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Potential of Land Readjustment Application for Urban Renewal in Kampung Braga of Bandung City

Ake Wihadanto[a]*, Baba Barus[b], Noer Azam Achsani[c], Deddy S. Bratakusumah[d]

[a,b,c]*The Study Program of Regional and Rural Development Planning Sciences, Bogor Agricultural University, Academic Ring Road, Campus IPB Dramaga, PO Box 168, Bogor, 16680, Indonesia*

[d]*Ministry of National Development Planning/National Development Planning Agency (Bappenas) Republik Indonesia, Taman Suropati Street No.2 Jakarta 10310, Indonesia*

[a]*Email: ake.wihadanto@gmail.com*

[d]*Email: deddys@bappenas.go.id*

Abstract

The growth of large cities that tend to be less controlled, gave rise to issues that accompany high population growth and limited land available for settlements. The condition is marked by the growth of slum settlement areas such as Kampung Braga in the center of Bandung city. Land readjustment can be selected as one of the planned participatory intervention tools in transforming and managing a slum built-up area through urban renewal. This study aims to analyze and formulate the application of land readjustment on the transformation of Kampung Braga area. For this purpose, more specifically the research will cover 5 (five) stages: (1) analyzing the value of land based on the value of the street (street value); (2) formulating or arranging the redesign of re-block of the area; (3) analyzing land value increase; (4) preparing the balance of land use after re-plotting; And (5) determining the contribution of land. The results of this analysis are expected to be an offer of innovative solutions for the transformation of Kampung Braga slums to a residential area that is habitable. This research used primary and secondary data. Data were collected from January to October 2016. Primary data used included parcels, households and physical environments in the irregular housing section of Kampung Braga. The questionnaires survey was conducted on residents and owners of parcels to find out the characteristics of shelters and the characteristics of actual environmental infrastructure. This research has resulted in a formulation of land re-adjustment in kampung Braga.

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* Corresponding author.

The formulation, reflected in the design of re-plotting over irregular areas, yielded some positive changes. These changes indicate the improvement of Kampung Braga area quality, which can be seen the value of increasing the value of land in the area of the increase rate of the re-plotting reached 3.72. In addition, improvements were also reflected in the land use balance (after and before re-plotting), increasing the extent of the land of the street network and its supporting facilities and increasing the extent of land for public green open spaces. In addition, from the balance of land use after replotting the area was obtained for reserves that can be used as financing. These results indicate that land re-adjustment can be considered as one approach that can be applied in transforming kampung Braga into a better (livable).

Keywords: land readjustment; urban renewal; slums settlement; Kampung Braga.

1. Introduction

Massive urbanization has created high demand for housing and land for urban settlement [11]. Meanwhile, the availability of land for urban settlement is limited and not proportional to the population growth and the price per-meter is expensive. As a result, some communities, especially those with low incomes, must live in slums and inhumane dwellings with high building density, tenements and narrow, illegal and irregular land, the area is called 'kampung' in urban areas [1, 18]. One of 'kampung' areas in Bandung is Kampung Braga located in Bandung City Center. The area has a high occupancy density, narrow access roads, tight and irregular buildings (slums) as well as being on the line along the river and flooded against disasters such as floods and fires.

Kampung Braga area needs to be transformed in order to increase the value of the quality of the area and the quality of life of the people who live in it. Settlement of slum areas in Kampung Braga can be linked with urban renewal (urban renewal) which aims to make changes in the physical area (including land use intensity) through slum area management and physical planning (facility and infrastructure) such as roads, drainage, clean water, sanitation and waste management and others and the development of decent housing for the poor and low income [3, 5, 25]. “In-situ” urban renewal can be done in kampung Braga area by involving the community or landowners' participation so as to prioritize to accommodate old residents, avoidance of land acquisition (mandatory purchase) and relocation or displacement of landowners.

An innovative approach is needed in transforming a built-up area such as Kampung Braga. An approach that is able to accommodate the needs of the area arrangement and assembly of land for the provision of new settlements and facilities and infrastructure through cooperation between the landowner and the city government (private developer) and self-finance. The potential land readjustment method is used for the rejuvenation of built-up areas such as Kampung Braga. This method can be an important tool in high-intensity land development to transform urban areas over the long term, especially residential areas that require rejuvenation with micro-level infrastructure development and area-wide urban land supply [5, 6, 7 18].

According to [13] land readjustment is one of the most important land management methods or tools especially for countries where the cities had experienced a rapid growth rate and the needs for public infrastructure investment are enormous, while municipal governments face financial constraints. This method is the

development of land that combines several elements, such as the union of property rights, the reorganization of the physical form of land (plot / parcel) arranging the planning of parcel location, the preparation of the urban infrastructure in a participatory manner, financing or self-financing, protecting social capital by eliminating through redistribution of land to landowners [6, 18, 10]. In addition, this method is an efficient way to consolidate small plot, spreading, and irregular land plots and reorganize them in efficient structures with the development of physical facilities and infrastructure based on the needs of the development plan [3, 22].

Figure 1 illustrates the land reconfiguration process that begins with some partial parcels of land that are reconstituted and then returned to the original landowners after readjusting the land with new plots and smaller areas. Another land area is part of the landowner contribution, called reserve land, allocated for the provision of road network and supporting infrastructure, public spaces and reserves for commercial land that can be used to finance projects such as planning, administration and construction costs. The magnitude of the contribution ratio is calculated fairly and agree upon and consensus with the participating landowner (participation). The actual land size of each reduced landowner used for land reserved is called "cost equivalent land" [2, 16, 19, 18]. During the readjustment process, the landowner may need to temporarily relocate from the area, but land tenure is fixed and no land acquisition takes place. Fixed ownership rights (no takeover) may reduce the resistance of the community or landowners [16].

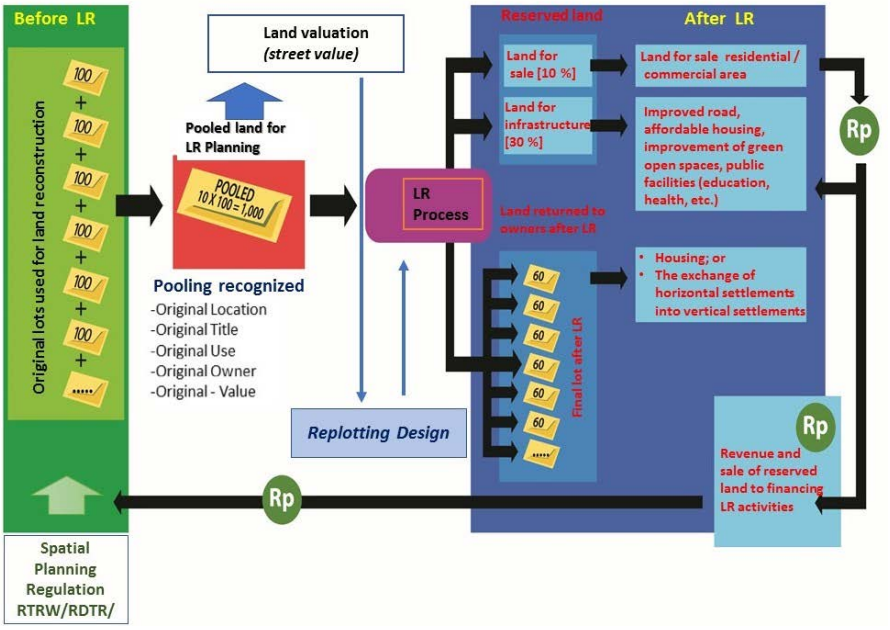


Figure 1: The principle of land readjustment

Source: Modification of [10]

The feature of this self-financing method is an appeal to developing countries facing funding constraints in urban development such as Indonesia. Some countries have good practice in using this method for urban development such as Germany (umlegung), Japan (Kūkaku Seiri) and Spain (reparcelación) as well as some countries in Europe, Asia, and America such as: (1) Europe: France, Italy, Sweden, Turkey; (2) Asia Pasific:

Nepal, Thailand, Malaysia, South Korea, Japan, West Australia, and; (3) America: Canada [6, 10, 13]. Some countries are implementing land readjustment methods for urban renewal rejuvenation such as: Hong Kong [25]; Turkey [3, 22]; China and Hong Kong [7]. The application of land readjustment modes and their degree of success in each country may vary and vary, because different planning, institutional and cultural systems exist. This study aims to analyze and formulate the application of land readjustment on the transformation of Kampung Braga area. For that purpose, more specifically this research will cover 5 (five) stages, namely (1) analyzing the value of land based on the value of the street (street value); (2) formulating or arrange the redesign of reblock of the area; (3) analyzing land value increase, (4) preparing the balance of land use after replotting; and (5) determine the contribution of the land. The results of this analysis are expected to be an innovative solution offer for the transformation of Kampung Braga slum areas into residential areas that are habitable.

2. Method

2.1. Site Selection and Regional Overview

This research is limited or focused on the slum area of Kampung Braga. The Kampung Braga area chosen by consideration of one of 'kampung' area in Bandung city center which has high densitiy of population, as well as buildings, the form of plots (lots) and irregular buildings, the availability of facilities-infrastructures that are still below the standards of urban settlements, and the lack of settlement construction with the spatial plan. In addition, the area is one of the 'urban kampung' which is included in the typology of slum areas in Bandung.

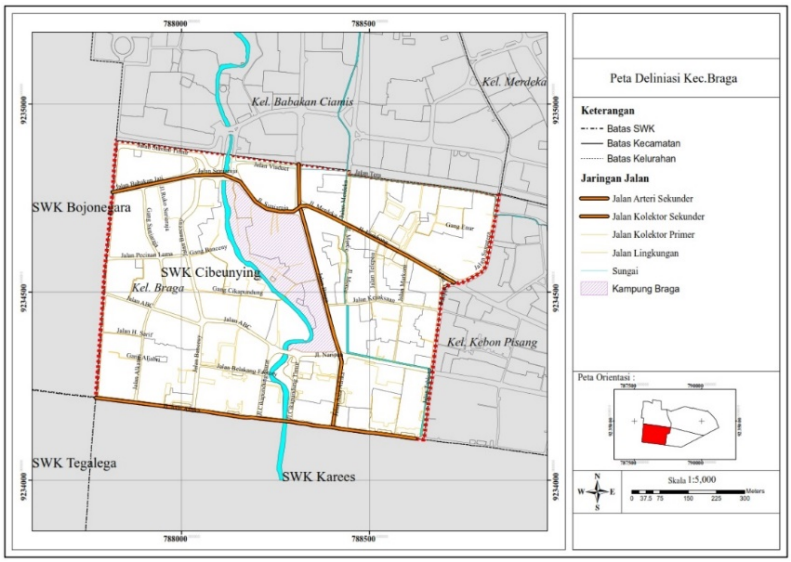


Figure 2: Map of study area of Kampung Braga of Bandung City

The location of kampung Braga area is strategically shaped like a 'pouch' (enclave) located in the center of the city which is the tourist route of Bandung, Braga Street and on the banks of Cikapundung River (Figure 1). Administratively it is located in Kampung Braga Sumur Bandung sub-district. This village has two *Rukun Warga* (RW), namely RW 04 and RW 08 which consists of six *Rukun Tetangga* (RT) for each RW. The population of Kampung Braga is about 2,368 people with high population density of 0.12 people / m^2 (above 0.05 persons / m^2). In general the actual use of land in Kampung Braga is very varied, which consists of

settlements, trade and services, hotels, education, and vacant land (Table 2). In general the area of land use in Kampung Braga is dominated by trade (shops) of 31.4% and settlements 27.96%, while the smallest land use is for religious facilities, education and public services as much as 2.58%.

Table 1: Actual land use in Kampung Braga area

No.	Land Use	Width (m^2)	%
1	Trade / shops	19538	31.41
2	Settlement	17 392	27.96
3	Hotel	14 647	23.54
4	Open space (green and non-green)	1 698	2.73
5	Means of worship, education, and public services (Schools, mosques, offices and halls RW, Posyandu etc.)	1 605	2.58
6	Road	7 333	11.79
	Total area	**62 213**	**100.00**

The result of the analysis shows that within Kampung Braga area, there are irregular and densely populated settlements +19 750 m2 (31.7% of total area), have high level of slum (with total score 88), with low regional quality (space quality index of 0.25). Under such conditions, the area requires transformation to reduce slum level and improve the quality of the area. The slum areas become the locus of this study to apply land readjustment (Figure 3).

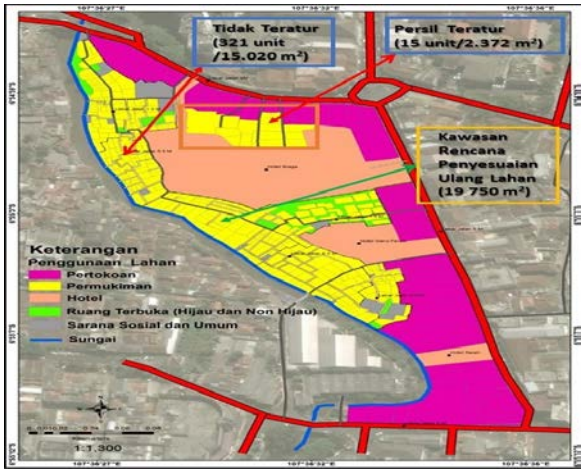


Figure 3: Area of Land Readjustment in Kampung Braga

The area has a land use structure as indicated in the actual land use balance (Table 2). Table 2 shows that the area is dominated by buildings (76%), with the ratio of road area and public green open space are 7.2% and 1.9%, respectively.

Table 2: Initial land use structure of Kampung Braga area (before replotting)

Category		Actual / Before PUL Area (m^2)	Rasio (%)
Land for public facilities	Road	1 427	7.2
	Green open space for public	370	1.9
	Other (schools, mosques, offices and halls RW, posyandu etc.)	1 605	8.1
	Sub Total	**3 402**	**17.2**
Land for private facilities	Building (lot)	1 5020	76.1
	Green ppen space for private (Garden etc)	1 328	6.7
	Sub Total	**16 348**	**82.8**
	Reserved land	0	0
	Total	**19750**	**100.0**

In this study area, there are 360 plots of land consisting of 321 plots of residential buildings and 39 plots of non-habitable buildings with the status of the government most of them belonging to property (37.2%). Meanwhile, the remainder is rent (35.6%); land owned by local government (Pemkot) (22.8%); and waqf (4.4%). For land with ownership status, 21% of them (with an area of +4 038 m2) has been certified. Meanwhile, of the total plot in the study area, about 78.1% or area ± 14 285 m2, has not certified yet. The status of this certified status has been occurred due to several factors such as the land is still a status of sale deed, state land or Bandung City Government which is along the river and other land that is not known to the status of his mastery (Figure 4).

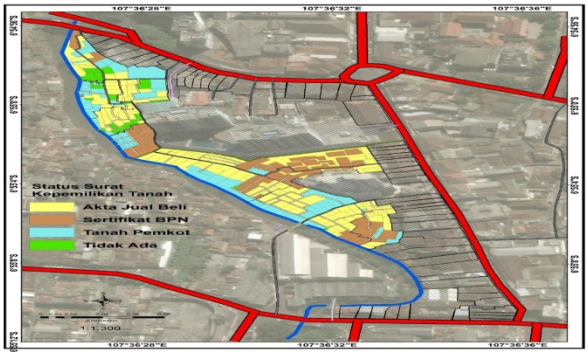


Figure 4: Status of land ownership in land readjustment area Kampung Braga

2.2. Data Collection Techniques

This research uses primary and secondary data. Data collection was conducted in January - October 2016. The primary data used included plots, households, and the physical environment in the irregular housing section of

Kampung Braga. The primary data, collected through a survey with the following stages:

- Preliminary survey to identify characteristics of land and building land and land ownership inventory in 'Kampung Braga' which became the area of land readjustment planning using Quick Bird satellite 2007 image after being digitized based on plot location, building shape, and roof size for initial sketches of layout (distribution) of irregular housing land plots and to know the number of households based on actual building plots. Based on the results of the digitizing, the data / information on the initial number of irregular plots to be used as a guide for household survey are 321 plots of buildings in 2 (two) RW: RW 04 (RT 02 to RT 06) and RW 08 (RT 02 to RT 06)).
- Interviews and discussions were with 321 owners of residential land plots to obtain data and information on land and building ownership. Number of owners of plots of residential building is a residential area located in an irregular (slum) in Kampung Braga. Since the location of the land adjustment is restricted to irregular areas according to the results of the preliminary survey the number of households in the sample is 321 households.
- Secondary data used include spatial planning document (RT RW Bandung and RDTR Bandung), population statistics, basic infrastructure data related to Kampung Braga Area (Kelurahan Braga-Sumur Bandung Sub-district) obtained from various agencies or related agencies such as: Land Office of Bandung City, Spatial Planning and Cipta Karya Bandung, Office of Housing and Settlement Area, Land and Garden City of Bandung, and Office of Settlement and Housing of West Java Province.

2.3. Data Analysis Method

In this research, data analysis was conducted by qualitative and quantitative approach with the following stages: (Table 3)

Table 3: Stages of Data Analysis

Stages	Analysis Method
1) Analyze the value of land based on the value of the street (street value)	Establish a street value index based on the position and size of each land parcel The value of the land is analyzed based on the Street Value Index, and the level of modification based on the features (form) of each plot
2) Formulate the design of replotting of the area	The design is formulated to rearrange the location, size, shape, and position of the lots within the area based on spatial, environmental facilities, infrastructure, and green open space development plan
3) Analyze the increase of land value	Analysis of the ratio (ratio) of the street value index after and before replotting
4) Preparing the balance of land use after replotting	The land use balance after replotting is prepared by recalculating the allocation of land use generated after replotting
5) Determine the contribution of land	Calculates the average portion of the reduced land area of each settlement unit before replotting (actual), and distributed proportionately to other uses (as replotting design).

1) Analysis of land value based on street value (street value);

This analysis is carried out by using calculation formula of land value using street appraisal (street value) pursuant to Land Conformity Standard of Ministry of Public Works (2014). Street is an important feature for development, the development of the entire region is possible only after the construction of the street. The formula consists of 2 stages: (1) Calculation of the value of the street that will generate a street value index, was conducted based on the position and extent of each land plot (units in units / m^2); and (2) Calculation of the land value of each plot was conducted based on the street value index, assuming the Street Value is 1000 units / m^2 (units in units / m^2).

Formula that used in 'street value' calculation is as follow:

Street Value (SV) = Street Coefficient + Accessibility Coefficient + Land Coefficient

A) The Street Coefficient (SC) reflects the value of land plot facing the street, and is calculated from the sum of the coefficients of the street function, the width of the street and the coefficient of street completion.
B) The Accessibility Coefficient (AC) reflects the beneficial / beneficial value of land parcels calculated based on relative distance (based on walking distance) + 400 m) between the plot by facility of transportation, and public infrastructure and facilities.
C) The Land Coefficient (LC) reflects the availability, convenience and security features of the infrastructure attached to the street and assigns value to the plot in front of the street covering the area, shape, land use, drinking water availability, sewerage, high voltage power lines or substations, wind position, airflow, soil conditions, and others.

After the street value is obtained, the next step is to calculate the index of the street value. The calculation of street value index (street value index) is carried out by conversion comparison approach where the maximum value of street value before the replotting process is 1000 units / m^2. Conversion value is obtained by selecting the street that has the highest value of a set of streets in the planning area to be a reference value for comparison. The conversion value is calculated as follows:

$$\text{Conversion Index} = \left(\frac{1000}{\text{Maximum path street before replotting}}\right)$$

Based on this conversion value, a street value index can be determined for all street segments in the area of land readjustment for before and after replotting. The calculation of 'land value' uses the calculation of the value of each plot based on the street value index. The plots assessment is done by making adjustments through modifying the original (original) plot feature (form). Evaluation value of plot is obtained from street value index multiplied by level of modification based on actual feature (form) from each plot with the following formula:

[Street Value Index] X (Level of Modification by Feature of Each Plot)]

The plot modification process follows the standard conversion of specified plot. The calculation of the value of plot is done within the planning area, each through the condition before replotting (actual condition). The calculation of the value of this land becomes the baseline for arranging and transforming the area and converting the actual land into a vertical building (flats).

2) Replotting of area blocks;

Preparation of the replotting design of the land readjustment area is accomplished by the following general steps (Figure 5)

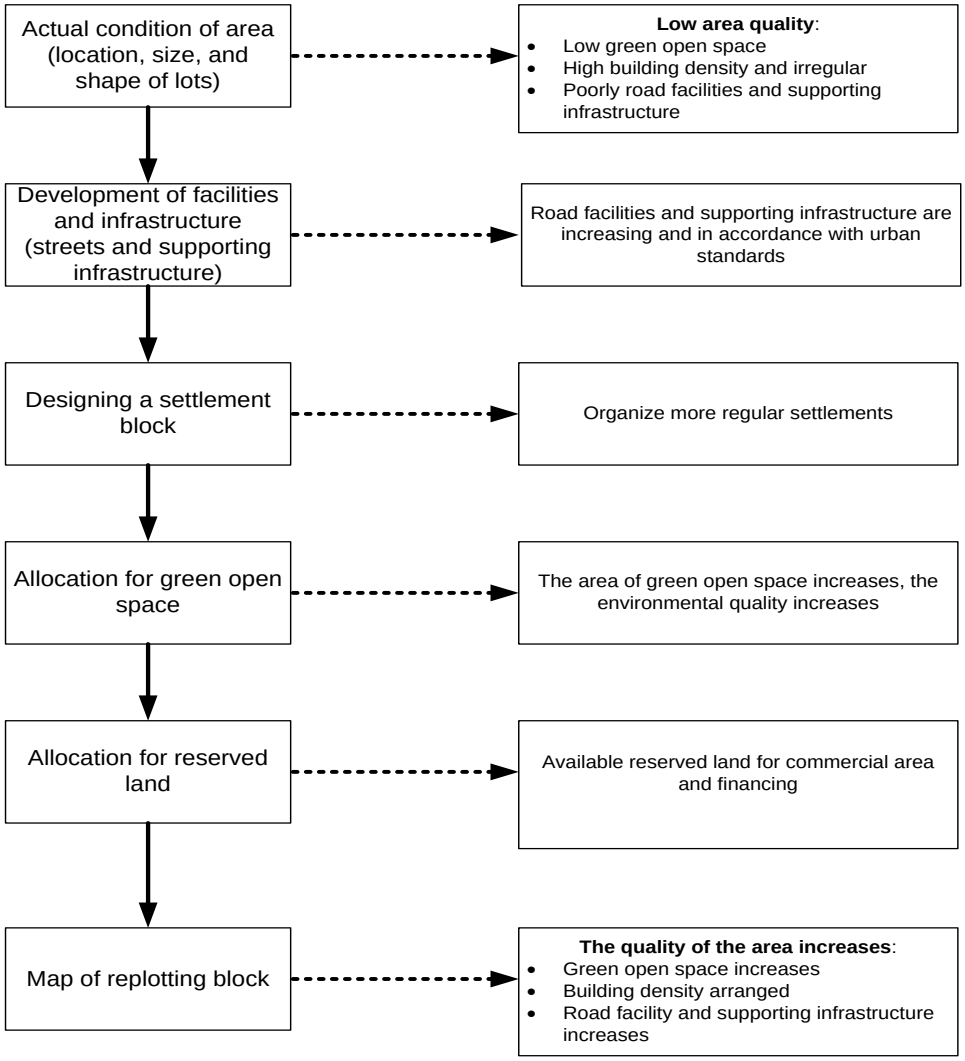


Figure 5: Phase design replotting of Kampung Braga area

3) Analysis of land value increase (after replotting)

In each condition before and after replotting can be calculated the average value of the index of the street value. By comparing the street value index after and before replotting can be resulted an 'increase rate' which is 'base

value' in the change of land value due to the replotting process. The result of the calculation of the value of the road resulted in the 'increase rate' (increase rate) of the area after the land readjustment. The value of the increase rate can be calculated as follows:

$$\frac{\textbf{\textit{Index after replotting}}}{\textbf{\textit{Index before replotting}}}$$

The average value increase (increase rate) of replotting result is said to be 'feasible' if its value is greater than or equal to 1.2 (> 1.2) according to the Land Reform Adjustment of Ministry of Public Works (2014).

4) Land use balance after replotting;

The land use balance after replotting is a calculation of extent and preliminary allocation planned for residential land use, streets and supporting infrastructure, green open space, reserved land and other uses. The land use balance can show changes in land allocation composition under actual conditions with conditions after replotting. This balance sheet reflects the transformation of space in the form of rearrangement of the area of both shape and plot of land according to the direction of spatial planning and urban land use that is adjusted to the needs of patterns of habitation or patterns of business, as well as the provision of facilities and infrastructure.

5) Contribution of land.

The contribution ratio in land readjustment is done by dividing the amount of land that is used for public services from the total of the area. This ratio is applied to each plot and in general the percentage of land contribution is 30% - 40% [3]. Contribution ratio was calculated by using the following formula: (Table 4) .

Table 4: Formulation of land contribution ratio calculation

Category	Actual/ before PUL area (m^2)	After PUL area (m^2)	**Difference**	**Share**
Road	A0	A1	A1-A0	SA=(A1-A0)/TL
Green Open Space public	B0	B1	B1-B0	SB=(B1-B0)/TL
Other (schools, mosques, offices and halls RW, Posyandu etc.)	C0	C1	C1-C0	
Plot (Lot) building	D0	D1	D1-D0	
Green open space (Park, etc)	E0	E1	E1-E0	
Reserved Land	F0	F1	F1-F0	SF=(F1-F0)/TL
Total	T0	T1	0	1.00

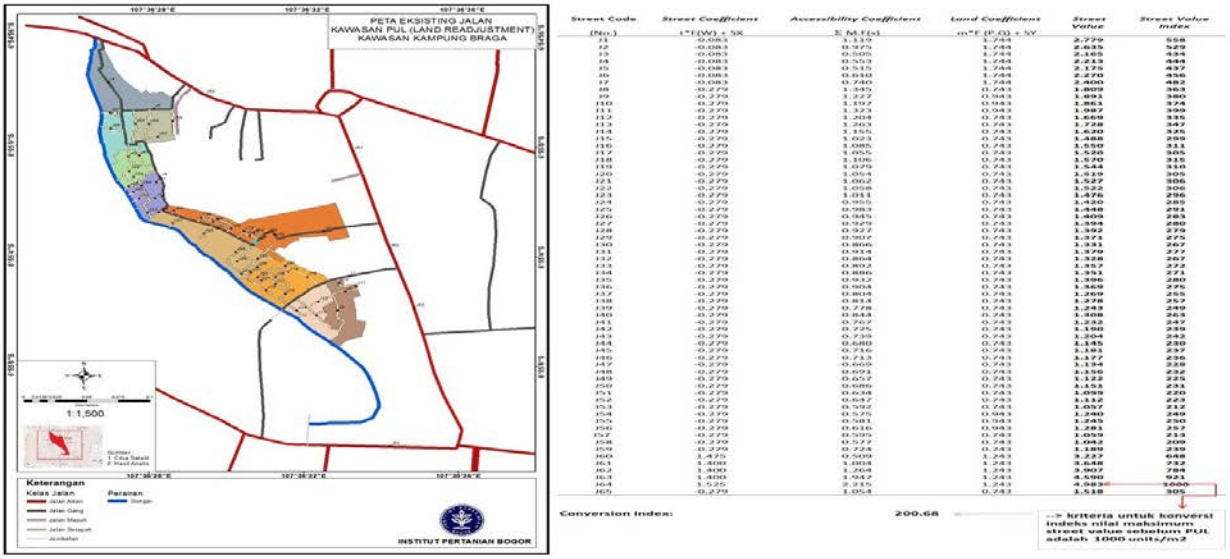
Categories of residential land that will be used in part are: Plot (Lot) building; Private Green Open Space, and Others (schools, mosques, offices and RW halls, Posyandu). As for distributed for the use of public facilities are: Street network, Public Space, and Reserved Land. The calculation of the contribution of each unit of residential area that will be used is as follows:

- Land area for public facilities after replotting (L1) = A1 + B1 + F1
- Land area for public facilities before replotting (L0) = A0 + B0 + F0
- Land area for settlements before replotting (P0) = C0 + D0 + E0
- Additional area for public facilities after replotting (TL) = L1-L0
- Percentage of Contribution (CR) = (TL / P0) x 100%
- Percentages of distribution for each unit of area contributed are: (1) For Road Network (SA x 100%); Public RTH (SB x 100%), and Reserved Land (SF x 100%); Where SA + SB + SF = 1.00

3. Result and Discussion

1) Analysis of land value based on street value (street value);

The calculation of the actual street value before replotting is presented below (Figures and Tables) Based on the street value, can be obtained the actual index plot value per-m2 or before replotting (Figure 7). Based on the drawings, it can be seen that the plot with the blue color (dark), have a higher index of land value compared with the lighter colored plot. Land plots with high land plots index of 29 units (8.1%), mostly in RW 08 and generally have a plot of land located on the main alleyway and near (<400 m) to the main street of Braga. Small land plot index value predominantly in Kampung Braga area amounts to 54.2 units (195%) encoded by green color. In general, the plot value index is low because it is at the back of the Access Street and Main Street and is on the river equivalent line.



Street Code (No.)	Street Coefficient t*F(W) + SK	Accessibility Coefficient Σ M.F(s)	Land Coefficient m*F (P,G) + SY	Street Value	Street Value Index
13	-0.083	1.119	1.744	2.779	558
14	-0.083	0.975	1.744	2.635	529
15	-0.083	0.505	1.744	2.165	434
16	-0.083	0.553	1.744	2.213	444
17	-0.083	0.515	1.744	2.175	437
18	-0.083	0.611	1.744	2.270	456
19	-0.083	0.740	1.744	2.400	482
20	-0.279	1.395	0.743	1.860	363
21	-0.279	1.227	0.943	1.891	380
22	-0.279	1.192	0.943	1.861	374
23	-0.279	1.323	0.943	1.987	399
24	-0.279	1.208	0.743	1.669	335
25	-0.279	1.263	0.743	1.728	347
26	-0.279	1.155	0.743	1.620	325
27	-0.279	1.023	0.743	1.488	299
28	-0.279	1.085	0.743	1.550	311
29	-0.279	1.055	0.743	1.520	305
30	-0.279	1.106	0.743	1.570	315
31	-0.279	1.029	0.743	1.544	310
32	-0.279	1.054	0.743	1.519	305
33	-0.279	1.062	0.743	1.527	306
34	-0.279	1.058	0.743	1.522	306
35	-0.279	1.011	0.743	1.476	296
36	-0.279	0.955	0.743	1.420	285
37	-0.279	0.983	0.743	1.448	291
38	-0.279	0.955	0.743	1.409	283
39	-0.279	0.929	0.743	1.394	280
40	-0.279	0.927	0.743	1.392	279
41	-0.279	0.907	0.743	1.371	275
42	-0.279	0.866	0.743	1.331	267
43	-0.279	0.918	0.743	1.370	277
44	-0.279	0.864	0.743	1.328	267
45	-0.279	0.802	0.743	1.357	272
46	-0.279	0.808	0.743	1.351	271
47	-0.279	0.932	0.743	1.396	280
48	-0.279	0.904	0.743	1.368	275
49	-0.279	0.808	0.743	1.269	255
50	-0.279	0.814	0.743	1.278	257
51	-0.279	0.778	0.743	1.243	249
52	-0.279	0.844	0.743	1.308	263
53	-0.279	0.767	0.743	1.232	247
54	-0.279	0.725	0.743	1.190	239
55	-0.279	0.739	0.743	1.204	242
56	-0.279	0.680	0.743	1.145	230
57	-0.279	0.716	0.743	1.181	237
58	-0.279	0.715	0.743	1.177	236
59	-0.279	0.669	0.743	1.134	228
60	-0.279	0.693	0.743	1.156	232
61	-0.279	0.657	0.743	1.122	225
62	-0.279	0.686	0.743	1.151	231
63	-0.279	0.634	0.743	1.099	220
64	-0.279	0.647	0.743	1.112	223
65	-0.279	0.592	0.743	1.057	212
66	-0.279	0.575	0.743	1.040	209
67	-0.279	0.581	0.943	1.245	250
68	-0.279	0.616	0.943	1.281	257
69	-0.279	0.595	0.743	1.059	213
70	-0.279	0.577	0.743	1.042	209
71	-0.279	0.724	0.743	1.188	238
72	1.475	0.509	1.243	3.227	646
73	1.400	1.008	1.243	3.648	732
74	1.400	1.268	1.243	3.907	784
75	1.400	1.947	1.243	4.590	921
76	1.525	2.215	1.243	4.983	1000
77	-0.279	1.054	0.743	1.518	305
Conversion Index:		200.68		--> kriteria untuk konversi indeks nilai maksimum street value sebelum PUL adalah 1000 units/m2	

Figure 6: Maps and the actual street value calculation results before replotting

Table 5: Land value index and number of plots

No	Range of land value index	Number of plots	%	Colour
1	491 – 645 (High)	29	8.1	Dark blue
2	336 – 490 (Medium)	136	37.8	Light blue
3	180 – 335 (Low)	195	54.2	Green
Total		360	100	

This land value is used for 2 (two) interests: (1) the base determines the area of land to be contributed (land donation) from each of parcel (lot) of participating landowners; (2) compensation for redistribution (exchange) for the need for exchange in the form of money or land and buildings provided by the city government based on land valuation before land readjusting activities if the landowner refuses to participate and a reference value for the landowner obtains a vertical building unit produced at the end of the activity.

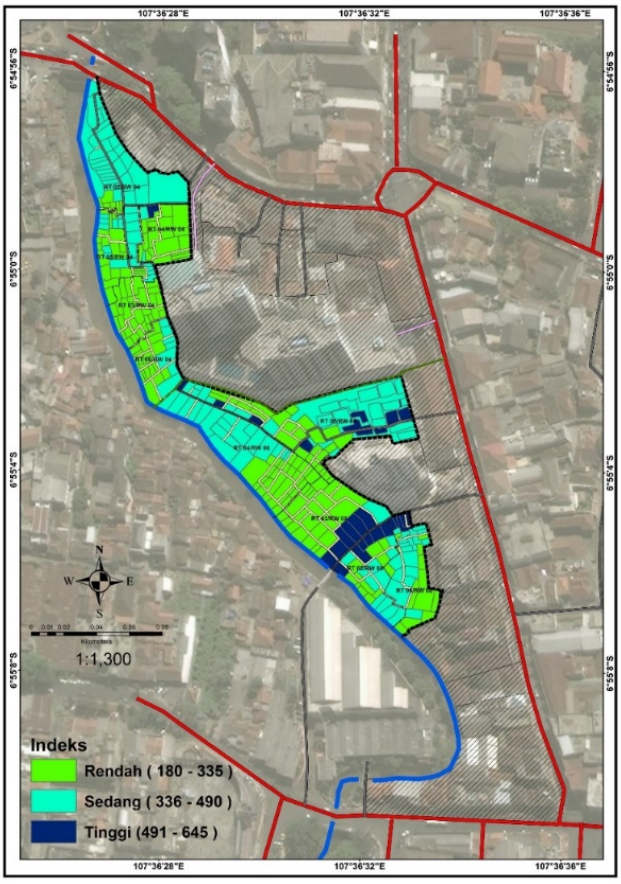


Figure 7: Plot Value Index actual Per-m2 l or before land readjustment

2) Replotting of area blocks;

The design of replacement area of Kampung Braga land reconstruction is presented in Figure 8. Based on the

replotting result of the land, the land in the readjustment area is divided into several blocks (Table 5). To transform dense and solid settlements such as Kampung Braga can be selected alternative development to the vertical of the flats or affordable apartment. Land readjustment allows for land acquisition, especially for land use and ownership arrangement of small land ownership is agreed uniting the land into one area for the construction of vertical buildings (flats or apartments) with adequate public and social facilities. Unified land into several blocks in the area will be planned to be reallocated for residential use (vertical), commercial areas, public and social facilities and green and non-green open spaces. By building a flat (vertical) KDB will shrink and allow the provision of green open space (GOS) is sufficient so that the layout becomes more comfortable. The construction of vertical flat building can organize the environment while also increasing the occupancy capacity by increasing the area and the number of floors and providing affordable housing for low-income community (LIC).

Reference [22] suggested five approaches to providing land for cheap homes through land readjustment, namely (1) selling land at a reduced or subsidized price by a low-cost housing agency, or through cross-subsidies for such deductions with higher payments to other landowners; (2) selling shares within the project area to an institution producing inexpensive homes before land readjustment begins; (3) using the financial surplus collected from land price increases to provide cheap housing; (4) using some landowners' plots to build some vertical units for rent or sale to low-income community; (5) increasing the rate of withholding of land taken from landowners at a certain level to finance low-cost housing.

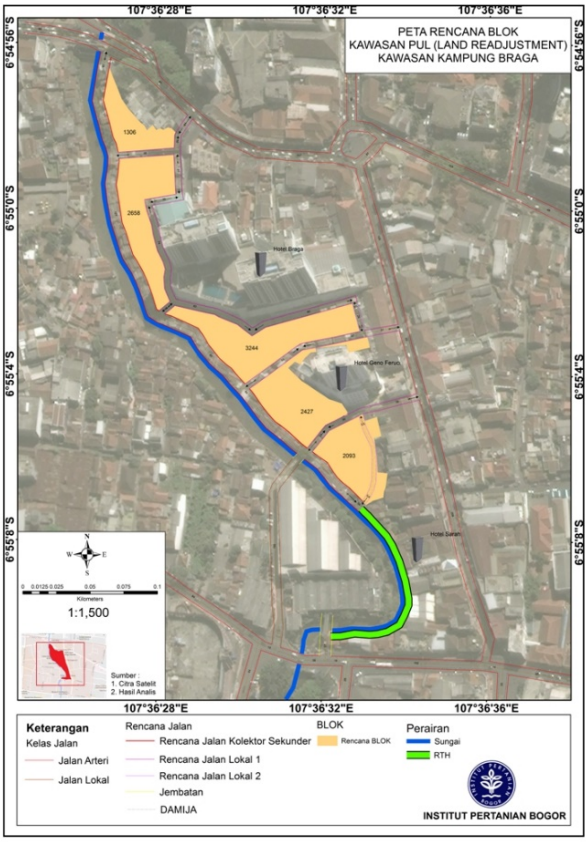


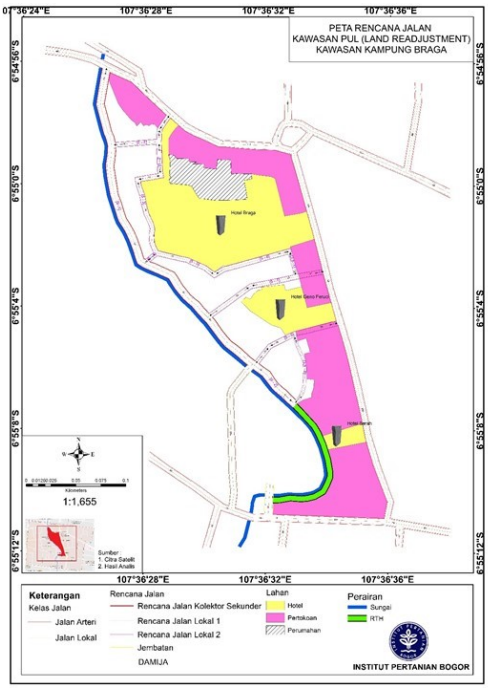
Figure 8: Replotting design of land readjustment of Braga Bandung area

Table 6: Blocks and replacing results of replotting land regeneration of Braga Bandung area

Block plan	Width (m^2)
Block 1	1306
Block 2	2658
Block 3	3244
Block 4	2427
Block 5	2093
Streets and supporting infrastructure	8022
Total (m^2)	19750

3) Analysis of land value increase (after replotting)

Calculation of the street value after replotting is presented in Figure 9.



Street Code	Street Coefficient	Accessibility Coefficient	Land Coefficient	Street Value	Street Value Index
(No.)	t*F(W) + SX	Σ M.F(s)	m*F (P.Q) + SY		
(9-1)	1.950	0.688	6.033	**8.671**	**1740.04**
(9-2)	1.950	1.321	3.591	**6.862**	**1377.01**
(5-1)	1.338	0.625	3.591	**5.553**	**1114.41**
(5-2)	1.338	0.490	3.591	**5.419**	**1087.45**
(5-3)	1.338	0.592	3.591	**5.521**	**1107.94**
(5-4)	1.338	0.675	2.544	**4.557**	**914.51**
(5-5)	1.438	0.880	3.416	**5.734**	**1150.65**
(5-6)	1.438	0.710	4.289	**6.436**	**1291.65**
(5-7)	1.438	0.941	4.289	**6.667**	**1338.01**
(5-8)	1.438	1.248	4.289	**6.974**	**1399.53**
(3.5-1)	1.308	1.040	4.289	**6.636**	**1331.73**
(3.5-2)	1.308	1.373	4.289	**6.969**	**1398.58**

Conversion Index:	200.685

Figure 9: Maps and actual street value calculations after replotting

The result of the calculation of the value of the street resulted in the 'increase rate' (increase rate) of the area after the land readjustment. The average value increase (increase rate) of replotting result is 'feasible' if its value is above or equal to 1.2 (> 1.2)). By comparing the street values index after and before replotting, an 'increase rate' can be generated. Index of average street value before replotting = 1270 and index of road value after replotting = 341.89, then 'increase rate' can be calculated as follows:

$$\frac{Index\ after\ replotting}{Index\ before\ replotting} = \frac{1270.9}{341.9} = \mathbf{3.72}$$

The value of the increase rate = 3.72 is the basic figure in the assessment of changes in land value due to the process of replotting (planning). According [12] in urban renewal scheme will encourage the increase of property value caused by 2 factors: (1) change of land use plan (spatial planning) and (2) improvement of street access (transportation infrastructure).

4) Land use balance after replotting;

After subsequent replotting designs, next are arranging the balance of land use after replotting (Figure 8). After the process of replotting the allocation plan of use can be arranged, the ratio of street network becomes 36.1%, green open space 3.8% and reserved land that can be used for commercial by 6.4% (Table 6).

Table 7: Balance of land use after replotting

Category		After PUL Area (m^2)	Ratio (%)
Land for public facilities	Road	7 131	36.1
	Green Open Space public	500	2.5
	Other (schools, mosques, offices and halls RW, Posyandu etc.)	1 605	8.1
	Sub Total	**9 236**	**46.8**
Land privat facilities	Plot (lot) building	9 000	45.6
	Green open space private	250	1.3
	Sub Total	**9 250**	**46.8**
	Reserved land	1 264	6.4
	Total	1 9750	100

5) Land contribution.

Contribution of land is a form of participation that is given by the landowner by reducing the amount of land area of all each plot (lot). The contributed land is used for the provision of facilities and infrastructure and commercial reserved land to finance readjustment activities. The determination of the magnitude of land contribution is an important issue as it relates to equity principles and is likely to influence people's decisions to participate in the project or not. Therefore, the contribution of the land should be determined by appropriate calculation based on the calculation of the value of land that is managed properly. The calculation of land contribution is presented in Table 7.

Table 8: Balance of land use after replotting

Category	Actual/before PUL area (m^2)	After PUL area (m^2)	**Difference**	**Share**
Road	1 427	7 131	5 704	80.36
Green open space public	370	500	130	1.83
Other (schools, mosques, offices and halls RW, Posyandu etc.)	1 605	1 605	0	
Plot (Lot) building	1 5020	9 000	-6 020	
Green open Space private (Garden etc)	1 328	250	-1 078	
Reserved land	0	1264	1 264	17.81
Total	19750	19750	7098	100.00

The contribution calculation of each unit of settlement area is as follows:

- Land area for public facilities after replotting (L1) = 7 131 + 500 + 1 264 = 8 895
- Land area for public facilities before replotting (L0) = 1427 + 370 + 0 = 1 797
- Land area for settlements before replotting (P0) = 1 605 + 15 020 + 1328 = 17 953
- Additional area for public facilities after replotting (TL) = 8895-1797 = 7 098
- Percentage of Contribution (CR) = (7 098/17953) x 100% = 39.5%

Percentages of distribution for each unit of area contributed are: (1) For Street Network (80.36%); (2) Public Open Space (1.83%), and (3) Reserved Land (17.81%). The percentage of the contribution in line with the value used in the project of land readjustment is 35%. - 40% like and Turkey [3]. If the percentage of contribution in the region turns out to be more than 40%, the excess must be taken over by the municipality in order to limit the percentage contribution not to exceed 40%. The replotting results developed at the end of the process are distributed to landowners according to the size of their land at their level of involvement. Reduction of land for public facilities and reserved can be defined as the main cost recovery tool in land readjustment. This method has efficient self-financing for ground assembly, when the procedure is capable of providing cost recovery [9, 17, 19]. Implementation of self-financing can be achieved by using cost recovery or value capture which is an important source of infrastructure financing, preventing speculative plans and providing social justice.

4. Conclusions and Suggestions

4.1. Conclusions

This research has resulted in a formulation of the application of land readjustment in kampung Braga. The formulation reflects in the design of replotting over irregular areas, yielded some positive changes. This change indicates an improvement in the quality of kampung Braga which can be seen the value of the increase in the land value index reaches 3.72. This indicates an increase in the value of land in the area. In addition, improvements are also reflected in the land use balance (after and before replotting) which is reflected in increased land area for road networks and increased land area for public green open spaces. In addition, replotting design also produces reserved land for commercial areas which can be used to finance self-financing land adjustment activities. This indicates that land readjustment can be considered as one approach that can be applied in transforming kampung Braga into a better (habitable).

In addition, the transformation of kampung Braga area by using the method of land readjustment can improve positive changes such as: standard parcel layout, produce and provide a plot with regular shapes and sizes, the availability of space for public facilities such as streets, green open spaces, sustainability of property rights and price stability (land) as a result of the fulfillment of demand (demand) through the provision of low-cost housing for low-income communities (LIC). In addition, land readjustment can provide the value of land and property as well as the overall value of the area in the form of value capturing.

4.2 Suggestions

Urban renewal of Kampung Braga by using the method of land adjustment directed to solve the problem of slum areas with the arrangement of plots of irregular settlements, development of facilities and infrastructure that meet the standards of urban settlements, as well as the provision of housing for low-income community (LIC) or poverty-habitable people. In addition, the use of land adjustment methods should be able to overcome the provision of urban infrastructure. In addition, the capacity of these methods to provide affordable housing should be increased for low-income communities in urban areas. In its implementation, land readjustment needs to be supported by solid policies, as well as adequate managerial capabilities from various parties, especially the government to ensure that this land adjustment approach can benefit all parties according to their promise.

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Appendix

Street value calculation formula

Street Value (SV) = Street Coefficient + Accessibility Coefficient + Land Coefficient

A) The Street Coefficient (SC) reflects the value of land parcels plot facing the road, and is calculated from the sum of the coefficients of the road function, the width of the road and the coefficient of road completion.

Formulation

Street Coefficient [SC] = t * f (W) + Σ X, where:

- t = the coefficient of road function, can be determined from the performance of traffic features and connections within the urban road network group.
- W = width of street, with function: f (W) = (W / (W + 3))
- X = coefficient of completeness of street section, for example if the street is completed with pedestrian path, construction type, and shade plant.

B) The Accessibility Coefficient (AC) reflects the beneficial / beneficial value of land parcels calculated based on relative distance (based on walking distance) + 400 m) between the plot by means of transportation, and public infrastructure and facilities.

Formulation

Accessibility Coefficient [AC] = Σ m * F (S), where:

- m = site profit and loss index, determined by experience such as: train station = 0.3; Garden = 0,1; Gas stations = 0.2.
- F (S) = index of impairment m value based on distance to facility, calculated by the formula:

o $F(S) = \left(\frac{S-s}{S-R}\right)^n \ (s \geq R)$

o $F(S) = 1 \qquad (s < R)$

- S = the distance of a facility's service depends on the type of facility such as railway station, park, and school.
- R = effective mileage of service
- n = service level decreasing feature
- s = distance between parcels and facilities

C) The Land Coefficient (LC) reflects the availability, convenience and security features of the infrastructure attached to the road and assigns value to the plot in front of the road covering the area, shape, land use, drinking water availability, sewerage, high voltage power lines or substations, wind position, airflow, soil conditions, and others.

Formulation

Land Coefficient (LC) = μ * f (P * Q) + Σ Y, where:

- μ = the basic level of land use determined through the direction of the plan, the intensity of the building, the status of the city, etc. Existing conditions before planning can be determined = 1; with the direction of the plan the value can increase to = 1.2 or other expected value. The value of μ can almost be interpreted as the value of land to be targeted by the planning.
- f (P * Q) = modification coefficient based on the effectiveness of land use, comfort effect, and facility availability features by following formula:
- $$f(P * Q) = 1 + \sqrt{(\frac{P}{Po})x(\frac{Q}{Qo})}$$
- Po = Standard proportion of public land (%). UUPR sets the standard proportion for green space (30%), 20% on public land and 10% on private land. For the ideal public land as a whole is 40%.
- P = Proportion of public land in the planning area
- Qo = Standard of road length intensity (m / Ha). At this time we do not have a specific standard on this subject; When following the experience of about 10% of the planning area for the road space; Or 111 m / ha
- Q = Intensity of road length (m / ha) in the planning area
- Y = Value coefficient and additional impact of construction of public facilities on streets and other physical factors affecting location, such as placement of drainage and sewer (~ 0,30), gas (~ 0,10), power grid, and so forth .