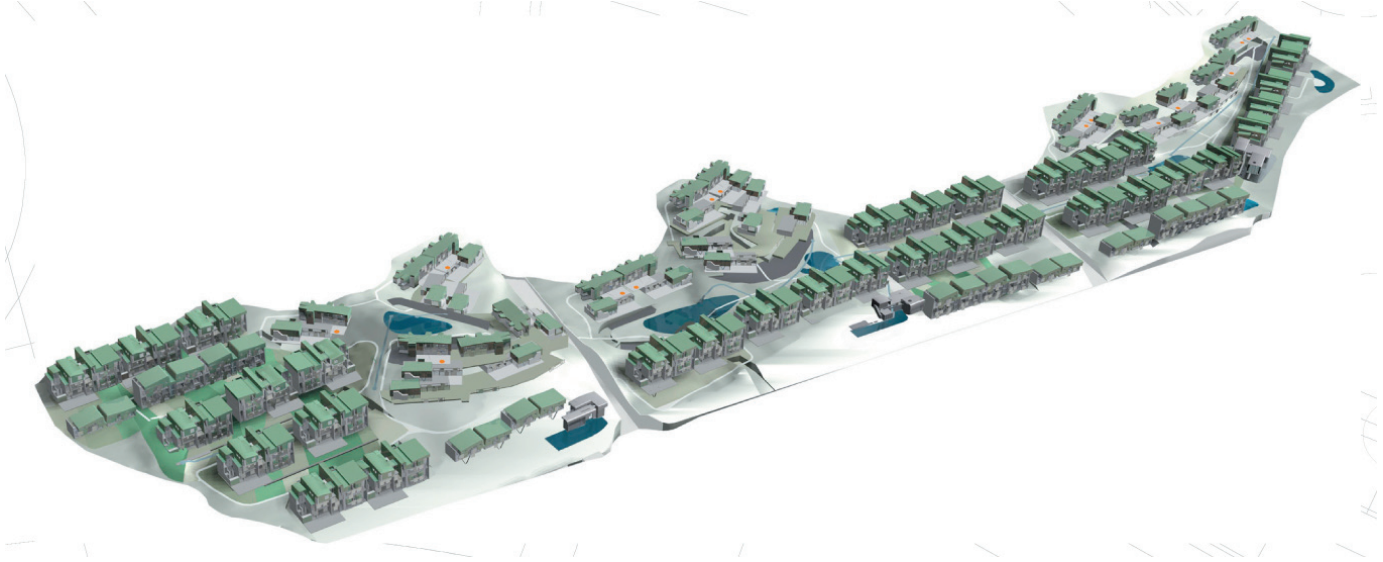


Image 3

## Research Context

There have been a number of historic developments in the USA and Europe that have tackled the problem of building on precipitous sites, but these have been single dwellings responding specifically to isolated topographic conditions. This proposal looks at standardizing 350 units where the terrain is different for every single dwelling.

The nature of the terrain with multiple curvature and steep inclines presented particular technical problems, since the regulatory framework that governs density, access and orientation is not site-specific and therefore pre-supposes optimum conditions i.e flat land.

The two major challenges for the design were first to create a domestic environment that addressed the evolving aspects of contemporary lifestyle and second to achieve a fixed range and density on exceptionally difficult terrain.

The design produces innovative solutions that address the challenge of standardization in a highly complex physical situation. This is its key contribution to new knowledge in terms of housing design.



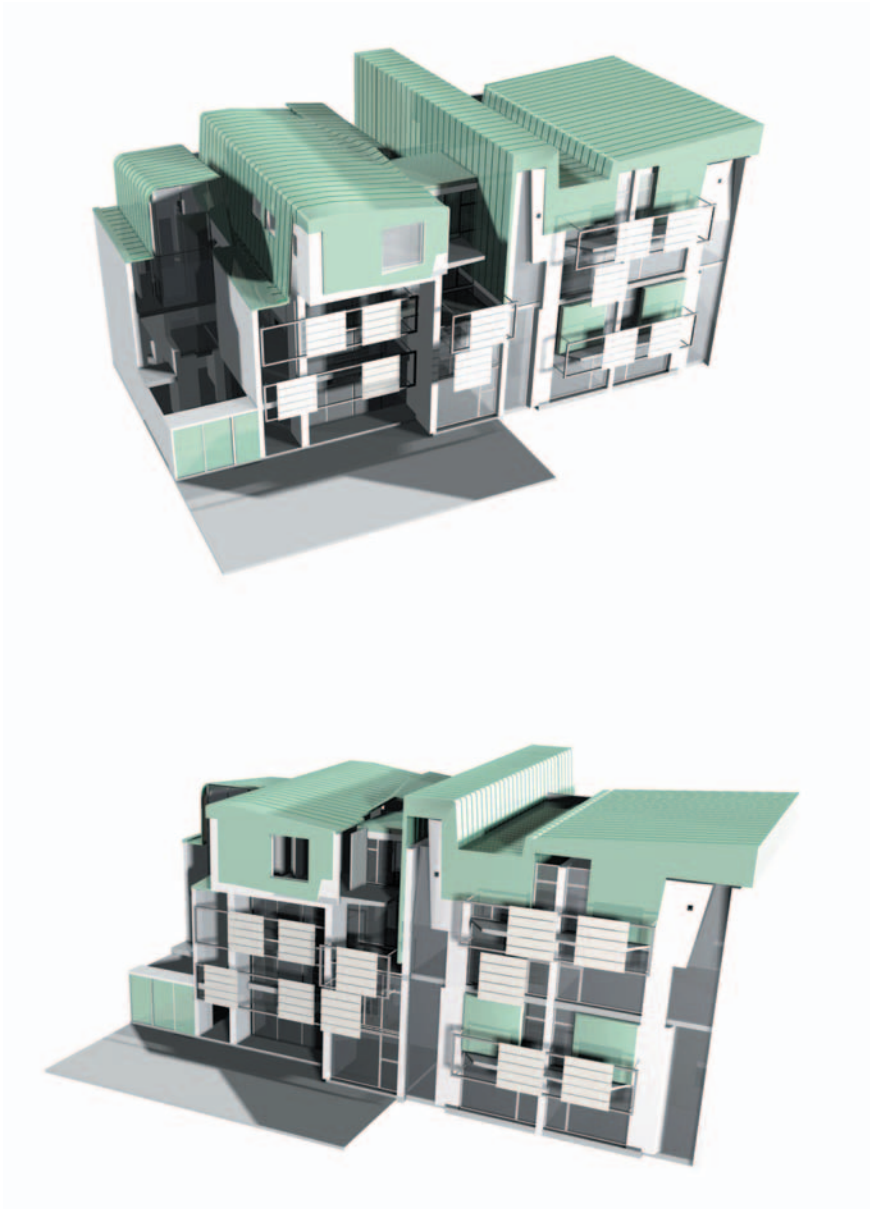


Image 4

## Research Methods/Design Proposals

The design process involved full three-dimensional modeling of the site; a detailed examination of construction positions, permissible orientation, vehicular and pedestrian access; and the examination of sectional options mono-aspect planning and environmental control. All these usual investigations presented particular difficulties due to the challenges of the site.

### Challenges

(1) Access: The first challenge was access. Major earthworks were excluded through cost, allowing only marginal adjustments to height and infill. Vehicular access needed to be modelled three dimensionally in order to understand the extent of land modification.

(2) Open space/density: The second challenge arose from the restriction of height. The relationship between open space and density is familiar however this was compounded by the nature of the site, which was so precipitous that many options for building location were effectively impossible.

(3) Variation/economy: The third challenge was to resolve how a range of spatial typologies could be organised with the most economic footprint.

### Solutions

(4) The major achievement was to accommodate volume house building on a site previously considered impossible to develop. The design produces innovative solutions to volume house-building and the particular challenge of standardizing a range of typologies within a highly complex terrain.

(5) A horizontally and vertically interlocking block offered a varied model of six types, using double-height space to maximize views and moderate environment. The other typologies were standardized with ground floor/basement and aspect modification according to site location.

(6) Environmental control was enhanced by the use of inclined glazing together with mobile sunscreens that allowed re-positioning according to the trajectory of the sun. These could also be stacked to allow the occupants the possibility of uninterrupted views.

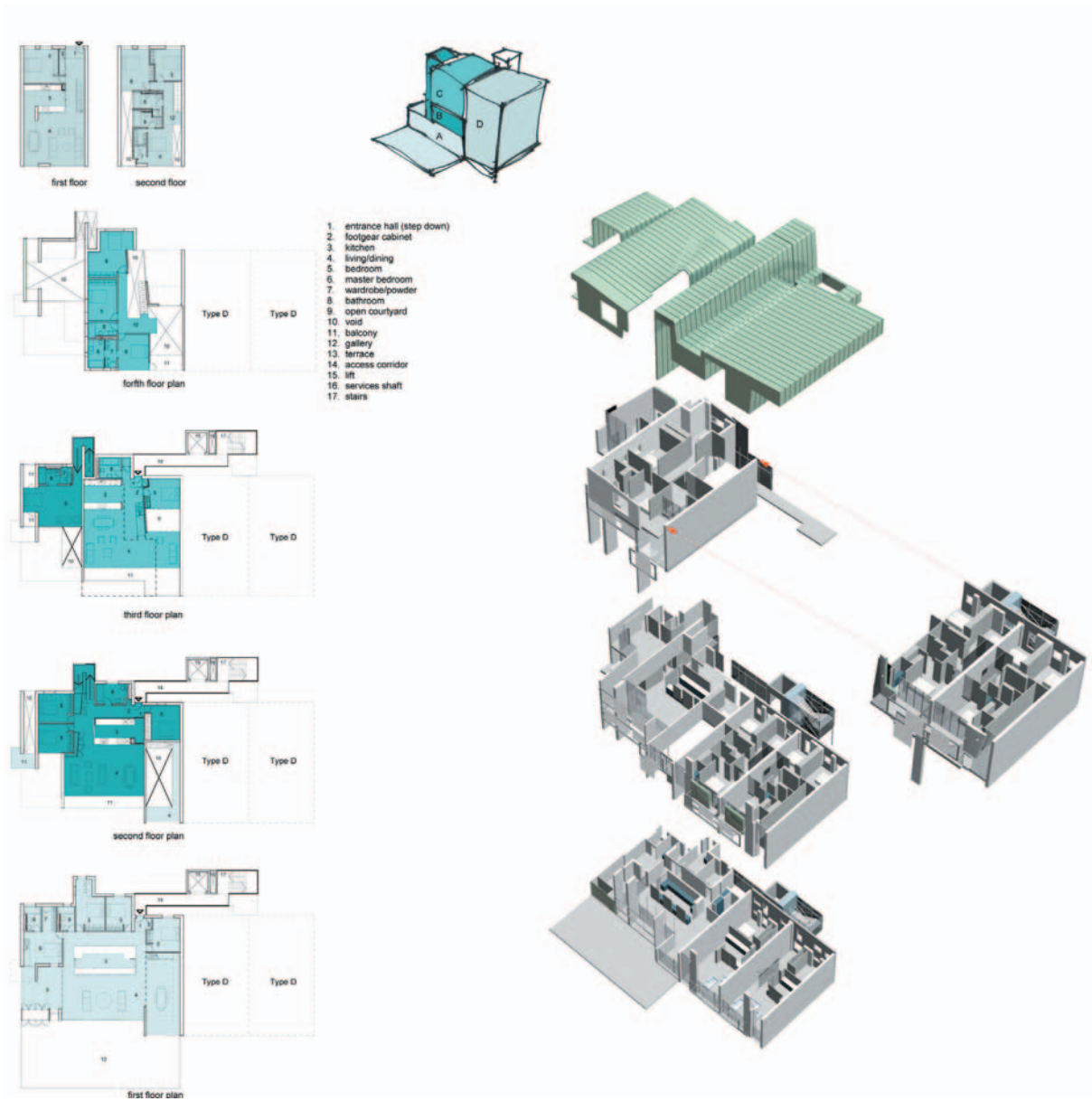


Image 6

### Block I

This vertically and horizontally interlocking block offers six different spatial typologies. The types range from one to four bedrooms, all with a south-westerly aspect.

The matrix gives an unusually wide variety of spatial organization, yet stays within a strictly controlled dimensional framework.

Many apartments contain double height space – to both maximize views, but also to accelerate ventilation.

An internal courtyard at the upper level brings height into the deep plan and gives additional mechanisms for cross ventilation.

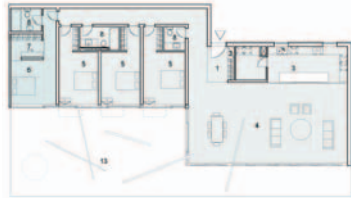
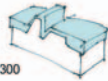
Construction is in-situ concrete giving increased thermal mass to minimize the risks of heat gain/loss.

Block I is raised on adjusted piloti to accommodate the variation of the ground plane and to provide sufficient space for car parking below.

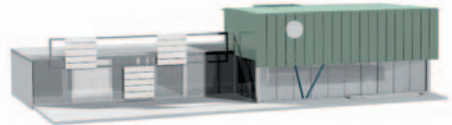
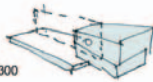
The ground condition is formed to both conceal the cars from view yet encourage accelerated airflow through the underside of the block, thereby mediating some of the effects of temperature and humidity.



Unit Type E Ribbon Development 1:300



Unit Type F1 Stepped Terrace 1:300



Unit Type F2 Stepped Terrace 1:300

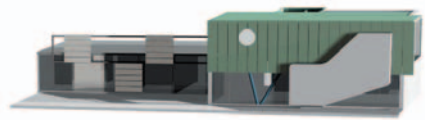
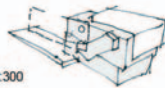


Image 7

## Block II

The northern (upper) edge of the site where the levels were particularly precipitous produced a mono-aspect solution. There was no opportunity to create a flat route and the building arrangement had to therefore accommodate a steep drop, with no rear fenestration.

Access to this type is from both from an upper or lower level road into a side access.

Both the living and bedroom accommodation face a large patio to maximize views and also use the sliding sun shield system to control temperature.

Additional ventilation is provided by a cavity wall system at the rear of the building – drawing in cold air from below. This is then linked to a lateral system of vents to optimize air circulation.

Construction is in-situ concrete.

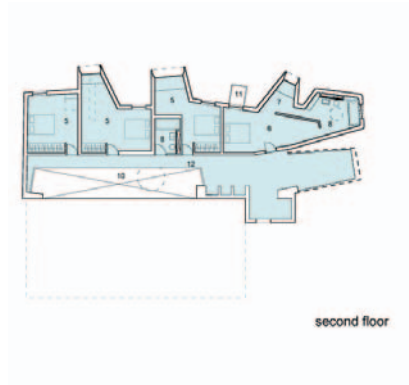
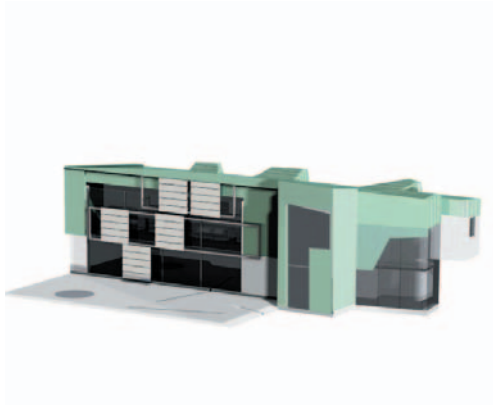
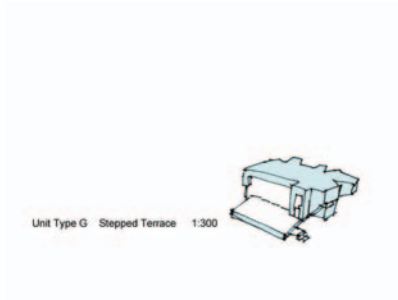
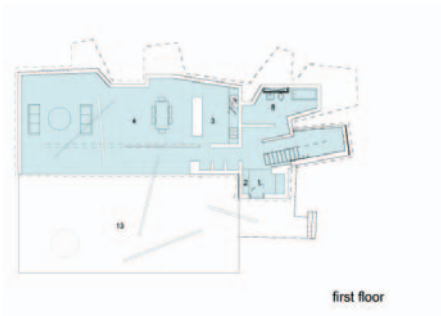


Image 8

### Block III

This structure provides large 4(5) bedroom types organized around a double-height living space. The bedrooms are situated along the north-eastern edge at gallery level – with views down into the living space and out into the landscape.

Small areas of fenestration are located within the rear wall offering natural ventilation.

Sliding partitions at ground level allow a range of configurations where the space can be sub-divided for privacy or left completely open.

Sliding sun shields are used to control heat and glare.

Construction is in-situ concrete.



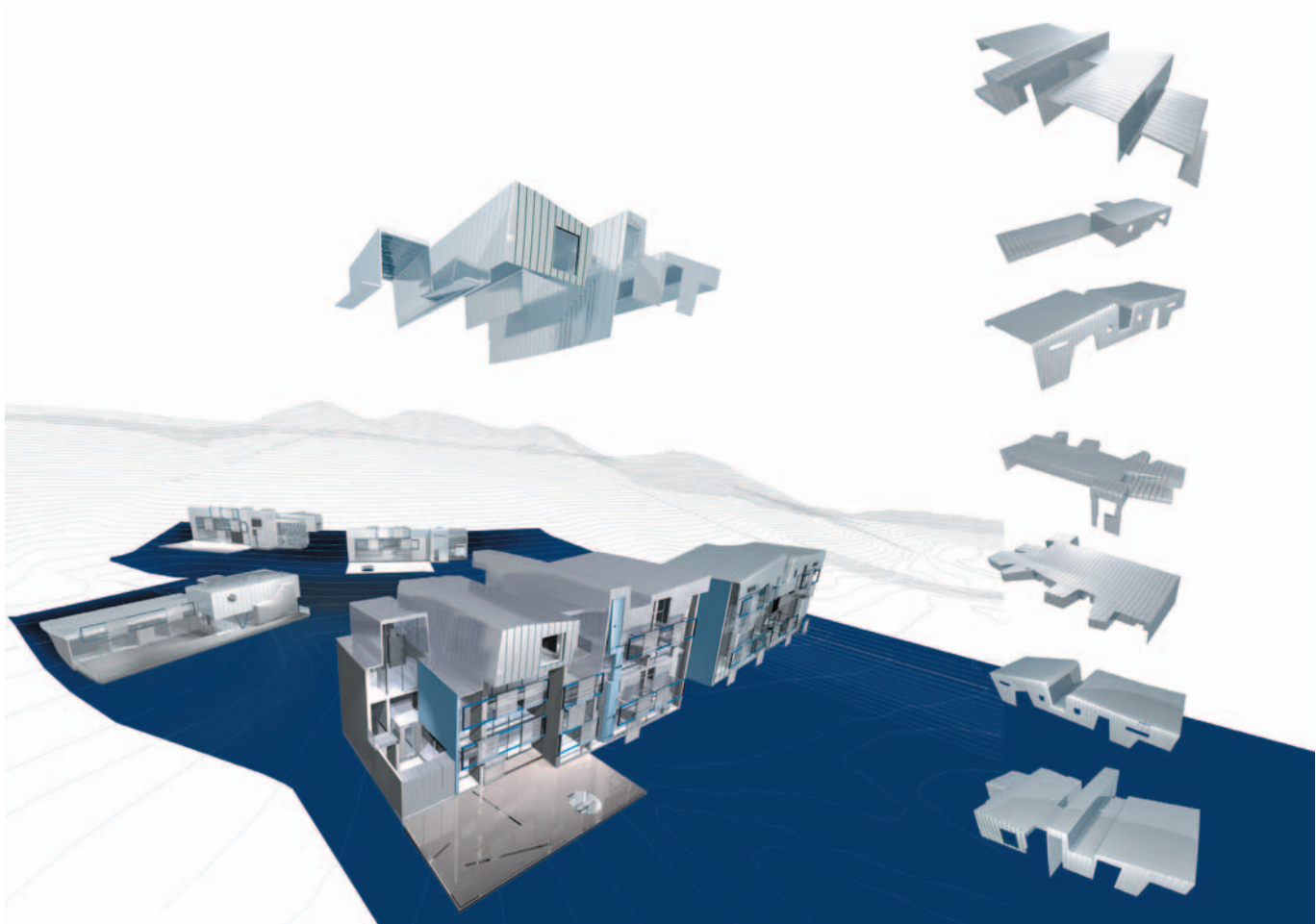


Image 9

## Landscape

The terrain offers the opportunity to create a range of environmental conditions and landscape forms an integral part of the concept. The large development is organized through an episodic series where water, shade, light, reflection and colour are arranged to echo aspects of Korean culture.

Water is both functionally important and a significant part of Korean culture. The position of a natural spring at the northern and highest boundary of the site, enabled gravity and cascade to be used to establish a system of small canals that both demarcate territory but also offer a series of sequenced routes through the site.

Water is controlled through a sequence of gullies that act as indicators of route, but also form a series of environmental habitats. The pedestrian routes through the landscape are orientated and planted to provide as much environmental comfort as possible, with consideration to local flora and seasonal patterns, orientation and sun paths. The spaces are organized to provide a range of experience, from those areas that offer seclusion to those that command exceptional views, to those that are seen as places for communal gathering.

The pattern of the landscape is designed to provide a controlled environment and one that leads the user through a range of natural spaces that complements the built environment.



Image 10



Image 11

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Image 12

## **Dissemination/ Esteem**

This was a limited competition. The other competitors included Ken Yeang, Ben Van Berkel, MVRDV, Schiskowitz and Kovalsky, Mark Mack.

The design was exhibited at Korea Design Centre, Bundang, Korea, 2006.



## Appendix 1: Related Articles by Christine Hawley

(1.1) Christine Hawley, the submission for *Pangyo Housing International Project Competition*.



