The score of Pendrecht
Giró, Héctor; Kegel, R.
Delft University of Technology (TU Delft), Netherlands

The study, which is briefly described here, springs from the significance of the analysis of a concrete situation and of beneficial experiments with spatial visualisations. The study is the continuation of several preceding studies and also related to teaching.

Pendrecht
In the study The lowest layer on top (De onderste laag boven, R.Kegel, 1996) Pendrecht is described in terms of its “green” compositional elements. The layout plan of the area, analysed in layers, shows the way in which the area was landscaped. The landscape, which is hidden within the plans like a puzzle, is represented in this study by schematic drawings. The ongoing study explores spatial visualisation.

Hand drawings and computer images
Experience of various media techniques has been gained in the studies Assignment and simulation (Overdracht en simulatie, J. v.d. Does and others, 1990) and The imag(in)ing (De verbeelding, J. v.d. Does and H. Giro, 1998). However, in the ongoing study we limit ourselves to hand-drawn illustrations in computer models, as traditional and modern techniques, and explore their significance and the opportunities for combining them.

Hand-drawn illustrations have a personal touch and are generally intended to give an impression of the subject. In particular, the loose character of a sketch, when supplementing factual images, leaves a lot open to the imagination. This has advantages in the initial stages of a design.

Computer images are based on precisely-defined 3-D models. With too little detail they appear dead, while too much detail in the early stages of a design project quickly gives the impression of a finished
design. On the other hand, computers offer the ease with which variations can be tested and the opportunity to accommodate different viewpoints.

These features make it attractive to combine the two visualisation techniques. The question is how and to what advantage?

**Objective of the study**
The objective of the study is the exploration of 3-D models of (green) compositional design features and the application of 3-D (combined hand-drawn and computer) visualisation tools.

The first point concerns the situation in Pendrecht, while the second focuses on adjustments to the design process of the initial phase, and in particular, on how greenery is illustrated.

**Focus points**
The study includes activities that on the one hand explore the 3-D model of Pendrecht and on the other hand examine the fusion of hand drawing with computer modelling, with Pendrecht the location in question. Special attention is paid to the technique for drawing trees.

- **Pendrecht, the district as a spatial composition** (figures 1+2)
  Translating the compositional elements described in the preceding study to 3-D visualisations in order to add value when compared to 2-D diagrams. Special attention is given to an arrangement that can be compared to the score of a piece of music.

- **Pendrecht, the district as a musical composition**
  A city district, a piece of music and a computer model can be well represented as layers.  
  Layers: giving opportunities for taking apart and (re)constructing the composition.  
  Size and rhythm in the appearance of the green elements in the district, leading to chords and melodies/themes

- **Trees**
  In order to import sketches of trees into a sober computer model
of Pendrecht, drawings are made and sketches of trees from literature are selected. In particular, pen-, marker- and chalk-drawings are made of 10 popular types of tree. Although the detail is limited, each type of tree is recognisable (summer and winter views).

The question is: “When can a scanned drawing be used in the computer, and what requirements must it meet?”

- Route images/Animation
  By compiling layout data, a visualisation of the routes of Pendrecht is made. Components include:
  - maps representing buildings and greenery
  - the height of the greenery
  - the height of the apartment blocks and single-family dwellings that make up the residential entity
  - based on its “green” composition, each route is represented musically
- low-level viewpoint (eye-level), an animation using images with a central perspective, synchronised with music and using scanned drawings in the 3-D computer model.

**Software**

The software used in this study: Maya, Adobe Photoshop, Anvil Studio, Adobe Premiere, Adobe After Effects.

**Pendrecht, the district as a spatial composition**

Pendrecht is a post-war example of New Building (Nieuwe Bouwen), a movement that stresses building in and with space. Pendrecht has been discussed in detail many times already in terms of social and architectonic developments. The "green" developers of the plan are Boer, Rahder and Schilperoort. As urban planner, Lotte Stam-Besse has also made “green” designs.

Because landscape architects played a definitive role in the design process, attention is focused on those elements and on layout principles that are characteristic of the urban building plan with regard to the landscape and urban “green.” Therefore a special effort was made to gain an insight into the compositional elements of the landscape by analysing and interpreting ground plans.

The compositional elements are briefly summarised as follows:

- Pendrecht is an independent spatial composition (figure 4)
- Divided into district, neighbourhood and living-unit levels -- levels 1, 2 and 3 respectively -- the “green” compositional elements contain at:
  - level 1, a non-classical cross-axis of waterways (figure 3)
  - level 2, no “green” in the neighbourhood; this layer is empty
  - level 3, a rhythmic arrangement of communal gardens (figure 6)
- The “green” compositional elements are concentrated in layer 3, at the living-unit level. At that level, there are “green” units which are repeated like stamps, in a similar way to the living units. (figure 5)
- When the “green” elements are seen as planes (communal gardens), lines (rows of trees) and points (groups or single
trees), a compositional relationship that falls into line with modern theories of art and space is evident.

- The communal gardens are for everyone to use
- The linear planting pattern is repeated in the north-south residential streets. Lone trees mark the entrance to streets locally.
- The Italian poplars (belonging to the communal garden) that connect the communal garden to the residential street have a structural significance that extends to district level. Their position and size means that Pendrecht can be classified as an urban 'coulisse' landscape.
Pendrecht, the district as a musical composition
Architecture and music are independent expressions of art. However, architects and composers have often sought overlaps between the two disciplines. Size and rhythm, space and time are relevant concepts, which can be represented in diagrams, but also as feelings and images.

Far-reaching manipulation of Pendrecht open up possibilities for using other types of notation. Thus arrangements of data about Pendrecht can be viewed as a piece of music. By representing communal gardens and greenery in a way that corresponds to musical notation, as an interpretation of the composition, the "sheet music" of the area can be created. The arrangement of the various characteristics
(instruments) can be regarded as the musical score of the composer. This study attempts to imagine Pendrecht as a 3-D score in combination with visual-spatial experiences. (figures 7+8)

The green areas designated as planes, lines and points can form the notes in the musical notation. Just as they do in the spatial composition, the Italian poplars remain the dynamic accents in the musical composition.

The north-eastern quadrant of the district forms the most consistent, ideal-typical division of the land. The spatial arrangement of communal gardens in zones is the starting point for more manipulations.

The spatial composition, of the north-eastern quadrant and hence the whole district, represented in musical notation places the gardens at b, d and f. Due to the correspondence between the spatial and
tonal distances, a relationship with the B-minor key is conceivable. (figure 9+10)

The translation of street trees into notes (a sort of minimal music) is based on the relative size and position of the trees.

**How trees are represented**
The trees are hand drawn and digitally manipulated in 3-D. Sketched trees are shown in 2-D (flat). The image can be a view or a silhouette, but the drawing technique can also cause a spatial illusion. In a computer model, a flat tree viewed in a close up or from changing positions (movement), can cause problems. By playing around with the flat images in the 3-D computer model, it is possible to compile a sufficient number suitable trees, certainly for the drawing phase of a building or complex of buildings, where only an impression of the environmental features is desirable. The combination of three planes gives the illusion of a massive tree. When viewed from above, every tree looks like a star in the computer model.
The practically upright trunk in the flat drawing of the tree is important so that the combination of sketches gives the illusion of a tree with one trunk. When combining three similar images it is advisable to start with an asymmetrically flat image to reduce pseudo-symmetry to a minimum. It is also advisable by placing the trees in a row or a group to arbitrarily turn the star on the map, which produces a more lively spatial image. The trees, regardless of the technique used in the computer model, can be given a certain degree of transparency, if required.

At the moment focus is given to experience gained in using hand-drawn trees in computer visualisations. With what minimal amount of work can maximal effect be achieved? These experiences lead to recommendations regarding illustration and manipulation techniques and the compilation of an archive of trees.
The illustrated trees have the following characteristics:

- Types: 10 street trees and some stylised trees (Figures 14-23)
- Seasons: summer and winter
- Colour and black-and-white
- Coarse and fine: The distinction lies in the choice of drawing equipment. All the trees of the same type are drawn the same size. Finely drawn trees are not drawn so that the shape of the...
leaves is recognisable. It is still just a sketch in the sketch plan of a built-up area.

- Drawing equipment: pen, fine liner, (coloured) markers, (coloured) chalk.

**Route images**
The routes that shown are situated in the north-eastern and south-eastern quadrants of Pendrecht. The images are compiled from a computer model of the buildings viewed at eye level and using
Figures 14-23
scanned and manipulated drawings of trees. (figure 11+12)

While moving along the route, not only the “green picture” that is immediately visible is shown: by giving the building blocks a certain transparency, the greenery in the next area is introduced and the relationship is shown. In the animation, the 3-D images are interchanged with 2-D images of the area and drawings of the trees. The images are synchronised with the music, which is a transcription of the green composition. (figures 13)

Moving through the model, the trees give a realistic impression, even though they are drawn with a good deal of reduction (for example, there is no shape to the leaves). (figures 24-25)

The 3-D representation is just an evaluation of the layout plans and analytical diagrams developed in 2-D. It is a model that offers the opportunity to display and to test the spatial effects of ‘green’. Likewise, there is also the matter of testing to assess the usefulness of the applied techniques and the value of the data.

References
Does, J.van der, A.van Haaften, R.Kegel, R.Vrins; Overdracht en simulatie; Delft, 1990
Does, J.van der, H. Giró: Imag(in)ing, a fresh look at design, presentation and communication; Delft, 1999 (Dutch edition 1998)
Kegel, R; De onderste laag boven; Delft, 1996