



TRANSFORMATION OF PETROVARADIN-BEOČIN RAILWAY TRACK INTO A GREENWAY

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Abstract – The paper presents a transformation of a public railway track Petrovaradin-Beočin into a greenway for pedestrian and bicycle traffic at the territory of the Town of Novi Sad and the Municipality of Beočin, which is intended for recreation, sporting, cultural, tourist and other servicing activities to the citizens of the Town of Novi Sad and the Municipality of Beočin.

Keywords – railway track, transformation, path, cyclists, pedestrians

1. INTRODUCTION

In 2016 the joint-stock company Serbian Railway Infrastructure reached a decision to suspend public transport of passengers and goods on a part of railway infrastructure which consists of 24 railway tracks amounting to the total length of 669.2 km. These include Petrovaradin-Beočin railway track, 17.1 km long, which had been in public railway traffic since 1908. It was in service for both passenger and cargo traffic, and since 1965 only for cargo traffic.

The traffic along this track was completely suspended in 2007 for safety reasons, since certain elements of railway infrastructure were worn out.

Late in 2017 the workgroup of the Ministry of Construction, Transport and Infrastructure and the Government of the Autonomous Province of Vojvodina decided to make a pilot project – the so called concept of a greenway, in other words the transformation of Petrovaradin-Beočin railway track into a pedestrian and bicycle path.

2. INSPIRATION AND GOOD EXAMPLES

The inspiration for greenway urban design has been found among the projects already implemented in the region, Europe and worldwide. The first of them is High Line project in New York (Figure 1), which is the most famous example of conversion of a railway track space in the heart of the city. This example was used to recognize good methods of forming a user-friendly area with a lot of greenery and urban mobile objects.



Fig.1. High Line, New York, USA

The second example is the project called Cycling through History, which is actually the revitalization of the old narrow-gauge railway Čiro through Bosnia and Herzegovina and Croatia, from Neum to the Municipality of Konavle (Figure 2). The implementation of this project includes developing and marking of about 200 km long bicycle path. The bicycle path is intended for both road and mountain biking. The longer part of the path is asphalt, while certain sections are macadam and are adjusted for mountain biking.



Fig.2. Conversion of Čiro railway track into pedestrian-cycling path

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The example of Schöneberger Südgelände industrial park in Berlin, Germany, was also taken into consideration. This park has preserved the elements of railway mobile objects, while the space in the park was converted for use primarily for sports and recreation (Figure 3).

The insight into the good practice examples was used to identify spatial guidelines which would be implemented into the subject space and which would influence the creation of ambient atmosphere and continuity of its use.



Fig.3. Schöneberger Südgelände Park, Berlin, Germany

3. CONCEPT OF SPACE REVITALIZATION

The transformation concept included planned development and marking of the route for pedestrians and cyclists in the area of Petrovaradin-Beočin railway track. The path was treated conceptually as a part of the park complex, the green road which connects two settlements and is 17.1 km long.

The path was designed as multifunctional with various contents, the area for art installations, outdoor gym, children playgrounds, and similar. The visitors and recreational sportsmen, in addition to enjoying sports activities, are also given information on tourist attractions in a wider area of the location, such as the information on Petrovaradin fortress, the monasteries of Fruška Gora as well as archeological sites.

By keeping the elements of rail traffic at some parts of the greenway the main characteristics of industrial landscape design are also maintained, while the disassembled elements of the railway track superstructure will be used for fences, paving, urban mobile objects and equipment.

Designing of roadway structure was made by segregation of pedestrian and bicycle traffic and putting laybys at establishments and at locations where the path intersects waterways. The roadway at laybys is designed to integrate pedestrian and bicycle traffic with the additional contents for sports, recreation and amusement.

Exits from pedestrian-bicycle path and junctions to paths and sidewalks in the nearby settlements have been provided, as well as exits to bus stops.

The connections of the greenway to sidewalks and roadways in the settlements are made by staircases of underpasses with a part of narrow bicycle ramp (Figure 4).



Fig.4. Image of descending from pedestrian-bicycle path at underways

The connection of bicycle path with surrounding road network will be established by 23 existing intersections of railway track and local roads in the same level.

During the further lifetime of the path it is possible to predict the additional points of intersection in accordance with the development of additional contents in the direct vicinity of the path.

The points of intersection of pedestrian-bicycle path with other roads in the same level are marked with the corresponding horizontal and vertical traffic signallization intended for both motor vehicle drivers and cyclists and pedestrians. It is also predicted to instal mounting forced speed bumpers which would reduce the motor vehicle speed.

Public lighting, which is planned to be put along the entire path, will enable motor vehicle drivers to see the path users in time in the conditions of night driving or reduced visibility. There will be 497 new 6 m high poles with LED lights of 20 W. The total installed capacity of the lighting is 10 kW.

As for traffic equipment, there will be parking poles installed along the greenway which would prevent the motor vehicles to enter the greenway.

Five types of driveway structures have been defined within the pedestrian-bicycle path. Figure 5 presents the typical profiles at the path with layers of construction and defined dimensions to separate bicycle from pedestrian path.

The landing spots will be covered with mulch, decking or Tartan. Such changes would indicate the users that it is a place where they can make a break – and in this way linear continuous space timely discontinues and is no longer just a flowing space. The roadway structure at landing spots is shown in Figure 6.

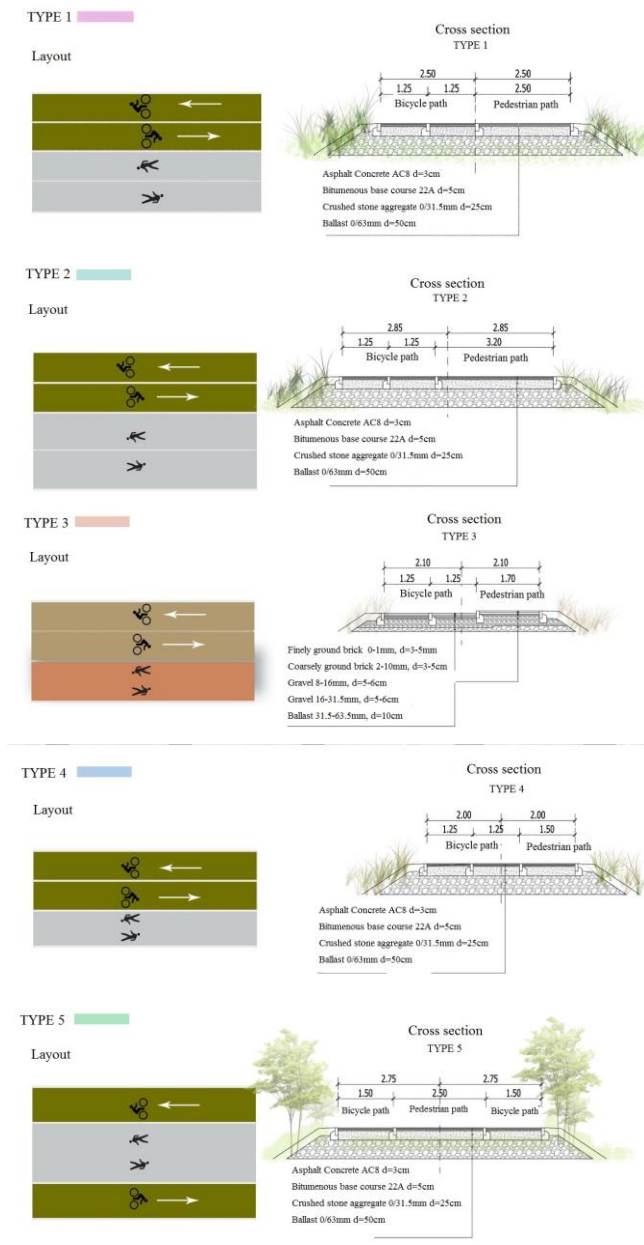


Fig.5. Typical cross-sections along the greenway

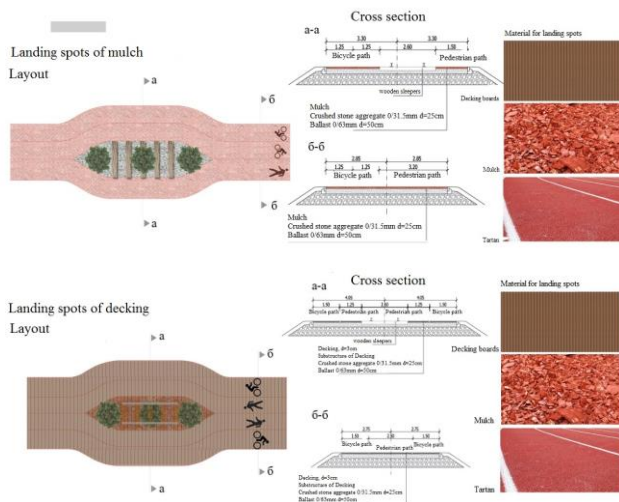


Fig.6. Type of roadway structure at landings

The landings outside establishments will be equipped with drinking fountains, benches, solar panels and service pumps (Figure 7).



Fig.7. Appearance of a landing

The concept of formation of contents within establishments is based on maximum use of rails and ties of the existing tracks. One type of mobile objects within establishments includes the deckchairs on tracks (Figure 8).



Fig.8. Deckchair on tracks

There are 35 culverts along the railway track, six underpasses and five bridges. In these locations, due to insufficient width of the facilities, the principle has been adopted to integrate pedestrian and bicycle traffic.

Railway track grid on concrete structures (underpasses and bridges) will be disassembled and crushed stone removed, and then it will be covered with a coat of insulation material and then a 3 cm thick layer of poured asphalt will be made.

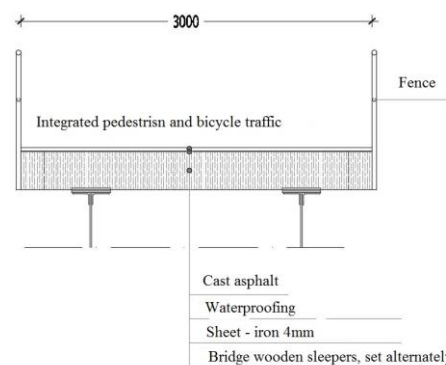


Fig. 9. Suggested reconstruction of steel railway bridge

As for steel bridges, one suggestions is to do the reconstruction by removing tracks and putting 4 mm

thick steel sheet over the existing wooden ties, coated with Bridgemaster or some other type of insulation. Then 3 cm thick poured asphalt layer will be made over the insulation (Figure 9).

There is lush wild greenery along the majority of the route considering that the railway track has not been in use for over 10 years. It is predicted to keep and maximally preserve the existing autochthonous vegetation by appropriate care and protection.

The planned greenery would accompany the planned solution of pedestrian-bicycle path and would contribute to the overall appearance and recognition of the location. Green surfaces are designed as: linear greenery and green portals along the bicycle path; groups of high trees in landing zones; decorative greenery (both high and low) in the establishment zones.

The suggested seedlings are of high esthetic value without being invasive or allergenic, and they also provide a change of colours according to seasons.

4. CONCLUSION

The transformation of the public railway track Petrovaradin-Beočin into a greenway for pedestrian and bicycle traffic in the territory of the Town of Novi Sad and the Municipality of Beočin has resulted in creation of ambient entities, which should attract various groups of users.

In addition to comfort and safety in pedestrian and bicycle traffic there is also animation of users by additional contents, which contribute to the improvement of quality of social and recreational life of the residents in these areas.

REFERENCES

- [1] Saobraćajni institut CIP, Generalni projekat rekonstrukcije i modernizacije železničke pruge Petrovaradin-Beočin, Beograd, 2008.
- [2] CESTRA, Idejno rešenje za transformaciju rekonstrukcijom železničke pruge Petrovaradin – Beočin u zelenu stazu, Beograd, 2018.