Problem Statement and Goals
SyncMaster

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Table 1: Revision History

Date	Developer(s)	Change
2024/09/17	Whole team	Initial review and formatting of problem statement
2024/09/24	Whole team	Initial problem statement and goals. Document completed
2025/03/19	Mitchell Hynes	Update markdown to LaTeX

1 Problem Statement

1.1 Problem

The City of Hamilton, Water Division requires an application to assist in the management and security of their water and wastewater stations. Stations are visited by internal staff and external contractors regularly, but no electronic log of their visit to site exists to confirm work that was performed. This makes it difficult to verify work completion and accurate invoicing. Each station has many documents associated with it (such as entry protocols, hazard assessments, etc) which are frequently updated and need to be effortlessly redistributed to relevant parties as required. This is currently completed manually and is very time consuming for the stakeholder and prone to human error. Many stations have site specific information, which is difficult to capture in a single document. Instead, a dynamic application which displays only information relevant to that station as it is needed would be advantageous. Information needs to be easily accessible to authorized site visitors.

Many documents require signing, and currently it is a manual process to distribute and collect routine signatures. This functionality currently requires the stakeholder to use multiple applications. The stakeholder also currently has many different computer applications for documentation storage. Each has a different standard for storing and managing that information. This leads to duplication and outdated documents in many locations, rather than a single source of truth. The stakeholder requries contract management tools including syncing of contract files to the application and automatic alerts when documents, training, or signatures are set to expire.

Directly related to station access is a management system for contractors. This includes the ability to collect and distribute contract documentation, contact information, training, and other records. A key control management subsystem would be beneficial to view key distribution in real time, as this is currently managed in a separate application. A system to authenticate users at stations prior to access would improve visibility and protection. A digital key system should control access and entry to the station approved from a work order generated in the work order system.

1.2 Inputs and Outputs

Inputs:

- User login information for staff, internal contractors, and visitors
- Uploading of documents
- Signing of documents
- Completion of training
- Verification of arrivals and departures from the plant for contractors
- Adding of new staff and contractors

Outputs:

- Station documentation
- Station maps and access protocol information
- Station forms
- Site contact information

1.3 Stakeholders

The stakeholder for this project is the City of Hamilton, Water Division. Primary stakeholders with the City are the Facilities team, SCADA (Supervisory Control and Data Acquisition) team, and Corporate Security. Depending on what is decided during the requirements gathering process, other stakeholders from the City may need to be included in the project, such as City IT.

- City of Hamilton, Water Division: Primary stakeholder and client for the project
- Facilities Team: Subdivision of the primary stakeholder
- SCADA (Supervisory Control and Data Acquisition): Subdivision of the primary stakeholder
- Corporate Security: A stakeholder with an interest regarding Hamilton Water station security

1.4 Environment

- Software: Windows 10 operating system, android, iOS
- Hardware: Laptop computers, tablets, smartphones

2 Goals

The system enables the synchronization of files across distributed consumers	This is a basic goal that must be achieved for the proposed system to be useful. This involves both file synchronization and conflict resolution
Intuitive GUI with high learnability	The interface of the system should be easy to understand for first-time users as many of them will be contractors logging in for the first time
Accurate verification of users at stations	The application should be able to accurately verify that a user is at a specific station. This will provide visibility into who is at what station
Should integrate with current business practices of client	The project aims to assist the stakeholders and provide value as a more efficient and secure method of completing existing tasks. It should not interfere with current business processes or create additional workload

3 Stretch Goals

Demonstrate the advantage of a single centralized platform instead of multiple disconnected platforms	Hamilton Water has applications which do not communicate between each other. Loss of information and working in "silos" is common as a result. Demonstrating the benefits of a platform which integrates the features of separate applications into one would be advantageous.
Expand the platform to be a contract management system, capable of having contract management tools accessible to authenticated project managers.	This would enable a greater integration of station and contractor documentation directly into the projects that utilize this information.

4 Challenge Level and Extras

The challenge level for this project is a general challenge level. This designation was decided because we do not believe there will be a research element required. The extras for this project will be conducting user testing and developing a user manual. These extras are a good choice for this project as it is being developed for a real client, with the objective of creating a usable tool. Extensive user testing and documentation will be critical for its long term use and maintenance by the client.

Appendix — Reflection

1. What went well while writing this deliverable?

    - Sections were divided efficiently, and everyone was aligned on what was to be written and who would write each section
    - We had great and open communication with the City during this deliverable which greatly aided us in developing the problem statement
    - Our team effectively documented the actions we took and helped each other learn how to use the git workflow for developing our project
    - Ample time was given to complete the deliverable
    - Multiple meetings were set to review work and hold accountability for work done
    - Everyone adhered to the self-imposed deadlines set for each section of the deliverable

2. What pain points did you experience during this deliverable, and how did you resolve them?

    - Some members had a better idea of the problem space, while others were more familiar with the development of software solutions. We overcame this by dividing members between this deliverable and the Development Plan
    - Version control does not allow live collaboration on written documents in the same way that Google Docs or Microsoft Word would. It was decided that the text for the different sections would be drafted on Google Docs before being committed to GitHub

3. How did you and your team adjust the scope of your goals to ensure they are suitable for a Capstone project (not overly ambitious but also of appropriate complexity for a senior design project)?

    To adjust the scope of the goals, we first discussed the project with the stakeholders to figure out what their main objectives were with the project. We then discussed as a team to figure out how to narrow these down to the most important and achievable goals and brought them back to the stakeholders to make sure they were acceptable. The goals we decided on are appropriate in complexity for a senior design project, are measurable, and focus on aspects of the system that are most important to the stakeholder.