Wastewater Treatment Data Visualization

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COMPANY BACKGROUND

Halifax Water provides **Wastewater & Stormwater Treatment** through **13 Facilities** across the Halifax region

The **Halifax Harbor Solutions Facilities** include the Halifax, Dartmouth & Herring Cove treatment plants

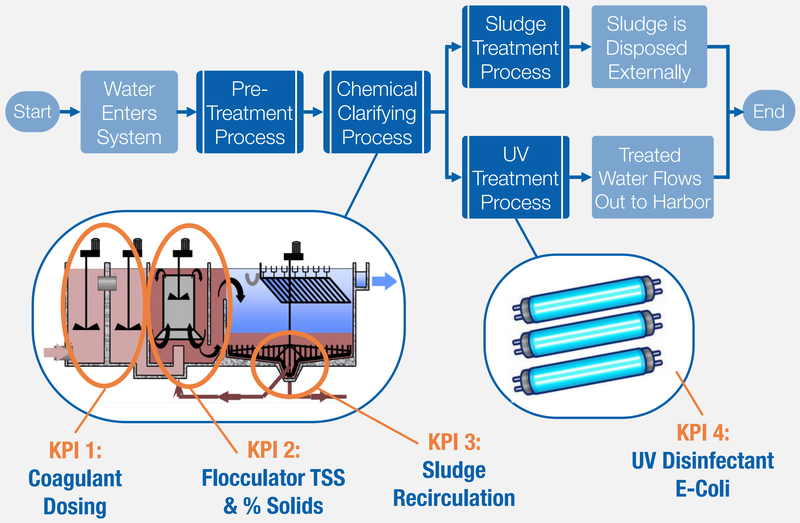
Data is continuously gathered from various unit processes

PROBLEM DEFINITION

- **Inconsistency** of data input, collection and storage process
- **Underutilization** of the data collected
- Absence of **real-time** data analysis and visualization

PROCESS MAPPING & IDENTIFYING KPIS

Process Mapping: To outline water treatment process and pinpoint process steps relating to each KPI of focus



Key Performance Indicators (KPIs)

1. Select appropriate Coagulant Dose (Alum) based on Influent Turbidity
2. Maintain % Solids and Total Suspended Solids (TSS) in Flocculator (Piston Reactor)
3. Adjust Sludge Recirculation Rates based on incoming TSS measurements.
4. Achieve E. Coli < 5,000 CFU/ 100 mL during periods of May 1 - October 31

DATA EXPLORATION

Purpose:

- To identify correlations and trends
- To compare compliance and employee recorded data

Data cleaning: Fix data errors, remove duplicates, ensure data consistency

Exploration Methods: Correlation Matrices, Control Chart, Contour Plots

REQUIREMENTS

Key Success Criteria for Solution:

- Display trends of historic and current data for selected KPI's in the form of graphs and/or charts
- Provide means of easily identifying visual data gaps & inconsistencies amongst data trends for each KPI
- Provide means of assisting the Business make data driven business decisions

In total, 27 Business, Functional, and Non-Functional Requirements were defined.

DESIGN IMPLEMENTATION

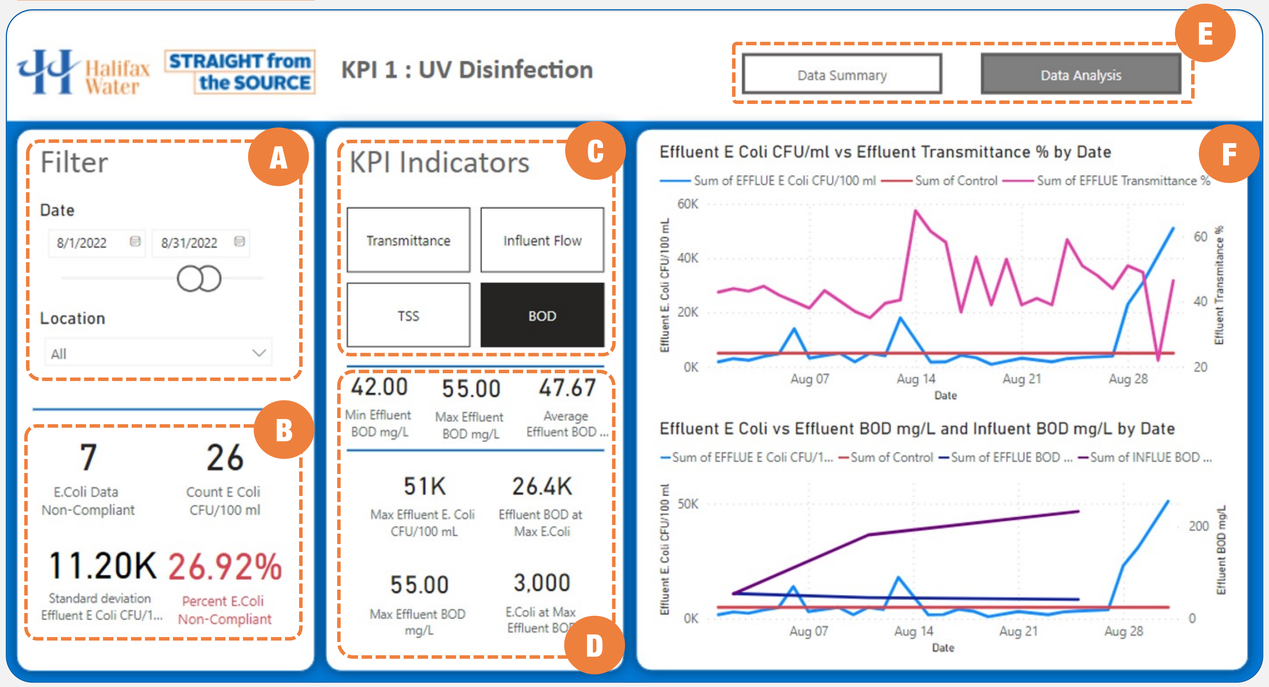
IMPLEMENTATION PLAN:

PHASE 1: Review Requirements → Initial Dashboard Creation → Internal Review & Test Case Development → Conduct Client Testing → Finalize Edits to Dashboard

PHASE 2: Develop Work Manual → Transition Solution to Clients → Develop Recommendations

SOLUTION DESIGN

POWER BI DASHBOARD



- **A.** Ability to filter graphs and KPI indicators
- **B.** Display the percentage of data in compliance
- **C.** Adjust views based on applicable variables
- **D.** Statistical measures such as Min, Max, Avg, etc.
- **E.** Data summary and data analysis views, providing alternative analysis
- **F.** Various visual graphs (Histograms, Control Charts, Scatterplots, etc.)

WORK MANUAL

- Back End Maintenance & Support
- Published Front View User Guide
- Change Management Procedures
- Data Dictionary

RECOMMENDATIONS

- Streamline & automate data collection process through the use of Power Apps
- Link dashboard to live servers & utilize Power Automate for automatic data refresh

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