

**Publishing Zoning/Development Plans and relevant relating Information on the Intranet**  
***An Application to assist Urban Planners of the City of 's-Hertogenbosch***  
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## **1. INTRODUCTION**

In the Netherlands space is a scarce commodity. All kinds of land use, i.e. housing, commercial activities, industry, nature and infrastructure, put claims on the available space.

For local urban planners, zoning plans are by all means the official lawful tools to bring all these claims together and balance them.

Because of the vast amount of different interests, regulations and impediments, the making of a new zoning plan is a time consuming process. Hence the risk exists that a new zoning plan is already out of date at the moment it becomes effective, since private initiatives anticipate on the current situation.

To speed up the process of making a new zoning plan, making it more efficient and to avoid omissions of important regulations and impediments, an intranet application is being made.

This application shows all the current and historical zoning plans and all other relevant spatial themes for a specific location or area.

The second reason for developing this application is that for the verification of proposed building plans the testers of these proposals need the same information.

And finally, the last reason is that exact knowledge about the current plans, impediments and regulations was only available in the minds of few older people in the organisation and mostly only available in paper form. This involved a high risk, since citizens could be informed with wrong or incomplete information. If a citizen suffers financial damage because of that, the city government can and will be claimed in court trial.

Making all the important information available in one application reduces the risk of claims to a minimum.

The application is implemented and accessible on any computer in the organisation via the Intranet. Plans are to make this information available to everyone via the Internet.

Selections can be made by clicking in the map or by selecting different administrative, geocoded features, like address, parcel number or by specifying the name of a plan in the process of formation.

The nice thing about this application is that it provides information of anything that is of interest, even when it is not visible in the currently displayed map.

The uniqueness of the project is that it is divided into three stages, where each stage provides a working solution and the next level is an extension to the previous, therefore minimizing the risk of loss of investment.

In this paper, the setup of the project is discussed, together with a description of it's functionality, the technology used, some organisational aspects and finally some conclusions that can be made after being operative for almost a year now.

## **2. A THREE-STAGE PROJECT**

### **2.1 The reason for this project**

This project has two commissioners, the Urban Development Department and the Building Department.

The Urban Development Department creates new development and zoning plans for the city. The planners need information about the current and past plans to be able to study the historical evolution of the area of interest. They also need information about all impediments and additional regulations that are in effect within the community boundaries, i.e. industry noise zones, drinking water protection zones, (potential) archeological sites, soil pollution areas, global urban planning directions from higher governmental institutes, high voltage electricity cable zones, telecommunication transmission zones, protected historical areas and so on.

Until now, this information was scattered around different departments throughout the organisation and mostly not available in digital format. Gathering the appropriate information for their new plans was therefore a time consuming task and slowed down the process of the creation of a new plan.

Besides that, because of the spread of information, there was a great risk that important information was left out or not thought of. This created a potential of severe claims by civilians and therefore the obligation to appear in time, capacity and costs consuming law suites.

In one case, the city had to buy some parcels and buildings back from a developer to avoid a not wanted urban development, because the city thought that a war rebuilding plan had the same status as a zoning plan but in a law case, the judge decided the opposite. It costed the city several million Euro's, money that otherwise could have been spend in a more effective way.

The Building Department tests proposed building plans by the current zoning and development plans, building regulations and impediments. Their information need is basically the same as the urban planner's need. Lack of proper information could and has resulted in granting building plans that on second examination afterwards, but unfortunately too late, would not have been granted.

Both departments have a mutual interest in having the right information at the right moment as fast as possible at their fingertips. Therefore it was not more than logical that both departments acted as commissioners and fund spenders for this project.

## 2.2 The setup of the project

At the beginning of the project, autumn 1998, the end goal was clear: it should be possible to find out the exact allowed development for any place in the city, no matter from which development or zoning plan it originates, including all the impediments and additional regulations.

However, since most of the information was only available in an analogue format and a clear overview of all zoning and development plans in charge, together with the impediments and additional regulations was not present, the project team decided to use a three-stage graduated approach, where each next stage of the project is an extension to the previous one. Besides that, when a stage was finished, it should deliver a working and practically useable application.

The reason for the latter restriction is, that if it turned out that a next stage was, for any reason, either technically or organisational not feasible, the project could be stopped, leaving a working solution and therefore minimizing the risk of loss of investment.

Another important reason is that this approach leaves room for adopting new technologies, since this project was predicted to be of long duration (which turned out to be the case).

### The first stage

In the first stage the boundaries of all ever published zoning and development plans are digitized together with the current impediments and additional regulations.

The boundaries are linked with a database that holds administrative information about them. The most important information is the reference to both the official paper file and the copy of the paper file. Copies of this paper file are placed in several cabinets spread amongst the different locations of the different departments who need access to this information.

The application shows for a given location both the current development plan in charge as well as the historical plans (the latter needed for the development of new plans), together with the impediments and additional regulations.

### The second stage

In the second stage, the first stage is extended by being able to have access to the files of the development and zoning plans in a digital form. This way, the information of the system is accessible at any computer at any office location.

To accomplish this, all the paper files of zoning and development plans are going to be scanned. A process that is already in progress. The application will be extended to be able to show the scans of both the drawings, the booklets and the official approval documents on the screen.

Note: the impediments and other regulations are from the beginning being made available in a digital form.

### The third and final stage

In the last stage we will have reached our final goal. The second stage is extended by being able to find out the exact allowed development at any given location within the city boundaries, together with the impediments and additional regulations.

This stage is a bit different from the previous ones, since at a certain moment in the nearby future, a time line will be drawn. Only from the plans that are at that moment still in charge, the allowed developments will be digitized. The reason is that digitizing all the historical allowed developments is too much work compared with the amount of times this exact historical information is needed. It is simply not cost effective enough.

When this stage is finished, a mixed situation has evolved. For the plans that are older than the time line, only the scans can be reviewed together with the exact location of its boundaries. For the plans newer than the time line, all the information will be available.

Still, as time passes by, still a historical database of exact allowed developments will be automatically build up.

## 2.3 The current situation

At this moment the first stage is about to reach its final status. Some impediments still need to be added together with information of development and zoning plans which are under construction. In spite of that, the application is already heavily used by both departments.

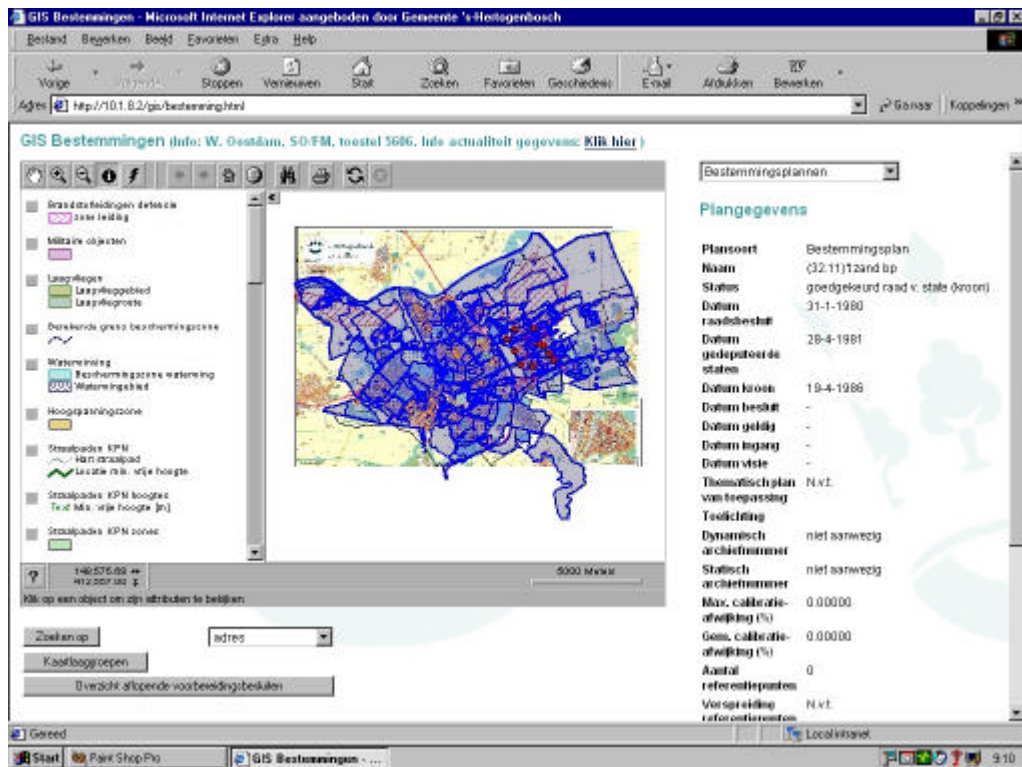
Also the scanning of all the paper files is in progress at full speed. Expectations are that in the middle of 2002 the extension to stage one, that is, the development of stage two can begin.

## 3. FUNCTIONALITY

Besides normal functions like zooming and panning, the application offers various ways to retrieve information, either by clicking on a spot in the map or by entering an address, parcel number, postal code or the name of a project. All these methods use a point search, except the last one, which performs an area search: "Find all the subjects of interest that fall within or intersect with my project area (i.e. a new development plan)". The boundaries of the project areas are up front, provided by the project leaders, entered in a separate map layer, together with the name of the project. Selecting a project name therefore selects an area which is used as a search criterion.

Finally a general find-tool is available which can be used to search on any attribute value of an object in any of the selectable map layers.

The figure below shows the webpage after clicking on a spot in the map.



Since the application's focus is on zoning and development plans, always first information is shown about the current plan in charge to the right of the map window. Buttons indicate whether there are older plans for that location. If so, the user can browse through the information about them.

On top of that part of the screen, a listbox is shown. The number of items in that list depends on the number of impediments and additional regulations that are of matter for that location. By selecting one of the items, detailed information about it is shown and the map automatically zooms in on the selected item.

This behaviour of the application ensures that for any location in the city the user has always the complete set of plans, impediments and additional regulations, therefore minimizing the risk of omissions.

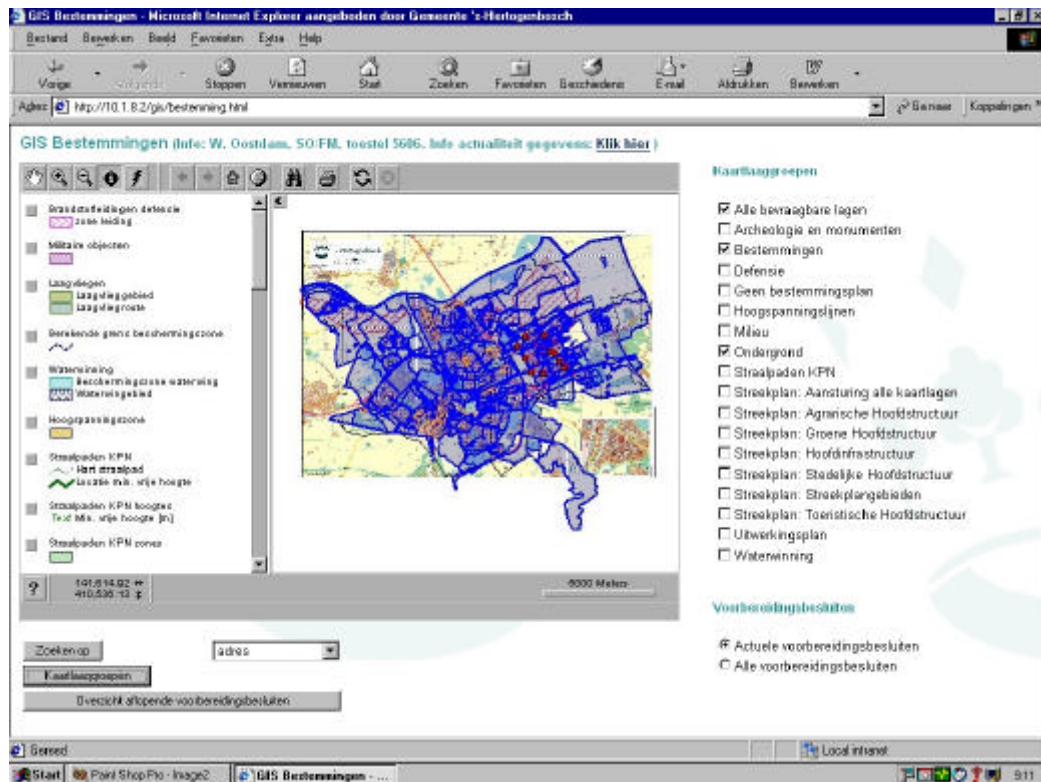
The neat thing built in this selection behaviour, is that a selection always shows all the information at a certain location, even when the information itself is not visible in the map. This is possible because the software used allows a map layer to be invisible but still be selectable.

The other way around is also possible and is used for the topological background, needed for geographical reference. This information is always visible, but not selectable. Depending on the zoom level, more or less detailed 'background' information is shown (zoomed display).

The user has the ability to turn on and off the visibility of all the map layers individually, except for parcels and topography. But because the large amount of map layers (35 now and finally about 43), the application provides a means to control the visibility in a more user friendly way. First of all, when first started, the application shows an initial display of cartographically balanced maps. A special button at the bottom of the page provides the user access to a page with so-called 'map layer groups'. In a database table map layers are grouped together into groups that logically belong together and assigned a unique name, i.e. all the environmental layers or all the military layers. These group names are displayed in a list in the page mentioned above. By checking or un-checking a box in the front of a group name, the user can turn on or off a whole group layers at once.

This mechanism also partly solved the cartographic problem that arose having to deal with displaying this large amount of map layers at the same time. It turned out not to be feasible. Instead, we ensured that each group of map layers is presented in a cartographic decent way.

Of course, when the user chooses to turn on all the map layers at the same time, the map window still will show a cluttering of information that isn't 'readable' anymore. The figure below shows at the right the list of map layer groups.



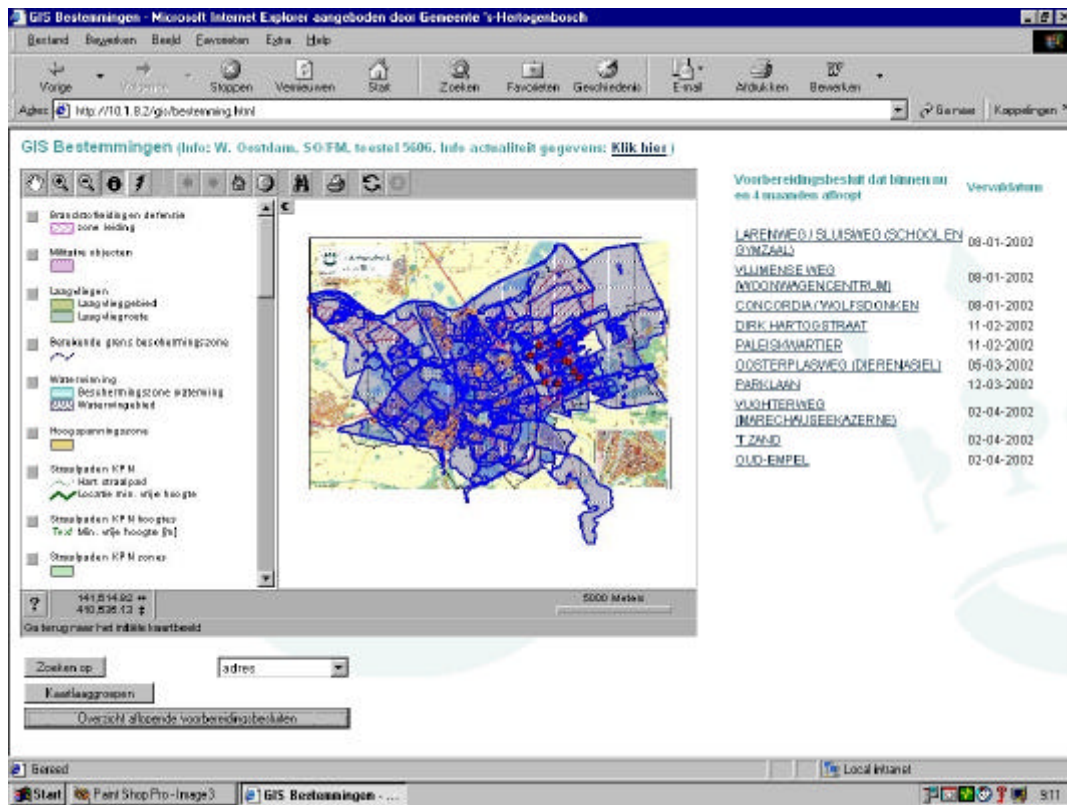
The second reason for adding the functionality of map layer groups is that a standard functionality of the used software allows a user to hide the map legend and thus enlarging the map window. The map layer group functionality therefore provides a means to be able to use the maximum map window size and still being able to control the visibility of the map layers. Otherwise, without this functionality, the only way to control the visibility of a map layer was via the legend. This would have resulted in the need for a constant switching between showing and hiding the legend, which every time needs a reload of the map window contents and therefore results in the reduction of the performance of the application.

A special functionality was added on behalf of the urban planners. They need to manage and have overview of so-called 'preparation decisions'. This is a typical Dutch legal phenomenon. It is a document that allows a building activity at a certain location, anticipating on a new, however not yet ready new zoning or development plan. The current plan in charge however does not allow this building activity. If this activity has such an importance, that it can't wait until the new plan is in charge, a 'preparation decision' can be taken. However, such a decision is only valid for one year. Especially with large projects, this span of time is often too short. Therefore after one year and if the new zoning or development plan is still not ready, a new 'preparation decision' needs to be taken, otherwise the building activity would be against the law.

To be able to keep track of preparation decisions who reach their legal deadline, the user has with a click on a button at the bottom of the page access to a list of all the preparation decisions whose deadlines are between the current day and the next four months, the time it needs to make a new preparation decision.

By clicking on an item in this list, detailed information about the preparation decision is shown and the map zooms in automatically at the boundary of that item.

In the figure below at the right side of the screen the list with preparation decisions whose deadlines are between now and the next four months is shown.



#### 4. ORGANISATIONAL ASPECTS

To complete the task of developing this application a project team was formed. Members were representants of the future users and the author him self.

This team formulated the technical and functional demands, choosed an appropriate software developer and managed and conducted the application development and the building up of the data.

It took only 2 months of software developping. Building up (digitizing) the data took two persons fulltime more than one year.

To promote the use of the application by the collegues of the Department of Urban Development and the Department of Building a public relations campaign was organised. Seminars were being held where the application was demonstrated and face to face training sessions were held. But the most difficult part was to convince the elder collegues and the always present sceptics to rely on the system, instead on their memories and knowledge in their minds. To accomplish this, the project group gave a commitment on the reliability of the system and therefore enforcing the trust in the system.

To ensure this reliability, the managers of the application ensure that the information provided in the application is always up to date and without any errors.

When an user finds an error (or thinks he/she has found an error) and reports it, immediate action is taken to solve the error. All the other activities of the managers are put aside for this. An answer to the error is provided within the as soon as possible.

Secondly, procedures for the data management for all the different kinds of information (map layers) in the system were being written, followed with great accuracy and reported to the users by means of a simple metadata-sheet that is accessible from within the application.

Finally, any update or change to the application is reported via internal email to all the users. A log of all these mails is also accessible from within the application.

The weakness of this application is the dependency on the information that is provided by other departments or external organisations and companies. Although in the procedures for updating the data, agreements are being made with the owners of the information, if for some reason, they can't comply to the agreements, the managers of the application have a problem (which is reported to the users).

On the other hand, making these agreements has a positive influence on the actuality and completeness of the data of the providing departments and external organisations. At the least they become aware that being up-to-date is not only important for themselves, but also for others. It tickles them to put more effort in the accuracy and reliability of their own data, which they need for their own work also. If necessary, payments are made to enforce the delivery of up-to-date and accurate information. Luckily, until now, this was not necessary.

## 5. TECHNOLOGY

### 5.1 Current situation

This application is an intranet application, accessible from any computer in the organisation. Plans are to make it accessible for everyone through the internet.

The application is developed on ArcView 3.2 together with ArcViewIMS. The reason for this choice is that at the moment the project was in a stage of selecting appropriate software, there was only one company that had something on stock that came close to our program of demands and that was able to read our standard CAD-format, which is MicroStation.

Our organisational strategy is not to develop (custom) applications in-house, but to use standard available applications. If the project group did not have to comply to this rule, perhaps a different choice would have been made, but since this is out of the question, no further investigations were made.

Furthermore, both ArcView 3.2 and ArcViewIMS were proven technology at the moment of choice. This also was an important reason.

The choice for this technology has proven to be a right one. It has a fast response and so far, all our functional demands are accomplished.

### 5.2 Future situation

The chosen platform will be used in the second stage also. The software provides functionality to link the boundaries with the scans of the original analogue files of the zoning and development plans. For displaying the scans and for the newest plans (after 1996), which are in vector format, additional software needs to be employed: software that is capable of both viewing large raster scans and vector drawings in MicroStation format. Because of that, Viecon Publisher from Bentley Systems seems to be a logical choice, especially since our vector drawings are managed with ProjectWise, which also is a product from Bentley Systems. ProjectWise has a tight integration with Viecon Publisher.

A very important feature of Viecon Publisher is that it is not only capable of displaying huge raster files very fast on the intra/internet, but also allows you to measure in them as well, even when they are not geo-referenced. This is an important feature when judging building proposal plans.

For the third and final stage, the picture is not yet clear. The reason for that is that recently a new official Dutch standard of classification of zoning and development plans has been released. This standard allows a multi-classification for a zoning or development area. This means a one-to-many relationship between an area object and more than one classification, where each classification can have a different set of attributes.

The traditional approach of map layers, where each object in a layer has the same set of attributes, is no longer appropriate.

Perhaps an object-orientated or object-relational approach is more useful in this case. A more thorough study of the impacts of this new standard is necessary, before any decisions on whether to maintain the current software platform or to change to a different one, can be made.

## 6. CONCLUSIONS, RESULTS AND EXPERIENCES SO FAR

The chosen three stage development strategy has proven to be a right one. At this time we know that we can safely develop the second stage with the current software platform. When this stage is finished, all the necessary information is available in a digital form at any place in the organisation. For the last stage, a new direction needs to be chosen, but until that stage is finished, the users can efficiently work with what already is accomplished. This complies with the goal that every stage must deliver a useable application.

Furthermore, although in the first stage the users must still look up the paper copies of the plans, they still have all the information at their fingertips and the risk of omissions is minimized.

Another proof of the right strategy is that already now colleagues in the organisation are using it intensively and complain when the application is not online because of maintenance.

For the digitizing of the boundaries of the zoning and development plans we crosschecked our files with the files of the province. Some 30 plans were discovered in the files of the province that were completely forgotten and sometimes even not present in our own files. These omissions are corrected.