

Urban land use classification and functional zoning of Ulaanbaatar city, Mongolia

Gantulga Gombodorj¹ and Chinbat Badamdorj¹

1. Faculty of Earth Sciences, National University of Mongolia,
Ikh surguulliin gudamj 2 -NUM building 6, Ulaanbaatar 210646, Mongolia
gantulga100@yahoo.com lis@num.edu.mn

Abstract: As Mongolia moves to a market economy and begins to encourage land ownership and the creation of private land and housing markets, it will need to revise its approach to the spatial planning and control of land uses and development by individuals and businesses. Designed for a regime of exclusive state ownership of land, the existing “target use” restrictions for individual parcels as shown in the detailed Master Plans hinders the exercise of market-driven choices by individuals and businesses wishing to put land and infrastructure to their most productive uses. [Nature and Science 2010;8(2):90-97]. (ISSN: 1545-0740)

Keywords: Urban land use classification, land use zoning and regulation, functional zones

Introduction

Mongolia is no exception to this commonly experienced urbanization pattern. Mongolia experienced rapid urbanization in the second half of the 20th century, and this trend was accelerated during the transition from a centrally planned to a market-based economy. By 2000, the urban population was 1.4 million, equivalent to 58 percent of the national population of 2.4 million. As of 2005, 37.7 percent of the total population of the country resides in Ulaanbaatar region, which covers 0.3 percent of the territory of Mongolia. 94.1 percent of the region lives in Ulaanbaatar city and the remaining 5.9 percent inhabits satellite cities and villages. Since the year 2000, migration to Ulaanbaatar has increased dramatically, and presently, following the official number of registered inhabitants, almost half of the whole Mongolian population lives in the capital.

The main reason for this ongoing migration is the weak infrastructural situation in the rural areas of Mongolia, and the absence of income-alternatives to mobile livestock-keeping, which is the dominant form of livelihood in most of the rural areas of Mongolia. The loss of livestock during the natural hazards of the winters of 1999-2002 in combination with droughts in summer was a major factor which led to massive impoverishment in rural areas and to an increase of migration towards the big cities of the country. In addition to this primary factor, there are several reasons for the rapid population growth by migration. For example, there are the lack of governmental policies for urban management, the existence of many universities and colleges in Ulaanbaatar, etc.

If we admit that any urban and settled areas represent peculiar systems of economic, social, and spatial management that contain in themselves the process of more centralized density within smaller space in the whole of the society, then they form within definite frames of limitations functional and spatial structures with a net internal conformity and on the base of perfecting these structures. It appears natural that, the spatial structures are to be renewed and exposed to evolution pursuant to the spatial demand and requirements of social development. One of the basic issues of urban research study is the problem on how the urban complements, residential quarters, enterprises and plants, warehouses and storages, trade and services, schooling and cultural as well as administrative establishments be spatially located better so as to be ecologically, economically and socially efficient and to satisfy the demands of the sustainable development. As is seen, the internal urban functions in a spatial structure basically find their reflections in the urban land tenure structure. Accordingly, the internal harmony of functional and spatial structures is dependent on the historical specifics, development scope, directions and duties, location and geographic distribution environment of the given city or town. It is also evident from the experiences of countries where the market economy is advanced that it is closely connected with the urban planning and particularly with the urban land tenure or utilization planning, zoning and management policy (B.Chinbat. 2004. p 31).

During the times of the centrally planned economy, the master plan of the capital city development, as was mentioned above, has been elaborated based on

SNIP (Construction Standards and Rules) or by the other plans that were brought closer to the conditions of Mongolia. The development of the master plan of the capital city Ulaanbaatar at a time of centrally planned economy represented not only the urban construction and physical architectural plan, but there is a sufficient proof to consider that it was based on the capital city investment planning and constituted a document that had a legal power to plan and control the urban internal land utilization. The reason for such is that the prevailing majority of industrial plants, economic and infrastructure sites, residential and dwelling apartment quarters were concentrated in the capital city and they had been reflected in the general urban development plan accordingly. On the other hand, everything was based on such a system, where the whole land of the country constituted a common property of the entire people (state), the land had been distributed under the tenure of factories and economic establishments of socialist forms and features and the utilization rules and orders were established by the state power and the tenure had been controlled and inspected by the society via state organs (D. Jamts. 1981. p.48). Judging by this, the stipulations connected with the urban land tenure and distribution, in line with the master plan of the capital city development are witnessed to have been acting as a law on the urban land planning, regulation and control. For instance, the territory of the capital city would be divided into the following zoning in conformity to chapter 60 of section 2 of SNIP (SNIP.II-60-79.1980.p.12):

- Residential zone – it is indicated here that there should be dwelling regions and social centers (administrative, scientific, training and health, sports etc) being distributed and developed as well as the green area facilities of common designation.
- Industrial zone – industries and other manufacturing and production plants and enterprises and sites, related to them.
- Zone of warehouses and storages, common economies – storages, camps, bus parking etc.
- Outer transportation zone – here are the transportation facilities outside the residential zone (passenger and freight stations, airports, forwarding camps, technical services lots etc) location streets, roads and squares.
- Recreation and entertainment zone – entertainment, travel, tourism and sports camps, gardens.
- Other designated zone – this comprises the location and development of water basins,

sanitary and conservation of green for health, places and facilities for special designation, agricultural land tenure and so on.

On the bases of this the functional zoning principles were implemented by way of diversifying the capital city into such definite zones as city center, residential area and the felt dwelling quarter and the industrial, storage and warehouses zones were separated from them by a protection stripe. In this connection the capital city construction space includes: 1. city central business district of compact character, centralized in the small ring region the political, administrative, municipal, diplomatic and international, as well as scientific, cultural, higher educational, banking and financial establishments; 2. a transit zone, oriented by the big ring borders which includes operation of offices, apartments, trade and services establishments; 3. outside these internal urban belts there is located the Residential zone with medium and high-rising apartment houses, mainly stretching forward to the west and east alongside the central axis of the city; 4. Industrial and warehousing zone, separated from other zones, located in the southern, western and eastern peripheral edges of the city by the green protection stripe; 5. in the outside of these zones there have been distinguished the development of felt dwelling quarter forming the periphery of the city. At a certain extent, it has created a kind of a Mono-centric urban internal structure.

The radical change of the political, social and economic systems of Mongolia since 1990s had caused a principal modification into the social understanding about the land. There were alterations into the policy, being pursued by the state and government of the country on the land. Not limited by this the role and significance of the land in the society had been changed basically (J. Narantsatsralt. 1998. p 91).

Since the irreversible transfer of the country into the market economy, the urban land use has turned to be based on the market relations and due to the reality that there have appeared no possibilities to regulate further on the land use by the old urban master plan, norms and standards, the course of the transition period the land use within the framework of the capital city has been left with no control and inspection. Regulation has been running in a chaotic competition manner up-to the present. Under these conditions the national specialists of Mongolia, for the first time in history, have attempted independently to work out the Master Plan of the capital city development until the year 2020 and had it approved, but despite this the Ulaanbaatar city land use plan and the land zoning system had not been

even drafted yet. The investment program is not definite, and dependent on these matters the new Master Plan has an abstract feature and represents a mere document of building-architectural physical planning only. In addition, the capital city land utilization Master Plan was projected in 2001 which had attempted to divide the territory of the capital within its margin into the following zones of land policy through legalizing them into the land tenure, regulation, conservation and protection:

- Urbanized and urbanization extension zone.
- Population social revival zone.
- Near-urban intensive Agricultural zone.
- Near-urban traditional or non-intensive Agricultural zone.
- Nature restriction zone
- Conservation of natural rare and picturesque landscapes zone.

The given plan has set forth the boundaries in lines and circles for the urbanized and urbanization zones and it has emphasized the necessity to restrict the chaotic urban outward extension and to increase the urban land use density, but the urban land use classification and the functional zoning issues were left aside considering that these would be regulated by the urban Master Plan. In any case, it is encouraging that such new proposals were reflected in the new Master Plan as to separate the small towns and settlements which are situated in uneven distances in the vicinity of Ulaanbaatar city by green belts and to restrict anew the land use within the green areas of the capital city and so on (B.Chinbat. 2004. p 33).

On the other hand, though such laws of Mongolia as the law on land (2002), on land payment (1997), on land ownership (2002), on urban planning (1998) were adopted and are being implemented duly, they miss basically such important stipulations as the urban land use classification and zoning and this witnesses that a legal environment for the urban land utilization has not been ensured yet.

Materials and Methods

1. It focuses on activities of collecting data required in determination of land structure, size and to define the land use purposes in obvious places. This types of research provide with information and gives clear responses to following issues:

- Land privatization, tenure, structure
- Changes in the urban internal structure
- Buildings number and main purpose
- Floor area ratio and building coverage ratio
- Zoning regulation

- Places in ecologically barriers

2. The common grounds, necessary for working out the Ulaanbaatar city functional zoning, were assembled through the comparison of the urban zoning systems of such countries as Japan, Korea and USA with the conditions of Mongolia. The common grounds were assessed and conclusions were drawn thereof.

3. The paper examined new types of land use, emerged from the traditional land uses as well as in the course of the transition period. Field surveys were conducted to estimate the modifications and alterations of the land use structure occurred in the land use structure by the area balance. Ulaanbaatar city is divided into 14 micro regions to represent the functional zones of the city

4. Remote sensing Data: Quick Bird image with a spatial resolution of 0.61 m, Toposheets (scale 1: 5 000), GIS software used Arcview 3.3

Establishment and main purposes of land use zones

For the purpose to identify the features of Ulaanbaatar city land use, we have separated and sorted the following land use zones within the framework of the developed areas of the capital city on the basis of the results of analysis conducted:

Residence zones

- RE-1 Single family housing zone
- RE-2 Low rise residential zone
- RE-3 Middle rise residential zone
- RE-4 High rise residential zone
- RE-5 "Ger" zone

Main purpose: A Residence zone is to provide a healthy, safe and civil environment for the residents within each zone.

Commercial zones

- CO-1 Central business zone
- CO-2 Satellite business zone
- CO-3 Neighbourhood commercial zone

Main purpose: A commercial zone is to provide adequate space in appropriate locations for retail, service, administrative and recreational development to meet the needs of the citizens.

Industrial zones

- IN-1 Danger industrial zone
- IN-2 Heavy industrial zone
- IN-3 Light Industrial zone

Main purpose: Industrial zone is to provide for the orderly and appropriate growth of industry in the city

Suburban zones

- SU-1 Farmer zone
- SU-2 Traditional agricultural zone
- SU-3 Natural conservation zone

Main purpose: A suburban zone is to provide a agricultural land use, safe and environment for the urban green zone.

Mixed use zones

- MU-1 Semi residential zone
- MU-2 Semi commercial zone
- MU-3 Semi industrial zone

Main purpose: Mixed use zones is to encourage a diversity of compatible land uses that may include a mixture of residential, office, retail, recreational, light manufacturing and industrial and other miscellaneous uses. Development shall be guided by an approved public policy or plan and through the use of planned unit development, special exception or other site plan review process.

Open space zones

- OS-1 Green built
- OS-2 Avenue, road
- OS-3 Restriction zone & area

Main purpose: Open space zones is to protect natural areas and features of the city.

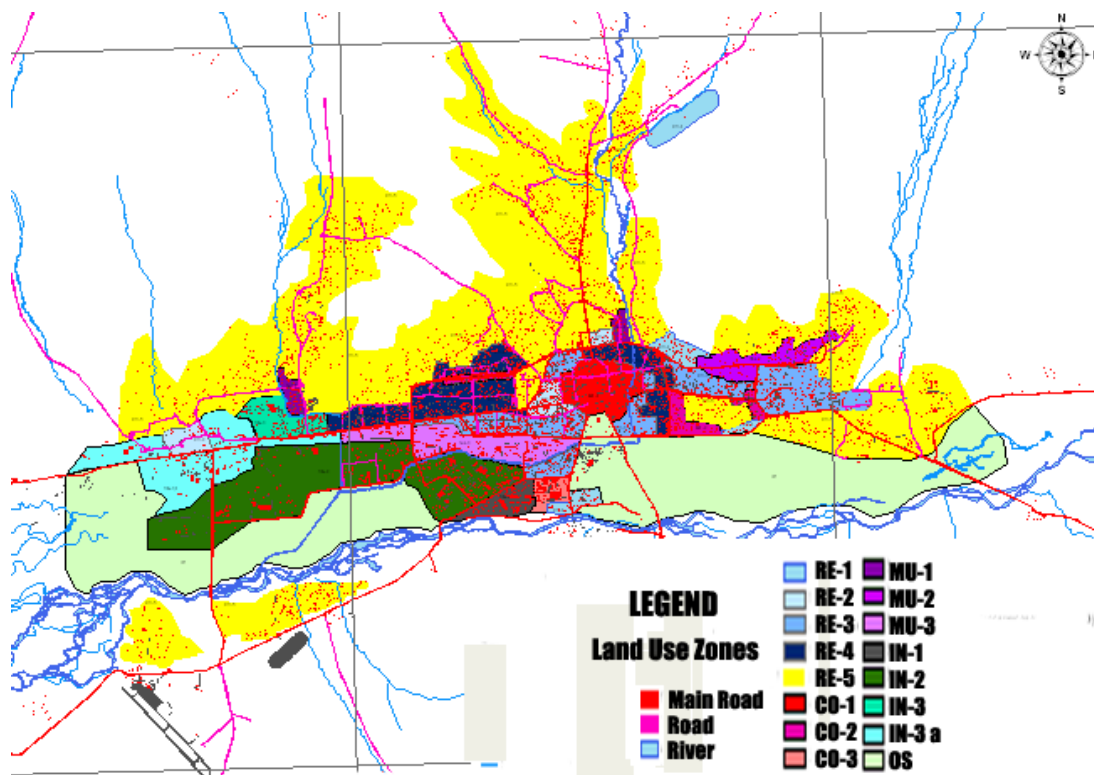


Figure 1. Land use classification and zoning scheme for the Ulaanbaatar

In developing the given list we have made better use of the urban zoning system of the Republic of Korea, the urban zoning systems of such cities of the USA and Japan. The followings (See table 1) are the list of permissible, conditionally permissible and prohibited types of the land use in above mentioned zones. The list represents the initial part of the elaboration of the urban land use zoning scheme for Ulaanbaatar city. But it is clear that the city and construction

management standards and norms to be pursued in these zones will represent a heavy work to be established through a thorough investigation study in the field of planning and engineering.

Zoning regulations

The Land Use Zones is the most fundamental system of building control in urban areas. There are 20

categories of Land Use Zones within which the use, density, height, or shape of buildings and so on are regulated in accordance with the basic classifications of the built-up area.

Discussion

There is also noticeable new types of land use that might deteriorate the residential zones of the

population, especially those environments which lay near to the residential areas. Accordingly, the demands and requirements for creating the legal environment for and controlling mechanism to plan and regulate the land use in the capital city in conformity to the best interests of the residents of the city are clear.

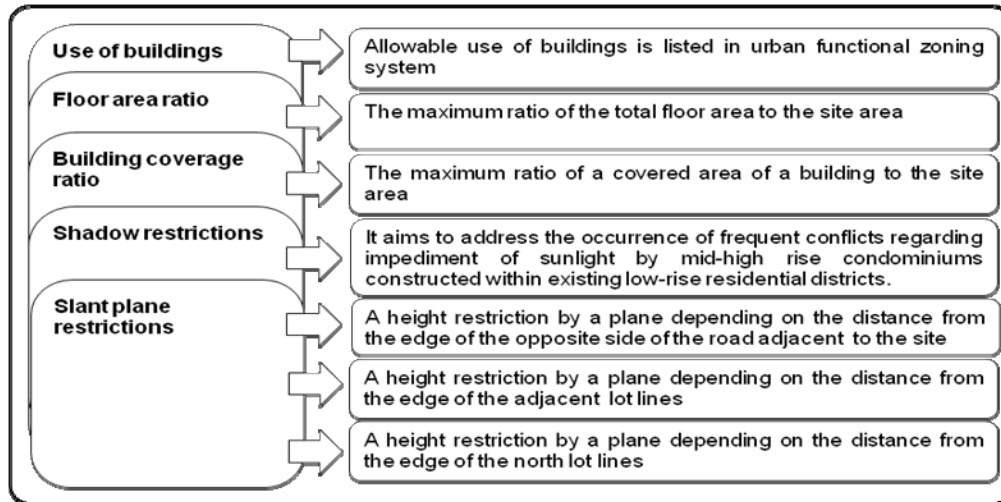


Figure 2. Restrictions on Buildings in the Land Use Zones System

Examples of buildings	Residential zones					Commercial zones			Industrial zones			Suburban zones			Mixed used zones			Open spaces		
	R1	R2	R3	R4	R5	C1	C2	C3	I1	I2	I3	S1	S2	S3	M1	M2	M3	O1	O2	O3
House, houses with other small scale function (store, office, etc)	E	D	C	B	F										D	D				
Kindergarten, Schools (primary, secondary, high)																				
Shrines, temples, churches, clinics											D									
Hospital, University																				
Stores, Cafe, Pub																				
Markets, Restaurant	F	E	E	E	E										E	D	D			
Offices, etc. not specified above						A	B	B												
Hotels, Inns						A	B	B												
Cinema, other entertainment																				
Ger, summer little house																				
Theaters, movie theaters, stores, restaurants, amusement facilities and so on, with more than 10000m ² of floor area																				
Bathhouses, Sauna, barbershop, washhouses, beauty salon																				
Auto park, garage, technical market.		F	F	E																
Warehouses of warehousing company, independent garage of other types than specified above	F	F	F	F	F	E	E	E	F	E										
Auto repair shop, Petroleum station										E										
Factory with some possibility of danger or environmental degradation									E	E										
Factory with strong possibility of danger or environmental degradation									E	F										

Legend					
A	Floor area must not exceed 1000 m ²	C	Floor area must not exceed 500 m ²	E	Floor area must not exceed 150 m ²
B	Floor area must not exceed 700 m ²	D	Floor area must not exceed 300 m ²	F	Floor area must not exceed 50 m ²
	Can be built		Conditional can be built		Usually cannot be built

Figure 3. Control of building use by Land Use Zones

Table 1. Use of buildings in land use zones of Ulaanbaatar

	Land use zones	Code	Selection of 14 micro regions		Allowed land uses		Conditional land uses		Prohibited land uses	
			Micro regions name	Research field (m ²)	Number	Area (m ²)	Number	Area (m ²)	Number	Area (m ²)
1	Single family housing zone	RE-1	“Jargalan” town	67472	26	5089	10	9304	-	-
2	Low rise residential zone	RE-2	15 th district	455746	58	54097	64	42768	-	-
3	Middle rise residential zone	RE-3	“Uurlan” town	64995	16	14082	3	3199	-	-
4	High rise residential zone	RE-4	13 th district	237922	39	11583	23	23528	-	-
5	“Ger” zone	RE-5	“7 buudal”	55310	52	3041	11	1891	-	-
6	Central business zone	CO-1	“Baga toirog”	841598	168	171937	51	34107	4	119
7	Satellite business zone	CO-2	Narantuul	54534	31	43560	23	17823	3	872
8	Neighbourhood commercial zone	CO-3	3, 4 th district	432120	112	88016	15	3870	1	114
9	Danger industrial zone	IN-1	Aris shir	38902	13	11309	14	5311	6	760
10	Heavy industrial zone	IN-2	4 th power station	21371	14	14236	8	7690	2	410
11	Light Industrial zone	IN-3	Suljmel, talh chiher	365354	38	46604	42	19900	-	-
12	Semi residential zone	MU-1	100 ail	374635	43	18011	99	60074	-	-
13	Semi commercial zone	MU-2	Urt tsagaan	72712	11	15580	15	8981	-	-
14	Semi industrial zone	MU-3	Bars and near site	34992	13	3884	15	7726	2	85

Conclusion

1. The urban internal structure, land use classification and zoning are a completely new research direction in the geography of Mongolia and actually in the country there are missing in general researches and surveys, conducted and creative works, published based on the modern urban geographical theory and methodologies of highly market developed nations.

2. The master plan of the capital city Ulaanbaatar development at a time of centrally planned economy represented not only the urban construction and architecture physical plan, but there is a sufficient proof to consider that it was based on the capital city investment planning and constituted a document that had a legal power to plan and control the urban internal land utilization.

3. Since the irreversible transfer of the country into the market economy, the urban land use has turned to

be based on the market relations and due to the reality that there have appeared no possibilities to regulate further on the land use by the old urban master plan, norms and standards, in the course of the transition period the land use within the framework of the capital city has been left with no control and inspection, regulation and has been run in a chaotic competition manner up-to the present.

4. On the other hand, though such laws of Mongolia as the law on land (2002), on land payment (1997), on land ownership (2002), on urban planning (1998), and also capital city's land use master plan (2001), Ulaanbaatar city's master plan (2002) were adopted and are being implemented duly, they miss basically such important stipulations as the urban land use classification and zoning and this witnesses that a legal environment for the urban land utilization has not ensured yet.

5. The present land structure of Ulaanbaatar city has all the possible opportunities to be compared with and diversified by according to the land use classification systems being pursued in the advanced countries of the world. In particular, we may note here that the classification of the land use, being applied in the urban planning of the Republic of Korea as identified and stipulated by the urban planning act has more closer identity to the classification of the land use in the capital city of Mongolia.

6. In conformity with this classification we are faced with the necessity to systematize newly the land use of Ulaanbaatar city, to reveal the functional zones according to this classification and to define in detail their boundaries and borders.

7. The land use structure in any belt or zone of the capital city has the opportunity to be enriched with new types of land utilization and there is evident a trend to increase the land use density in the capital.

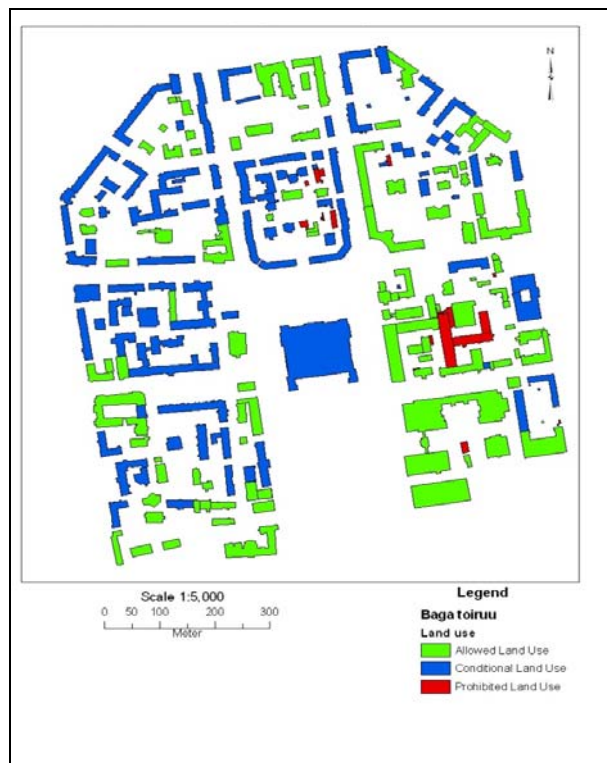


Figure 4. Urban land use zoning regulation of Baga toiruu

8. There are also noticeable new types of land use that might deteriorate the residential zones of the population, especially those environments which lay

near to the residential areas. Accordingly, the demands and requirements for creating the legal environment for and controlling mechanism to plan and regulate the land use in the capital city in conformity to the best interests of the residents of the city are clear.

9. To this end we have to identify the Ulaanbaatar city land use functional zones and to clarify more in detail the permissible land use types, conditionally permissible types and the types that prohibit the land use at all, taking into consideration their designation and duty.

Acknowledgement

I would like to thank professor B.Chinbat, P.Myagmartseren and V.Battsengel for all their help. Furthermore, I would like to thank all the colleagues at the Department of urban planning and land management and province for support in the field research.

Correspondence to:

Gantulga Gombodorj
 Faculty of Earth Sciences
 National University of Mongolia
 Ulaanbaatar 14201, Mongolia
 Telephone: 976-11-310091
 Cellular phone: 976-99282129; 976- 99197825
 Emails: gantulga100@yahoo.com; lis@num.edu.mn

References

- [1] Building code of Mongolia. (1998), Journal of the Construction news, 12.98 (140): 12-20
- [2] Capital city's land use master plan. Research project report 2001, Ulaanbaatar City Government, Urban Planning, Research and Design Institute: 67-89
- [3] Data of 2008 "Urban land use zoning and classification, information system" scientific project, Ulaanbaatar
- [4] Jamts.D. 1981 Land reserve of the Mongolia and issues on rational utilization. dissertation. Harikov: 80-87
- [5] Land law of Mongolia 2002, in "The laws and act of Republic of the Mongolia", Ulaanbaatar: 14-44
- [6] Land privatization law of Mongolia (2002), in "The laws and act of Republic of the Mongolia", Ulaanbaatar: 44-59

- [7] Law on land payment fees of Mongolia (1997), in “The laws and act of Republic of the Mongolia”, Ulaanbaatar: 88-92
- [8] Ministry of Land Infrastructure and Transport (2007), “Urban land use planning system in Japan” JICA: 23-24
- [9] Narantsatsralt.J. 1998 “Fundamental problems of land use management in the new social-economical condition, a case of Ulaanbaatar, dissertation: 34-68
- [10] SNIP, construction norm and standard II-60-79, (1980), Construction and Architectural Committee under Council of Ministers of the Mongolian Public Republic: 26-34
- [11] Ulaanbaatar city’s master plan: Research report I, II, III volume, 2001, Ulaanbaatar City Government, Urban Planning, Research and Design Institute
- [12] Urban planning law of Mongolia.1998, Journal of Construction news, 12.98 (140), Ulaanbaatar: 2-12

1/20/2010