

# Underground Space – Lost Space Ready to be Reclaimed

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## 1 ABSTRACT

‘Lost spaces’ can become interesting experimental areas within the urban fabric of cities. An example of this are former inner city docks that provide numerous opportunities for new uses and activities. Can lost spaces add to a city’s diversity and also be part of social initiatives that lead to new social structures?

Apart from this question, the authors will be looking at a vast area of lost space, namely the space which exists underneath cities and is often overlooked. In the event that it is acknowledged as a part of the urban fabric, it is often seen as an urban service level, the space where we place the utilities. Those functions which we rather not have on the surface are readily placed below the surface. The authors will provide an overview of cases that demonstrate this, but will also propose a radically new approach which questions the wisdom of this choice.

This new approach is to see underground space not as lost space but as a valuable societal asset which can be integrated into the urban fabric and used in various ways. The value for society is that it provides new and additional spaces that actually compliment or further enhance livability on the surface. This can play a key role in common day urbanism based on density and mixed-use.

We will reveal that just like lost spaces in cities, underground spaces are unappreciated and often misjudged in terms of their potential. But just as with lost spaces, there are citizen initiatives which unlock the potential of underground spaces. The Lowline project in New York is a prime example of this (figure 1). The concept involves reusing a former, now disused underground tramway depot and unlocking its potential as a new public space in form of an underground park.



Figure 1: artist impression of the Lowline NYC (US), courtesy of RAAD Studio

The main difference between underground space and surface development is that below the surface there are no open spaces by definition. In a sense all spaces between underground developments are lost by definition. It means that any development should take this into account and contribute to creating connections and thereby public spaces. This requires not only planning but also management of underground space. The authors argue that just understanding the potential of underground space is not enough. The actual development will require a spatial dialogue between many stakeholders, including planners, engineers, developers and public decision makers. The extensive use of underground space beneath the City of Helsinki was achieved in this way: the creative reuse of former civil defense shelters, connecting them and planning future uses based on sound geological expertise.

Although unlocking the potential of underground lost spaces may seem daunting, the potential rewards for society are enormous. Many cities are struggling to cope with the ever increasing demands on space. Underground space can provide an interesting answer and should really be a standard component of modern urban planning.

## 2 LOST SPACES: THE CASE OF INNER CITY DOCKS

Inner city docks can become industrial wastelands when they lose their original function. They often influence the urban landscape surrounding them negatively as many examples worldwide illustrate. Revitalizing these areas can be a major challenge. In the city of Rotterdam a former inner city dock was reused in an innovative way. After closing off the dock from the river and pumping out the water, the space which was lost under water was reclaimed. A waste water treatment plant was then built in that reclaimed space. After completion the plant was covered and a city park scape created (figure 2a and 2b). This allowed for further urban development in an area which would have lost all its attractiveness had the plant been built on the surface (Cornaro & Admiraal).



Figure 2a and 2b: Dokhaven redevelopment Rotterdam (NL) before and after completion

In the same city, part of a former rail road yard was redeveloped into an urban farm. The farm produces not only for its own restaurant and shop but also supplies local restaurants and bakers. The urban farm itself attracts customers and serves as an information center on urban farming and on how citizens can become part of an initiative which focusses on creating awareness amongst citizens to seize the initiative and accept responsibility for greening their city (Pötz & Bleuzé). In this way, what at first was a simple initiative to reuse a, for all intent and purposes lost space, suddenly becomes a campaign for new social initiatives and creation of new social structures over time. Part of the success was using crowd funding to acquire the capital needed for the project and to create special advantages for those that contributed like special menus and seating in the restaurant.

The authors emphasize both these examples to underline the potential of what can happen if the concept of underground space is seen as an opportunity to reclaim lost spaces and to create opportunities for civic ecology practices (Krasny and Tidball). It requires us first to accept the concept of underground space, but also to look past that concept in terms of just using it as an urban basement or service level.

## 3 OUT OF SIGHT – OUT OF MIND

The concept of underground space is not new. It has been around for a long time and looked at from an abstract level as part of mankind's choice in terms of shelter: the cave or the tent. The cave is seen as synonymous for underground space: mankind creating modern day caves and in that way reclaiming lost spaces. Historical examples are the 'Yaodongs' in China, which were already being used before the start of the Common Era and are still in use today (figure 3). They provide shelter against the harsh environment on the surface. The Yaodong is of interest from a conceptual point because it demonstrates the concept of opening up underground space to the surface.

Although these historic examples are well known, it wasn't until the 19th century that engineers started thinking about building tunnels as part of the evolving railway networks. This made it possible to also start thinking about underground railway lines, thus the metro was born. But along with the idea of using underground space for these large conduits carrying trains and passengers, the underground space also proved an effective way of hiding what we didn't want to see on the surface. The Paris Sewers created by Hausmann are a good example of this. In many cities, by the beginning of the 20th Century, chaos was reigning in the underground space through uncoordinated use of it for utilities. By using underground space as an urban service layer, the concept of opening up underground space was lost as well. It was as if underground space was disconnected from the surface and became lost space. It was out of sight and out of mind.

The question which this raises is whether the concept of underground space is so limited that it can only be seen as the ultimate urban service level?



Figure 3: example of a Yaodong, China

#### 4 A NEW APPROACH: OPENING UP UNDERGROUND SPACE

We have shown that the use of underground space evolved through the work of pioneers, exploring this vast lost space beneath cities. Their approach was to develop in a way that was for the larger part disconnected from surface activities. In a publication by the Government Planning Agency of the Netherlands in 2000, underground space was literally portrayed as the final frontier (RPD, 2001). This comparison was not far from the truth in that in many cases underground space is used on a first come, first served basis. The first to stake his claim can use underground space irrespective of the question whether this is advantageous to society or not. Although the use is seemingly disconnected, at certain points, connections are made – in the case of underground metro lines, the staircases provide access to underground platforms or stations. But imagine if once again we could open up the underground space in such a way that it would be integrated into the urban fabric without citizens consciously thinking about whether they are above or underground. That is precisely what the next two examples propose.

##### 4.1 New York City, Lower Eastside, the Lowline

Krasny and Tidball write about civic ecology practices as: “(...) self-organized stewardship initiatives, often taking place in cities”. The Lowline project is an example of such an initiative. It is about pioneers who discover a lost space below the Lower Eastside of New York City. This lost space consists of a structure which extends three blocks and was used until 1948 as a station and balloon loop for streetcars. It has ceilings which are 6 meters high. The core idea of the Lowline is to become the inverse of the High Line initiative. The High Line is a former elevated railway line running through New York City and has been successfully transformed to an elevated linear park stretching over thirty city blocks. It provides the city with much needed public space but also has attracted flora and fauna amongst which endangered species as the Monarch butterfly. The Lowline is proposed to become an underground park by opening up parts of the structure to the surface allowing daylight to enter (see also figure 1). The founders see it as an invaluable public green space, providing the city with what it lacks: open public spaces where people can meet and relax. From a conceptual point of view this is a perfect example not only of reclaiming lost space, but also of how to integrate underground spaces into the urban fabric and how to use these spaces to strengthen social structures through creating places that people can share and where people can meet.

##### 4.2 Osmose, the Paris metro station of the future

In a study commissioned by the Paris Transport Authority RATP, one of the proposals called for a new concept for an underground metro station. By literally opening up the underground to the surface on a grand scale, slopes are created which can perform various uses. These range from just relaxing and enjoying the surroundings to watching movies on a big screen. A density is created focused on a transport hub, but in such a way that quality is achieved and multi-functions are created. In this proposal what in reality often is a

mono-functional hidden and lost space, was dramatically transformed and integrated into the urban fabric and reclaimed for the city to use and enjoy (figure 4a and 4b).



Figure 4a and 4b: Open Air Metro Project Paris (F), courtesy of Foreign Office Architects

## 5 APPRECIATING, PLANNING AND MANAGING

Appreciating the possibilities of underground space is just one step. The earlier mentioned concept of shelter illustrates this: tents can be placed, caves have to be created. The use of the underground space asks for an understanding of the geology and other factors which determine the possibilities from an engineering point of view. Underground space use also asks for an understanding of its possibilities. The first come first served strategy could prove to be disastrous in the long term. Not planning it will prove to be non-sustainable. Using underground space from an energy perspective (geothermal applications) can in itself lead to an exploitation that inhibits further use from a space perspective. The authors would like to stress that only through a spatial dialogue on the use of underground space between all parties involved, will it be possible to decide its best long term use.

This is further illustrated by the zoning plan shown in figure 5. As the city planners conserve areas for storage of hot and cold water as part of hot-cold extraction schemes, other uses of underground space are ruled out. This could hold true for a larger part of underground space or just one layer, depending on the consistency of the water carrying layers.

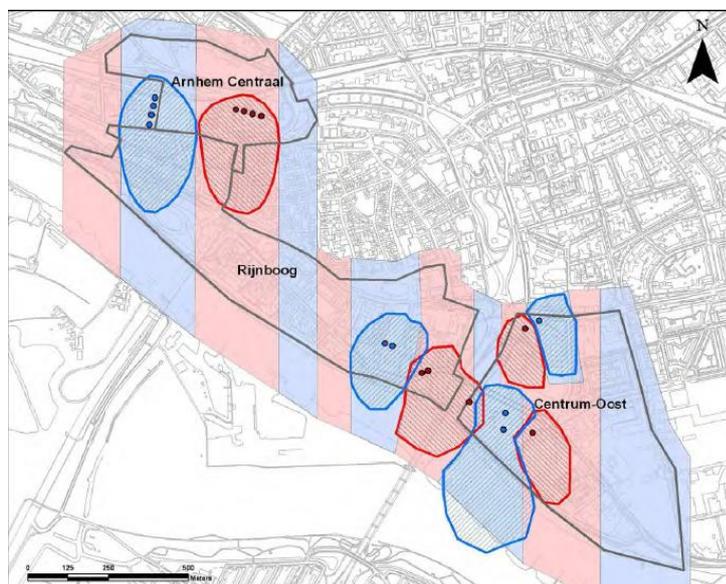


Figure 5: underground zoning plan showing hot and cold zones for water storage schemes, City of Arnhem (NL)

The City of Helsinki is one of the few cities in the world that actually has an Underground Space Master Plan. The plan itself was driven by both the geology and existing structures. Large underground nuclear shelters were identified for reuse as car parks but also as a swimming pool (figure 6). The geology identified other areas for future spatial use, making it possible to connect facilities underground. Building underground metro lines provided excavated material which was reused by the city to backfill old docks and redevelop these into new waterfront properties. Helsinki clearly illustrates that to plan underground space one needs to know underground space in terms of its geology and understand the opportunities this gives.



Figure 6: Itäkeskus Swimming Pool, Helsinki (FI)

Planning the use of underground space from a wider perspective is paramount to the sustainable development of underground space. But in itself it's not enough. Underground space also needs to be actively managed because of the various resources that it contains, space being just one of those. Although most of underground space might be seen as lost space, it contains an enormous potential for cities if planned and managed in the right way. Not doing so will ultimately result in chaos and prevent future development and use.

## 6 CONCLUSION

The authors have shown that in terms of lost space, underground space can be taken to be a prime example of space lost to society. But just as lost spaces on the surface can be transformed, the same can be achieved below the surface with often surprising results. Integrating underground space into the urban fabric is a challenge which, when met, will provide spatial quality to a city. This cannot be achieved by just looking at underground space as a segregated urban service level. Planning and managing underground space is key to its sustainable development and ultimately providing the city with those spaces it desperately needs, but cannot provide at the surface.

## 7 REFERENCES

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