Requirements Document

Expected Requirements:

Data Visualisation

* Using time-series and bar charts to show pollutant levels over time and to compare pollutant levels across different applications making the charts easy to understand and intuitive. Can use QTcharts.
* Implement a traffic-light colour scheme to interpret whether pollutants levels are in safe limits. Green (Safe), Amber (Close to threshold), Red (exceeding threshold).

Compliance Indicator

* Explicitly show if the pollutant levels are within UK/EU standards
* Be able to filter data by pollutant type, geographical location or compliance status so you can see which pollutant require attention

Interactive Map (optional)

* Integrate a map view to display geographical hotspots which highlights locations with elevated pollutant levels.
* Provide colour – coded markers which displays compliance status and pollutant concentration at different locations

Accessibility

* Ensure an accessible experience that meets basic accessibility standards. Needs to meet colour blind needs, sufficient contrast, screen reader labels and keyboards navigation.
* Must include Internalisation (i182n) so that the app can be accessed by non-English-Speaking users so the app must allow a basic selection of supported languages.

Target Audience –

* Environment Researchers :- Be able to access pollutant data and use the information provided to track patterns and trends
* Policy Makers – View dashboards and compliance indicators to make informed decisions
* General Public – Be able to quickly interpret pollutant levels, compliance level and geographical trend to gather information about water quality.

Core Application Features

Include a data page to display the pollutant data in a table format to fully use the starter code. The page allows users to look through raw and unfiltered data to allow developers to apply the model approach for the starter code

Implement the data page first and then modify the starter code’s data handling approach the handle the dataset.

Analysis Pages – Focuses in presenting statistical summaries, trends and visualisations from the data and is implemented in custom view components.

Dashboard Layout Requirements

Header

* Application title – displays the application name
* Navigation – include links to each of the data visualisation pages
* Language Selector – offer a language selection option if implementing internalisation

Main Content

* Present pollutant overview cards for each category
* Summary information – Each cards includes a brief summary of pollutant levels and a compliance indicator using a traffic-light scheme
* Interactive links – Each card is linked to the corresponding page
* Quick filters – Option to filter by time range (weeks – years) or location

Footer

* Help Links – Include links to user guides, help resources and references for data sources.

Dashboard - Responsive Design Requirements

* Responsive Layout – Dashboard layout must adjust for both desktop and mobile, tablet screens. Charts and cards need to resize for the different screen sizes.
* All interactive elements need to be accessible for touch input. Elements should be sized and spaces accordingly for this.

Pages

Pollutant Overview Page –

Purpose: Display detail information on common pollutants

Key Elements:

* Search function – Search bar to be able to find pollutants by name
* Visualisation - Time series or bar chart to show pollutant trends
* Compliance Indicators – Colour Code pollutant levels as described previously (traffic-light system)
* Pop – Ups – Provide additional information on pollutants risks, compliance status, and safety thresholds when a user hovers over or clicks on a data point,

Persistent Organic Pollutants

Function – Show data PCBs and other persistent organic pollutants. Important as this pollutant have long lasting effects.

Key Elements

* Data Trends – Use line charts or similar visualisations to show POP levels over time at different sample points
* Rollover Pop – Ups: Include additional information on health risks; monitoring importance and safety levels
* Compliance Colour Coding – Use traffic-light system to show compliance with UK/EU

Fluorinated Compounds

Function – Display levels of PFAS and fluorinated compounds, displaying if they meet safety standards

Key Elements –

* Summary cards: Displays compliance status for each pollutant with a quick colour – coded indicator.
* Map or Time-Series Visualisation : Show how the compounds are distributed across sites, using a time – series chart or map view with colour codes.
* Rollover Pop – Ups – Provide contextual information on PFAS persistence and health and environmental implications.

Compliance Dashboard

Function – Overview of regulatory compliance across all pollutants, showing which substances meet or exceed safety standards.

Key – Elements

* Summary Cards – Display status for each pollutant using traffic light system
* Filters – Be able to filter by location, pollutant and compliance status. Useful so can see areas that are most dangerous.
* Pop – Up – Summary for non-compliant sites, explain possible causes or data trends.

Minimum Viable Product (MVP)

* Working Dashboard
* Basic Visualisations for each page
* Preliminary compliance indicators
* Fully implemented Backend but not strictly required for all features.

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Design Requirements

Primary Libraries:

QtCharts - As the main library for data visualisation, including line, bar, pie charts and other data visualisations. Also can be used for compliance indicators.

Additional Libraries-

* QtLocation and QtPositioning can be used for mapping, displaying geological hotspots abd pollutant distributions.
* QtSQL – Can be used for data storage and management. Can parse the CSV file into database to make easier to manage.

Responsiveness:

Use Qt layout managers to create responsive layouts.

* QVBoxLayout
* QVBoxLayout, QGridLayout

Accessibility

* Clear colour contrast for compliance indicators and label interactive elements for readers
* Make the keyboard navigation functional, users must be able to tab through all interactive components

Language Support

Respond to changes in local based on device preferences

Not required to generate full transactions but app should be designed to allow for them.