

# Development planning approach for children with orthopaedic disabilities; example of Eymir Lake (Ankara)

## Ortopedik engelli çocukların iyileştirilmelerine yönelik planlama yaklaşımı: ODTÜ Eymir Gölü örneği (Ankara)

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### ABSTRACT

The aim of this study is to provide the re-planning of Lake Eymir, located in the city of Ankara with the participation of shareholders and children with orthopedic disabilities as the main user group. Post-occupancy evaluation was implemented in the research and techniques, and surveys, observations, and interviews with experts were used. Behavioral maps showing the activities of the subjects were created using geographical information systems. People's rude manners, limited means of transport, and economic problems prevent children with disabilities from visiting open green areas. It is suggested that Lake Eymir and its surroundings should be convenient for developing activities for children with disabilities. A convenient and accessible passage should be planned to achieve this.

**Keywords:** Behavioral mapping, children with orthopedic disabilities, Eymir Lake planning, landscape, post-occupancy evaluation

### ÖZ

Çalışmanın amacı, Ankara kenti yakın çevresinde bulunan Eymir Gölü'nün doğal çevre değerlerinin paydaşların katılımı ve ortopedik engelli çocukların kullanıcı kesimler olarak gözlemlenmesi doğrultusunda yeniden planlanmasını sağlamaktır. Araştırmada kullanım Sürecinde Değerlendirme Metodu (POE) uygulanmıştır. Bu kapsamda anket oluşturma, gözlem yapma ve ilgili uzmanlarla görüşme teknikleri kullanılmıştır. Gözlem sonucunda coğrafi bilgi sistemi kullanılarak deneklerin yapmış oldukları etkinliklerin gösterildiği davranış haritaları oluşturulmuştur. Başta çevredeki insanların rahatsız edici tavırları, ulaşım olanağı kısıtlılığı ve mevcut ekonomik sorunlar, bu engelli çocukların açık yeşil alanlara gitmesini engellemektedir. Eymir gölü ve çevresinin, ortopedik engelli çocuklara yönelik geliştirilen etkinliklere uygun olması ve bu kapsamda erişilebilirliğin sağlandığı uygun geçiş yollarının yeniden düzenlenmesi önerilmektedir.

**Anahtar Kelimeler:** Davranış haritalaması, Eymir Gölü planlaması, kullanım sonrası değerlendirme, ortopedik engelli çocuklar, peyzaj

### INTRODUCTION

Today, many scientists have been conducting studies the effects of natural and organized environment on human health and healing (Erickson, 2012; Harris, 1996; Marcus & Barnes, 1999; Söderback et al., 2004; Stigsdotter & Grahn, 2003; Ulrich, 1999; Whitehouse et al., 2001). One point that the present study takes into consideration is the planning of green networks of inner and outer urban to create healing environments, as accessible and suitable places, for disabled persons.

To achieve this, it is necessary to have a participative management approach in which the related experts, state and non-state organizations, and also managers of governmental institutions play a role. When the magnitude of the orthopedic disabilities of population is compared to the general population in Turkey, (Barış & Uslu, 2009; Maralcan et al., 2003; Sakız & Woods, 2015; Yalçın, 2012; Yorulmaz, 2010), it is not possible to mention an area planning that contains wide fields, has rich

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recreational diversity and brings the healing features of the natural environment values to the forefront, except for the limited-sized and numbered replannings made for the treatment of the disability (Akin, 2006). The fact that there have been partial improvements for the disability in some areas of the existing parks is not sufficient to say that these kinds of park areas have the healing quality for the disability. In this case, a process that constitutes all the green web components within the city needs to be initiated with a participatory approach (Şafak & Pouya, 2016). Participatory approach can be defined as joint actions of people, landscape architects and, city planners with the objective of formulating development plans and selecting the best available alternatives for their implementation (URL 1).

Within the immediate environment and hinterland of the city, city forests, wetlands, wide city parks providing wide mobility can be given as examples of these green web components when considering the natural environment values (vegetation, water resources, birds and other living creatures) as well as the healing and treating features for the disability. It has been reported that 12/29 percent of the population in Turkey has mental or physical disabilities and out of this percentag, 9 million people are at the age of 1-12 who have special needs. According to the Ministry of Education, there are 1 million and 100 thousand disabled children aged between 4 and 18 and among them 45 thousand ones have vision impairment, 130 thousand ones have hearing impairment, 500 thousand of them have mental and emotional disabilities, and 300 thousand of them suffer from physical disabilities. Enrollment rate in Disabled Children School is around 2% (Pouya et al., 2018; Şafak & Pouya, 2016).

In this study, the Lake Eymir located in the immediate environment of Ankara city is replanned in accordance with the participation of shareholders and observation of the children with orthopedic disabilities as user groups. In the study, students with orthopedic disabilities aged 8-12 in the Dogan Chaglar Special Education School (DCSES) in Ankara were chosen as subjects.

The reason for choosing this age group is that it is the age group in which awareness about environment and nature starts to shape for the first time if we look at the literature on the pertinent subject. In addition, it constitutes the periods of time when

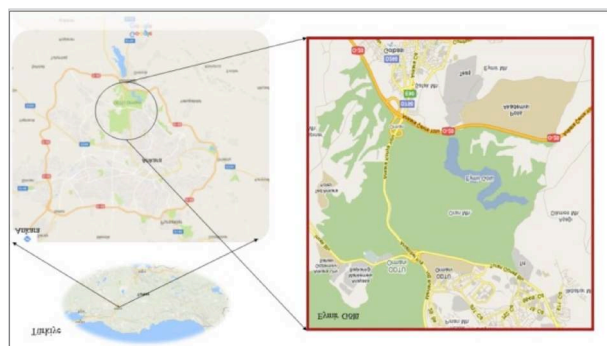


Figure 1. The location of Eymir Lake and its surroundings in Ankara

the interest towards environment intensifies and physical and mental mobility reaches its highest level. Also, it is highly important for the children to be in relation to natural areas in terms of their development (Ünver, 2014).

The aims of this study are:

- To systematically evaluate the usage process of the Lake Eymir-Mogan which is planned for visitors' recreational (one-day) usage, located in the immediate environment of Ankara city and whose implementation is conducted in terms of the children with orthopedic disabilities.
- To determine the level of meeting the need and requirement of the user with orthopedic disabilities in this field, to identify the place performance value.
- To determine what kind of activities this area is designed and for what kind of activities the children with orthopedic disabilities use this area.
- To determine whether the area meets the needs and demands of the children users with orthopedic disabilities or not.

## MATERIAL AND METHODS

### Study Area

As to the study area, the Lake Eymir recreation area and its surroundings is located in the Ankara city macro form and is one of the limited open green areas (Figure 1) (Beklioğlu, 2000; Eyyubi, 2004). The Lake Eymir recreational area, which is located in Ankara city macro form and one of the limited open green areas, is among the privileged areas for increasing urban life quality and creating an image for the city as well as its ecological contributions with its immediate environment to the city ecosystem (Figure 2) (Bilgin, 2009) and for this reason this area has been chosen as the research area. Middle East Technical University is responsible for the management of the area (Gürer, 2014; İnce, 2002; Köç, 2006; Sarıremir, 2009). The reason for choosing this area as a research area is

Also, the area of the Dogan Chaglar Special Education School was used as a material together with students with orthopedic disabilities used as subjects. The reasons for preferring this school are:

- It is a unique Special Education school that has the most ancient history located in Ankara (Elementary, Secondary and High School) (TR. Altındağ District Governor, 2013).
- In every step of the study; the construction of this school (administrative, educational, social, and physical) has enabled to conduct observation studies with children aged 8-12, surveys with the families and teachers, and interviews.

The method used in the study is Post Occupancy Evaluation Method (POE). This method, which constitutes many techniques, is the main method of the study (Groat & Wang, 2002; Preiser, 2002; Presier et al. 1988; Sherman et al. 2005; Whitehouse et al. 2001). Systematical observation, survey, interview technique methods have been used among the techniques, according to the aims of the study. The stages of POE in the Study

Method: Stage I: POE Planning Stage, Stage II: POE Management Stage, Stage III: POE Application Stage (Figure 3).

### Stage I: POE Planning Phase

#### Making Presentation in DCSES

Before starting the study, a presentation consisting of detailed information about the main goal of the study, its scope, and implementation studies was made to the school administrators, teachers, families and, students. The presentation consisted of information about the positive effects of the natural areas on the orthopedically disabled children and the activities that children can do in the Eymir area.

#### Identification of the subject group

The student group aged 8-12 from Ankara DCSES was selected as the subject in the study. There were also children who had mental and speech disorders among them. It was deemed suit-

able to choose ones with orthopedic disabilities having different characteristics among them and to use them as subjects in order to observe the children's behaviors and reactions on a large scale. The number of the sample observed in this study was four. In this type of observation, given the study purposes, it was not possible to have the natural observation and therefore, the samples were taken to the environment. This, in turn, had a set of limitations and difficulties (such as hard transportation, parent accompany etc.). So this issues made us focus on only four cases.

#### Getting permissions needed for the study

After deciding to conduct surveys, interviews and observation practices about the study, the researchers received permission in order to work in Turkey Governorship of Ankara, Directorate of National Education, DCSES and to enter into the Middle East Technical University Presidency, General Secretariat, area of Lake Eymir and its surroundings on 20-25 May.



Figure 2. Eymir Lake Area

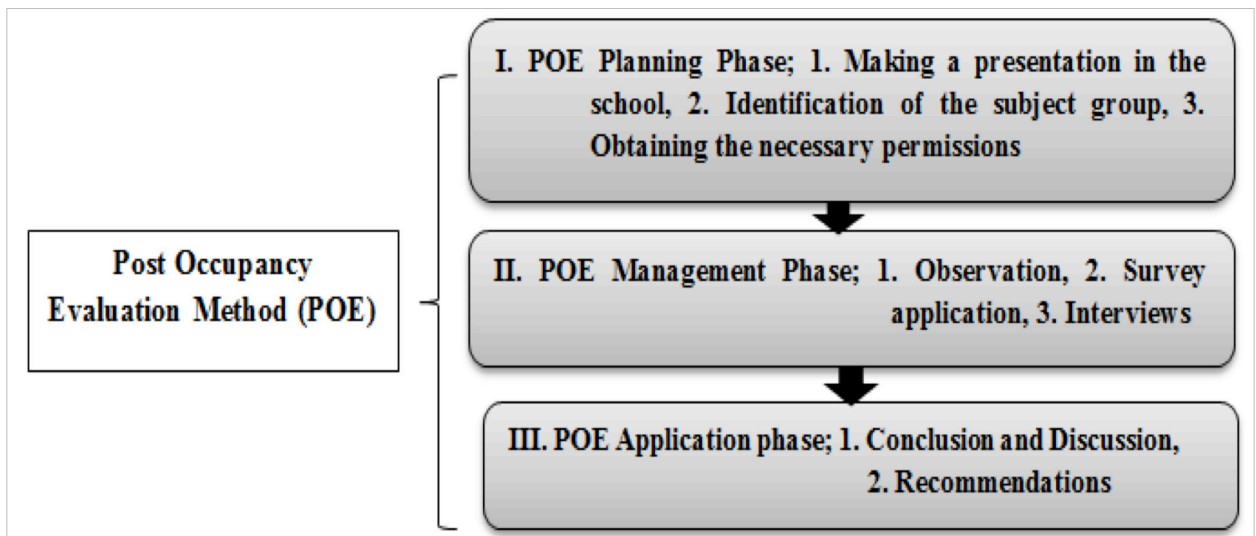


Figure 3. The basic design of the research

**POE Management Phase**

This stage consisted of three main steps; systematical observation study, survey study with the parents of the children with orthopedic disabilities and interviews.

**First Step: Systematical Observation**

Observation study was organized as a 6-day fieldwork on 20-25 May. This study was conducted with a 15-person team consisting of 4 children with orthopedic disabilities chosen from DCSES, at least one parent that accompany children (mother-father), the counselor from the school, 4 professional observers (academician group), a driver and Antalya Representative of Orienteering Federation (as a one day participant).



Figure 4. Selection of sub-spaces for the observation technique in Lake Eymir

Before starting the observation study, all the places in the area and the activities conducted were explained in order to examine this area and its surroundings. The activities that could be conducted by the children with orthopedic disabilities aged 8-12 were determined. Six sub-places were chosen in the area (Table 1).

Observers took part in the activity as well, because of the fact that the observation tour was an unstructured one. 1 observer for each child was picked and charged from the observer group consisting of the academicians. "A Notation Chart" was used and developed in order to make it easy to observe and record (digitize) the data when it was necessary on the observations. The data obtained through the observations were recorded instantly in whipstitches. These records were kept with the notes taken on the notation chart, observation forms filled right after the observations, and physical recorders (photograph and video recorders).

On the first day of the observation study, children were brought to area 3 which had been planned beforehand in the field of Lake Eymir. Each child was helped to get on a bike. The bikes were 3-wheeled. Children safely sat on the back and their seat belts were fastened. On the second day of the observation study, children were brought to the horse riding area, in other words to the area 4. Each child was brought to the horse riding area, was helped to get on a horse safely and was toured around the children horse riding area 4-5 times with the help of the employees. On the third day of the observation, children were brought to area 1. Area 1 was a premise located on the south side of the lake in an access point to water as explained in the previous chapter. Children viewed the most beautiful

Table 1. 6 sub-places were chosen in the research area in order to do planned activities

1-day	2-day	3-day	4-day	5-day	6-day
To get on a bike	The horse riding	Sightseeing & took photographs	Trip to the forest	Orienteering activities	Playing with the ball

Table 2. The description of three orienteering activities

Game 1	Labyrinth orienteering was conducted as sorting numbers from 1 to 9. The aim of the game was to find the numbers that had been splattered randomly in the activity area and provide them to sort the numbers from 1 to 9 in an order. While doing this sorting, snapping the checkpoints on the floor into the slots through a thread with the electronic ring given to the participants, in the meantime focusing their attention and making believe them that they could do this was among the main goals.
Game 2	Puzzle orienteering. The aim of this game was to complete the whole puzzle by matching A4-sized 25 orienteering symbols on the paper with the dispersed and tiny symbols. While completing the puzzle, the aim of the game was for the participants to see the piece in the fastest way through ensuring eye, hand, symbol coordination and put it in its place as a puzzle piece. All the children completed this stage successfully.
Game 3	Snake orienteering. In this game, children followed the snake figure on the picture drawn on the map and passed through the funnels. Participants reached their targets by showing the designated route on the map to the group leaders (Orienteering trainer or observation group) and by going forward in order to pass through the funnels.

landscape of the lake and took photographs in this area. In this area, the observers taught children how to take photographs with a camera. On the fourth day of the observation, children were brought to area 5 in order to observe their stimulation senses. This area was on the north of the lake and right on the roadside. Because of the fact that this area was inclined, bringing them to the area with wheelchairs and their mobility was performed with the support of their parents, observers and the counsellor (Figure 4). On the fifth day of the observation, children were brought to area 2. This area was designed as a basketball field. This area was preferred because of its flat floor and impervious surface in order to conduct orienteering activities to the children. Orienteering trainer in the activity designed three different games. Preparations were made before starting the game. The description of the games explained in Table 2.

On the last day of the observation study (sixth day), they went to the other area which was area 6. It was chosen as the most convenient place for playing with the ball because there was a huge lawn in the area. Children were brought to the lawn after eating something and in this area, they played with the ball with the observers.

### **Preparing Behavioral Maps**

The data obtained from the notation charts were evaluated via using ArcGIS10.0 program in order to digitalize them. Data points were obtained via GPS and activity routes were determined through following the subjects during the activities. The information of which activities, in which places and for how long they were conducted was digitalized with the Behavioural Maps in Geographical Information System (GIS).

### **Second Step: Survey Study with the Parents of the Children with Orthopedic Disabilities**

Reasons for making the survey with the parents; to get informed about the performance level of the natural areas around them and about the sufficiency and suitability level of the existing natural areas in Ankara for the disabled children, and to determine what the issues and problems are in terms of them. To know the thoughts of the parents on the subjects of the design of the natural areas (for example area of Eymir) and to suggest them for designers.

The Survey study conducted in this stage consisted of 2 parts as A and B. Questions were usually asked as test form. In addition to that, choices were given in order to give hint in some questions but they were open-ended questions in order that children can write other answers.

### **Third Step: Interviews**

The last stage of the study was to make interviews. Interviews were made to 4 different groups face to face in accordance with various disciplines with special goals. These were teachers in DCSES (How can the presence of orthopedically disabled children aged 8-12 in the natural areas contribute to them from the viewpoint of the teachers? and so on.), principal or vice princi-

pal of the school (Does he believe in the importance of taking children to these areas and giving education there? and so on.), director or administrator of the area of Lake Eymir which is affiliated to METU (Is there any healing or educative effect of the area of Lake Eymir on the disabled children? and so on.), Doctor/ Psychologist Related to the Education and Rehabilitation of the orthopaedic disabilities (What kind of benefits do the natural areas have in terms of the health of the disabled children? How should be the design of the natural areas towards the disabled children? and so on).

## **RESULT AND DISCUSSION**

### **Results of Behavioral Maps**

According to the behavioral maps of all the participants, they faced walking problems in all areas (mostly in area 5). Pavements, ramps, and passageways in the areas were not convenient for the proceeding and access to wheelchairs. When the behavioral maps of the participants were compared, it was seen that the participants had shown different behaviours from each other. But some small details were obtained. For example, it was detected that Participant 1 had shown more interest in the animals and birds in the area, wanted to watch and pet the animals s/he came across to, talked and had more conversation with the people around while riding a bike, paid more attention to red flowers (Dutchman's breeches), and succeeded in standing up and shooting the ball with the help of his/ her mother while playing with the ball.

It was observed that the participants had to ask for help from their parents and the observers while riding a horse, playing orienteering games, riding a bike, playing with the ball, and wandering in the areas. The participants conducted the activities with different speed and quality because of the fact that their physical properties and disability levels were different.

### **Results of the Observation Forms by the Observers**

According to the comments of the observers, it was noticed that almost all the participants had the walking problem with wheelchairs in the chosen sub-places in the area of Lake Eymir. Ramps, pavements, and roads in the areas weren't convenient for them. It was observed that children wanted to touch the water in area 2 but couldn't touch due to the fact that they were in wheelchairs and the water level was low. It was observed that children wanted to touch the water in area 2 but couldn't touch due to the fact that they were in wheelchairs and the water level was low. According to the comments of the observers, the presence of the disabled children in the natural areas showed that it was beneficial for their education. It was seen that the children fancied taking landscape pictures in area 2 and being in the natural areas and playing together made the disabled children socialize more and increased their self-esteem. Orienteering games in area 2 and ball-playing activities in area 6 gave them the opportunity to interact with each other and participants got information about geographical skills, map-read, field survey, and geographical sub-

jects. The area of Lake Eymir and other natural areas like that affect disabled children positively in terms of spirit, the sound of nature; the sound of water, the sound of birds, the sound of leaves, all of them are the factors that bring peace and happiness to the children. It was observed that the facilities in the area of Lake Eymir, for example especially the entrances of WCs, restaurants, and cafes were not designed convenient for the disabled children (Figure 5).

### Results of the Survey Conducted by the Parents

Results of the survey conducted by the parents are shown in Table 3.

### Results of the Interviews Made with the Teachers of DCOHES

When the teachers were asked whether they used open-green areas of the school or not, all the teachers said that outdoors were important for disabled children but that the schoolyard wasn't convenient for that because some of the children had the mental disability as well as physical disabilities. Thus, they suggested that education settings could be created in the schoolyard. According to the teachers, disabled children do not use schoolyard much and they spend their out of school time at their homes. They also said that plants and animals outside the school drew their attention and they were like a therapy and thought to be positive for them to socialize.

Table 3. Results of the survey conducted by the parents

- 79, 3% of the children use wheelchairs and 51% of these children have mental problems. In addition to their orthopedic disabilities, 51, 72% of the children have mental problems and 31, 01% of the children have speech disorders.
- When analyzing the question "How do the parents took part in the research spend their spare time with their children?," it is stated that 25, 9% watch TV, 20, 9% rest in the home, 19, 2% visit relatives-friends, and 11, 7% go to parks. It could be deduced that parents spend their time mostly at home environment instead of taking their children outdoors.
- 23% of the parents couldn't go to open-green areas with their disabled children, 51, 7% couldn't go because they are annoyed from the looks of the people around, 21, 9% have transportation problems and economic shortages.
- In the study, families stated that they preferred these areas mostly on weekends (58, 9% of the families) and they spent maximum 1-3 hours in these areas (59% of the families).
- In the surveys, families stated that animals, birds (18, 1%), nature sounds of the environment, and water elements (12, 3%) drew the attention of 22, 1% of the children in outdoors.
- It was stated that 43% of the children showed interest in flowers and fruit trees and they wanted to touch them.



Figure 5. Pictures taken in the area during the observations

### Results of the Interview Made with the Director/ Manager of the Lake Eymir

The area of the Lake Eymir is open to all kinds of pedestrian use but automobile entrance only belongs to the METU personnel. Any kind of construction is prohibited because of the fact that the area of the Lake Eymir is under protection but road alteration is possible. Activities of the METU rowing team and walking, running, bike-riding activities that everybody could do are provided in the area. Wild animals, fresh air, water activities, natural plants and all elements associated with nature show healing and rehabilitation effects on the disabled children. It is seen that the facilities and activities in the area aren't convenient for the disabled children but road alterations and increase in sports facilities in the future will be beneficial for these children.

### Results of the Interview Conducted with the Principal of DCSES

The principal of the school believes that natural environments are beneficial for the disabled children especially in terms of education. Courses can be given and technical visits can be conducted in schoolyard and schoolyard will be altered for the disabled children in the future. The principal of the school said that the disabled children didn't have important differences from normal children but the disabled children needed more care and their problems stemmed from health problems aside from their orthopedically disabled. He stated that trip programs, picnic activities, and similar organizations for them to socialize were organized for the disabled children but it is important in these trips and picnic activities that the physical place should be accessed easily by the students.

### Results of the Interview Made with the Related Groups Intended for the Education and Rehabilitation of the Orthopedically Disabled

The number of factors affecting the development of a child increases and changes if there is orthopedically or health deficiency in the child. Aside from the issues that deficiency caused, factors like education level of the family, socio-economic situation, number of siblings, and their environment play a big role in the development of the child. Usually, the problems of the children with orthopedic disabilities are; no physical, language, speech, mental, social, and emotional features unique to them, balance disorder, limitation of movements like walking, running, and climbing, lack of self-esteem, poor motor coordination, adjustment problems, writing difficulties.

Natural and green areas in Ankara city are not useful enough for the disabled children, because of the fact that children with orthopedic disabilities cannot benefit from gardens and parks and there are a lot of reasons for that. Access problem (Families have access problems due to the fact that these parks and natural areas are usually distant, they can only go by their own cars because they cannot go on foot or by public transport vehicles), design drawbacks of the natural areas (especially, roads are not convenient for wheelchair and walking stick users), annoying looks and reactions of the people around are counted among the reasons. Natural areas are the places used for game therapy. Tactile activities; sand and water paintings, trees planted in the garden that provide smells, touchable surfaces or surfaces that direct the child can be conducted in these areas.



Figure 6. Suggested arrangements for Eymir Lake and its surroundings

**Suggestions for the Re-Planning of Lake Eymir and its Surroundings**

Altering the Lake Eymir in order to easily access and use the area is more important than making special designs. Decreasing the limitations to the minimum in the natural areas like Lake Eymir and its surroundings in terms of the disabled people and considering them in the design, practice and rearrangement studies should be among the most important goals. In area 5, children had trouble accessing and wandering the area and their families took them to the area. Special walking trails should be constructed in the area, in this way, these areas can transform into an accessible and usable one (Figure 6).

In all the sub-places chosen in the area of the Lake Eymir, it was observed that the usual cause of walking problems was that the flagstones weren't convenient. Width, slope and flooring of pedways and, pavements shouldn't limit the movements of the disability. Curbstones of the pavements are some of the most faced obstacles and poor stones should be especially used in the junction points (Figure 7).

In order for the wheelchair user to make contact with, touch or reach to the plant, elevated flower boxes should be 90 cm from the floor on a minimum 120 cm-wide pedway. Around the Lake Eymir, for example, the heights of the flower pots in area 2 are short, thus disabled children devoid of smelling and discovering them, flower boxes with different heights should be present in the area (Figure 8). Observing terraces can be built in some places of the lake, in this way, children can easily watch the landscape and take pictures (Figure 9). It was observed that some activity areas weren't convenient in the area of Lake Eymir. One of them was the horse-riding area. It was seen that the children with orthopedic disabilities had trouble while getting

on the horse and its reason was that some tools were lacking in the area (Figure 10).

**CONCLUSION**

The study information is analyzed from the post-occupancy evaluation method which includes the questionnaire, interview and, observation. Specifically referring to the questionnaire the analysis in this research is done through the same method as Soltani, et al. (2012) in Malaysia. The result shows that there is a considerable demand for improving the current design and status to boost the needs of children with disabilities in Turkey, especially in Ankara city. Additionally, nature and greenery spaces have healing effect that allows disabled children to socialize themselves with normal children thus, can enhance their confidence level.

The article used behavioral maps to evaluate the designed area in terms of disabled children with the difference that researchers was carried out in the school garden. Similarly, this evaluation method is used by Hussien, 2012 and Hussein & Daud, 2014, research. Overall, the results are roughly the same that children with disabilities are able to play games and participant on similar activities in green space along with other normal kids. In this research, the most important problem of the Eymir lake after its assessment was the routes and the connectivity of the paths, that prevented the accessibility of disabled children especially orthopedic disabled children. This result is the same as Hussein & Daud, 2014 article finding. Moreover the remarkable result of this article was that children with disabilities going to the semi-open spaces around the city are affected by the financial status of the family, the acceptance of disability in the society around and simplicity to access vehicles and transportation services.



Figure 7. Arrangements to be made in Eymir Lake and its surroundings



This study needs to be discussed in a more integrated approach in order for the Lake Eymir and its surroundings to fulfill their healing function especially in terms of the children with orthopedic disabilities. There should be complementary elements of the integrative planning that will be conducted

specifically to this area. Functional analysis and filthiness analysis of natural values of all data layers' levels of interaction and bearing capacity studies (ecologic, physical, visual, economic, and social) resulted from recreational use should be conducted. For this, there is a need for a management plan. The



Figure 8. The size of the flowerpots in the area should be arranged according to the children with disabilities

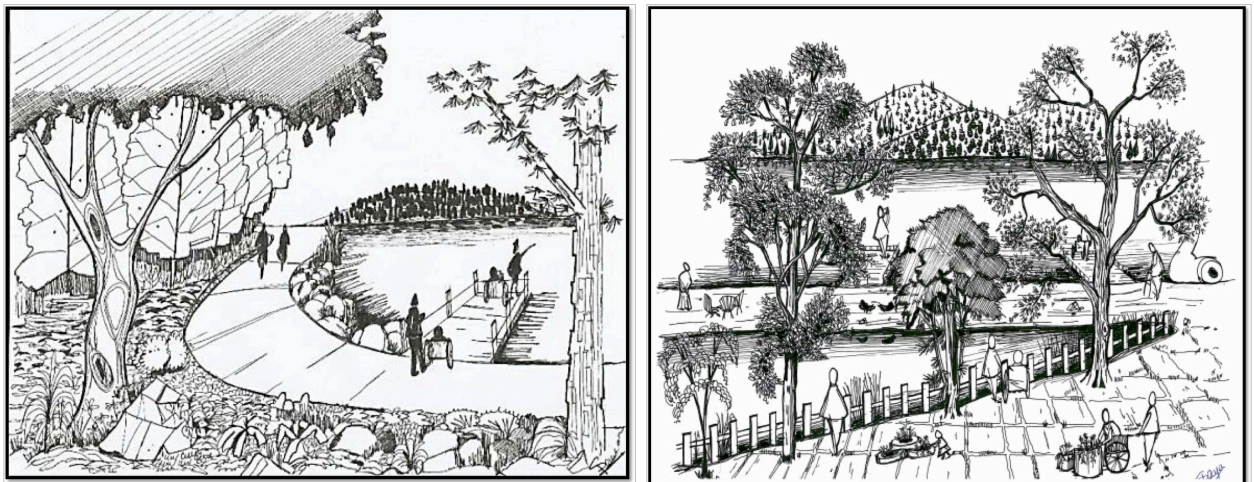


Figure 9. Viewing terraces must be built to watch the scenery around Eymir Lake and take pictures (Perspectives by Sima Pouya)



Figure 10. Arrangements to be made in the horse riding area

management plan should put forward the organization model in the first step responsible for the area management. An interdisciplinary plan involving the opinions of all parts should be materialized with a participatory approach for the area. The planning should involve levels that provide the protection, improvement, social benefit, and economic development of the area. The importance of the area in terms of people should be again put forward with a vision paper with an approach that represents different layers of society and all walks of life. The disability that represents an important part of the society is included as well. Important functions of the area like protection, creating economic value, social utilization, and economic rehabilitation should describe the parts of the area and zoning should be conducted in this way. The features put forward by different function sections will give hints about which needs are put forward by which activities in which places. This planning approach is resource-based and environmentally sensitive and it will help to define the recreation areas.

**Informed Consent:** Verbal informed consent was obtained from children who participated in this study.

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