



Innovative continuous odour monitoring during gasworks remediation

Advances in Contaminated Land Assessment and Remediation

University of Sheffield | 03 March 2023

Barry Roberts

Overview

01 The site

02 The project

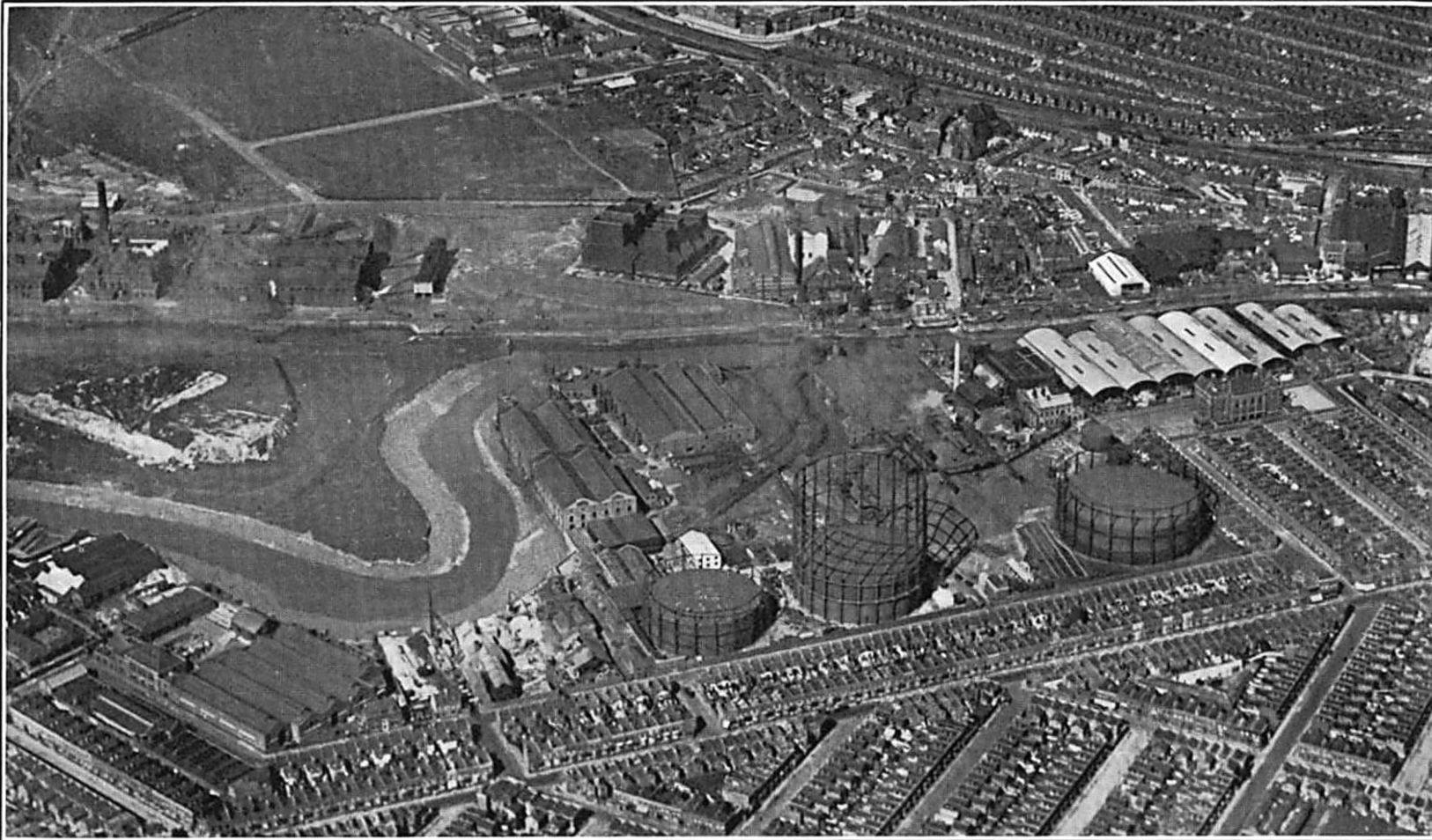
03 Development context, opportunities and challenges

04 Environmental monitoring and mitigation plan

05 Odour monitoring and mitigation

06 Lessons learned

The Site



POPLAR WORKS—FROM THE AIR.

[Surrey Flying Services.]

8.4 Ha site in East London.

Reclaimed land from 1804.

Former gasworks from late 1870s.

Legacy soil and groundwater contamination, incl.:

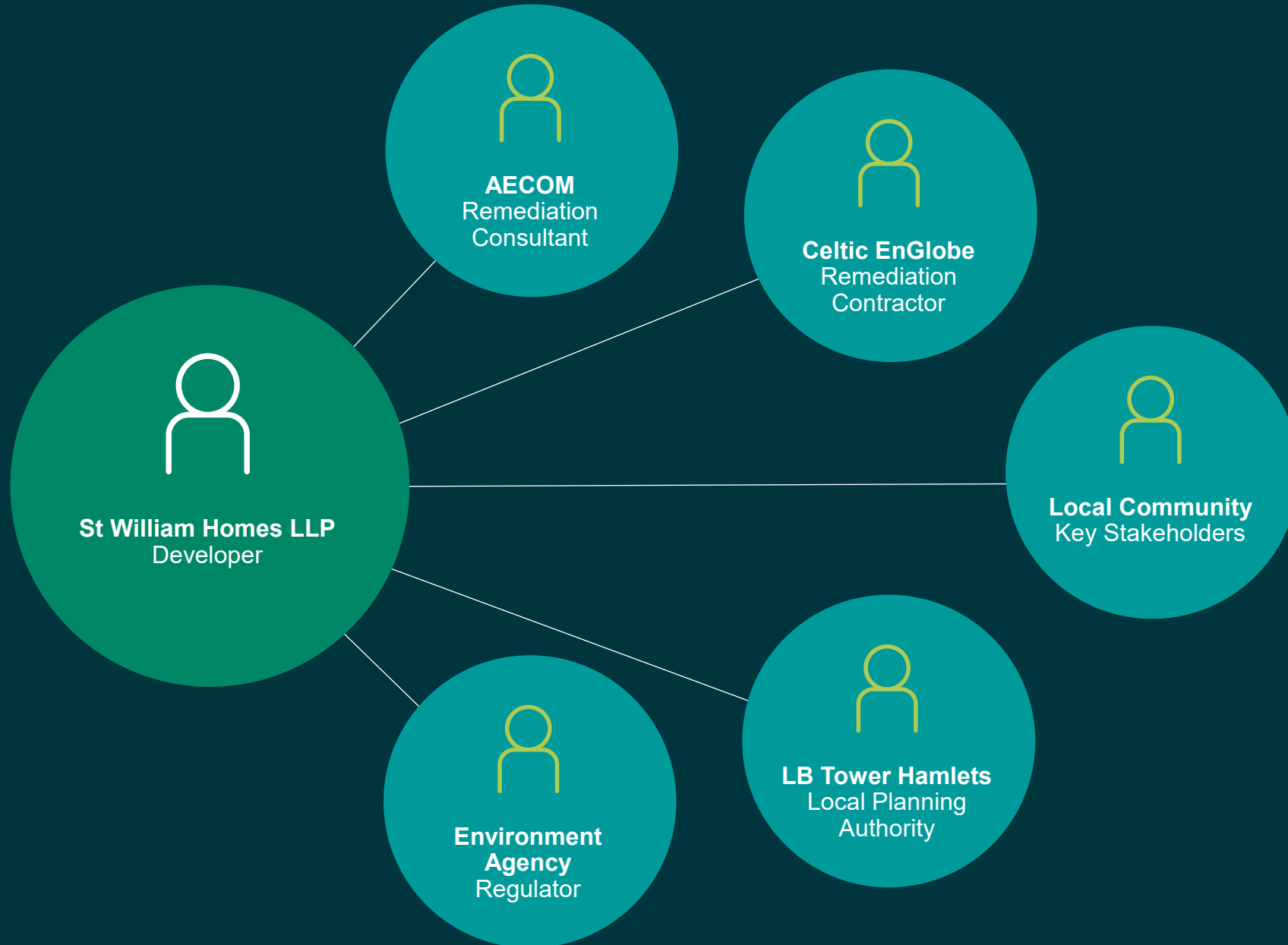
- tar
- foul lime
- spent oxide
- asbestos

The Project



- Remediate entire site
- 2,800 residential dwellings
- 1 ha public park
- Retail / commercial space
- School
- Remediation ~14 months
- Construction ~20 years

The Project



Development context, opportunities & challenges



Residential dwellings on three site boundaries.

Regulator challenges / pressure.

Community scrutiny and some 'citizen science'.

COVID-19 pandemic and lockdowns.

Developer's desire for innovative practice.

Use of sub-surface gasholder as stabilisation work area.

Environmental monitoring and management plan

Two continuous dust monitors (reporting PM₁₀ and PM_{2.5})

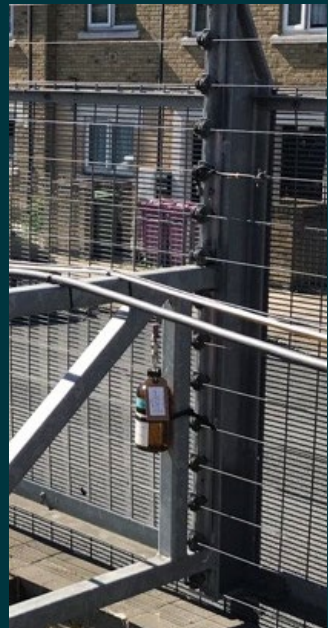
Passive diffusion sampling for nitrogen dioxide (NO₂), hydrogen sulphide (H₂S), ammonia (NH₃) and volatile organic compounds (VOCs)

Short-term active sampling for VOCs

Audits with continuous logging photo-ionisation detector (detecting to ppb range)

Regular odour 'sniff' tests at nearby off-site locations

Analysis of 1,351 air samples for total fibres using Phase Contrast Optical Microscopy and a further 195 air samples for asbestos fibres using Scanning Electron Microscopy



Odour monitoring and management

Developer challenge to evaluate additional techniques capable of continuous odour monitoring that could be deployed at the site

Literature review → capability for quantitative reporting of odour unit concentration (OU/m³)



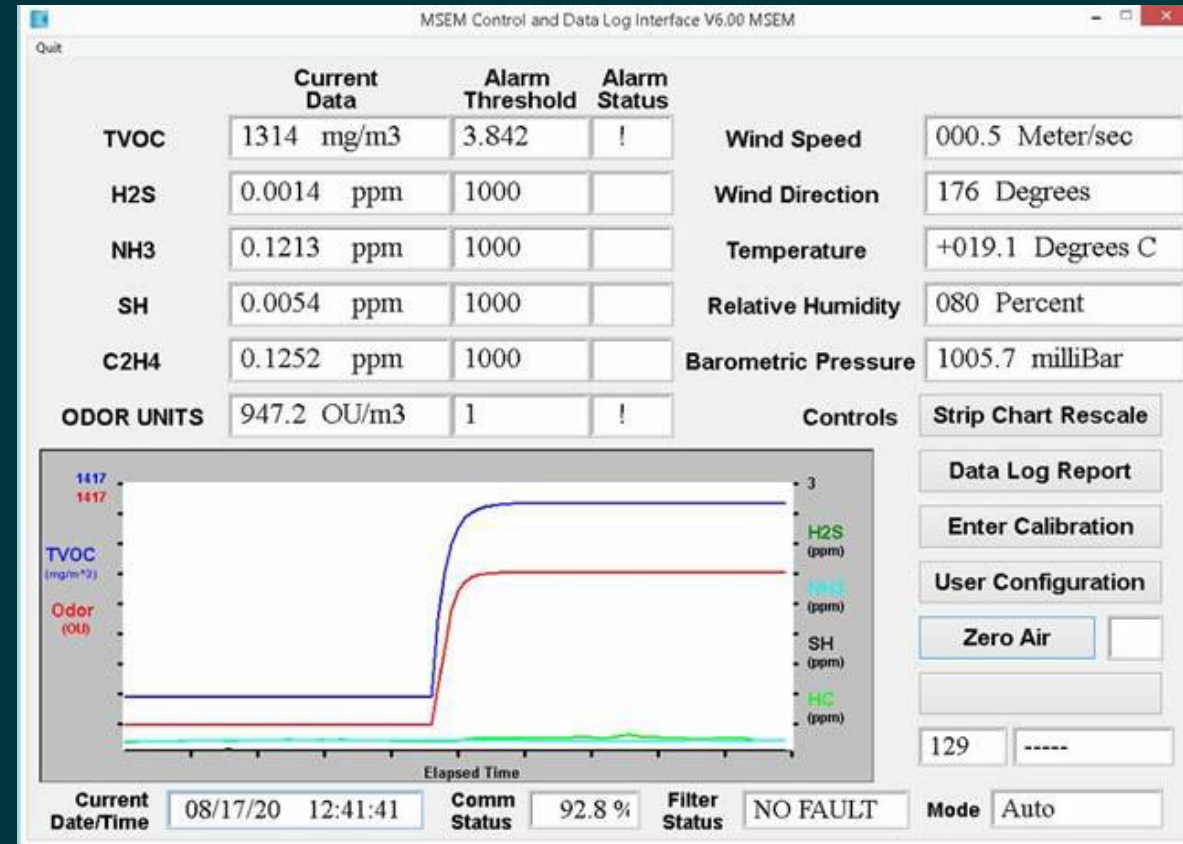
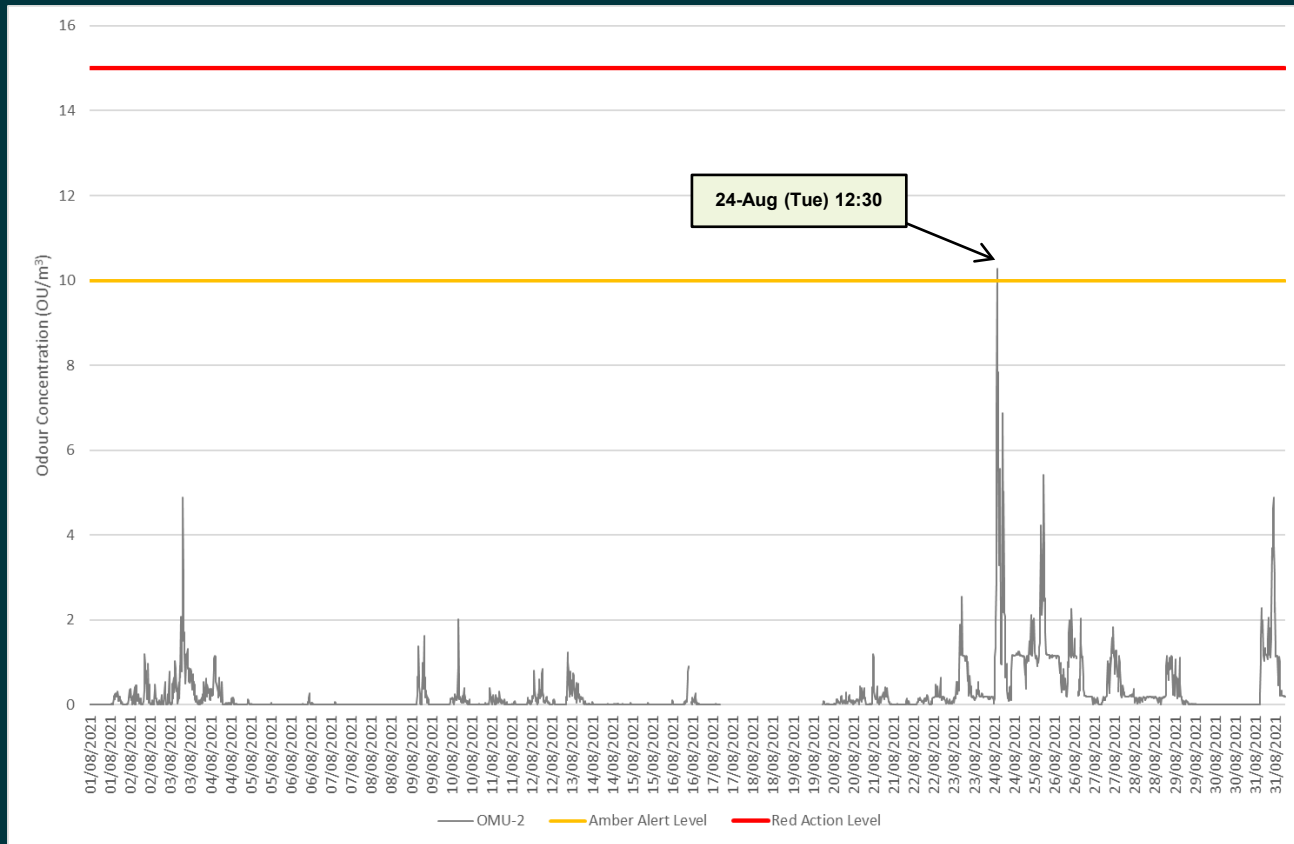


Google Earth

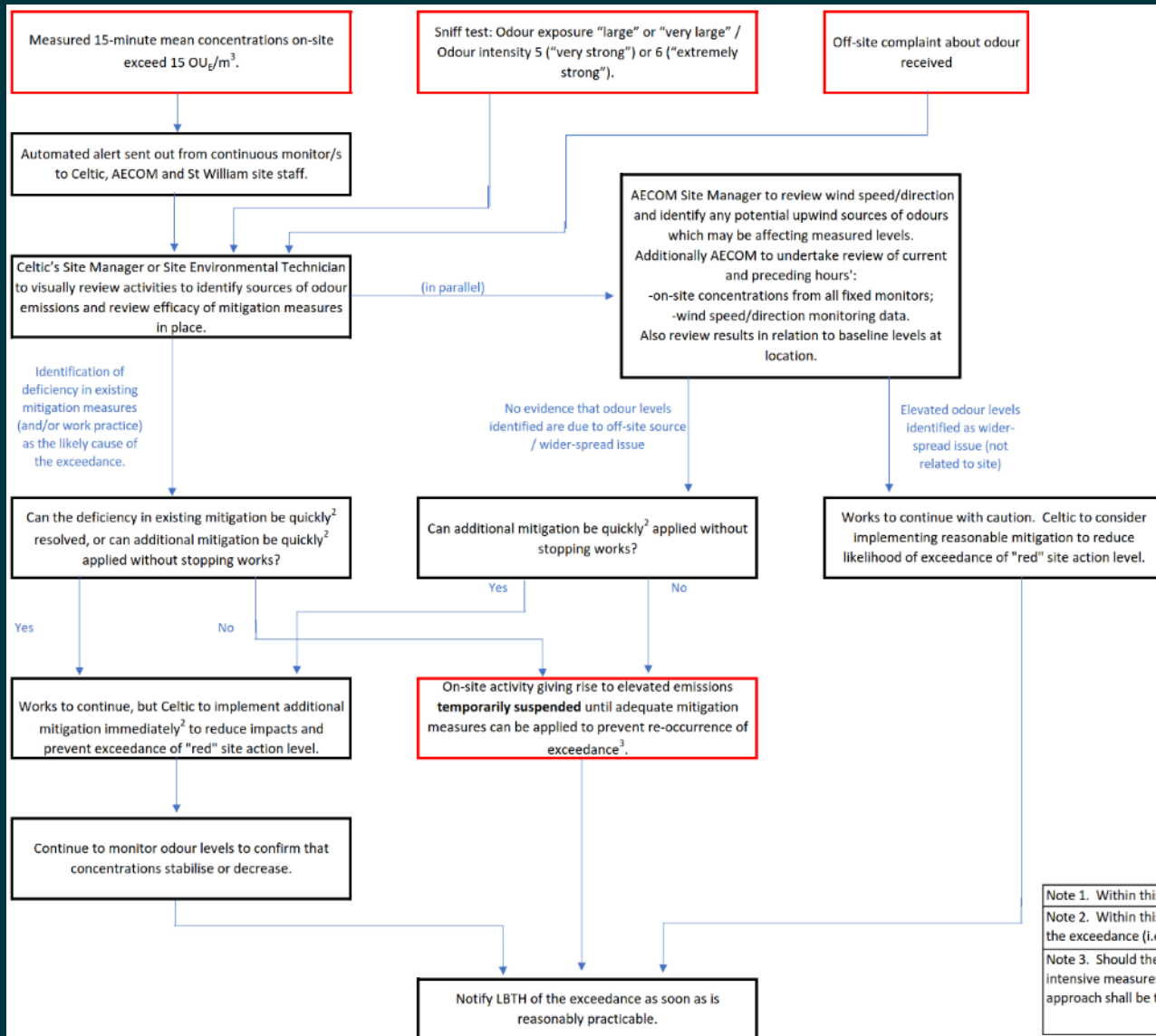
200 m



Odour monitoring and management



Odour monitoring and management



Mitigation Process Flows

- Part of the regulator-approved plan
- Exceedance of Amber Alert Level
- Exceedance of Red Action Level

Note 1. Within this context, 'quickly' refers to being deployed and effective within 30 minutes.

Note 2. Within this context, a *maximum* duration of 45 minutes in total is inferred from the alert being issued to the measures being implemented and effective if on-site works identified as the source of the exceedance (i.e. up to 30 minutes for deployment of measures after a maximum of 15 minutes of review).

Note 3. Should there be two or more exceedances in a day attributable to the same on-site activity/source, it is indicative that mitigation measures implemented were inadequate. Additional or more intensive measures must be put in place (and documented as such) by the Remediation Contractor and approved by the St William Site Manager prior to re-commencing the activity. A precautionary approach shall be taken, whereby if the cause of an exceedance cannot be clearly attributed to off-site (non-project) activities, then it shall be presumed that the cause shall be project-related activities.

Odour monitoring and management

Zero
Calibration

Low
Range
Calibration

High
Range
Calibration

The screenshot displays the MSEM Control and Data Log Interface V6.00. The main window shows a table of current data and alarm thresholds for various pollutants. A dialog box titled "Enter Calibration Data" is open, allowing for the update of odor units and ID. The current data table is as follows:

	Current Data	Alarm Threshold	Alarm Status
TVOC	0.0010 mg/m3	20	
H2S	0.0000 ppm	1	
NH3	0.0399		
SH	0.0000		
C2H4	0.1054		
ODOR UNITS	0.0000		

The calibration dialog box contains the following fields:

- Update Odor Units:
- Update Odor ID:
- Data Date (MMDDYY): 121020
- Data Time (HHMMSS): 124438
- Odor Value (0-2000): 304
- Odor ID class (1-5):
- Log Data Present?: Yes
- Delta Time (seconds): 0

Buttons: Check Input, Accept, Close.

At the bottom of the interface, the status bar shows: Current Date/Time: 02/05/21 18:14:59, Comm Status: 100%, Filter Status: NO FAULT, Mode: Auto.



Lessons Learned



New / innovative solutions can come with teething problems

- DIY (instruments, connections, mounting)
- User friendliness of interface
- Flexibility of data handling/processing
- Alert communications limitations
- Portable doesn't necessarily mean portable!
- Tech support time difference
- Service and manufacturer calibrations



Lessons Learned

(images courtesy of EnGlobe)



Effectiveness of using gasholder as 'container' to control odours

Odour monitor interferences

Value of effective public/ stakeholder engagement

Cost-effective, with real environmental and social benefits



Thank you.

Barry Roberts
Technical Director - Air Quality & Permitting
0774-1859-005
barry.roberts@aecom.com

