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Categorization of Parcels Without Road Frontage in Seoul and Development Possibilities for Sustainable Urban Transformation

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Abstract: Parcels without road frontage are produced by subdividing larger parcels of land before the land planning and Building Act was established. Parcels without road frontage are neglected in real estate investment and urban development causing their deterioration and isolation in the city. Parcels without road frontage can be discovered in dense residential districts which were informally developed. Sometimes, an easement agreement is established for a new construction. However, validity of the easement could be changed pending upon the land ownership. Therefore it makes the development of parcels without road frontage unstable and unsustainable. In this paper, through case study of parcels without road frontage of Changsin Sungin District in Seoul, parcels without road frontage are categorized to examine their conditions and problems. This analysis allows evaluation of development possibilities of parcels without road frontage based on information of land owners, adjacent lot conditions, and physical situations of existing buildings to lead the development of parcels without road frontage. By considering such an information, if we induce adequate development of parcels without road frontage in Seoul, it would contribute to regeneration of the parcel, the block and the neighborhood, enhancing the value of parcel and driving the sustainable urban transformation.

Keywords: parcels without road frontage; categorization; development possibilities; Changsin Sungin District; Seoul

1. Introduction

In many urban morphology studies about a parcel on urban development planning, an adjacent road has been one of the major subjects in addition to its use, size, arrangement, and shape [1,2]. It was analyzed mainly for evaluation of inferior conditions and assessment of their urban regenerations. For example, number of adjacent roads and width of front road are major factors to study typologies of urban parcels and their developments [2]; contact types between a building on the parcel and the front roads were examined to define the street environments of a region for further discussion on the management of the existing urban environment; situations of road frontage of parcels were studied to analyze the space typology of dense housing areas with small parcels; investigation of road frontage conditions stimulated the need for a study on the improvement of poor urban spatial structures in case of regions maintaining the natural parcel structures [3].

Road frontage is considered as the ultimate requirement for permitting a building on the lot in the architectural practice and the urban planning. Road frontage allows public access, public services, police and fire protection. Without road frontage, parcels get neglected in real estate investment and urban development to cause deterioration and isolation of themselves in urban settings. Finally, they become exposed to higher risk of becoming slums. Therefore, in many district level urban plans, various policies and development plans are proposed to diminish in amount of poor parcels without road frontage.

Under the urban policy to promote revitalization of existing urban neighborhoods, it is very important not to neglect any shady spots and to find out vulnerable places in the city in order to prevent the propagation of slums although all of urban areas cannot be equally treated in their conditions and values. From this view, parcels without road frontage are weak points in the city in need of public awareness and strategic interest for urban development.

Nevertheless it's not easy to improve the condition. Availability of their individual improvement depends on their physical and structural conditions. Various conditions of parcels make it difficult to take building actions. Basically according to the Building Acts, it's impossible to demolish and reconstruct a building on the parcel without road frontage [4].

For such a situation, recently established special planning districts for revitalization in Seoul allow some exceptional and conditional building activities. And the current law allows to remodel buildings on parcels without road frontage as far as the existing building had been permitted. Therefore, some parcels without road frontage have opportunities to be regenerated and upgraded as demanded by the land/building owners and by the public for the healthy and safe neighborhood development.

The central task of this paper is to categorize parcels without road frontage. It includes subtasks to extract multiple factors of the situation and to demonstrate which method of revitalization can be applied to specific parcels based upon their situations. We fulfill this task firstly by examining distribution of parcels without road frontage in Seoul and urban planning policies allowing their development in Section 2. In Section 3, we will analyze specific distribution of parcels without road frontage and their conditions

in case study and assessing revitalization possibilities of those parcels. Lastly, we will suggest the appropriate regenerating methods of parcels without road frontage.

2. Parcels without Road Frontage in Seoul and Urban Planning Policies

2.1. Distribution of parcels without road frontage in Seoul

In Seoul as other old cities, many large parcels were subdivided not as a precedent planning but as an acknowledgement after settlement, which includes informal settlements, sudden expansion of settlements, and unplanned readjustment of properties. They frequently occurred before the modern urban planning was adopted or the Building Act was established.

A parcel without road frontage is an unintended by-product resulted in those situation. In other words, it is a missing parcel in the process of land division process, an unwillingly formed property due to placement of a building, or an incautious parcel without careful considerations on adjacency of roads with the minimum width as required.

These areas are generally urban housing districts naturally formed with its characteristic spatial structures and organizations: Streets in naturally-generated settlements are formed in directions to mitigate the slope of the topography; Many accesses to individual parcels are provided with narrow alleys less than 2 meter wide because the streets were organized just for pedestrians; more than 90% of roads are owned by private because there was no methodical road planning when the district emerged [5].

Although many parcels without road frontage were readjusted in the redevelopment process of Seoul, there still remains many of them in the residential areas of the inner city. In addition, parcels without road frontage are sometimes newly formed by small-scale private developments in dense residential districts. When the private construction of individual houses occupies a certain area of parcels in irregular shapes, some parcels are unintendedly isolated from a road. Sometimes these constructions were induced by incoming population in pursuit of specific industrial engagements.

In many cases, parcels without road frontage might be underdeveloped and lagging in some services due to their incompliant state to the requirements by law despite the building on the parcel was permitted through several legalizing process. Therefore, we can argue that relationship between the adjacent roads and parcels determine qualities of buildings and environments.

As an improvement policy for environmental quality, the previous Seoul Metropolitan Government planned and implemented reconstruction and rebuilding projects. Targets of the projects were generally housing districts in the poor and vulnerable condition, which have relatively more parcels without road frontage. However, reconstruction and rebuilding projects were criticized due to their inflexible implementations. The projects – so-called housing reconstruction, housing rebuilding, and housing environment improvement and maintenance projects – predefined too detailed clauses. They specified not only project scales but also the size of allowable houses and the ratio of rental housing construction responding to transformation of housing type [5].

2.2. Release of reconstruction and rebuilding projects and designation of leading revitalization project districts in Seoul

Recently the city government announced to abandon the conventional redevelopment method in urban planning. Then the government declared to improve the deteriorated urban areas as well as to respect the current situations and dynamics of industrial, cultural and historical values. As the population growth rate slows down and economic recession continues to stagnate, the development direction for the residential areas is shifting toward management and revitalization of existing residential areas rather than focusing on quantitative expansion such as new town developments or big-scale maintenance projects [1].

Under this new direction of urban planning policy, previously designated 187 districts for reconstruction and rebuilding were released after process of public hearing and reaching agreement among residents as of March, 2015. Instead, the city government announced the new policy to support interest of loan for housing improvements and new constructions of low-rise residential buildings mainly on districts released from reconstruction and rebuilding project sites.

In those situation, the urban building regulation take a significant role on the evolution process of a region as a means to control the architectural actions in the level of parcel scale. Housings in the area tend to respond to changes of the urban building regulations sensitively then to bring about transformation of the street environment by producing a new type of building [1].

There are examples of such a regulation. First, buildings on parcels without road frontage permitted before establishment of Building Act can be remodeled to accommodate new programs then to improve the environment quality. Second, an easement agreement. With regard to the development around a parcel without road frontage, an easement agreement is sometimes established between two owners. However validity of the easement could be changed pending upon the land ownership. Therefore it makes the development of parcels without road frontage unstable and unsustainable. Third, a building agreement. It was proposed by Architecture & Urban Research Institute in Korea as an approach of lot-based housing revitalization. It can be achieved by a gradual process of housing renewal taken by residents' own initiative within the systems of the Building Act. Specifically, the adoption of the building agreement makes an exception out of the Building Act and actively makes a use of party wall construction. It is expected to overcome the limits of neighborhood projects in the past [6].

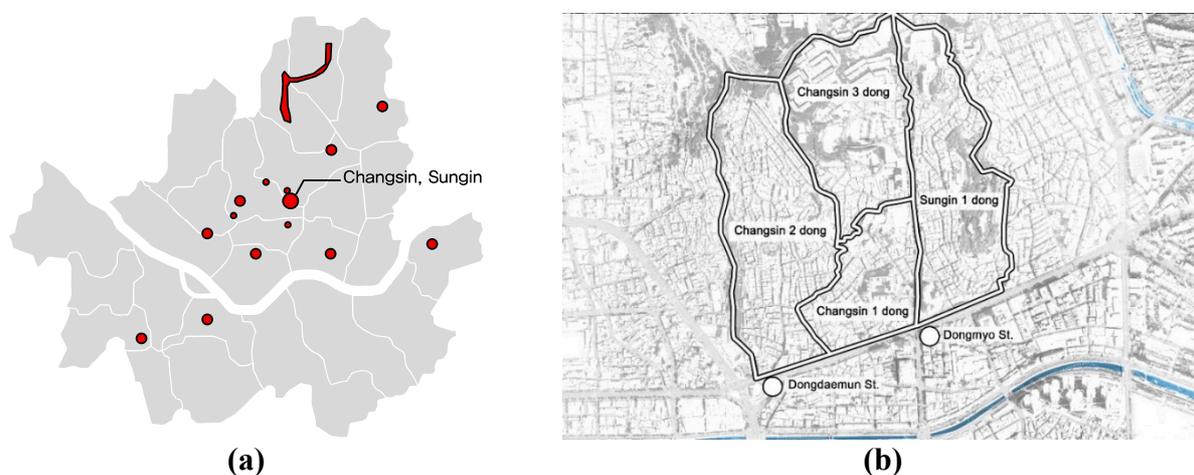
The building agreement is included in the Urban Regeneration and Assistance Act implemented as of January 1, 2015. With that, building reconstructions became possible with building agreements among more than two parcels according to the press release from Ministry of Land, Infrastructure and Transport on January 9, 2015 [7]. In the district with narrow roads or small parcels, it was difficult to comply with the building code, and thus hard to initiate reconstruction. And the district lacking project feasibility was in the same situation. But now the building agreement makes reconstruction easier and makes an urban improvement and maintenance project possible in these districts. Furthermore, this new policy allows a parcel without road frontage developed with building agreement among the adjacent land owners.

At the same time, some policies were established to help these implementations. For example, Ministry of Land, Infrastructure and Transport decided to legalize specific buildings which violated ordinances before December 31, 2012 and residential buildings of small and medium scale. With this

special allowance, parcels without road frontage could be permitted in case of not interfering with fire service, and these building can be remodeled as well.

As a specific implementation to promote redevelopment, 13 leading revitalization project zones were selected by Ministry of Land, Infrastructure and Transport on April of 2014. Afterwards, Seoul Metropolitan Government announced to accelerate revitalization of Changsin Sungin District, one of 13 zones. In addition, on March 9, 2015, Seoul Metropolitan Government made the announcement at the press briefing that 27 districts were selected as leading revitalization project districts in Seoul, which was accompanied with issuance of Seoul Urban Regeneration Master Plan as well. The districts have 12 deteriorated residential areas including Changsin Sungin District (Fig. 1 (a)).

Figure 1. (a) Distribution of 12 deteriorated residential areas designated as leading revitalization project districts in Seoul and Location of Changsin Sungin District. **(b)** Scope Area of Changsin Sungin District



So far, it is clear that recent changes on regulations and policies tend to boost a redevelopment not as a whole but as small-scale. According to the precedent studies on the small-scale joint development, the parcel-level development project can preserve the continuity of existing urban structures and allow land owners to become developers [5]. The parcel-level development project intervenes the various relations between roads and parcels. This concept of the development makes the construction activity at the parcel-level, maintains the existing property ownerships, and promotes the efficient utilization of land by party wall construction between adjacent parcels and joint development [4].

2.3. Issues in Developing Parcels without Road Frontage

Although the land readjustment project until 1983 had improved physical residential environment in Korea, many other parts of the areas have been in poor condition for more than 30 years. As housing reconstruction was allowed by legislation of Urban and Living Environment Improvement Act in 2003, its implementation began in earnest around far deteriorated residential areas. The areas had high density of buildings that did not even meet the minimum legal standards in poor structural conditions. By approaching with individual parcels, it was nearly impossible to reconstruct buildings responding scattered tiny parcels, irregularly shaped parcels and inadequate road adjacencies as well as meeting the legal requirements. These problems were also noted as a cause of acceleration in the deterioration [5].

To make it realizable to reconstruct and to regenerate houses including those on parcels without road frontage, parcel-level projects with building agreements were proposed in many studies and initiated by the government. A parcel-level housing improvement and maintenance project with building agreement or joint development are recommended without coercion. In this case, it is important to have similar conditions between the parcel without road frontage and adjacent parcels. In addition, through reconstruction or redevelopment, the owner of adjacent parcels in contact with roads should achieve the substantial benefits from the project. The difficulty of joint development has been already pointed out since the special planning zones of small-scale lots in the district unit plans in Seoul were designated in 2000. These difficulty caused the lack of willingness to share joint development of land [8]. At this point, we can say that the project implementation is not successful.

To activate the building agreement policy, it is necessary to demonstrate pilot projects as well as to share enough information including benefits and obstacles: detailed information about building agreement process; benefits of the policy to improve the living environment; and obstacles against the building agreement. At the same time, they should be distributed with successful demonstration cases of building agreement among various agents led by the government. For these reasons, it would not be easy for residents to utilize the policy actively. Although the building agreement policy tries to derive the voluntary improvement and revitalization by residents in the existing urban districts, it is expected to take long time to settle the policy as a tool to upgrade and manage the residential districts [9].

The leading revitalization project districts will preserve the existing living grounds, install or repair streets and parks as requested by residents, establish public facilities including community centers and community libraries, install fundamental infrastructure for living, and reactivate the community and local economy around alleys of the deteriorated inner city areas. The government and municipalities would support the finance of projects. And so resident would not be required to help pay for the project implementations. Nevertheless, still parcels without road frontage would be easily neglected from the authority, the public, and the local community to be excluded from voluntary improvements or new constructions.

With the inherent issues in developing parcels without road frontage under the building agreement policy, it is not just positive to expect the successful development of parcels without road frontage and the sustainable urban transformation. We will discuss the more thorough analysis on the possibilities of the development in the following section with a case study.

3. Case Study: Changsin Sungin District in Seoul

3.1. Method

This research adopts a case study as an explanatory demonstration on the phenomena in real life. In the case analysis process, we approached the study from typo-morphological perspective. The target for case study was selected to have standard characters to consider the recent designation of special district for the urban regeneration projects and the urban morphology of informal settlements in the urban area of Seoul. As noted in the previous section, Changsin Sungin District in Seoul (Fig. 1 (b)) was designated as a leading revitalization project district by Ministry of Land, Infrastructure and Transportation and Seoul Metropolitan Government, as a deteriorated residential area with existing urban tissues and long

period of settlements. For the purpose to examine the possibility of developing parcels without road frontage in relation to the building agreement policy, we will analyze the locations, architectural and land information, and the current situation of parcels without road frontage located in the district.

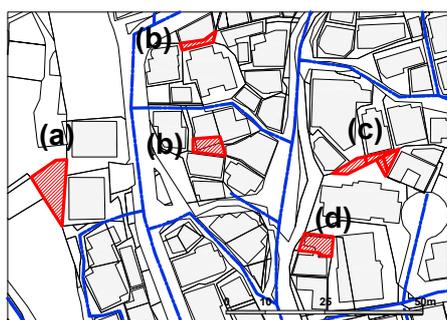
To search the suitable targets of parcels without road frontage, we utilized the GIS software. First, we prepared GIS data about roads and lands around the target area. The searching process starts from selecting the land parcels touching roads as following:

- (1) click ‘Select by Location’ in the ‘Selection’ tab of the pull down menu
- (2) Select the lands layer at ‘Target layer(s)’ section
- (3) Select the roads layer at ‘Source layer’ section
- (4) Select ‘Target layer features are within a distance of the Source layer feature’ at ‘Spatial selection method’
- (5) Check ‘Apply a search distance’ and set the value at 10 millimeters

Because coordinations of the GIS data are not perfectly accurate, it is necessary to set the buffer at approximately 10 millimeters between lands and roads. After parcels touching roads are selected, we can extract parcels without road frontage from the current selection by inverting the selection and extracting only the lands whose land type is ‘Daeji’. Up to this step, it is driven by the GIS engine.

The final process to extract the proper parcels without road frontage needs a manual work to exclude improper parcels as presented in Figure 2, including (a) parcels with no building, (b) parcels with a building beyond the adjacent parcel, (c) micro-size parcels, (d) parcels with very thin parcels to access the roads, and (e) parcels extracted due to insufficient land data. Parcels without road frontage in Changsin Sungin District are located as shown on Figure 3 after exclusion and final selections process to collect adequate samples for further analysis.

Figure 2. Examples of excluded parcels.



Indicator	Description
(a)	A parcel with no building
(b)	A parcel with a building beyond the adjacent parcel
(c)	A parcel that are micro-size
(d)	A parcel with a very thin parcel to access road

Although samples reviewed in this section cannot be generalized as representatives of all the conditions of parcels without road frontage in Seoul, they can be viewed as some categories of parcels without road frontage currently existing in urban settings of Seoul. Information regarding buildings, owners and lands of finally selected parcels without road frontage and their adjacent parcels (see Table 1) was collected and it was followed by detailed explanatory analysis from examination of collected information and field research with interviews.

In the figure of each situation map of a parcel without road frontage, parcel and road information is shown as following: (1) Parcels without road frontage - in red line with red diagonal line hatch; (2) Adjacent parcel – in red dashed line; (3) Building – in light grey shade; (4) Road - in blue center line (5) Possible joint for building agreement development – yellow dot with yellow bridging line.

Figure 3. Locations of parcels without road frontage in Changsin Sungin District, indicating exclusion and final selections process

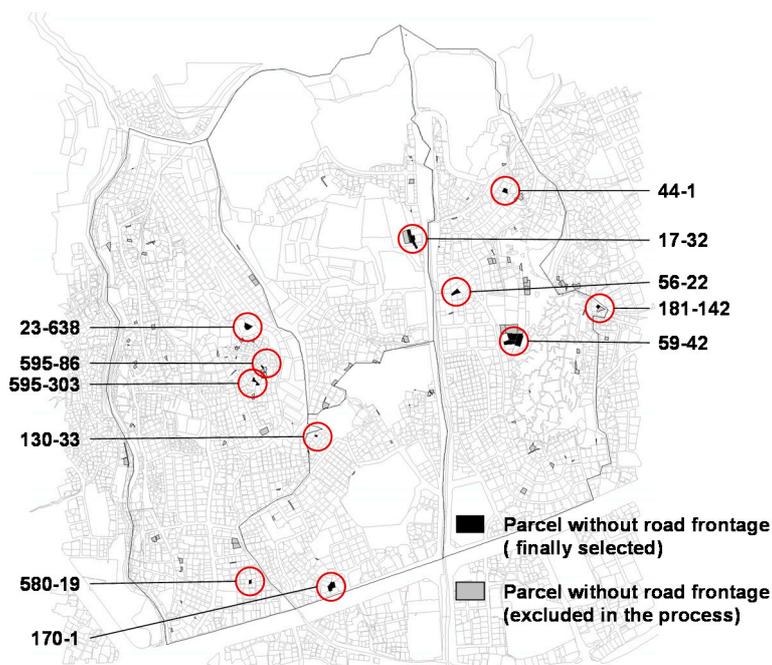
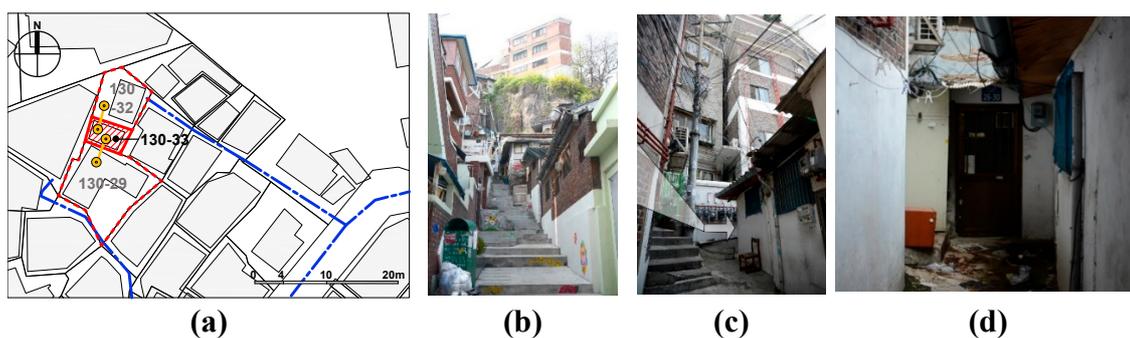


Figure 4. (a) Situation map around 130-33, Changsin 1 dong. **(b) (c) (d)** Field pictures demonstrating access and situations of 130-33, Changsin 1 dong



130-33 Changsin 1 dong, the parcel without road frontage is located on the upper slope at the foot of a cliff above (Fig.4 (b)). The parcel has a small and old building, which has a main entrance looking out onto the narrow alley beside the 130-29 (Fig.4 (c), (d)). Although the building has another entrance in the direction of the parcel, 130-32, it doesn't seem to be used. The parcel, 130-33 seems to be very hard to be developed together with 130-32 or 130-29 because the surrounding condition of site is inferior and complicated. The inferior condition means that it's very hard to access and the area of the parcel is very small at 23.1 m². Even if three parcels of 130-29, 130-32 and 130-33 are bound and developed together, they would not have enough space for adequate sunlight and ventilation (Fig.4 (c)). The complicate

condition means that 130-33 and the surrounding parcels are owned by different persons. In addition, 130-33 and 130-32 don't have building registers.

3.2. Analysis of Types

Table 1. A List of Parcels without Road Frontage and their adjacent parcels for Analysis. (Abbreviations: RF=Road Frontage, N.C.= Not Conforming, C=Canceled, FAR = Floor Area Ratio)

Parcel #	Parcel Type	Area (m ²)	Owner (acquisition year)	Owner's residency	Building Registration	Building FAR(%)	Building use	Year of Building Use Permit	Structure
130-33	W/out RF	23.1	CK(2006)	x	-				
130-29	Adjacent + RF	92.6	SM(2005)	x	o	25.0	house	1929	wood
130-32	Adjacent + RF	49.6	TK(2004)	x	-				
170-1	W/out RF	169.3	HK(2002)	x	o	123.1	retail	1970	brick
173	Adjacent + RF	143.8	HK(2002)	x	o	210.7	NLF	1966	RC
23-638	W/out RF	123.3	DC+SL(1991)	o	o	75.4	house	1981	brick
23-639	Adjacent + RF	196	JL(1983)	o	o	32.6	house	1974	brick
595-86	W/out RF	26.4	JL+K com(2006)	x	-				
595-83	Adjacent + RF	89.6	BL+2 pers(1988)	x	o	222.2	house	1985	brick
595-84	Adjacent + RF	23.1	SC(2001)	x	o	190.2	house	1985	brick
595-303	W/out RF	73.52	JL(1990)	x	-				
595-113	Adjacent + RF	125.9	WK(1979)	o	o	92.6	house	1981	brick
595-114	Adjacent + RF	46.3	HO(2005)	x	o	134.6	house	1985	brick
580-19	W/out RF	36.4	MJ(2010)	x	o	63.6	house	1936	wood
580-18	Adjacent + RF	52.9	SJ(1988)	o	o	43.7	house	-	wood
580-20	Adjacent + RF	39.7	AS(2010)	o	o	58.3	house	1936	wood
581-13	Adjacent + RF	69.4	KJ(1987)	x	o	50.6	house	1933	wood
581-28	Adjacent + RF	99.2	IC(2011)	o	o	45.8	house	1933	wood
17-32	W/out RF	93.51	Borough(1988)	-	-	-			
17-13	Adjacent + RF	254.8	BP+MY(1989)	o	o (N.C.)	265.01	retail	1997	RC
17-33	W/out RF	19.32	CC(2012)	x	-	-			
17-23	W/out RF	118.55	BK+EL(2014)	x	-	-			
17-19	Adjacent + RF	184.8	YS(2012)	x	o (N.C.)	295.43	NLF	1970	RC
17-21		20.1							
17-24	W/out RF	45.41	BK+EL(2014)	x	-	-			
17-22	Adjacent + RF	68.5	DL(2014)	x	o (N.C.)	180.79	office/ house	1998	RC
17-35	W/out RF	25.69	JL+YK(2014)	x	-	-			
17-36	Adjacent + RF	107.9	OY+YM(2005)	x	o	227.17	retail / office	1974	RC+ST
44-1	W/out RF	76	YK(2006)	x	o	46.8	house	1964	brick
44-2	Adjacent + RF	59.5	SK(2008)	x	o	56.9	house	1964	brick
43	Adjacent + RF	125.6	SL+YH(2012)	x	o	49.1	house	1966	brick
45	Adjacent + RF	109.3	JK(1966)	o	o	134.6	house	1980	brick
56-22	W/out RF	104.8	JK(2014)	x	o	46.1	house	1958	brick
56-21	Adjacent + RF	239	HL(1988)	o	o	111.8	house	1959	brick
56-89	Adjacent + RF	112.4	DL(2014)	o	o	148.9	house	1989	brick
56-150	Adjacent + RF	125.6	DC(2001)	o	o	48.9	house	1968	brick
181-142	W/out RF	41.7	YL(1962)	-	C	-		-	-
181-143	Adjacent + RF	83.6	5 persons(1998)	-	o (N.C.)	255.3	house	1995	RC
181-144	Adjacent + RF	108.1	5 persons(1997)	-	o	239.92	house	1997	RC+BR
181-168	Adjacent + RF	70.7	CL+7pers(2002)	-	C	-		-	
58-555	Used as road	113.5	Borough(2002)	-					
59-39	W/out RF	231.4	B temple(1966)	o	o	30.87	temple	1964	block
59-42	W/out RF	152.8	SC(2000)	o	o	34.25	house	1965	block
58-284	W/out RF	254.5	B temple(1970)	x	-				
58-286	Adjacent + RF	127.9	JP(2010)	x	-				
59-40	Adjacent + RF	155.4	BK(2000)	o	o	22.55	house	1985	block
59	Adjacent + RF	115.7	DW(1992)	o	o	192.17	house	1963	brick

Figure 5. (a) Situation map around 170-1, Changsin 1 dong. **(b) (c)** Field pictures demonstrating access and situations of 170-1, Changsin 1 dong



170-1 Changsin 1 dong, the parcel without road frontage is located behind the parcel 173 that faces Jongno, the main road of the area. 170-1 can be accessed from Jongno via a narrow alley located on the part of 173 (Fig.5 (b), (c)). Such an access are assumed to have a relation to ownership of two parcels by one person. The ownership provides accessibility and possibility of development for 170-1. The location and the ownership explains the recent alteration of the building on 170-1 to a hostel for foreigners (Fig. 5 (b)).

Figure 6. (a) Situation map around 23-638, Changsin 2 dong. **(b)** Field pictures demonstrating access and situations of 23-638, Changsin 2 dong



23-638 Changsin 2 dong, the parcel without road frontage, can be accessed from the road through the part of 23-639 that is wide enough even to carry goods (Fig.6 (a), (b)). The building on 23-638 has a good view to its backside because it lies on the edge of a cliff in the middle of slope. In other words, it's not a poor condition to live in as it is. For the new development together with 23-639 in contact with a road, joint development would be possible upon the building agreement. Each owner lives in the building on each parcel, which was built around the same time.

595-303 Changsin 2 dong, the parcel without road frontage, is one of the parcels surrounded by steep rock that was a quarry during the era of Japanese rule of Korea. In the area where rock was cut out, a lot of houses were built disorderly, that is to say, the urban squatter settlement was formed by the late 1960s (Fig.7 (a)). Although most buildings were registered by government policy, there remains many buildings without building register in this area. Furthermore, the overall forms of many buildings are indistinguishable from the adjacent buildings and most of those seem to have extended

extemporaneously as time goes by (Fig.7 (c)). The building on 595-303 is included in those informal agglomerates. It doesn't have a building register. Its form is entirely integrated with the next building on 595-113 (Fig.7 (b)). Therefore, it needs more systematic approach than a parcel-level development like building agreement.

Figure 7. (a) Situation map around 595-303 and 595-86 Changsin 2 dong. **(b) (c)** Field pictures demonstrating access and situations of 595-303, Changsin 2 dong

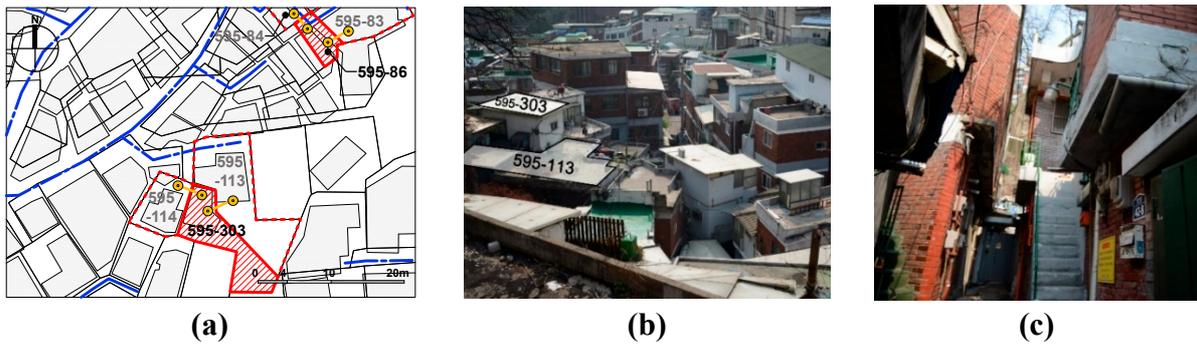
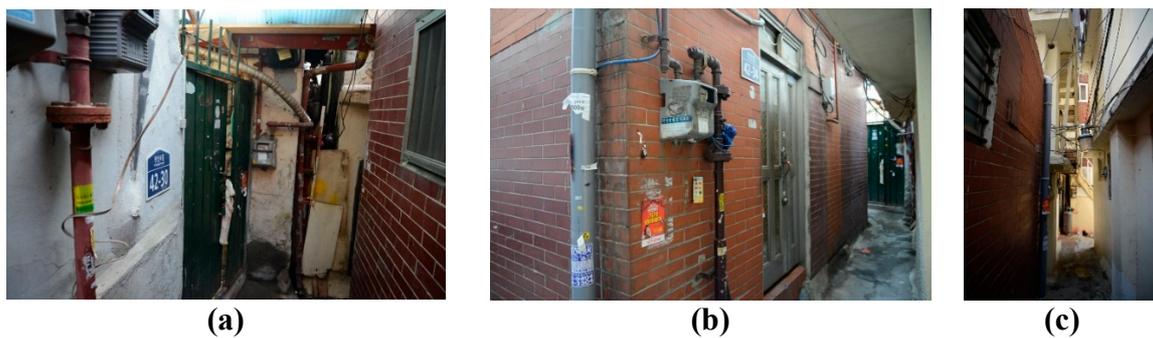


Figure 8. (a) (b) (c) Field pictures demonstrating access and situations of 595-86, Changsin 2 dong.



595-86 Changsin 2 dong, the parcel without road frontage, near 595-303 is in the similar situation to 595-303. The access from road to the entrance is very narrow, damp and obscure (Fig.8 (a), (b), (c)). The building on the parcel is not registered. The area of the parcel is less than 50 m². These features makes it difficult to remodel the building executively and physically. A senior woman dwelling in the area stated, “The more I spend the money for repair, the more the building require for repair. I need some different measures instead of a temporary repair.”

Figure 9. (a) Situation map around 580-19 Changsin 2 dong. **(b) (c)** Field pictures demonstrating access and situations of 580-19, Changsin 2 dong



580-19 Changsin 2 dong, the parcel without road frontage, is in the relatively normal condition. It is located near a street market and the main road, Jongno. Although the building has an entrance in the south-east corner of 580-20 (Fig.9 (a), (b)), its new red roof explains that it has been recently remodeled (Fig.9 (c)). The parcel has four building agreement alternatives with an adjacent parcel to north, south, east or west. Most of buildings in this area are constructed in 1930s as sorts of Hanok.

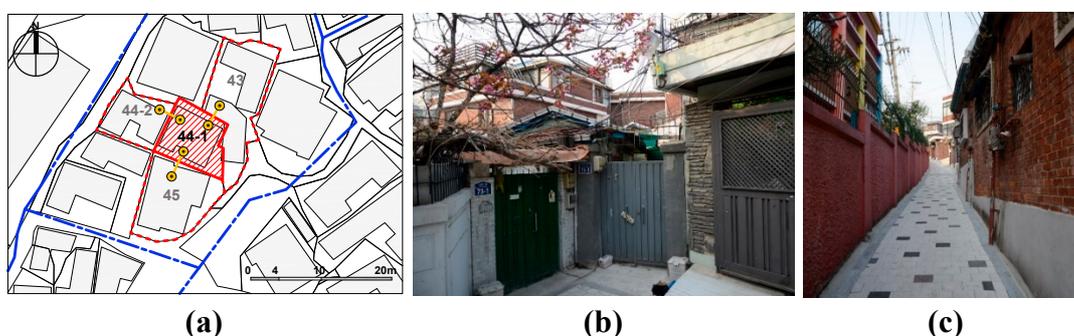
Figure 10. (a) Situation map around 17-32, 17-23, 17-33, 17-24 and 17-35 Changsin 3 dong. (b) (c) Field pictures of 17-32, 17-23, 17-33, 17-24 and 17-35 Changsin 3 dong



Although the parcels, 17-32, 17-23, 17-33, 17-24 and 17-35 Changsin 3 dong have no legal road frontage, they have an on-site access alley from the west park site to four buildings on these parcels (Fig.10 (a), (b)). To the east, there are larger parcels with taller buildings fronting a wide road (Fig.10 (a)). However, there is no access route between a group of 17-32, 17-23, 17-33, 17-24 and 17-35, and a group of 17-13, 17-19, 17-21, 17-22, and 17-36 (Fig.10 (a)). The buildings on parcels of two groups have so different conditions - building use, building age, and etc. - that building agreement between two groups would be hard to accomplish.

The parcels without road frontage are owned by different persons. In front of the parcel, 17-24, there is a small courtyard shared by four worn-out buildings (Fig.10 (a), (c)). Although buildings are on lease, they have no building register.

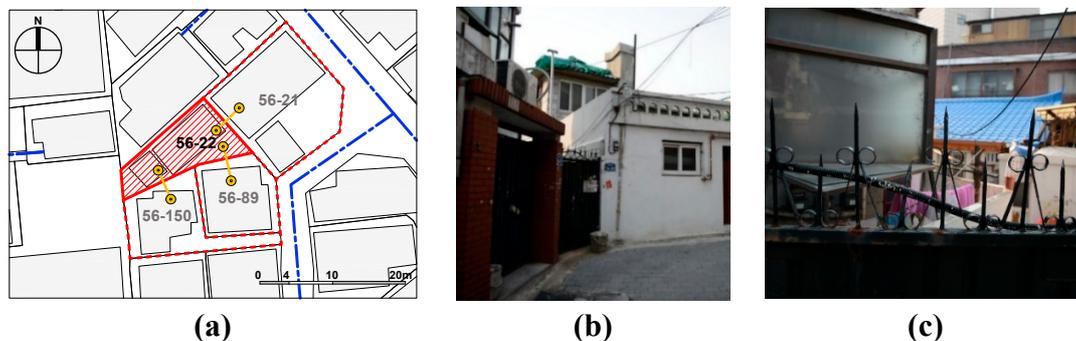
Figure 11. (a) Situation map around 44-1 Sungin 1 dong. (b) (c) Field pictures demonstrating access and situations of 44-1 Sungin 1 dong



44-1 Sungin 1 dong, the parcel without road frontage, is located in the quiet residential area. The main entrance of the parcel is at its south-east corner, which is a part of the adjacent parcel 45 or 43 (Fig.11 (a), (b)). Although the parcels in the area are owned by different people, some aspects make it possible

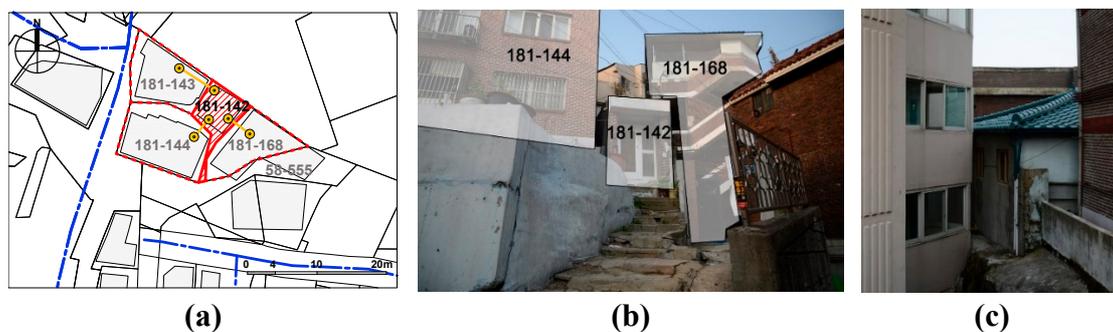
enough to redevelop them with building agreement. They have similarity in conditions of building age and building materials as well as good environmental quality of surroundings including pavements (Fig.11 (c)).

Figure 12. (a) Situation map around 56-22 Sungin 1 dong. (b) (c) Field pictures demonstrating access and situations of 56-22 Sungin 1 dong



56-22 Sungin 1 dong, the parcel without road frontage is located in the similar condition to 44-1 as mentioned above. The parcel uses the part of 56-89 and 56-21 for access to the building located deep from the road (Fig.12 (a), (b)). Owners of all adjacent buildings live on each parcel, which forms a good condition for building agreement. Even if not redeveloped through building agreement, the current situation is not bad for living. The building on the parcel was recently remodeled (Fig.12 (c)).

Figure 13. (a) Situation map around 181-142 Sungin 1 dong. (b) (c) Field pictures demonstrating access and situations of 181-142 Sungin 1 dong



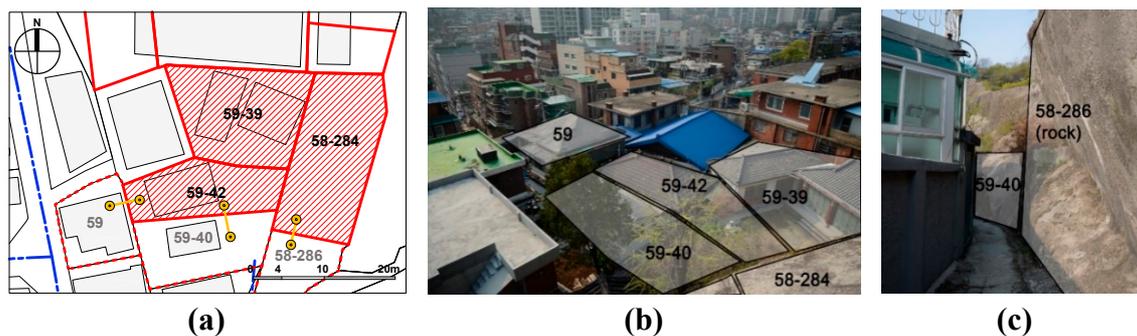
The parcel 181-142 Sungin 1 dong touches the parcel 58-555, owned by the borough Jongno-gu and used as a road currently, with its long and narrow part (Fig.13 (a)). Because the part isn't wide enough for even a person to pass through, 181-142 is considered as a parcel without road frontage in this study.

Considering the adjacent parcels 181-143 and 181-144, it's hard to expect building agreement between 181-142 and adjacent parcels because their conditions, especially such as the built year, are different: adjacent buildings on 181-143 and 181-144 are built in 1995 and 1997 respectively; the building on 181-142 seems to be much more deteriorated than the adjacent buildings (Fig.13 (c)) – it has no choice but to be judged from its appearance because it has no building register.

With another adjacent parcel 181-168, it's also hard to expect building agreement between 181-142 and 181-168 because the condition of building on 181-168 is so complicated as follows. First, although

its building register was terminated several years ago, there still is a 4-story building on the ground and there are people living inside. Second, it is owned by eight people. Finally, the building is over the boundary with 58-555 owned by the borough as mentioned above. Therefore if a building is legally built again, it would have less floor area than the current building has.

Figure 15. (a) Situation map around 59-39, 59-42 and 58-284 Sungin 1 dong. (b) (c) Field pictures demonstrating access and situations of 59-39, 59-42 and 58-284 Sungin 1 dong.



The parcels 59-39, 59-42 and 58-284 without road frontage are used as a temple. 59-39 and 58-284 are owned by the temple and owner’s address of 59-42 is registered to 59-39. Three parcels without road frontage are considered to be effectively belonged to the temple. As examined on the field, three parcels and 59-40 share a courtyard at the center of four parcels and the entrance to the courtyard at the south border of 59-40(Fig.15 (b), (c)). However, the relationship between the owner of 59-40 and the temple is not verified.

According to the land registration map and land register, the temple had owned the parcel 58-286 that only had road frontage of all the temple’s parcels. But in 2010, the temple sold it resulting to isolated parcels from the road. However, the temple seems to have no difficulty in accessing from the road because it shares the courtyard and the entrance as explained in the previous paragraph. Moreover in fact, 58-286 and 58-284 are not flat ground but steep rock, so they cannot be used as accesses to the buildings inside.

The parcels with road frontage in the north of 59-39 and 59-42 have several buildings and are owned by one person. Therefore it’s hard to expect building agreement with them. The easiest way for 59-42 to have road frontage is to negotiate with the adjacent parcel 59 to the west. But it is assumed to be difficult because of different building uses. Despite such situations, nothing would be a problem to the temple because the parcels have the stable condition to access and live in.

3.3. Discussion: Possible strategies for revitalization of parcels without road frontage

The purpose of this paper is to verify adaptability of initiated urban policies to promote revitalization of deteriorated residential districts for parcels without road frontage through a case study of Changsin Sungin District and to examine alternatives to approach feasibility studies of regeneration projects.

Up to now, the study reviewed ten cases in which parcels without road frontage have various conditions and relationship with the adjacent parcels. Taking results from the review into account, these

cases can be divided into two groups. One group includes the parcels possible for developing with building agreement (Table 2). Another group includes the parcels which are difficult to develop with building agreement (Table 3).

Table 2. Types of Parcels without road frontage possible for developing with building agreement.

	Condition between parcels without road frontage and the adjacent parcels with road frontage	Changsin 170-1	Changsin 23-638	Changsin 580-19	Sungin 44-1	Sungin 56-22
P1	Same owner	○				
P2	Similar building deterioration or condition		○	○	○	○
P3	Relatively easy to access roads		○		○	○

Table 3. Types of Parcels without road frontage difficult to develop with building agreement.

	Condition between parcels without road frontage and the adjacent parcels with road frontage	Changsin 130-33	Changsin 595-86, 595-303	Changsin 17-32 and etc.	Sungin 181-142	Sungin 59-42 and etc.
D1	Inferior condition in which joint development between two parcels is not enough for development	○	○	○		○
D2	Different building deterioration			○	○	
D3	Owners more than one individual				○	
D4	Different building use					○
D5	Particular condition around the parcel				○	

As demonstrated in Table 3, it is hard to expect a building agreement in the parcel conditions such as D2 and D3. However a precedent study [3] could not investigate the condition of specific cases, so it categorized such parcels only as targets to be improved by joint development at small-scale or at adjacent parcel level. If some kinds of developments are possible on such parcels, they would be remodeling projects just within the parcels. Of course, further details should be considered for maintenance of current situation or parcel-level improvement because remodeling projects can be varied depending on the lot size, level of deterioration, and financing ability. But above all, resident’s intention on the parcel without road frontage would be the central factor in remodeling project planning.

With regard to the parcel conditions such as D1, D4 and D5 in Table 3, it is more effective to initiate redevelopment or regeneration for the overall areas than to consider projects at the small-scale level. The government, municipality and the local community can consider procurement of community facilities by utilizing parcels without road frontage located inside a block and adjacent small and poor parcels to place a children care center, a playground, a community common facility, and a community garden. This will require public intervention in improving situations of adjacent parcels around the parcel without road frontage to improve infrastructure demanded for the better living environment.

There is no perfect urban policy to be adopted for all of parcels and for their conditions of land, building, and owner or residents. Although parcels without road frontage are considered as having a common character in many previous urban morphology studies, situations of all the parcels without road frontage are so various that it would not be successful to apply uniform standards and policies in driving urban improvements. Therefore, we suggest the situational information of parcels regarding lands, buildings, and owners and propose the adaptive application of urban policies. To induce the revitalization

project through building agreement, the parcel without road frontage and adjacent parcels should have following conditions:

- Each building on every parcel should have a similar building age and owner's desire toward redevelopment of each parcel should be alike.
- Each parcel should have one owner to make the smooth agreement. The principle of building agreement policy is to have a consensus among all the land owners and building owners.
- For redevelopment of adjacent parcels contacting roads, increased FAR should be possible to acquire the investment benefit. Otherwise, the parcel owner shall be the actual resident on the parcel, having the will to improve the living environment.
- For a combined development of two parcels, these parcels should meet minimum feasibility in consideration of building regulations such as set-back requirement from property lines.

Without meeting qualification as listed above, it would be hard to expect a building agreement. The parcel without road frontage would be remodeled or it should be redeveloped with broader area around it.

To adopt adequate and realistic revitalization policies, it is important for the government not to intend to grasp every situation and condition of parcels without road frontage but to open to various guidance policies for urban regeneration and redevelopment which the land owners can voluntarily plan the improvement and maintenance of their parcels.

4. Conclusions

With the case study of parcels without road frontage of Changsin Sungin District in Seoul, we scrutinized types of parcels without road frontage and examined their conditions and problems for urban development. The analysis evaluated development possibilities of parcels without road frontage based on specific information on lands, buildings, and interested people. In detail, it evaluated the possibility considering access to the parcel, land owners, shape and size, adjacent lot conditions, structure type, and age of the building from the viewpoint of public and private investment to lead the development of parcels without road frontage. The targets of the examination cannot cover all the categories existing in Seoul, but the approach of this case-study, categorization and explanatory analysis can play a leading role to verify effectiveness of revitalization policies and to propose alternatives.

The analysis demonstrated that redevelopment by building agreement is not valid for all of parcel conditions and lacks in practical implication. Consequently, we propose an approach by responding to individual demands at parcel-level in the urban development policies to revitalize and improve parcels without road frontage. By doing that, if we induce adequate investment on the development of parcels without road frontage in Seoul, it would contribute to revitalization of the parcel, the block and the neighborhood enhancing the value of a parcel and driving the sustainable urban transformation while preserving a healthy neighborhood.

Conflict of Interest

The authors declare no conflict of interest.

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