BITS
Bicycles and Intelligent Transport Systems

# Evaluation report

## Counting cyclists in Withernsea
## East Riding of Yorkshire Council

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# Short description

Withernsea has been identified as a community where levels of physical activity are low and so East Riding of Yorkshire Council is piloting new and exciting ways of encouraging residents live more healthier, more active lives, including through the BITS project. At the start of the project, the council recognised that it had little data on cycling levels in the town. To address this gap, the council installed temporary static counters at five locations to count cyclists during five week-long surveys through the project. These surveys took place in December 2019, December 2020, August 2021, December 2021 and August 2022. The automatic traffic counters were strategically placed to cover all the entry and exit points into town as well as a recreational route. They gathered information on the number of cyclists, their direction of travel, their speed of travel and the date time and location of the journeys. During the project, the surveys established a new repository of cycling data that has enabled the project team to identify and analyse cycling trends in Withernsea.

# Type of ITS

Counting of cyclists

# Timeline

East Riding of Yorkshire Council collected cycling data sets five times during the project; each survey ran for a whole week. In December 2019, a first round of data collection was launched in five different locations in Withernsea. The first counting period established a baseline measure. In December 2020, August 2021, December 2021 and August 2022 another four surveys were undertaken to collect data on the number of cyclists, their direction of travel, their speed of travel and the date time and location.

# Hypothesis

By gaining insight into the number of cyclists in the town of Withernsea over a 3-year period, we will be able to draw documented conclusions about the changes in bicycle use in Withernsea. Monitoring the number of cyclists helps to learn how cycling volumes change over time and how much cycling occurs in particular locations. In a second phase, these data may help to formulate recommendations for policy makers on cycling and cycle infrastructure and be used in conjunction with data and information generated by other interventions (cf. the bicycle library).

# Data sources

- Statistics collected by the counters in Withernsea and analysed by the University of Oldenburg on the number of cyclists, date/time/location data and direction of travel measured by five rounds (Dec 2019, Dec 2020, Aug 2021, Dec 2021, Aug 2022) of automatic counting for 7 days.
- Report of a meeting with the project managers about the evaluation of the pilot (Spring 2022).

# Analysis

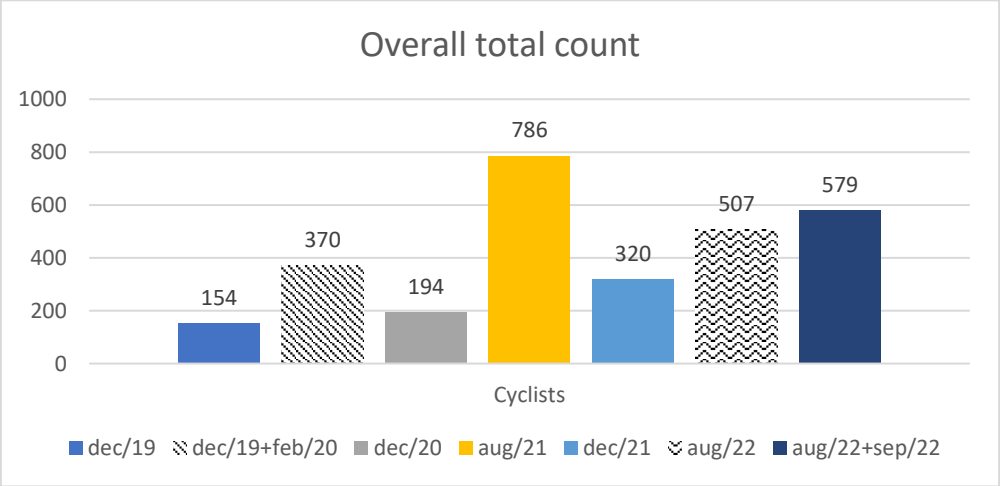
## Report of the pilot

Data was collected during five counting periods.

- The first counting survey ran from 15th to 21st December 2019. The goal was to measure the number of cyclists in five locations in the town. Unfortunately, the counter at Queen Street was damaged after two days by a road sweeping machine and so this survey was repeated two months later in February 2020 for one week. This week started on February 11th and ran until February 17th.
- The second counting round in December 2020 started on December 13th and ran until December 19th.
- The third counting round was during the summer. This counting started on August 30th and ended on 5th September 2021. The rationale for doing this was to collect cycle data at a different time of year and do another survey at the same time of year later in the project for comparison purposes.
- The fourth counting round was again in December, i.e. from the 14th to the 20th December 2021.
- The final counting round was during the late summer, starting on August 28th and ending on September 3rd 2022. Unfortunately, the counter on Pier Road was damaged during this counting period so the survey at this location had to be re-run from September 26th until October 2nd.

The five rounds of counting show some interesting changes in the number of cyclists at the different locations in Withernsea. Firstly, we would like to add the methodological note that data was only collected for periods of one week, which can have a strong impact on the results. For instance, particular weather conditions such as low temperatures, rain or snow conditions or heath during that week may have affected the number of cyclists.

In the graph below, an overview of the total number of cyclists for each counting period is shown. The counting period in December 2019 and February 2020 is hatched since there are doubts on the correctness of this number of cyclists (see below). The counting period in August 2022 is hatched as well since in this amount the counting on Pier Road is missing.



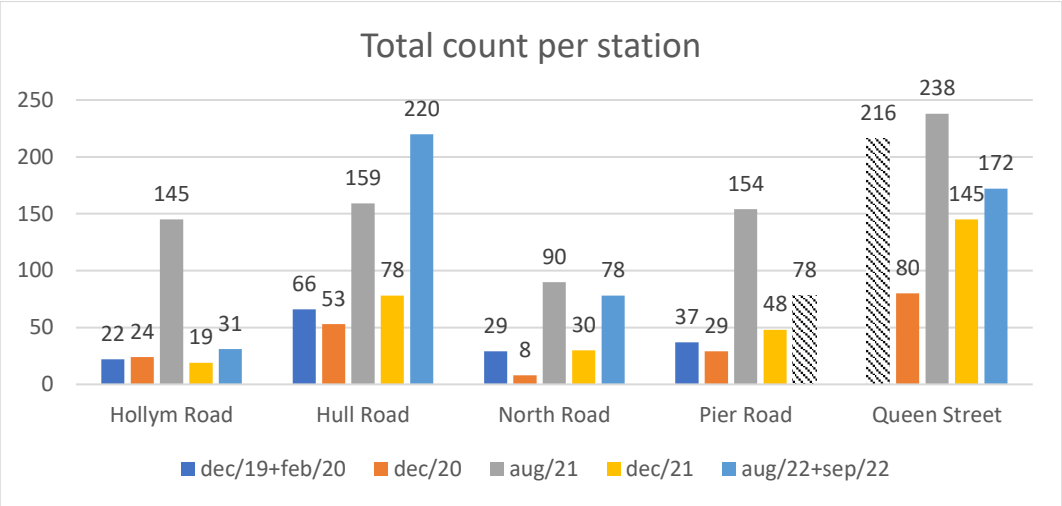
Comparing the total counts in December 2019 and December 2020, we observed at three counting locations in December 2019 a decrease in December 2020 (see detailed numbers in the graph below). It is important to mark here that the totals we are comparing (154 with 194) are based on four counting stations in December 2019 vs five counting stations in December 2020. The East Riding was in a 'very high risk' (tier 3) category of Covid-19 management, meaning travel and social interaction was limited and many public settings were closed. These restrictions could explain the decrease in cyclists in 2020 compared to 2019.

We assume a status quo between the counting in December 2019 and 2020. This is an assumption since the counting in December 2019 was disturbed by the damage to one of the counters. Continuing to August 2021, we notice a steep increase. The counting in 2021 was held during summer (August 2021) which explains the number of cyclists compared to the rounds of counting held in winter. At each location, there has been a clear increase of cyclists resulting in a total increase of 592 cyclists, compared to December 2020.

We observe a decrease again when counting in December 2021. Again, this could possibly be due to Covid-19 and the emergence of Omicron, which prompted the government to reintroduce some prevention measures. In total, 466 less cyclists were counted compared to the counting a few months earlier. This is no surprise given the different weather circumstances in winter versus summer. However, when comparing the counting of December 2021 to the counting in December 2020, we notice an increase of 65%, i.e. +126 cyclists were counted compared to December 2020. Comparing the four streets (and excluding the counting of Queen Street) in December 2021 to the same streets in December 2019, we notice an increase of 21 cyclists (which is +14%) in December 2021.

Compared to December 2021, we observe an increase in the total amount of cyclists in summer 2022, from 320 cyclists in December 2021 to 579 cyclists in August and September 2022. Potentially this amount could have been higher if the counting on Pier Road was not disturbed and would have been measured in August as well. We notice an increase of 81%, i.e. + 259 cyclists in summer 2022 compared to winter 2021. However, when comparing August 2021 with August 2022, we observe a decrease with 26%, from 786 to 579 cyclists. It is unfortunate to conclude that the increase we observed during winter months was bit continued in summer months. We can only hypothesize on explanations such as weather or other circumstances.

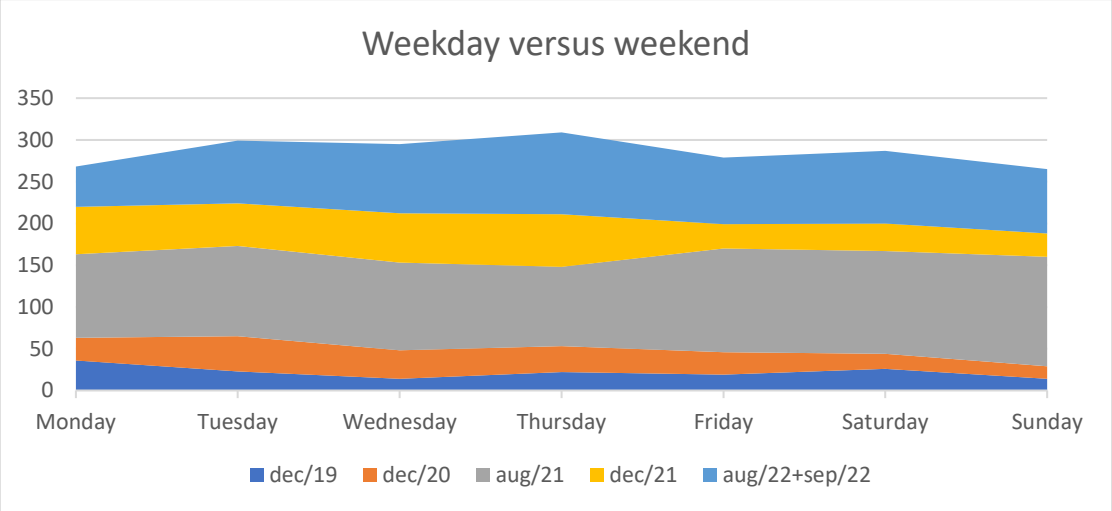
In the graph below, an overview of the total amount of cyclists at each counter for each counting period is shown.




A very high number of cyclists was counted during the extra counting in February 2020 in Queen Street. Especially on Saturday February 15th an abnormal high number was determined. No logic arguments could be given to explain the very high number of cyclists on this day (e.g. an organised event or good weather). When comparing the numbers of Queen Street in February 2020, except on that Saturday, with the numbers of this street in December 2020 and 2021, the results are comparable. This makes this extreme Saturday even more questionable. Therefore, we interpret this result as an outlier. No hard conclusions will be drawn based on this result.

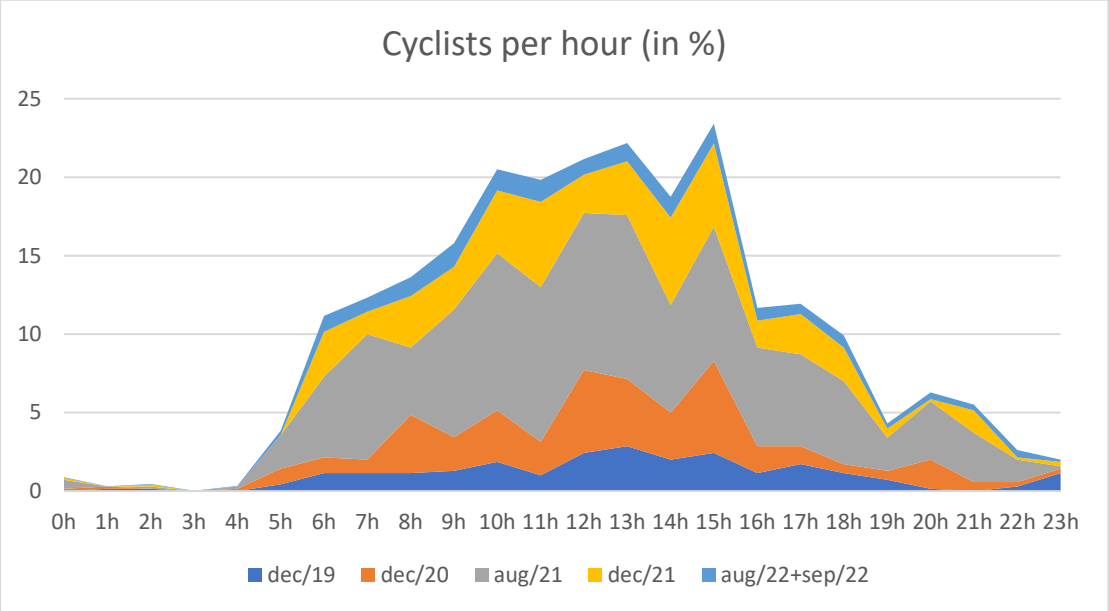
**Weekday vs weekend**

In the graph below an overview is given of the daily number of cyclists on the five counting surveys. The counting in Queen Street in February 2020 was not taken into account. No clear pattern can be drawn of more cyclists in the weekend compared to on weekdays. The share of cyclists on a weekday is the same as the share of cyclists on a Saturday or Sunday.



**Timing during the day**

When analysing the timing during the day when people cycled most frequently, we see an increase of cyclists during the day. Especially at noon and in the afternoon more cyclists can be seen. No clear peak during morning hours (6 to 9h) or at the end of the working day (14-19h) could be detected. However, it is important to note that these are the averages of the total counting period, thus both including weekdays and weekends. Especially in winter a peak during the afternoon can be found. During summer, there is a more equal spread during the day. This could indicate that not a lot of commuters are cycling in Withernsea during morning and evening hours. But instead that people are cycling for recreational purposes during the day. There is a high number of older people in the town so the number of people of working age (and therefore possible commuters) is lower here.




## Impact

The East Riding counting pilot measured on five different occasions the number of cyclists, their direction and the timing at different locations in Withernsea. With this data, some trends in cycling could be analysed.

However, there are some drawbacks with using cycle counting data as a measure of the number of cyclists in the town. Although data has been collected for one week intervals, only a limited number of locations are covered. For instance, in the town of Withernsea, the number of cyclists was measured at five locations. Even though it is a small town, in order to get a precise overview of the number of cyclists in a particular community, the number of detection spots needs to be high enough. Moreover, the counting weeks are reflective of a specific time period, which can be affected by different circumstances, for example weather. A sunny week versus a week of rain and wind will impact the number of cyclists. Secondly, the COVID-19 pandemic probably also had its impact on the counting. During December 2020 citizens had to follow strict measurements, which might have impacted cycling habits. Thirdly, the Bike Library pilot was launched. This

pilot encouraged Withernsea inhabitants to cycle more often. Possibly, this could impact the amount of cyclists in the town. However, it is hard to measure what the impact was.

Nevertheless, when assessing the data and comparing the different counting surveys, we can make statements about the impact on the overall BITS objectives. The overall objectives of the BITS project are to increase cycle use by 10% and decrease $CO_2$ emissions by 9%. In this pilot, we see an increase of cyclists of 14% when comparing the winter moments December 2019 and December 2021[1]. Comparing the winter counting in December 2020 with December 2021, we see an increase of 65%. When comparing the summer counting moments, we see a decrease of 26% between the counting week in 2021 and 2022, taking the re-run on Pier Road into account. When comparing the four counting stations in August 2021 and 2022 excluding Pier Road in both counting, we observe a decrease of 21% between 2021 and 2022. Despite the decrease between summer 2021 and 2022, we can still conclude that the amount of cyclists in Withernsea did increase during the project. However we note that the BITS project want to realize a 10% increase due to ITS, not just a 10% increase. The fact that the amount of cyclists has increased in Withernsea is not due to ITS. We have only used ITS to measure the increase (which in itself of course is useful for future cycling policy.

Besides the increase in cyclists, we cannot give an indication on the impact on the $CO_2$ emissions, the second main objective of the BITS project. We have no indication that all the people using their bicycles on the counting days were using their bicycle for a ride that they would otherwise have done with a motorised vehicle. We have no information on the decrease of rides with a motorised vehicle and can thus not give a scientifically proven indication on the decrease in $CO_2$ emission. However, we can assume that to a certain extent, these extra cyclists will have led to less rides with motorised vehicles and thus less $CO_2$ emissions.

## Experiences project managers

A meeting with a member of the project team took place in May 2022. The project worker was positive and satisfied with the pilot. First of all, it was the first time that a programme of cycle counting surveys was performed in the town, making it a unique dataset of cycling volume over time and at particular locations in Withernsea. The counting data is considered as a very useful data source or *"ingredient in a greater mix of pilots in Withernsea and around"*, not least of which in combination with other pilots in the town (e.g. bike library and Active Withernsea) or in comparison with pilots of other BITS partners (e.g. via the Cycle Data Hub and Bicycle Data).

Secondly, having some internal experience in the counting of other types of traffic in Withernsea was also seen as valuable. Practically, the project team was able to set up the counting system quite easily due to their previous experiences with traffic counting. They also worked with colleagues in the Active Withernsea team to select the best locations.

Thirdly, the collaboration with the BITS partners is considered very positive , the support from the University of Oldenburg whose researchers carried out detailed analysis and helped to draw conclusions

[1] This comparison is without the counting in Queen Street, since there was no valid counting in December 2019.

from the raw data. The analysis of the peaks and troughs in numbers at the different spots, the influence of the weather conditions, the differences between the week/weekends, etc. was an essential step in processing the data. Without the support of the University of Oldenburg, who have the technical expertise, this exchange would not have been possible. In addition, being part of the BITS partnership also has the added value of being able to make comparisons with other cities. The ability to transfer and add the data to the Cycle Data Hub has also been highlighted as a very positive aspect of this pilot.

Fourthly, according to the project worker, the pilot has the potential to offer new insights to local policy-making. The counting surveys make the cycling trends visual which may, in combination with the other pilots such as the bike library, help to make thoughtful policy decisions about cycle infrastructure and further interventions. The project worker also shared some important challenges related to this pilot. Although the timing (winter vs. summer) and number (5) of the surveys were well thought out, it remains very difficult to out rule disruptive factors such as COVID-19, weather conditions during the rounds of counting, the start of the other pilots and accompanying events or workshops, in the town. The main challenge however has to do with the use of technology itself, which is not flawless and may negatively impact the counting. For example, the damage to the counting strips during the first and last rounds of counting.

# Conclusions

In this pilot, during five weeks in different seasons on five locations in Withernsea all cyclists passing by were counted. This resulted in a first-of-its-kind dataset which provides the opportunity to compare cycling trends in the town and with other regions. Three surveys were executed in winter, two were executed in summer. The first and last counting period experienced technological problems and consequently not all counting periods are equally comparable. Nevertheless, we determined an important increase in cyclists during winter periods and overall. It is also important to put these numbers into perspective: the countings are just one snapshot and are determined by the circumstances, such as the weather, covid restrictions, organised events etc. Therefore, we also need to be careful making conclusions. Although we cannot conclude that the increase in cyclists automatically leads to a decrease of $CO_2$ emissions - we have no information on the use of the bicycle instead of a motorised vehicle, countings are valuable for policy preparation in terms of mobility, which can subsequently lead to an increase in cyclists and a reduction in $CO_2$ emissions in the future.