

Sustainable Urban Development in Germany in the 1990s – a Situation Report after 20 Years

Axel Laistner, Hermann Laistner

(Dipl.-Ing. Dr. techn. Axel Laistner, axel laistner consulting UG(hb), Rosenstraße 6, 73466 Lauchheim,
axel.laistner@laistnerconsult.de)

(Dipl.-Ing. (FH) Dipl.-Ing. (FH) Hermann Laistner, Hardtsteige 29, 73466 Lauchheim)

1 ABSTRACT

Already in the 1980s the subject of sustainable urban development was a recognised and coming issue. In this process significant research and development work was done by the now defunct company of POET GmbH and the IfEU GmbH first in West Germany and later also in the eastern parts of Germany. Coming from a solid engineering foundation of project work and research into the structure and efficiency, especially regarding energy and environmental issues, as well as the community political processes, they were among the pioneers of public-private-partnering in urban development. The two companies found themselves in a unique position to react to the German reunification and the ensuing period of transition, to use the un hoped for degrees of planning and development flexibilities.

Now – almost 20 years later – we can look at some of these research and development projects, and have a first discussion on their sustainability success. In this paper and the accompanying presentation, we will take a research project from western Germany (1986 to 1995), the developing understanding of which went directly into the design and execution of a real urban development project in eastern Germany (1991 to 1994), and look how the latter has stood the test of time over 20 years.

What can be learned when comparing the original thought processes with the current status of reality? All these projects were both situation driven (in time and in space), and implemented the developing knowledge on sustainability, as a methodology to ensure project longterm success.

Having been party to this process, as managing employees and researchers in these companies at that time, and having access both to the documentation and other then leading engineers and planners involved, the authors can give a unique perspective covering the whole time period.

At present a new relevance develops in this activity field. The current urban development schemes in China, India and many other places of the world are of such scales, that questions of doing it right, while doing it timely, are of prime significance. At the same time, we are facing a situation, in which within the coming 40 years the whole energy supply and distribution system of the world – including China and India – will need to be 100% restructured and reworked. We need a whole new quality of urban flexibility, and a resurgence of a full consideration of the human scale, even in gigantic projects, to achieve the path to urban sustainability.

Taking proven experience in sustainable urban development and engineering, what will be the tasking and quality expectation of urban design and development in the coming years and decades? System changes will require mental, philosophical, and educational changes in human minds, encompassing developers, planners, architects, and engineers. So, what do we need to learn, and how do we teach it, fast and to many humans, in a short time?

2 BASELINE THOUGHTS ON ECOLOGY IN URBAN DEVELOPMENT – A SITUATION APPRAISAL OF THE DEVELOPING UNDERSTANDING IN THE 1980S

Starting with the Club of Rome “The Limits to Growth”¹ in 1972 a period of developing consciousness on the unsustainability of western societies' urban developments ensued. This was characterized by a multitude of developing descriptions for problems, solutions, and designations for whole fields of interest. Nomenclature and its meaning was and is still in a state of partially defined flux – misunderstanding and misrepresentation abound(ed). Then in 1987, the world first learned the meaning of the word sustainability and the multitude of its facets in the UN Brundtland Report .

Words like "environmental", "ecological", and then even the then new "sustainable" were and are used sometimes interchangeable. Very often with different understandings of their meanings and definitions, especially as pertaining to different trades, and in different languages and cultures.

¹ for our pathway to experience see the reference listing on publications and projects provided for the subjects "sustainable urban planning and engineering" and "energy systems and waste management" at the end

For the reason of retaining a reflection of this state of affairs, in the following appraisal of the time, the words "ecology" or "ecological" have been retained – even though by today's understanding it would be more often be replaced by "urban sustainability", "environmental sustainability" or "sustainability" (without qualification).

During the mid 1980s Hermann Laistner approached the field of sustainable urban development with an interdisciplinary experience, gathered by actively developing the area of "energy efficiency consulting" through a series of research and pilot projects starting in the late 1970s. He was selected as the key researcher, developing the chapter on urban supply systems, within the team and scope of a German federal research project on "Ecology in Urban Zoning" (Ökologie in der Bauleitplanung).

Within this technical field at that time, the traditional biological definition of "ecology" was found to be unsuitable to the application on human society and infrastructure. A new approach to the definition of "ecology" needed to be found and developed. Our situation appraisal and train of thought back then was:

The central European landscape, dominated by civilization, is endangered. The consequences of uncaring use of the available natural resources by the industrialized civilization are visible and undeniable. Even more troubling are the reactions of soil, water and atmosphere to the continuous careless production of artificial products, with the most varied characteristics. It therefore must be the tasking of future human action to protect the still remaining resources from complete depletion and devastation. This demands a careful approach, and the limiting of needless use, as well as the reclaiming and reuse of our process materials.

The civilized landscape, created by humanity, is no longer capable to cope with the effluents of our industrial societies. Product and contamination concentrations in soil, water and atmosphere grow steadily, and our so called "clean-up measures" don't eliminate them, but simply transfer them from one carrier medium to another. Our aim must therefore be to keep the production of materials, and therefore the number of material transformation processes, at a low level. This is not the call for "back to the stone-age", but the tasking to our highly industrialized society to set it's aims towards preferably innovative and efficient future developments.²

From this analysis the technically founded working-definition of „ecological“ became:

“Avoid and reduce the material transformation processes, while at the same time develop and strengthen mitigation mechanisms”

By now this has developed into the "mantra" of the energy management engineers:

AVOID – REDUCE – COMBINE

A principle just codified in the last two years in the ISO 50001 and EN 16001 standards on Energy Management Systems.

Back to our situation appraisal between 1985 and 1996. Upon closer inspection, the applications of this working definition onto the field of urban development were found to be many, and can only be characterized in short hereafter.

3 OUR STARTING POINT – AN ECOLOGICAL EVALUATION OF PUBLIC SUPPLY/DISPOSAL NETWORKS – THEN AND NOW – A SHORT APRAISAL OVER 20 YEARS

Being engineers, trained in the technical aspects of urban and energy systems, our approach was to inspect our everyday technical supply system structure in a first step.

Starting with considering the aspects of soil protection, our attention was drawn to the there buried pipes and cables of public supply systems. Taking up the discussions on leakage and enroute losses, new demands on the line quality, leakage protection, as well as regular maintenance were developed as a first step. This however proved to be only an intensified system of fault detection and repair, of our urban buried systems, existing in general below our public roads and walkways. Overall, this encompasses not only operational pipe and cable systems, but a multitude of historical relics.

Digging up holes regularly seems to be an unavoidable result of this historically developed system.

² Citation from „Der moderne Infrastrukturkanal“ published 14.04.1993. chapter 1. Einführung in das Thema – translated 2012.

3.1 Water Supply Systems

The existing system in many industrialized countries was and is largely non-sensical. It carefully extracts raw water out of the ground, streams and lakes, then processes and disinfects this raw water carefully to the highest quality potable water standards. Then we use it undifferentiated for hygienic and cleaning applications, as well as for toilet flushing, car washing, industrial applications, and irrigation, or fire fighting. The large majority of those applications do not necessarily need hygienic potable drinking water.

A differentiation according to water use is needed. This then leads to the installation of rainwater runoff collection in cisterns of single houses or whole developments. Or as very widely used in dry climates the grey water collection for black water flushing use. However driving this technology is the growing scarcity of water in ever larger areas of the world – not in, nor by, the still "water fat"³ industrial countries.

3.2 Sewage and Precipitation Drainage Systems

Especially in southern Germany, the wide spread combination of sewage and rain water drainage in one pipe still existing is technically obsolete, but historically and fiscally at present not correctable. The separation and treatment of household black water from precipitation run-off must be instated now in accordance with law, while just 20 years ago this was just the reverse. In modern systems black water needs to be directed in as concentrated form as feasible to treatment plants, well contained and monitored. While precipitation runoff needs to be dealt with as local as possible. In principle precipitation water should be retained locally even in urban sealed areas. Meaning – as far as a suitable geology is present – soil infiltration or surface run-off in open ditch systems, preferably unpaved and planted, into natural run-off beds.

3.3 Waste Disposal

The undifferentiating throw-away and cover-up depositing of wastes of all kinds, still prevalent in Germany throughout the 1980s and 1990s has been replaced by a whole industry of waste processing, geared for profitable recycling of materials. However, as long as the so called "thermal reuse" of materials is classified as a form of recycling of materials at present, we have still have a ways to go. Only the non reusable waste components should be burned for heat and electricity generation. Burning in our definition book means destroying any materials' useful characteristics – and that we don't classify as recycling unless heat energy it is the only useful characteristic remaining in a collected material.

3.4 Heat Energy Supply Systems

Historically one can see that the generation of heat energy came from old wood stoves, through the fossil fuels coal, oil, and gas and now increasingly returns to regenerative carbon e.g. wood pellet, bio gas, and solar thermal systems as heat source. This exemplifies the increasing importance of the renewable resource of our forests.

Using the heat potential of our excess heat in industry and in the generation of electricity has spawned both metropolitan urban district heating networks, but also smaller more rural network sizes fed by Building block heat-electricity co-generation plants. By now whole villages are being supplied with heat and electricity by such plants using biogas as renewable fuel. Currently a whole new structure of debates and applications develops in this area.

3.5 Electrical Power

Up until a few years ago, ever since the 1930s, industrial countries have developed a highly centralized electrical power production, and large interconnected distribution grid systems. Power plants were for a very long time thought to be only efficient and profitable, if they reached a certain economy of scale. Using our traditional system of economic evaluation – which blatantly disregards any and all environmental issues other than raw material extraction and those that produce an accountable bill – huge burdens coming from this scaling up were non-chalantly postponed into the future. World wide we still don't face up to the fact, that nuclear reactor waste is an as yet TOTALLY UNSOLVED engineering problem, with us for only 60 years now. The issue of fossil fuel induced climate change is just beginning to make headways into peoples minds.

³ "water fat" is a wording created by Frank Herbert in his novel "Dune". It signifies the unconscious and uncaring dependency on the plentiful availability of water by a society and its members.

Coming from the system analysis above, within the research project "Ecological Business Park Mainz-South" (Ökologischer Wirtschaftspark Mainz-Süd) executed for the Federal Ministry of Construction (BMBau) from 1986 until 1995, therefore not only sustainability aspects of the urban surface development were considered. A significant chapter was reserved on how to better, and more long-term sustainably, deal with all the "stuff" we bury in the ground. The old idea of the "utility tunnel" (Infrastrukturkanal, Leitungsgang, Werkleitungstollen, Sammelkanal, Kollektor, urban galery, common duct, galerie techniques, just to cover some of this technologies' names in at least 3 languages) which has been successfully used since 1865 in Europe was reconsidered and creatively applied to the research project. To this and its effects see more in the presentation "Utility Tunnels – proven sustainability above and below ground" by us in these same conference proceedings.

Suffice it to say here – we've successfully achieved REAL NO DIGGING situations in urban development (meaning also – no horizontal boreholes), achieving longer road surface stability and other beneficial effects.

4 URBAN DEVELOPMENT – FROM "STRENGTHENING THE COMPENSATION FUNCTIONS" TO "SUSTAINABILITY DESIGN AND OPERATION"

Within the above cited federal research project "Ecological Business Park Mainz-South"⁵, the initial question was:

"Why do business and industrial areas so often degrade into industrial wastelands – which then have to be expensively cleaned up and recycled?"

The contrast to housing developments, which retain or even rise in value during their time of use, is evident and striking. In the process of developing the research project we went, together with the other involved partners, especially the City of Mainz Planning Authority, through various planned steps to come to valid results. Towards the midterm of the project a situation developed unexpectedly, called "the German reunification", that enabled us (POET mbH as Designers & IfEU mbH as Researchers) to implement the just gained insights in a real East German development project – the Business Park Wachau North – located now in the City of Markkleeberg, directly south of the City of Leipzig in Saxony .

This paper will in the following describe the considerations developed in Mainz-South, while the congress presentation accompanying it will show their implementation at Wachau-North and how the area has stood the test of time over 20 years. Short conclusions on the individual success or applicability at the Wachau project are the end of each chapter

4.1 Laying the Base – Understanding the Situation

The initial step performed in Mainz-South was an in depth ecological situation analysis performed by the project partners "ifp – Institut für Planungsdaten – Offenbach", "igi – ingenieurgeologisches Institut S. Niedermeyer – Westheim", and "IfEU mbH". An intensive involvement of many branches of the City of Mainz administrative offices brought to the table considerations and aspects of demography and statistics, economy, traffic and transportation, tourism and recreation and many more.

This in depth look at the whole area of the southern city and open areas up to the next built up neighbouring communities on all sides was the foundation of all future considerations.

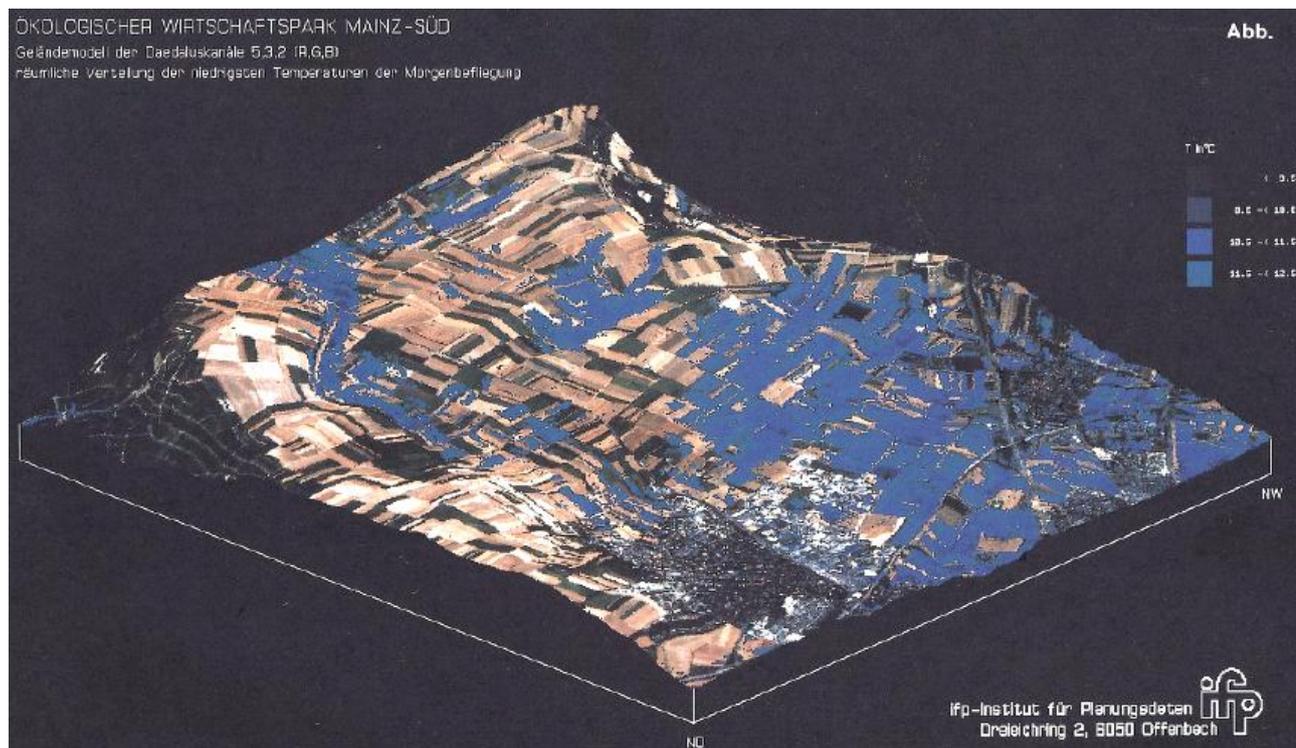


Fig. 2: Ecologically considered area in relation to identified urban business/industrial development area. sketch overlay on picture excerpt from research final report5 Abb. 3

At the time this was begun in 1986, this kind of initial study was not necessarily yet part of the normal process of developing an urban zoning at all. This research project was intended to produce an example documentation for others, later to be copied: how to conduct such an in depth effort. Therefore it was important to identify a complete situation picture regarding hydro-geology, climate impact on temperatures and ventilation, topography, biotopes and biotope potentials, and identification of possible business areas and compensating green or open areas to create a sustainable end solution. Nowadays this scope would still be widened by a consideration of endangered or protected species in the areas.

This is the only step that was not equally performed in Wachau, as by the time of our involvement the detailed development area there had already been defined and partially marketed to investors.

4.2 Sealing the Landscape = Contaminating the Ground

A first analysis came to the conclusion that the unattractive but “seemingly” practical approach of total surface paving had to be considered to be one of the main reasons for the business areas' decline into wastelands. It maximizes technical surfaces that need expensive maintenance (always in short supply in competitive environments). It also maximizes and focuses run-off, which in turn leads to both flooding effects downstream, and the concentration of contaminations at main leakage or seepage points. Rendering parts of the areas virtually useless because of “health hazards” after sometimes surprisingly short times. These effects are compounded by the VERY WRONG assumption of most people operating and working in such sealed surface areas, that “a little spillage is alright – it can't go into the ground anyway”.

The longer this process, the worse, and worst of all – our long term involvement with sewage systems taught us – is the military operator. Regardless of nationality or ideology, they are closely followed by the energy production and chemical industries. National security and easy subsidized profits seem to trump all considerations – and the results are accordingly, as we've continuously found through all the various conversion, survey and design projects over now a 40 year plus period of engineering lives.

This insight led us to the planning approach for the open ground – limited surface paving – conception of Mainz-South and the subsequent execution of this at the Business Park Wachau-North.

4.3 Defining the Urban Structure and Access

As with any urban development an initial urban access structure was developed, considering transportation systems (road axes, public transport, parking), and urban gravity center structure.

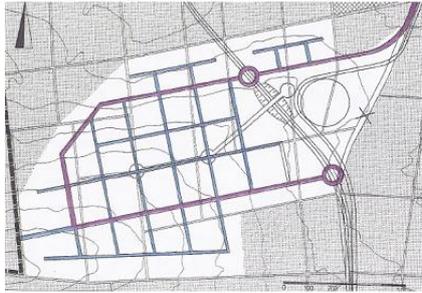


Fig. 3: road grid

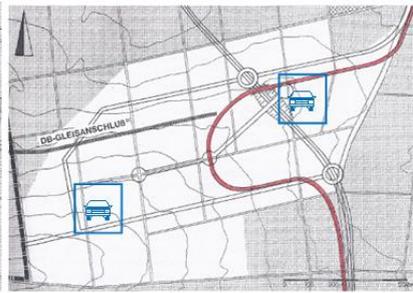
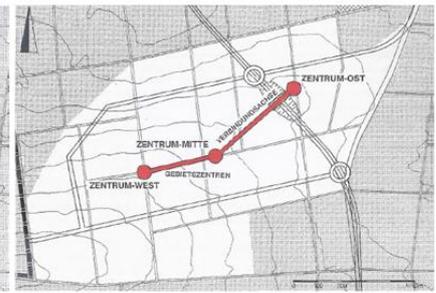
Fig. 4: public transport (rail) & parking
of the urban business / industrial development area

Fig. 5: centres structure

picture excerpt from research final report⁵ Abb. 11, 12, 13, 19

An important consideration for urban sustainability, it turns out, is to consider the need of humans, to need places of "interest" to congregate. It helps to consider compatible and non compatible functionalities, and then develop focus points within the access grid, that are helpful to the users, e.g. to use sustainable transport, to switch from an access to area transport mode to an inside area transport mode, to find other facilities that enable secondary tasks like shopping for food on the way to/from work, etc.

Regarding the acceptance of urban mass transport or other public transport, understanding the "human" limitations on the acceptance of such systems, and the direct dependence of human decision making on the subjectively experienced level of comfort of the individual is crucial. To successfully develop a transportation access mix for any business or industrial area, which is not automatically heavily biased towards the use of cars for all other comers by the required road dimensions for trucking access is not a trivial issue.

Urban/rural comparative experience shows that car use for short to medium distances of travel correlates very closely with the availability of easy parking at both ends of the way. For people to consistently forego the use of their cars, requires parking problems at both ends, but ALSO very comfortable, preferably more direct public transport AND pedestrian routes to and from the stations. The later possibly at least with some consideration as to adverse weather conditions, the former definitely at an adequately cheap fare price in relation to the average income.

Only if MOST or ALL of these conditions are met, will people even consider to forego using or even having a car – if their affluent enough to own one. Building a public transport system with stops every few kilometers, at city quarters, without walkways and in subtropical climate – as can be observed lately in Dubai UAE – will not decongest the road system. While building covered and weather protected walkways through building blocks and independent from the roads, as can be seen in Montreal Canada for many years now, will keep people using urban transit even in the dead of a Canadian winter. So pedestrian ways need not and should not necessarily follow roads. As feet are not round – we should all know and understand this.

And in Wachau in 1991, we also were still relearning these facts. So while the internal pedestrian routes are adequate and both bus and tram access or border the area, most traffic there is still by car, but numbers of public transport users are slowly growing – both due to increasing economic difficulties of the population and due to service improvements by the public transport operators.

4.4 Using Green Elements

4.4.1 as Long-term Structuring Design Elements

by making a concious decision to integrate open surface – high quality green corridors as value retaining elements into the urban zoning design of a mixed business and small industry development.

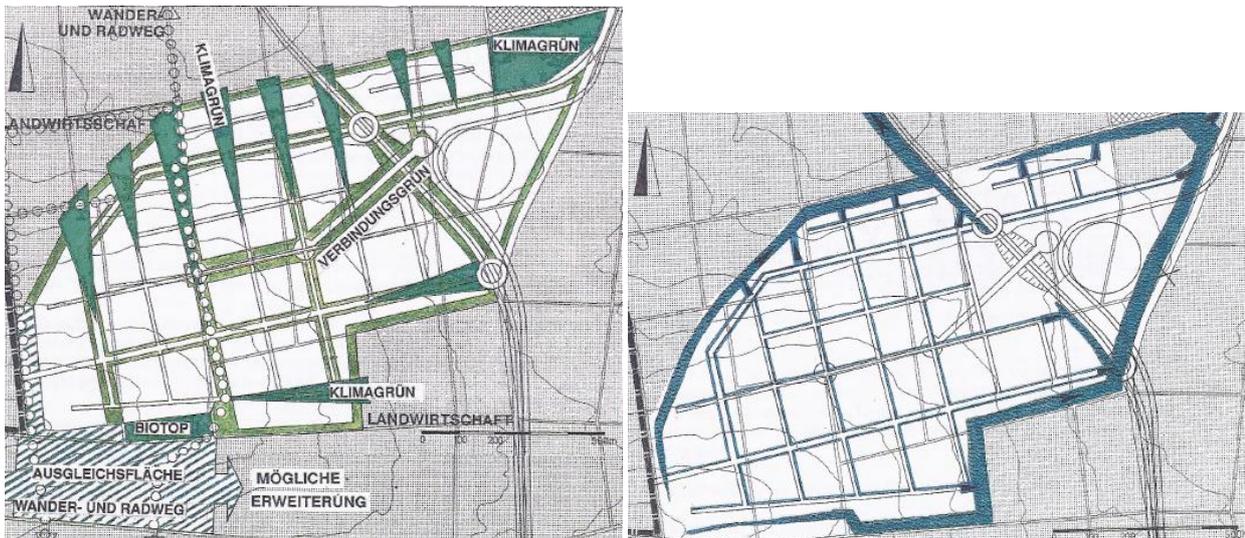


Fig. 6 (left): green zone grid, recreational – hiking and bicycling ways, of the urban business/industrial development area. Picture excerpt from research final report, Abb. 16, 18. Fig. 7 (right): Fig. 7: open ditch surface dewatering structure.

The research area – as can be seen in Fig. 2 above, was and to our knowledge⁴ still is mostly used as farm land, and will remain also for a significant time in the future surrounded on all sides by farm land. It is situated right in between the city to the north and 4 or 5 smaller towns and settlements to the east, south and west. Accordingly both rural and farming traffic, as well as the recreational traffic of hikers and bicyclists, needs to be accommodated by the design of urban pathways with a rural "flair", to avoid untoward disruption of an important rural and recreational area close to the city.

The climatological analysis had shown that it is important to have "climate corridors" for temperature regulation, and to avoid undue wind turbulences as much as possible in the area. So the concept from the start girdled the whole area with a green zone, which also accommodates two main drainage ditches and facilities for surface runoff.

The road cross sections have been purposely designed to have green stripes planted as boulevards, with trees and bushes on both sides, and ditches on either one or both sides. Parking is limited to one side on defined parking stripes only. Access to the individual business properties is limited to defined access points. Frontal parking areas, linking and paving building lines and road edges directly, are expressly prohibited by zoning rules application, and property sales contracts.

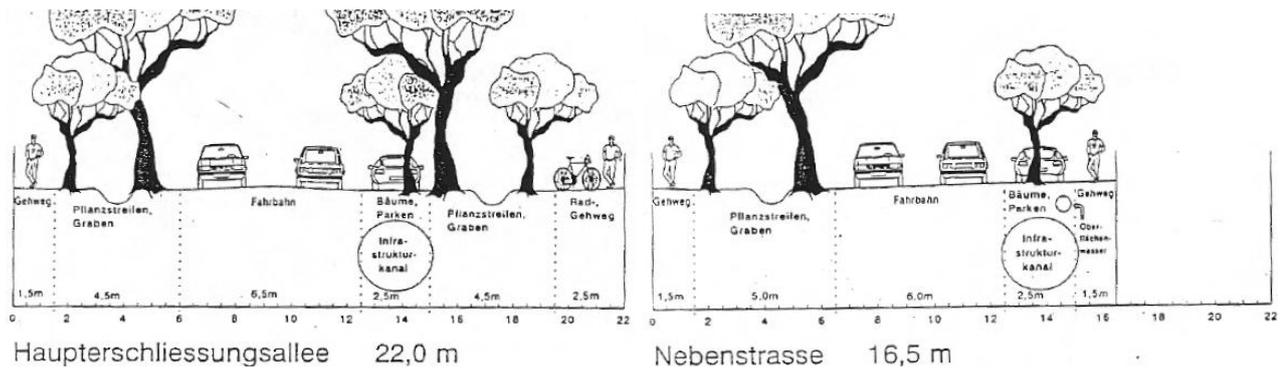


Fig. 8: standard road grid cross sections for main boulevards and side roads of the urban business/industrial development area

picture excerpt from research final report⁵ Abb. 15

This concept – which also has significant positive effect on the utility tunnel underground system and its surface penetrating elements – has been implemented in full, and enhanced by non-public, mandated green zones, and maximum property surface sealing limitation in Wachau-North. It has proven extraordinarily successful there. The only comment by the manager of the still functioning development company there at a visit to the area in March 2012 was:

⁴ according to Google Earth and Google Maps last checked on 22.03.2012

"Put curbstones on both edges of the roadsides – even the ditch side. Defined inflow-points to the green ditches limit the green area pollution with throw-away waste, and makes road sweeping easier for the sweeper drivers." – We took note, and learned.

4.4.2 as Economic Performance Enhancers

Both the open surface drainage in green ditches, open retention ponds with a continuous minimum standing water level, and the integrated planting, green zones, and roads structured as planted boulevards, create a green atmosphere in the business park. It was thought and hoped that this would have positive effects to:

- keep the area looking clean
- enhance level of moral with the employees in the area
- enhance corporate marketing and image building as well as client impressions when visiting

This design concept intended to test a possibly durable set of solutions has passed the reality check of time. In Wachau people have continuously reported to prefer this working environment. With a short stroll, easily during break times or meal times, they can have their morning snack or lunch next to a "duck pond". This effect has been noticed by the business managers, who in turn report better performance and moral in their employees, as well as a very high marketing and client contact and recognition value effects for their businesses.

The aim to retain this green area character, and the property values continuously, has until now been achieved over the 20 year period. Properties of businesses that defaulted have easily, and at good value been resold. All lots but two are occupied, which is not at all the average for such areas in the eastern German states, even so long after reunification. Due to the attractiveness of the business park there are no empty buildings.

What we missed in Wachau's green areas according to local feedback were: spaces to place business location bulletin boards at the main road entries into the area

We've since applied this learned knowledge on urban design and successful elements to various other developments both of business and housing areas, small and large. We've continuously found them to be an economic performance enhancer, starting with the property marketing at the beginning, and continuing on through the years, by keeping areas viable, values and supply level of service high, and maintenance an disruptions low.

Our overall conclusion on this is – humans are willing pay to have humane surroundings!

4.5 The Human Element in Urban Development

4.5.1 an integrated – target oriented, and feedback controlled, design & optimization process

Urban and regional planners, who are educated as such, have understood for a long time, that their field requires intensive coordination, balancing, and value choices between a multitude of hard and soft factors, impacting on any development situation and human society.

It is therefore only proper to demand such an integrated approach from the whole team of participating engineers, architects, planners, economists, investors and – last but not least – local politicians. And right there it starts to get difficult. Many interests create many interfaces, and not all are reconcilable.

We've found it highly helpful therefore to approach such projects with two main process instruments:

- comprehensive knowledge in the design team from day one onwards
- a known methodology, which we implement on the consent of our clients, and thereby create an operative framework of decision making, and target evaluation, with clear feedback mechanisms and consideration input of all involved parties.

We call this "integrated design in a network optimization process". It is based on developing a clear target canon, aimed to smoothly work within the legal framework of zoning and planning regulation. And to give due consideration to the political processes involved. While ensuring, that these are not hindered or interrupted for reasons of faulty, incomplete or unduely late design and document preparation.

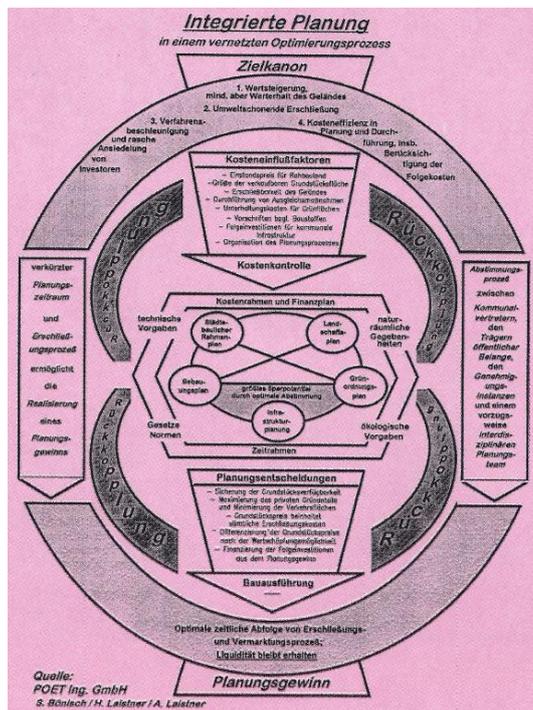


Fig. 10: integrated design – POET mbH company presentation

Our success at best in the Business Park Wachau-North development has been a fully completed legal zoning and development process within only 5 months between design contract and tendering of development construction works. And providing construction power to the first private property investor's construction site a scant 4 months after that.

4.5.2 - retaining knowledge and intentions by institutionalizing operations and their funding

Already prior to the research project Mainz-South, an increasing economic pressure started to develop within Germany regarding community finances. More and more the communities were suffering under an increased debt burden. When the opportunity came in the German reunification process to try something new, instead of the "old" strict public administrative structures and processes, we did. We used the idea of public-private-partnership structures. Instead of burdening newly created, understaffed village administrations in eastern Germany with all the ins and outs of a large development project, we suggested the creation of a privately structured, but in its majority publicly owned development company.

The relationship of 70% public ownership to 30% private ownership developed in Wachau from the fact, that the public side brought into the partnership both the property value, and all the public authority rights, while the private investor (one of the initial larger property investors interested in the area) supplied his organisation, banking and property marketing skills. This proportion proved to be fortuitous, as it created a situation in which, once profitability was achieved, the public side was the main beneficiary, as well as having "learned the business" so to speak. An unplanned withdrawing of the private investor, which in other PPP cases, so often leads to the public partner suddenly finding themselves teamed with a completely unknown new business partner, with completely new and different investment interests, did not happen.

Also the development concept from the start included a continuous income to the development company, from mainly two sources. Why – because we knew, that future upkeep was needed to ensure success – and at the time no public works structure was available. So why not build a development company into the kernel of a future public city works and supply company.

Its income to this day, is mainly generated from the sale of heating energy to the properties in the development area, and the sale of electricity to the grid through the open electricity market. To achieve this we designed and built a heat/power cogeneration plant in the development area. The secondary income is from the dues of an ownership cooperative of the property owners and users of the development area. All owners until now could be convinced, that this mandatory membership to enter the area, is worth its money – as this keeps the green areas, ditches and roads clean, the trees and bushes pruned and the marketing and property values up.

On the side – as operator of a heat/power plant the development company maintains the utility tunnel, the road surfaces and the street lighting. It has proven so successful and effective, that when the village of Wachau was integrated into the City of Markkleeberg, the new city heads decided to turn over the development and operational works of a huge recreational lake and waterway development to the south of the city (slowly converting the old lean coal strip mining pits) to the development company – which is therefore currently designing and building a waterway lock for recreational ship traffic.

5 CONCLUSION AND OUTLOOK

It can be said, that the development ideas, which were developed in the late 1980s with the support of the German Federal Ministry for Construction, Zoning, Urban Development, the German Federal Ministry for Research and Technology, and many state and local authorities and research partners have passed their first stage test of time in the unforeseen but fortuitous implementation project at Wachau-North. While many of the research projects of the time were designated "Modellvorhaben = Demonstration Project", only few could be implemented against the inertia of the status quo, and the often uncoordinated pressures of investment and political interests. However – now we have this and other demonstration projects to study.

On the other hand, POET mbH and IfEU mbH did not arrive at this level of knowledge all at once. We went through a long process of idea development and successive implementation trial – one or two ideas at the time all through the 1980s and 1990s. The focus of this paper on only two projects – Mainz-South and Wachau-North – only reflects the unusual confluence of research and implementation chances taken – a rare situation for analysis of the development of ideas and their testing over time.

There is however the future to consider. And while – as an attendee to the realcorp now for quite some time – we realize that these ideas have spread, we do still perceive a pronounced lack of understanding for the human requirements and conditions. Especially, when confronted with large to huge to gigantic projects all over the world, we must state emphatically, that the universities and trade schools for engineers and city planners are NOT YET getting the message across.

We are still educating whole generations of architects, planners, engineers and economists who have not a clue what sustainability means. Above all else, and apart from all the many elaborated and sophisticated definitions that are put onto this single word:

Sustainability means – it has to last & humans have to like it to make an effort to make it last.

To get people to make the effort – the direction the finger is pointing could not not be clearer:

Start remembering, and take consideration of your and others' humanity, and integrate human and humane requirements into your technical, creative, administrative or economic thought processes.

Until and unless you do – nothing of you and your effort and work will remain in time.

6 REFERENCES

Reference Projects and Publication Listing of POET mbH, IfEU mbH and their ownership-partners and employees during the 1980s and 1990s (listed by date of publication/production):⁵

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