

## **Oxfordshire County Council Vivacity Labs Multimodal sensor location selection rationale and background**

Oxfordshire County Council owns over 100 Vivacity Labs (VL) sensors in the county, with most located in Oxford City. These sensors use machine learning to process video images, identifying types of road users and counting them as they cross a virtual line in the roadway. Unlike other automatic traffic counters, VL sensors are able to detect and count vehicles, pedestrians, and cyclists anywhere in the roadway, providing an understanding of how a roadway is used that is particularly relevant to monitoring active travel and evaluating interventions such as Low Traffic Neighbourhoods which impact all types of road users.

VL sensors in Oxfordshire have been installed as part of externally funded innovation projects. Although these projects have now completed, they continue to provide the council with cycling, walking, and classified vehicle counts.

### **General VL sensor location requirements**

VL sensors require mains power and a nearby installation location 5 meters above the ground with an unobstructed view of the area required for monitoring. Assets to which sensors are mounted must either be owned by OCC or permission must be gained by the asset owner. Assets are usually streetlighting columns. Streetlighting column install must be approved by the OCC streetlighting team, which determine suitability based on asset age and wind and weight loading tolerances of the specific asset. The column location must also be safe for a maintenance team to reach. Many if not most streetlighting columns are not suitable for VL sensor install. These factors limit the possible sites for installing VL sensors.

### **Sensor location rationale**

The vast majority of VL sensors in Oxfordshire were installed as part of two externally funded innovation projects:

- VL sensors installed in 2018/2019 were installed as part of Smart Cycle detection Scheme, an innovation project funded by NPIF. Monitoring locations for this project were selected to be on roads with higher traffic flows and/or with significant cycle usage.
- VL sensors installed in 2020/2021 were installed as part of the Data Driven Road Safety Project, an innovation project funded by Innovate UK. Locations were selected based on factors including higher road safety risk areas and suitable available asset for sensor mounting.

Secondary countlines: The primary countlines (a virtual line that is programmed into the VL sensor that is used to count road users as they cross the line) of a VL sensor was selected for the reasons bullet-pointed above. However, VL sensors are capable of having multiple countlines crossing multiple roadways. Where possible, sensors were mounted to also cover roadways of secondary importance to increase the value of the asset. As sensors, in general, have been located to count roads with higher traffic flows roads with lower traffic flows are, in general, covered by secondary countlines.

### **Cowley Low Traffic Neighbourhood monitoring with Vivacity Labs sensors**

The Emergency Active Travel Fund, which provided funding and impetus for implementing Low Traffic Neighbourhoods was established during the Covid-19 pandemic. The impacts on travel caused by the pandemic were a confounding factor in monitoring Cowley LTNs; it would be difficult to disaggregate the impacts of Covid-19 lockdowns and those of Cowley LTNs. To do so, traffic monitoring data would need to extend to before March 2020 to establish a pre-pandemic baseline and comparison monitoring sites used to account for the impacts of lockdowns. This required using monitoring locations that had been established and collecting data before LTN planning had commenced. There are two types of areas for which a monitoring need was identified:

- *within LTNs*, to monitor the impacts of the LTN on residential roads that no longer permitted through traffic and
- *boundary roads* to monitor the impacts of the LTN on the roads that immediately border the LTN that would be impacted by displaced traffic that would have otherwise moved through the LTN

### **Selection of VL sensors for monitoring Cowley LTNs**

VL locations for monitoring *within Cowley LTNs* needed to meet the following requirements:

- installed before March 2020 in order to establish a pre-pandemic baseline
- providing consistent data before, during, and after the LTN implementation
- covering roads within the LTNs

These three requirements significantly limited the possible monitoring locations, particularly the final one. As LTNs cover residential roads with lower traffic flows, VL primary countlines were unlikely to be located within LTNs. Therefore, monitoring of traffic flows within LTNs (and control sites for this) often utilise secondary countlines. All possible monitoring locations within the LTNs that met the above requirements were therefore used in the evaluation.

On this basis, the only VL sensors available to us within the Cowley LTN were:

- Cowley Road North
- Long Lane East
- Rymers Lane

The sensor in Barnes Road had to be excluded because it lacked sufficient historical data.

The presence of filters was not a factor in the sensor selection.

VL locations for monitoring *LTN boundary roads* needed to meet the following requirements:

- installed before March 2020 in order to establish a pre-pandemic baseline
- providing consistent data before, during, and after the LTN implementation
- covering LTN boundary roads

While these requirements restricted possible monitoring locations, as boundary roads have higher traffic flows and are of strategic importance, there were a greater number of relevant sensors to select from. Where there was more than 1 sensor on each boundary road that met the above requirements, the sensor with the most complete data in the most impacted location was selected.

