



SENSEMYSTREET
DATA FOR EVERYONE

SENSOR COMMISSIONING TOOLKIT FOR COMMUNITIES

Aare Puussaar

 @sensemystreet

 @aarewoodisland

Open Lab
at  Newcastle University

DC
Digital Civics

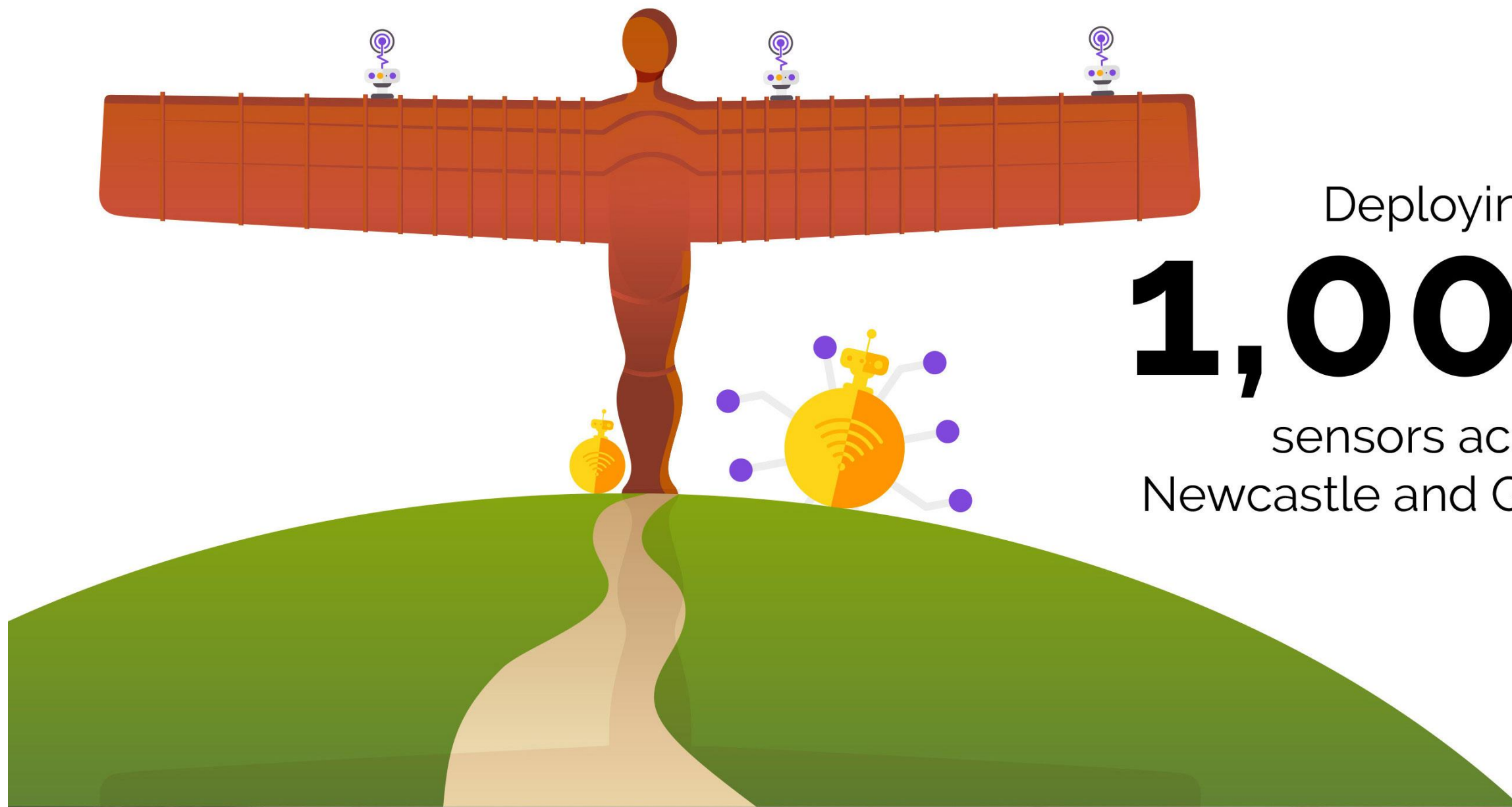
EPSRC
Engineering and Physical Sciences
Research Council



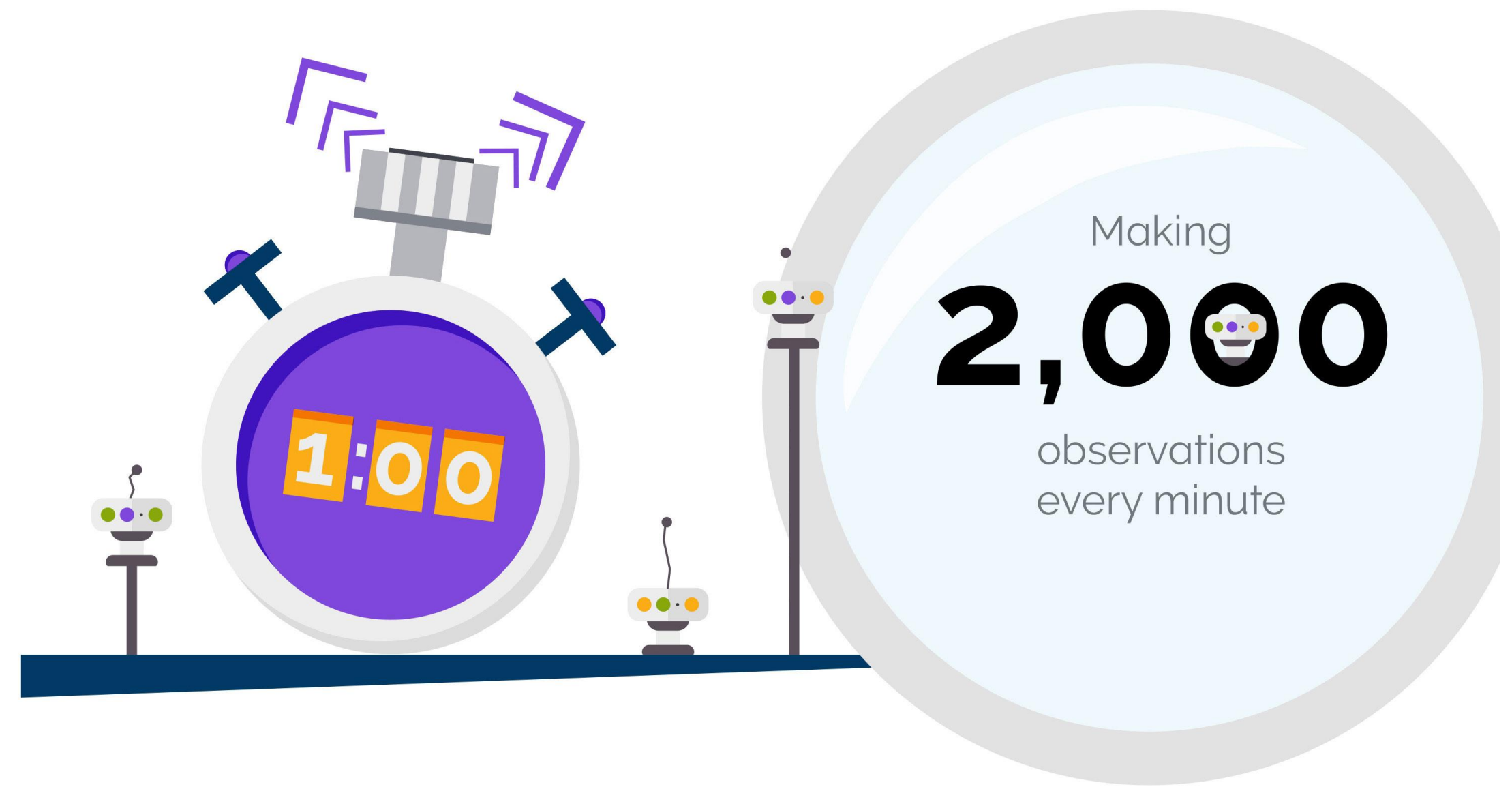
urban observatory

IAPSC Conference 2018
Thursday 22nd of Nov





Deploying
1,000+
sensors across
Newcastle and Gateshead



Making
2,000
observations
every minute

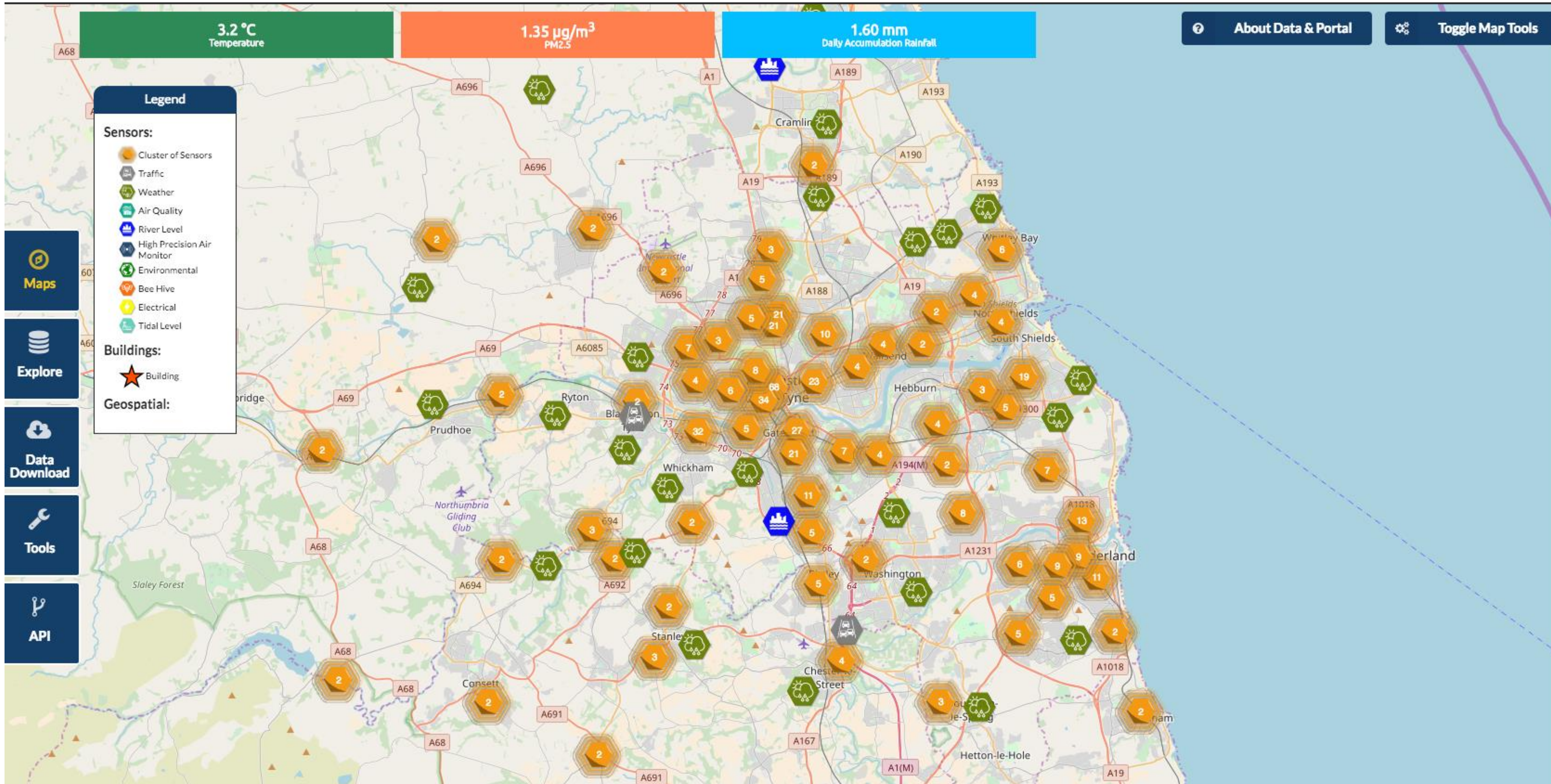


Measuring over
600
environmental indicators,
from air quality to flooding
and biodiversity



In fact,
900
MILLION
observations
have been made so far

<https://ncl.ac.uk/who-we-are/vision/urban-observatory>



```
[{"Value": 3.2, "Lat": 55.0664, "Lon": -1.6197, "Timestamp": "2017-12-14 14:30:15.257000", "Units": "Celsius", "Variable": "Temperature"}, {"Value": 3.1, "Lat": 55.0079, "Lon": -1.6198, "Timestamp": "2017-12-14 14:30:15.430000", "Units": "Celsius", "Variable": "Temperature"}, {"Value": 25.249702722254213, "Lat": 55.0079, "Lon": -1.6198, "Timestamp": "2017-12-14 14:30:15.430000", "Units": "ppb", "Variable": "NO"}, {"Value": 92.5, "Lat": 55.0079, "Lon": -1.6198, "Timestamp": "2017-12-14 14:30:15.430000", "Units": "%", "Variable": "Humidity"}]
```

bed & movies kinda day
2017-12-14 14:31:02

630,962,990
Records

Level 4 'Extreme Citizen Science'

- Collaborative science – problem definition, data collection and analysis

Level 3 'Participatory science'

- Participation in problem definition and data collection

Level 2 'Distributed Intelligence'

- Citizens as basic interpreters
- Volunteered thinking

Level 1 'Crowdsourcing'

- Citizens as sensors
- Volunteered computing

(Haklay, 2013)

Why?



How?



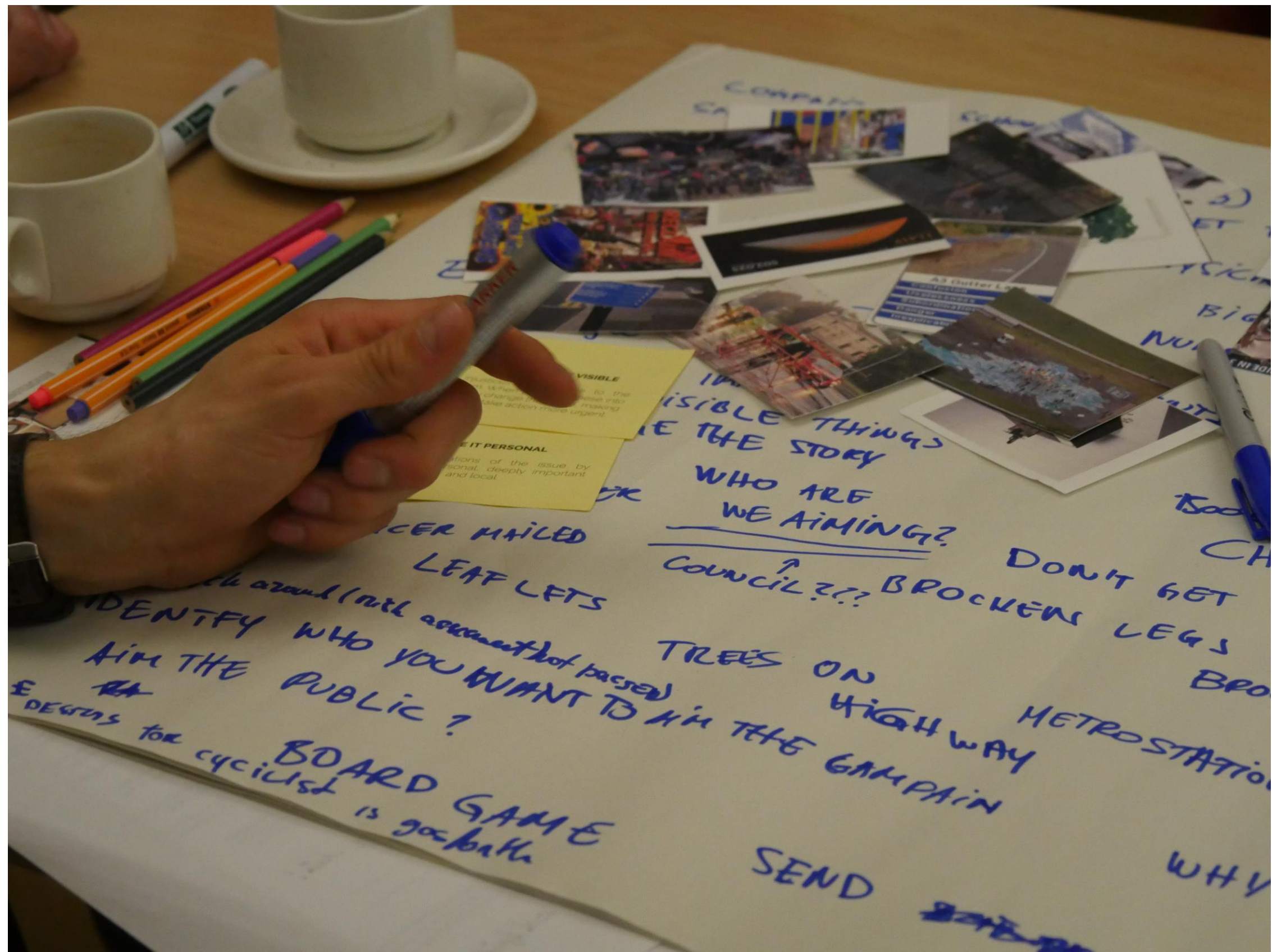
What Next?



BEYOND PINS ON A MAP

Open Lab
at Newcastle University

© Google Maps



PRIVACY CONCERNS
 WRITTEN MATERIAL ASIDE — WHY? + WHAT?
 QUALITATIVE INFO
 AGGREGATION
 AREAS NOT STREETS
 ADDING THE ERROR (PUBLISHED)
 HOW I PERSONALLY FEEL
 REFLECT * DAY
 GETTING SOMETHING BACK
 COMPARE TO OTHERS
LIMITS OF DATA
 AVG OVER A PERIOD OF DATA
 IDENTIFY THE PATTERNS
 PRESENT HIGH TRAFFIC AIR POLLUTION
 WHAT THE NUMBERS MEAN
 ACROSS THE CITY EXPOSURE FROM
 THE LOW COST
 CONVERSATION STARTER
 REFLECTION
 PEOPLE HAVE DONE
 THEIR BID
 BUYING DIESEL
 MONITORS ALL
 THE STREETS
 COMPARISON/SUPPRESS INFO
 IS * +
 HAVING FACTS
 ARE VALUABLE
 BIG TROUBLES FOR Council
 Political struggle
 Raising awareness
 Find data, more data? Make it accessible.
 What do graphs create costs more graphs
 Get people interested.
 Make it more accessible
 Speed motivations (Signage for pollution)
 local and national issue.
 Reason works • GETTING FEEDBACK
 IDENTIFY CHALLENGES
 availability and awareness
 people have heard of Global Warming, but no link to individual actions
 REFLECT
 INFORMATION
 REAL TIME



SENSEMYSTREET

DATA FOR EVERYONE

SensemyStreet is a toolkit developed in collaboration between [Open Lab](#) and the [Urban Observatory](#) at Newcastle University. Toolkit enables citizens and local communities commission sensors from the [Urban Observatory](#), on their local streets to collect evidence for informing or even changing the community. For the first time, the public has access to precision equipment to gather data relevant to their local issues.

1

Tell us your issue

Flag your issue on the map



2

Plan and propose

Decide when and where to place sensors with your local community



3

Get the facts

Get sensors deployed on your street



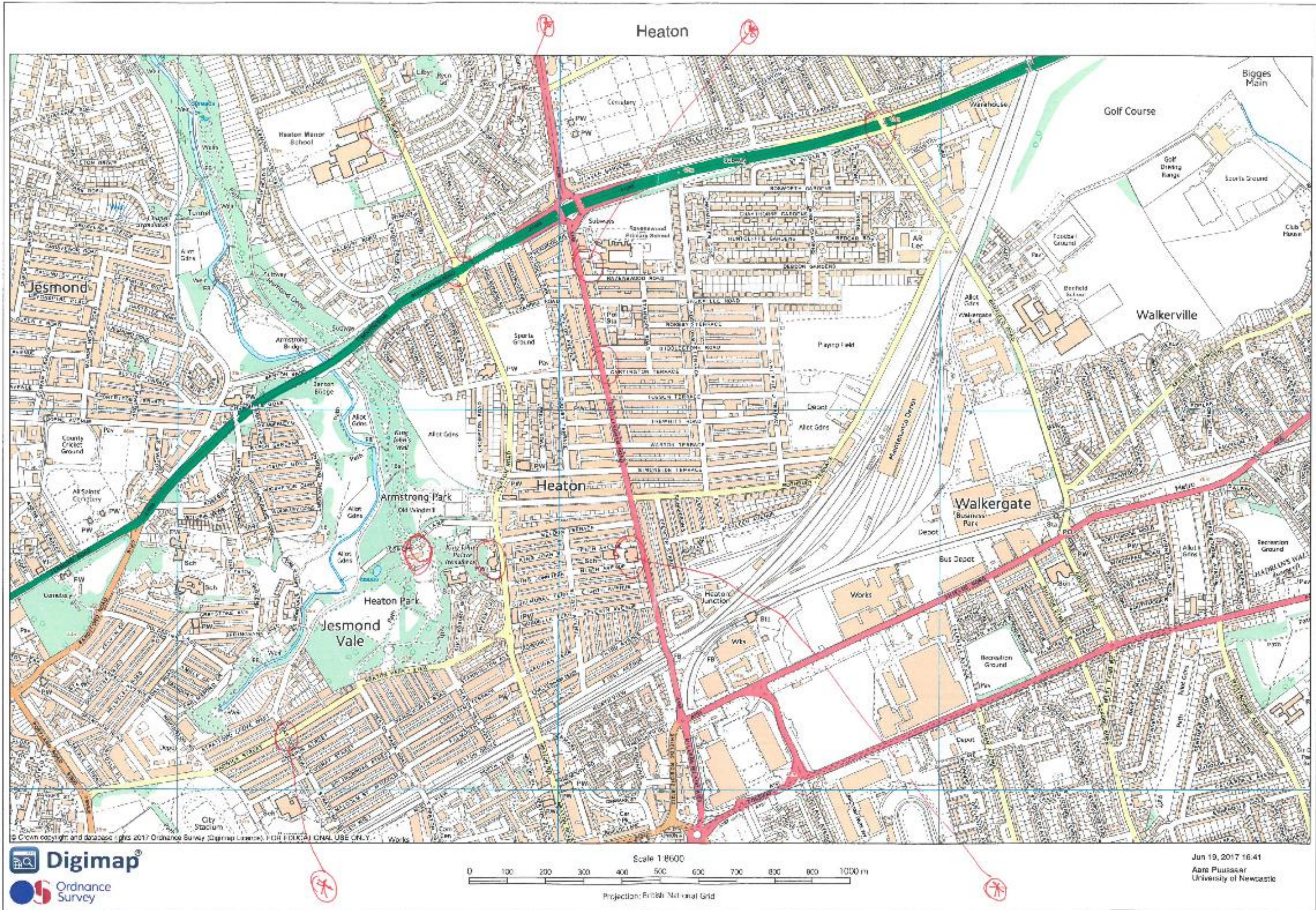
4

Data for everyone

Get the data to evidence or inform your issue



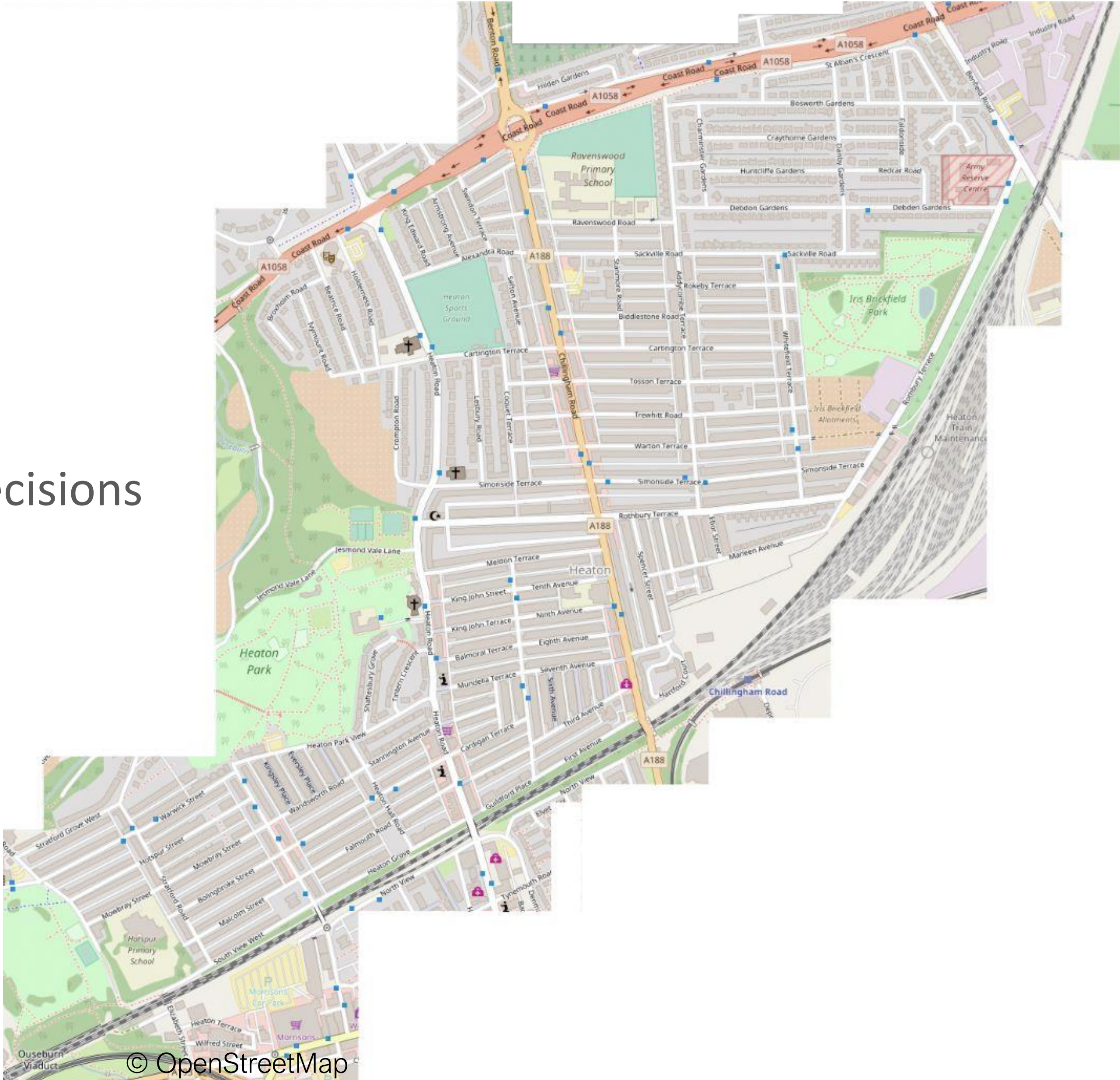
<https://sensemystreet.uk>



Heaton

Air pollution Bid

The desire for data to help residents make decisions



Tell us your issue

Flag your issue on the map



Visit



Flag the issues



Identify neighbourhood areas



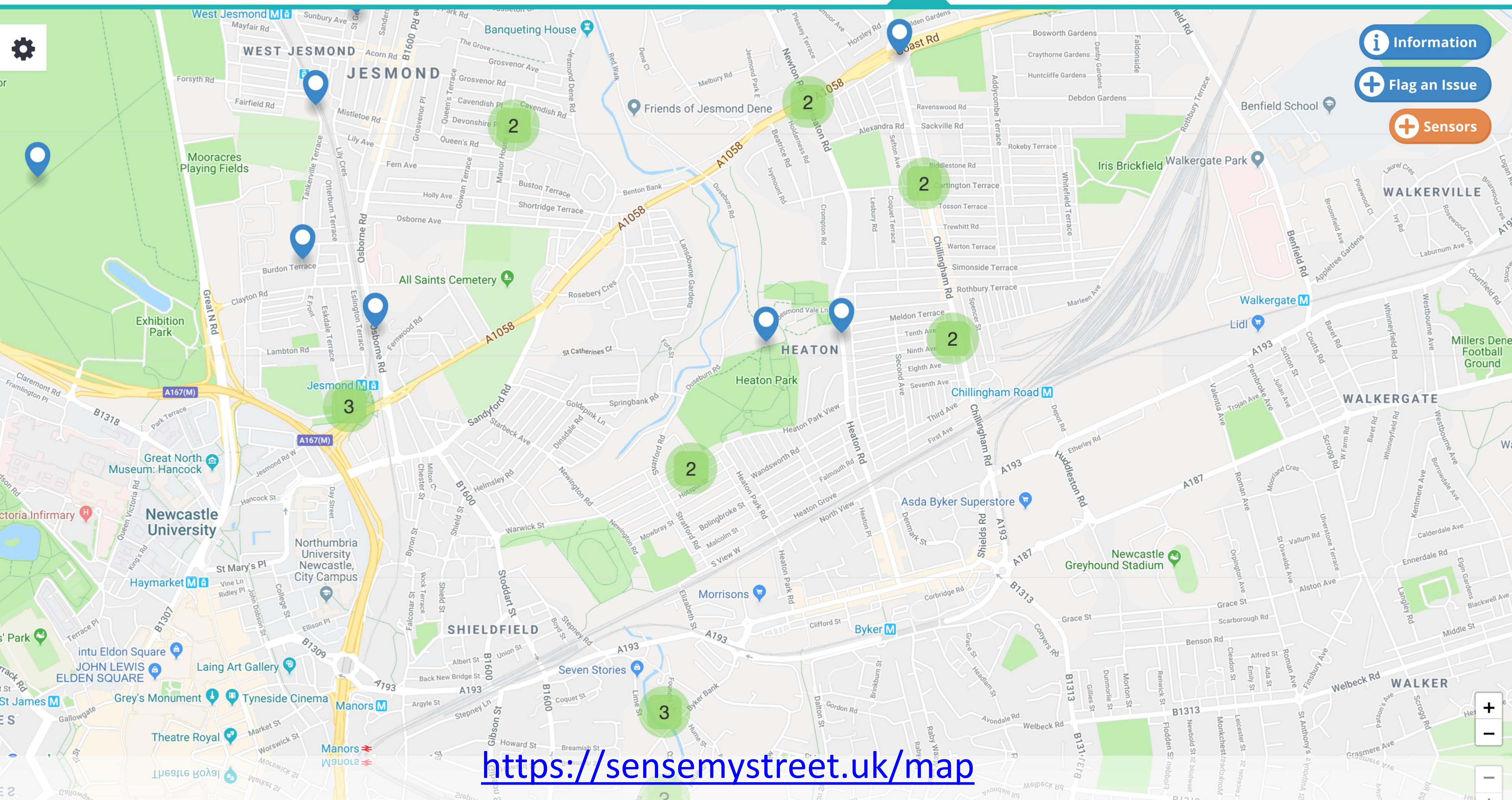
Recieve hand-held



Conduct preliminary sensing



Negotiating within the Community



- Information
- Flag an Issue
- Sensors

<https://sensemystreet.uk/map>

SenseMyStreet

* Required

Equipment and Measuring

See what sensors are available and when - <https://goo.gl/14wrgM>. See also the public calendar - <https://goo.gl/LfYFk8>. We are working hard to acquire more sensors for the toolkit. Please specify the time and the areas you would like to collect measurements from.

Loan start date *

Maximum time for the loan is one month at a time.

Date

dd/mm/yyyy

Loan end date *

Maximum time for the loan is one month at a time.

Date

dd/mm/yyyy

Choose the neighbourhood areas you to want cover *

If the areas you are interested in are not yet mapped, head to <https://sensemystreet.uk/map> and flag the issues.

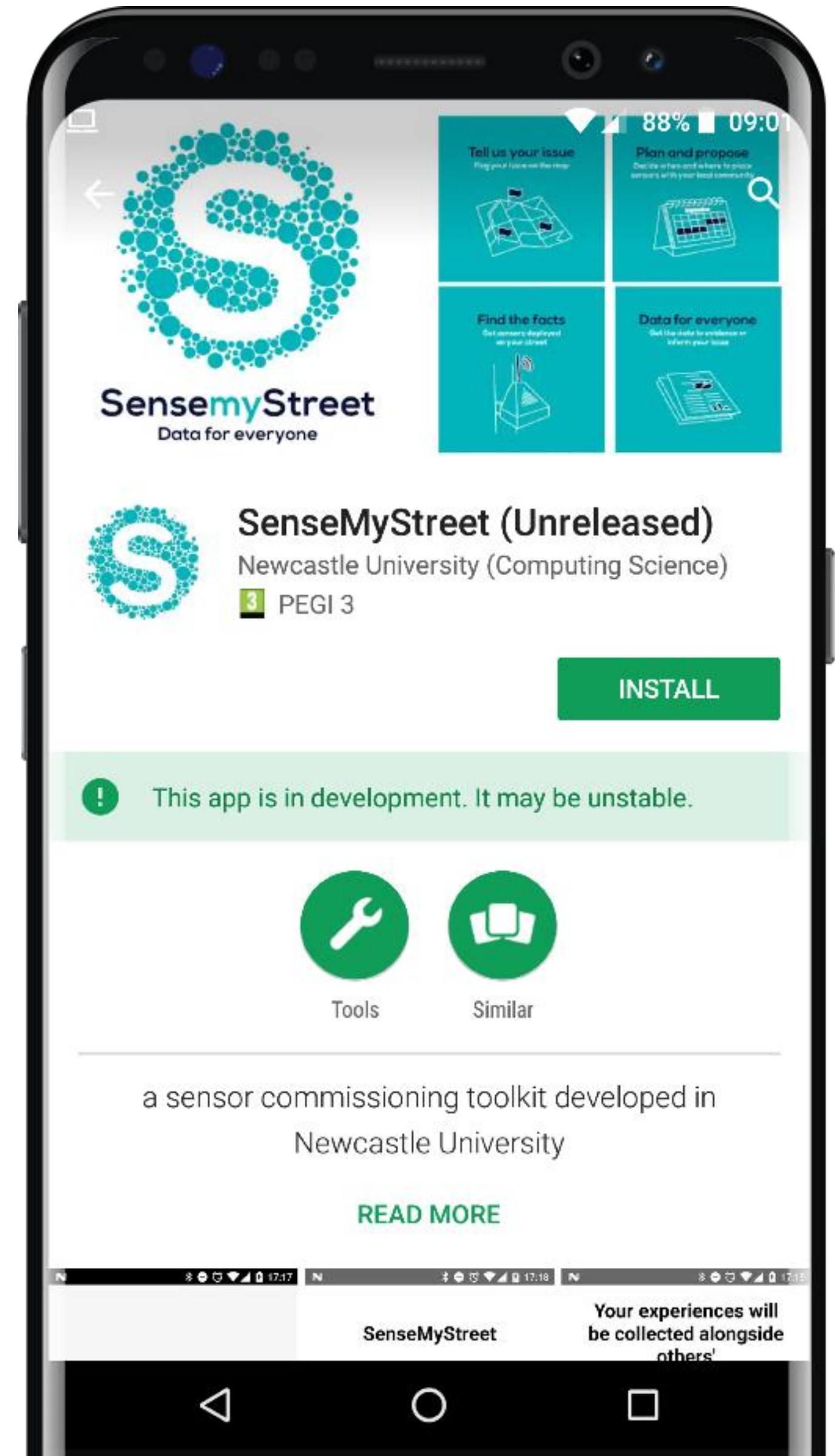
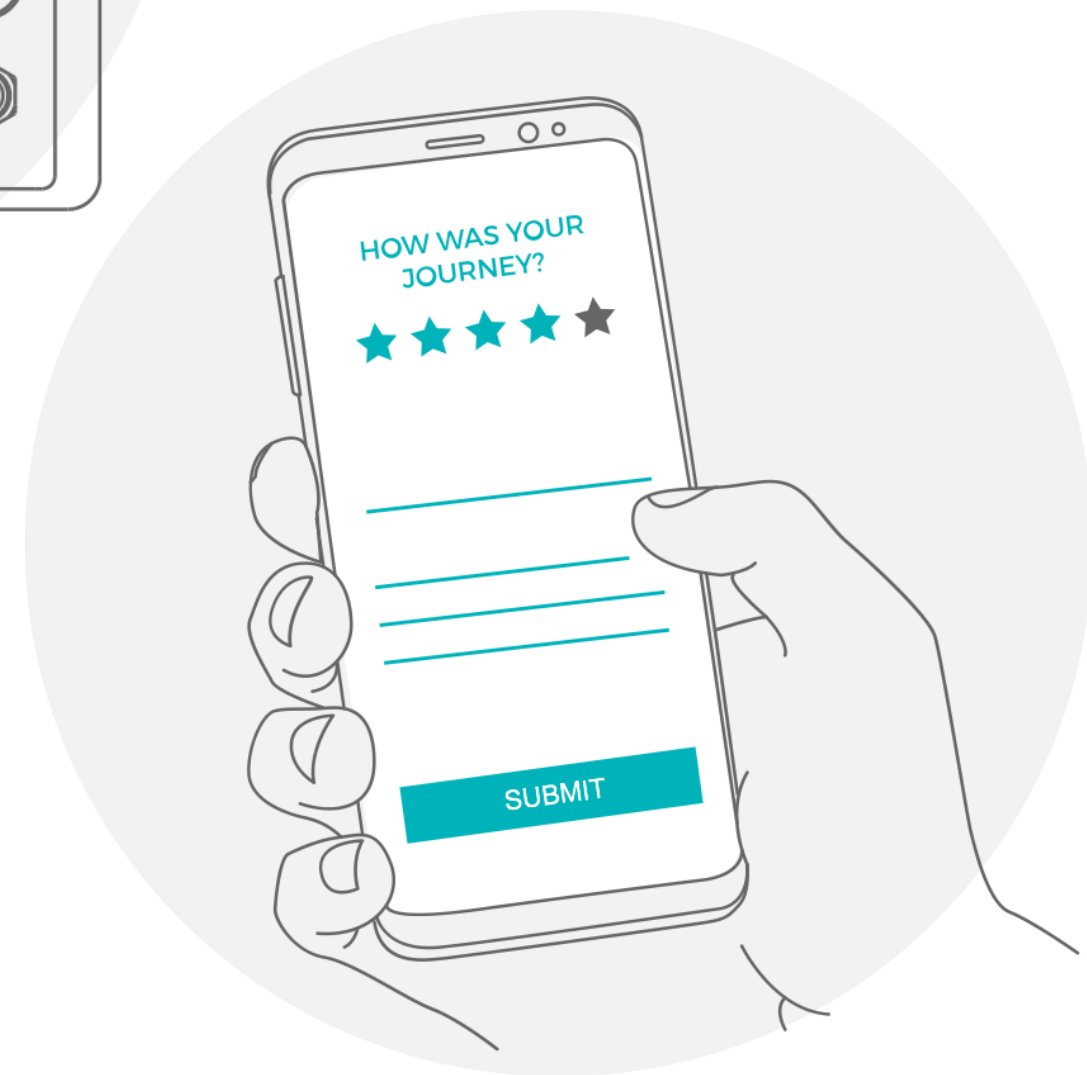
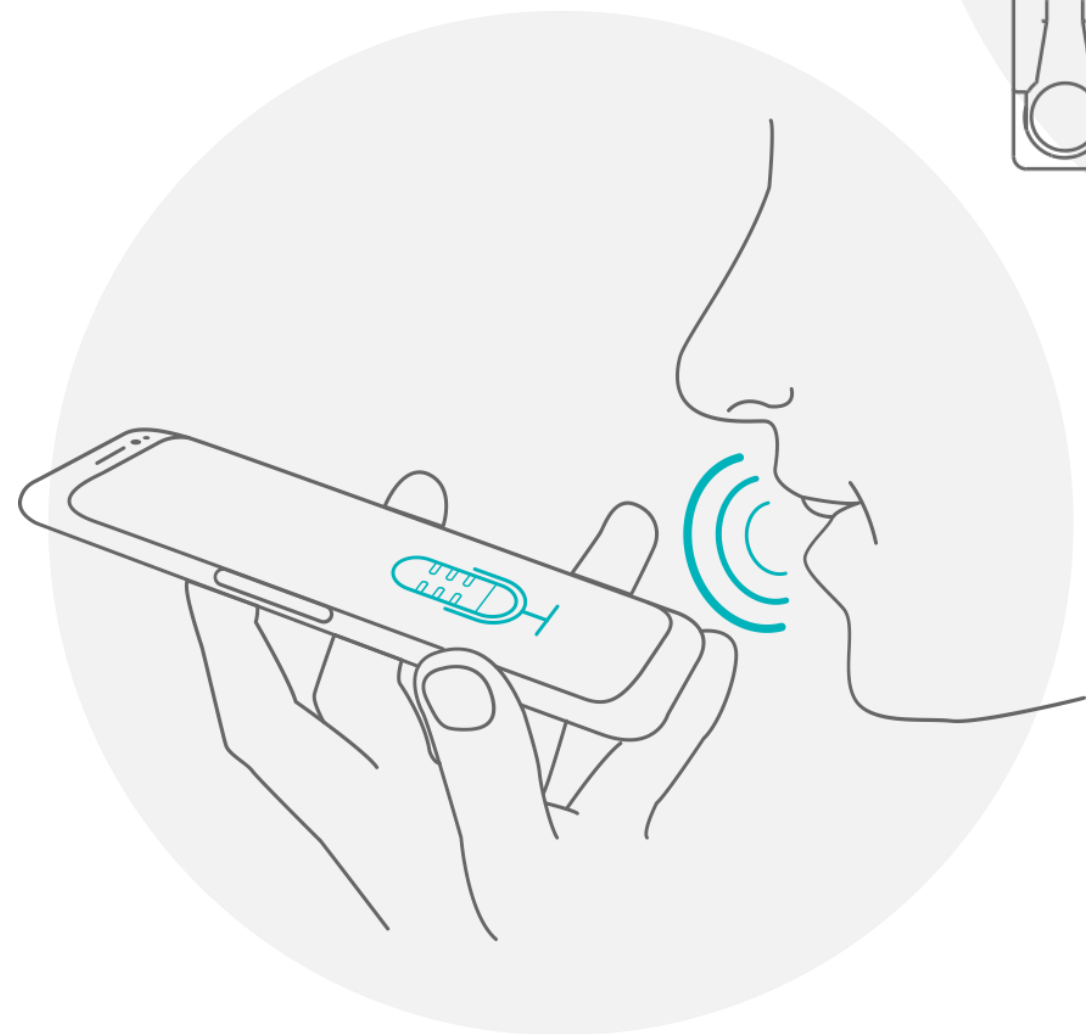
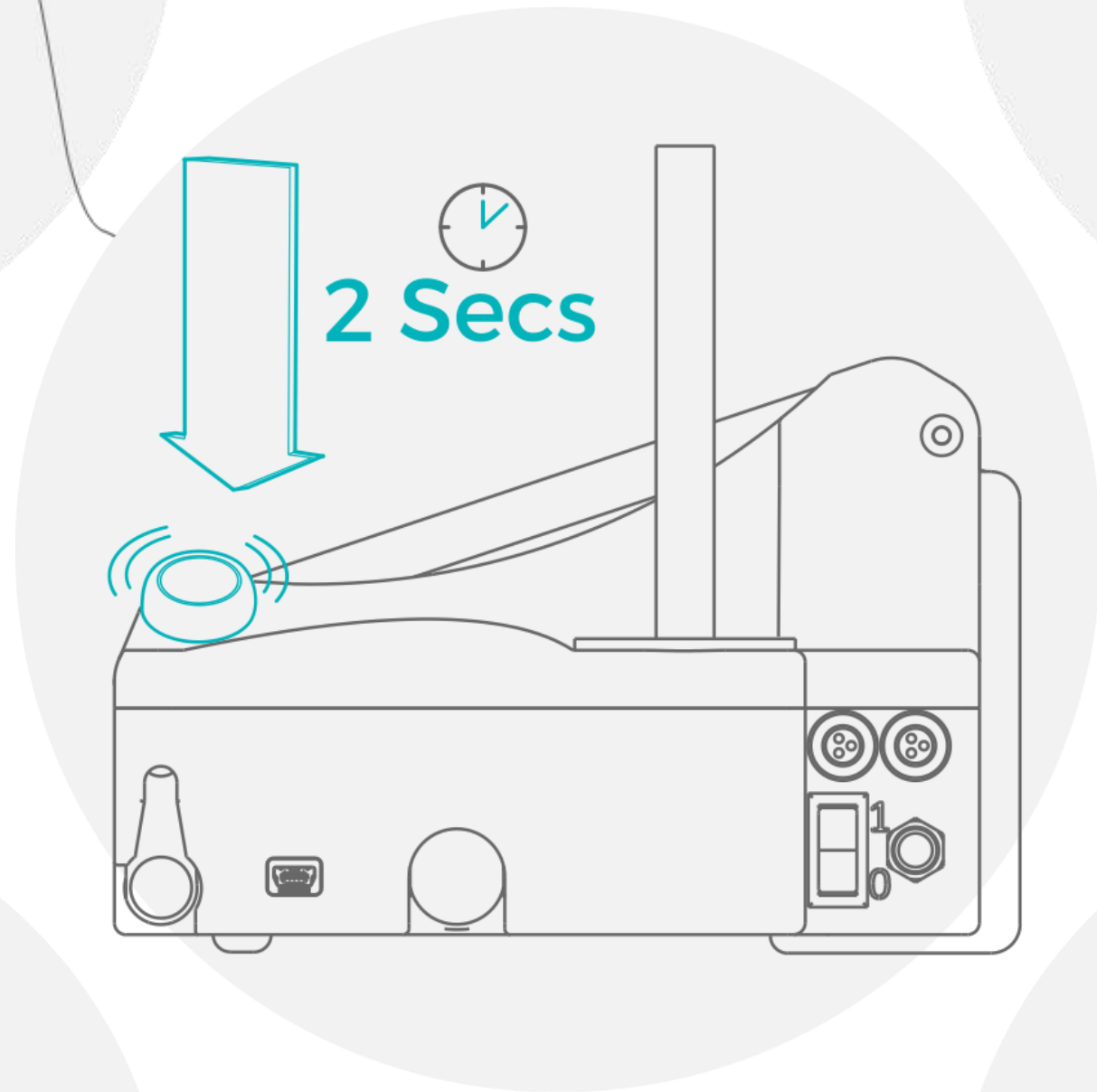
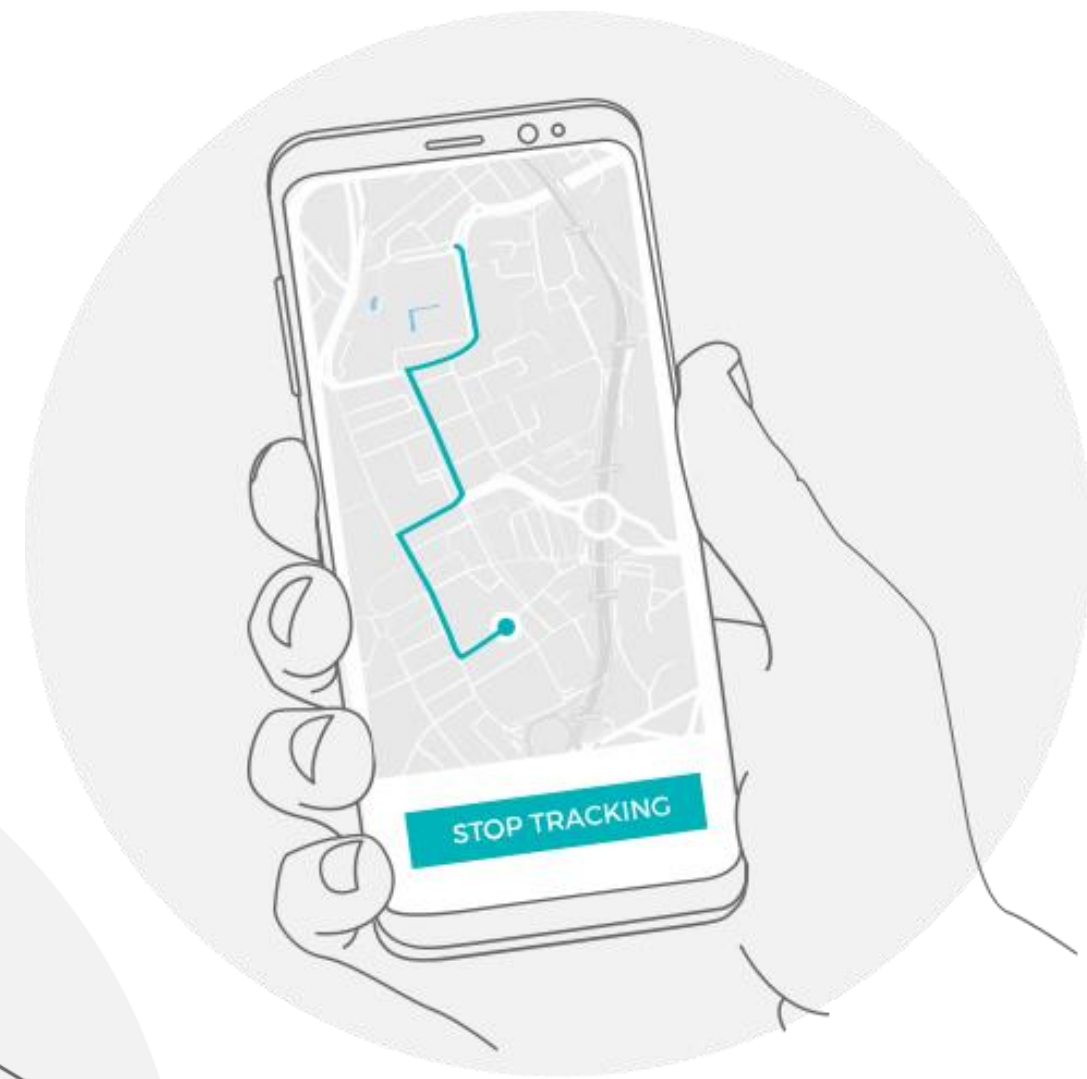
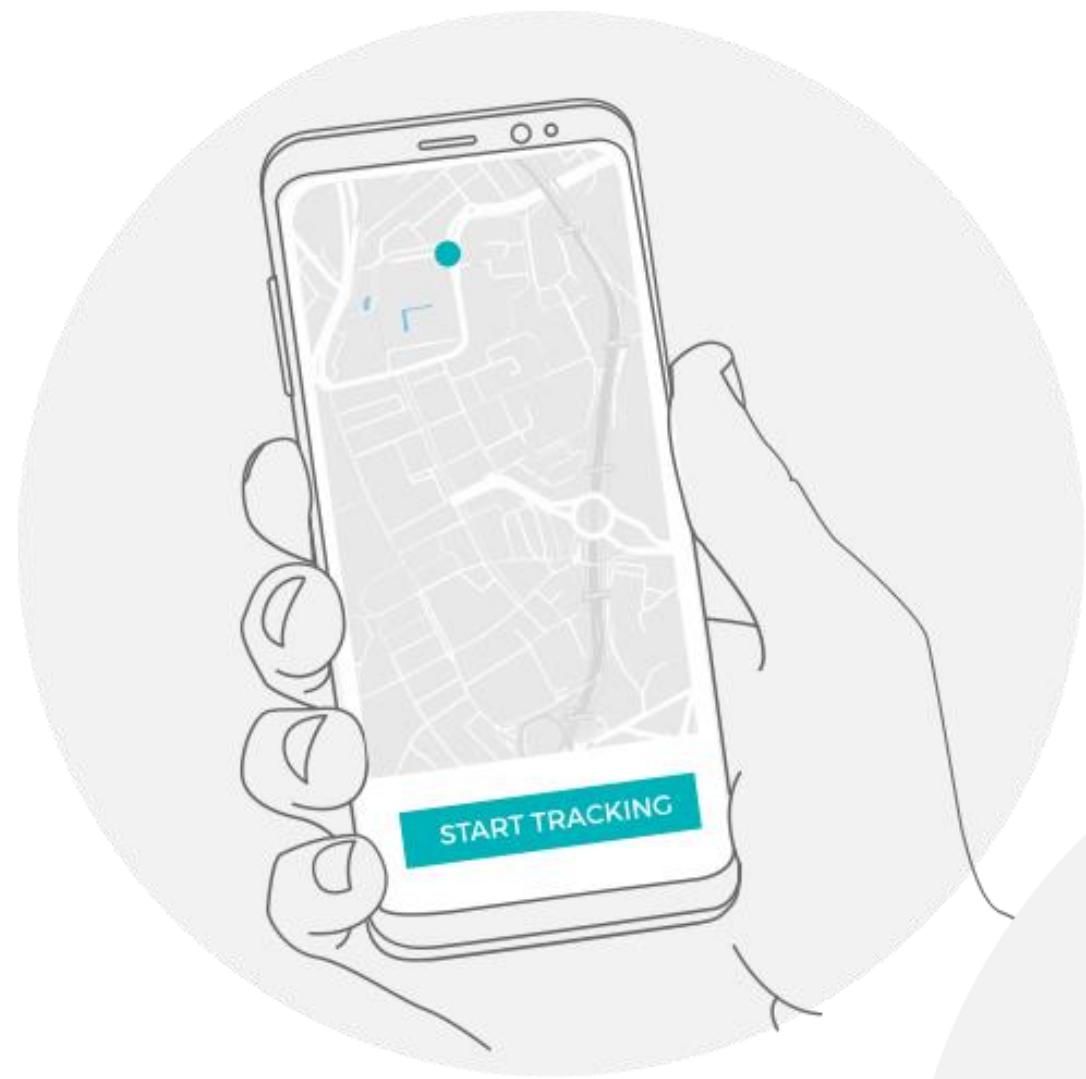




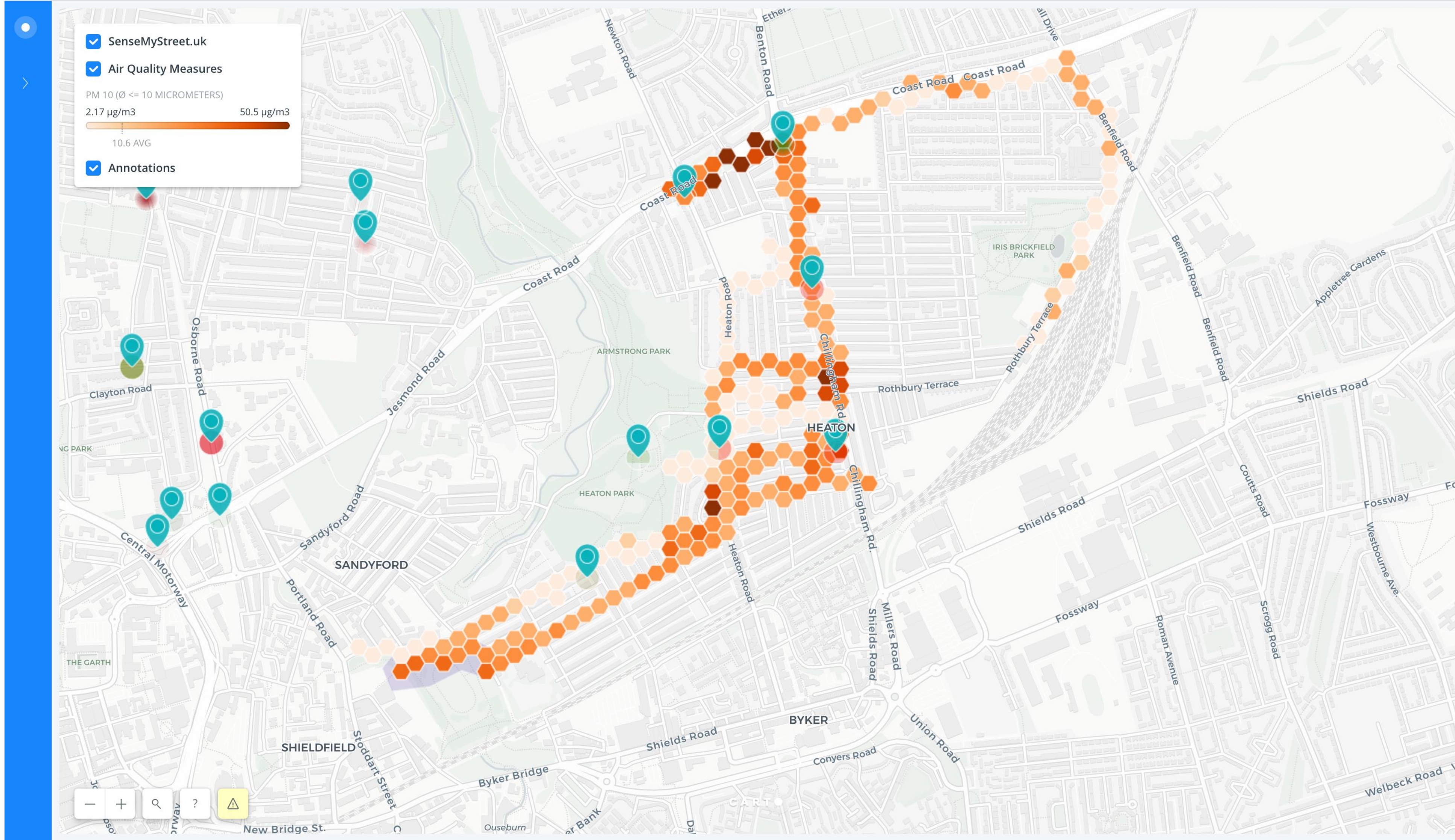
© Fidas® Frog is a product of Palas GmbH



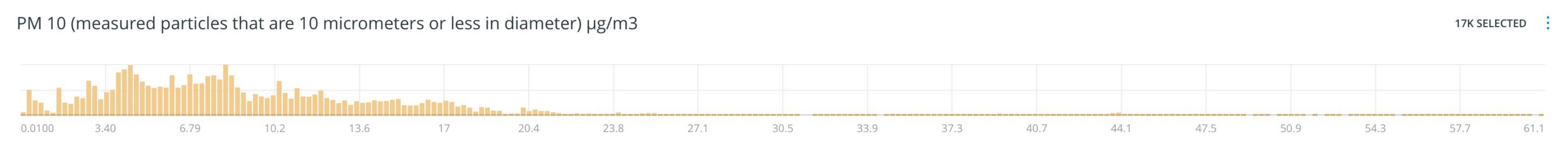
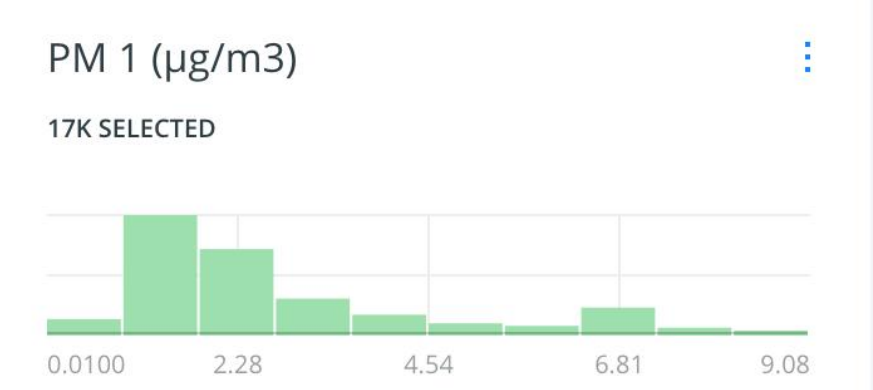
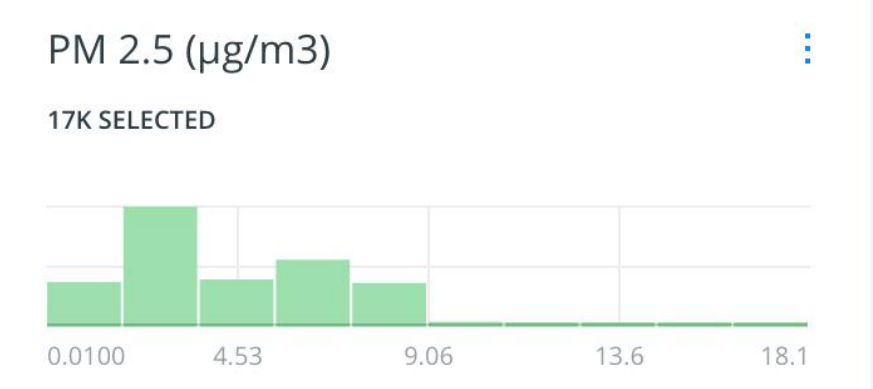
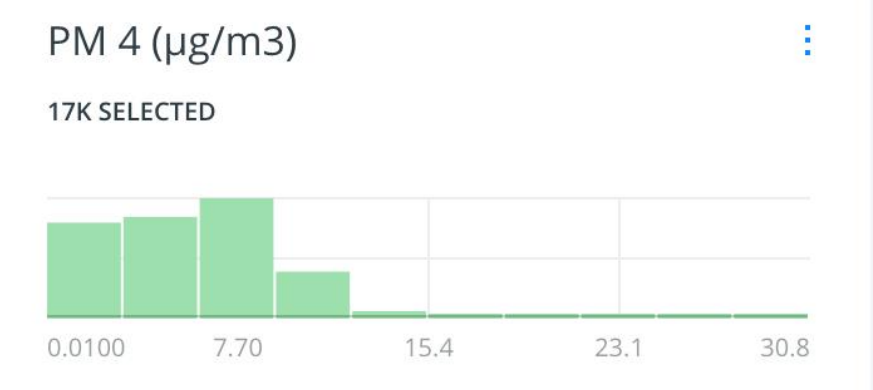
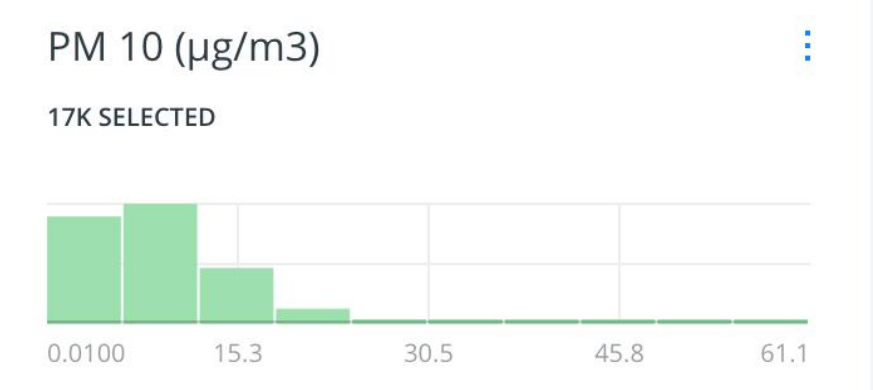
<https://sensemystreet.uk/sensors>







Number of Readings
16,659
 between 07/14/2017 -04/10/2017



<https://sensemystreet.carto.com>

Plan and propose

Decide when and where to place sensors with your local community



Plan/Target areas. Issues → sensors



Negotiating with Urban Observatory and other stakeholders



SENSEMYSTREET
DATA FOR EVERYONE



Collaborate

An online space to form ideas, ask questions and make decisions.

[Learn More](#)

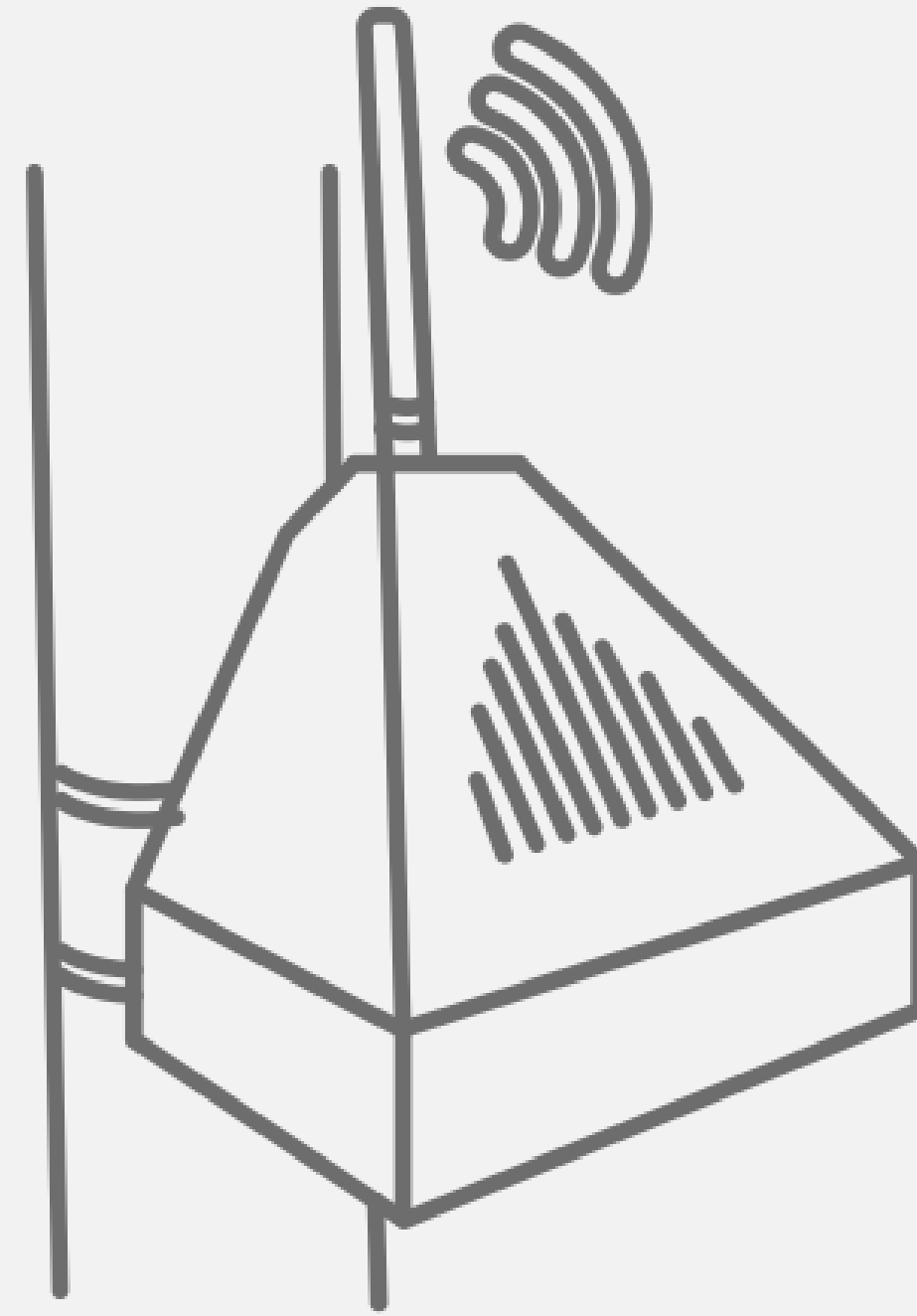
<https://sensemystreet.ideaboard.co.uk>

Get the facts

Get sensors deployed
on your street



7

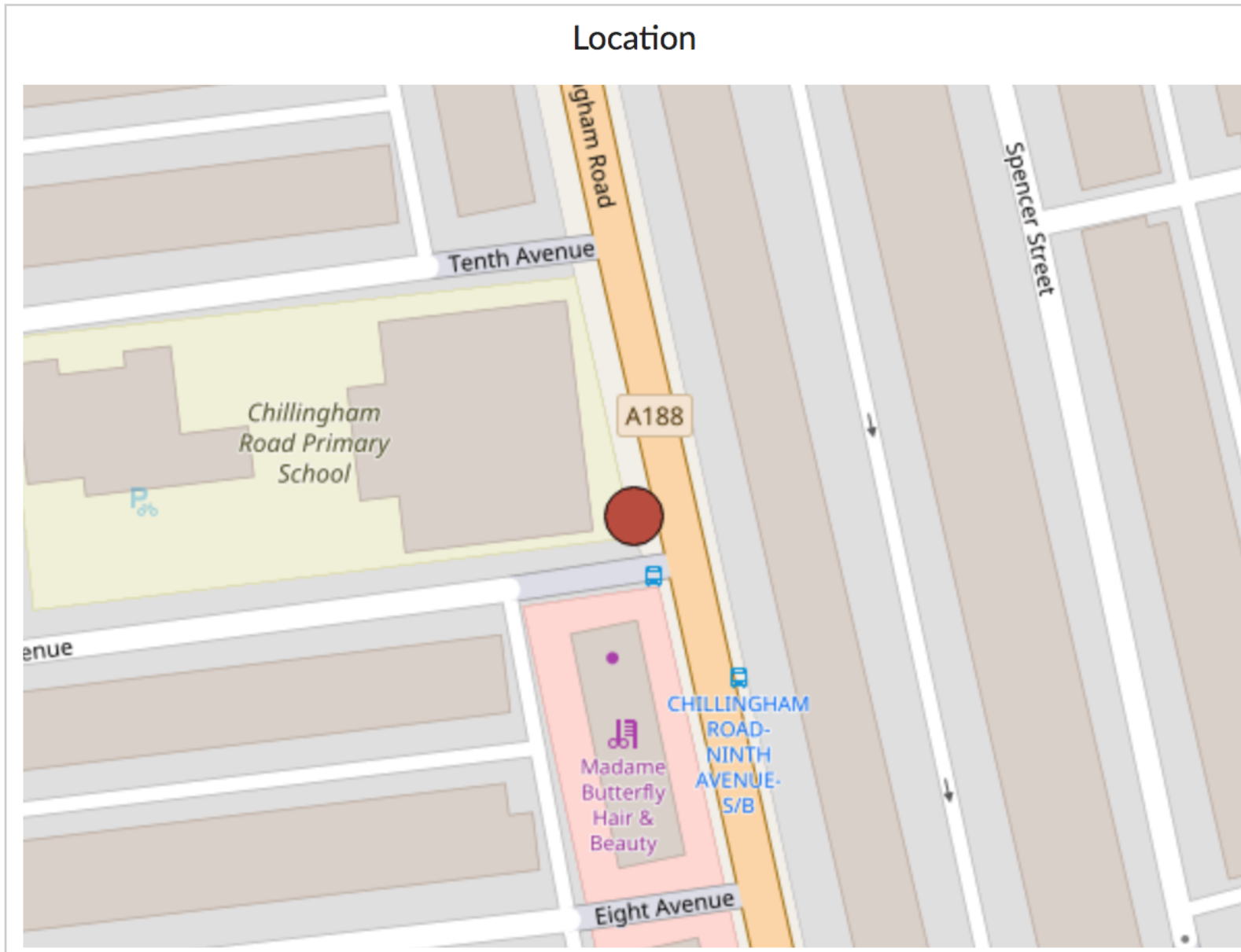


Getting approval for putting the sensor in place



aq_mesh1970150

- Maps
- Explore
- Data Download
- Tools
- API

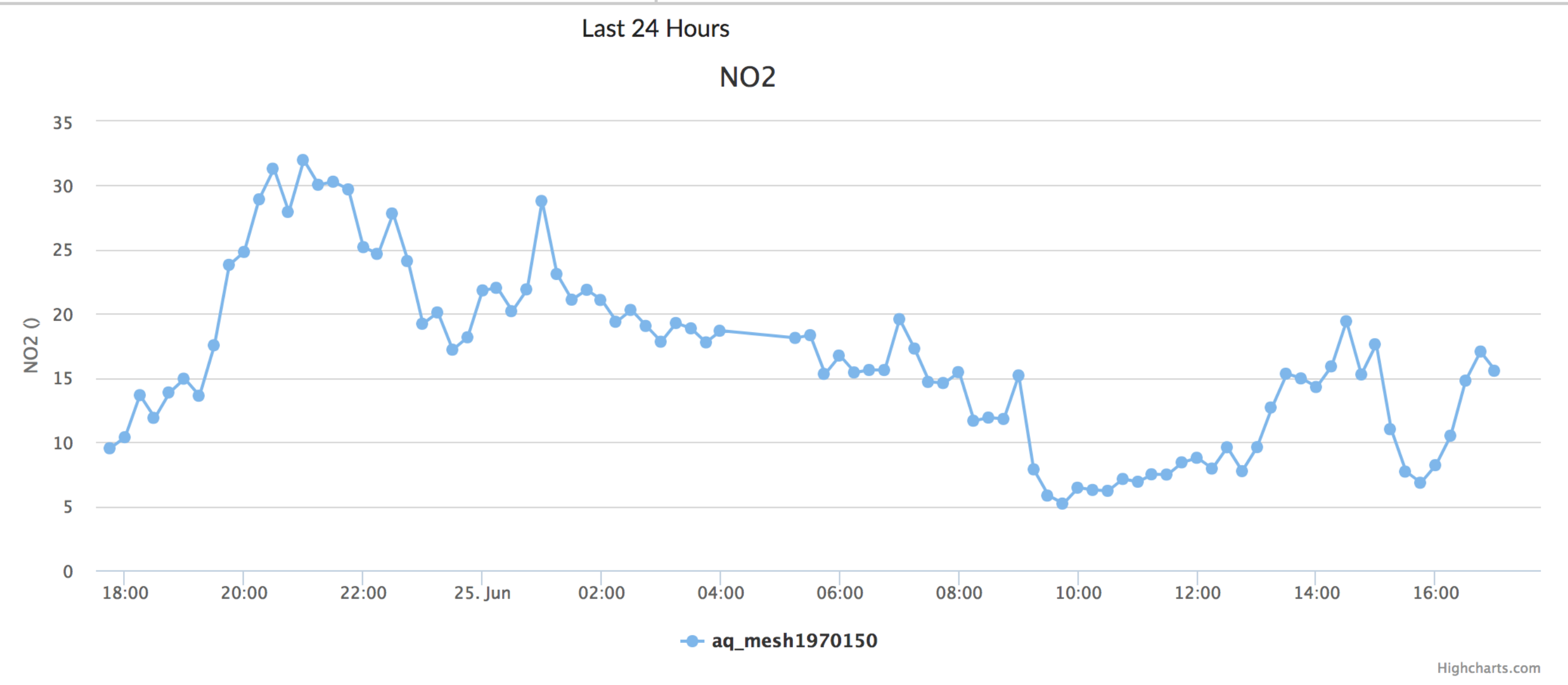


Live Readings			
Time of readings: 2018-06-25 17:00:00			
PM1 0.3	O3 59.1	Temperature 23.5	PM10 1.6
NO2 15.5	Pressure 1024.4	Humidity 46.2	NO 5.9
Particle Count 1.6	PM2.5 0.7		

Sensor Health
Time since last reading: 30m10s
Number of readings in last 24 Hours: 868
Number of "suspect" readings: 48

Metadata
About: aq_mesh_api
Sensor Document: N/A
First Record: 2018-05-22 15:00:00

- PM1
- O3
- Temperature
- PM10
- NO2**
- Pressure
- Humidity
- NO
- Particle Count
- PM2.5



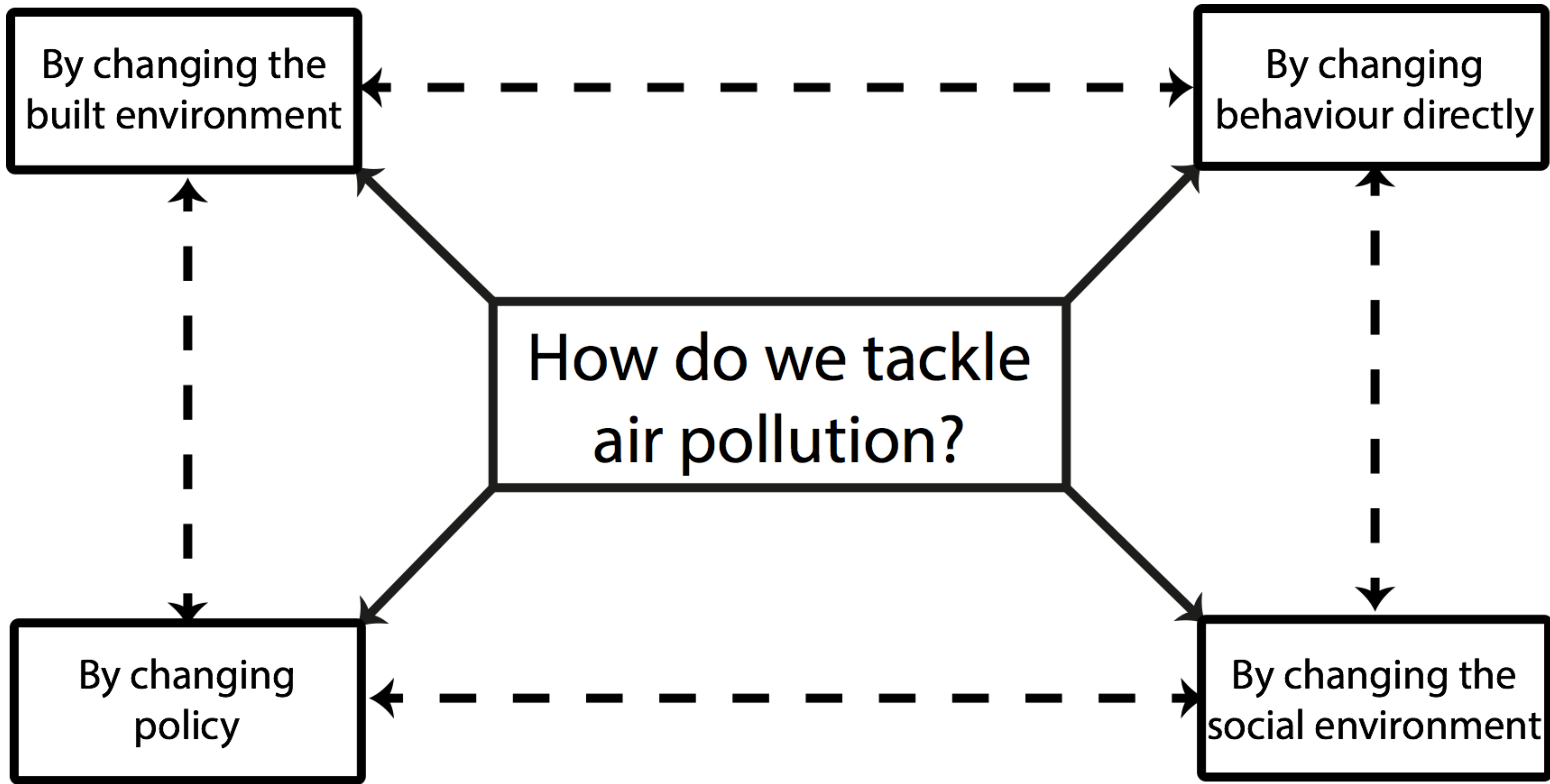
Data for everyone

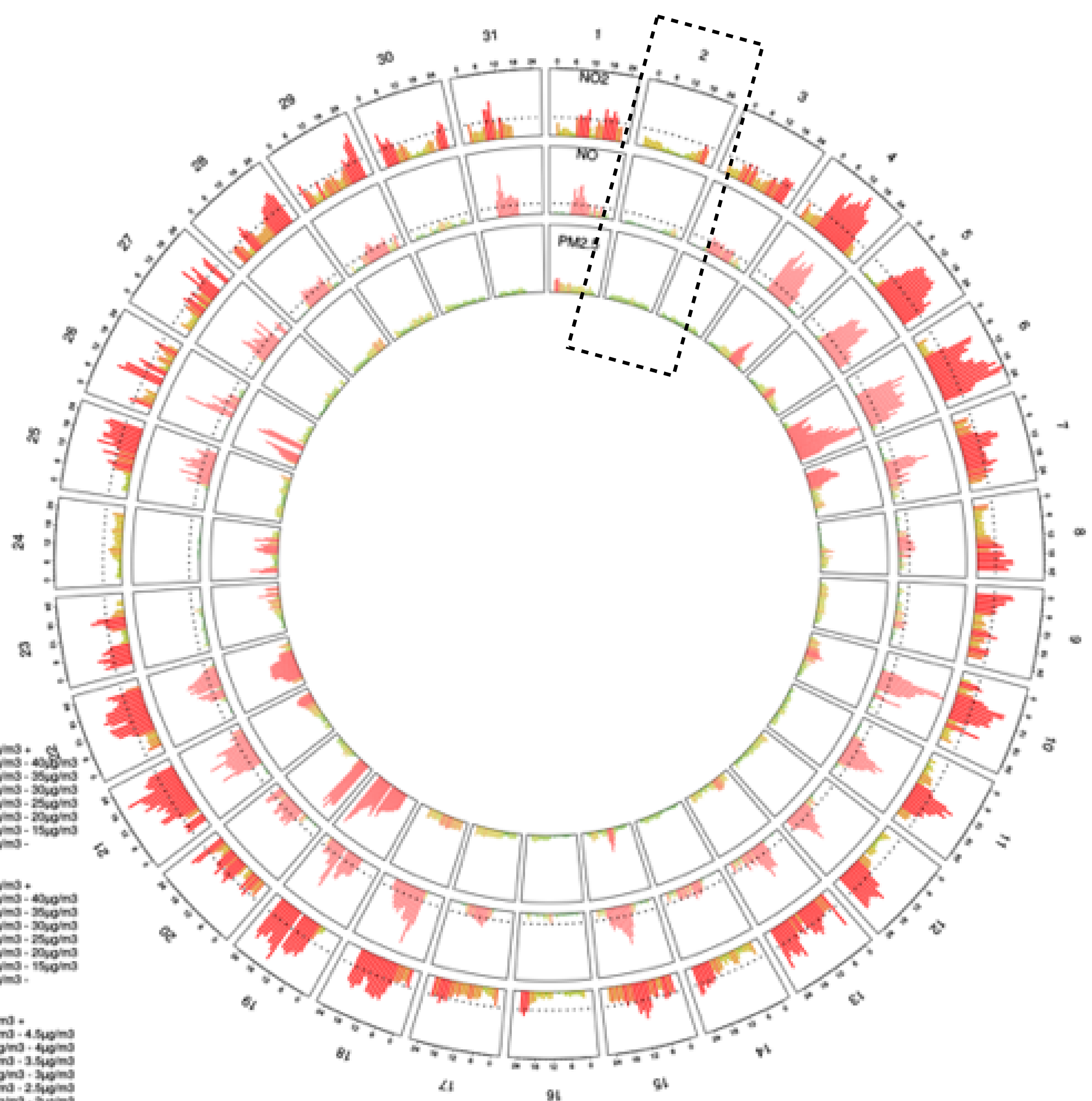
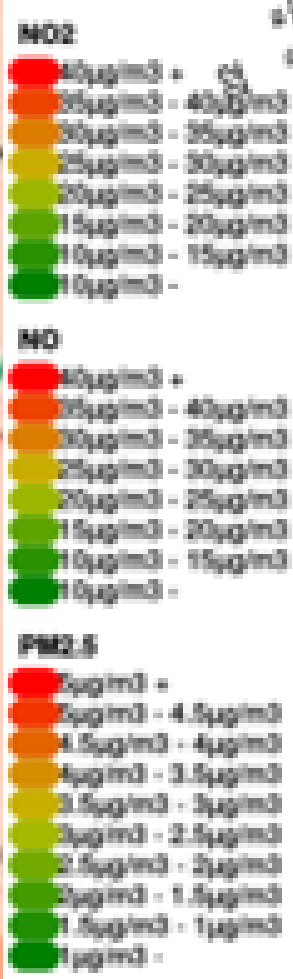
Get the data to evidence or
inform your issue



8

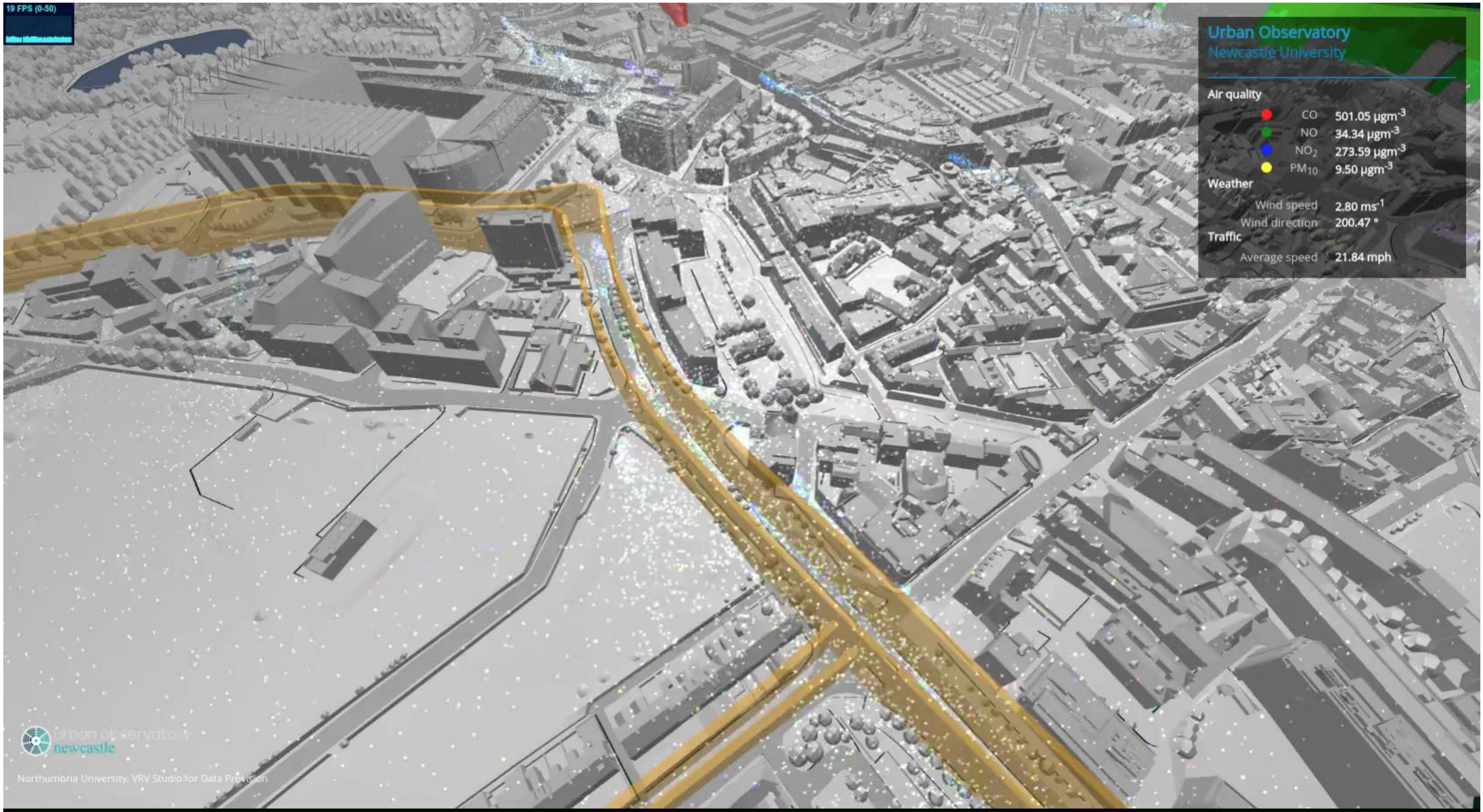
Tools for sensemaking and making data actionable





19 FPS (0-50)

VRV Studio for Data Provision



Urban Observatory Newcastle University

Air quality

- CO 501.05 $\mu\text{g m}^{-3}$
- NO 34.34 $\mu\text{g m}^{-3}$
- NO₂ 273.59 $\mu\text{g m}^{-3}$
- PM₁₀ 9.50 $\mu\text{g m}^{-3}$

Weather

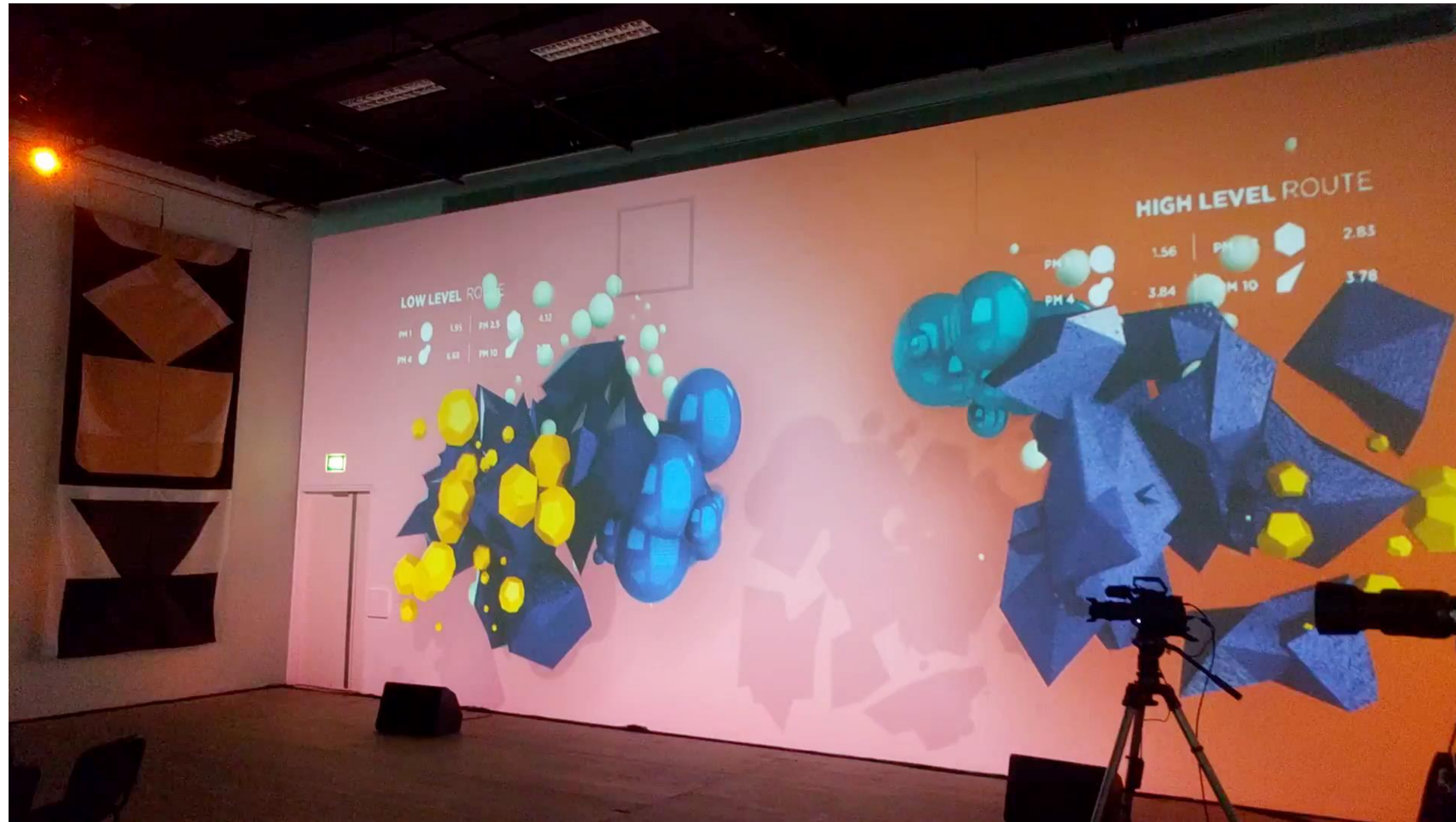
- Wind speed 2.80 ms^{-1}
- Wind direction 200.47 °

Traffic

- Average speed 21.84 mph



Northumbria University, VRV Studio for Data Provision



<https://vimeo.com/236657773>

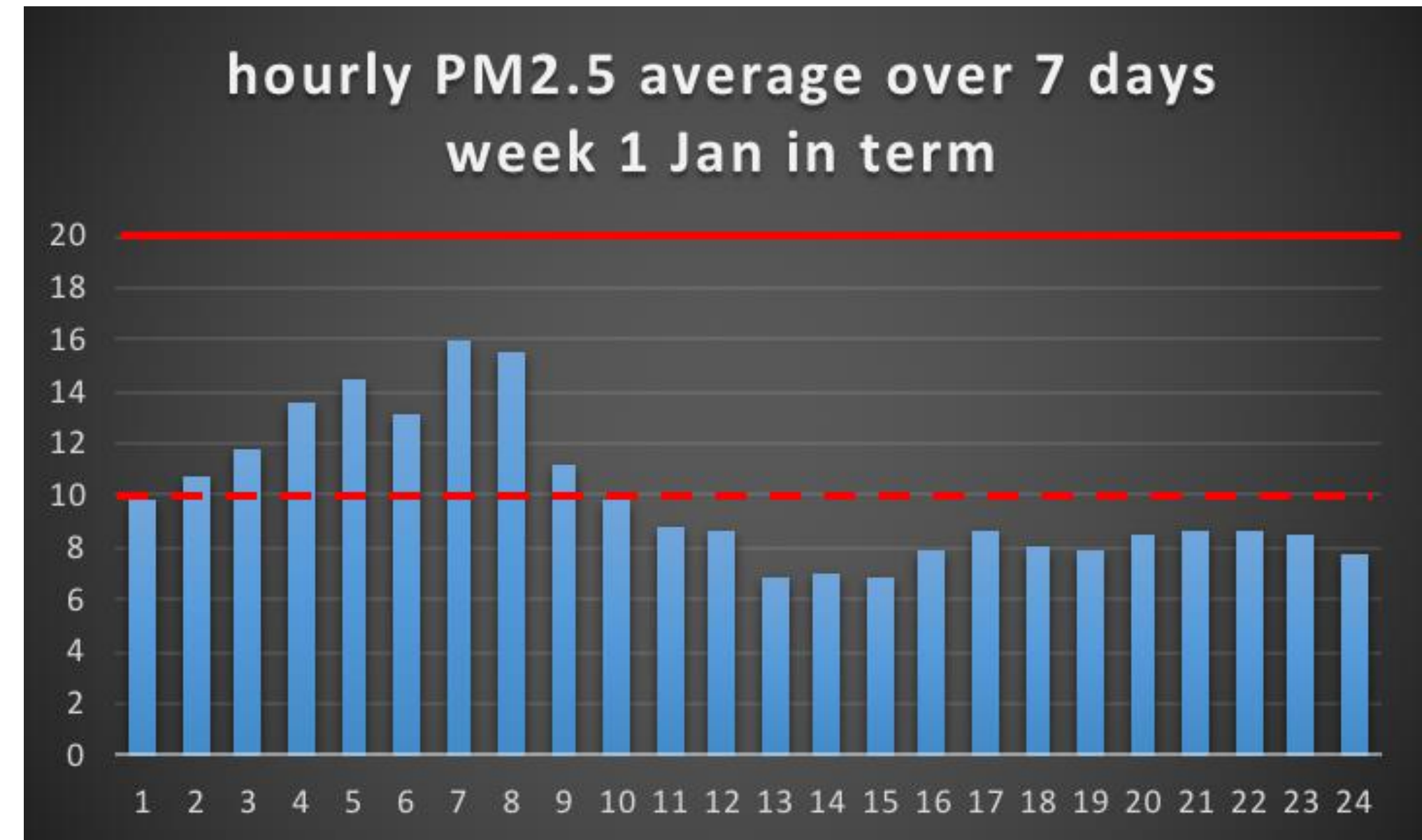
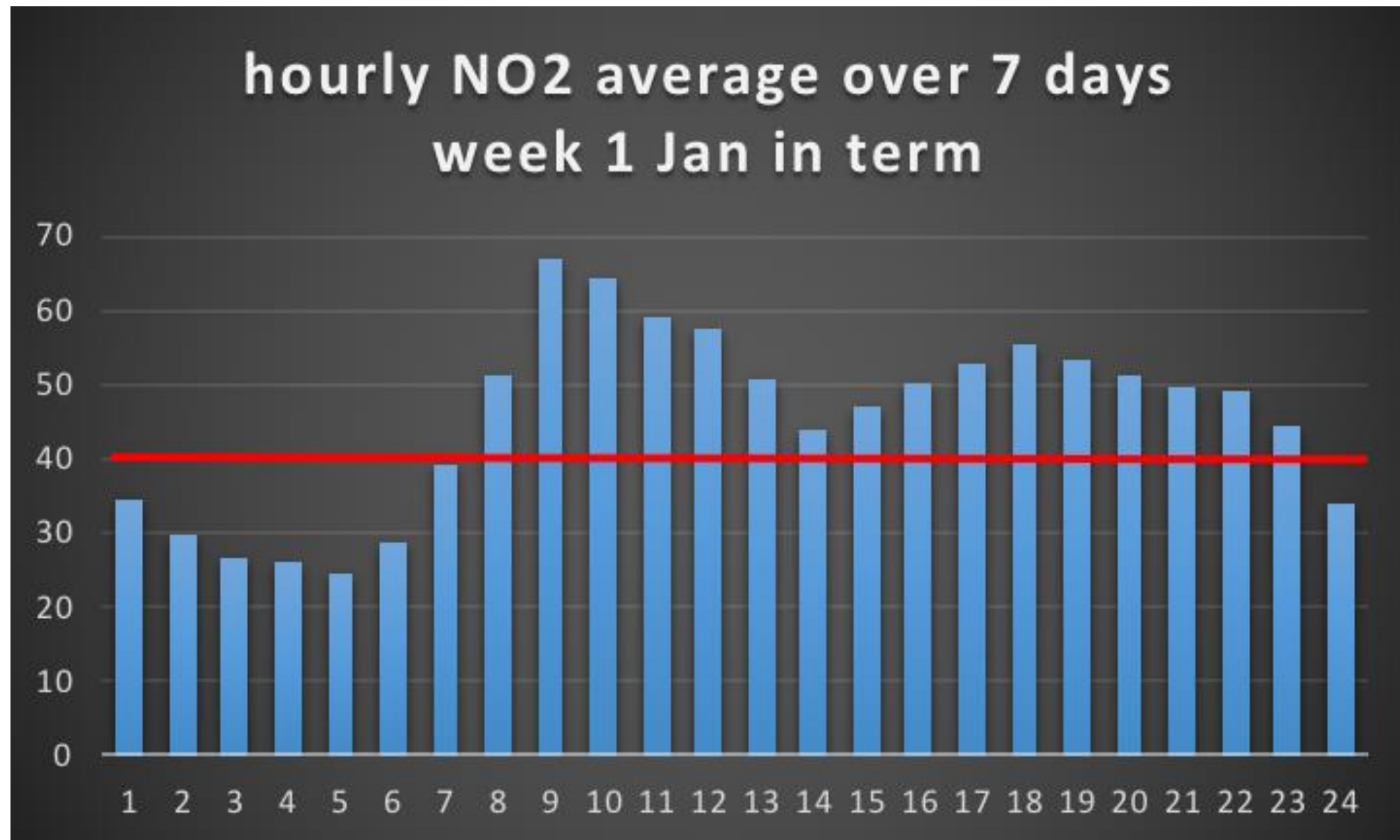
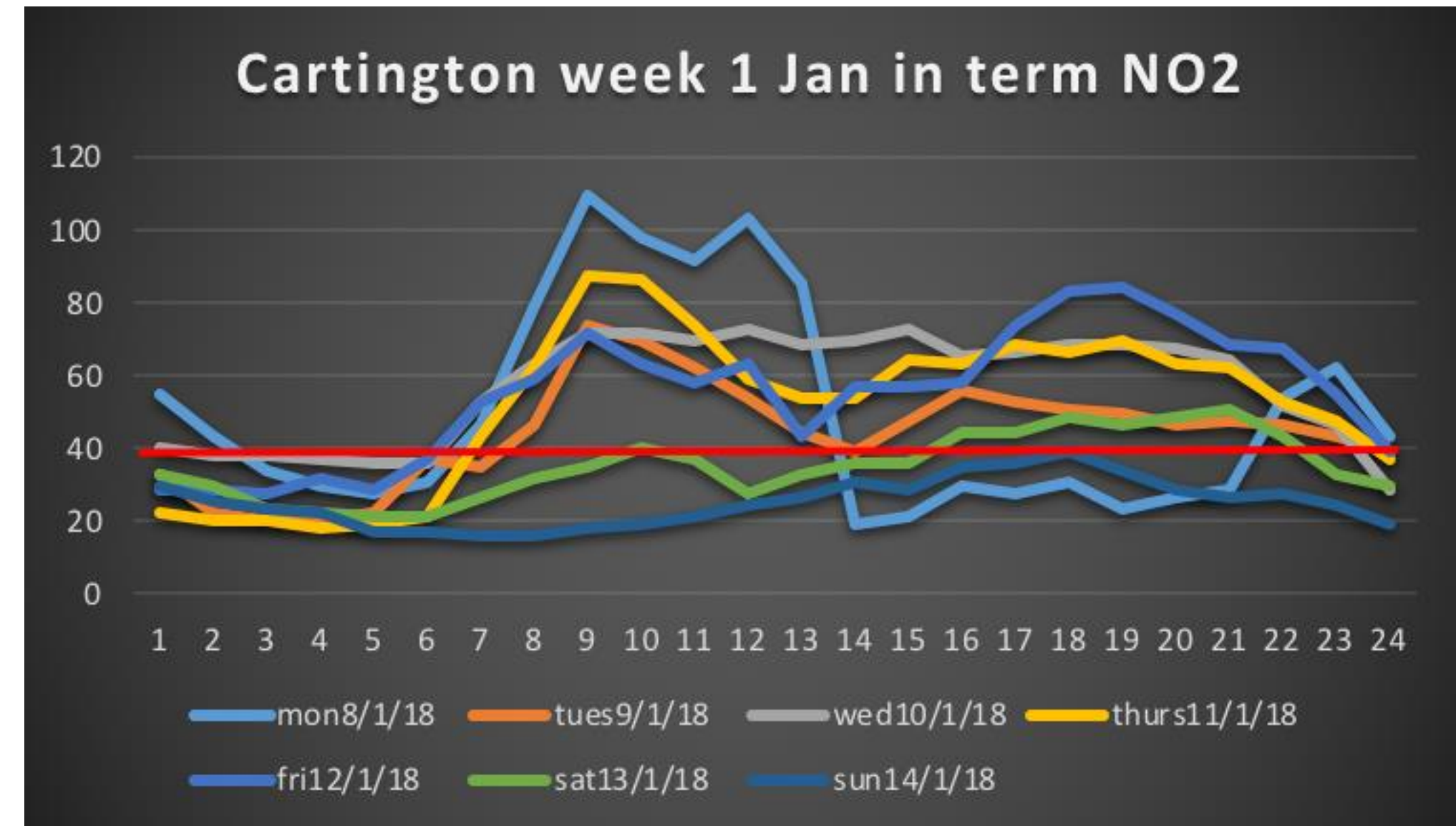
Google #SPAN17

<https://design.google.com/span2017/newcastle-gateshead/>

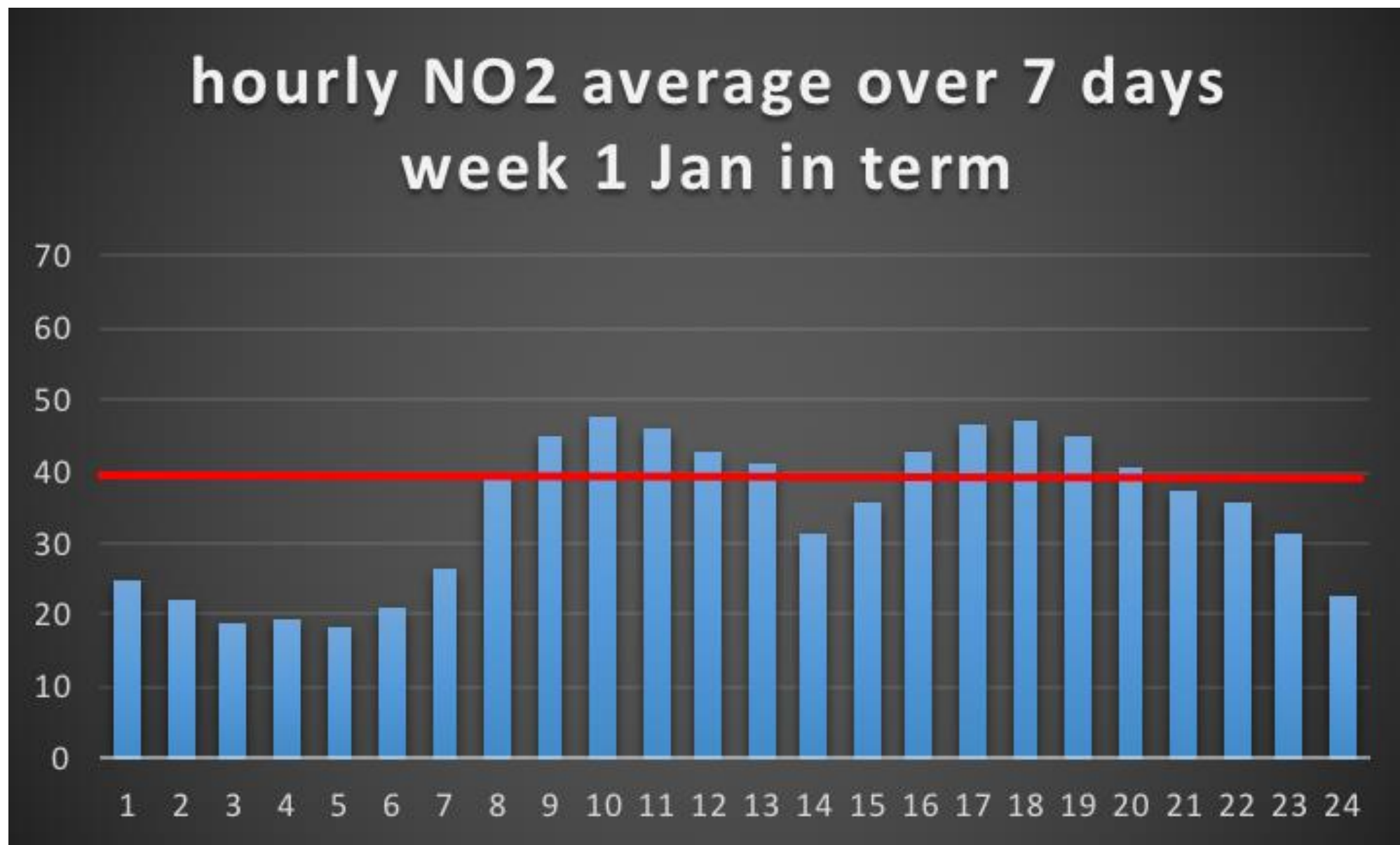
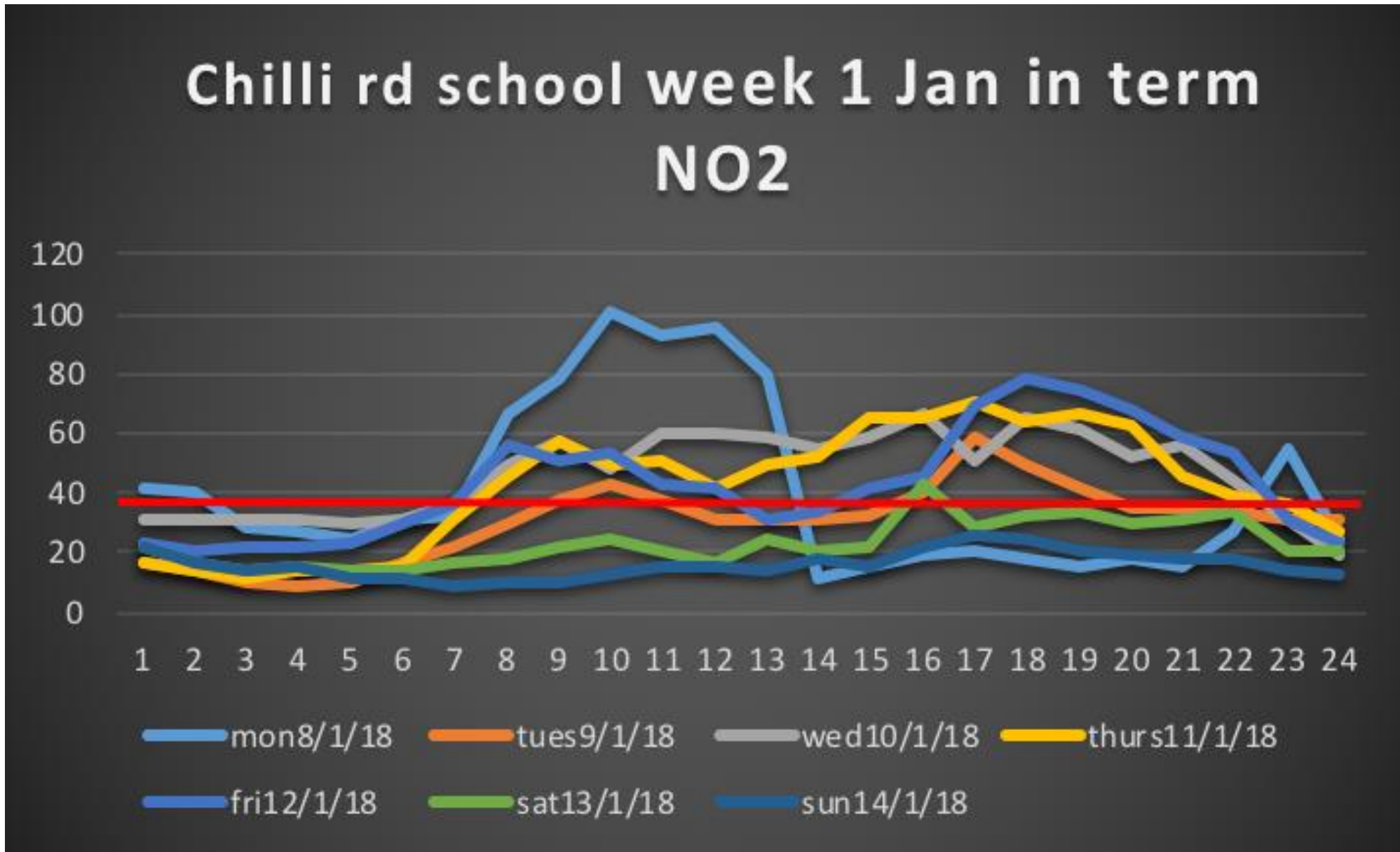


Sense Our Streets

SenseMyStreet in Schools



Community created graphs



Heaton Air Quality @AirHeaton · 10s
 NO₂ at Corner House junction yesterday (07-11-2018)

24h Average: 23.30 µg/m³

Max: 48.04 µg/m³ at 07-11-2018 18:15:00

Low: 12.02 µg/m³ at 07-11-2018 04:00:00

Community created graphs



© Google Maps

to create **sustainable cities** we
need **inclusion of citizens** as
active **contributors of**
knowledge

Thank You

Open Lab  at Newcastle University  

 urban observatory

<https://sensemystreet.uk>

<http://urbanobservatory.ac.uk>

<https://ncl.ac.uk/who-we-are/vision/urban-observatory>



@aarewoodisland @sensemystreet