CASE STUDY

Stellwerk 60

COLOGNE, GERMANY

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STELLWERK 60 SITE FACTS

- **Developer and Architect:** Kontrola Treuhand
- **Developed Area:** 4.2 ha
- **Total Area:** 6.1 ha
- **Planned Completion:** 2011
- **Population:** 750
- **Density:** 123 persons / ha
- **Net Housing Density:** 95 units / ha
- **Completed Housing Units:** 320
- **Planned Housing Units:** 400
- **Jobs On-site:** 0
- **Distance from City Center:** 2.5 km
- **Parking Spaces/Residence:** < 0.3
- **Cars:** 60 per 1,000 residents
- **NMT Mode Share:** 26%*
- **Transit Mode Share:** 53%*
- **Households with Carsharing Membership:** 67%
- **Number of Carsharing Vehicles Available:** 17

*by distance travelled

BACKGROUND

Stellwerk 60 is a "car-free" development of 700 homes in the Nippes district of Cologne, a German city of almost 1 million inhabitants. It was chosen for this study as an evolution of the Vauban model, with totally car-free residential streets as well as spatially and fiscally separated parking. Car ownership is 20% of that in the surrounding neighborhood, and per capita transport-related CO_2 emissions are half those of the city as a whole.

Built on the site of a former railway repair works, the genesis of the project was a local citizens' petition calling for a new type of residential area for people wanting to live free from the nuisance of motorized traffic. This led to a master planning competition, with Kontrola Treuhand selected as sole developer to realize the vision of a car-free district on a site close to existing services and transit routes, and within cycling distance of the city center. The development includes a range of home types and tenures, from apartments to town houses, for rent or sale on the open market, offering between 61 and 106 m² of floor space (Figure 1).

On-street parking is prohibited within Stellwerk 60 and on nearby residential streets, and the requirement that all car owners pay for a parking space in a peripheral garage. Non-car owners are required to sign a legal declaration that they will not bring a car to the site or attempt to park it in the surrounding area.

PLANNING PROCESS

Stellwerk 60 residents began with the intention to create a traffic-free community. The project took some time to come to fruition owing to negotiations regarding the unique legal status of Stellwerk 60 as "car-free housing." The project could not get a total exemption to German minimum parking standards, so the developers comprised on an "optically car-free" plan, with a separate garage providing the negotiated minimum of 120 parking spaces for 400 planned housing units, or 0.3 spaces per unit. Special contracts between the developer and the city, and the developer and residents, were drawn up to satisfy the planning authority.

The future provision of car parking within the development is prohibited under a City of Cologne land use plan and building law, and the interior is officially designated as a pedestrian zone.

KEY POLICY AND DESIGN MEASURES

In addition to the absence of parking within the development, and the policy requirement for car-owners to purchase a space in a garage that is physically and financing separated from the residences, there are several measures that make other modes of transportation more attractive.

Urban Design

There is a driving and parking ban for motor vehicles development-wide (all roads marked in yellow in Figure 1), enforced simply through the "limited access" model with physical access restrictions at each of the three entrances (Photo 1). Retractable bollards allow access for the emergency services and municipal vehicles, but general drop-offs and deliveries are not permitted. In addition, at around 2.5 m in width the residential streets are not physically wide enough for parking, unlike those found in the "parking free" streets of Vauban.

Local shopping facilities, a daily farmers market, a primary school, kindergarten and hospital are all available within 600 m of the development, reachable via pleasant residential streets with outdoor cafés (Photo 2). Small play areas within the site, together with an adjacent park, mean that travel is not required to reach recreation and green space.

Figure 1: Stellwerk 60 site plan. Cars may not access the streets marked in yellow.

In addition, home owners and tenants must sign a legal contract to indicate that they agree not to (a) drive motorized vehicles within the development, (b) create parking spaces and (c) park in specified areas in the surrounding district.

These conditions ensure the entire residential area is completely free of moving and parked cars, releasing land for recreational space and significantly reducing the convenience of car ownership.

Parking

State minimum parking standards require that provision be made for vehicle owners. Since there is no parking within the residential area of Stellwerk 60, this problem was addressed by providing a total of 120 spaces in the peripheral car park depicted in Photo 3: 0.2 residents' spaces per unit, plus 0.1 spaces for visitors. This also houses six Cambio Carsharing vehicles. Under the same planning rules, which require a minimum of 0.3 spaces per unit, land adjacent to the car park has been set aside to cater for a possible future upturn in car ownership.

Car owners must purchase a parking space at a cost of 16,000 EUR and pay a maintenance fee of 70–80 EUR per month. The high cost of the parking — set to reflect the true cost of providing such facilities on valuable urban land — are a significant deterrent to car ownership. At the time of writing, a total of 45 car parking spaces (56% of the total for residents) had been sold.

Public Transportation

A dense network of heavy rail routes, the most frequent of which are branded "S-Bahn," and Stadtbahn[1] lines form the backbone of transit provision in Cologne. These routes offer combined S-Bahn and Stadtbahn frequencies of ten minutes and at least every five minutes respectively, to the city center and beyond during the daytime on weekdays (Photo 4). Every home is within 500 m of a stop, with one bus stop located immediately outside the north entrance to the site (Photo 5).

An additional outer-orbital Stadtbahn line provides direct services to key interchange in other parts of the city, removing the need to make lengthy journeys via the city centre. Three bus routes complete the local network, including a popular new route direct to the University. Operating since December 2009, this has been a victim of its own success, as overcrowding threatens to suppress demand. Happily, this is likely to be addressed by increasing the peak frequency in December 2010: it is important that operators or tendering authorities respond quickly, to avoid turning passengers away.

A timetable is provided at every stop, with the majority offering comprehensive maps and fare information. All local stops are unstaffed, but S-Bahn stations feature standard Deutsche Bahn touch-screen ticket machines. Tickets for journeys commencing by bus must be purchased on board, and not all bus stops are equipped with waiting shelters.

All transit services other than the outer-orbital tram offer step-free access, with lifts to station platforms in good working order when a site audit was conducted in March 2010. Bicycles can be carried on transit subject to space and purchase of a separate bike ticket.

[1] In Cologne these are light rail routes in tunnel in the central area, where underground stations are branded "U-Bahn," with a mix of segregated and on-street surface running elsewhere. The vehicles closely resemble conventional trams. Stadtbahn is the generic term for this type of system.

Cologne is in the Verkehrsverbund Rhein-Sieg (VRS) integrated public transportation authority area. VRS single trip and period tickets allow unlimited changes to reach one's destination within one or more zones of validity, minimizing the inconvenience of interchange. Within the large Cologne City zone, fares include:

- 20-minute "short trip": 1.60 EUR;
- Transferable monthly season: 66.50 EUR;
- Transferable off-peak (after 09:00) monthly season: 46.40 EUR.

The monthly passes compare very favorably with the monthly maintenance fee of at least 70 EUR for owners of car parking spaces in the Stellwerk 60 garage. VRS has a comprehensive website with timetables, fares, maps and details of how to register for the purchase of single-trip and one-day tickets by mobile phone (HandyTickets). A "mobility guarantee" is offered by VRS: a transit delay of twenty minutes entitles a ticket holder to travel by long-distance express trains or taxi as appropriate, with a full refund of additional rail fares incurred, or up to 20 EUR in the case of taxi fares. This provides additional reassurance to intending transit users.

Google Maps includes Cologne U-Bahn and S-Bahn stations, but no timetable data or any bus information at the present time.

Pedestrian and Cycling Infrastructure

A shared cycle and pedestrian path is provided from the south-west entrance to Nippes S-Bahn station. Local streets are one-way and/or traffic-calmed with humps, street furniture or by narrowing, encouraging the use of non-motorized modes for local journeys, and many of the former permit contra-flow cycling, maximizing convenience for cyclists.

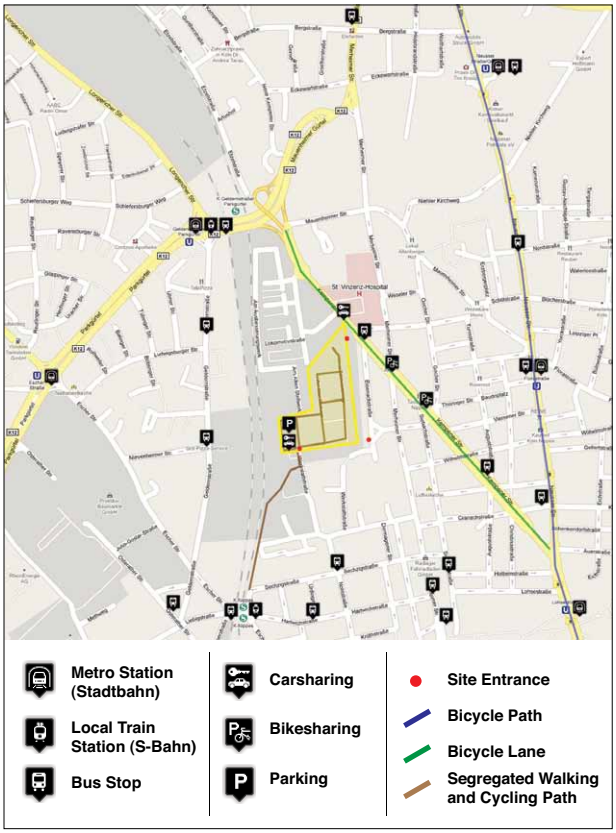


Figure 2: Map of the area surrounding Stellwerk 60

1
Southwest entrance to Stellwerk 60

Cars are restricted with retractable bollards, which can allow emergency vehicle access when necessary.

2

A public square on the walking route to the shopping area on Neusser Straße.

3

The Stellwerk 60 parking garage is located at the edge of the development, making driving less convenient. Space in the foreground is reserved for future expansion if needed.

4

Every household in Stellwerk 60 is within 500 m of a transit stop. Trains have daytime frequencies of between 5-10 minutes, making transit extremely convenient.

5
Sechzigstraße bus stop

Street narrowing serves as an effective traffic-calming feature.

6
Cycle parking outside row houses

7
A Cambio carsharing station

Three vehicles were used within the course of a 15-minute site survey.

8
Delivery vehicles

All motorized traffic is banned from Stellwerk 60, including delivery vehicles, so the development offers free "rental" of human-powered cargo vehicles for residents to haul in goods.

9

Advertising for the most recently completed apartments: "Rental of exclusive living space / dreams! Car-free living area – Stellwerk 60."

Roads within Stellwerk 60 are for the exclusive use of cyclists and pedestrians. An average of one cycle parking space is provided per 30 m² of residential floor space, and the vast majority of this is provided in the form of parking cellars easily accessed by ramps. Each row house has three racks (Photo 6).

Covered bicycle parking is available at S-Bahn and Stadtbahn stations, although the short distances from Stellwerk 60 are easily walkable. The city center is around 10–12 minutes away by bicycle, along direct routes with a mixture of on-road cycle lanes and paths shared with pedestrians (Figure 2).

Carsharing

Sixteen Cambio Carsharing vehicles are available on-site, split between the general car park and ten spaces adjacent to the north-east entrance to the development (Photo 7). These include small and medium-sized cars, as well as small and transit-sized vans. Membership fees are waived for residents, with discounted usage fees: these vary by frequency of rental, distance traveled and vehicle class.[2]

Interestingly, the rival carsharing firm Flinkster has a single vehicle stationed adjacent to the main car park. Unlike Cambio, it aims for the image-conscious market by offering an Alfa-Romeo sports car, albeit one with a relatively modest 1.4 liter engine. Market differentiation is likely to be important in broadening the appeal of carsharing.

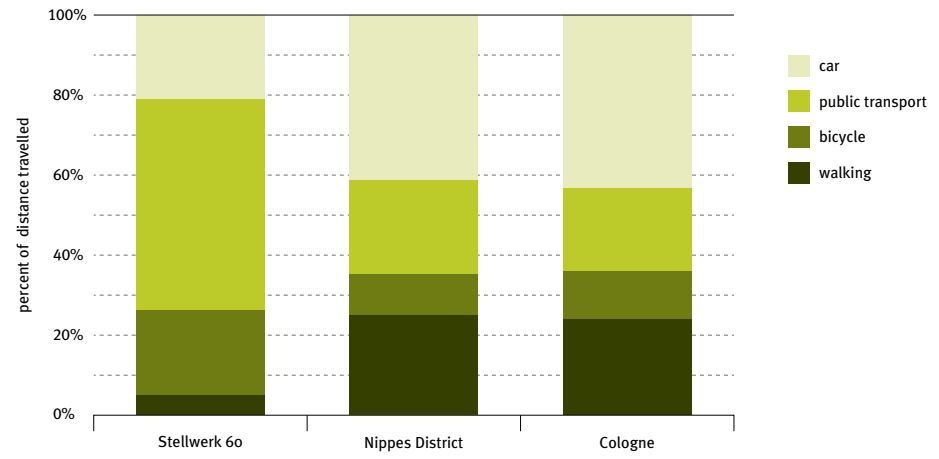
Deliveries

As previously mentioned, there are very few exceptions to the no-access rule for motorized vehicles, presenting quite a challenge for the delivery of heavy and bulky goods. To address this problem, a "mobility center" located close to the south-west entrance to the site has a range of human-powered trolleys and trailers (Photo 8) for free rental by residents. This service is paid for by the developer on an ongoing basis. Thus the last leg of every delivery is extremely low-carbon, and the safe and noise-free nature of Stellwerk 60 is maintained.

Home deliveries of beer and other drinks are made by a supplier once a week, under a special contract granting access to the development by motorized van, in return for the waiving of delivery fees normally payable by customer. This service is slowly increasing in popularity. Thus far this is the only example of residents accepting a compromise in the zero-tolerance approach towards motor vehicle access.

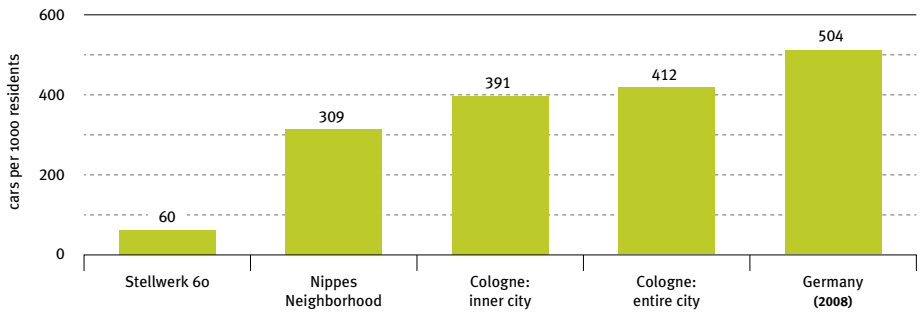
[2] For more information, see the Cambio Carsharing website

Figure 3: Modal split for all trip types



Mantau, 2010; Stadt Köln, 2008

Figure 4: Car ownership in Stellwerk 60 as compared to surrounding area



EC, 2010; Mantau, 2010; Stadt Köln, 2010

Marketing

The development is heavily marketed as being car-free, suggesting that this is regarded as a positive term by the developer and landlords, rather than indicative of being denied something desirable.

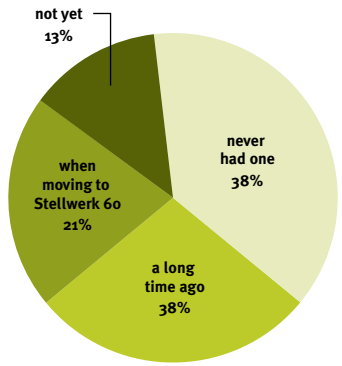
Advertising for the next phase of the development alludes to the peaceful and relaxing nature of a site free of traffic nuisance (Photo 9). Although existing "car-free choosers" are drawn to developments such as Stellwerk 60, given their rarity, the marketing is likely to be of broad appeal to anyone seeking a better quality of life (see also Figure 8).

QUANTITATIVE ANALYSIS

We are grateful for access to survey data collected by University of Cologne student Fabian Mantau. An online survey with a total of 75 questions on actual travel behavior and attitudes towards the development was launched in April 2010, following the distribution of flyers to every household in advance.[3] This was done in cooperation with Autofreie Siedlung Köln, the association that has promoted the concept and district since 1999. 53 people completed all or most of the survey, equivalent to a response rate of 16.5% on a household basis.

[3] http://www.i.am./car-freeinKoeln (accessed 12 August 2010)

Figure 5: Stellwerk 60 residents: when did you give up your car?



Mantau, 2010

Modal Split

Mode share data by distance traveled are presented shown in Figure 3 (data by number of trips are unavailable). More than half the total distance traveled is by transit, with the bicycle accounting for a fifth, the same proportion as the car.

Over half of the respondents cited using a bicycle, with rail-based transit as second-most popular choice. This result reflects the concentration of economic activity in the nearby city center and in other districts easily reached by bicycle, S-Bahn or Stadtbahn. 62% of residents have a commute of between 2 and 10 km, ideal for cycling within a typical 30–45 minute travel time budget. In addition, 2% of homes serve as a place of work.

89% and 77% of respondents cycle and walk (respectively) to shops on a regular basis, suggesting the frequent use of local facilities rather than weekly shopping runs by car. Cycling plays a pivotal role in the everyday mobility — and sustainability — of Stellwerk 60 residents.

Vehicle Ownership

96% of respondents have a driving license, meaning that a car-free lifestyle is a deliberate choice. 71% of Stellwerk 60 households do not own a car, 29% have one car and no households have more than one car. In contrast, only 21% of German households do not have a car (Figure 4).

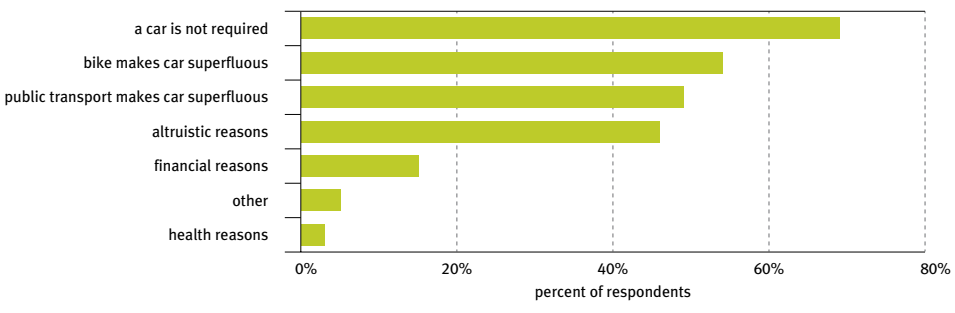
Stellwerk 60 has achieved a seven-fold reduction in car ownership, with only 45 registered vehicles among the current population of 750 residents (Figure 4). In contrast, every household owns at least one bicycle, with 37% also possessing a bicycle trailer.

Respondents were also asked to indicate when they had given up "their" car, and provide the reasons for not owning one (Figures 5 and 6). 66% of those sampled had either never owned one (or made use of a company vehicle) or gave it up "a long time" before moving to Stellwerk 60.

These percentages are of the subset of residents who have either given up a car, or intend to do so: a fifth of respondents disposed of their vehicle around the same time as moving. Figure 5 suggests that two thirds of residents had made a decision to go car-free independently of moving to the development: Stellwerk 60 has attracted people who already live car-free. Respondents were asked to indicate all the factors influencing their decision, from the choice of answers shown in Figure 6.

Almost 70% of respondents believe that they simply do not need a car, with around half attributing this to bicycle use and transit

Figure 6: Reasons for Stellwerk 60 residents giving up their car[9]



Mantau, 2010

provision. Having an environmental conscience plays a significant role for 46% of residents.

CO_2 emissions

Per capita CO_2 emissions from private car use in Stellwerk 60 are 64% lower than in the wider district, and 75% lower than the average for Cologne (Figure 7). The importance of decarbonizing public transportation can be seen from the doubling of Stellwerk 60 residents' transit emissions, although their overall emissions are significantly lower — halved compared to the city as a whole — thanks to the drastic reduction in car use.

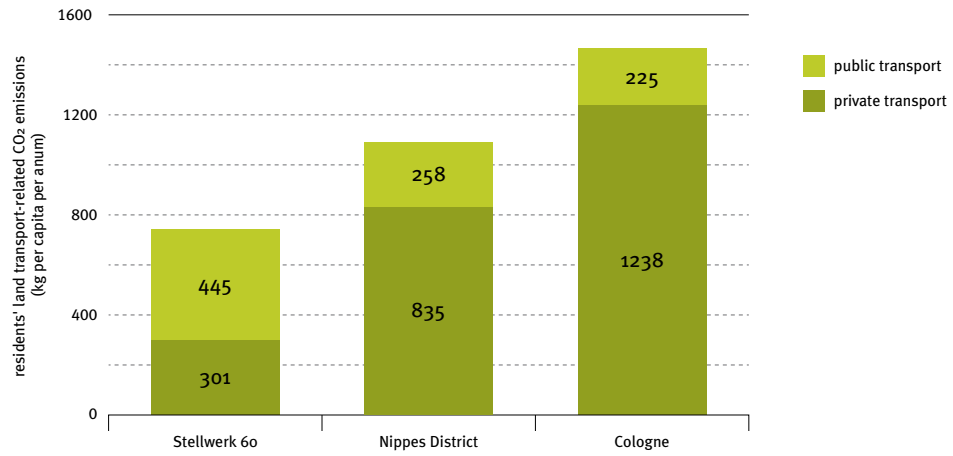
Residents' Views on Stellwerk 60

The survey probed residents' thoughts on why they moved to Stellwerk 60 (Figure 8). A safe and pleasant environment for young families was the most cited reason, followed by a reference to "green living" and being free from the externalities of car use. When comparing the development with "elsewhere," Stellwerk 60 scored highly in two specific areas: (i) 92% think that Stellwerk 60 sound levels are either "better" or "very good," and (ii) 90% regard the carsharing service to be "better" or "very good."

With an almost zero-tolerance approach to motor vehicles within the site, and a choice of 17 carsharing vehicles on offer (as opposed to one in the 3,000 resident Kronsberg development in Hannover), these results are easily explainable. Indeed, 67% of respondents use carsharing vehicles, with a quarter stating that they use the service several times per month.

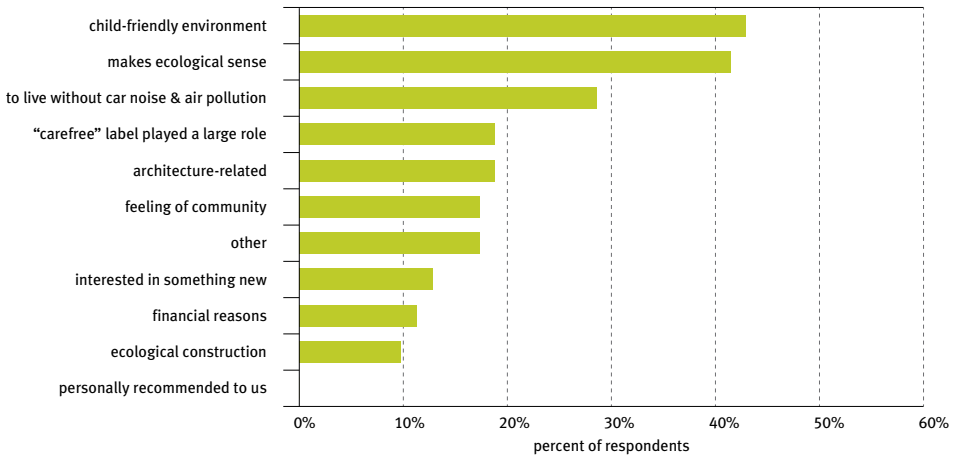
However, a majority of respondents indicated that public transportation, the cycle network and shopping, medical and school facilities are on a par with other districts. On a negative note, 68% feel that a better local recreation area is required, with insufficient green space within the development. This is certainly noticeable in comparison with Vauban, but it is expected that the green space north of the parking garage will eventually be improved.

Figure 7: Transport-related CO_2 emissions



Mantau, 2010; Stadt Köln, 2008

Figure 8: Why did you move to Stellwerk 60?



Mantau, 2010

LESSONS LEARNED

Stellwerk 60 is a clear success in terms of vehicle ownership, which is the primary determinant of car use, and modal split. It's proximity to local facilities, the city center and the availability of a robust public transport and cycling facilities make living car-free simple. The development has its origins in a local group's determination to live free from car noise, pollution and danger, suggesting that it is grassroots demand for radical concepts such as car-free living areas that will see them rolled out more widely. German planning rules made the visually intrusive parking garage necessary, but this does offer a choice for those who want to "have their cake and eat it." The family-friendly nature of housing with a car-free or heavily car-reduced immediate environment is an essential selling point of such developments, whilst avoiding the high cost of underground parking.

An estimated 20 people signed the car-free declaration but own a car, which they park in the garage or in neighboring streets that are not yet part of the Nippes controlled parking zone. This is a source of irritation to other residents. A possible solution is for parking enforcement officers in the Nippes controlled parking zone to work with the residents' association to patrol the car park. The Stellwerk 60 model should provide an incentive for the developer, Kontrola Treuhand, to fund this and other measures required to recover lost revenue.

Is the Stellwerk 60 model transferable? This model requires grassroots support and intention of a community to live car-free. However, many of the best practices including proximity to existing jobs and destinations, provision of high quality transit and cycling facilities, limiting and spatially separating parking, and designing narrow streets to discourage driving could all be applied to other developments, even in less extreme cases.

Specific improvements that could be made at and around this development, and with respect to transit provision, include:

- Making better use of the park to the north of the parking garage, as well as making the land set aside for future car park expansion more attractive;
- Improving the attractiveness of the elevated S-Bahn stations, which suffer from graffiti, poor lighting and a lack of natural surveillance;
- Providing more bicycle parking in the shopping area, and more covered parking at other popular destinations;
- Enhancing capacity on the new bus service to the University, as well as on the Stadtbahn in the morning peak period.

Only the first of these is the direct responsibility of the developer, highlighting the importance of a holistic approach to maintaining high quality infrastructure and services on- and off-site, requiring interventions by a variety of actors.

FUTURE RESEARCH RECOMMENDATIONS

Further detailed research may help establish the potential demand for car-free living, and the circumstances that might precipitate it. This would help to persuade local authorities to consider the concept more pro-actively, and assuage developers' fears that developments of this kind are less profitable. A study examining the re-sale values of privately-owned homes would add value in this regard, although anecdotal evidence suggests data would be difficult to acquire, given low property turnover in Vauban and Stellwerk 60.

The overall effect of Stellwerk 60's parking management is clear, but it might be instructive to conduct travel surveys in the neighboring Lokomotivstraße development: this is of similar size, age and tenure, but with a conventional street layout and one bundled parking space per residential unit, mostly located within a few meters of each home. Such an exercise would provide more evidence for the success of Stellwerk 60 to be attributed to measures peculiar to the development, rather than external factors associated with the Nippes district. ■

SOURCES

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Verkehrsverbund Rhein-Sieg: http://www.vrsinfo.de

Image credits

Figure 1: Stellwerk 60

Figure 2: Google Maps

Photos 1–9: Simon Field, ITPD Europe

Thanks to Stellwerk 60 resident Hans-Georg Kleinmann for granting an interview and providing additional information, Fabian Mantau for sharing his research data and Christian Dörkes of Stadt Köln for providing additional statistics.