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從都市再開發過程中創造綠色基盤設施的法規限制：台北市舊城區

Regulatory Impediments to Green Infrastructure Creation in Urban Redevelopment: Findings from the Old Town in Taipei

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摘要

自1990年起，台北舊城區已開始呈現人口縮減的現象。儘管全國的生育率十分低，比起去成長型的都市發展願景，規劃當局依然偏好以都市成長爲願景，據以推動都市再開發。在這樣的背景下，整合綠色基盤設施與都市再開發，似乎能夠提供一個較爲永續的解決辦法。一方面保全綠地系統，提供支持生命的多重功能和服務，另一方面能在不開發自然環境的狀態下，容納預估的成長人口。

本文以台北舊城區爲例，呈現出在的高密度環境及都市成長引導的發展模式下，若要施行這項整合性策略，將可能面臨哪些挑戰，特別是法規層面。本研究採用個案研究法，首先回顧與該策略相關的關鍵性都市政策與規範。接著，從空間上指認出綠地和再開發案的位置，呈現出綠地和再開發基地之間的空間關係。最後，歸納再開發案中創造綠色基盤設施元素會面臨的法規限制，並且提出政策發展上的建議供高密度城市施行整合性策略之參考。

關鍵字：綠色基盤設施、都市再開發、法規限制、舊城區、台北市

Abstract

Taipei's old urban core has shown population shrinkage since 1990. Despite an extremely low birth rate in this country, promoting urban redevelopment based on a growth scenario is still more favoured than a degrowth one by the authority. Given the context, integrating green infrastructure (GI), which can secure a green space system that provides multiple life-supporting functions and services, and urban redevelopments (UR), which can sustainably accommodate growing population without consuming extra natural environment, seems to provide a sustainable

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solution.

This article, thus, focuses on revealing what challenges, regulatory in particular, this strategy can encounter in Taipei's old urban core, which is already densely populated and its development is driven by an urban growth model. By adopting a case study strategy, it firstly reviews key urban policies and regulations in relation to the integration. Based on a map identifying green spaces and redevelopment projects, it exemplifies how these two spatial elements interact. It finally draws concluding remarks on the regulatory impediments to creation of GI elements in these redevelopments as well as policy lessons for adopting the integrative strategy in densely populated cities.

Keywords: green infrastructure, urban redevelopment, regulatory impediments, old town, Taipei

Introduction

Compared with cities worldwide, a heavy and rapid concentration of the urban population is expected to occur in Asian cities (UNFPA, 2007). The urbanisation in the form of rapidly growing population size and density is a special phenomenon in major East Asian cities (Rowe, 2005). Due to the leading roles of these East Asian cities in the national or regional economic growth and development, environmental problems are often more diversified and complicated (Bai and Imura, 2000). The rapid economic growth leads to both rapid urbanisation and a deteriorating environment in this region. The environmental deterioration of surrounding natural areas requires the redirecting of urbanisation into the already-built areas in a form of urban renewal, redevelopment or regeneration while ensuring that the intensification does not lead to low-quality urban life due to the resulting overcrowded space for urban living.

The intensification approach towards the redevelopment of inner-city areas in East Asian countries, such as Hong Kong, Japan, South Korea, Singapore, Taiwan, Malaysia and China all share similar visions and strategies of urban redevelopment by the erection of high-rise buildings (Sorensen et al., 2010, Shin, 2009a), prominent skyscrapers, urban flagships and megaprojects to raise or reinforce their status as global cities (Kong, 2007, Shin, 2009b). However, most of these UR initiatives are found to be mainly driven by the force of economic growth in competing with other global cities. As the leading exemplar for many East Asian cites, Tokyo's high-rise redevelopments have shown a stronger focus on profit accumulation than on other aspects (Sorensen *et al.*, 2010).

As most East Asian cities already show a higher density, with further development likes in an infill mode with high-rise redevelopments, it is important to

provide these dense urban environments with adequate green space in order to result in better quality of life. Nevertheless, urban environments with higher density are expected to have problems when embedding green spaces. 'Competition for space' can be critical in an urban area with exceptionally high development density, such as inner cities or old urban cores, and can cause difficulties in retaining and developing urban green spaces (Jim, 2008, Jim, 2004). In Tokyo, it is also often difficult for public parks, as an amenity, to compete with infrastructure, such as road, in construction budget (Waley, 2005).

Given the context, integrating green spaces provision and urban redevelopments provides a strategy, which is assumed to be able to deliver both of their key benefits. Urban redevelopments (UR) can sustainably accommodate growing human population without consuming extra natural environment (Evans and Jones, 2008, Jones and Evans, 2008, Winston, 2009) while an interconnected green space system being regarded as a "green infrastructure (GI)" can provide multiple life-supporting functions and services for humans and ecosystems (Benedict and McMahon, 2002, Williamson, 2003, Gill et al., 2007, Kambites and Owen, 2006).

This article, thus, focuses on revealing what challenges, regulatory in particular, this strategy can encounter in Taipei's old urban core consisting of three districts already densely populated and driven by an urban growth model. Therefore, it serves as a pertinent case to assess the opportunities and barriers which exist when attempting to achieve sustainable urban form through densification. By adopting a case study strategy, it firstly reviews key urban policies and regulations in relation to the integration. Based on a map identifying green spaces and redevelopment projects, it exemplifies how these two spatial elements interact. It finally draws concluding remarks on the regulatory impediments to creation of GI elements in these redevelopments as well as policy lessons for adopting the integrative strategy in East Asian cities.

The Regulatory System

In the Taipei Metropolis, the key urban policies and regulations for regulating or encouraging the provision of green infrastructure in urban redevelopments are based on a zoning and review system, a few incentives and a draft Landscape Master Plan.

Zoning and Review System

The zoning system includes a master plan and a detailed plan devised on the legal basis of the Urban Planning Law (amended on 19th May 2010). The intensity and type of land use are regulated by ordinances whilst the design quality is controlled by a series of design codes enacted both by the local legislative bodies on the legislative

foundation of the national laws. The rigidity of zoning is notorious for its unsuitability for promoting diversification or variety and causing sharp divisions physically and socially (Gallent and Kim, 2001).

In response to the identified weakness, a review mechanism, presumably characterised by a more flexible, independent and open atmosphere, has been introduced to mitigate the rigidity of the current system. As the zoning plan forms the basis of the urban planning system, the review mechanism offers flexibility to implement planning policies that are contradictory to the outdated zoning and land use control. Three main statutory review committees in the planning system are designed for reviewing the change of land use, development or redevelopment projects, namely, the 'Urban Planning Commission', the 'Urban Renewal Review Board' and the 'Urban Design and Land Development Permit Review Board'.

The Urban Planning Commission is the foundation of the statutory planning system for reviewing all the development or redevelopment projects involving land-use change. This mechanism provides the spatial integration of GI and UR - a legitimised course to the statutory urban zoning plan. The Urban Renewal Review Board is particularly designed to review whether the redevelopments comply with the Urban Renewal Law. A main discretion of the board is in granting the incentive awards. It could also be seen as a statutory platform, which allows conflicting issues arising from the replacement of holding rights to be discussed. The responsibility of the Urban Design and Land Development Permit Review Board is to review all the redevelopments, and some developments situated in the designated areas, on aspects such as the allocation of the onsite open space, pedestrian routes, environment-protection facilities and the appearance of buildings, as well as the landscape, management and maintenance plans. The review process serves as a complementary mechanism to the two-dimensional zoning ordinance and provides quality control for the urban environment.

In these procedures, the integration of GI and UR can be approached in two ways. The fundamental way may be securing existing GI components by designating the land use as 'green and open space' or by preventing a 'green and open space' designation from being changed into other uses. The other way is through the urban design review board to ensure that a certain quality and quantity of GI components will be provided in redevelopments.

However, deficiencies of the board in relation to the lack of transparency and objectivity are identified. The quality of design lies on the more arbitrary decision of the board member in the absence of a complaints mechanism and a review of standards (Ho, 2005). Although the design principles are established for the neighbourhood scale, they may be less effective for the issue of GI, which demands a high-level statutory spatial guide.

The monitoring of the results of these boards relies on the public. Nevertheless, the process provides few opportunities for public participation. Public access to a plan is confined to a 30-day public exhibition. Also, during the review meeting, the public's opinions are legally restricted to a less interactive way. Only some responses from authorities in writing can be received afterward. The review process is thus likely to be manipulated by certain powerful interest groups (Chen and Chen, 2000). Given the unbalanced power structure, public welfare is likely to be neglected in these review boards.

Incentives

A possible policy tool to integrate GI with UR in the current planning system is incentives. Among the incentives, the Floor Area Incentive is the most ready tools to encourage a more desired GI provision on the part of private actors in the process of urban renewal. As shown In the *Urban Renewal Act* (amended on 12th May 2010), urban renewal is a fixed term defined for activities of redevelopment, renovation or maintenance:

Article 3	*1. Urban Renewal: Refers to the implementation of reconstruction, renovation or maintenance within the urban plan area in accordance with the procedures instituted in this Act.*

Although the definition of urban renewal refers more broadly to the implementation of reconstruction, renovation or maintenance in the central act, the local ordinance shows a more focused purpose for the reconstruction activities in *Article 19: Floor Area Bonus* (*The Planning and Design Criteria for Floor Area Bonus in Taipei Urban Renewal Units*, amended on 5th Nov 2008). In this article, six planning and design criteria, vaguely described and entitled for reward, reveal the synonymous relationship between urban renewal and reconstruction.

The first criterion provides that the design of a reconstructed building meets the design principles for the disabled and for natural disaster prevention and shelter space. Two others are about the provision of a certain area of open space and pavements whilst another is about the preservation of historical and/or memorial buildings. A further criterion is about the scale of the renewal area and the final one is about compliance with the principles of green architecture. Most of these criteria directly link to the encouraged design of buildings. Although open space and pavements are included, the criteria themselves tend to be quantitatively defined to encourage minimum provision.

The overall legislated regulatory tool is the '*Taipei Municipality Land-Use and Zoning Regulation*' (amended on 23rd Jun. 2010) in which general land use types are

regulated. A particular incentive and regulatory volume is in the *Regulation on Relaxation and Floor Area Bonus for Comprehensive Design* (Chapter 11, Article 79 to 82). A higher proportion of onsite provision of public open space is encouraged by granting a floor area bonus, which is regulated with the minimum requirement of the type, size and shape of the public space. The arrangement and greening of public open spaces has also been articulated in Articles 81 and 82. Article 82-1 refers to the '*Comprehensive Design Principles for the Arrangement and Maintenance of Public Open Space'* (Code Taipei13-03-1002, launched 1994), which consists of a particular set of design principles addressed to ensure connectivity with adjacent green and open spaces. This particular set of principles would help to improve the provision and connection of open space and green space in the urban setting.

The current urban design control on the private sector relies on the '*Regulation of Development Permit Review on Urban Design and Land Use*' (Code Taipei13-03-1005, launched 2003) and the '*Architecture and Urban Design Code for Hillside Development*' (Code Taipei13-03-1002, launched 2002) in which certain required design documents are asked to be provided.

For the public sector, the urban design control involves the design of public parks with an area above one hectare (*Urban Design Code for Public Park Development*, Code Taipei13-03-1003, launched 2002) and the design of flyovers and subways (*Urban Design Code for Flyovers and Subways*, Code Taipei13-03-1004, launched 2002). In general, the means for urban design concerns are fragmented and mostly from a visual perspective, rather than a functional one. For public facilities, the regulation only involves building coverage and floor area ratio.

Although incentives and regulatory tools exist for shaping the design of urban open space, it is less clearly addressed for improving the ecological function by regulating or encouraging the ratio of pervious surfaces designed onsite. Also, no clear vision or guidance is provided to inform both the public and private sectors of the preferred provision. In turn, this ambiguity subjects the review boards to a rather routine or arbitrary method of decision-making.

Draft Landscape Master Plan

The draft Landscape Master Plan for Taipei City (2006) is an advisory, non-statutory plan. Its preparation starts by analysing landscape resources (including ecological, cultural, open space and daily-life landscape resources). It then moves on to discuss a set of environmental and implementation issues, and finally develops a landscape framework that identifies important landscape elements, for example, mountains, rivers, biotopes and green corridors within the city boundary. Based on the analysis, strategic plans and urban design principles are drawn out in this Plan for linking up the gaps in the existing ecological network.

As a newly-developed Landscape Plan, it is considered to fit into the existing zoning system by serving as guidance for the review of urban design and permits of development. Therefore, the plan provides suggestions on areas requiring the revision or drafting of urban design principles. Many of the assigned areas have undergone large-scale redevelopment or reclamation, and thus left no traces of the cultural or ecological landscape that originally existed. Only a few areas are more small-scale, housing-oriented renewal. Their spatial distribution demonstrates that the western part of Taipei City receives more attention.

Moreover, the Plan shows a reflection of the spatial differences more elaborate than the zoning plan, which merely designates population density and land use according to the prospective need for urban growth. The procedural distinction between the two systems reveals that the Plan incorporates a more sustainable planning philosophy as it considers the limitations and special nature of the existing environment while the Urban Plan is generated from a more anthropocentric, urban-growth viewpoint, which takes the environment as an exhaustible supply of land for allocating people and development. Therefore, this Plan is suitable to serve as a decision-support tool, which forms the discretion basis for the Urban Design Committee (Huang, 2006). In this regard, the subjectivity in the review process of urban design could be better avoided by using the Plan as a guide.

Identifying UR on a GI Mapping

On the GI map, the designated UR areas in the three districts which are entitled to the UR incentives specified in Chapter V of the Act are mapped (Figure 1). The local authority is permitted to actively prepare UR plans and designate UR areas to guide the private-led UR by the *Urban Renewal Act* (amended on 12th May 2010):

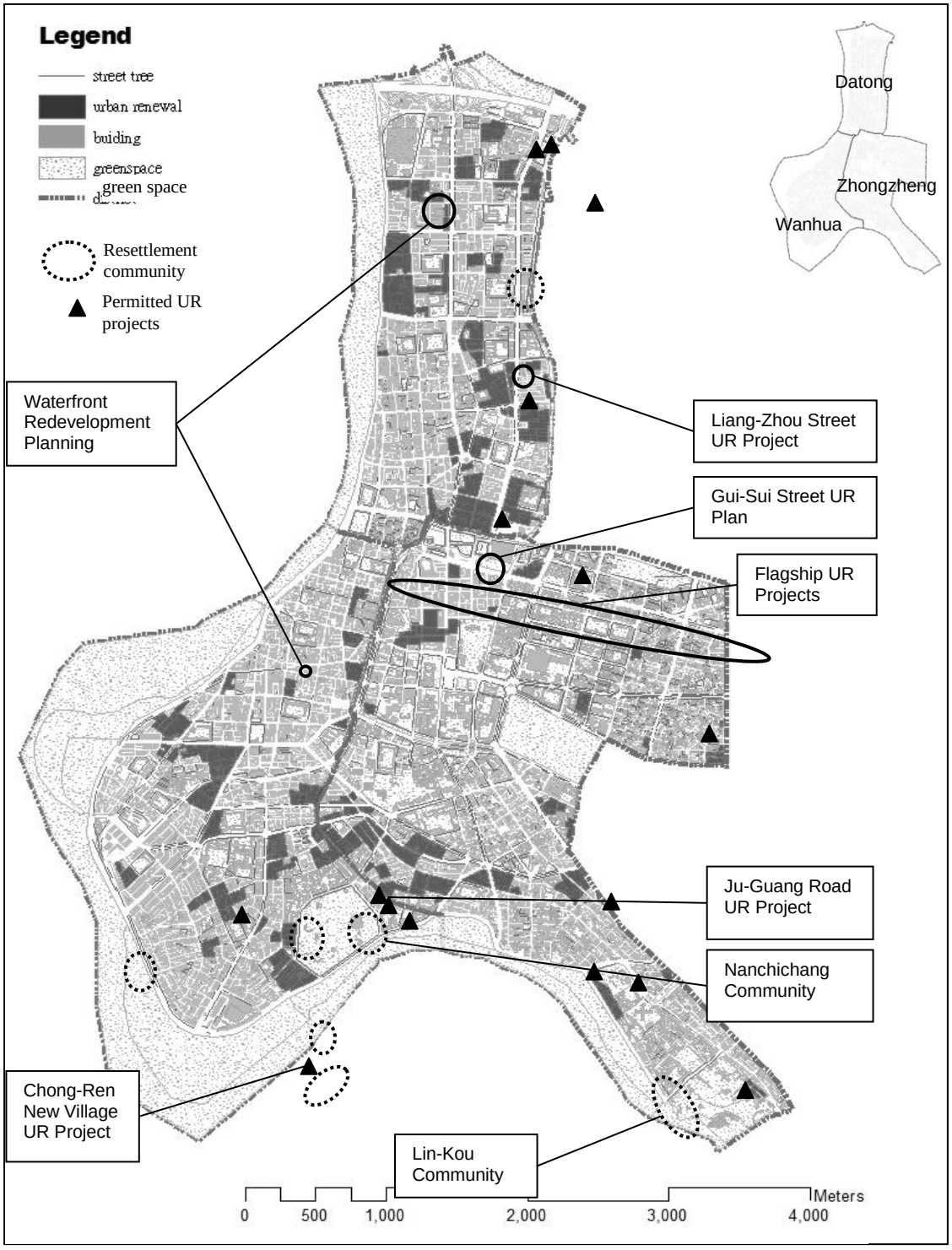

Figure 1. Designated UR areas (Source: URO, 2002a, URO, 2002b, URO, 2002c)

Chapter II: Designation of the Renewal Area

Article 5 *The municipal and county (city) authority should conduct an overall investigation and evaluation for the urban development situation, residents' willingness, existing society, economic relations and human characteristics. When designating the renewal area, the following items should be specified in accordance with the actual requirements in the urban renewal plans individually to be*

used as guidance for drafting the urban renewal business plans:
1. Renewal Areas. 2. Objectives and Strategies. 3. Physical redevelopment. 4. The designation of renewal units or the criteria of designation. Other items requiring to be specified.

Several tools to encourage private investment in UR are set out. Two important incentive tools are offered for the local authority to attract private inputs: granting additional floor areas and relaxing taxes:

Chapter V: Incentives

Article 44 *Building sites within the urban renewal business plan can consider the actual needs of urban renewal businesses and assign them additional building space.*

Article 46 *The taxes on the lands and buildings within the renewal area are reduced/exempted*

According to the principles of the designation regulated in the Act, several UR areas in the old urban core are designated by the authority as the prioritised areas in need of UR:

Chapter II: Designation of the Renewal Area

Article 6 *Under any of the following circumstances, the County (City) authority can designate an area as a renewal area in advance:*
1. Buildings that have deteriorated and have no fireproof structure, where the space between neighbouring buildings is insufficient and/or where the building is hazardous to public safety.
2. Buildings that are in a dilapidated, dangerous condition that have been badly built or roads that are curved and narrow or in any way hazardous to public safety.
3. Buildings that do not meet the urban function.
4. Buildings that are not coordinated with important development projects.
5. Buildings that have historical, cultural, artistic or other memorable value that urgently require preserving and maintaining.
6. Buildings which have a bad living environment that constitutes a hazard to public health or the peace and order of society.

Article 7 *Under any of the following circumstances, the municipal, county (city) authority should designate the renewal area*

based on the existing situation to draw or revise the urban renewal plan:
1. Destruction or damage due to war, earthquake, fire, flood, storm or other major incidents.
2. To prevent a major disaster occurring.
3. To coordinate with central or local major construction projects.

The number of designated UR areas is 27 blocks in Datong, 27 in Zhongzheng and 24 in Wanhua (Table 1). The designation principles concern mainly the condition of buildings, and neglect other aspects of the overall quality of life. Most of the UR areas are in Residential Type 3, Residential Type 4 or Commercial Type 3 land use types. These land use types are for use in a relatively high intensity areas, which accommodate a higher building coverage ratio and a larger floor area ratio than Types 1 or 2 (*Taipei Municipality Land-Use and Zoning Regulation*, amended on 23rd Jun. 2010):

Article 10 *Building coverage ratio and floor area ratio in residential areas shall not exceed the amount regulated in the following table:*

Residential	*Building Coverage Ratio*	*Floor Area Ratio*
Type 1	*30%*	*60%*
Type 2	*35%*	*120%*
Type 3	*45%*	*225%*
Type 4	*50%*	*300%*

Article 25 *Building coverage ratio and floor area ratio in commercial areas shall not exceed the amount regulated in the following table:*

Commercial	*Building Coverage Ratio*	*Floor Area Ratio*
Type 1	*55%*	*360%*
Type 2	*65%*	*630%*
Type 3	*65%*	*560%*
Type 4	*75%*	*800%*

In Zhongzheng and Datong, the UR areas were designated in accordance with Article 6-1, whereas in Wanhua, the designation was mostly according to Article 6-6. This suggests that although these UR areas are considered as rather deteriorated (Article 6-1), they are not dilapidated or dangerous (Article 6-2), or the cause of a bad living environment (Article 6-6). Little of the UR is designated in accordance with Article 6-5, which concerns historical or cultural purposes.

Table 1. The officially designated UR areas in Zhongzheng, Wanhua and Datong

Zhongzheng	**Date launched**	**Land use type**	**Area (Hectare)**	**According to**
1-1~1-17	2000.6.26	NA	NA	NA
1-18	2002.10.28	Residential Type 3	0.87	Article 6-1
1-19	2002.10.28	Commercial Type 4	0.79	Article 6-4
1-20	2002.10.28	Residential Type 3	0.27	Article 6-6
1-21	2002.10.28	Residential Type 3	0.58	Article 6-1
1-22	2002.10.28	Residential Type 3	2.34	Article 6-1
1-23	2002.10.28	Residential Type 3	2.41	Article 6-1
1-24	2002.10.28	Residential Type 3	2.29	Article 6-1
1-25	2002.10.28	Commercial Type 4	0.51	Article 6-1
1-26	2002.11.19	Residential Type 3	1.25	Article 7-1
1-27	2002.11.19	Residential Type 3	1.97	Article 7-1
Wanhua	**Date launched**	**Land use type**	**Area (Hectare)**	**According to**
2-1~2-16	2000.6.26	NA	NA	NA
2-17	2002.10.28	Residential Type 3	1.17	Article 6-2
2-18	2002.10.28	Residential Type 3	0.52	Article 6-1
2-19	2002.10.28	Residential Type 3	3.69	Article 6-6
2-20	2002.10.28	Residential Type 3	1.56	Article 6-6
2-21	2002.10.28	Commercial Type 1	2.4	Article 6-6
2-22	2002.10.28	Residential Type 3	0.78	Article 6-6
2-23	2002.10.28	Residential Type 3	1.48	Article 6-6
2-24	2002.10.28	Residential Type 3 & 4	1.32	Article 6-1
Datong	**Date launched**	**Land use type**	**Area (Hectare)**	**According to**
3-1~3-19	2000.6.26	NA	NA	NA
3-20	2002.10.28	Commercial Type 3	0.08	Article 6-1
3-21	2002.10.28	Residential Type 4 & Commercial Type 3	1.12	Article 6-1
3-22	2002.10.28	Residential Type 4 & Commercial Type 3	0.5	Article 6-1
3-23	2002.10.28	Commercial Type 3	0.99	Article 6-4
3-24	2002.10.28	Commercial Type 3	0.47	Article 6-2
3-25	2002.10.28	Commercial Type 3	0.25	Article 6-1
3-26	2002.10.28	Residential Type 4 & Commercial Type 3	0.69	Article 6-1
3-27	2002.11.19	Residential Type 4 & Commercial Type 3	0.92	Article 7-1

NA: Not applicable (Source: URO, 2002a, URO, 2002b, URO, 2002c)

Redevelopment of the Resettlement Communities

Within these UR areas, ‘resettlement communities’ are targeted as the strategic redevelopment areas by the authority. The resettlement communities, which accommodate residents relocated due to the construction of public works from 1955 to 1975, are mainly distributed in Zhongzheng, Wanhua and Datong (TMG, 2010).

As shown in the map, most of the targeted resettlement communities are congregated in Wanhua, whereas a few are in Datong and Zhongzheng (Table 1). Because of the smallness of the housing units, ranging from 26.45 to 39.67m2, and the lack of management and maintenance, these settlements are considered to provide bad living conditions that require redevelopment (TMG, 2010).

Among these communities, the Nanchichang community in Wanhua has been paid particular attention due to the geographical aggregation of poverty, crime and deteriorated housing conditions. The community consists mainly of migrants and people generally suffering from poverty, which makes its life cycle ultimately a vicious circle as people move from resettled tenement neighbourhoods back to tenement slum regeneration (Jou and Liu, 2001). The closed, marginalised atmosphere among the residents strengthened by low housing standards is suggested as the key factor that means the community is targeted for UR (Jou and Liu, 2001).

The only resettlement community which has been redeveloped is the Lin-Kou Community in Zhongzheng. The first phase of the redevelopment is claimed by the authority as a very successful showcase for public involvement. However, the displacement of the residents is observed, and the participatory levels are found in fact to be unequal during the empowerment (Tsai, 2007). In particular, vulnerable households were excluded from the decision-making forum. The second and the third phases of the redevelopment of the community are still in the process of seeking private investment.

In Datong, the street blocks around Gui-Sui Street are one the target UR areas. The plan developed for this area shows a concern for using private-led redevelopment projects to strategically create corridors by linking up public parks and providing open space at the corners of street blocks. Originally, the implementation seems to be problematic due to the rather large scale of the redevelopment. Also, the extra expenditure on the provision of green and open spaces makes the private sector rather reluctant to invest in the redevelopment. To tackle the situation, the authority selected only four street blocks in the area to receive government assistance and become prioritised UR demonstration projects. Most of the four blocks selected are adjacent to public parks and school campuses.

The example of these communities suggests the difficulties in attracting private investment to the most deprived areas in the three districts. It seems insufficient to rely merely on the legislative UR mechanisms, such as the incentives granted for the UR areas. The examples demonstrate that, in order to achieve the quality of life that UR attempts to bring in, the local authority should play a more active role in UR and actively cooperate with residents. In this way, an improvement in GI provision is less likely to be sacrificed in private-led redevelopment.

Waterfront Redevelopment

Although the Danshui River flows through the metropolis, the large embankment visually and physically divides the riverside green space and its waterfront settlements. Due to the isolation, a visionary plan has been prepared by the authority to encourage private-led redevelopment along the riverside. This involves providing concrete platforms jutting out over the embankment at several sites along the waterfront. The selection of locations demonstrates the attempts to reconnect the old urban core and the riverbanks. It is assumed that, through the platforms provided by the visionary waterfront redevelopment projects, accessibility to the natural green space will be improved and, most importantly, a UR effect will be triggered off.

In Datong, a veranda sitting over the highway and embankment from the proposed redevelopment of the Namchow Chemistry Factory is suggested by the authority (Figure 2) in an attempt to mitigate the continuous block impeding pedestrian flow into the riverbank parks. However, the project has still not been adopted by the Factory owner due to the unprofitable nature of the creation of a veranda.

Figure 2. The continuous embankment along the riverbank (left) and the simulation of a platform jutting out from a redevelopment project (right) (URO, 2010)

In Wanhua, another example is a sky walk stretching out from a renewal site for integrating buildings with a complex viaduct system lying on the way to the riverbank. However, the construction of the hanging platforms is expensive. For example, one platform designed for a demonstration UR project in Datong is estimated to cost about 600,000,000 NT dollars. Despite the huge cost of the platform, the contribution of these UR projects to GI is rather limited. Also, the ecological perspective has been relatively disregarded. Although the idea of green connectors for linking up riverside green space with other urban green space does exist in the planning documents, it remains a stopgap solution with little ecological benefit.

Permitted UR Projects

Only few completed redevelopment projects could be found in the case study area. By the end of 2009, seventeen UR projects were permitted by the planning authority. A rather uneven distribution of the 16 UR projects with permission to construct is found: eight in Zhongzheng, six in Datong and two in Wanhua. This implies that geographically private-led UR favours Zhongzheng, whereas the Wanhua district is the least favoured.

These projects are demonstrated as an achievement of the UR implementation by the authority. However, the implementation seems to be rather easy in terms of consolidating landowners for a joint redevelopment. For example, although the Chongren New Village in Wanhua occupies an area of 17,619m^2, it is entirely owned by the General Political Welfare Bureau, the Ministry of National Defence (Figure 3). Another example is a site in Zhongzheng for residential use permitted in 2007 (Figure 4). The project with an area of 5,299m^2 has only two private owners in an area where land is 95% nationally owned. As an easy case to consolidate landowners for joint redevelopment, the site is still entitled to a great deal of floor area bonus and brings in 154 households on the renewed site. At best, the project provides pavements with an area of 1,801.84m^2 and 450.46m in length.

Figure 1. Residential redevelopment of the Chong-Ren New Village in Wanhua (CPAMI, 2009, URO, 2010).

Figure 2. Ju-Guang Road residential redevelopment in Zhongzheng (CPAMI, 2009, URO, 2010).

This type of land could be redeveloped easily on its own and thus needed no incentive to encourage private investment. In this sense, the floor area bonus seems

to be granted without a real effect. Some of the designated UR areas in which it is most difficult to attract private investment remain untouched regardless of any bonuses. Moreover, the floor area granted to those sites, which can be redeveloped easily, would bring in extra population and burden the capacity of public facilities. Only a few of the projects seem to be more challenging and worth of granting floor area bonus. For instance, a redevelopment in Datong which occupies an area of 3,156m^2 was permitted in 2008 (Figure 5). The site is entirely privately owned with 73 private owners. After the redevelopment, this housing project will accommodate 155 households.

Figure 3. Liang-Zhou Road residential redevelopment in Datong (CPAMI, 2009, URO, 2010)

Two important findings are revealed. First, these projects tend to make little contribution to GI. In general, they are small projects redeveloped into sites which are mostly occupied by building structures. Therefore, the types of GI components most possibly to be provided are linear pavements and small squares. Also, these projects can be relatively easy in terms of consolidating landowners for collective redevelopment because they feature a small number of private owners and a large parcel of government-owned land. However, they are still qualified to receive incentives, which are theoretically designed to encourage the renewal of areas abandoned by the market. In this regard, government intervention in the form of incentives has not yet resulted in a good effect on those sites that are more in need of support from government; instead it has assisted those that are easier to be redeveloped in nature.

Flagship UR Projects

A significant project conducted by the central government is the ‘Comprehensive Planning and Design of the Central Station and Central Park’. The project is part of a strategic redevelopment plan covering an area of 100 hectares with a length of 3000m. The linear land, which lies at the centre of the old urban core, was obtained from the Railway Underground Project in 1983.

Due to the grand scale, a more comprehensive GI provision is more likely to be embodied in the plan. In terms of interconnectivity, green spaces are allocated

along with the new high-rises. This outdoor landscape links up several existing or earlier-created green spaces. It also considers connections from the redevelopment site to nearby green space through some pedestrian precincts and pavements with street trees. Moreover, in terms of multi-functionality, the landscaping addresses the ecological function by naming two major green spaces, the Central Ecological Park and the Outdoor Ecological Square. This supplements the more recreational and cultural functions provided by the existing green spaces.

Although the plan delineates a more desirable picture of the integration of GI and UR, the implementation has been long drawn out. Although two phases between 2009 and 2016 are planned for the central-government-led UR, no significant progress is shown during this research.

Concluding Remarks and Policy Lessons

The regulatory impediments to creation of GI elements in these redevelopments are concluded. Looking at the policy tools, including plans, regulations and incentives, it is not common to find official commitments made to any GI-like plans. Although the draft Landscape Master Plan for Taipei City can serve as a GI plan, it remains non-statutory and thus has a limited effect on the statutory zoning system, especially when the entire land planning process follows the zoning logic. The review mechanism is introduced to the zoning regulatory system to allow the rigid planning system more flexibility (Chen and Chen, 2000). Nevertheless, it is criticised because the lack of transparency, review standards and discretion results in a review mechanism that is ineffective (Ho, 2005). Most importantly, the design of the floor area bonus as a ready incentive tool shows little concern for encouraging private contributions to GI.

The spatial gaps in GI do not seem to be particularly bridged by the designated UR areas and the completed UR schemes. The designation of UR areas is deemed to be an action to encourage private-led redevelopments in those officially delimited areas. However, no clear correlation between the designated UR areas and the existing GI system is shown in the mapping result because the designation depends on the dilapidated condition of buildings rather than reflecting the deficiencies of GI. In this sense, GI is not considered as an infrastructure that should be comprehensively provided or expanded with redevelopments. This is particularly evident as most of the redevelopments provide merely pavements and squares.

From the spatial relationship between GI and the first type of UR, the housing-led UR has not been planned with due consideration for improving GI provision. Between GI and the second type of UR, the environmental improvements show a strong relationship to the private-led UR but less to the GI system. In this sense, spatially GI and UR are neither well nor comprehensively integrated. As a

result, the UR policy in the case study area still relies on the gentrification effect of the housing-led redevelopments to achieve the local quality of life, rather than on securing, enhancing and increasing the local GI.

The policy requires the regulatory and incentive tools to shape investment behaviour, for example the floor area ratio bonus (EL, 2009). Although incentive and regulatory tools exist for shaping the design of urban open space, the tools are not designed in a way that encourages the integration of GI and UR. Responding to the shortcomings, the legislative tools call for amendment through analysing their effect on integration and their replacement by ones that are more effective.

In the short run, making amendment to the Floor Area Bonus is most urgent for the government to reshape private behaviour in compliance with and in delivery of a GI-like plan. The planning and design criteria should emphasise the ecological contribution of onsite GI provision rather than the type of GI provision, pavement or square merely. Also, for the *Regulation on Relaxation and Floor Area Bonus for Comprehensive Design* (Chapter 11, Article 79 to 82 in the '*Taipei Municipality Land-Use and Zoning Regulation*', amended on 23rd Jun. 2010), the minimum requirements for an encouraged public green and open space should not be articulated within traditional specification involving type, size and shape merely, but should incorporate an ecological index that could better reflect the ecological contribution of onsite GI provision.

In the long run, for adopting the integrative strategy in a densely populated city like the old urban core in Taipei, a policy tool effectively reflecting the ecological contribution of a redevelopment site is necessary. To quantify the ecological contribution, the Green Plot Ratio (GPR), which measures "the ratio of the total single-side leaf area of the planted landscape to the plot or site area", can serve as a useful planning and design parameter that helps to "specify a minimum acceptable degree of ecological responsiveness without restricting or predetermining the design proposal" (Ong, 2003: 206). From Ong's findings (2003: 206), the GPR values for three general types of ground cover are as follows:

- *heavily wooded and densely populated landscapes with trees—6:1,*
- *herbal gardens or small bushes—3:1 and*
- *turf or grass—1:1.*

With the GPR value, the planning authority can control maximum allowable built-up floor area as well as ensure minimum ecological performance of greenery in a building development (Ong, 2003). However, the desired GPR value of a site has to be decided by negotiating its anticipated use. Thus, attention can be paid to developing a process of negotiation. The process is made on the basis of best practices, which have been deemed achieving a good level of GPR for their types of land use in the Taiwanese context. This would require further studies on a minimum GPR value for different types of land uses. The ecological performance can be secured by devising and specifying the values in regulations, including the

Land-Use and Zoning Regulation, the Planning and Design Criteria for Floor Area Bonus, and the urban design codes for different types of special districts and public facilities.

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