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## **THE METHOD OF EVALUATION LANDSCAPE FOR DESIGN OF CYCLING PATHS**

*key words:* method of evaluation architect's landscape, Poland

### **INTRODUCTION**

Often ask themselves the question: "What is the landscape? What is included in its composition? What is characterized?"

"The landscape of extraordinary value, beauty and qualities of cognitive cause in many areas of the world through the harmonious interaction of people from the forces of nature" (Wojciechowski, 1997).

An unambiguous statement of what is the landscape is not easy. Some scholars determine the landscape as earth surface physiognomy, including a team of natural factors and are created by man (Borcz, 1999).

It can also be defined as the natural occurring on a given area of a certain kind of structure and interrelationship of elements in the present (Piesik, 2004).

Others look at the issue have naturalists, for which the natural landscape is composed of units properly related components called. geokomplex.

Yet another attempt to find a proper way of clarifying the issues, what is the landscape has so. American school where he is treated as a combination of patches, corridors and backgrounds, all of which elements clearly stand out in terms of environmental conditions (Richling, 1996).

Another way to look at the floor surrounding our landscape is its perception as a potential commodity for sale, the latter qualities of tourism and opportunities to earn them.

All the above-mentioned attempt to define the landscape does not yet include one very important element namely do not take into account its visual aspects, which are the most significant influence on its audience. This kind of perception of the

landscape prefer mainly landscape architects, they deal with their merger into one integral whole, which is primarily an art, and its most important function is to encourage and protect human residences and the wider country's natural landscape and is also linked to lifting convenience, well-being and health (Małachowicz, 1994).

Items found in the landscape can be divided as follows:

**Anthropogenic origin:**

- Linear eg roads, railways, power lines
- Civil works such as: bridges, viaducts, culverts
- Water, for example, ponds
- Green for example, crops
- Architectural objects such as: homes, buildings
- Places of worship and remembrance for example, cemeteries, chapels

**Natural:**

- Water, for example, rivers, lakes
- Vegetation such as: forests
- Relief
- Soil

Because of this, what elements are in place we can classify the landscape as a primary, natural and cultural (Pokorski, 1991).

Original landscape - is in an area untouched hand man. It is the most stable, natural parties such as high mountains (not present in Poland).

The natural landscape - is the area where human activity is not yet so clearly evident. Still there is still a balance between the main components of the landscape: a sculpture of land, soil, climate, vegetation and water.

Cultural landscape - has been clearly marked by human activity. You see the great transformation in elements of its composition. In addition, there are many anthropogenic factors as: roads, engineering equipment, buildings affecting its shape. It is created by man in the creative process characterized by a great variety of forms. It is often the subject of research the history of architecture in the broadest possible terms. This diversity is determined by many factors. The two most important of them is a time and place of creation (Pawłowska, 2001).

Although these types differ from one another, each of them has a lot of valuable items in terms of landscape. It would seem that only the first two have some positive qualities, it is easy to discern in the cultural landscape Positive accents. That cultural landscape is the subject of further development and valuation, since previous two types in the area of research will not occur.

In addition landscape is divided into open and urbanized (Pokorski, 1991). In the area of development there are two types of the above, however, predominantly open countryside.

With each landscape can be further divided into the interior landscape. These are the views from certain points such as having the interior architectural foundation, which may be meadows, fields, roads, walls in the composition, which the facades of buildings, rows of trees, forest fringe; vaulting as a heaven or branches of trees, in addition there are elements of free ( Borcz, 1999).

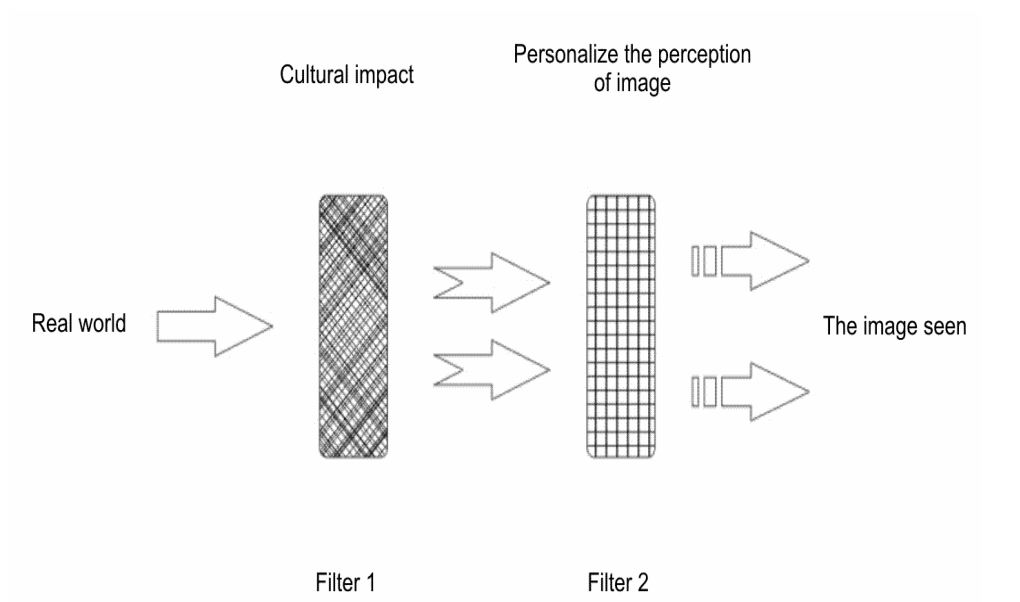
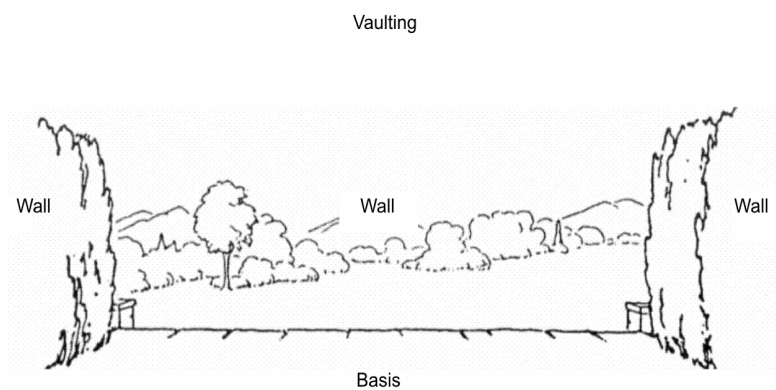


Fig. 1. Filters of perception. *Source: Böhm, 2004.*

The interior of the composition of the landscape plays a considerable role (Böhm, 2004) (fig. 2). It is an integral part of and affects the reception or in itself constitutes a landscape.

An important element of landscape or receipt observed the interior landscape is in its perception, to register. Attempt to clarify this makes Rapoport (Böhm, 2004) which proposed a method for filters of perception (fig. 1). It consists in the fact that the observed object is subjected to filtration first, and only then is it that we received and evaluated.



**Fig. 2.** An example of the interior landscape.  
*Source: Böhm, 2004.*

It is cultural uniqueness of the human influence on how he receives the world surrounding it.

#### **METHODS OF ASSESSING THE LANDSCAPE**

The landscape is so complex and extensive that its valuation to be adopted in a number of different methods of indexation (still there are newer and increasingly more complex or specialized).

Valorisation, or the conversion or valuation of natural ingredients, means the valuation, the importance of identifying and assigning certain types of benefits. In relation to the landscape is understood, as its classification (Hopfer, 1982).

You can distinguish three main groups of methods to assess the landscape (Cymerman, 1988b):

- Methods based on an assessment of value of individual elements of the environment
- Methods based on an assessment of the value of old favorites scenic landscape.

Last is particularly useful when working method adopted for the valuation of the landscape panoramas on the basis of the angle of 360 degrees.

You can also meet with yet another division (Bajerowski, 1991) in relationships:

- Since adopted, the parent of interpretation - the method of aesthetic and economic
- From the implementation of indexation
- From how to obtain information: methods of terrain, small, mixed
- From the way of creating value - the methods of subjective and objective
- From the use of resource information

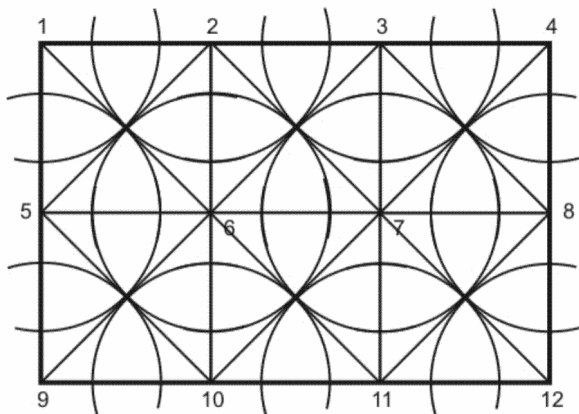
A. One way is the method of indexation landscape by Söhngen (Cymerman, 1988a) takes account of three groups of the components of the landscape: vegetation, terrain, water.

Each component is evaluated on the basis of certain characteristics for the parameters on a scale of 1 - 5 points. The sum of assessments is the basis for grading and determining the value of the requirements for its preservation and protection.

**B.** Another method uses the natural elements of land (Cymerman, 1996). It is to extract diagnostic features of certain areas, such as water, vegetation, terrain, degree of land use, the degradation of the environment.

For purposes of analysis used already existing materials such as sleepers mapping. As a result of standardization is a Class 4 areas with adequate environmental value.

**C.** Other adjustments to a thorough analysis of photographic imagery (Cymerman, 1996). It was developed by Cymermana and Hopfera. Lies in the implementation of photos on the square corners towards the interior, which gives a full picture of the test area (fig. 3), then divided them into 2 segments, and examining the content is granted a certain number of points from 0 - 3 for each of them. After that, the classification and evaluation of the final individual photos, and ultimately, the test area.



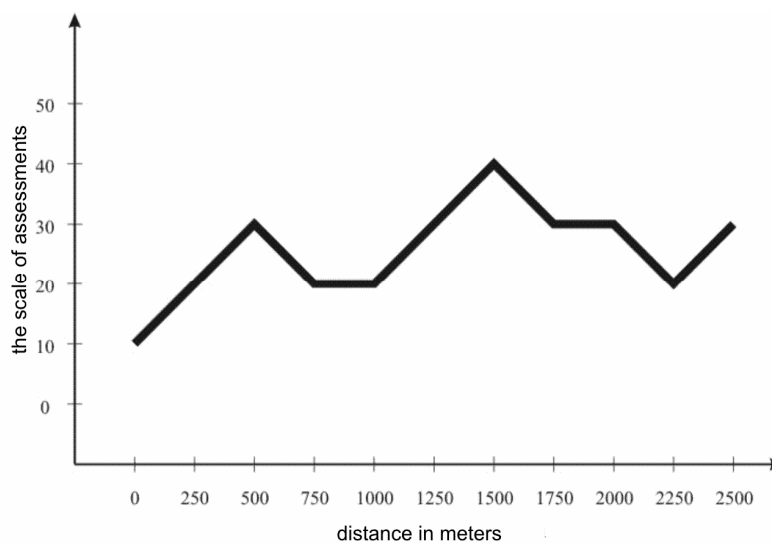
1,2 - location and number of pictures

**Fig. 3.** Schematic layout of pictures.

*Source: Cymerman, 1996.*

**D.** Wejchert experience curve method was developed to assess the urbanized (Cymerman, 1996). It graphically presents the experience tension and emotional sensations that occur in the course of moving a string of time and space. During test referred to a section of research, at a fixed distance, it shall evaluate the site, most separately for one side over which they move. It assumes that each observer otherwise receives a place and evaluate them otherwise, it is, however, that there is

a certain group of people who have similar feelings aesthetic. To the result was the most subjective, in these studies should take the large number of people. After some modifications, this method is also useful in measuring the landscape. The presentation of research results is a curve on the chart where on the horizontal axis are placed as far as distance or time and the vertical axis scale point (fig. 4). On this basis, it can be concluded that the point of view is viewed more or less valuable, and where to introduce any changes to its improvement.



**Fig. 4.** Example curve experience.  
*Source: by author.*

E. different approach is characterized by a landscape architectural units method by Bogdanowski (Bogdanowski, 1973). It provides a summary of test chamber and field, leading to the creation of maps of the landscape values. The development of such a map is two steps:

- Designation of architectural landscape
- Quantifying the elements of landscape within individual units.

This method is based on maps and data collected during the field inventory. On the basis of collected materials draw up the value of land. It operates in a horizontal plane that is on view from the top.

#### **LANDSCAPE EVALUATION ONE PART THE ROUTE**

Used for enhancing the value of the research is a compilation of various already well-known and widely recognized methods, though some elements which allow holders obtain the full: conscientiousness repeatability and clarity of the study.

The bicycle as a means of transport since the time of its invention and introduction to Europe at the end of the nineteenth century, has become extremely popular, and in times of today's cycling is experiencing a real flourish.

In Poland, only recently began to seriously deal with cyclists.

In the area of Lower Silesia there are hundreds of disused track, which, because of their lack of parameters such as problems with drainage, slight decreases oblong, well-suited to adapt to the bicycle paths.

It should be examined first, catalog and valorize the potential site on which you want to route to the movement of cyclists.

Analysis covered the panorama, which is a vast landscape seen from a distance.

Enhancing the value of the development was carried out on the panoramas, that is, in pictures, including his vision full circle - that is 360 degrees. Powered them at intervals from 1 - 2 kilometres, except that, for technical reasons, this option does not exist, for example, because of terrain or too high density of plants, the distance between panoramas amounted to 4 kilometres, or 2 times as many as the maximum limit of coverage develop a set design from the axis of cycling routes. This allowed for a distance of almost 100% coverage area coverage panoramas, which translates to the quality adjustments to the test area.

Re-selling has been divided into 4 stages: A1, A2, A3, A4.

A1 - Each of the panoramas has been divided into 12 segments. This makes it easier for orientation, because the amount corresponds to the breakdown of segments on the analog clock, is split into 12 hours. It is a modification of the method Cymermana and Hopfera where each image was divided into 2 half (Cymerman, 1996). Segment represents the first time 12 This is helpful in the orientation of the field and on the map. The first segment is always directed to the north, with a tolerance of 20 degrees.

They were also written directions of the world to facilitate orientation.

A2 - On a panorama have been selected:

- Dominants landscape
- Lines of the building (if any)
- Green line

A3 - Each segment is evaluated separately, and the evaluation is applied to chart where on the vertical axis is scoring, and on the horizontal axis numbers assessed segments. In this way we created a specific experience curve as it is in the method of curve experience Wejchert (Cymerman, 1996) with this difference, however, that it is not created it as the mean rating obtained in the research field but on the basis of an assessment of individual pieces of the panorama.

A4 - At the end of each segment is classified on the basis of obtained scores:

- 0 - 10 points - landscape with a very low value, the need for immediate intervention in the landscape for its repair,
- 11 - 20 points - it is recommended to properly landscape in a short period of time,
- 21 - 30 points - monitoring changes in the landscape and possible interference in the event of a deterioration of values,
- 31 - 40 points - with high landscape value and natural beauty.

Scoring was determined on the basis of arithmetic division of the maximum possible to obtain assessment of the four compartments.

The results obtained from the valuation of individual segments are added together and divided by the number of segments. In this way you'll have a general assessment of the whole panorama which allows for comparisons between panoramas with each other and to designate potential areas requiring special attention such as heavily degraded, or those that lend themselves perfectly to the points of view.

Based on the average assessments of individual panoramas, you can build a model of the test landscape.

The results were presented as table indexation. Evaluated 10 different elements constituting the landscape on a scale of 0 - 4 points (tab. 1). Have been taken into account the following components grouped into categories:

- **A** - dominant in the landscape - are taken into account all dominant in the landscape, both positive such as churches, individual trees as well as negative such as chimneys, power poles. The most valuable are those which increase the value of the landscape. In the absence of dominant granted a rating of 1 point. The criteria were adopted on the basis of an analysis of literature (Böhm, 2004; Borcz, 1999).

- **B** - Harmony compositions - is taken into account the relationships between the various components of the landscape and how they interact with each other. The more there is harmony between the elements of this assessment is higher. The criteria for evaluation created on the basis of the scientific work Cymermana (Cymerman, 1988c). Introduced to be done on the basis of an analysis of literature (Strzeminski, 1974) to bring them to five scale used in the valuation work.

- **C** - Saturation infrastructure - in the assessment includes all elements of infrastructure: linear (such as roads, power lines, strings foot ride, embankments), surface (such as sewage treatment plants), points (eg. semaphores, the reduction of gas station, pumping stations) and other facilities such as bridges, culverts, overpasses.



Tab.1. The assessment of the landscape.

Symbol group	Categories	Points				
		0	1	2	3	4
A	Dominant in the landscape	Dominants adversely affecting the reception of the landscape	The lack of dominant	A small number of dominant does not change significantly on the landscape	Dominants to improve reception of the landscape	Dominants very positive influence on the perception of landscape
B	Harmony composition	Lack of harmony	The vast minority of the components of a good compositions	Some components of a good compositions	Most components of a good compositions	All the elements are a good composition
C	Saturation infrastructure	Infrastructure occupy more than 60% of the land sector	Infrastructure occupy 40 - 59% of the surface	Infrastructures are in sight occupy 21 - 39% of the surface	Infrastructures are in sight occupy 11 - 20% of the land sector	The elements of infrastructure to less than 10% of the sector
D	Architectural objects and places of worship and remembrance	Significant reduction in value, like objects in isolation from the rest of the evaluated sector	Items are not integrated into the landscape, not complementary to green but in some way related to landscape	No impact on the perception of landscape, not improving or not deteriorating view, or lack of them in the landscape	Good integration in topography and vegetation, improving the aesthetic value of the sector	Objects perfectly integrated into the landscape, complementary to green
E	Line and the line of green buildings	The building very much scratched, almost green line does not occur exposing building lines	The building dominates the entire line of green	The building slightly visible, slightly below the line of green building line	Line and the line of green building are on the same level (except for the dominants), or line the building does not occur at all	The green is higher than the building line (except for the dominants)
F	The diversity of the landscape	The landscape of boring, dull, single or a large number of items negatively enrichment landscape	Little diversity of the landscape, the individual elements enrichment	Low diversity of the landscape, few individual trees, shrubs group	Average diversity of the landscape, a lot of individual trees, groups of trees, groups of plants	The great variety of landscapes, a lot of individual trees, groups of trees, avenues
G	Relief	Flat terrain, the lack of diversity	A slight differentiation of land	Land diverse, you can see more hills and depressions	Considerable diversity of the terrain, you can see more up and a reduction in land	Land heavily wrinkled, firmly maintaining the value of varied landscape
H	Vegetation	Vegetation of low value, requires the transformation	Vegetation that have little value	Vegetation with an average values	Vegetation by more than the average values, worth maintenance	Vegetation of high ecological values of landscapes
I	The level of devastation and the landscape of the area	The area does devastated more than 50% of the sector	The area does devastated 31 - 49% of the surface	The area does devastated 11 - 30% of the sector	The area does devastated 1 - 10% of the sector	The landscape is not showing signs of degradation
J	The impact of the sector on receipt of full view	The sector negatively affect the whole collection	The sector reduces the value of receiving a whole	The sector does not affect the reception of a whole	The sector positively affect the whole collection	The sector relies on receiving full value

Source: compiled by the author.

The lower the saturation of the infrastructure that the rating is higher. The criteria for evaluation created on the basis of the scientific work Cymermana (Cymerman, 1988c). Introduced to be done in order to adapt them to five scale used in the valuation work.

- **D** - architectural objects and places of worship and memory - are taken into account those elements that are not dominant in the landscape, but in a significant influence on its audience. The most valuable are those which increase the value of the landscape in the sector, are integrated into it and perfectly harmonized. In the absence of any object is to be given to assessment of 2 points. The criteria were adopted on the basis of an analysis of literature (Małachowicz, 1994; Borcz, 1999, 2003).

- **E** - green line and the line built - is determined by the building line, and if there is a line of green, and then compares their joint impact. It is valuable that is where the landscape is dominated by green line above the building. In the absence of the building line shall be 3 points. The criteria were adopted on the basis of an analysis of literature (Małachowicz, 1994; Borcz, 1999, 2003).

- **F** - The diversity of the landscape - the more varied landscape that he has the greater value is taken into account only those elements that have positive influence on the test sector, following a negative impact is granted zero number of points. The criteria for evaluation created on the basis of the scientific work Cymermana (Cymerman, 1988c). Introduced to be done in order to adapt them to five scales used in the valuation work.

- **G** - Sculpture of land - is taken into account the terrain and its impact on the landscape. The more varied the landscape sculpture site more interesting and has a greater aesthetic value. If there is no line-builders, there is only a green line, then granted the maximum number of points. The criteria were adopted on the basis of an analysis of literature (Cymerman, 1988a).

- **H** - Plants - the value of vegetation in the sector such as its diversity. In a larger variety of this landscape is valuable and has a greater impact on the. The criteria for evaluation of data generated on the basis of the scientific work Cymermana (Cymerman, 1988a). Introduced to be done in order to adapt them to five scales used in the valuation work.

- **I** - The devastation of the landscape and the area - determine the extent to which the landscape in the sector was devastated. In the level of devastation is less or not at all the landscape there is a greater aesthetic value. The criteria for evaluation created on the basis of the scientific work Cymermana (Cymerman, 1988c). Introduced to be done in order to adapt them to five scale valuation.

- J - The impact on the whole perception of view - is the overall impact of the sector on how to receive the rest of the panorama, evaluated on the basis of subjective feelings of the observer. The criteria were adopted on the basis of an analysis of literature (Małachowicz, 1994; Borcz, 1999, 2003; Böhm, 2004; Strzeminski, 1974).

In making the assessment of each of the panoramas includes the following elements:

- Assessment of the overall panorama - with implications for the designation of scenic points, panoramas, which require continuous monitoring of places or areas in need of urgent repair of the landscape.

- Is given the lowest rating which is the weakest point valued panorama.

- Is given the highest rating point represents obtained valued panorama

- Is given the classification of sectors on the basis of the phase 4 study - A4

- The spread between the minimum and maximum number of points, to indicate how strongly panorama is differentiated in terms of the value of the sector, which affects its overall perception. The greater the diversity of this panorama is less well received by the viewer. Assume the following breakdown:

- 0 - 5 points - small variations.

- 6 - 10 points - the average diversity.

- 11 - 20 points - a wide diversity.

- 21 or more points - very different

Before the accession to exploit the photographic documentation has been made in the form of panoramas. In addition, all panoramas have been marked on the map.

Data from the valuation of various panoramas and their location gives the ability to create a curve, which reflects the experience, the quality of the landscape along the proposed route cycling.

The area panoramas served as nodal points created model for the assessment of land.

In fig. 5, the stages of the exercise of any adjustments to the panoramas.

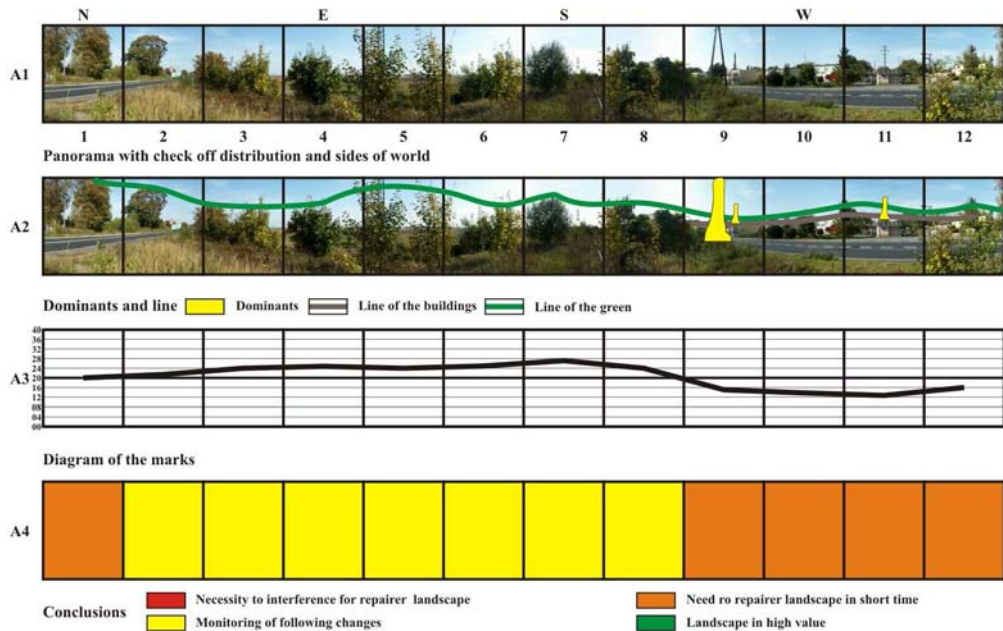


Fig. 5. Stages of the performance of any adjustments to the panoramas (route Lagiewniki - Kondratowice, Lower Silesia). *Source: compiled by the author.*

## CONCLUSION

By combining the credits with each other is a kind of experience curve (fig. 6).

Due to the high density of nodal points of deviation from the actual value of the landscape in the points arising as a result of connecting nodal points is small. It can be assumed that the landscape on the slopes formed by the merger nodal point mark in the same way as the assessment between points, or linearly. This will allow you to determine the worth of that seen in the area of any point along the route and not only at junctions.

In addition, is assigned to each of the segments in which there is a node is assigned to mark the colours of belonging to one of three groups: beauty spots, landscape that requires monitoring, landscape requiring immediate intervention to its improvement in order to enhance the visibility of differences between them.

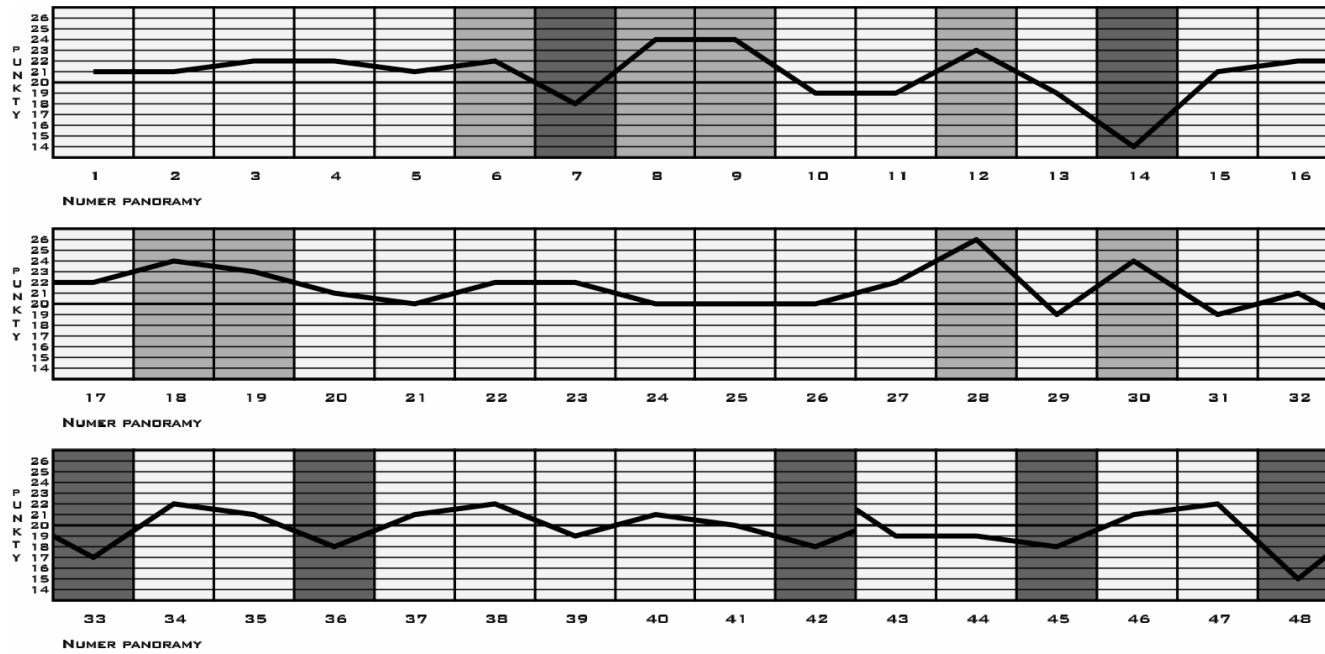


Fig. 6. Example curve impressions created as a result of research carried out in the hills south Strzelińsko-Niemczańskich.  
 Source: compiled by the author.

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## SUMMARY

The problem of landscape evaluation for the bicycles road is not a new one from the point of view of landscape architects, yet, unfortunately, not taken under consideration by town planners responsible for realization of those plans.

There are numerous methods of landscape evaluation and most of them are based on map backing which involves only two dimensions excluding the third one-height, i.e. the one which is actually recognized by an average man staying inside the analysed area. In this way the space surrounding us and its sequences remain disregarded. Therefore, there is a need to work out such a method of investigation which will satisfactorily include all three dimensions.