Build in 1918 (Pfleghard & Häfeli), the housing complex ‘Nordstrasse’ or due to the clapboards also known as ‘Schindelhäuser’ (clapboard houses), has a vital historical importance for Zurich’s architectural memory. The complex consists of free assembled, long part of structures build around courtyards and squares. Constructed on behalf of the city council as an answer to the desperate housing shortage after the end of the first World War, the complex and its architecture is a contemporary witness of that time. Since 1988 the multiple-dwelling as well as the residential environment are subject to a preservation order. Since that time, renovations were only made on individual bases which resulted in a heterogeneity of the portfolio. This reflected for example the situation of the bathrooms: 1/3 of the apartments had a shower in the toilets, some of the apartments had a shower in the kitchen whilst others used shared showers in the basement or laundry room. The heating system consisted of isolated oil- and wood stoves, the infrastructure (pipes, etc.) were obsolete. In 2004, the city of Zurich conducted a feasibility study to estimate the reinstatement work, in 2009 till 2012 the renovation of the housing complex took place. During the renovation phase, the tenants kept living in the apartments. 2012, the project was distinguished with the award ‘Nachhaltig Sarnieren’ (sustainable refurbishment) by the city of Zurich.
Housing complex on a picture of 1920

Image source: Schäublin Architekten

Housing complex on a recent picture

Image source: Schäublin Architekten
Kitchen before the renovation

Image source: Schäublin Architekten

Kitchen/hallway after the renovation

Image source: Schäublin Architekten
Kitchen before the renovation

![Image source: Schäublin Architekten](image1.png)

Kitchen after the renovation

![Image source: Schäublin Architekten](image2.png)
Toilet before the renovation

Toilet with shower after the renovation

Image source: Schaublin Architekten
Room after the renovation

Image source: Schaublin Architekten
Representative plan for a model apartment after the renovation
Aspects en accord avec les principes du développement durable | Aspects in line with sustainable development principles

1 SOLIDARITÉ, JUSTICE SOCIAL: SOUTENIR LES PERSONNES DÉFAVORISÉES (SIA 1.1.3)
Sustainable development does not concern only environmental aspects but also society and economy. Solidarity and social justice is part of the SIA norm, thinking about how to integrate socially as well as economically disadvantage people should start in the planning phase of the project. One aspect is to optimise the concept of construction/refurbishment in order to keep the costs low. Within the ‘Schindelhäuser-project’, the question of rent control, thus of preserving relatively low rents was already raised in the planning phase. The demolition and a following reconstruction of the complex was discussed within the city council but abandoned in favour of a solution where the construction cost could be minimised. Thus, the renovations carried out were limited to relatively modest modifications without substantial improvement of the comfort. The standard, although increasing with the refurbishment, is still moderate. The size of the apartments was not modified and therefore the total quantity of apartments kept. Before the renovation, the monthly rent for a 2 room apartment was 530.- CHF which is very modest for down town Zurich. After the renovation, the same flat costs around 730.- which is, in comparison to the relatively high prices of Zurich and the central situation of the complex, still in the lower price segment. The rent is still manageable also for low-income households and stays under the decisive recommendation level of the social welfare administration. An intern social administration is responsible to find individual solutions for so called hardship cases.

2 PARTICIPATION, FAVORISER L’ACCEPTATION GRÂCE À LA PARTICIPATION (SIA 1.1.4)
The participation of different target groups already in the planning of the project increases the chance of the acceptance and the support of all persons involved in the project. The participation must permit the expressions of ideas and opinions and therefore allow a debate. If the project has potential for a conflict, the way how to deal with conflicts can be defined (for example mediation or supervision). Within the project an association of the residents of the ‘Schindelhäuser’ existed already 30 years before the renovation took place. After the announcement of the city council 2005 that some refurbishment will be done, the association became very popular. About 2/3 of the residents where member of the association at the time the project started. The city was strategic with its communication, mostly because it was known that the tenants where anxious about rent increase and announced resistance against the refurbishment plans. In early September 2005, the city presented the feasibility study of the project to a core group of the association. End September 2005 all the tenants where informed by a letter. A study group of 4 tenants (ominated by the association) was invited to join the following 5 project sessions. In 2007, a meeting was held where the project concept was presented to all the tenants. In the end, the design of the kitchen and the bathroom as well as the choice of the heating system (pellet heating system) was a result of this consultation with the tenants. The responsible persons for the project were careful to avert any conflicts that might occur. Although there was some residence in the early stage of the project, the concept of information and integration has proven itself to be successful.

3 CONTACTS SOCIAUX, CRÉER DES LIEUX DE RENCONTRE FAVORISANT L’ÉCHANGE (SIA 1.1.2)
The creation of a place where an exchange and communication can take place is one of the SIA criteria for sustainability. There are certain organisation of space that facilitate social contacts, among others semi-public spaces. A further criteria is the creation of optimal condition for an integration and a social mixture, cultural as well as intergenerational. Within the ‘Schindelhäuser-project’, the modernisation of the kindergarten that already existed and the opening of the nursery were planned as strengthening of the housing complex on the one hand and as contribution to the development of the whole quartier on the other hand. This two roles of the kindergarten are especially mentioned in the jury report of the ‘sustainable refurbishment’ award (Stadtentwicklung Zürich, Schlussbericht der Jury: 24). The kindergarten as well as the playground help to improve the integration of the neighbourhood of ‘Schindelhäuser’ in the quartier by creating meeting places for all the inhabitants of the quartier. Furthermore, the design of the kindergarten/ nursery was adapted according to ‘modern educational methods’ thus the rooms were designed in order to use with larger groups (maximum 25 children). Flexibility is ensured with sliding walls that replaced the former small scale compartmentation. The colour concept was especially adapted to create a child friendly environment (violet, green- and yellow shades).
The new kindergarten is also suitable for wheelchairs. The already existing playground was increased in size as to response to the new number of children but also adapted to ensure that people/children with walking disabilities have access to it and/or can use it.

4 MATÉRIAUX DE CONSTRUCTION, MATIÈRES PREMIÈRES RECYCLÉES (SIA 3.1.1)
Historic buildings are inherently sustainable. Preservation maximises the use of existing materials and infrastructure, reduces waste, and preserves the historic character of older towns and cities (National Trust for historic preservation, 2011: VI). This two aspects (preservation on the one hand and reuse of materials on the other) where both respected in the project. The national trust for historic preservation in Canada states that ‘little has been know about the climate change reductions that might be offered by reusing and retrofitting existing buildings rather than demolishing and replacing them with new construction. This […] study concludes that building reuse almost always offers environmental savings over demolition and new construction’ (National Trust for historic preservation, 2011: 6). The approach chosen with the ‘Schindelhäuser-project’ not to demolish and build new but to keep as much as possible from the old stock is very much in these lines.

The flooring of the apartments (wooden floor, parquet, ceramics) and the wooden panelling was where possible, kept and refurbished. The windows, folding shutters, porch roofs and plinth were not replaced but only given a new paint finish. Thus the need for new material was kept at a minimum level. The typical façade of the buildings was kept, no new construction was added and also the public space with the green areas, courtyards and places as well as a fountain was not altered. On first sight, the refurbishment of 2009-2012 is not visible as such. The preservation of the particularities keeps the city’s history and culture alive and adds social value to the quartier but also to the community that lives in the houses.
Aspects en contradiction avec les principes du développement durable | Aspects in contradiction with sustainable development principles

1 UTILISER AU MAXIMUM LES ÉNERGIES RENOUVELABLES (SIA 3.2.4)
The reduction of energy consumption for heating as well as for cooling system can be assured by construction measures and by technical solutions. The SIA norm states that 1/3 of the consumption of energy in Switzerland is due to heating. Compact and well insulated buildings can reduce the energy consumption drastically, solar energy and other renewable energy sourced could be used for the heating system and hot water as well as for electricity.

The project ‘Schindelhäuser’ renounced a broad and sustainable energy concept: No corrective measures to retrofit for energy saving devices and systems were taken, the buildings were almost not adapted in order to reduce energy loss. The old heating system consisting of isolated wood-, oil- and electric furnace was replaced by a central wood pellet heating system indeed but the possibilities for other renewable energy sources were not verified. The project was for example not assessed for the potential to incorporate on-site renewable energy including solar, geothermal, biomass or bio-gas strategies. Post-insulation was done only with the cellar ceiling in the laundry room area. Important factors like replacement of windows or further post-insulation (ex. roof, façade) were not considered partly because of preservation consideration, partly because of the restrictive budget planning. The National Institute of Building Sciences suggest that with proper maintenance, caulk and weatherstripping, old and or historic windows can be upgraded in order to be more energy efficient but still preserve their character-defining features (National Institute of Building Sciences , 2013). No such or a comparable measure was taken within the project though. Preservation and green goals often overlap, the reconciliation of their differences was not a question in the concept of the project and therefore even cost-efficient measurements for energy reduction where neglected.

2 INTÉGRATION, MIXITÉ (SIA 1.1.1)
According to the SIA standards, a quartier that is characterise by a socio-demographic mixture and a social and commercial infrastructure is on the one hand more stable and has on the other hand much more potential to be flexible to changes. Given the sizes, the standards and the floor plan of the apartments, there are at least two aspects which contradict this norm: the socio-demographic profile of the tenants is very homogeneous and there is, besides the kindergarten/nursery, no other use within the housing complexes than habitation. The people that live in the ‘Schindelhäuser’ have in general modest income and agree to trade off comfort and a high living standard for low rent and the central location in the City. Most of the tenants live in single-person or two-person households, there is almost no space to raise a family thus an important socio-demographic class is excluded almost already from the beginning. The concept is resistant to any alteration, each apartment is considered as single, independent object and therefore not allowing any expansion. There are, for example, no balconies which would increase living space and the standard of living. There are no lifts in the buildings, the access to the apartments, except for the ground-floor apartments, is limited. The concept to integrate people with disabilities which was developed for the kindergarten and the playground was not extended for the apartments. Furthermore, there is no place for business and/or small trade, thus, besides the kindergarten/nursery the housing complex ‘Schindelhäuser’ is not open to the public. The exchange with other inhabitants of the quartier and or the city takes place almost exclusively outside the area.

3 BRUIT, VIBRATIONS (SIA 1.4.6)
The low standard of furnishing of the apartments has disadvantages that influence even the cohabitation and the composition of tenants in the housing complex which can be seen with the criteria of noise. The SIA standard claim that noise and vibration can cause sleep disturbance, enfeeble the body, weakening mental performances and constrain the oral communication. The Scottish Building Standards Agency which made a report about housing and sound insulation focusing especially on already build stock states very clear that ‘noise […] may act as a catalyst affecting the occupant’s health and well-being.’ (SBSA, 2006: 37). Noise should therefore if possible be avoided. Since there was no alteration to the old building structure of the houses within the ‘Schindelhäuser Project’, one of the problem that was already existing before the refurbishment was not solved: the walls between the apartments are extremely thin and thus poorly sound-proved, this goes for airborne sound (like noise from people talking) as well as for impact sound (e.g. footsteps noise). The social structure depends thus very much on the considerateness of the inhabitants.
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and this fragile structure could be disturbed with every change in the tenant community. The SBSA lists some ways of remedial treatments in order to improve sound insulation also within existing and even historical buildings, for example the insertion of materials into the existing wall and floor without significant alteration to the existing room interiors. Solutions could be render coats, resilient wall linings or mineral fibre backed boards (SBSA, 2006: 127). Within the project, no measures what so ever were taken, noise and vibration stays therefore a problem.

4 GARANTIR UNE EXPLOITATION ÉCONOMIQUE À LONG TERME ADAPTÉE AU SITE (SIA 2.1.1)

With a land area of about 11’944 m2 and the buildings that take about 3’382 m2, the whole area of the ‘Schindelhäuser’ is not densely built over. There have never been plans to build new extensions to existing buildings in the area, the complex presents itself with the same outlines as it did in 1918, preserving the waste green space between the building complexes.

SIA states that the utilisation density should be appropriate and thus contribute to the reduction of land for building which in turn helps to prevent urban sprawl. Zurich is already facing a shortage of housing space at the moment and the prognoses for the future development predict a growth in population. A smart extension of the building complexes or a loft conversion could have increased the density and enable more people to live in the area. If part of the concept an extension could also have helped to create a better socio-economic intermix of the tenants, for example by creating apartments that are suitable for families. Furthermore a smart extension could have helped to reduce the energy consumption of the whole building, for example by reducing heat loss through the surface to which it is attached. Also the flexibility of the building structure could have been increased for example with the creation of common rooms or rooms for commercial usage. The concept and the implementation lack flexibility to adapt to any transformation of the requirements of the inhabitants and of society as a whole on short- and mid-term.
Sustainability is about overlapping environmental, social and economic requirements and the need to bring them all into harmony. All of them are relevant to older buildings. Within the project of ‘Schindelhäuser’, the emphasis lies clearly on the social and the conservational aspects. The environmental aspect was almost not part of the planning and the implementation but, rather indirectly, plays an important role in the constructing process. The energy efficiency and historic buildings guidelines published by the English Heritage specifically underline the fact that there is no inherent conflict between the retention of older buildings and the principles of sustainability though. It is a process of careful adaption and re-use which can lead to results in accordance with both principles, that of building conservation and that of sustainability also in the ecological dimension.

The ‘Schindelhäuser project’ did recognise that the heritage assets are a non-renewable resource and have therefore to be handled with great care. Doing so, the reuse of already existing material and the minimisation of any intervention in the basic structure of the building helped to minimise the impact on the environment. Reusing materials (recycling) minimises waste and saves the resources that would have been used to produce new material (grey energy). This goes very well together with the SIA criteria for ‘reduction of the impact on the environment during the fabrication’. The social criteria have impact on more than one dimension of the project: On the one hand, the aim to limit the increase in rents caused the construction team to look for solutions that are as economical as possible which increased the willingness to recycle rather than to build new. The fact that the rents are still modest enabled the tenants to keep their apartment even after the refurbishment. No change in the socio-economic structure or gentrification of the quartier took place. The integration of all the parties involved helped to avoid greater conflicts, objections and oppositions of any kind.

On the other hand the limitation set up by the budget limited also the possibilities to implement a comprehensive strategy for an ecologically sustainable refurbishment. The project is for example not in line with the aim of the City of Zurich for a 2000-watt society and has no MINERGIE label.

The ‘Schindelhäuser complex’ belongs to the city of Zurich. This fact involves several aspects that could have been used in order to develop a broader concept of sustainability: a long term planning is possible since short term profitability and money are less prominent (no investors). Zurich has principles for municipal buildings which includes the standard for MINERGIE also for refurbishments. The ‘Schindelhäuser complex’ is not a municipal building but, with the help of the already existing expertise and in line with the efforts of the city of Zurich, the energy use and consumption as well as other environmental aspects should have been tackled nevertheless. Important questions concerning health (noise, light, ventilation) could have been included in a broader concept. Social integration could have been extended and future developments (ex. densifications) anticipated.

The decision to renovate while the tenants still lived in the apartments is part of the social compatibility of the whole project but limited at the same time bigger interventions. Here again, it is a trade-off between social and ecological aspects which characterises the whole project.

The project has some capturing aspects, especially the preservation of the buildings and of the simplicity of the housing space as well as the integration of the inhabitants in the refurbishment process. Taking in to consideration the relatively complex refurbishment of the infrastructure (pipes, wires, heating system) and the circumstances as described above, the lack of a more comprehensive sustainability concept in terms of ecological sustainability is, for the author of this report, not entirely comprehensible though. Furthermore, the refurbishment of a complex like the ‘Schindelhäuser’ (relatively large historical building complex under preservation order, obsolete infrastructure, small, simple and cheap apartments, central location) is a challenge that the city of Zurich faces since a couple of years. For the renovation of the ‘Wohnsiedlung Zurlinden’ for example, they choose to modify some of the floor plans in order to create more variety. Furthermore 10 of the apartments in ‘Zurlinden’ (out of 178) were adapted for wheelchairs. Within the project ‘Siedlung Sihlfeld’ which was also distinguished with the ‘sustainable refurbishment’ award and which is also under a preservation order, the problem of the impact of footfall sound was successfully solved, the energy consumption optimised and densification achieved (Stadtentwicklung, Schlussbericht der Jury: 18).

The potential for a strategy that focuses especially on simple and cost efficient solutions for historical building stocks was given but not considered in the ‘Schindelhäuser project’ (see for example the guidelines of the English Heritage Association or of the SBSA).
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