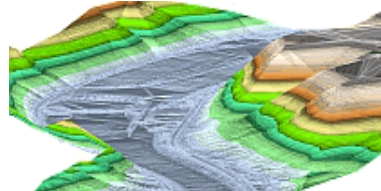


Product information



Surveying

Our base software for importing measuring data of current device manufacturers, for mapping and for compiling of location plans.



Digital Terrain Model

With BBSOft you can compile quickly a DTM from terrain data, points (laser scan data also) and breaking edges.



Road planning

The software fulfills all current requirements in road planning, especially in site development, in redevelopment and in the design of intersections.



Sanitary and Environmental

The complete solution for planning, hydraulic calculation, redevelopment and condition classification for sewer and waterline networks.



Water planning

Software for the areas dike - and water planning as well as for the simulation of high tide with interfaces to programs of water table layers.



Urban planning

You can edit your master- and urban plans quickly and easily under consideration of the standard for map symbols.



Calculation of quantities

You can automatically record, calculate and manage your masses and areas with the help of check routines with BBSOft.



GIS

Our GIS-information system for engineering offices and communes makes it possible to access upon information and to induce own application modules.



Cadastre

It's possible to convert your parcels of land - and your owner information into high-quality CAD-data or to import these into the cadastre information system.

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1 General

1.1 About us

BBSoft® - reliable, practical, customer oriented
B&B Ingenieurgesellschaft is a leading provider of civil engineering solutions on the basis of CAD in Germany, Austria and Switzerland. Engineering offices, planning- and surveying offices, city administrations, civil engineering departments, construction companies and industrial companies are among our clients. Continuous growth, acquisition, cooperation and last but not least our reliability designate our success.

The roots in the engineering office are still crucial and mark the programs. The constant further development of our software, the orientation towards customer requirements, the ambition for better software and services are a challenge and a personal commitment for us. We attach great importance on practical software and on the satisfaction of our clients. Longtime experience and qualified personnel ensure a fast and well established customer service. Our capable assistants have a sympathetic ear for every individual concern and are on hand with help and advice for you.

1.2 Sectors of application

- surveying tasks and mapping
- interfaces to land surveying offices and external calculation programs
- digital terrain model, DTM-analysis and quantity surveys according to REB
- road planning with intersections based on different parameters (D, A, CH) and EU-guidelines
- sewer stocktaking with rating according to ISYBAU, ATV and EN 13508
- sewer planning with integrated hydraulic calculation and dimensioning
- complete water supply with net calculation
- GIS- and geodata management
- stocktaking from inspection videos
- split sewer charge

Basic modules of the **BBSoft®** civil engineering software are globally used systems, like AutoCAD®, BricsCAD® and Oracle®.

1.3 Base technology and software strategy

The BBSoft® programs answer to the needs of the structurally engineered surveying and the cartography, to the requirements of common civil engineering and the site development- and road planning. They represent an easy to use and sector-specific expansion of CAD programs and of Oracle®. The product range starts with the implementation of tacheometries and guides further to the terrain modelling, the road- and intersection planning right up to the planning and presentation of different conduit systems. All packages are developed exclusively in the house of B&B and so the

trouble-free interaction between the single software-modules is guaranteed.

The publication of particular projects and data by e-mail, intranet and internet right up to the communal information system is realised through the tight cooperation with further well-known software developers. The great stability and safety of the Oracle® database expands these open systems and allows other office programs (Microsoft® Office® and Apache OpenOffice™) secured access to the stored data.

1.4 Service & Support

What can we offer you?

25 years of experience and exactly the service you want.

Of course, the customer service is very important to us. For the past 25 years, we program our civil engineering software BBSoft®. Therefore, we know what it takes.

We support you professionally and personally at all steps, which are necessary for a successful implementation and use of our civil engineering software. Finally you want a software that fits perfectly to your requirements.

We advise you within the scope of free presentations (online & on your location) already before you purchase our software. During the phase of using, you will benefit from our extensive range of service offers, such as service contracts, individual financing possibilities like leasing or rent of our software, hotline, remote maintenance, trainings and special consulting services.

During the office hours our staff is available for you personally via email, telephone and fax. We have established a specific support hotline for you for interrogations by phone. You can rely on professional assistance and on short response times.

2 Surveying

Surveying comprises the inclusion of all important parts in civil engineering and serves here as a basis for entering, organization, administration and visualization of geospatial data.

Measuring data is recorded and documented tacheometrically, photogrammetrically, by the positioning of satellites or by laser scanning. It consists of measuring points with location- and latitude information and it is possible to describe the measuring data with additional attributes.

Our civil-engineering solution makes it possible for you to represent the measuring data directly in CAD in 2D or 3D. BBSoft® includes importing and processing of measuring data as well as fundamental survey-technical calculations. The administration of all geodata occurs in our own GIS-solution (CivilDesign®) and offers all common interfaces like p.ex. Shape, XML, KML, ISYBAU and DWA.

From the beginning you are able to build up your plans with measuring data with the help of BBSoft® in CAD and you are able to administrate these in our GIS-solution. Intelligent objects can be built out of simple measuring points, which

can be uniformly be worked on and can be graphically distinguished. Our Software uses the CAD-basis, in order to not change the usual working, but to expand it with specialized knowledge. The import rather the export of DXF™/DWG™ and the REB-conform interfaces belong naturally to it.

2.1 Base module

The base module (SurveyCAD) is the basis for all other modules of the BBSOft® civil engineering software. It takes over the complete project control (measuring data, drawings and texts) and arranges a smooth teamwork of the different program parts.

The major tasks are:

- processing of the survey data (without point transformations)
- print of point lists / pegging lists
- creation of cadastre plans
- supply of digitizing tools (buildings, conduits, embankment hatch patterns and dimensioning)
- supply of design basics with switchable map scales, line types, hatch patterns and automatic inscriptions
- administration of the civil engineering-compliant symbols with a comfortable block manager
- automatic area division and area calculation
- functional layer management (independently of drawing)
- transformation (Helmert, Affin, ETRS/UTM)
- the definition of map frames

The import and finish of area data as well as measuring point transformations are furthermore enabled via the field book interface.

The following substantial **device manufacturer** will be supported:

- Trimble
- Leica
- Topcon
- Sokkia
- Geodimeter
- Husky-Hunter
- Wild
- Zeiss
- REC500

The direct data exchange between record device and PC is possible. The program applies route mappings (building edges, conduits, embankment edges and breaking edges) independently, according to the quality of the recording. The civil engineering software provides necessary measuring point conversions and the following mapping from 2D- or 3D-points. An automatic embankment hatch pattern and area filling facilitate and accelerate the compilation of cadastre plans. Map frames can be compiled in standard dimensions or free dimensions in the desired plot measurement. Drawing objects, which are projecting over the map frame, are faded out.

2.2 Point transformation

The module **BBSOft® point calculation, ETRS89/UTM** expands the field book interface of the basis module by survey-technical mathematical methods and instantiates the change of coordinates from Gauss-Krüger to ETRS89/UTM. The calculated measuring data can be directly imported in CAD or in the field book to continue there with the analysis. The following geodesic mathematical methods are available:

free positioning:

- through polar coordinates
- through Helmert transformation
- through Affin transformation

intersection:

- arc calculation
- forward insection
- backward insection (by Cassini)

station abridgement:

- This function enables the output of orientation unknowns and of the standard deviation.

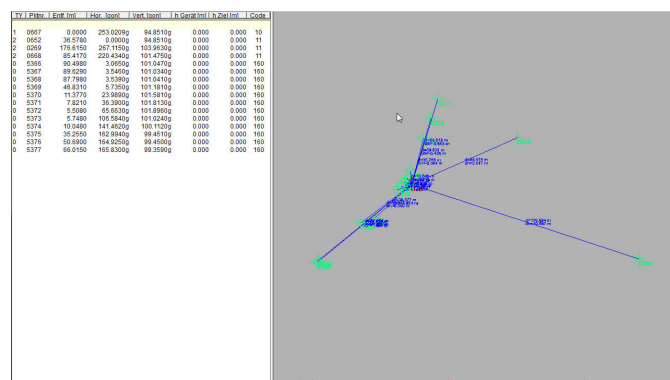
polar addition:

- Point determination by polar addition to a well-known point.

traverse:

- for one-sided and on both sides connected traverses
- with the possibility to distribute the angle exclusion failure
- with output of temporary coordinates, improvements and final coordinates
- with optional distribution of the coordinates exclusion failure

The transformation constants and the standard deviations are listed in the lists output. The user can intervene manually upon the angle exclusion failure and the error limit. In addition there is the possibility to execute different reductions, as well as other deviations.



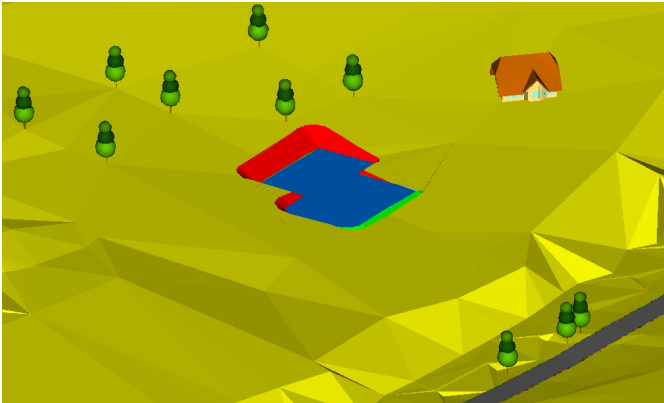
ETRS89/UTM

The until now used Gauss-Krüger-coordinate system is replaced by the European terrestrial reference system ETRS89 with the Universal Transversal Mercator (UTM)-illustration. Background of this change is a uniform and official geospatial reference, which becomes effective transnational. Relating

to this the administrations of surveying of the federal states make official transformation foundations available. With the help of these transformation foundations point data can be transformed from GK to UTM and vice versa. The required transformation foundations, with their corresponding ground control point files, can be asked for by the administrations of surveying of the federal states.

3 Digital Terrain Model

The digital terrain model (DTM) represents parts of the earth's surface simplified as a geometrical model.



The DTM is composed from the digital height model (DHM) and the digital situation model (DSM). The digital height model contains 3D-coordinates, which represent the height structures of objects or of the terrain. The digital situation model illustrates information about the terrain structure, like embankment edges and skeleton lines. Accordingly the DTM contains all information about the ground level.

The structure of the terrain model is based upon triangles. With the help of triangles the single height points of the digital height model are meshed together. The triangular transformation considers additionally the morphological information of the situation model, by using breaking edges as the side of a triangle.

The DTM is on the one hand used for the presentation of ground levels and layers of earth and on the other hand it is used for the planning of rainwater retention basins, pits, spoil banks, water reservoirs and dumps.

Our civil engineering software BBSOft® makes the following functions possible:

- import of area data, points and breaking edges
- creation of a 3D-terrain model out of points and/or breaking edges
- orders for the construction of pits and dams
- intersection of digital terrain models
- embankment calculations with berm functions
- analysis functions for the presentation of contours, contour levels and of the falling gradient
- automatic creation of terrain profiles with presentation as profile through all terrain levels
- mass calculation according to the prism method

3.1 DTM, compile and manage

The software modul DTM is a powerful tool for the processing of huge amounts of data. Thereby the creation of the 3D-terrain model is just as flexible as the administration of data and the presentation.

The calculation of the triangle mesh can occur from different basic elements, for example from:

- points (in a drawing or from a measuring point file),
- points and breaking edges,
- breaking edges, e.g. contours without points or
- laserscan-data.

Furthermore it is distinguished whether the DTM should be stored in a drawing, in an external file or in a software-sided database.

Through the external data export it is possible to process huge amounts of data and to exemplify these. Concerning the number of points the triangle mesh is not limited. Even constitutive functions are in a complete range available, like the generation of terrain profiles, the calculation of masses or the creation of contours. In doing so the appropriate information is analysed and presented in the CAD.

The later insertion and deletion of points is at all times possible. The software permits also the adoption of digital terrain models from other projects. A smooth data exchange with other programs over REB or XML is ensured. Further software modules of BBSOft® make terrain profiles, DTM-analyses (e.g. with contours and inclination arrows) and mass calculations possible.

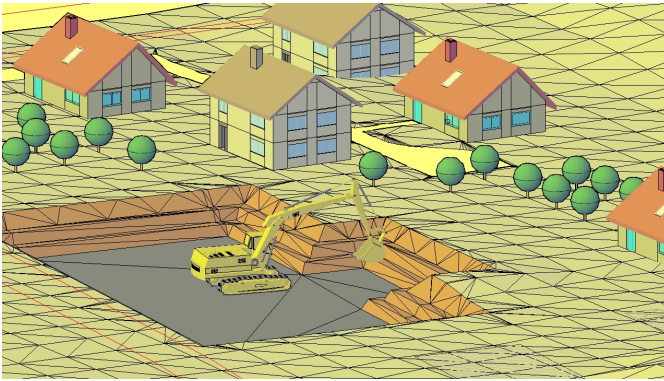
The coloured configuration of the calculated 3D-surfaces can be conducted individually. It is possible to induce several 3D-models in only one drawing. Thereby the composition of dumps or layers of earth is essentially simplified.

In every place the terrain height in the 3D-model can be interrogated. On demand the program includes 2D-elements in the terrain model, e.g. intended building-corners or man-holes. The embankment inclination can be simulated during the landing of pits or earth reservoirs. This embankment is also a component of the DTM.

Different plausibility checks allow the search after cutting breaking edges and holes. Mostly these functions are only needed for external or rather imported terrain models.

3.2 Embankment/berm

The construction of embankments and the displaying of filling or rather excavated surfaces are essential components of the field "civil engineering". Our software is in accordance with these requirements and offers additional functions for the planning and further processing of constructed objects.



The embankment calculation refers not only to a homogeneous embankment, also the creation of graded embankments (with integrated berms) is possible.

A berm divides the embankment into several horizontal sub-areas, so that the earth pressure on the embankment foot is decreased. An embankment failure can be avoided therefore, e.g. at scarps.

The embankment baseline must be defined for the planning and calculation of the embankment. This can consist of 2D- or 3D-polylines. It is possible to define only one part of the selected line as embankment baseline.

The embankment can be charged in both directions from the embankment baseline. Alternatively the embankment calculation is charged from the baseline on an existing DTM or on a border edge.

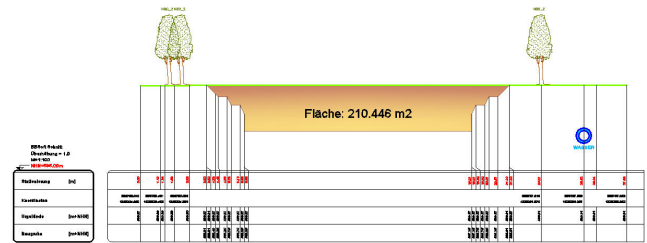
The embankment inclination is needed for the calculation of the embankment onto a DTM. This can be defined as a whole or only freely at single stations. The software searches off the baseline the intersections with the terrain with the denoted inclinations.

The construction of embankment profiles (e.g. berm - embankment - berm - embankment) occurs through a controllable dialog. The defined composition can be transferred graphically in the CAD to influence the embankment profile interactive. This is integrated automatically in the embankment.

The outcomes are executed as 3D-surfaces, so that it is possible to blend these with existing terrain models.

3.3 Terrain section

Longitudinal- or rather cross-sections can be induced with a terrain section. These illustrate one or several surfaces as well as cutting elements. The terrain section exemplifies the course of the ground along an alignment.



The definition of the alignment occurs in the CAD by arbitrary and free selectable bases. An import of coordinates by hand is also possible. The alignment can be positioned arbitrarily because the single stations produce the cross-sections. In the area of arcs the station lines are located vertically to the alignment. The program allows also the predefinition of not vertical and asymmetrical cross-sections. Our civil engineering solution considers the selected presetting for the presentation of the desired longitudinal- and cross-sections.

The generated profile lines of longitudinal- and cross-sections are automatically calculated from tacheometrical recordings, digital terrain models, constructed 3D-lines or by existing contour points.

Special feature: to every measuring point or polyline (e.g. cutting or border) an extended presentation can be assigned in the section. This means, that if the course of the section cuts a water line, streets (with profile) or trees these will be sketched in correct positions. If texts follow each other very closely, the clean exemption of the inscription will be natural. The postprocessing or rather the supplementing of the longitudinal- and cross sections are reduced almost completely.

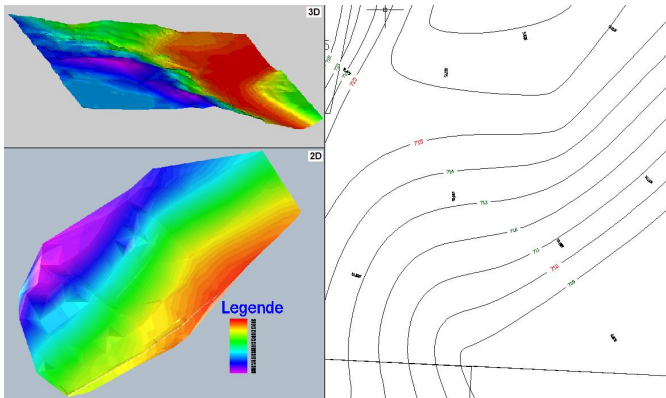
A grid with a selectable distance can be indicated and for all points the real coordinates can be edited for a better orientation.

The program allows the selection of the descriptive terrain levels, if there are diverse terrain models in the CAD-map. All terrain levels can be optionally incised in the sections and these can be differently represented over diverse layer bookings. Diverse section-variants can be induced in a very short time. Additionally the printing of the sections in separate files is possible, which can be automatically converted in PDF-files (with map frames also). The models of the sections and profiles are freely configurable. Later working on already drawn profiles, like changing of scale or insertion of superelevation, is without any problems possible.

3.4 Contours/DTM-Analysis

For the visual analysis of the 3D-terrain model the software makes the automatic generation of contours, contour levels and colour fields possible. The interpolation of contours considers all kinds of different parameters, like the selectable equidistance (distance between the contours), the calculation

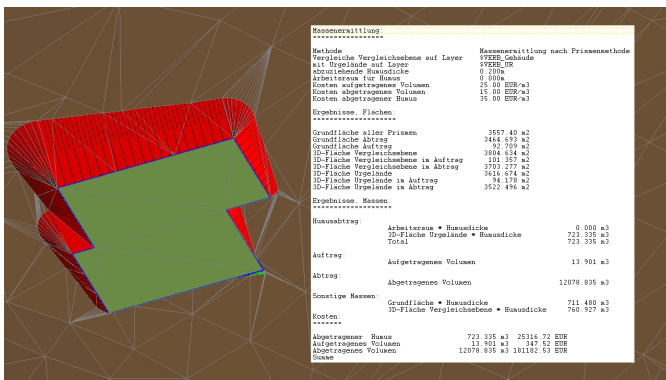
method (if contours are approximated) and the free selectable level of generalisation. The contours can be sub-divided into main-, medium- and simple contours and can be distinguished graphically also.



The inscription of the contours occurs automatically and is individually adjustable. Shall an inscription occur? If so, how? Which contours shall be inscribed? Which adjustment shall the texts adopt? Shall the contours be inscribed in intervals or only at elected positions? The configuration of the text can be adjusted according to scale. Optionally the program inscribes the inclinations of the surfaces in percent and draws an arrow in falling-gradient direction. Additionally surfaces of the 3D-terrain model can be represented in color depending on the particular inclination. A legend or a statistic can be executed for the selected visual analyses, so that the defined colour grades and colour classes are apparent in the location plan.

3.5 Quantity survey

The quantity survey calculates the volume between two 3D-terrain models, e.g. stock and intended terrain. The calculation of the masses occurs according to the prism-method REB. The mass difference is indicated in cubic metres and is sub-divided into filling- and cutting surfaces. The cutting of a defined humus layer is considered optionally. The single, with each other compared, surfaces receive numbers and are described in a calculation report with corner points and their appropriate heights. A cost estimation is executed in the protocol through the input of the cubic metre prices for filling, cutting and humus cutting.



The software makes mass balancing available, in case, that the quantity survey does not fulfill the given masses. Here you have the possibility to shift your layer of comparison in vertical direction and to adapt your filling- or rather cutting surfaces. Different possibilities are offered to you for the graphical configuration of the result in the location plan in order to mark the earth movement in the filled or rather excavated areas.

The following presentation methods are available for the location plan:

- output of the prism numbers
- output of filling and cutting with '+' and '-'
- output of filling and cutting with surface hatch patterns
- presentation of Delta contours

The calculation of masses is solved comfortable and quickly with the help of our civil engineering solution, with misshapen building pits, quarriers or waters also. By using our software in the area of river engineering shorelines as well as water depths of flood plains can be determined and represented comfortable. Even the quantity survey between thousands of surfaces occurs very fast and is completely reviewable.

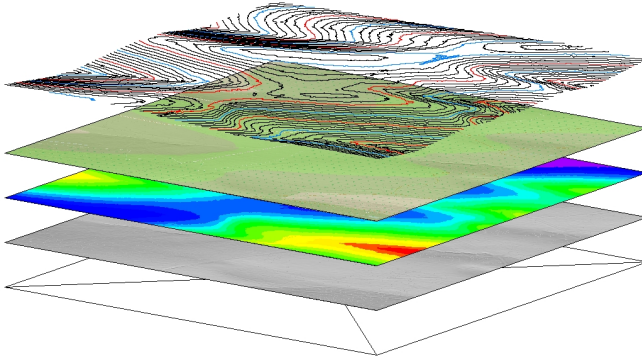
3.6 DTM from Laserscan

Throughout Germany grid-laser scan data (format: 1x1 km² tile in the 1m-grid) is provided in high resolution from the responsible authorities of the federal states. The grid-laser scan data contains already georeferenced, in a grid arranged points, which describe the ground level. Besides of the already simplified laser scan-recording the data volume is enormous and only a few CAD-systems can process this amount of data.

Our civil engineering software makes the use and the processing of the grid-laser scan data possible. The laser scan data is always stored in the project directory and is not loaded into the CAD in order to keep the capacity utilisation of the CAD as low as possible. Through a constructed reference to the tile the information about height can be interrogated very fast off the CAD. In the CAD only the limiting of the tile is drawn. For further adaptation, e.g. the generation of a terrain section, the appropriate information is evaluated and illustrated in the CAD. The data is not thinned out and is therefore to the full extent available.

The advantages of this method are:

- use and processing of very big grid-laser scan data
- no point limiting through CAD-systems
- no complex and expensive GIS necessary
- no hardware constraints
- no reloading or thinning of data
- terrain-section and quantity survey over several kilometres
- planning over the whole surface possible
- extensive visualisation



Surface analyses, planning of infrastructure and profiles can be liquidated over several kilometres. For the visual analysis all functions of the DTM-analysis (contours, contour levels and inclination arrows) are available. Additionally there is the opportunity to fade in Open Street Map data (OSM) for each tile. The OSM-data is provided by BBSoft® for whole Europe.

Hillshade surfaces can be generated as a further analysis-function. This shading model gives the user a spatial impression of the relative altitude differences in the terrain. The graphical support of the Hillshade and of the OSM-data help the user to classify the exact area of planning spatially. The system offers a pleasant and high-power visualisation.

4 Road planning

BBSoft® is an interactive tool for street-and site development planning. The civil engineering software meets the current requirements for road constructions, especially for site development, for rehabilitation and the planning of intersections and roundabouts. In addition the program considers the effective route design guidelines of Germany, Austria and Switzerland.

The user can concentrate on planning tasks through the graphical support and meaningful automation of routine works. Changes and adaptations upon the route are automatically updated in the location plan, the longitudinal section and the cross-profile. For the planning in the stock, the program adopts roadsides, considers constraining heights and determines the vertical alignment, based on the terrain model.

The program contains, besides the classical applications, extensive functions for street furnitures. Existing axes and the associated traces are the basis for the generation of road markings. It can be switched between the diverse kinds of markings. With the block manager you can compile quickly and precisely traffic sign plans and a street lighting cadastre. Those can be directly transferred to a database, where they can be edited and managed. The software can be configured modularly for diverse project requirements. Therefore the entire program can be tailored to your individually needs.

The **road-planning software** contains all current functions like the planning of alignment, longitudinal- and cross section, mass calculation, pavement design specification and

surface drainage.

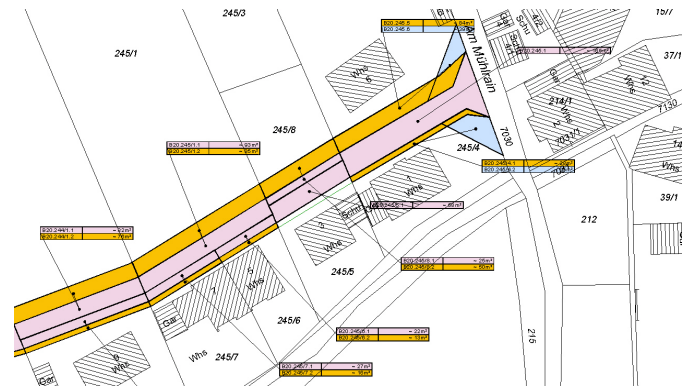
The **optimization-module** complements the software in the area of editing of alignment and contains the examination of the alignment according to RAS-L.

There are additional functions available with the **intersection planning** like turning lanes, road dividers, traffic islands, jughandles, swept paths and fields of view.

All planning data can be transferred with the **OKSTRA-interface** as a generally admitted data format.

4.1 Land purchase

The land purchase/land acquisition is a new function for displaying of plot areas or lots, which shall be bought or used momentarily. These partial or total areas are calculated and inscribed with used and unused areas. For the marking of buildings that shall be demolished further commands are implemented. The presentation and the inscription are already editable and are integrated for customers in Switzerland and Germany.



The adjustment of these marking- and inscription elements is carried out in the user interface for map symbols and signatures.

4.2 Swept path

By passing through a bend the front wheels of a vehicle are directed on a guideline, which is given by the steering angle. The back wheels on the other hand move, as a function of the dimensions of the vehicle, on a subsequent swept path inside of the turn. BBSoft® offers a comprehensible solution for testing the trafficability of traffic areas or gasoline stations.

The swept path can be determined over a quick construction or along an existing polygon from the CAD (e.g. borders). In addition, the calculation considers already constructed objects of the road construction software (alignment and borders). At any time the swept path can be adjusted in the location plan in an interactive way to local conditions and the change between different vehicles occurs by pushing a button. Different dimensioning vehicles are available for the user. It is possible for you to archive and define own vehicle types in a comfortable vehicle editor. Diverse presentation options allow for an individual configuration of the vehicles

and of the surface fillings. The software considers safety distances just as different reference points, so that the calculation hasn't to occur over the alignment master point. The guideline has to consist of at least three bases, the software calculates the arches automatically.



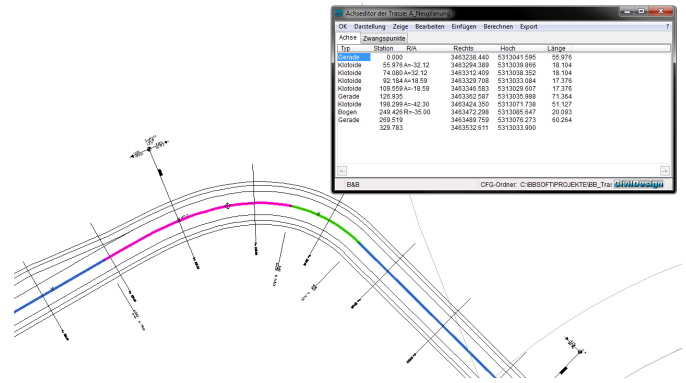
The user can choose between four different ways of driving:

- **Way of driving along a constraining line:** The vehicle is dragged along upon the polygon, without considering the minimal radius of the turning circle and without balancing the polygon also.
- **Way of driving 1 (according to FGSV):** The steering angle is carried out during the driving. The transition points from the line into the circular arc occur tangentially, so that no buckles will develop on them.
- **Way of driving 2 (according to FGSV):** The driver turns in with an almost standing vehicle and initiates then. This way of driving, with a maximal change of the steer angle during standing, is simulated with the assumption of an abrupt transition between line and circular arc.
- **Way of driving during parking processes:** By this way of driving the driver turns in the front wheels while almost standing and drives therefore directly from a line in a circular arc with a constantly held steering angle.

4.3 Alignment construction

For the user two methods are available for the planning and calculation of alignments. Lines, arches and circles, which are drawn at the desired position (e.g. over measuring points (constraining points), find a use for the construction. The adoption of alignment elements out of other CAD-systems (*.dxf-format) is without any problems possible. These elements are added by a mouse-click. If the tangents are defined, transition and buffer elements can be construed. For

the user a large number of construction possibilities with diverse calculation results are available. During the construction, the parameters can be at all times changed, like e.g. dimension of the radii, lengths of the tangents and the clothoids. The automatic go over and the calculation of the changes go on in the background and offer the possibility to control adaptations immediately.



Tangents could be construed in the location plan with the automatic alignment calculation. The program calculates the predefined transition elements autonomous and integrates these tangentially. During the construction tangents can be shifted or modified in parallel and arches and clothoids can be adjusted. The belated integration of alignment elements is possible too. The program considers constraining points, the software checks minimum- and maximum values and illustrates differences graphically.

The program puts the finished alignment on a separate layer. By request, lines, radii and transition curves are automatically inscribed. All alignment (route) information is located on separate layers too and offers the possibility to regulate the inscription individually. All location elements are centralised in a superior dialog with declaration of the coordinates, they can be controlled and edited there. A great advantage of the program is the opportunity for belated integration of new location elements in the already existing alignment, by what complex and inconvenient calculations are omitted.

4.4 Route optimization

The route optimization contains checking and modification functions. It complements the existing applications with interactive commands for alignment editing and for the automated check routine of the alignment, of the vertical alignment and of the traces. During the alignment editing single elements, like lines, clothoids and arches, can be shifted tangentially and can be adjusted. The editing occurs in the location plan. Additionally the software can automatically round out tangents with a predefined radius and spares multiple editing. The changing of an alignment in the CAD as well as the removing and the integration of alignment elements raise the degree of effectiveness of the road planning enormously.

The examination of a planned alignment, according to RAS-L, VSS and ÖNorm, is another function. The program checks

the position and the height of the elements based on the category of the road and based on the speed of the design. The result is written down in a clearly arranged protocol and points to minimal- and maximal values in the construction, which should be observed.

The keep of minimum longitudinal gradients and of minimum slopes is, from the sight of the drainage-technology, a basis component in the planning. The software considers free definable falling gradient values of the vertical alignment and of the traces during the checking of the route and illustrates areas, with inclinations that went below or went beyond, graphically different. The program automatically updates the marked areas, after the editing of the longitudinal gradients and of the slopes.

4.5 Route editor

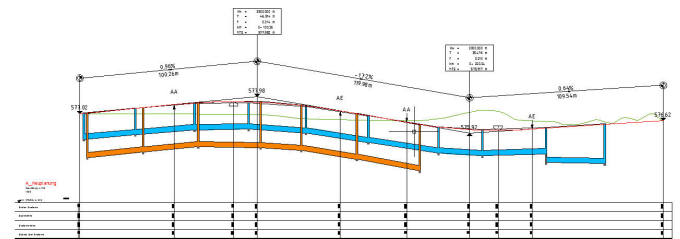
All information of the alignment, of the vertical alignment, of traces with their width, of slopes, of pavement constructions and of the embankment are centrally managed in one dialog. Each element can be separately looked at and worked on. Changes are automatically saved and during the redrawing of the route updated in the location plan. Overall the software manages up to 30 traces per alignment in parallel. A belated incorporation of traces in an existing planning is just as possible as the simple adoption of plotted border lines out of external data, like house facades, which can be assigned per mouse click to a border. Widening, like bus bays and other transformations of the route, can be inserted without any difficulty. Additionally the program manages the typical cross sections of the German, Austrian and the Swiss route design guidelines. The complex definition of single traces is therefore omitted. Thereby the trace names are geared to the guidelines.

In addition the route-editor provides the basis for the calculation of the sight distance and the stopping sight distance. The editor defines the parameter for the subsoil drainage of the road and calculates on the basis of the RAS06, the RAL 2008, the RAA 2008 and the VSS-norm (SN 640 105b) the road widening in bends. The road-editor saves the whole presentation of the route, like the inscriptions of the slopes, of the width of the traces, of the maximum- and minimum points of the route as well as of the intersections of tangents, in a separate dialog. An individual type of hatch pattern and a color value can be allocated to every trace. All adjustments are considered for the calculation and presentation of the cross profiles, the pavement design specification and for the quantity survey.

4.6 Longitudinal section

By starting this command beginning- and end height of the vertical alignment are automatically determined. The program generates the information from the terrain model. Are no 3D-surfaces available, the height information can be inserted via dialog. Longitudinal gradients and heights of the tangents are editable in the list view. Beyond that, the soft-

ware permits an interactive editing in the plotted section. New tangent points can be induced and modified by mouse-click. The program automatically calculates the lengths and inclinations of the tangents and updates these in the section. Summits and basins can be construed per dragging in the section and can be subsequently edited in the list. Radii as well as lengths of the internal radii are editable. Alternatively it is possible to waive the internal radius of the vertical alignment. The civil engineering software offers the possibility, by definition of the gap, to automatically adjust the vertical alignment to the existing terrain. Especially for the redevelopment planning, calculations and additional constructions at the vertical alignment are omitted. Curves, ramps, slopes and longitudinal gradients, stopping- and overtaking sight distances can be illustrated as a diagram with annotations and inscriptions.



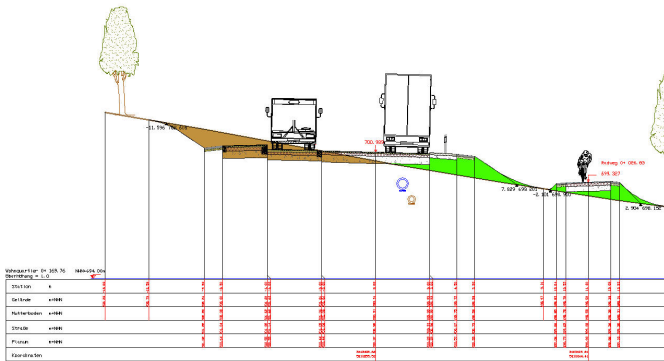
Extensive options, based on the RE, offer the possibility to fade in important information. Adjacent alignments, filling and cutting areas and crossing elements (e.g. gas-, water- or sewer conduits) can separately be selected and drawn. It is possible to liquidate parallel sewer- and water conduits in the contour map. Optionally the liquidation of the borders and of the embankments can be illustrated next to the vertical alignment. This application-related function is available for the editing of constraining heights in the section. The changes can be automatically updated and illustrated during the editing of the vertical alignment with the "Show"-function. This tool is also suitable for the water- and dam planning through the flexible application and the extensive adjustment- and presentation options. It is possible to represent building points or distinctive objects as symbols in correct position.

4.7 Cross section

The typical cross section of a road serves as an overview for the calculations and for the construction. It provides information about the kind of fixation of the road and about the thickness of the road pavement construction. In addition other installations, like the position of supply- and disposal lines, can be illustrated.

The cross-profile-editor is the central tool for the presentation and for the output of cross-profiles and of typical cross sections. The level of detailed information can be individ-

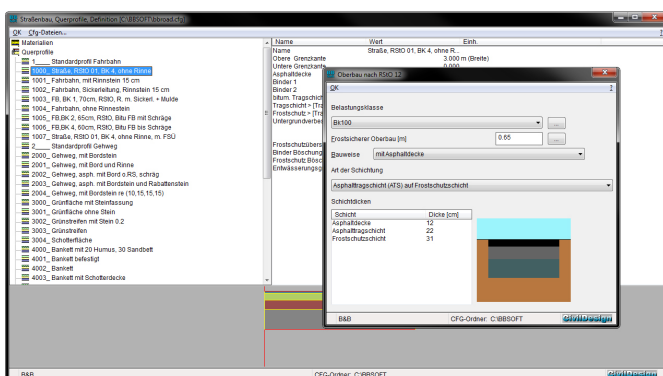
ually regulated. The output is automatically generated for the whole planning as well as for a selection. The program directly draws the profiles in the location plan and arranges these, depending on the adjustment. The user has the possibility to represent besides the terrain level, the road pavement construction with or without hatch patterns, in terms of color separated filling or excavated surfaces also constraining points, crossing conduits (like sewer, water and gas), the embankments and the defined thickness of the humus can be represented. The software additionally considers axes and their borders, which proceed along the planned location.



Traces, data of profiles, widths, slopes, height of borders and the height differences are listed in the editor, besides the preview of the selected station. The editing of single parameters occurs in a dialog, the program automatically calculates changes in the list and in the preview, already drawn profiles will update through a mouse-click. This tool is suited for the planning in the stock, through the different presentation- and change options. The user orients himself, along the stationing, through his pavement. Border lines can be placed on the terrain level or optionally on the height of constraining points. Adaptations to height- and inclination specifications are without any difficulty possible. The display of the longitudinal falling gradient in front of and after the current station considerably facilitates the planning.

4.8 Road pavement construction

The different layers and borders for the road pavement construction can easily be compiled and edited in a clearly arranged dialog. Three different possibilities are available for the user for the creation of profile structures.



The fastest and easiest alternative represents the application of already drawn standard profiles or of those who are assumed from external programs. The software uses the existing polylines in the CAD and assigns these to the profile of the list, in doing so a maximum of flexibility in profiling is scored. Redefinition and complicated adoption is not necessary. For further adaptations the profiles can be drawn in the CAD, processed and transferred again.

Another option is the input of the thickness of layers of the single materials. The listed layers can be viewed and edited separately. Every selected layer is highlighted and updated automatically in the preview. Adaptations can be checked immediately.

Additionally there is, for the classified road construction, the possibility for the definition of a trace according to RStO 12. The software determines, based on the different parameters, the load class and adjusts the thickness of layers automatically. The adjustments and results of the calculation of the load classes can be transferred for the evidence in a separate print. Beside the profiles, the dialog offers the possibility to define materials with different color- and hatch pattern styles. In addition an accounting number can be given to every material, which is used for the detection of masses of cross profiles. This number forms the base for the civil engineering software BBSOFT®- calculation of quantities.

4.9 Drainage

Given that the structure and the traffic safety could be at risk, the surface drainage takes a high priority in the road planning. The calculation and the analysis of the catchment areas look about the German (and based on the European standards) RAS-EW. For the cost estimation of the drainage areas the vertical alignment and the traces with their particular slope are considered. All drainage low points are listed in a clearly arranged dialog.

The program calculates, based upon the determined drainage areas and a predefined absorbing power, the number of road gullies and deposits them automatically in the location plan. Subareas are added together and are involved in the calculation. Belated adding, shifting and cancelling of road gullies is at all times possible. The software hachures all drainage areas for the graphical rework. It is possible for the user to fade in flow arrows for visual control. Subsequently the road gullies can be connected with an existing sewer system.



4.10 Quantity survey

The quantity survey of the route occurs according to Gauß-Elling (REB 21.003). Individual traces or the whole location can be considered, depending on your selection. Additionally there is the possibility to conduct the calculation step-by-step, this means only between two defined stations. The results are recorded in a separate file (PDF, XLS or ASCII). The program draws profiles of masses in the location plan, which can be used for the plot afterwards. The calculation generates for the data exchange the DA66, respectively DA51, DA53 and DA54.

The quantity survey according to Elling isn't necessary for each project. Often the mass is determined over the surfaces between the single surveyings (before and after the building phases). Especially the 3D-quantity survey offers a suitable solution for this requirement: the individual surfaces of the route are determined and multiplied with the particular profile structures. The result are volums sub-divided to traces. Optionally the program induces 3D-solids of the whole location. Generally this calculation method serves as a plausibility check.

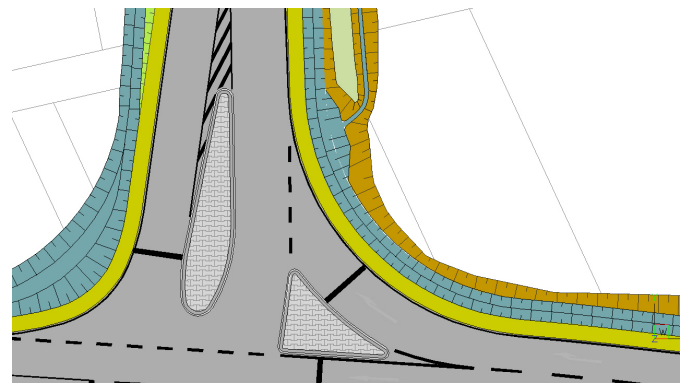
The user can generate pavement height- and pegging plans in the pavement design specification. The output of the height can be regulated individually for every trace. There is the possibility to conduct the calculation for a defined area, as well as with quantity survey. Formation level books, as well as point files for building machinery, can be executed also. The program represents the pavement heights as absolute height, as differential height to the alignment or as differential height to the terrain. Thereby the software stores the textpositions. The user writes a measuring point file for the import in the surveying instrument, in doing so the coding is defined as user-related. The calculation generates the data type DA45 for the data exchange.

During the detection of the embankment and the terrain model of the route the information off the vertical alignment, off the slopes and the width of borders and off the embankment inclinations is considered. The embankment edges are illustrated as separate polylines in the location plan, they can be used and edited again. The software generates automatically embankment arrows, hatch patterns, colors the filling and excavated areas differently and files all results on separate layers. The new surface net delivers (blended with the

ancestral terrain) the base for realistic views. BBSOft® includes manholes and reaches automatically in the 3D-model. The heights of the covers correspond to the actual height of the pavement.

4.11 Intersection planning

Intersection planning complements the extensive road planning program towards a complete, user-related and graphical road planning tool. In doing so the planning process considers the country-specific norms (RAS-K, RAS06, VSS and ÖNorm). For the user a large number of construction elements and calculations are available, which are necessary for the planning of intersections and roundabouts. Based on already constructed routes, within the range of junctions the required elements like turning circles, turning lanes, jughandles, traffic islands and restricted zones can be applied menu-guided. Especially for roundabouts road dividers and accesses and exits are additionally implemented according to BMV ARS and VSS. All parameters, like distances, radii and lengths, are edited and adapted in the dialog. The program automatically calculates changes in the planning and updates the construction in the location plan. The software takes over automatically existing parameters, like slopes and trace constructions, if intersection elements are calculated at an already intended location. Of course all commands in the road planning, like the editing of cross-profiles, of stationings or of the contour map, can be still disposed after the intersection planning.



Accesses and exits can be discretely located in the connection ranges. Thereby the vertical alignment is automatically determined. Therefor the height information of the existing borders is adopted and interpolated. The user places high- and lowpoints in the contour map in an interactive way.

The assimilation of different border heights between the single traces represents a great challenge in the planning. Per selection of the borders in the location plan the program automatically places at the intersection of the lines points of connection and takes over the selected heights. Axes and the associated borders have to be shifted through the changes in the presettings. This causes that connection points and heights are incompatible with one another and therefore complex reworking is the consequence. With only one click the software moves these points and heights and updates the

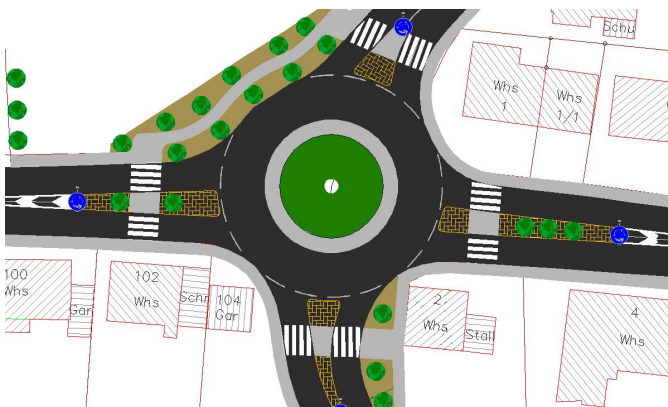
elements in the location plan. New height information has consequences on the slopes of the traces and on the course of the vertical alignment. These are automatically new calculated by the program and the sections have to be updated just once.

Intersections have to be recognizable at an early stage on grounds of the traffic safety. With selection of the speed the program calculates fields of view and hatches the surfaces which should be left blank. Fields of view for passenger cars, pedestrians and bicycle riders are considered. Additionally bus- and turning bays are integrated in the intersection planning according to RAS_{t06}. These can be allocated to the already constructed borders.

4.12 Street furniture

Different arrangements can be taken for manipulating the behaviour of the road users. They are linked with the term 'street furniture'. These include amongst others traffic signs, marking, sign-posting, signalization and illumination.

Road markings and the sign-posting are geared to the alignment and the roadside. On the basis of the already constructed route you can apply longitudinal-and lateral markings, restricted zones, parking lots and sign-postings. All available road markings are updated by changes of the course of the route. All markings are based upon the principles of PlanzV90, RAS, StVO, SNV and Önorm.



With the block manager of BBSOft[®] traffic signs and the street lighting can be integrated quickly and precisely in the location plan. Therefore there is the possibility to compile appealing and high quality marking- and traffic sign plans for presentations.

In addition it is possible to transfer traffic signs and street lightings to a database. This option provides the possibility (especially for communes) to compile and to administer traffic sign- and street lighting cadastres.

4.13 OKSTRA

From the general description 'object catalogue for road and transportation' the abbreviation OKSTRA developed. OKSTRA is introduced from the federal ministry of traffic,

building and housing (BMVBW) as a nationwide standard. With the general circular letter 'road construction' ARS no. 12/2000 from the 15.05.2000 the OKSTRA-standard became authoritative also for the area of the interstates for all federal states. The data exchange occurs in the formats CTE and XML. It is possible to generate the OKSTRA-data as a DWG[™] -/DXF[™]-drawing-file and to take it over in a GIS-database.

4.14 Data backup

The data backup plays an essential role during the planning process. Therefore two different variants of backup are available for the user. In the first step it is possible to save track data like alignment information, traces, inclinations, road pavement constructions, contour points, general drain spots and stations automatically. The data is filed in the project directory as an ASCII-text.

In addition you can export this data in a database (Oracle[®]) and manage it there. With it a high rate of security is ensured. The database permits thereby different states of planning of one route in multiple variants.

Additionally filter- and searchfunctions can be disposed. Even the output of information concerning the route is in Microsoft[®] Word, Excel[®], HTML and LaTeX possible. In this way important information can be combined, managed and looked at, related to existent infrastructure (sewer, water, electricity and trees). The option to mix different areas of data backup by re-establishment represents a special feature. For this reason an existing alignment in the location plan can be brought together with another variant of alignment height. Libraries for Germany, Switzerland and Austria are considerably available, other libraries are in progress.

5 Sanitary and environmental

The pipe-, conduit and cable administration of the CivilDesign[®]-conduitsystems is subdivided into single categories (wastewater, water supply, gas, power and district heat). Currently the focus is located at wastewater and water supply with planning functions and hydraulic calculations.

Summary of the concept:

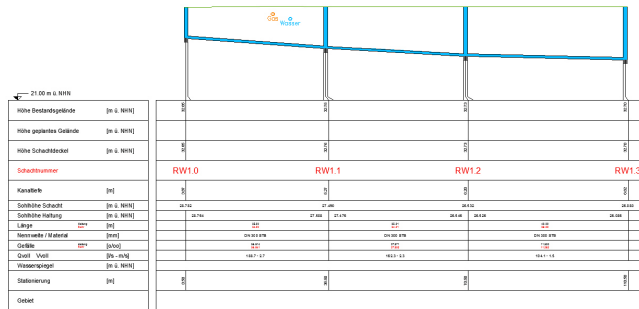
- schedular data administration,
- graphical data administration,
- barycentric representation,
- integrated CAD-planning and calculation,
- collective use of data, cross-projectally also.

5.1 Longitudinal section of conduits

Imagine, all conduit systems in the database, regardless whether sewer, water or power, could be represented in the section. Crossing conduit lines would be visible too (checking for a collision!). Further CAD-lines and blocks (e.g. borders) could be illustrated without a database-import.

BBSOft® already instantiates this vision at their cutting function. Optionally existing terrain models are considered too. Depending on the civil engineering solution the interactive editing of heights is made possible at manhole covers or rather at the manhole bottom, at pipe connections or at conduits.

Consequently the planner receives a tool with a number of intervention possibilities and reversible presentation functions.



5.2 Sewer planning

Clearly arranged plans and lists with manholes, conduits, special buildings, house connection conduits and gullies, each with inspection data, can be compiled with our software. The main focus lies on the DWA-(ATV-) sheets, on ISYBAU-formats or rather on the EN 13508.

New manholes and reaches can be transferred in the CAD via digitalization commands (as drawn lines) or from imported DWG™ - or DXF™ - drawings. Thereby existing plans are integrated very fast in the system. The positioning of the inscriptions will be held on during the adoption of CAD-elements and the further editing. The automatic determination of the cover heights from a planned topping or from a digital stockmodel is possible. If required the program calculates afterwards the falling gradient with the help of adjustable parameters, like min./max. manhole depth and minimal/maximal falling gradient, with automatic crashes by exceeding of the max. falling gradient. Also the interactive access to the manholes and reaches is possible in the longitudinal section. It can be worked with or without superelevation.

As desired the sections receive the energy- and backwater curves, alternatively calculated new or from the database. The presentation of the results from hydraulic calculations of BBSOft® (from HYSTEM-EXTRAN or similar programs) is possible, too.

5.3 Sewer calculation

The civil engineering software BBSOft® makes the module **planning/calculation** available. It takes over the measuring of a conduit and the calculation of flow time. The program recognizes the reaches which lie above in flow direction. Therefore the program calculates the flow time and

writes this to every manhole. All integrated calculations (like special building measurement (RÜ), time coefficient, heights of precipitation, summation diagrams, flow times and filling quantity) extract the basic data from the data fields or rather from the dedicated catchments. In the CAD available surfaces can be used as a catchment and can be automatically calculated and inscribed. It is possible to calculate the complete net or only single areas in the plan. If important data is missing, the program will indicate that. The results are available in several possible output formats (e.g. the list according to DWA A118 also). The program provides the detail for the minimum diameter of a pipe, as measured by the maximum water quantity. Values from hydrodynamic calculation systems are represented too (e.g. from HYSTEM-EXTRAN). An integrated data interface is used for the adoption.

Special feature storm overflow: These calculations are not only available if a database is connected, but they allow the input and the import of calculation parameters.

5.4 Sewer mass calculation

The civil engineering software BBSOft®-**calculation of quantities**, formerly named 'canal mass calculation', is detached from the CAD or rather from a database. The module can be inserted without additional basis-software and is therefore also available for clients without Oracle® or CAD. Aim of the program is the quick and extensive calculation of canal masses with site measuring, pipe bedding, embedment and backfilling (less the pipe / manhole masses).

It is possible to import Isybau 96/01 type K data, which for instance develops by a canal inspection as well as a CivilDesign®-specific format (with file ending *.mas). The provided list of pipe materials contains all current standard profiles and can additionally be widened.

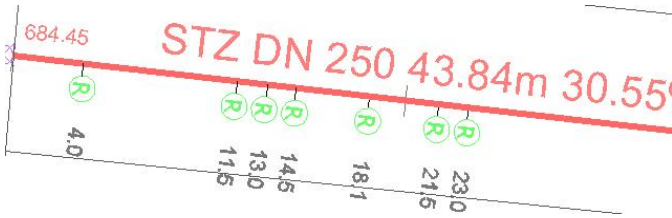
5.5 Damage history

An arbitrary number of inspections, redevelopments and of other operating data can be administered for every manhole and every reach. The previous, maybe already rated and redeveloped damages, don't have to be deleted. New and old codes are administered independently from each other, so that it is possible to continue with inspections according to Isybau/ATV old and in EN 13508. Thereby the creation of a real damage history is possible: evaluation results can be compared with each other and no break appears. The program optionally saves the moment of the last editing and the last user.

5.6 Damage assessment calculation

In what condition is my sewer network? A huge effort is connected to this question, which is software-assisted diminished. The automatic pre-evaluation and the classification of damages in damage categories is possible. Thereby manholes and reaches can be evaluated separately. The user surface is

uniform. Depending on the type, the program offers special plausibility checks. All new inspection- and damage codes are already integrated, equally the new established '**Standardized annotations**' and the appendent tables and calculation regulations. All single values for every damage appear in a clearly arranged list according to the quality target.



Subsequently costs for single- and route damages can be assigned to the rated damages. On demand a further function arranges in the location plan a redevelopment code and -symbol to the damages. The user receives a detailed calculation of the damage classes, of the cost and of the redevelopment suggestions with a location plan, that is appropriate shaped.

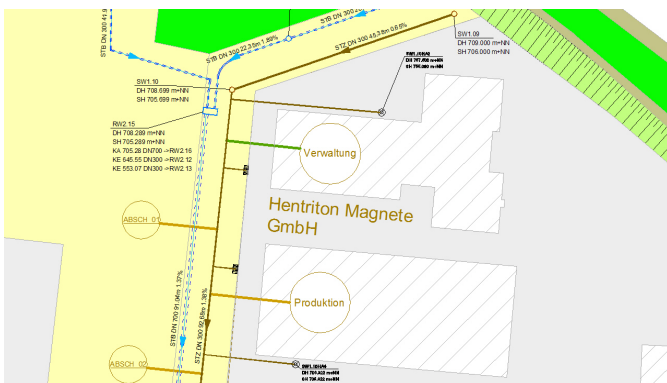
Special feature: The program manages the 'old' inspections and the new ones (according to EN 13508) side by side: both damage types can be represented in the plan.

5.7 Indirect discharger

The indirect discharger database consists of the following objects and relations:

- companies,
- transfer points (dedicated to the company),
- substances and waste (dedicated to the company),
- separation (dedicated to the transfer point),
- wastewater inspections (dedicated to the company or to the transfer point).

The local companies with their specific data are in this way recorded in a database, that an assignment of the transfer points to the particular companies can be conducted. During a contamination of the wastewater it is possible, with the help of facts, such as substance and direction of the inflow, to gather within the database upon the polluter (with the help of search- and filter functions).



With the aid of critical values a specification is possible, which can cause an contamination. A graphical presenta-

tion is possible in the CAD for the net tracking of pollutants. Thereby the affected manholes and reaches are highlighted with color.

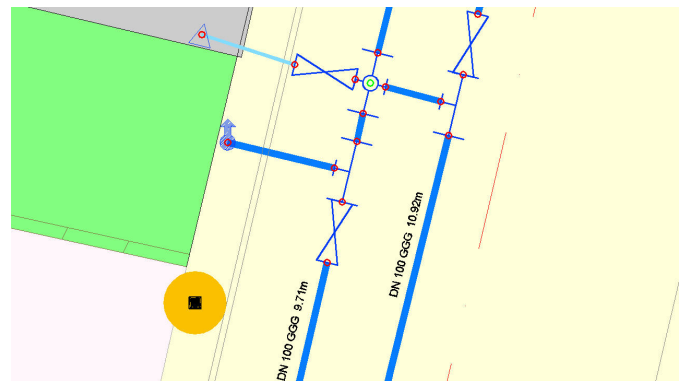
5.8 Interface Isybau, HYSTEM-EXTRAN...

In the civil engineering software different import/export modules are, as integrated sewer-interfaces, available for ASCII, ISYBAU 96/01, ISYBAU 2006 (XML), DWA-M 150, HYSTEM-EXTRAN, INGRADA, Stanet and for 15 other sewer investigator-formats. These guarantee the safe data transfer.

Geographic information like covers, bottom, connections and conduit connections is directly transferable from the electronic field book into the database. A specific option for the data exchange is the bidirectional Sicad-interface. The database searches per mouse-click on the hard disc or the CD-drive for the corresponding photos to a damage.

5.9 Water supply

With the civil engineering software BBSOft® 'water supply' objects, like fittings, house connections or conduits are planned in the CAD and administrated in the database. An extensive list of fittings is available for the user. In the planning the user falls back on measuring points, lines or polylines (2D or 3D). The integration of the fittings occurs automatically in the existing conduit, with adjustment and height interpolation. Additionally individual samples can be compiled and released for recurring operations

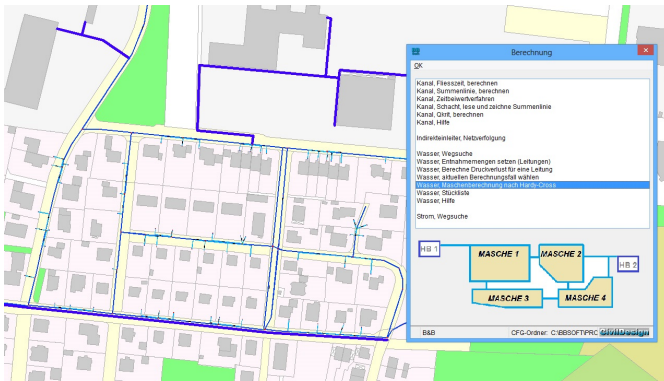


A profile presentation with cutting conduits and with collateral sewer sections is possible across the whole conduit section. In the longitudinal section the falling gradient between water nodes can be adjusted and additional nodes can be inserted in the conduits. The automatic actualization occurs in the longitudinal section, in the location plan and in the database.

Information for location and adjustment of the elements as well as single components with corresponding notation is included in the database. The user can administrate details for redevelopment and for hydraulic data: these serve as a basis for the following net calculation.

5.10 Water network calculation

With the water network calculation the user receives a separate civil engineering solution with several tools for the calculation of a pressure pipe system (according to Hardy-Cross). The different applications are directly explicated in the CAD-drawing and the results are automatically written down to the database. Whether the whole water network is closed can be checked with the water-flow path. All conduit sections in the net will be marked, which can deliver water to a specific pipe.



The program calculates extraction quantities and determines, based on the extraction quantity and on the flow, the pressure loss for water conduits.

The user has to apply one or more water reservoirs for the water network calculation. The coefficients of roughness and the extraction quantities have to be defined at nodes and conduits. The program determines the pressure loss for single conduit sections under consideration of different calculation cases (loading/fire conditions). Opened and closed valves are included in the calculation, therefore different zones of a net can be calculated. In the calculation protocol, besides the meshes and conduits, intersections and fittings are registered. Fittings, that go beyond or rather below the predefined minimum and maximum pressure, are highlighted. In the location plan the incoming and the outgoing water quantity, the extraction quantity and the pressure head loss at nodes and conduits is automatically inscribed.

5.11 Options for data acquisition

Strategy 1: Sewer example: Across the integrated interface the automatic evaluation according to DWA or rather ISY-BAU can determine the condition of a reach after the import of the sewer inspections. Previous applying of manholes and reaches isn't necessary. The program assigns further data (like coordinates of a reach) autonomously. The generation or rather tracing of location- and damage plans occurs by the program.

Strategy 2: The coordinates of a manhole will be (for example) digitized. The import of the inspections follows, if applicable an automatic evaluation according to DWA or ISYBAU.

Further editing: Program functions in the CAD-plan or in the data screen are now available for the user for the sup-

plement or for the control of the data. General data (DWA-XML, Isybau-XML and type K) as well as BBSOFT®-specific formats can be imported. For example a DWA-XML- or a Isybau-XML-file develops during a sewer inspection. The provided list of pipe material contains all current standard profiles and can be expanded.

6 Water planning

The water planning is used for the observation and implementation of all geomorphological and water-ecological fundamentals. Under the hydraulic, hydrologic and ecologic aspects waters in Germany are analyzed, observed and planned according to the EU-water framework directive. It is possible to conduct environmental sustainability studies on the just mentioned fundamentals, to observe or to evaluate the development of watercourses or to build a biotope cadastre.

The civil engineering software BBSOFT® is a flexible tool, which is in total accordance with the requirements of a **water-/dike planning and the surveying of a river**. The software offers you the opportunity to observe the development of waters and to conduct the maintenance planning as well as the renaturation of watercourses. The BBSOFT® water planning is composed of the modules dike planning and surveying of rivers, which make it possible to plan dikes and flumes as well as to generate automatic profiles of courses of rivers.

Specific adjustments for the fields water development, planning of water courses, river engineering and the planning of dams are also implemented in the software. Additionally there are options for displaying of flood plains, flooded surfaces and filling or rather excavated areas.

BBSOFT® makes it possible for you to plan dam bodies interactive, to generate longitudinal- and lateral profiles and to export masses.

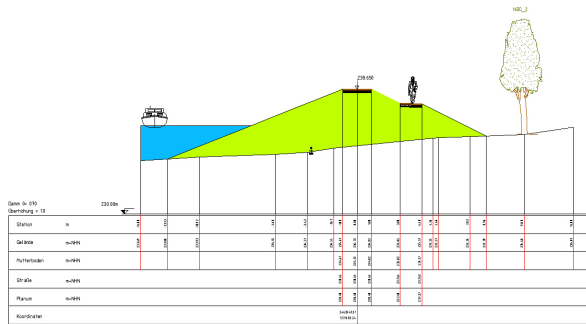
The surveying of a river serves for the observation of all with the waterway connected important parts, like bridge constructions, vegetation, sewer inlets and weires. Furthermore water tables and historic water levels could be illustrated in the profil.

The import or rather the export of DXF™/DWG™, LandXML and the REB-conform interfaces belong naturally in the same place to it. It is possible to transfer these results to hydraulic calculation programmes (Jabron, Rehm, WSP-WIN, WSP-ASS).

6.1 Dike planning

An alignment is specified on the basis of a terrain model by the **water-/dike planning**. The alignment can be made up of CAD-lines or she can be modelled with the alignment construction of the civil engineering solution "location". The planning in a longitudinal section allows an accurate definition of height and falling gradient of the crest or rather of the channel bed. Further information, like ground levels, sta-

tions of the location plan as well as crossing elements, can be illustrated synchronically also in the longitudinal section. The user defines dam embankments, service ways and retention areas while he is supported by a dialog. At this point it is also possible to indicate specifications of heights, widths and slopes. If materials and embankment proportions are familiar you could use these as well. A comfortable planning is possible through consideration and displaying of constraining heights, borders or bridges. The user experiences the maximal support through lists of material and water profiles, which he can configure freely.

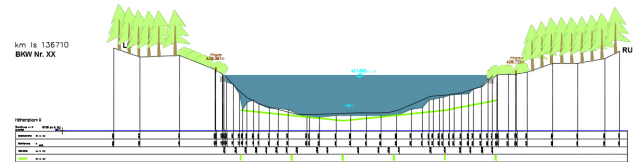


The cross-profile editor offers the opportunity to move through the scheduled water-/dam body. The "Show"-order draws every favoured cross-profile as a CAD-element with desired text-dimensions, scale and as well hatch patterns. Crossing elements like borders, conduits or cables, are also illustrated. These are drawn differently corresponding to their type. Naturally at this time also the vegetation or trees are discernible. The program distinguishes between the diverse levels through the selection of the terrain models. Therefore different gauges can be simulated or rather measured and without any further graphical effort the cutting line, inclusive the filling of the surface, can be represented in the CAD. The DA51, 53, 54 and 66 can be imported and exported for the mass confirmation, apart from the data of the alignment in form of the data type 21, 40 and 50. As an additional examination a record of the alignment is written. Ground levels of dam or rather flume can be displayed as ASCII-file. The results are transferred to hydraulic calculation programmes (Jabron, Rehm, WSP-WIN, WSP-ASS) by means of DA66. BBSOft® makes with LandXML a channel of communication available, which is to this time in the world of civil engineering the latest!

6.2 River surveying

River surveying is used for admittance and continuance measurement of waters. The civil engineering software was developed in cooperation with the LfU (Regional office for environment protection, Baden-Württemberg) and the BAFU (Federal Office for environment, Switzerland). The applications are directed especially at the surveyors who record and analyze a river water body-specifically and at hydraulic engineers as precondition for further calculations. Surveying data is available as basis, which was recorded stationary and

which can be provided with up to three different codings pro measuring point. The user can very easily determine the appearance of his symbols by size, angle, distance as well as his labelling, briefly, he can determine the entire presentation of his obtained data in the profile and he can design his plans individually quite comfortable.



Further specific features:

- multiple codings for vegetation and subsoil,
- profile with for yourself defined grid,
- processing of sonar recordings,
- representation of the high tide mark, of crests, bridges and barriers,
- automatic marking of water level height,
- evaluation and representation of historical profile measurements,
- data exchange by Interlis2, WPROF, DA66,
- output of lists.

7 Urban planning

Which engineering office or civil engineering department doesn't wish for an extensive software solution, which hold a proper tool ready even for not frequently occurrent requirements? A lot of work is still carried out manually in the AutoCAD® (e.g. the drawing of master plans), because of too high costs for specialised software. How many time could be stunted through omitted tedious adaptation- and selection processes, information procurements and test phases, if only one additional activation for a module is basically needed?

For this reason BBSOft® offers functions, as a supplement to the planning modules, for the faster and more comfortable creation of parametrizable 3D-buildings. From simple single houses over school- and office buildings to churches and castles the ground-floor plans, which are available in the CAD out of ALKIS, can be converted. Of course we offer as well a tool for the signatures of the map symbol V90. This fits in perfectly into the handling of the other modules and offers the possibility to compile high quality master plans.

Additionally for every client is the base module available, a tool for the calculation of surfaces and the generation of own, even complex signatures: route types with blocks, but also surface signatures with fore-and background hatch patterns and additional symbols, facilitate a high quality planfinish

according to the actual standards.

7.1 Standard for map symbols

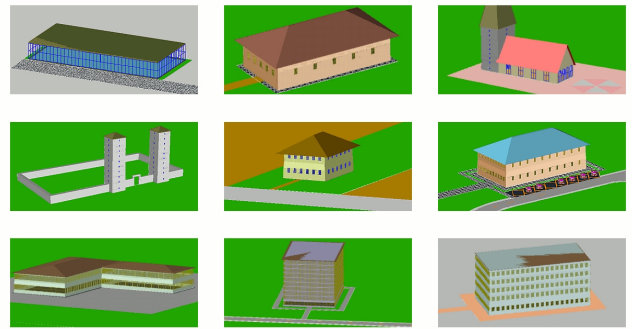
The civil engineering software **BBSOft®-map symbols** contains an easy handling of land use- and urban plans under consideration of the standard for map symbols 1990. After an appropriate selection the surfaces are automatically shaded or represented as a colored surface and armed with the necessary symbol. Through simple selection a change in another scale is possible and the symbols are adjusted also. An editor, which is easy to handle, manages the surfaces by groups, sums up the numbers and subareas and makes a quick transformation of a surface to another map symbol possible. Check routines and optical warnings prevent the accidentally creation of double surfaces or the transformation of already dedicated signatures. The selected surfaces are calculated and statistics of the surfaces are represented. These are in turn automatically induced by the program, after the appropriate command. New drawing subjects are filed on separate layers. Across modules a legend function induces a detailed legend in the model- or layoutarea. Alternatively annotation texts of your own can be integrated. Map symbols are complemented through hedge- and wall signatures, which can be individually adjusted in width and hatch pattern. Of course applying of own elements and signatures, for further plan design, is possible too.



7.2 3D-buildings/3D-appointments

Parametrizable 3D-buildings and walls represent an ideal supplement to road planning. Without any further effort a street can be visualized. Therefore twelve predefined building- and six wall- or rather fenceprototypes are available, which can be later adjusted with the help of extensive parameters. The possible selection between roof types like hip-, flat- or gable roof, overhang, pitch and color of the roof, height and paint of walls, number of floors, number of windows per wall and type, height, width and color of the windows allows for much possibilities during the configuration. Additionally you have the chance to add a ground plus to project the buildings on an already existing DTM. The storage directly at the CAD-object of use, street and house number establishes in turn the connection to the ALKIS. All objects are composed of AutoCAD® 3D-surfaces on variable layers and form therefore

an excellent starting point for the handover to the visualization programs. Even the simple visualization through angular views and shading functions in the CAD provide the planner a very good basis for presentations.



3D-buildings out of the property cadastre

As quick 1-click solution serves the generation of standard buildings directly out of the building ground-floor plan in the database. All buildings with standard values are converted with an unique image buildup. This act is very easy and provides a certain overview. It is planned, in the course of the incorporation of building parameters in the ALKIS on the part of the land surveying office, to import these data in a database and to copy the buildings realistically with the help of their characteristics like e.g. number of floors or ridge height. Therefore the cost-intensive and complex installation of additional software, for the generation of a 3D-citymodel for planning purposes, is omitted.

8 Calculation of quantities

The module "calculation of quantities" can be treated as a graphical addition component to current AVA-programs, because these don't have a graphics connection and are more likely organized in list- or hierarchic structures. Additionally you can't directly import site measuring for the purpose of correction. The correction of lengths, surfaces or number of objects has to occur manually outside of the tender program, which is a defective and complex task. The module "calculation of quantities" adopts this step: the software indicates the differences after the import/ the recording of the surfaces and of the measuring points in the CAD and after the import of the corresponding bill of quantities over REB DA81-DA86 and you transfer the real site measuring data per data interface DA11 automatically to the tender-program and to the accounting routine. If the units of the CAD-object (e.g. m²) don't match with the corresponding units in the bill of quantities (e.g. m³), the user immediately receives a warning and the color of the texts changes to red. Complementary a module for the sewer mass calculation is available according to ATV A 139 or rather EN 1610, which calculates the excavated mass of a sewer trench.

8.1 Accounting of CAD-objects

The module "calculation of quantities" makes a quick acquisition of surfaces, lines and punctate objects off the CAD possible, also the transformation in accounting objects/material allocations and their connection to the bill of quantities with automatic quantity control is possible. An import interface GAEB DA81-86 is available. One or multiple positions can be assigned to every object and vice versa a position can naturally comprise diverse surfaces. A quick import of site measurements is integrated, too. The replication with the employer occurs as a difference data file REB DA11.

Acquisition:

The calculated CAD-elements can be selected with the help of different filter functions (e.g. after surfaces, polylines, points and layers) or via selection and they can be converted to accounting objects in one operation. These could be for example: pavement surfaces, topsoil filling, kerbs, gutters in running meters, trees or bollards as simple elements. In the same operation an AVA-file (e.g. DA81) is imported. An editor indicates for you all objects, classified according to type or unit, as well as the bill of quantities with the positions. The positions can be ordered too (according to different criteria), to facilitate the assignment. The assignment takes place via "drag and drop" in the bill of quantities-editor. The processed CAD-elements will be marked in color after the occurred assignment, similarly to the positions, which already have an assigned CAD-element. This increases the clarity and avoids mistakes. Different formulas of the REB 23.003 can be assigned to simple objects for the general calculation of quantities. Also solid calculations are possible at the surfaces (across a definition of layer thickness).

Presentation:

It is made possible for the user to compile an extensive list or library of signatures or rather accounting types (asphalt, pavement, grass seeding and topsoil filling) for the simultaneously and high-quality plan design of accounting plans. A base library will be included, whose entries can be copied as samples. Display settings are not only color, types, widths and angles of hatch pattern- and border polylines. Further important display settings are: the automatic inscription of name, of 2D/3D-surfaces, of 2D/3D-lengths and of segment dimensioning, the calculation and inscription of the barycentres and the coordinates with or without z-component and their distances. The measured surfaces get a surface name and are automatically counted up. The accounting objects become CivilDesign[®]-elements, which can be individually changed at all times with the [edit element]-command (assign to another accounting type and change the name). The position of the text of the surface inscription is stored and can be changed via CAD. A map frame-function compiles high-quality layouts in the CAD under consideration of the in-house title block, of individual north arrows and of the optional generation of coordinate planes with adequate inscription.

8.2 Cross-profile accounting

One further function is the automatic acquisition of cross-profiles with integrated accounting according to Elling or ÖNorm. It is possible to comprehend quickly an accounting from cross-profiles, which are only graphically existent in the CAD.

Acquisition and presentation:

The settlement clerk receives a plan with drawn profiles. The compiler records the profiles after the definition of a conversion table. A frame at the cursor allows for the exact acquisition of single profiles. The software converts automatically all surfaces, compiles contour points around the single horizons, generates a map frame in DIN A4 or DIN A3 and inscribes the profiles with all necessary lists (e.g. with surface lists with m²-specifications, contour point lists with coordinates and numbers as well as with project names and with data of the compiler).

Position assignment:

After the acquisition all levels and cross-profile components appear ordered in one editor and can be assigned per 'Drag and Drop' to one position in the bill of quantities. Special filter functions allow the ordering of the horizons according to station and cross-profile component or according to material or rather levels.

Accounting:

The accounting occurs over a report generator. As an option accountings are available sorted by project and material, by material or by number of cross-profiles. An automatic calibration of the units and checking routines draw attention to different units between the bill of quantities and the recorded CAD-objects. A volume calculation can occur through an extension of the features (by the indication of a level thickness).

Export and transfer:

An automatic plot function sends all profiles to the favoured plotter and centers the profiles on one sheet. The profiles can individually be saved and sent as an PDF. An export of the difference data in REB DA 11 as well as in ÖNorm B2114 and B2114 XML is possible too.

8.3 Sewer mass calculation

The module 'calculation of quantities' contains a sewer mass calculation according to EN 1610 and to ATV A 139. Thereby the calculation of the sewer trench can occur via a standard interface or directly from the database. The calculation isn't bound to a database, it is possible to operate the module reclusively, too. A library, ordered for pipe diameter and material, makes the individual adaptation of the external diameter or rather of the wall thickness possible at the preferred pipe manufacturer. It is possible to define different trench widths, if the user want to diverge from the norm. Pipe bedding, embedment and trench width are calculated according to EN 1610, to ATV A 139 or according to constant values. The widening of a trench can be calculated with or without trench lining, different support angles are possible. The working space for the manholes can be indicated

explicit. Further calculation parameters are available for the excavation depth. During the use without the database the presentation of the net can also occur without the CAD, so that at all times an overview above the just calculated pipe section exists.

Result:

A detailed protocol is compiled, in which the calculated parameters (e.g. medial depth of the trench, surface, total area, excavation, frost protection, soil replacement and pipe extrusion) with the used formulas are clearly arranged listed in a document for every reach or rather for every manhole. The output of the total volume is possible at the end of the accounting. For the evidence a detailed legend with corresponding graphics is compiled, which exemplify the parameters. For the future a connection to a bill of quantities is planned, with it the calculated values can directly be assigned to a position and can be exported via DA11.

9 GIS

Our GIS- information system, based upon the free of charge Oracle[®]-XE-database, offers engineering offices and communes the possibility to represent and to administrate specific geodata functionally, easy to use and clearly arranged.

Through the optional CAD-connection additional possibilities are available for the user for the graphical editing, for the plannings, calculations and for alternative presentation possibilities.

BBSoft[®] helps you to stay flexible as an user, because with our GIS-system you can generate quickly, uncomplicated and without additional costs your own application modules with associated technical data masks.

BBSoft[®] makes i.a. the following GIS - application modules available:

- Property cadastre (parcels of land, buildings, borders, lease, topography)
- Split sewer charge (sealed surfaces)
- Hunting cadastre
- Mobile mapping
- Cemetery cadastre/cemetery administration
- Environment (green area, tree, stream, dangerous waste, recycling)
- Traffic area (lamp, sign, condition)
- Building

9.1 Data exchange

The data exchange is needed in order to pass on technical data to e.g. an engineering office or to a commune. BBSoft[®] offers the possibility to export technical data in an ASCII-, a HTML-, an Excel[®], an odt.- or simple in a txt.-format.

Special features:

- A direct access with Microsoft[®] Access[®] and with ODBC-capable programs is possible.
- All existing technical data information can directly

be exported out of the database, also as Shape-files (points, lines and surfaces).

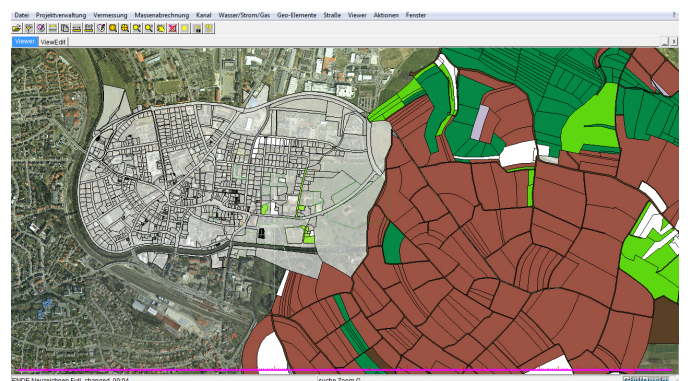
- It is possible to specify precisely by a editor, which technical data should be exported out of the database (areas could be renamed or deleted completely).
- An attribute-statistic can be compiled directly from the database: the number of the objects as well as their type of use are registered there.
- The output of an additional location plan is optionally available.

9.2 Presentation

The presentation of the GIS-data, like for example for the groups sewer, water, power and for all further application modules, occurs at the BBSoft[®]-viewer. This displays the geographical position of the technical data from the Oracle[®]-database and serves for the graphical representation.

Special features:

- Single objects (e.g. houses or green areas) can be displayed in the GIS-viewer.
- With the help of an filter-editor it can be searched for special technical data (e.g. according to the name or to the use).
- The technical data regulates the presentation (e.g. colouring of the buildings and inscription of the parcels of land).
- The information content within the viewer is dependent from the adjusted scale.
- Multiple layers can be selected simultaneously for a differentiated presentation (e.g. buildings, house connections and green areas in one figure).
- A full-scale printing of the view in the viewer-window is possible (e.g. 1:100, 1:250, 1:1000).
- Distances between objects or complete area sizes can be measured in the GIS-viewer.



9.3 CAD-connection

BBSoft[®] provides a CAD-connection in order to make a specific elaboration and a clearly arranged presentation of their GIS-data for users possible. In this way entire database projects can be loaded and edited uncomplicated in the CAD.

Special features:

- The location plan can be further elaborated graphically in the CAD and consequently a professional presentation can be achieved.
- Objects of the database can be marked and inscribed with different colours.
- Already existing drawings in the CAD can be reviewed with the help of the data of the database and can be adjusted if necessary.
- It can be determined, which contents of a drawing shall be updated in the CAD by means of the Oracle®-database (all objects or only the visible ones in the selected area).
- Elements outside of the selected area are deleted during the redrawing. This process ensures the clarity of a drawing.
- Inserted additional-inscriptions in the CAD can be simply transferred in the database.
- BBSOft® synchronizes the input at the database as well as in the CAD during changes of the data in the location plan.
- A printing true to scale is possible out of the CAD.

9.4 Property cadastre

The BBSOft®-module Property Cadastre serves communes and engineering offices for the administration of cadastral data, which they receive from the land surveying offices or from the administrations of surveying. It is a pure information system, which holds information about plots and their owners ready.

Special features:

- The converted data can be directly imported as DXF™/DWG™ in the CAD or in a Oracle®-based database.
- Technical data of buildings and parcels of land can be exported as a list or in terms of detailed overviews.
- The user can regulate the graphical configuration in the database (colouring of buildings and of agricultural areas).
- The BBSOft® update 2015 is going to make it possible to import continuance data and to facilitate thereby the adoption of changes in the database.

In order to use the above mentioned functions for the cadastral data in BBSOft® primarily these have to be imported with our NAS-converter.

9.5 Split sewer charge

BBSOft® offers, with the module Split Sewer Charge, the possibility to conduct the calculation of the sewer charge according to rules for the precipitation amount, which is induced from every parcel of land in the public sewer system. The number of square metres of the sealed surfaces is automatically calculated. The areas and surfaces from the official property cadastre serve as basis for acquisition. These were obtained through aerial views and scanned charts. Com-

munes and engineering offices are supported at all stages of the surface determination.

Special features:

- The cropping of the considered parcel of land occurs automatically and facilitates the work enormously.
- Deposited aerial views allow for an accurate evaluation of the covering surface.
- The surface detailing can be determined by the user in person, e.g. only the roof surface area according to inclination classes or to the pavement types.
- Functions for plotting allow for the compilation of full-scale plans.
- Generation of full-scale parcel of land plans, in which the citizens can insert supplements and annotations.
- The addressees of the notifications of charge could be imported in the database from existing Excel®-lists.
- Prefabricated example cover letters for the information disclosure are included as a sample (Microsoft® Word or Apache OpenOffice™).
- The automatic generation of serial letters is possible.
- The collected data can be transmitted to the responsible office for the cost estimation and for the notifications of charge.



9.6 Hunting cadastre

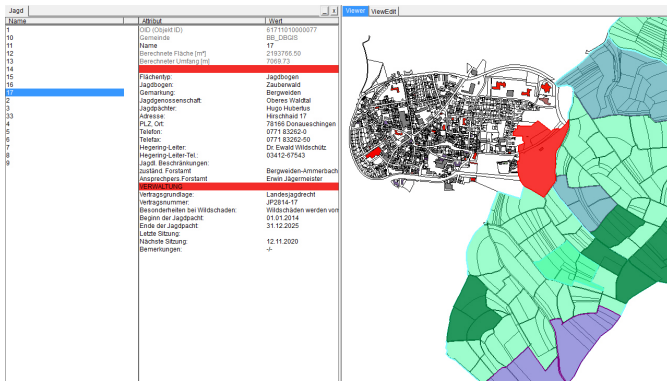
The module Hunting Cadastre administers clearly all hunt-able surfaces. Extensive information is supplied, besides the surface type, e.g. about the hunting association, about the tenants of a hunt and about the chief of the hunters' association, about the responsible forestry office (with the respective contact person) and detailed information for a lease contract is provided.

Special features:

- A visually appealing presentation with predefined signatures for hunting grounds, pacified areas and parcels of land.
- Individual setting options for the inscription (area size, tenant of a hunt and end of the tenancy of a hunt).
- The output of individually designed reports and invitations to hunting conventions, in Microsoft® Word or Excel® is possible.
- Comfortable administration of convention protocols, which can be directly opened and edited in Microsoft

Word®.

- Implementation of counting of votes after hunting conventions, at which the presence of the owner as well as the area size of the parcel of land are considered.
- Pacified areas are automatically excluded from the counting, because they house small towns or farms and doesn't count to the hunting ground.
- The polygon overlay of pacified areas and hunting grounds can be clearly illustrated in the Viewer window.
- All plots are apparent in an extensive presentation through the loaded cadastral data in the background.



9.7 Mobile mapping

Patented system for the acquisition of street damages, of the communal infrastructure and for the controlling of existing GIS-data.

With this collective development B&B Ingenieurgesellschaft mbH has taken over, with the engineering office Wolfert, the leading role by the acquisition of the traffic area. A range of forward-looking innovations makes the acquisition, the checking and the supplement of geodata to an unbeatable cost-performance ratio possible. Two further sensors are evaluated for the complete data gathering with the already from other systems used components GPS, Video and Laser. Therefore the driving under trees or bridges doesn't direct to the loss of the quality or to the break-off of the measuring.

The acquisition by video makes it possible to digitize street damages and the street accompanying, communal infrastructure in a FullHD-video and to save these automatically in a geo-database. Already existing objects (trees, lamps, manholes and reaches) are indicated in the GIS-database during the digitization. Therefore the replication of existing geodata is possible in the running film.

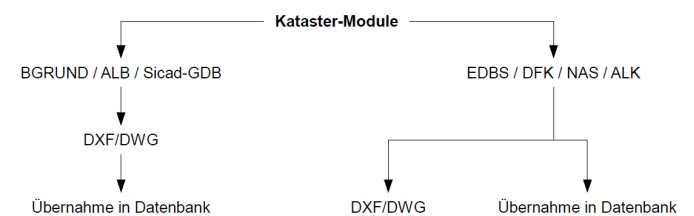
The big price advantage results from the fact, that only one vehicle (manned with one person) drives, instead of a whole surveying team and that all things, which are visible, are put on record. Only single elements are recorded by tachymetrical recordings or by handheld. The input in the geographic information system can occur to every arbitrary time, regardless of the weather! One video can be used at several times for different purposes. During classical surveying a new measurement has to be conducted for every task (e.g. trees or

manholes). Important: it is no simple self-contained Stand-alone software, but it is an open system consisting of an acquisition tool, a database surface with viewer and optionally with CAD-connection.

The data acquisition and digitization is in 400gon (all around) possible and is inch-perfect. Vertical clearances, eaves or hanging lamps over the street are ascertainable. Through successful practice and further improvement in the last years a system with the highest cost-benefit ratio is available for you for rental or for purchase.

10 Cadastre ALK/ALKIS

Cadastre comprises the area-wide description of all parcels of land of one section or of one land. The geometrical position, the structural properties, the kind of use and the size are specified in a descriptive part (ALB) and in charts (ALK-Automated guided property chart). The civil engineering software BBSoft® makes interfaces available, like NAS, EDBS, BGrund and DFK for the conversion of the cadastral data of the land surveying offices.



The user has the possibility to add missing parts of the cadastre out of analogous charts afterwards or to keep the cadastre permanent up-to-date through the continuance data. To a greater extent the property data is hold available in geographic information systems (GIS) because of the great amount of data. For this BBSoft® offers the user a GIS-database import. Through easy orders in the screen view it is possible to look with the GIS-Viewer, at technical data, to print plans according to scale, to search for characteristics or to measure surfaces and distances. The user interface can be handled intuitively and no special training is necessary.



10.1 General

The stocktaking is one part of surveying. It deals with the acquisition and the documentation of topographies. In line with this surveyings the recordings are made during external work to make it possible after this to generate an accurate evidence of the available stock in the actual state.

Stocktaking is carried out through the BBSoft® - base module (SurveyCAD).

Through auxiliary functions you can:

- design location plans individually,
- digitize cadastre plans,
- measure distances in 2D and 3D,
- determine surfaces.

Through the adequate presentation you can additionally:

- adapt measuring point symbols individually,
- execute symbols in libraries and layers
- generate map frames easily.

Also different data formats like:

- DWG™, DXF™,
- Microstation, EDBS, NAS, LandXML
- ArcView, ArcInfo, MapInfo are imported.

The digital cadastre charts of the land surveying offices are described with the following formats:

- EDBS
- BGrund
- Sicad
- Grips
- DFK
- NAS

10.2 NAS

The standard-based exchange interface (NAS) was defined in line with the introduction of the geographic information systems AFIS, ALKIS and ATKIS (AAA-model). This data interface serves for the exchange of geo information. Henceforth the until now accepted data formats BGRUND, EDBS and DFK are replaced through it. The BBSoft® NAS-converter translates the XML-based property cadastre in CAD- and in database utilizable files. The extensive data model of the BBSoft® solution contains an expansive conversion catalogue. This one supports the different requirements of the federal states. It is possible for the user, if desired, to adjust the ALKIS import to his own office standards. Without any problems an import of several XML-files in only one pass is possible. It is possible to manage the huge amount of data quickly and clearly through the import in a GIS-database (GIS-Viewer).

DXF™/DWG™ output

The BBSoft® NAS-converter offers in contrast to the simple NAS-converters on the market, besides the possibility to generate GIS-data, also the automatic generation of a DXF™-location plan (CAD).

The conversion generates geometric objects in the form of points, lines, surfaces and texts. The presentation occurs on different layers, which the user can control across a conversion table. Every object is filed under his specialised meaning on a separate layer during the presentation of data in the CAD.

Special care is taken on professional implementation of points. These are not only illustrated with the help of their professional symbolism. Also the kind of bench marking and the quality level can be visualized. These are therefore available as basis for the surveying-technical analysis and calculation and also for the pegging. The use-related filling of the surface can be determined by closed polylines (buildings or parcels of land).

Adoption in the Oracle®-database

It is possible to take over all the ALKIS and ALB data in the Oracle®-database through a particular file format. Diverse presentation methods are available from here. The data can be represented in the BBSoft®-viewer and you will receive access to the ALB-data, belonging to the object, very easily. A view with 3D-buildings can be generated quickly. Of course the project can be represented in the CAD, also.

Additional features of the BBSoft® NAS-interface are e.g.:

- it is tested with the official test cases of all currently delivering federal states and adapted to GeoInfoDok 5.1, 6.0, 6.1,
- user-specific presentation methods like e.g. free layer- and symbol assignment,
- flow arrows and belonging lines for water courses and parcels of land,
- prepared libraries with hundreds of symbols and presentation options,
- preset hatch patterns for better determination of main- and adjoining building (e.g. depending on type of use),
- presentation of parcels of land with boundaries of types of use,
- determination between kinds of bench marking for limiting points,
- separate parcels of land (islands),
- adoption of posting data,
- possible import in geo database,
- adaptations and corrections, which occur continuously on the NAS-format, can be obtained online,
- adoption of embankments with top-, lower edge and hatch patterns,
- selection of the elements which shall be imported (points, texts, lines, parcels of land, buildings),
- adoption of limiting- and topographical lines in the database,
- differentiation for limiting-, recording-, covering- and other points. Separate marking of trigonometrical points,
- presentation is controllable for point type, for data origin and the kind of bench marking,
- it is possible to storage optionally all point attributes in one database for precisely analysis (origin, quality and

- trustworthiness),
- texts can be imported separately depending on the associated presentation model, the adjusted height of texts and the deposition on different layers.

- waters and topographical information,
- administrative borders.

10.3 EDBS

The EDBS (an uniform database interface) is a data format, which comes into operation for the exchange of cadastral data of in Germany ordinarily used property charts (ALK) . The working-group of the administrations of surveying of the federal states of the Federal Republic of Germany (AdV) has determined this specific data format as interface for the data exchange. The geometries (e.g. borders or buildings) and their specialised meanings (e.g. parcels of land or residential building) are the essential contents of this data format (ALK, ATKIS). It is possible to generate the EDBS-data as a DWG™ -/DXF™ -drawing file or to transfer it in a GIS-database.

For this the civil engineering software **BBSOft**® offers the following possibilities:

- user-specific presentation methods, like e.g. free layer- and symbol assignment,
- selection of the EDBS-slides, which shall be represented,
- flow arrows and belonging lines for water courses and parcels of land,
- embankments are represented as surface and line, separated for top- and lower edge,
- it is possible to hatch main- and adjoining buildings, depending on their type of use,
- presentation of boundaries of type of use,
- determination between kinds of bench marking for limiting points,
- adoption of arc elements,
- consideration of spatially separated parcels of land, e.g. separation by rivers,
- optional import of the point data format EDBS.

10.4 DFK

The digital cadastre map (DFK) contains the graphical information of properties (plots and buildings). The interface format DFK takes over the essential part of the bavarian administration of surveying, because it serves for the exchange of the digital cadastre maps. Besides the automated property book (ALB) this is the second component of the official plots- and subsoil information system (GRUBIS).

The digital cadastre map contains:

- borders and numbers of parcels of land,
- buildings inclusive the house numbers,
- names of streets and parcels of land,
- details for boundary and community,
- location notation,
- borders and notations of types of use,
- limiting- and surveying points,

11 Appendix

11.1 Reference Customers

Germany

MVV Energie AG

Neckarvorlandstraße, 68159 Mannheim, www.mvv.de

Landeshauptstadt Saarbrücken – Stadtplanungsamt

Bahnhofstraße 31, 66111 Saarbrücken, www.saarbruecken.de

Landeshauptstadt München – Vermessungsamt

Blumenstraße 28b, 80331 München, www.muenchen.de

LEG Nordrhein-Westfalen

Ross-Straße 120, 40476 Düsseldorf, www.leg-nrw.de

Reutlingen, Tiefbauamt

Marktplatz 22, 72764 Reutlingen, www.reutlingen.de

Stadtverwaltung Elmshorn, Schleswig-Holstein

www.elmshorn.de

Björnsen Beratende Ingenieure GmbH, Koblenz

Maria-Trost 3, 56070 Koblenz, www.bjoernsen.de

Stadtverwaltung Biberach

Sernnhofgasse 4, 88400 Biberach, www.biberach-riss.de

Stadtverwaltung Bad Urach, Tiefbauamt

Marktplatz 8-9, 72574 Bad Urach, www.badurach.de

Bundesstadt Bonn, Stadtverwaltung

Berliner Platz 2, 53111 Bonn, www.bonn.de

Ingenieurbüro Henz und Pusse

Schloßbergstraße 58, 66440 Blieskastel, www.henz-pusse.de

Westpfälzische Ver- und Entsorgungs-GmbH, Kaisersl.

Blechhammerweg 50, 67659 Kaiserslautern, www.wve-kl.de

Stadt Kaiserslautern

Willy-Brandt-Platz 1, 67653 Kaiserslautern,

www.kaiserslautern.de

Überlingen Tiefbauamt

Bahnhofstraße 4, 88662 Überlingen, www.ueberlingen.de

Gemeinde Hohberg (7900 Einw.)

Freiburger Straße 30-32, 77749 Hohberg, www.hohberg.de

Stadt Blumberg (10 000 Einw.)

Hauptstraße 52, 78176 Blumberg, www.blumberg.de

Regierungspräsidium Freiburg, Dienstsitz Offenburg

Ortenberger Straße 11, 77654 Offenburg, www.rp-freiburg.de

Niedersächsische Landgesellschaft mbH

Arndtstr. 19, 30167 Hannover, www.nlg.de

SI Beratende Ingenieure GmbH + Co. KG

Bahnhofstraße 4, 73235 Weilheim a. d. Teck,

www.si-ingenieure.eu

Ingenieurteam Michael Jouaux

Am Waltersberg 2, 97947 Grünsfeld, www.jxnet.de

Ingenieurbüro Fritz Spieth GmbH

Fritz-Müller-Straße 143, 73730 Esslingen, www.ib-spieth.de

Vermessungsbüro Wolfert

Daimlerstr. 8, 74909 Meckesheim,

www.Vermessungsbuero-WRS.de

Switzerland

Axpo Power AG / Nordostschweizerische Kraftwerke

Parkstrasse 23, CH-5401 Baden, www.nok.ch

Locher Ingenieure AG

Pelikanplatz 5, CH-8022 Zürich, www.locher-ing.ch

FKL & Partner AG

Laufenbrunnenstrasse 36, CH-9472 Grabs, www.fkl.ch

Kanton Aargau Abteilung Tiefbau / Zentrale Dienste

Entfelderstraße 22, CH-5001 Aarau, www.ag.ch/tiefbau

Schällibaum AG

Ebnaterstrasse 143, CH-9630 Wattwil, www.schaellibaum.ch

Straub AG Ingenieure + Geoinformatiker

Täferstrasse 26, CH-5405 Baden-Dättwil,

www.straub-online.ch

Porta Norda AG

Neumarkt 1, CH-5201 Brugg, www.porta-partner.ch

SRP Schneller Ritz und Partner AG

Nordstrasse 16, CH-3900 Brig, www.srp.ch

Ingenieurbüro Koch + Partner

Im Bifang 2, CH-5080 Laufenburg, www.kopa.ch

Ingenieurbüro Ballmer + Partner

Distelbergstraße 22, CH-5000 Aarau, www.ballmer-partner.ch

GeoplanTeam Hutzli + Kluser

Egliweg 6, CH-2560 Nidau, www.geoplanteam.ch

Leica Geosystems AG

Europastrasse 21, CH-8152 Glattbrugg

KIBAG Infra

Seestrasse 404, CH-8038 Zürich www.kibag.ch

Austria

Strabag AG

Ortenburgerstr. 27, A-9800 Spittal, www.strabag.at

Rüf-Transporte

Im Forst 469, A-6883 Au/Vlb, www.rueftrans.at

Rusaplan GmbH

Alois Orth Allee 12, A-2640 Gloggnitz, www.rusaplan.at

Böckl Erdbau und Abbruch GmbH

Pöllach 100, A-5340 St. Gilgen, www.boeckl.com

Felbermayr Bau GmbH Co KG

Machstraße 7, A-4600 Wels, www.felbermayr.cc

More references can be found on our website under www.bbsoft.de.

11.2 Modules - short description

Module name	short	Application section	Required modules
SurveyingCAD base module	VGR	Survey points management with import/export, CAD-layer and -block manager, automatic print layouts, CAD tools, field book interface	CAD
Surveying calculation	VPKB	Polar point and traverse calculation, hight equalizing...	CAD, VGR
3D-terrain module(DTM)	VDGM	DigitalTerrainModelling basing measuring points, ASCII import/-export, DA58, excavation pits, rainwater basins, slops...	CAD, VGR
Contours module	VHLN	Contours over surface, marking the slope, assembly-line direction	CAD, VGR, VDGM
Section module	VSCH	Creating of sections/profiles, DA66	CAD, VGR, VDGM
Quantity calculation module	VMAS	Volume calculation for DTM, cut and fill (REB), layouting of the results as text and with several display properties	CAD, VGR, VDGM
Cadastral data, 'NAS'	VNAS	Import of cadastral data in NAS format	CAD, VGR
RoadDesign module	VSTR	Streets-aneu-/reconstruction planning, cross sections, alignments, embankment, dam, material calc., tracing list, display properties, ascii export, road design dtm...	CAD, VGR, (VDGM)
RoadDesign optimizing module	VSOP	Graph. change to the axis with tangential adjusting of the lines, clothoid and curves, axle elements dequeue / paste with automatic adapting	CAD, VGR, VDGM, VSTR
RoadDesign Intersection module	VKNT	To drop, bus trakcs, turn equipments, Towed curve, roundabout, wider planning functions	CAD, VGR, VDGM, VSTR
Interface-module: OKSTRA-data	VSTO	Export of route data in the OKSTRA format	CAD, VGR, VSTR
Signature / PlanzV module	VPLV	Userdefined patterns, signs, icons / coloured or hatched areas, PlanzV 90, free designed signatures, area calculation	CAD, VGR
Building cost validation	VMABR	Excavation amounts, recalculation, surface size plan and cross sections, interface to: Isybau, MS Word, MS Excel, REB(DA66), sewer, HTML, GAEB, ÖNORM...	CAD, VGR
RiverSurveying	VFLE	CAD import of river surveying point data, analysis several point information, special profile, ascii export...	CAD, VPKB, VGR, VSCH
GIS Base module	LGGR	Data administration and project management for all Oracle based modules with interfaces (e.g. measurements)	Oracle
Sewer data	LKAN	Layout and treatment of line data in material data mask or in CAD, cuts	Oracle, CAD, VGR, LGGR
Sewer damage statistics	LAS	Calculating damage situation and repairing cost based of the sewer inspection (ATV/ISYBAU)	Oracle, CAD, VGR, LGGR, LKAN
Interface-module: INGRADA	LING	Export of wastewater systems, 'ING/OUT'-format by INGRADA	Oracle, CAD, VGR, LGGR, LKAN
Sewer pipe inspection photo viewer	LPIC	Graph. layouting of manholes, viewing of sewer inspection pictures as AVI, MPG...	Oracle, CAD, VGR, LGGR, LKAN
Sewer pipe damage detail	LHBT	Detail drawing of a pipe with inspection data, in letter size	Oracle, CAD, VGR, LGGR, LKAN
Sewer planing / volumetric calculation	LCPL	Sewer planning in CAD, hyd. calculations (stormwater calc.), rainwater areas, display properties...	Oracle, CAD, VGR, LGGR, LKAN
Manhole book	LCSP	Detail-drawing of structures, view with angle entries...	Oracle, CAD, VGR, LGGR, LKAN
Indirect launcher	LIND	Company data about dangerous material and the connection of their pipes to the public sewer systeme, pollution incident...	Oracle, CAD, VGR, LGGR, LKAN
Water	LWAS	Water supply data with layouting and editing in CAD, network display properties...	Oracle, CAD, VGR, LGGR
Water volumetric calculation	LWSB	Dimension calculation power mains, flow-times, display properties...	Oracle, CAD, VGR, LGGR, LWAS
Power	LSTR	Power supply data, road lighting, presentation and treatment in CAD, network display properties...	Oracle, CAD, VGR, LGGR
GeoElements	GEGR	User-defined database fields with configurable CAD display properties + editing...	Oracle, CAD, VGR, LGGR
Shape-/KML-Export	VSHPKML	Create Shape-/KML data	LGGR