



MEASUREMENT REPORT

SOMBOR HALFMARATHON

(remeasurement)



by Borut Podgornik
AIMS/WA course measurer

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SUMMARY OF MEASUREMENT SOMBOR HALFMARATHON

Date of measurement: 12. 8. 2022

How many measurements of the course were made? 1

Name of measurer: Borut Podgornik

How much of the road width is available to runners throughout the length of the road race course?

Entire width of the roads is available to runners on the whole course except at some points where only left half of the road is available to run (see descriptions with pictures 11 to 18 below).

If the route at turns cannot be described as the „shortest possible route“, explain what restrictions will apply, and how these will be enforced?

The course was measured as the shortest possible route on the roads with exceptions above where the measurement was done only to the middle of the road on the left side.

Length of course after any adjustment: 21.097,77 m

Difference between longest and shortest measurement: /

Which measurement was used to establish the final course length and WHY?

The final length of the course was established after bicycle postcalibration and moving the distance for 2 m away from a pedestrian roundabout in front of main building of Municipality of Sombor – already during the measurement (see data sheet below).

OVERVIEW OF THE MEASUREMENT PROCEDURE

Sombor halfmarathon is one of the most traditional events in the region, next year organized already for 43rd time. The organizer is a local Athletic and Rekreational club ARK Somaraton. The course was already official measured before and had a certificate, but expired this year. Beside halfmarathon there is also a 7,0325 km (one lap) race and a relay 3 x 1 lap in the program. The date of the event for next year is Sunday, 14th May with start at 10.00 in the morning. The start and finish is in City center and the course itself is in the city all the way, but therefore with many turns and bends, so maybe not very fast, although very flat. Approximate number of participants will be more than 1000.

I found an appropriate road for calibration course on bicycle path along main road heading to Apatin from Sombor (pictures 1 to 5). Bicycle calibration was done before and after the measurement as a standard procedure on this course (see below).

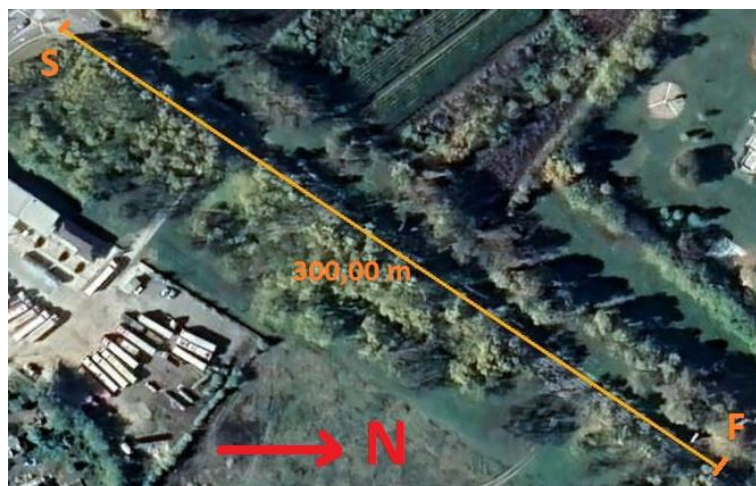
The measurement of the course was very simple. I started at the starting point in the city center (parallel to the City clock) - see pictures 6 and 7 and made a ride with a bicycle in running direction on shortest possible route accompanied with a three person on the bike too to show the route and to take care about the safety. When passing the pedestrian roundabout (point 8 – picture 18) I ride a bike 2 m away from the inner curb of the roundabout to follow the instructions from accompanying person who know the course very well. After finishing the lap I read the counter and found out that the distance is almost exactly correct («only» 9 cm more), so the measurement itself was done correct.

At all important points (= bends and separation) I marked on pictures below where the organizer should put fences and cones in order to prevent runners to take short cuts.

The course (see picture 9) is on tarmac road all the way and flat - picture 19, the difference between the lowest and the highest point is 7 m. Start and finish is at 90 m above sea level.

DETAIL OF THE CALIBRATION COURSE

- 1 Name of event: Sombor halfmarathon
- 2 City/town: Sombor, Serbia
- 3 Location of calibration course: on bicycle path beside main road from Sombor to Apatin, in NW direction, start parallel to the far edge of traffic sign STOP just after the road to Logistical center (1,10 m away), 2,90 m right from near edge of drain cover on the right side of the road (see pictures 1 and 2), finish 12,25 m after traffic sign »Bicycle path« and 7,50 m after (diagonal right) near edge of in grass hidden drain grid on the left side, just opposite of City Swimming pool (see pictures 3 to 5).
- 4 Length of calibration course: 300,00m
- 5 Date measured: 11. 8. 2022
- 6 Method used to measure calibration course: 50m steel tape (20°C, 50N)
- 7 How many times did you measure the calibration course? 2x
- 8 Measurement team leader: Borut Podgornik
- 9 Address of team leader: Staneta Severja 14, 2000 Maribor, Slovenia
- 10 Phone contact of team leader: +386 41 664412
- 11 Email address of team leader: borut.podgornik@triera.net
- 12 List names and duties of team members: Helena Javornik, assistant
- 13 Is the calibration course: STRAIGHT? YES PAVED? YES
- 14 How are the start and finish points marked? PK nails
- 15 Are the start and finish points located in the road where a bicycle wheel can touch them? YES
- 16 Number of full tape lengths 6 Total length: 6 x 50m = 300m
- 17 A picture of calibration course:



STEEL TAPING DATA SHEET (for measuring a calibration course)

Name of calibration course: bicycle path Sombor

City/town and State: Sombor, Serbia

Date: 11. 8. 2022

Start time: 15.30 **Finish time:** 16.25

Pavement temperature: Start 28°C Finish 28°C Average 28°C
(thermometer shaded from direct sun)

Measurements and calculations:

- 1 First measurement. This establishes tentative start and finish marks which should not be changed until the final adjustment on line 6 below.

$$\begin{array}{rccccccc} 6 & \times & 50,00\text{m} & + & / & = & 300,00\text{m} \\ \# \text{ tape} & & \text{distance per} & & \text{partial tape} & & \text{measured} \\ \text{lengths} & & \text{tape length} & & \text{length} & & \text{distance} \end{array}$$

- 2 Second measurement. This checks the distance between the SAME tentative start and finish points marked in the first measurement, but use new intermediate taping points.

$$\begin{array}{rccccccc} 5 & \times & 50,00\text{m} & + & 49,995\text{m} & = & 299,9975\text{m} \\ \# \text{ tape} & & \text{distance per} & & \text{partial tape} & & \text{measured} \\ \text{lengths} & & \text{tape length} & & \text{length} & & \text{distance} \end{array}$$

- 3 Average raw (uncorrected) measurement of course: 299,9975m

- 4 Temperature correction. Use the average pavement temperature during measurement. Work out answer to at least seven digits beyond the decimal point.

$$\text{Correction factor} = 1.0000000 + (.0000116 \times [28 - 20])$$

$$\text{Correction factor} = 1,0000928$$

NOTE: For temperatures below 20C, factor is less than one

For temperatures above 20C, factor is greater than one

- 5 Multiply the temperature correction factor by the average raw measurement of the course

$$\begin{array}{rccccccc} 1,0000928 & \times & 299,9975\text{m} & = & 300,025339768 \\ \text{correction factor} & & \text{avg. raw measurement} & & \text{corrected measurement} \end{array}$$

- 6 I moved the finish mark for 2,5 cm backwards and drive PK nail into the road.

Final (adjusted) length of calibration course 300,00m

BICYCLE CALIBRATION DATA SHEET

Name of event: Sombor halfmarathon

Date of measurement : 12. 8. 2022

Name of measurer: Borut Podgornik

Length of calibration course: 300,00m

PRE-CALIBRATION - ride the calibration course four times, recording data as follows:

<u>Ride</u>	<u>Start Count</u>	<u>Finish count</u>	<u>Difference</u>
1	56000	59285	3285
2	59285	62569,5	3284,5
3	62569,5	65853	3283,5
4	65853	69138	3285

Time of day: 15.45

Temperature: 29°C

WORKING CONSTANT = number of counts in one kilometre, calculated from the pre-measurement average count, and multiplied by 1.001 – the „short course prevention factor“

Pre-measurement average count = 3284,5

Counts per km = pre-measurement average count x 1000/length of calibration course in metres

Working Constant = counts per km x 1.001 = **10.959,281666666**

POST-CALIBRATION - ride the calibration course four times, recording data as follows:

<u>Ride</u>	<u>Start Count</u>	<u>Finish count</u>	<u>Difference</u>
1	90000	93285,5	3285,5
2	93285,5	96570	3284,5
3	96570	99555	3285
4	99555	103140	3285

Time of day: 17.00

Temperature: 30°C

FINISH CONSTANT = number of counts in one kilometre, calculated from the post-measurement average count, and multiplied by 1.001 – the „short course prevention factor“

Post-measurement average count = 3285

Counts per km = post-measurement average count x 1000/length of calibration course in metres

Finish Constant = counts per km x 1.001 = **10.960,95**

CONSTANT FOR THE DAY = the average of the working constant and the finish constant = **10.960,115833333**

COURSE MEASUREMENT DATA SHEET

Name of event: Sombor halfmarathon

Name of measurer: Borut Podgornik

Date of measurement: 12. 8. 2022

Start time: 16.15 Temperature: 29°C

Finish time: 16.45 Temperature: 29°C

Constant for the Day: 10.960,115833333 counts/km

MEASUREMENT DATA

Measured point	Counter reading	Cumulative counts	Cumulative distance in m	Adjustment in m
Start – Kralja Petra I street in the City center, parallel to City clock – see pictures 6 and 7	91000	00000	0,00	/
Finish – the same point - see picture 8	168078	77078	7032,59	/

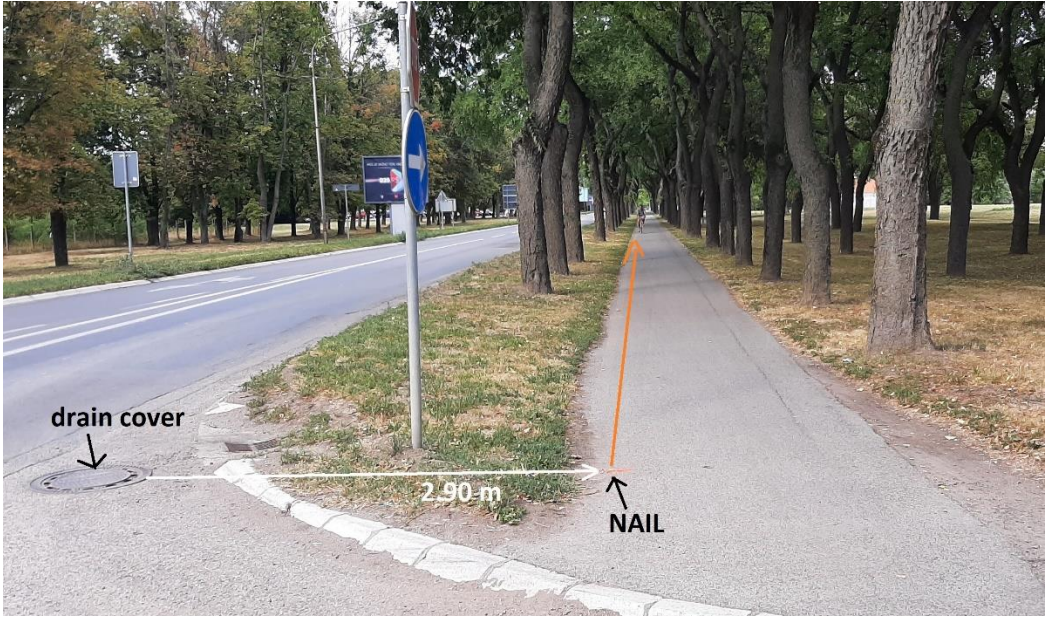
RECAPITULATION OF MEASUREMENT

I. halfmarathon

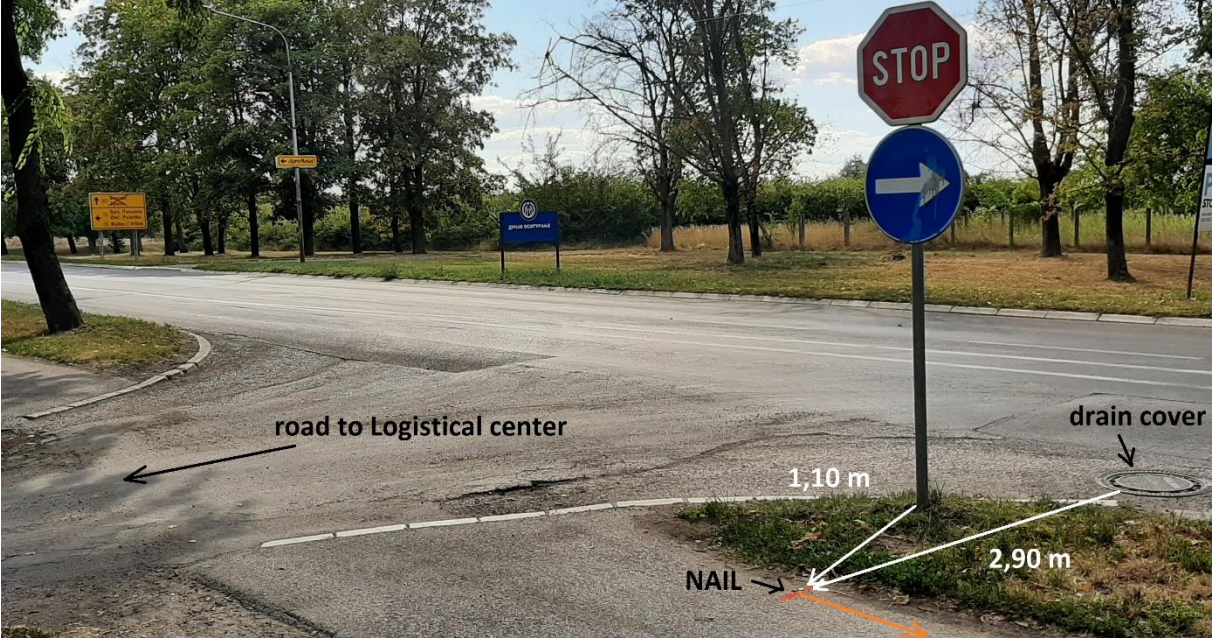
desired length of the course: 21.097,50 m

measured course: $7.032,59 \text{ m} \times 3 =$ **21.097,77 m (correct distance!)**

CALIBRATION COURSE START onwards – (picture 1)



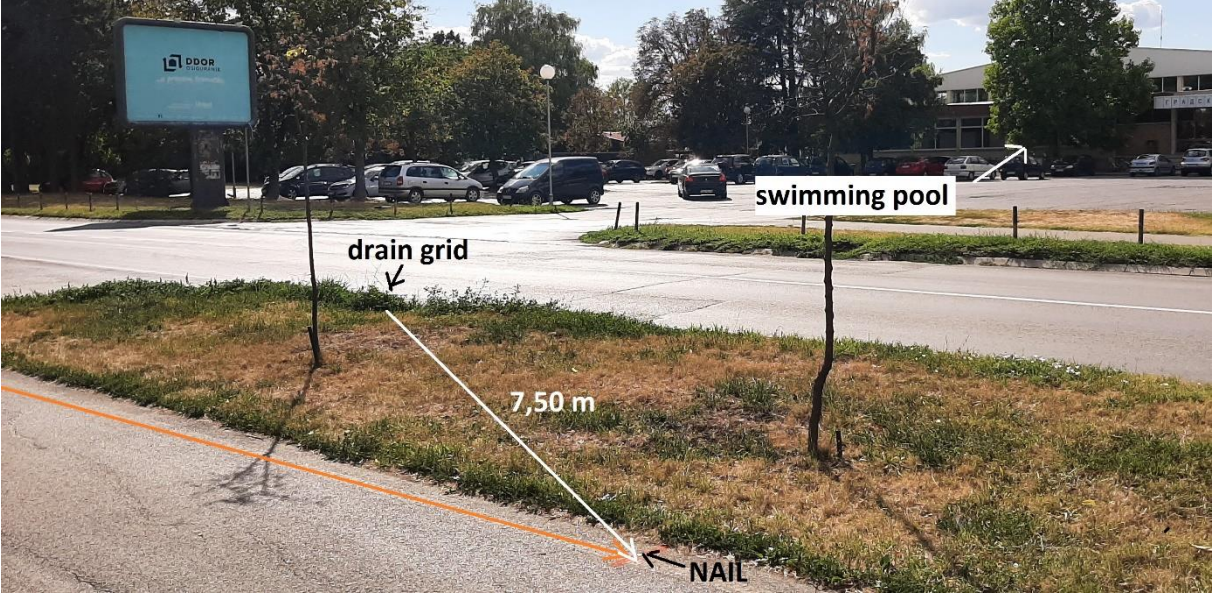
CALIBRATION COURSE START side view – (picture 2)



CALIBRATION COURSE FINISH backwards – (picture 3)



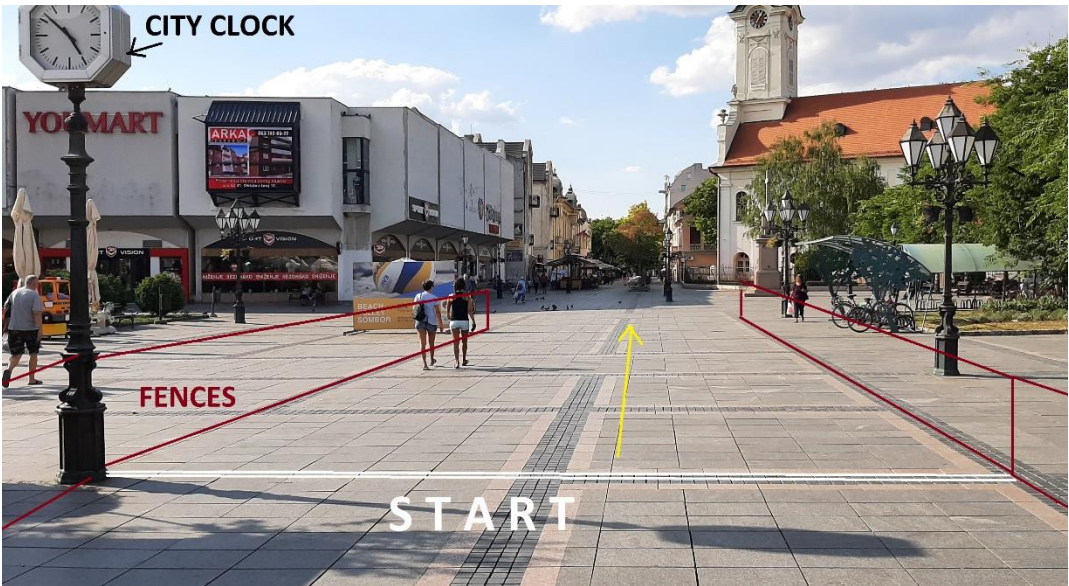
CALIBRATION COURSE FINISH side view – (picture 4)



CALIBRATION COURSE BEFORE FINISH onwards – (picture 5)



START onwards - (picture 6)



START side view – (picture 7)



FINISH – (picture 8)



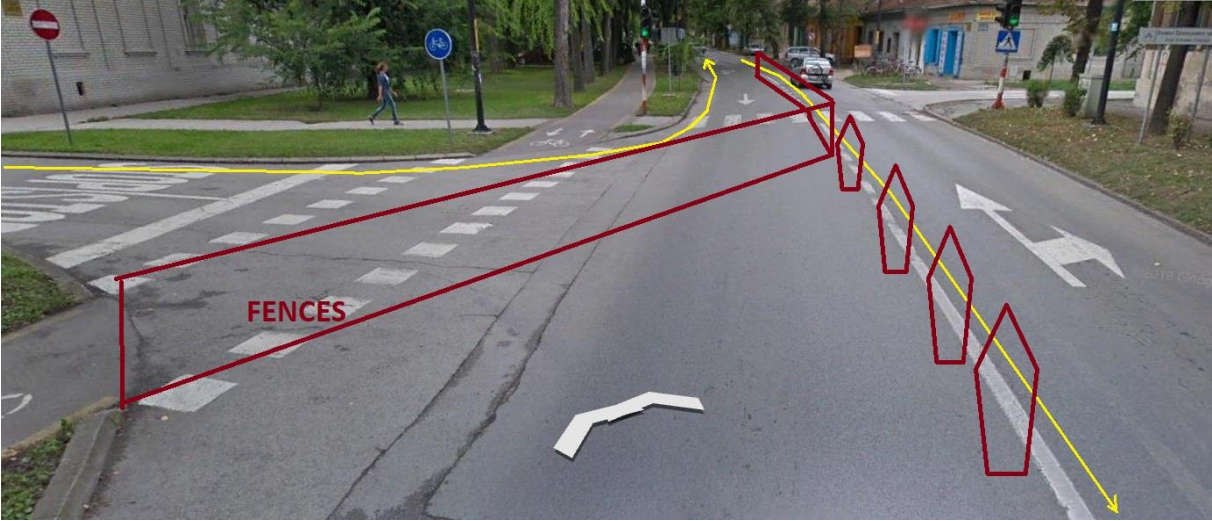
THE COURSE – (picture 9)



THE COURSE WITH SOME REMARKABLE POINTS – (picture 10)



POINT 1 – (picture 11)



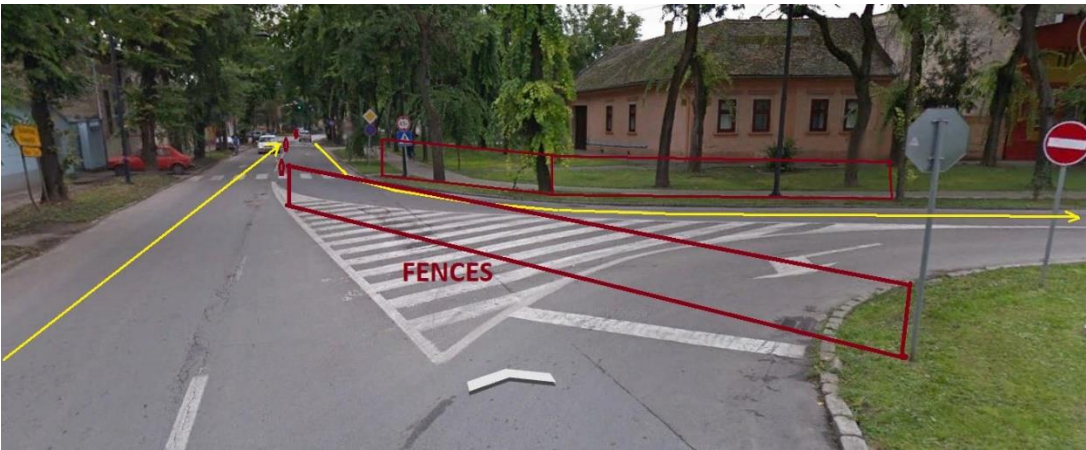
POINT 2 – (picture 12)



POINT 3 – (picture 13)



POINT 4 – (picture 14)



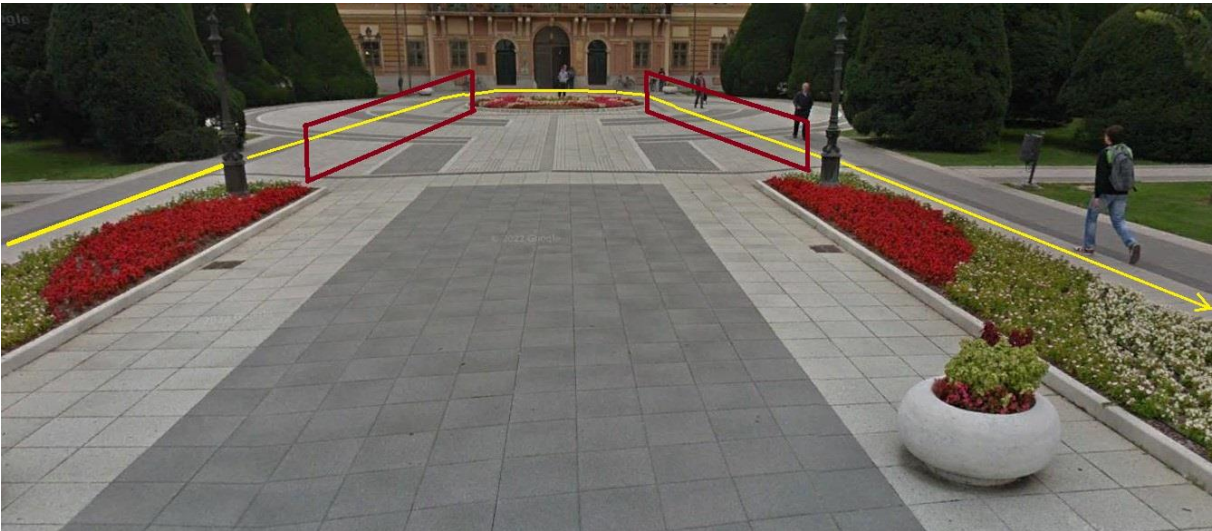
POINT 5 – (picture 15)



POINT 6 in the park – (picture 16)



POINT 7 – (picture 17)



POINT 8 – (picture 18)



ELEVATION PROFILE halfmarathon (basic lap) – (picture 19)



Maribor, 25th August 2022

Report prepared by: Borut Podgornik
WA/AIMS licensed course measurer