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## Original Research Article

# Evaluation of the Neighborhoods in the Historical Context of Khansar Baghsahr from a Physical Sustainability Perspective (Case Study: Polegoosh Neighborhood)

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## Abstract

**Problem statement:** In the last few decades, various changes and developments have caused damage to the historical context of the neighborhoods of Khansar city. Therefore, measures should be taken to create sustainability in these neighborhoods. Sustainability in the neighborhood depends on sustainability in four economic, social, cultural, environmental, and physical sectors. To achieve sustainability in the first three parts, one must first achieve sustainability at the physical level, which is the infrastructure and foundation of the other three parts. If there is a need to create physical sustainability at the level of the Polegoosh neighborhood, we need to address the following questions: What are the indicators of physical sustainability? And according to these indicators, what is the level of physical sustainability of the Polegoosh neighborhood?

**Research objective:** By expressing the concept of neighborhood sustainability, this research seeks to extract indicators of physical sustainability and evaluate the Polegoosh neighborhood of Khansar based on these indicators.

**Research method:** This research employed the descriptive-analytical method and logical reasoning to extract the physical sustainability indicators based on library and field studies and evaluate the Polegoosh neighborhood based on those indicators. To analyze the Polegoosh neighborhood, this study used three methods of field surveys, the study of the master plan of Khansar city, and in-depth interviews with residents.

**Conclusion:** The results of the research indicate that the indicators of physical sustainability include seven indicators: building architecture, multi-functionality of public buildings, standard uses, mobility and dynamics, public spaces, proper access, and physical quality. According to the above indicators and based on the analysis and investigations, three indicators of standard uses, proper access, and physical quality are stable in the Polegoosh neighborhood; the architectural index of buildings is semi-stable and the three indicators: multi-functionality of public buildings, dynamic and public spaces are unstable.

**Keywords:** *Historical Context of Khansar, Historical Neighborhood, Polegoosh Neighborhood, Physical Sustainability, Architecture of Houses.*

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## Introduction

In recent decades, the growth and development of cities, the weakness of infrastructure, city services and amenities, and the lack of attention to identity and physical dimensions have created many problems for historical tissues. Due to the existence of valuable buildings and a significant population in these areas, it is necessary to solve these problems with an all-around approach and pay attention to their historical background. On the other hand, with the increase of concerns about human intervention in the surrounding environment in the last half-century, the issue of sustainability was raised (Sepahvand & Arefnejad, 2012, 44). According to researchers, the best scale to create sustainability in cities is the neighborhood scale (Pérez, Riera, Laprise & Rey, 2018). So that the change in the quality of life at the neighborhood level, as the smallest unit of urban division, quickly affects the whole city (Moztarzadeh & Hojjati, 2014). In recent years, the historical Context of the city of Khansar has not been immune from human aggression and has been damaged. Now the problem is how to solve the problems of the historical context of Khansar city and take steps towards the sustainability of the historical context and the whole city. The first step in achieving a sustainable city is to measure and evaluate the current situation. In this regard, taking into account that sustainability has different environmental, physical, cultural, social, etc. dimensions and also the historical context of Khansar city is very wide, in this research, indicators of physical sustainability are evaluated on a case-by-case basis in Polegoosh neighborhood of Khansar city. The purpose of this article is, first of all, to examine the physical Sustainability and extract its indicators, and in the next step, to evaluate the level of physical Sustainability of the neighborhood of Polegoosh, Khansar, according to the collected indicators. Therefore, this research seeks to answer the following two questions:

- What are the components of physical Sustainability in the historical neighborhood?

- What are the results of the evaluation of the Polegoosh neighborhood of Khansar from the point of view of these components?

## Literature Review

In connection with the issue of sustainability, various types of research have been conducted on economic, social, cultural, physical, etc., at different urban, regional, etc. scales. According to the topic of this article, related research can be categorized into three areas: physical sustainability, neighborhood sustainability, and sustainability in Khansar. In a study, Dempsey, Bramley, Power, and Brown (2011) introduced the favorable quality of the environment, suitable public territory, high-quality housing, pedestrian neighborhood, and proper access as the most important physical indicators of social sustainability. Barzegar, Divasalar, Fani, and Safar Alizadeh (2017) evaluated the functional integrity in the conditions of medium sustainability and the components of place quality and facilities of the place at the level of weak sustainability by examining the developments in the physical infrastructure structure of small cities. Momeni & Mavedat (2017) investigated the physical-social sustainability of Ahvaz city with a developmental-applicative approach, the results of which show the difference in the level of sustainability in different regions. Various studies have examined the issue of sustainability at the neighborhood level. Colantonio (2007) emphasizes paying attention to the concepts of neighborhood and neighborhood unit in the sustainability approach and by introducing the neighborhood as the most important space to achieve sustainability, considers the goal of sustainability to be the realization of a stable local community. Qadiri, Hekmatnia & Allahyari Bayatiani (2018) investigated the relationship between social capital and physical sustainability in the Zamzam neighborhood of Tehran, and the results indicate that the overall social capital index of this neighborhood is medium to high and the physical quality index is in It is located low and inappropriate. Mofidi

Shemirani & Moztaarzadeh (2014) with the aim of identifying the physical criteria of sustainability in urban areas, evaluated the physical characteristics of local areas in hot and dry climates and finally find out that the traditional local areas located in hot and dry climates from the physical aspect of the criteria They follow sustainability. Hosseinzadeh, Ahmadi & Sadraei (2019) found that the housing in this city is quantitatively lacking and qualitatively, the residents' satisfaction with the quality indicators is lower than average by planning the housing of Khansar city according to the sustainable development approach. Shahriyari, Vali Shariat Panahi & Faraji Rad (2016) in a research study the factors affecting the sustainability of rural resources of Khansar city and the role of ecotourism in the matter of sustainable development, the results of which show that the rural areas of Khansar, despite the many development capacities in the field of tourism and So far, sustainable development has not been able to gain a suitable position. According to the sources, it is concluded that the researchers have examined different areas of sustainability on different scales, but so far no research has been done on the issue of physical sustainability of the historical neighborhoods of Khansar city.

## Theoretical Foundations

### • Sustainability

By expanding the discussion of the use of renewable resources and reducing the use of non-renewable resources in the world, a concept called sustainability was formed, which can be generalized to different social, economic, environmental, and physical fields (Drakakis-Smith, 1995, 5). To achieve sustainability from the 1990s onwards, the concept of sustainable development and sustainable societies occupies a special place (Mazmanian & Kraft, 1999). Groholm Brantland in the World Commission on Development<sup>1</sup> and Environment in 1987, in a report titled Our Common Future, considers sustainable development as development that meets the needs of the present generation without compromising

the ability of future generations to meet their needs (Singh, Murty, Gupta & Dikshit, 2009). Environmental protection, a self-reliant society, reducing the use of non-renewable resources, and equality between generations are among the principles that are presented in the description of this definition to achieve sustainability (Maclaren, 1996).

Nowadays, the inability of historical contexts in cities to meet the needs of their residents has led to the expansion of cities horizontally, which leads to the evacuation of the historical context from the population and its destruction. A tissue that is environmentally stable but has lost its physical, social, and economic sustainability (Nooriyan & Abdoulahi, 2007, 54). According to Friedman, achieving sustainability at different levels requires a fundamental change in the concept of planning and providing a new definition of it (Goodland, 2003). For this purpose, the endogenous approach can be used to achieve sustainability. In this attitude of small communities, native people and the surrounding environment are the focus of study and planning, and human needs in that area rely on the facilities available there (Navabakhsh & Arjmand Siahpoosh, 2008, 209). In this regard, by using urban planning at the neighborhood scale, various processes, topics, and issues can be raised (Azizi, 2005, 37). In neighborhood-based planning, local manageable organic units are considered instead of the macro, micro, and local perspective and instead of large unmanageable metropolitan masses (Van Dick, 2004).

### • The Neighbourhood

The topic of neighborhood is one of the concepts that have been examined from different aspects and various definitions and descriptions have been expressed around it. Lexical review is the first approach that can be mentioned. In this regard, in the Dehkhoda dictionary, the neighborhood is defined as Koy, Barzan, and Part of the City (Dehkhoda, 1956), in the Oxford dictionary, it is a group of people who live in a specific place and have common

characteristics such as occupation, race, ethnicity, etc. And in Latin, it is interpreted as Neighborhood<sup>2</sup> and Township (Barton, Grant & Guise, 2003, 4).

Another approach that exists in this field is the ideas and definitions of different theorists around the concept of neighborhood, which have led to the emergence of different views related to the concept of neighborhood. In this chapter, Lynch believes that the neighborhood is a region that, according to its characteristics, the audience can understand entering and leaving it (Lynch, 2007, 322). In defining the neighborhood, Shonberg points out features such as clear boundaries, the existence of more than one institution and institution in its space, and the existence of requirements in the formation of social networks and public spaces (Galster, 2001, 2111). Halide Brand Free defines the neighborhood as an area with a working radius of 110-120 hectares with a population density of 6 people per hectare and a population of 7000 people, whose borders are defined by the railway, the main street, and green space (Abdolahi, Sarafi & Tavakalinia, 2010, 92). According to Pour Jafar, the neighborhood is a part of the physical-cultural division of the city, with a specific geographical area or space, interests, feelings, collective belonging, neighborhood relations, and common pattern of life, which together form the common identity of the people living in the neighborhood (Movaqar, Ranjbar & Pourjafar, 2015, 38). Examining different theories shows that neighborhood does not have the same concept from different perspectives. Therefore, in the following, the concept of neighborhood is presented from different perspectives in the form of Table 1.

Another aspect of defining the neighborhood is to examine it in the foundations of Iranian architecture and urban planning. In the history of Iranian architecture and urban planning, the neighborhood has been mentioned as a geographical, cultural-social, economic, and political unit and the main building block of a traditional city (Bastani Rad, 2012, 4). The urban society, influenced by the tribal system, in the process of its formation, created groups that became

known as neighborhoods. From the beginning of the construction of cities, each nation and tribe built a separate neighborhood in the city under the conditions of family, common interests, and kinship networks. The need for internal correlation on the one hand and the identification of individual social groups on the other hand justified the need for self-sufficiency in the field of necessary services and facilities. This feeling of solidarity made the neighborhoods different from each other. The prevailing social relations were effective in shaping and ossifying the neighborhood and defined the communication network and the center of the neighborhood and other physical elements such as Abanbar, Sqakhaneh, Hosseiniyeh, and the bathroom. The physical Context of the neighborhood as a spatial crystallization of the socio-economic conditions of the society had a certain coherence and homogeneity. In other words, the mentioned factors caused the physical elements of the neighborhood to appear, and a set of the mentioned elements in residential centers created an environment that reflected the mutual relations of the residents in their daily communication (Pakzad, 2010). According to these descriptions, the inevitable element of every neighborhood was the square that was located in its heart and was considered its most public and social space (Beyzaei, Shakiba & Noqsan Mohammadi, 2017, 5). Neighborhood centers can be divided into two types in terms of physical form, the first type includes a row or passage, which is where social and commercial spaces are located. The second type includes neighborhood centers in the form of a square, which is often located at the intersection of several roads or in the vicinity of the main road of the neighborhood, and some shops are placed around it to supply the residents with essential goods (Jahdi & Sashurpour, 2019, 57). On the other hand, according to the definition of the neighborhood unit in the West, this concept is a spatial-geographical unit with a specific border, planned and primarily a physical concept. The neighborhood unit is an almost inflexible and stereotyped model in terms of population, surface, separating boundaries, and public facilities (Serali & Pourdihimi, 2016, 13).

Table 1. Different views about the concept of neighborhood. Source: Authors.

Viewpoint	Neighborhood Definition
Urban Sociology	A true social unit is formed unconsciously and takes a stable form over time (Tavasoli, 1997, 13).
Social Sciences	The small residential area, the residents of this area, and the relationship between the residents and their quality of life is called a neighborhood (Gould & Kolb, 1964, 924).
Urban And Social Geography	urban neighborhoods are formed by the three components of having a geographical area of the city, forming a small community of city people, and creating dependence between social groups (Thomlinson, 1969).
Urban Planning	The combined range of uses that provide the needs of residents in the structure of the city is called a neighborhood (Cowan & Rogers, 2005, 256).
Social Psychology	An area whose residents have social and human relationships that lead to emotional dependencies (Movahed & Kurde, 2017, 8).
Urbanists	The neighborhood is one of the main organizational elements in urban planning, which has a radius of 400 meters and an area of about 50 hectares. neighborhoods are connected by a continuous and sequential network of urban transportation (Cowan & Rogers, 2005, 258-259).

Therefore, there is a substantial difference between the historical definition of the neighborhood and the neighborhood unit in the west, and it is not equivalent to assuming that these two are correct. It is important to mention that in the contemporary urban development of Iran, the neighborhood is the place of residence and employment for 700-1250 households (3500-6200 people) with a walking distance of 4- 5 minutes, including elements such as elementary school, mosque, commercial centers, neighborhood park, etc. (Habibi & Masaeli, 1999, 13).

According to the definitions and theories expressed in connection with the concept of neighborhood, neighborhood can be defined as follows. A geographical area with an approximate area of 50 hectares, an access radius of 4- 5 minutes (on foot), and a population of about 7000 people, the borders of this area can be understood mentally. The body of the neighborhood is continuous and consists of residential houses, mosques, elementary schools, etc. Residents of the neighborhood usually have a common culture, language, religion, etc., and are emotionally dependent on each other and the neighborhood, so they also mention their neighborhood in their introductions, and consider the interests of the neighborhood more than personal interests in various events.

• **Neighborhood sustainability**

Today, sustainable urban policies have understood

the importance of neighborhood units and local institutions in achieving sustainability. Sustainability at the neighborhood level is the beginning of achieving sustainability at the metropolitan scale (Fani & Al-Boghbish, 2017, 44). In this regard, Colantonio and Dixon believe that in the new sustainability approach, local communities are considered the most important space to achieve sustainability (Colantonio & Dixon, 2011). The neighborhood-based approach refers to the objective facts on a local scale, by recognizing the abilities of each area, towards the empowerment of that neighborhood. This attitude was quickly accepted by everyone, so that in the third millennium, UNESCO defines development around the subtle increase of small communities (Memar, 2011, 112). Various researchers have examined the issue of neighborhood sustainability and have presented various components to achieve a sustainable neighborhood (Table 2). The intersection of different theories related to neighborhood sustainability is summarized in four economic, social and cultural, environmental, and physical components. Therefore, a sustainable neighborhood must have all these components. But different conditions cause the prioritization of using these components to be different in different neighborhoods. In this regard, a sustainable neighborhood can be defined as follows: “A sustainable neighborhood is a neighborhood that can physically meet the needs of its residents

in the present and future, is environmentally friendly, and is formed based on the maximum use of renewable and green energy and reducing the level of environmental degradation. In terms of economic self-sufficiency and management of the neighborhood in a cooperative manner is the responsibility of the residents of the neighborhood and it has cultural bases for the use of people and increasing social interactions.”

• **Physical sustainability indicators**

The physical components of the neighborhood provide an important part of human life. So that one

of the necessary infrastructures to achieve economic, social, cultural, and environmental sustainability is the existence of a stable physical base. On the other hand, in historical contexts, body empowerment is a very important component in residents’ satisfaction. Therefore, to create stability in the neighborhoods, first of all, sustainability should be achieved physically. In this regard, different aspects of sustainability should be introduced. In the form of existing theories and research in Iran and the world, various indices for physical sustainability have been presented, which, while similar, also have

Table 2. Neighborhood sustainability from the point of view of theorists. Source: Authors.

Theorist	Theory	Aspects of sustainability			
		Economical	Social and cultural	Environmental	physical
Geis & Kutzmark	Respecting the natural and human environment, emphasizing the quality of life, supporting life cycles and physical organization are the most important characteristics of a sustainable neighborhood (Geis & Kutzmark, 1995).	-	*	*	*
Habibi	The most important characteristics of a sustainable neighborhood include strong physical, cultural, and activity identity, distinctive urban signs, the existence of spaces for social interaction, and residents’ supervision (Habibi, 2003).	-	*	-	*
Power	The criteria of a sustainable neighborhood include social justice, security, environmental sensitivity, proper service delivery, proper design and implementation, a coherent communication network, creating the potential for development, and proper management (Power, 2004).	-	*	*	*
Clarck	The components of a sustainable neighborhood include density and mobility, a mix of uses, diversity of architectural types, walking, and cycling, energy efficiency, sensitivity to water resources, ecology, public realm, and cultural responsiveness of individual character (Clarck, 2010).	*	*	*	*
Barton	The relationship between place and context and attention to global ecology, maximum preservation of natural resources, attention to the environment, stabilization of social capital, and economic sustainability are among the most important principles of neighborhood sustainability (Barton, 2000, 10).	*	*	*	*
Roseland	The basis of sustainable neighborhood, local capital includes social, natural, economic, physical, human, and cultural components (Roseland, 2005, 5).	*	*	*	*
Condon	To create a sustainable neighborhood, one must follow the seven rules of revitalizing urban trams, connecting street systems, locating schools, transportation stations, and commercial services within a five-minute walking distance, locating valuable jobs in the vicinity of homes, diversity in construction, creating parks and natural resources, and using the infrastructure. Cheap, smart, light, and green to be fully implemented (Condon, 2012).	*	-	*	*
Mitlin & Satterthwaite	The criteria for creating sustainability in the neighborhood include increasing the efficiency of transportation and housing production, localization, development of information technology, the attraction of tourists focusing on natural, cultural, and historical resources, and housing design based on the optimal use of people-oriented development (Mitlin & Satterthwaite, 1994).	*	*	*	*

different natures. Based on these theories, indicators of physical sustainability can be classified into two general categories: quantitative and qualitative indicators. Quantitative indicators include those factors that can be evaluated based on defined standards. But in the definition of quality indicators, you cannot refer to any defined standards because these standards change with the change of position. Among the most important quantitative indicators, we can mention per capita uses, the width of roads, density of buildings, construction techniques, etc. In the definition of quality indicators, it is also

possible to refer to the arrangement of spaces, signs and symbols, social interactions, readability, etc. The examination of these indicators indicates that according to the range of performance of each of these indicators and their dispersion, the above category cannot provide a suitable answer to the evaluation of neighborhoods in terms of physical sustainability. Therefore, researchers suggest a classification based on the field of performance. Based on this classification, seven main indicators are presented and other indicators are included in their subsets (Table 3).

Table 3. Physical sustainability indicators. Source: Authors.

Indicators	Components			Source
Architecture of buildings	- Suitable materials (suitable to the climate, economic, acoustic, eco-friendly, etc.) - Arrangement of spaces (their location, dimensions, and sizes)		- Construction technique (double-glazed wall, double glazed window, windbreak, and a garden pit in hot and dry climates, cat-roof in moderate and humid climates, etc.)	(Memarian, 2007), (Ahmadi, 2005, 108), (Kheirabadi, 1997,43), (Bonine, 2000, 51)
Multi-functionality of public buildings	Dual-purpose construction of public buildings to create resilience against accidents			(Cutter, et al., 2008)
Standard uses	- Sports (gyms, open fields, etc.) - Commercial (retail stores, local markets) - Religious (mosque and Hosseiniyeh)		- Cultural (library, intellectual development center, etc.) - Educational (kindergarten, preschool, and elementary school) - Treatment (clinics and health centers)	(Santos & Martins, 2007), (Morais & Camanho, 2011)
Mobility and dynamics	- Neighborhood centers	-Signs and symbols	- Residents' social interactions	(Ghobadian, 2013, 168)
Public spaces	- Green space - Square and local squares		- Parks and recreational spaces - Public open spaces (cultural activities, including open-air theaters, etc.)	(Haughton & Hunter, 2004), (Roseland, 2005)
Convenient access	- Easy access to public transportation	- Emphasis on walking, cycling	- Traffic at the neighborhood level	(Chapman, 2016, 156), (Roseland, 2000, 94)
Physical quality	- Sewer network and surface water disposal - Security - Legibility (the clarity of the boundary and the presence of symbols and signs)		- Width of roads and sidewalks - Density of buildings (density should be taken into account according to the population, climate, and weather conditions)	(Khakpoor, Mafi & Bhavanpuri, 2009, 68), (Motalebi, 2004, 101), (Movahed, Sasanpur & Ghasemi Kafrudi, 2015, 548)

## Methodology

The present research method is descriptive-analytical using logical reasoning and is based on library research and field studies. The information on the issue of sustainability, its aspects, and sustainability at the neighborhood level was gathered from books, articles, theses, and other library documents. The focus was on the physical aspect of sustainability. Attempts were made to extract its indicators from different sources. Then, based on these indicators serving as a framework for evaluating neighborhood sustainability, the master plan was scrutinized while using field methods including direct observation and in-depth interviews, the historical neighborhood of Polegoosh was investigated as the area under study. The data extracted from these investigations were analyzed and finally, the amount of benefits of the Polegoosh neighborhood from physical sustainability indicators is determined.

## Case Study: Polegoosh neighborhood of Khansar

Khansar, Khunsar, Khosar, and Khanisar are different names that have been applied to the city known as Khansar since the fifth century (Ashraf Al-Kotabi, 1988, 54). From the 5th century to the Safavid period, the city of Khansar was considered one of the villages of the district of Golpayegan, but during the Safavid period, it became one of the important scientific, cultural, and somewhat economic centers of the region with noticeable growth and progress. (Karimiyan & Sedighiyan, 2015, 86). Due to the location of the city, which is located in a narrow valley and the river passes through its center, the structure of the city has been in the form of a city garden since the past. The spatial distribution of these gardens has caused the distance between neighborhoods and architectural elements. According to the documents and travelogues from the Qajar period, the situation was similar. According to the available documents, the city of Khansar in the Qajar period consisted of ten neighborhoods with the names of Shirak or Oliya- Mahaeh, Sarcheshmeh, Cheshme Akhund, Jozechch, Malgah, Polegoosh, Labrood,

Do Rah, Chitgah and Reisan (Sedighiyan & Sabzi, 2016, 35). Polegoosh<sup>3</sup> neighborhood is one of the old neighborhoods of Khansar city, which is located in the core of this city. This neighborhood shares borders with Chitgah and DoRah neighborhoods from the north, the Reisan neighborhood from the east, the Agha Nazar neighborhood from the south, and the Manzarieh neighborhood from the west (Fig. 1). This neighborhood with an area of about 30 hectares constitutes approximately 38% of the original core of Khansar city. The population living in this neighborhood is approximately 1350 people. Polegoosh neighborhood has two important nodes including Imam Khomeini Square and Hosseinieh Ibn Al-Reza. Imam Khomeini Square is located in the northeast part and at the intersection of Imam Khomeini and Shahada streets. In the vicinity of this square, there are elements and theoretic ally important uses of Polegoosh Bazaar, Agha Asadullah Mosque, and commercial uses<sup>4</sup>. Hosseinieh Ibn al-Reza is considered the religious center of the neighborhood so much so that the vast majority of religious ceremonies and gatherings take place in this place (Fig. 2). The features of this range are as follows:

- A. The main uses of this area include commercial, residential, and wastelands (gardens)<sup>5</sup>.
- B. The most important thoroughfare of this neighborhood is Imam Khomeini Street, where most of the commercial uses are located on its edge.
- C. Approximately, most of the buildings with historical value are located in the center of the neighborhood, and the edges of the main roads are devoid of valuable historical context.
- D. Due to the mountainous nature of the Khansar region, the neighborhood has a significant slope.

## Research process

Investigation and analysis of the Polegoosh neighborhood according to the extracted physical sustainability indicators, includes two parts. In the first part, by studying documents, comprehensive and detailed plans, past studies, and field studies,

Years	1956	1979	2022
			
Source	Mapping organization	Mapping organization	Google Earth

Fig. 1. The range of Pelgosh neighborhood in different years. Source: Authors.

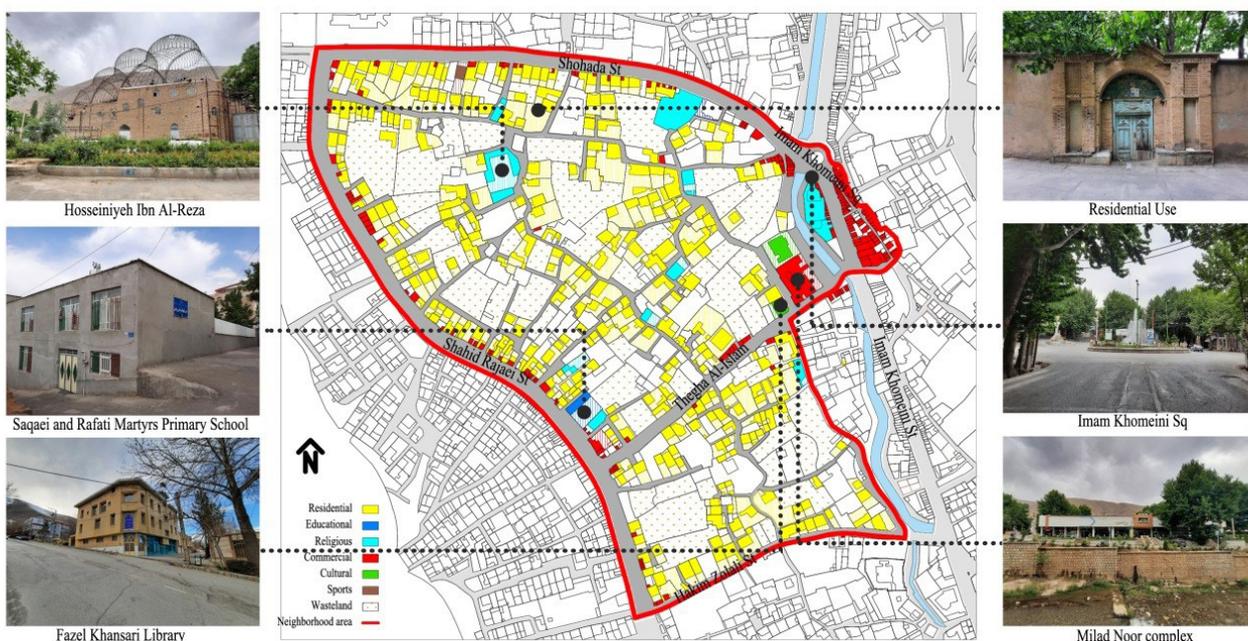


Fig. 2. The approximate area of the Polegoosh neighborhood along with uses and roads. Source: Authors.

sustainability indicators in the Polegoosh neighborhood are examined. In this section, the process of physical changes in the city will be investigated by studying aerial photographs over three different decades. Then, by examining the comprehensive plan of Khansar city and field studies, the indicators of physical sustainability in the neighborhood are examined. In the second part, to measure the findings of the first part and take advantage of the opinions of users living in the neighborhood, the in-depth interview method is used. The selection of interviewees is different in quantitative and qualitative research. In quantitative

research, the interviewees are selected based on various criteria, but in qualitative research, the selection criteria are people who have experience related to the research topic and are willing to talk about it. Another criterion is the diversity of people, which can increase the range of narrations. The number of participants and data collection is limited to the point where the researcher can gain a clear understanding of what people are saying (Laverty, 2003). To conduct interviews, researchers interviewed different people during 4 days of active presence in the neighborhood. The interviews came to the point where people’s conversations

became repetitive and 15 people participated in this interview. During the interview, people were asked to describe their neighborhood and they tried to avoid short and pre-prepared questions so that the interviewee could confidently present his/her content while holding a dynamic conversation. After that, by visiting the neighborhood again, the researchers tried to represent it in the neighborhood according to the narratives of the residents so that they could understand this neighborhood well. In this order, to express the physical characteristics and examine the indicators of physical sustainability in the Polegoosh neighborhood, a collection of narratives was created by the researchers, each of which presented characteristics of the Polegoosh neighborhood. Finally, according to the findings in the analysis section of the master plan and field observations and the interview section with the residents of the neighborhood, the evaluation of sustainability indicators in the Polegoosh neighborhood is presented.

### Findings and Analysis

As mentioned in the previous section, the analysis and investigation of sustainability indicators in the Polegoosh neighborhood include two parts of document analysis, documents, comprehensive and detailed plans, field observations, and interviews with residents. For this purpose, in the first step, by referring to the maps and pictures of the neighborhood from 1956 until now and by studying its growth stages, the physical periods of the neighborhood can be divided into three main periods. In the first period (before 1956), the Polegoosh market was considered the axis and commercial center of the city where merchants from other cities used to visit this market for business. Therefore, to facilitate trade, a Timcheh, and a caravanserai were built in a part of this market. The construction of Pahlavi Street is another important and noteworthy case in this period, which destroyed a part of the historical context and the creation of a new axis in the context of the neighborhood and

the city. With the creation of Pahlavi Street, the intersection of this street and the Pelgoosh market became an important node in the neighborhood and the city so much so that the importance of this node has not decreased until today. In the second period (1956-1979) with the extension of Pahlavi Street (Imam Khomeini) and the creation of a square, the Polegoosh market was divided into two halves, and a part of the two-way market was also destroyed. Another action in this period is the construction of Shohada Street, which destroyed another part of the historical context of the neighborhood. The construction of Shahid Rajaei Street was one of the other actions of this period. Considering that this street was outside the historical boundaries of the neighborhood, the construction of this street was one of the measures that created a new passage and did not harm the historical context of the neighborhood. Reducing the area of gardens and increasing construction in the neighborhood are other measures taken during this period. In the third period (1979 until now), the division of the Polegoosh market into two parts, the western and the eastern, caused the weakening and then the destruction of the eastern part, so that today nothing is left of it. The construction of Seaghat-al-Islam Shahidi and Hakim Zolali Streets and the demolition of buildings along these roads are among the other actions that have been carried out in this period. Perhaps the most important action in this period, which caused a further decrease in the stability of the neighborhood, especially from a physical point of view, is the destruction of gardens and historical context and the creation of heterogeneous architecture with the historical context. Also, not paying attention to the needs of the residents of the neighborhood caused the migration and decrease of the population of the neighborhood, and as a result, the level of its sustainability decreased. Among the other actions of this period is the strengthening of Imam Khomeini Street from various aspects (commercial, administrative, residential, etc.) and seeking to weaken the Polegoosh market as a commercial

center and the historical context of the neighborhood (Table 4). In the next step, indicators of physical sustainability in the Polegoosh neighborhood will be investigated based on field surveys and the study of the master plan of Khansar city. The results of this study are presented in Table 5. In the final step, in-depth interviews have been conducted with people living in the neighborhood

to clarify the analysis. In this regard, the sentences, concepts, and words expressed by the residents of the neighborhood in their interviews related to physical sustainability indicators are colored and specified to extract common concepts. Common statements are extracted from the text of the interviews and presented in the form of Table 6. It should be noted that all the statements of the interviewees are quoted

Table 4. Physical changes of Polegoosh neighborhood in different periods. Source: Authors.

Period	Map	Physical characteristics	source
before 1956		<ul style="list-style-type: none"> <li>- Polegoosh market as the commercial axis of the neighborhood and the city.</li> <li>- Pahlavi Street; The most important intersection of the neighborhood and the city.</li> <li>- The neighborhood of the intersection of Pahlavi St. Polegoosh Bazaar, and Do Rah Bazaar as the main node of the neighborhood.</li> </ul>	Mapping organization
1956-1979		<ul style="list-style-type: none"> <li>- Strengthening Imam Khomeini Street as the main thoroughfare</li> <li>- Decreasing the value of the Polegoosh market axis by demolishing a part of it and creating a square.</li> <li>- Creation of new roads on the north and west side of the neighborhood</li> </ul>	Mapping organization
1979 until now		<ul style="list-style-type: none"> <li>- Demolition of the western part of the Polegoosh market</li> <li>- Creation of Seghat-al-Islam Shahidi and Hakim Zolali streets</li> <li>- Creating a new node (Hosseinieh Ibn al-Reza)</li> <li>- Demolition of some historically valuable houses and gardens</li> </ul>	Google Earth

Table 5. Examining the indicators of physical sustainability of Polegoosh neighborhood according to the comprehensive plan of Khansar city and field surveys. Source: Authors.

Indicators		Components							
Architecture of buildings	Material	Historical context	Mud and clay	*	*	*	*	-	
			Brick	*	*	-	*	*	
			Wood	*	*	-	*	-	
		Modern context	Rock	*	-	-	-	*	
			Cement	*	*	-	-	*	
			Metal	*	-	-	-	*	
	Arrangement of spaces	Historical context	Most of the houses in the historical context are designed and built on two floors, so that on the ground floor there are service spaces such as a barn, storage, and kitchen, and on the first floor there are rooms such as Shahneshtin, and porch.						
		Modern context	Single unit	In single-unit buildings, all spaces are arranged on one floor.					
		Duplex	The arrangement of spaces in duplex houses consists of two parts: spaces such as parking, Livingroom, bathroom, etc. are located on the ground floor, and spaces such as bedrooms, bathrooms, and terraces are located on the first floor.						
	Construction technique	Historical context	Apartment	In the apartments, the basement and ground floors are dedicated to parking and commercial space, and the required spaces for each unit are organized on the floors.					
Historical context			Using thick walls that create thermal and acoustic insulation.						
Modern context			Using double-glazed windows and walls that provide thermal and acoustic insulation.						
Multi-functionality of public buildings		According to the master plan of Khansar city, the Polegoosh neighborhood not only lacks dual-purpose uses but also no crisis management shelter is foreseen in it.							
Standard uses			Standard per capita (square meter per person)	Required area (square meters)		Current status (square meter)			
	Sports	1	1350	438					
	Religious	0/2	270	8640					
	Cultural	0/2	270	1837					
	Educational	1/5	2025	1196					
	Treatment	0/5	675	0					
	Commercial	0/5	105	8437					
Mobility and dynamics		Field surveys indicate that the Polegoosh neighborhood does not have any neighborhood center in the classical sense, but it has an important node and point that provides gathering and social interactions. Imam Khomeini Square is a city landmark that is formed on the main thoroughfare of the city, as well as the commercial lines around it, causing people to gather. The second most important point of the neighborhood, which is also considered a religious sign and symbol of the neighborhood, is Hosseiniyeh Ibn Al-Reza, which provides reasons for the gathering of people during religious ceremonies.							
Public spaces		Polegoosh neighborhood lacks public green spaces, parks and recreational spaces, local squares, and public open spaces.							
Convenient access	Easy access to public Transportation	Type	Service location						
		Mini-bus routes	Imam Khomeini street						
	Taxi routes	Imam Khomeini, Shohada, and Shahid Rajaei streets							
	Emphasis on walking, cycling	Due to the location of Khansar city on the mountainside, the roads of the Polegoosh neighborhood have a relatively high slope, for this reason, walking and cycling in the neighborhood are relatively low.							
Traffic in the neighborhood	Field investigations show that the traffic in the neighborhood is light and smooth.								

Rest of table 5.

Indicators		Components
Physical quality	The width of the passages	Main roads The width of Hakim Zolali and Shohada streets needs to be widened in some parts. The width of other passages is suitable.
		Sub-passages Some of the secondary roads have a small width due to their location in the historical context, which makes it difficult for vehicles to pass through.
		Sidewalks Hakim Zolali Street has no sidewalk. The sidewalk is suitable for other roads.
	Sewer network and surface water disposal The urban sewage system of Khansar is running, but it cannot be operated at the moment, and the sewage system of the Polegoosh neighborhood is in the form of absorption wells. The surface water disposal network of the neighborhood also includes open streams that connect to the middle river of the city.	
	Readability The border of the Polegoosh neighborhood is determined by roads, which are relatively recognizable and understandable. Among the symbols and signs that recognized the power of the neighborhood, we can mention Hosseinieh Ibn al-Reza.	
Density of buildings	<ul style="list-style-type: none"> <li>- This neighborhood has the highest gross density with a gross population density of 138.1 people per hectare.</li> <li>- The density of people in housing in this neighborhood is equal to 3.9, which is higher compared to other neighborhoods.</li> <li>- Average floors of residential buildings in the Polegoosh neighborhood are 2.2 floors.</li> <li>- Building density in the Polegoosh neighborhood is 129%, which has the highest density among Khansar neighborhoods.</li> </ul>	

in colloquial literature and exactly their words so that changes in the sentences do not create a gap in the validity of the statements.

### Discussion

According to the quantitative information obtained from the study plans, as well as the field information collected from the interviews, at this stage, the indicators of physical sustainability in the Polegoosh neighborhood are analyzed and investigated. The analysis of the neighborhood is done according to its current conditions, and the sustainability and instability of each indicator cannot be related to the neighborhood’s past. Maybe some indicators are unstable in the present, while they were stable in the past and vice versa. This can have various reasons, such as the changing needs of residents, immigration, the emergence of new technologies, etc.

#### • Architecture of buildings

According to the comprehensive plan of Khansar city, almost half of the context of the Polegoosh neighborhood consists of old and historical buildings. Therefore, in the investigation of the architectural index of buildings, both historical and newly constructed contexts should be analyzed and investigated. The materials used in old buildings

are relatively stable according to the sustainability components, and the materials used in new buildings are semi-stable. The type of arrangement of spaces in old and new buildings is different according to the daily needs of the residents, for this reason, the residents in the last two decades have changed the historical context and destroyed and renovated the buildings, while the architecture of the new buildings does not match the Historical architecture does not have a neighborhood and this leads to instability. In historical buildings, the relationship between each building and other buildings and components of the neighborhood was a two-way and reciprocal relationship, so that all buildings complemented each other and ultimately led to a stable neighborhood. Meanwhile, the new buildings are completely separate from each other and there is no relationship between them, and this weakens the performance of the neighborhood and its sustainability. In relation to the use of construction techniques in neighborhood buildings, the historical context, according to the science and technology available at the time of construction, has used various techniques to improve the architectural condition, but in newly constructed buildings, except for a few limited cases, new techniques and methods are used. It has not been used, and this is even though today various

Table 6. Statements of people’s indicators and their codified meanings according to physical sustainability indicators. Source: Authors.

Indicator statements	Codified meanings	Physical sustainability indicators
Widen the alleys.	To improve the conditions of the neighborhood, the roads should be widened.	Physical quality
The school is in Manzarieh, it does not have these places.	Usually, students go to nearby neighborhoods to study.	Standard uses
Before there were seven or eight people in each house, now there are one or two people in each house	The architecture of the buildings has changed and is formed according to the population living in each house.	Architecture of buildings
We have never had a robbery in the neighborhood.	The security level of the neighborhood is good.	Physical quality
The neighborhood is good, the only problem is these alleys where we have problems in winter.	Due to the slope in the neighborhood and the narrow width of the roads, it becomes difficult to travel in the neighborhood in winter with snowfall.	Physical quality
During the ten days of Muharram, the population of the neighborhood increases.	The multitude of religious places and hosseiniyehs is not only for daily use but also to hold religious ceremonies in the Muharram decade.	Standard uses
The neighborhood does not have a clinic, but the clinic is nearby.	There is no treatment space within the neighborhood.	Standard uses
No child wants to go to school.	The aging population of the neighborhood has caused a decrease in education per capita in this neighborhood.	Standard uses
The problem is that the Aineh neighborhood does not have sewerage.	The sewage system of the neighborhood is in the form of absorption wells.	Physical quality
Because it is uphill here, they mostly use cars and motorbikes.	Due to the high slope of the roads, there is very little walking and cycling.	Convenient access
People have to live in 70-80 meter apartments.	New buildings are not architecturally suitable, but people use them for various reasons.	Architecture of buildings
Cultural spaces are good for the population.	Per capita cultural spaces are appropriate.	Standard uses
When the mosque opens at night, they do not pray more than three or four times.	Religious spaces are mostly used in special ceremonies.	Standard uses
There are no other shops in the neighborhood and they are often moved to the side of the street.	Due to the decrease in the population of the neighborhood, the businessmen have moved their shops to the side of the street, which has an urban function, to make a living.	Standard uses
My mother is not willing to go to Polegoosh, I ask why? He says because I have no neighbors.	The decrease in population and the subsequent decrease in social interaction in the neighborhood is one of the reasons for the decline of the neighborhood.	Mobility and dynamics
Humans are social beings, but when they enter the neighborhood and see that there is no news, they leave	The level of social interactions in the neighborhood is low.	Mobility and dynamics
All neighborhood gardens are private.	There is no public green space, park, and recreational space in the neighborhood.	Public spaces

technologies in the construction industry help to improve the architecture of the building. Therefore, it is possible to evaluate the construction technique in old buildings as stable and new buildings as unstable (Fig. 3).

• **Multi-functionality of public buildings**

According to the comprehensive plan of Khansar and

field surveys, the Polegoosh neighborhood does not have any dual-purpose use and crisis management shed. Considering the history of various disasters such as floods in Khansar city, one of the most important of which is the flood of 1366 which caused a lot of damage, it is necessary to have dual-purpose buildings in the neighborhood (Fig. 4). The

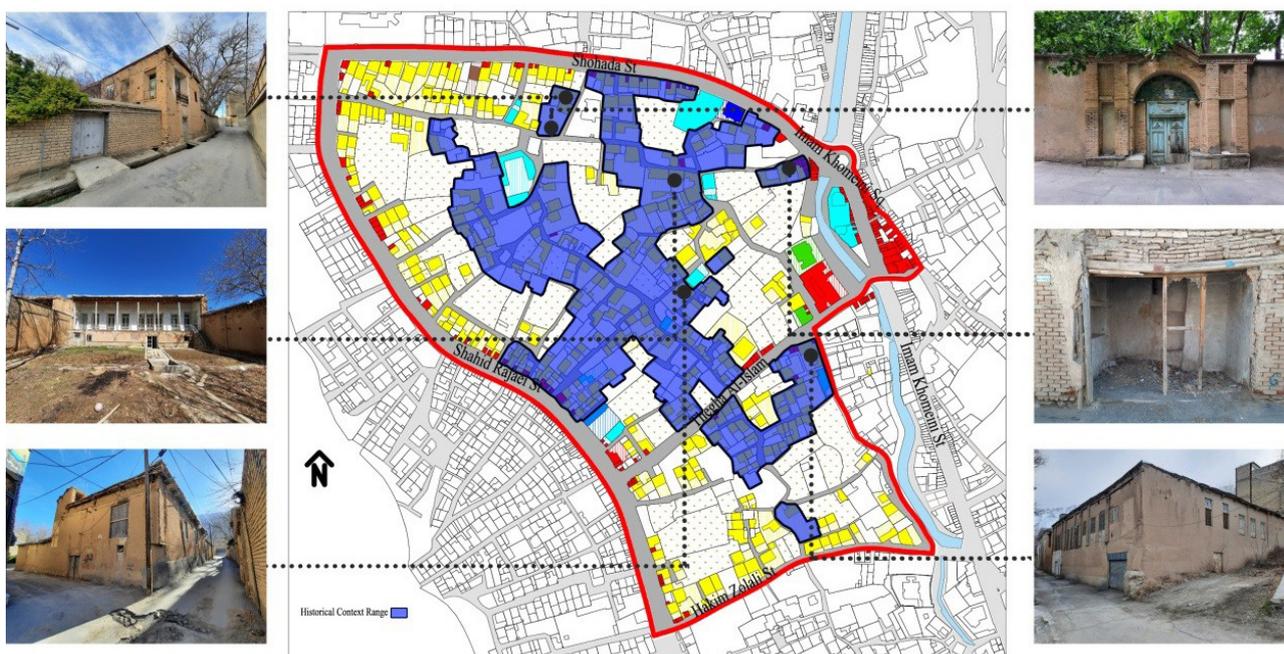


Fig. 3. The scope of the historical context of the Polegoosh neighborhood. Source: Khansar Master Plan, Pasargad Consulting Engineers, 2009. and pictures of the historical context. Source: Authors.



Fig. 4. Damage caused by the flood of 1987 in Khansar. Source: <https://www.facebook.com/M.hajizaki>.

best uses for allocating excess use are public uses such as commercial and cultural complexes, sports halls, mosques, and hosseiniyehs, etc. Therefore, the Polegoosh neighborhood is in an unstable condition in terms of the presence of multi-purpose buildings.

• **Standard uses**

Forecasting per capita is necessary for each person, including the conditions that contribute to physical sustainability. Necessary uses include cultural, sports, religious, healthcare, educational, and commercial spaces. The religious spaces include 10 mosques and Hosseinieh, which have a total

area of about 8640 square meters. According to the per capita standard of religious use of allocating 0.2 square meters per person, the existing per capita religious space is higher than the standard per capita predicted in the master plan (Fig. 5).

Cultural uses in this neighborhood include the two spaces of the Children’s Intellectual Education Center and the Fazel Library, which have a total area of 1837 square meters. The standard per capita of cultural space is 0.2 square meters per person, according to which the existing per capita is higher than the standard per capita. The only sports facility

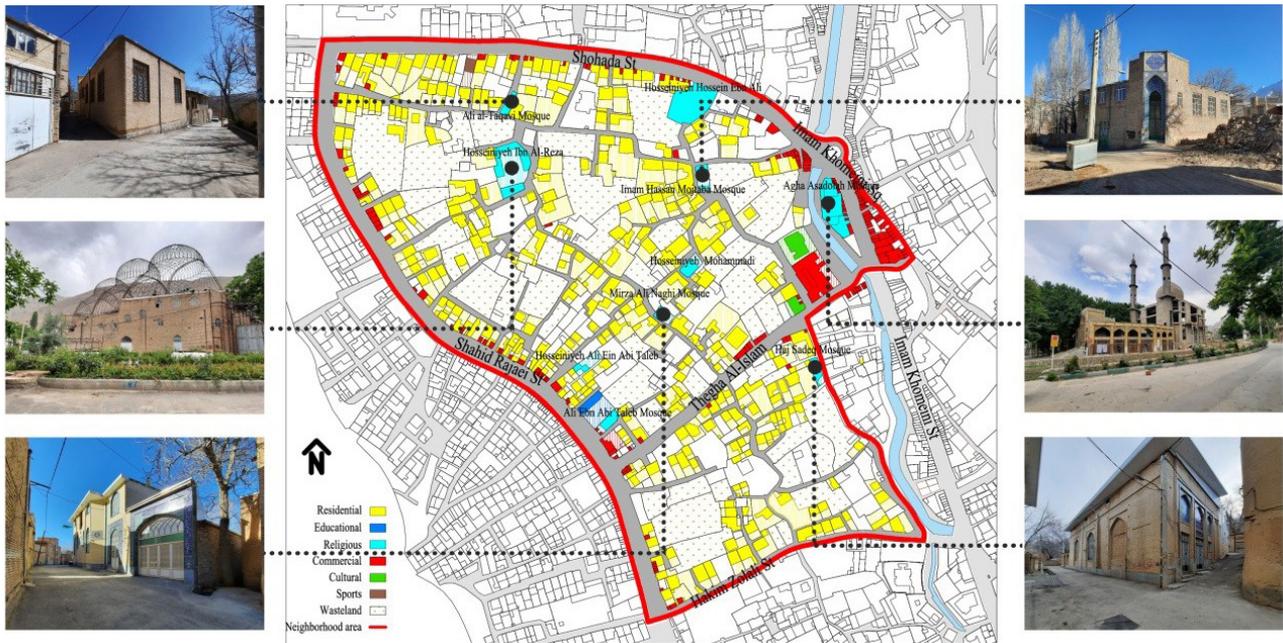


Fig. 5. Religious use of Pelgoosh neighborhood. Source: Authors.

in the area is the sports club located on Shohada Street, which has an area of 438 square meters. The standard per capita for sports use is one square meter per person, based on which the existing per capita is lower than the standard per capita. According to the per capita standard, 0.5 square meters of treatment space should be built for each person, which is currently not being met. The existing educational use includes Shahidan Shafaei and Rafati elementary schools with an area of 1196 square meters, which are located in the vicinity of Shahid Rajaei Street. According to the population of the area, there is 0.88 square meters per person, which is less than the standard per capita of 1.5 square meters per person. But due to the low population of students, the conditions of educational use are currently stable. The existing commercial use with an approximate area of 8437 meters has created a per capita of 6.24 square meters per person, while the standard per capita projected in the master plan is 0.3 square meters per person. Therefore, the existing per capita is higher than the standard per capita. According to the investigations, it was found that the conditions of religious, educational, cultural, commercial, and semi-stable sports uses are stable and medical uses are unstable (Fig 6).

• **Mobility and dynamism**

Mobility and dynamism are formed based on the interactions of neighborhood residents with each other. The more neighborhood residents interact with each other, the more dynamic the neighborhood will be. Social interactions are at a low level in the Polegoosh Khansar neighborhood, based on field studies and interviews conducted with neighborhood residents. So that people don't have much desire to live in this neighborhood, and they consider the lack of social interactions as the main reason for this. In general, in residential neighborhoods, social interactions are carried out daily and periodically (seasonally). In the daily interactions of neighborhood residents, by attending squares, parks, cultural centers, open public spaces, neighborhood centers, etc., they eliminate the need to interact with others. The few interactions that have taken place in this neighborhood are also related to religious ceremonies that are held on several days of the year. Therefore, the main reasons for the lack of social interactions and the subsequent decrease in mobility and dynamism in the Polegoosh neighborhood are the lack of hardware facilities. Field surveys and interviews with different people also confirm the low level of social interactions and mobility in this neighborhood,

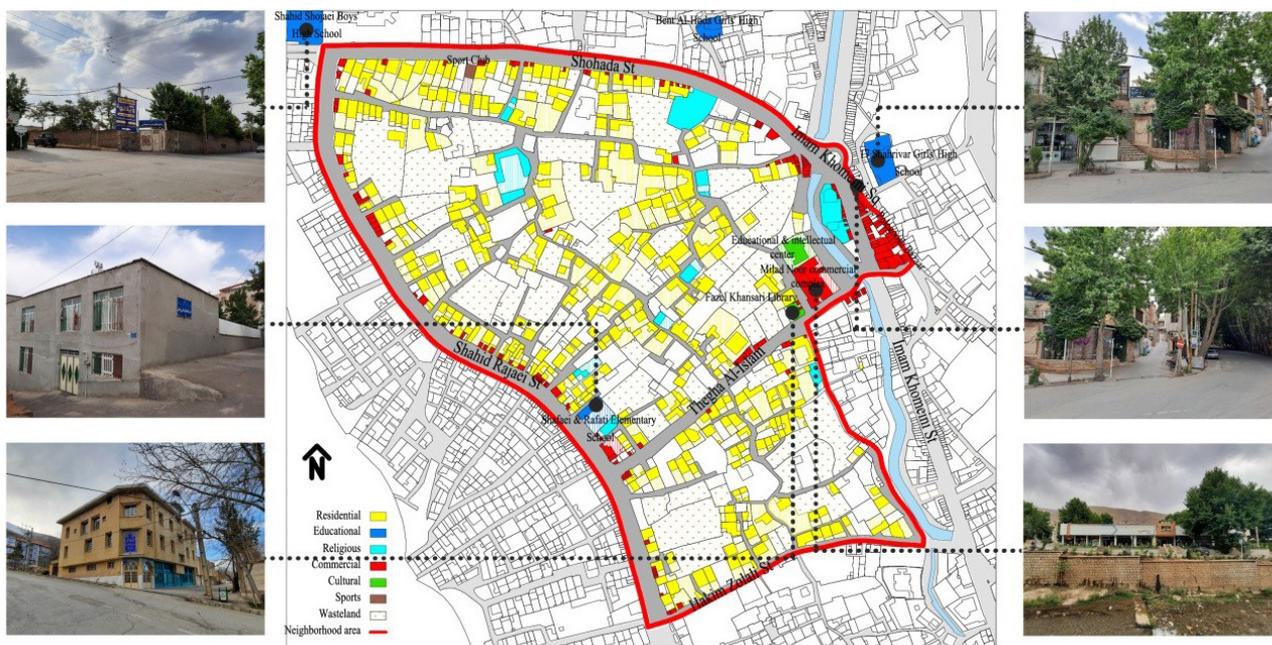


Fig. 6. Religious use of Polegoosh neighborhood. Source: Authors.

which has caused the migration of some residents to other neighborhoods. According to the interviewees, the relationship between the people living in the neighborhood was good in the past, and almost all the residents had various interactions with each other, so by creating the smallest problem for each of the people, the other people living in the neighborhood became aware of it and took steps to solve it. But over time and with the change in lifestyle and architectural style of the neighborhood, these interactions decreased day by day and are currently at their lowest level. Therefore, the conditions of mobility and the dynamism index in the Polegoosh neighborhood are unstable.

• **Public spaces**

The public spaces of neighborhoods include green spaces and parks and recreational places, local squares, and public open spaces. There are many gardens in Khansar city and more than half of the city is made up of gardens. Polegoosh neighborhood is no exception to this rule and has many gardens, but these gardens are privately owned and not public and cannot be used for public use. Surveys show that the Polegoosh neighborhood of Khansar city lacks any public parks and green spaces, while according to the comprehensive plan of Khansar city, the per capita standard of parks

and green spaces is 2 square meters per person, which is aligned with the population living in the Polegoosh neighborhood. This neighborhood needs at least 2700 meters of parking and public green space. On the other hand, field investigations indicate that this neighborhood lacks any local squares and public open spaces. Therefore, this neighborhood is considered unstable in terms of public spaces.

• **Appropriate access**

Since Khansar city is located at the foot of the mountain and the roads have a steep slope, the use of bicycles and walking in the neighborhoods rarely happens, and the residents prefer to use private cars, public transportation, and motorcycles. Public transportation, including taxis, is moving around the main streets of the neighborhood, and each person can access public transportation with a maximum of 5 to 10 minutes of walking. On the other hand, traffic in the neighborhood is in good and normal conditions. Therefore, in general, it can be said that proper access is stable in the Polegoosh neighborhood (Fig 7).

• **Physical quality**

The streets of the Polegoosh neighborhood are divided into two main and secondary streets. The main roads are divided into three categories: first, second, and



Fig. 7. Taxi lanes (right) and minibus lanes (left) in Polegoosh neighborhood. Source: Khansar Master Plan, Pasargad Consulting Engineers, 2009.

third-grade roads. According to the comprehensive plan and field surveys, the first and second-grade roads of the Polegoosh neighborhood have suitable widths and also have suitable sidewalks, but the third-grade roads of Hakim Zolali Street need to be widened and paved. Unlike the main roads, the secondary roads are not wide enough. Field studies and interviews with different people indicate that most of the residents are not satisfied with the small width of the side roads, especially in the winter season, and they consider this issue as one of the important reasons for the lack of development of the neighborhood, so they believe that by increasing the width of the roads and opening them up, prosperity can be achieved again. returned to the neighborhood. Therefore, it can be stated that the main roads of the neighborhood are stable and the secondary roads are unstable (Fig. 8).

The urban sewage network of the Polegoosh neighborhood is in the form of absorption wells. Of course, the water and sewage company is implementing the urban sewage network, which will be put into operation in the not-too-distant future. The surface water in the Polegoosh neighborhood is affected by the topography and moves in the direction of the slope, and all streams and road water, which are often seasonal, finally flow into the Khansar River, which flows from south to north in the middle of the city. The surface water collection and disposal system of this neighborhood

consists of a series of small and large streams, generally open around and along the road network, that collect surface water and deliver it to the middle river of the city. Therefore, the sewage network and surface water disposal in Khansar can be evaluated as stable. According to the residents of the neighborhood, security in the neighborhood is at a high level, so you can move around the neighborhood safely at different hours of the day and night. Field investigations indicate that the vast majority of the buildings in the historical context of the neighborhood have two floors. On the other hand, the number of floors in some newly constructed buildings is more than two. According to the master plan, the average number of floors in the Polegoosh neighborhood is 2.2. The increase in the number of floors in the newly built buildings causes the skyline of the neighborhood to collapse and isolate its historical context. Therefore, in the design and construction of new buildings, special attention should be paid to the historical context and the skyline. The building density in the Polegoosh neighborhood is 129%, which is the highest density compared to other neighborhoods. In general, the building density in the Polegoosh neighborhood is in a semi-stable condition (Fig. 9).

## Conclusion

In general, neighborhood sustainability has four dimensions: economic, social and cultural,

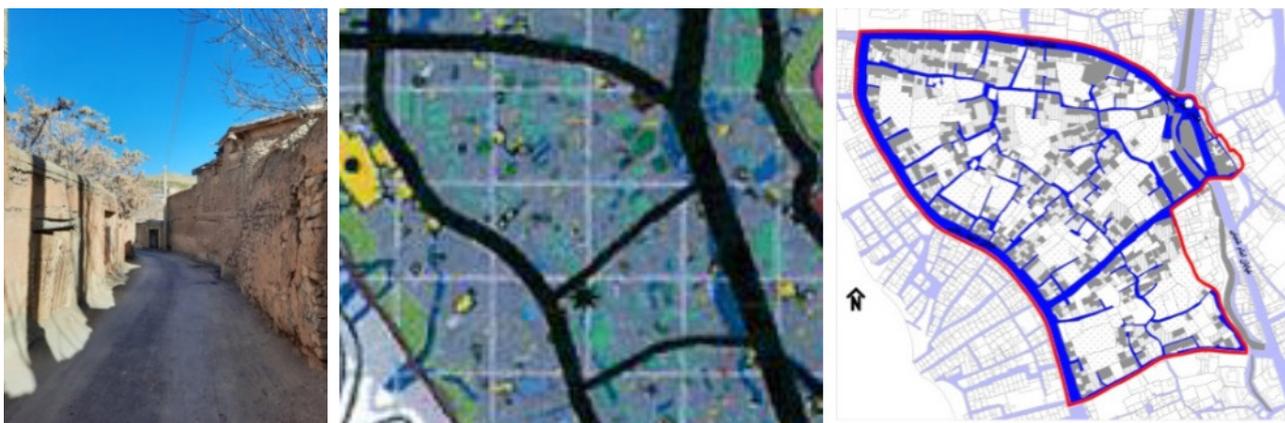


Fig. 8. Spatial organization of main and secondary roads in Polegoosh neighborhood (right), the hierarchy of main roads in Polegoosh neighborhood (middle). Source: Khansar Master Plan, Pasargad Consulting Engineers, 2009, the narrow width of secondary roads (left) (Authors).

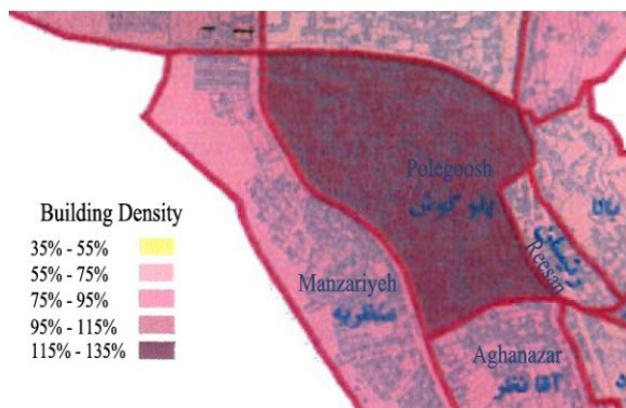


Fig. 9. Building density in Polegoosh neighborhood. Source: Khansar Master Plan, Pasargad Consulting Engineers, 2009.

environmental, and physical. One of the important infrastructures to achieve economic, social, cultural, and environmental sustainability is the existence of a stable foundation and body. To create physical sustainability in the neighborhood, sustainability should be achieved in seven indicators: building architecture, multi-functionality of public buildings, standard uses, mobility and dynamics, public spaces, proper access, and physical quality. The city of Khansar with its long history is one of the cities that has an untouched historical context in its heart. The combination of buildings and gardens has created attractive architecture and a city garden. Polegoosh neighborhood is one of the old neighborhoods of the city, which is located in the core of the city. Various changes and developments in the last few decades have caused serious damage to the historical context of this neighborhood and threatened the life of its

valuable buildings. Therefore, in this research, the body of this neighborhood was evaluated according to the indicators of physical sustainability. The results of the research indicate that the body of the Polegoosh neighborhood has instability in some indicators. Based on the analysis and investigations carried out in the Polegoosh neighborhood, three indicators of standard uses, proper access, and stable physical quality; The architectural index of buildings is semi-stable and the three indicators of multi-functionality of public buildings, mobility and dynamism, and public spaces are unstable (Fig. 10). It is clear that these results cannot be related to the neighborhood's past, because some indicators such as mobility and dynamism, the architecture of buildings, etc. were stable in the past, and over time and for various reasons, including the decrease of the neighborhood's population, the change of construction style And... they have become unstable and semi-stable.

### Endnotes

1. WCED
2. Neighborhood means a residential neighborhood with a distinct identity and Township is an area that, in addition to being large in size, has a variety of job opportunities.
3. Regarding the naming of this neighborhood, it is said that in the olden days a girl sold her earring and built a bridge with it.
4. In addition to the important role of this square at the neighborhood level, this square also plays an irreplaceable role at the city level, so that it can be considered the heart of the city and the most important point of the city.
5. The barren lands and gardens within the neighborhood are privately owned, but due to various problems, including the problems of the heirs, these gardens have been abandoned, as if they are a part of the urban space.



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