**Senior Project Requirements**

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# 1. The Purpose of the Project

## 1a. The User Business or Background of the Project Effort

The purpose of this project is the creation of a homeowner’s association tool to facilitate ease of data collection/management for homeowners, a means communication between association leaders and members, and collection of dues required by the association from its members.

Motivation

Homeowner’s associations (HOA) have long been a topic of frustration for homeowners across the country and is increasingly becoming a reality for more homeowners as newly built subdivisions require them. While some of the frustrations such as rules, restrictions and fees are issues that do not have a common or satisfactory solution for all, inefficient management and transparency are issues that can be addressed. A homeowner’s association should be able to effectively collect and manage the personal data of homeowners as required for operations, communicate effectively to its homeowners through a number of forums convenient and appropriate to the homeowner, efficiently collect and levy dues for the homeowners and make access to pertinent homeowners association information as uncomplicated as possible. These issues can be amplified when run by the homeowners themselves and not management companies. These issues can mostly be attributed to poor data management practices which can be addressed, and the issues have a solution which can go a long way to solving some of the hostility and frustrations that build within homeowners associations and help promote better communities.

Considerations

Management issues within a HOA may seem to be a trivial issue that may just affect quality of life issues for homeowners on a day-to-day basis, but in fact, ineffective management and organization by HOA leaders can leader to far greater consequences for homeowners. Depending on how the HOA is registered and what entities hold property under, an HOA can be legally and financially responsible for much more than a homeowner is aware of and as part of the association, a homeowner is thereby responsible. Improper management and organization can leave homeowners themselves responsible for responsible for issues that the HOA doesn’t take care of.

Form

The solution for a HOA management and organizational tool is a functional website to facilitate the collection and storage of homeowner information, allow the free flow of communication through announcements, emails, recommendations, and surveys, to promote transparency through upload and viewing of pertinent homeowners associations documents and to effectively track and allow for collection of homeowners association dues and fines.

## 1b. Goals of the Project

The proposed website will address four key areas that are basic tasks of every homeowner’s association. Data collection and management is key for the HOA to not only know who is in the community, but also how and who they should be communicating with. A second area that will be addressed is communication between the HOA and the homeowners. The website will serve as basic communications hub that will allow for announcements of HOA business and events, surveys to informally gauge homeowner interest on topics, and provide a means for suggestions to the HOA from homeowners. The issue of transparency within HOAs will be addressed by providing homeowners access to the governing documents of the HOA as well, minutes from all HOA meetings, and information regarding the current financial status of the HOA. The last issue to be addressed is the billing of homeowners by the HOA for dues and fines and providing a means for the payment from the website.

Motivation

The basic issues that are experienced within a HOA can mostly be attributed to poor data management practices and communication. Other issues arise when all of the actions that a homeowner would need to take to do their part in an HOA are handled across a number of varying platforms, some of which they do not wish to be a part of. The website could go a long way to solving some of the hostility and frustrations that build within homeowners associations and help promote better communities.

Measurement

The overall goal of this project is service related to the homeowner and addressing common issues that are seen across HOAs. Measurement of success is providing the HOA with the means to effectively manage the association and providing the homeowner the tools be apprised of information, communicate with the HOA and to take care of their financial obligations to the HOA. By providing the tools to do so, we are providing the opportunity to eliminate common issues in the HOA and some of the homeowner frustrations that arise with HOAs, but this does not guarantee satisfaction or even desired participation by the homeowner.

Measurement of the completeness of homeowner information can be quantified. By taking a baseline of the current level of information and requiring information to be completed/verified upon login or prior to payments, future levels could be compared with the baseline to demonstrate the increases in completeness.

Monetarily, the rate of outstanding HOA dues could be tracked and show the effectiveness of all online payments versus the prior methods.

# 2. The Stakeholders

## 2a. The Client

The target client is any homeowners association. The website must be an acceptable and usable means of managing homeowner information, conveying information to the homeowner and for updating pertinent HOA information. If it is not acceptable, the issues that are pervasive within HOAs will not be solved. While the basic issues of homeowners associations are generally the same, there will be edge cases where a HOA has a different set of issues or may have workable solutions to some but not all of their issues. In these cases, this project may not be suitable for them.

## 2b. The Customer

The client and the customer can be viewed as the same entity.

## 2c. The Hands-On Users of the Product

1. Board member

Role: This entity is responsible for decision making and administrative tasks within the HOA board. For many HOAs they coordinate and convey information to the homeowner. Within the project, they will be given roles, to communicate information to homeowners, create/view survey results, view homeowner recommendations, update HOA documents, and view/update homeowner information.

Experience: A board member could represent someone within a management company or in the case of a member led community, a homeowner, it will be assumed that their experience is at novice level.

Characteristics: The only assumption of personal characteristics that can be made is that a board member must be at least 18 years of age. This means that for usability purposes, the product must cater to a wide audience.

Motivation: The website must be an acceptable and usable means of managing homeowner information, conveying information to the homeowner and for updating pertinent HOA information. If it is not acceptable, board members will reject its use and the benefits will not be experienced by the HOA nor the homeowner.

2. Administrator

Role: The role of the administrator will be limited to the creation of new accounts, reviewing, and updating user permissions and resetting accounts as required.

Experience: Due to the limited role of the administrator, drastic changes will not be required for the website, and the experience required is that of a novice level with a basic understanding of permissions.

Motivation: The website must provide acceptable means of managing the users of the website without intimate knowledge of the database or website itself.

3. Homeowner

Role: The role of the homeowner is the primary user of the product.

Experience: As the homeowner can represent anyone from a wide audience, the expected level of experience is that of a novice.

Characteristics: The only assumption of personal characteristics that can be made is that a homeowner must be at least 18 years of age. This means that for usability purposes, the product must cater to a wide audience.

Motivation: The website must provide acceptable means of managing the users of the website without intimate knowledge of the database or website itself.

## 2d. Priorities Assigned to Users

Key users: Homeowners, Board members

Secondary users: Administrators

Unimportant users: N/A

Motivation

Adoption of the platform by homeowners and board members is key to product success as a service-related goal. Prioritizing their needs and tailoring usability to these users ensures continued utilization of the product.

# 3. Constraints

## 3a. Solution Constraints

Title: General Solution

Description: There are no specific constraints that affect the decision of the proposed solution due to this being a generalized solution for a common homeowner’s association problem. The solution centers around a database and a way for a user to interface with it without using an actual database. Therefore, Oracle APEX has been chosen as the vehicle for the solution.

Rationale: There are no specific constraints that affect the decision of the proposed solution due to this being a generalized solution for a common homeowner’s association problem. By tailoring the solution too specifically, the possible adoption by a wider audience is reduced.

Fit Criterion: The solution should address the needs that have been outlined for the majority of associations without major modification.

Title: Access

Description: The website's design and navigation should be intuitive and user-friendly. Residents, especially those who may not be tech-savvy, should find it easy to locate information, make payments, and communicate with the HOA.

Rationale: It should be convenient for homeowners and board members to login and conduct business without being in front of a computer.

Fit Criterion: The website will be accessible and compatible with both desktop and a wide range of mobile devices.

Title: Ease of Use

Description: Solution should be accessible from both desktop and mobile environments

Rationale: It should be convenient for homeowners and board members to login and conduct business without being in front of a computer.

Fit Criterion: The website will be accessible and compatible with both desktop and mobile devices.

Title: Security

Description: The solution should have adequate security measures in place to protect data, prevent unauthorized access, and ensure the privacy and integrity of information.

Rationale: Users demand security of their personal data. If security is an issue, adoption of the product by end users would become an issue.

Fit Criterion: The solution demonstrates compliance with industry-standard security practices and protocols.

Title: Content Management

Description: The website should have an easy-to-use content management system that allows authorized users to update announcements, news, and documents regularly without requiring technical expertise.

Rationale: Ensures that authorized users, even those without technical skills, are able to update and manage website content, keeping information current and relevant.

Fit Criterion: Allows authorized users to update announcements, news, and documents with a simple, intuitive interface. Authorized users can add, edit, or delete content without encountering technical complexities.

## 3b. Implementation Environment of the Current System

There are no considerations for this product in terms of its placement in a technological or physical environment within an organization. The solution will not reside in a specific client/customer system. The solution will be available for use and accessed by all homeowners, board members, and administrators from any device that has an internet connection.

## 3c. Partner or Collaborative Applications

No partner or collaborative applications will be utilized for this product at this time.

## 3d. Off-the-Shelf Software

The solution will be based around an Oracle APEX application and no other software at this time. The non-use of off-the-shelf software is not a consideration or a requirement that has been established. Design constraints for the product may be limited to what is achievable within Oracle APEX applications. Designing customized web pages that are not based on what is inherent within Oracle APEX itself could lead to non-function web-pages in the future, should updates occur.

## 3e. Anticipated Workplace Environment

The solution will be available for use and accessed by all homeowners, board members, and administrators from any device that has an internet connection. The environment that it is accessed in is of their choosing and does not drive design or functionality requirements.

## 3f. Schedule Constraints

The only current schedule constraint for the implementation of this solution is for a fully functioning product by May 2024.

# 4. Naming Conventions and Terminology

## 4a. Glossary of All Terms, Including Acronyms, Used by Stakeholders Involved in the Project

Annual Meeting: A yearly gathering of homeowners within the association to discuss important matters, review financial reports, and elect board members.

Architectural Review Committee (ARC): A committee responsible for reviewing and approving or denying requests for architectural modifications or improvements to properties within the community.

Assessment: A periodic fee paid by homeowners to the homeowners association to cover common expenses, such as maintenance, landscaping, and community amenities.

Balance: Refers to the outstanding amount of money owed by a homeowner to the association.

Board of Directors: Elected individuals responsible for managing the affairs of the homeowners association, making decisions, and enforcing community rules and regulations.

Bylaws: Rules and regulations governing the internal affairs of the homeowners association, outlining its structure, operations, and decision-making processes.

CC&R (Covenants, Conditions, and Restrictions): Legally binding rules and regulations that govern the use and maintenance of properties within the community, outlining what homeowners can and cannot do with their properties.

Common Areas: Areas within the community, such as parks, swimming pools, or common buildings, that are jointly owned and maintained by all homeowners in the association.

Declaration of Covenants: A legal document that outlines the restrictions and obligations imposed on property owners within the homeowners association.

Dues: Regular payments made by homeowners to the association, typically used to cover maintenance, repairs, and other community expenses.

Fine: A monetary penalty imposed on a homeowner for violating the community's rules, regulations, or covenants.

HOA (Homeowners Association): A governing body that manages and maintains common areas, enforces community rules, and collects assessments from homeowners.

Homeowner: An individual who owns a property within the homeowners association and is subject to its rules and regulations.

Management Company: A professional firm hired by the homeowners association to handle administrative tasks, financial management, and property maintenance on behalf of the association.

Meeting Minutes: Official records documenting discussions, decisions, and actions taken during association meetings, including board meetings and annual meetings.

Property Manager: An individual or company responsible for managing day-to-day operations, property maintenance, and tenant relations within the community.

Reserve Fund: A fund set aside by the homeowners association for major repairs, replacements, or unexpected expenses in the future.

Rules and Regulations: Specific guidelines and policies established by the homeowners association, addressing issues such as noise, pet ownership, and property maintenance.

Special Assessment: An additional fee levied on homeowners to cover unexpected expenses or significant community improvements not covered by regular assessments.

Voting Rights: The ability of homeowners to participate in association decisions by voting on important matters such as board elections, bylaw changes, or special assessments.

# 5. Relevant Facts and Assumptions

## 5a. Relevant Facts

Title: Social Dynamics

Description: There will be varying social dynamics across all homeowners association communities. Some communities may desire in person and face to face communication and this product may not be a solution that individuals want to interface with no matter how successful it may be with others.

Title: Digital Literacy

Description: There are varying degrees of digital literacy within communities across vastly different age groups. While the goal is to provide an easy to use and intuitive solution for users to navigate, there will be individuals that still struggle to utilize the solution effectively.

## 5b. Business Rules

Title: Voting Rights

Description: There are criteria and procedures for voting in association matters, such as elections and major decisions. Criteria include being up to date on all assessments and fines.

Effects: Implement user-specific dashboards displaying voting eligibility and active polls.

Title: Membership Dues

Description: Set rules for calculating, collecting, and managing homeowner association fees, including due dates and penalties for late payments.

Effects: Develop a method of online dues payment and automated fee calculations. Implement a notification system for upcoming dues payments and late payment reminders.

Title: Transaction Records

Description: Maintain accurate records of financial transactions, including dues payments, fines, and other fees.

Effects: Create a transaction management system to record and organize financial data securely and generate detailed transaction reports for users.

Title: Board Meetings Scheduling

Description: There are established rules for scheduling, notifying, and conducting board meetings, including quorum requirements.

Effects: Create an event management system for scheduling and notifying members about board meetings and implement a collaborative decision-making platform for agenda discussion and voting.

Title: Announcements/News

Description: Organization community events, meetings, and social gatherings as well as other news should be distributed to the widest extent possible among the homeowner audience.

Effects: Create an event management platform, allowing residents to be made aware of announcements, events and news and access details. Implement a notification system for announcements and news. Implement a community calendar feature for residents to view upcoming events and activities.

## 5c. Assumptions

The assumptions that have currently been made regarding the design and implementation of this solution are that all aspects of the solution are achievable through an Oracle APEX application and can be implemented within the given timeframe.

# 6. The Scope of the Work

## 6a. The Current Situation

Topic: Homeowner information

### Description: Many homeowners associations that are not run by larger management companies are unable to keep track of homeowner information. This leads to non-payment and inability to even communicate with the homeowner which ultimately leads to larger issues within the community.

### Topic: Homeowners Association Official Communication

### Description: Official means of communication is generally a topic of dispute amongst homeowners and board members alike. The growth of social media platforms have led communities towards communication in an online forum that many are not accustomed to or do not welcome. Homeowners should be able to access official communication and receive it in a medium of their choosing (email, mail, official website). Communication on other platforms often leads to unprofessional communication with little to no regulation.

### Topic: Voting

### Description: Voting within homeowners associations is typically reserved to those residents with current accounts. Verification of this condition can be achieved through both manual and automatic processes. Sending of ballots could become an automated process.

### Topic: Membership Dues/Fine Payment

### Description: Payment of dues and fines is typically the worst experience for the homeowner as part of the association experience. Mishandling of payments and inaccurate record keeping can lead to further headaches for the homeowner and administrators of the homeowners association. Automating the process to ensure payment is made/received and updating related records is an essential process.

## 6b. The Context of the Work

The table below identifies all of the current anticipated inputs and outputs that would flow between the work and the adjacent systems for a potential client.



## 6c. Work PartitioningExample

Business Event List

Event Name Input and Output Summary of BUC

|  |  |  |
| --- | --- | --- |
| 1. Owner sends a message | In - New message  Out - New message | An owner creates a new message and a notification to the recipient is made. Message maps are updated. |
| 2. Owner makes a payment | In – New Payment  Out – New entry | A new payment is made by the owner and the account is updated. |
| 3. Owner takes a survey | In – New Survey Result  Out- New entry | An owner completes a survey. The results captured and the survey map is updated. |
| 4. Owner has a past due account balance |  | An owner account becomes delinquent, and the voting rights of the owner are suspended. |
| 5. Owner sells property | In – New owner | A new account is generated for the new owner. The new owner information is used to generate a new owner in the database and all subsequent database connections are updated. Login information for the owner is sent to the new owner. |
| 6. Owner logs into account | In – Login | An owner logs into their account. Login information should be updated to keep metrics on user adoption and usage of the product. Individual user login information will not be available to other users. |
| 7. Owner updates contact information | In – Phone, email | An owner updates their contact information. The relevant fields should reflect the changes. |
| 8. Owner updates opt out preferences | In – Opt Out preference | A user should have the option to opt out of unwanted communication. When the user selects to opt out, all communication, except for required notifications that are generally received through the postal service, should cease outside of the website. |
| 9. Board member posts an announcement | In – New announcement  Out – New announcement | A board member creates a new announcement post for the community. The post is made, and notifications are sent. |
| 10. Board member changes assessment rates for a new year | In – New rate | A new yearly assessment rate is added by a board member. An entry is made, and all subsequent periodic assessments are based off the new rate. |
| 11. Board member issues a fine | In – New fine  Out – New fine  Out – Account balance | A board member issues a fine for a violation. The new fine is created, and the account balance is updated. A notification of the fine is sent to the owner. |
| 12. Board member changes a homeowner role | In – Role Change | A change in the owner board map is made to reflect a higher-level role for the owner within the community. |
| 13. Board member posts a survey | In – New Survey  Out – New Survey | A board member generates a new survey for the community. The survey is posted |
| 14. Board member posts a document | In – New document  Out – New document | A board member uploads a new document to the website. The document should be stored and available to the appropriate users. |
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## 6d. Specifying a Business Use Case (BUC)

The following specifies how Business Use Cases respond to Business Events that have been identified.

|  |  |
| --- | --- |
| Business Event | **Owner Sends a Message** |
| Business Use Case # | **1** |
| **Business Use Case** | **Message Communication** |
| **Description** | Owners can send messages to the HOA board or other homeowners for inquiries, concerns, or general communication. |
| Actors | Homeowner, HOA Board member |
| Preconditions | Owner is logged into their account. |
| Triggers | Owner initiates a message from their account. |
| Main Flow | Owner selects recipient(s) and composes the message.  Owner sends the message.  Recipients receive the message and can respond if necessary. |
| Postconditions | Message is stored in database and available for viewing by recipient. |

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| --- | --- |
| Business Event | **Owner Makes a Payment** |
| Business Use Case # | **2** |
| **Business Use Case** | **Online Payment** |
| **Description** | Owners can make online payments for HOA dues, fines, or other fees securely through the website. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account and has selected payment items. |
| Triggers | Owner initiates a payment transaction. |
| Main Flow | Owner selects payment items and enters payment details.  Payment gateway processes the transaction securely.  Owner receives payment confirmation. |
| Postconditions | Payment is processed, and the owner's account balance is updated. Voting rights are restored if they were disabled |

|  |  |
| --- | --- |
| Business Event | **Owner Takes a Survey** |
| Business Use Case # | **3** |
| **Business Use Case** | **Survey Participation** |
| **Description** | Owners can participate in surveys posted by the HOA board to gather feedback on community matters. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account and accesses the available survey. |
| Triggers | Owner selects a survey to participate in. |
| Main Flow | Owner answers survey questions.  Owner submits the survey responses.  Survey module compiles and stores the responses. |
| Postconditions | Survey response is stored in database and anonymous results are available for viewing by community members and report is generated for board members. |

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| --- | --- |
| Business Event | **Owner Has a Past Due Account Balance** |
| Business Use Case # | **4** |
| **Business Use Case** | **Account Past Due** |
| **Description** | The system notifies owners when their account balance is past due, outlining the outstanding amount and providing payment options. |
| Actors | Homeowner |
| Preconditions | Owner has unpaid dues or fines. |
| Triggers | Account balance becomes overdue based on due dates. |
| Main Flow | Owner voting rights are disabled.  Owner receives a notification about the past due status.  Owner accesses their account to view details.  Owner makes a payment to settle the past due balance. |
| Postconditions | Past due balance is cleared, and the notification is resolved. |

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| --- | --- |
| Business Event | **Owner Sells Property** |
| Business Use Case # | **5** |
| **Business Use Case** | **Property Sale** |
| **Description** | Owners can notify the HOA when they sell their property, facilitating a smooth transition for the new homeowner |
| Actors | Homeowner, Board Member, Administrator |
| Preconditions | Owner is selling their property and wishes to inform the HOA. |
| Triggers | Owner initiates the property sale notification. |
| Main Flow | Owner fills out the property sale notification form with new owner details.  HOA board member or administrator verifies and updates the property ownership records.  New owner accesses their account to view details. |
| Postconditions | New Account created, new owner created, new owner able to access account |

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| --- | --- |
| Business Event | **Owner Logs into Account** |
| Business Use Case # | **6** |
| **Business Use Case** | **User Authentication** |
| **Description** | Owners can securely log into their accounts to access HOA services and information. |
| Actors | Homeowner |
| Preconditions | Owner has a registered account. |
| Triggers | Owner attempts to log in. |
| Main Flow | Owner enters their credentials (username/email and password).  Authentication system verifies the credentials.  Owner gains access to their account dashboard.  Login date/time is updated |
| Postconditions | Owner is successfully logged into their account. |

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| --- | --- |
| Business Event | **Owner Updates Contact Information** |
| Business Use Case # | **7** |
| **Business Use Case** | **Contact Information Update** |
| **Description** | Owners can update their contact details including phone number and email, to ensure accurate communication from the HOA. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account. |
| Triggers | Owner accesses the account settings to update information |
| Main Flow | Owner selects the contact information section.  Owner edits the necessary details.  Owner saves the updated contact information. |
| Postconditions | Owner's contact information is updated in the system. |

|  |  |
| --- | --- |
| Business Event | **Owner Updates Opt-Out Preferences** |
| Business Use Case # | **8** |
| **Business Use Case** | **Communication Preferences** |
| **Description** | Owners can manage their opt-out preferences for receiving specific types of communications from the HOA, such as message, announcement, and account notifications. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account. |
| Triggers | Owner accesses communication preferences settings. |
| Main Flow | Owner selects communication types they wish to opt out of.  Owner saves the updated preferences. |
| Postconditions | Owner's communication preferences are updated, and they receive only desired communications. |

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| --- | --- |
| Business Event | **Board Member Posts an Announcement** |
| Business Use Case # | **9** |
| **Business Use Case** | **Announcement Publication** |
| **Description** | Board members can post announcements to inform homeowners about important community updates, events, or policy changes. |
| Actors | Board Member |
| Preconditions | Board member is logged into their account and creates a new announcement. |
| Triggers | Board member initiates the announcement publication. |
| Main Flow | Board member creates the announcement, including details and media if necessary.  Board member publishes the announcement. |
| Postconditions | Announcement is displayed on the HOA website for homeowners to view. |

|  |  |
| --- | --- |
| Business Event | **Board Member Changes Assessment Rates for a New Year** |
| Business Use Case # | **10** |
| **Business Use Case** | **Assessment Rate Adjustment** |
| **Description** | Board members can update assessment rates for the new fiscal year, ensuring accurate billing for homeowners. |
| Actors | Board Member |
| Preconditions | Board member has the authority to adjust assessment rates and reviews financial data. |
| Triggers | Start of a new fiscal year or financial review period. |
| Main Flow | Board member reviews financial data and community needs.  Board member adjusts assessment rates based on the analysis. |
| Postconditions | New assessment rates are applied, and homeowners are informed about the changes. |

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| --- | --- |
| Business Event | **Board Member Issues a Fine** |
| Business Use Case # | **11** |
| **Business Use Case** | **Issuing Fines** |
| **Description** | Board members can issue fines to homeowners for violations of community rules or non-compliance with regulations. |
| Actors | Board Member |
| Preconditions | Board member identifies a violation and decides to issue a fine. Board member is logged into their account.  Board member has the authority to issue a fine. |
| Triggers | Identification of a violation |
| Main Flow | Board member documents the violation, including evidence and details.  Board member issues the fine, specifying the violation type, violation date, amount due and due date. |
| Postconditions | Fine is recorded in the homeowner's account, and the homeowner is notified. |

|  |  |
| --- | --- |
| Business Event | **Board Member Changes a Homeowner Role** |
| Business Use Case # | **12** |
| **Business Use Case** | **Role Modification** |
| **Description** | Board members can modify homeowners' roles within the community, granting or revoking privileges based on their involvement or responsibilities. |
| Actors | Board Member |
| Preconditions | Board member identifies a homeowner role must change. Board member has the authority to change user roles and permissions. |
| Triggers | Identification of a violation |
| Main Flow | Board member reviews homeowner roles and responsibilities.  Board member modifies the homeowner's role as needed. |
| Postconditions | Homeowner's role is updated, granting, or restricting privileges accordingly. |

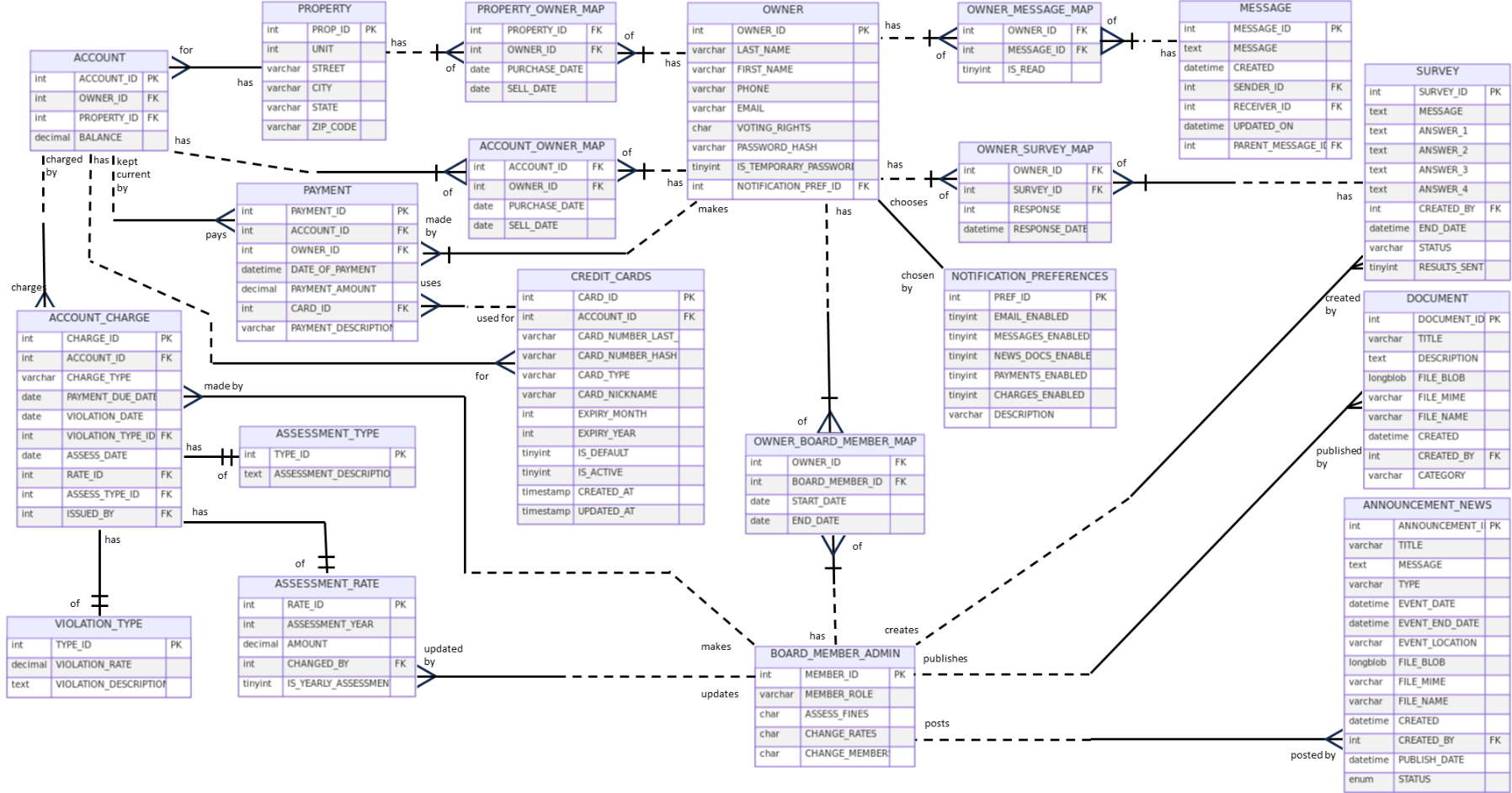
|  |  |
| --- | --- |
| Business Event | **Board Member Posts a Survey** |
| Business Use Case # | **13** |
| **Business Use Case** | **Survey Creation and Publication** |
| **Description** | Board members can create and publish surveys to gather feedback and opinions from homeowners on community matters. |
| Actors | Board Member |
| Preconditions | Board member identifies the need for homeowner feedback on a specific topic. |
| Triggers | Need for community input or decision-making. |
| Main Flow | Board member logs in and navigates to the board actions page. Board member selects to create a new survey. Board member provides the information into the modal and submits. |
| Postconditions | Survey is published and available to homeowners for submission. |

|  |  |
| --- | --- |
| Business Event | **Board Member Posts a Document** |
| Business Use Case # | **14** |
| **Business Use Case** | **Document Upload and Publication** |
| **Description** | Board members can upload and publish documents, such as meeting minutes, policy updates, or community guidelines, for homeowners' reference. |
| Actors | Board Member |
| Preconditions | Board member has relevant documents to share with homeowners. |
| Triggers | New document creation or update to existing documents. |
| Main Flow | Board member uploads the document, providing a title and description.  Board member publishes the document for homeowners to access. |
| Postconditions | Document is available for homeowners to view and download. |

# 7. Business Data Model and Data Dictionary

## 7a. Business Data Model

Below is the working Entity Relationship Diagram for the proposed solution. This is subject to change based on further problem analysis.



## 7b. Data Dictionary

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Description | Data Type | Type |
| ACCOUNT | Account related information | Table | Class |
| ACCOUNT\_CHARGE | Charge related transactions for an account | Table | Class |
| ACCOUNT\_OWNER\_MAP | A mapping of account to owners (account\_id + owner\_id) | Table | Class |
| ANNOUNCEMENT\_NEWS | Storage of all announcement and events | Table | Class |
| ASSESSMENT | Assessments are a type of account charge | Table | Class |
| ASSESSMENT\_RATE | Assessment rates | Table | Class |
| ASSESSMENT\_TYPE | Assessment types | Table | Class |
| BOARD\_MEMBER\_ADMIN | Board member positions and permissions | Table | Class |
| CREDIT\_CARDS | Credit card information of all users | Table | Class |
| DOCUMENT | Storage of all published documents | Table | Class |
| FINE | Fines are a type of account charge | Table | Class |
| MESSAGE | Message from users and system | Table | Class |
| NOTIFICATION\_PREFERENCES | Preferences of user for email notification of events | Table | Class |
| OWNER | Owners of HOA properties | Table | Class |
| OWNER\_BOARD\_MEMBER\_MAP | A mapping of owners to board member postions (owner\_id + member\_id) | Table | Class |
| OWNER\_MESSAGE\_MAP | A mapping of message to to owners and read status (owner\_id + message\_id) | Table | Class |
| OWNER\_SURVEY\_MAP | A mapping of owners to survey responses (owner\_id + survey\_id) | Table | Class |
| PAYMENT | Payment related transactions for an account | Table | Class |
| PROPERTY | Physical properties | Table | Class |
| PROPERTY\_OWNER\_MAP | A mapping of owners to properties (owner\_id + property\_id) | Table | Class |
| SURVEY | Storage of all surveys that have been or will be published | Table | Class |
| VIOLATION\_TYPE | Types of violations | Table | Class |
| ACCOUNT.ACCOUNT\_ID | Unique account identifier | int | Attribute/Element |
| ACCOUNT.BALANCE | Amount of payment or charge | decimal | Attribute/Element |
| ACCOUNT.OWNER\_ID | Unique owner identifier | int | Attribute/Element |
| ACCOUNT.PROPERTY\_ID | Unique property identifier | int | Attribute/Element |
| ACCOUNT\_CHARGE.ACCOUNT\_ID | Unique account identifier | int | Attribute/Element |
| ACCOUNT\_CHARGE.ASSESS\_DATE | The date of an assessment is imposed | date | Attribute/Element |
| ACCOUNT\_CHARGE.ASSESS\_TYPE\_ID | Type of assessment made | int | Attribute/Element |
| ACCOUNT\_CHARGE.CHARGE\_ID | Unique charge identifier | int | Attribute/Element |
| ACCOUNT\_CHARGE.CHARGE\_TYPE | Type of violation being imposed | varchar(255) | Attribute/Element |
| ACCOUNT\_CHARGE.ISSUED\_BY | Unique board member position identifier | int | Attribute/Element |
| ACCOUNT\_CHARGE.PAYMENT\_DUE\_DATE | The date by which a payment is due | date | Attribute/Element |
| ACCOUNT\_CHARGE.RATE\_ID | The unique identifier of an assessment rate | int | Attribute/Element |
| ACCOUNT\_CHARGE.VIOLATION\_DATE | The date of a violation | date | Attribute/Element |
| ACCOUNT\_CHARGE.VIOLATION\_TYPE\_ID | The unique identifier of a type of violation | int | Attribute/Element |
| ACCOUNT\_OWNER\_MAP.ACCOUNT\_ID | Unique account identifier | int | Attribute/Element |
| ACCOUNT\_OWNER\_MAP.OWNER\_ID | Unique owner identifier | int | Attribute/Element |
| ACCOUNT\_OWNER\_MAP.PURCHASE\_DATE | The date of purchase of a home by the owner | date | Attribute/Element |
| ACCOUNT\_OWNER\_MAP.SELL\_DATE | The date of sell of a home by the owner | date | Attribute/Element |
| ANNOUNCEMENT\_NEWS.ANNOUNCEMENT\_ID | Unique announcement identifier | int | Attribute/Element |
| ANNOUNCEMENT\_NEWS.CREATED | The time/date an announcement is created | datetime | Attribute/Element |
| ANNOUNCEMENT\_NEWS.CREATED\_BY | The board member identifier of the announcement creator | int | Attribute/Element |
| ANNOUNCEMENT\_NEWS.EVENT\_DATE | The time/date an event is scheduled for | datetime | Attribute/Element |
| ANNOUNCEMENT\_NEWS.EVENT\_END\_DATE | The time/date an event is scheduled to end | datetime | Attribute/Element |
| ANNOUNCEMENT\_NEWS.EVENT\_LOCATION | The location of an event | varchar(255) | Attribute/Element |
| ANNOUNCEMENT\_NEWS.FILE\_BLOB | A large binary object, for holding files | longblob | Attribute/Element |
| ANNOUNCEMENT\_NEWS.FILE\_MIME | Multipurpose Internet Mail Extensions of a file | varchar(255) | Attribute/Element |
| ANNOUNCEMENT\_NEWS.FILE\_NAME | Name of a file | varchar(255) | Attribute/Element |
| ANNOUNCEMENT\_NEWS.MESSAGE | A message accompanying an announcement | text(65535) | Attribute/Element |
| ANNOUNCEMENT\_NEWS.PUBLISH\_DATE | The date an announcement is published | datetime | Attribute/Element |
| ANNOUNCEMENT\_NEWS.STATUS | The publishing or scheduled stauts of an announcement | enum(9) | Attribute/Element |
| ANNOUNCEMENT\_NEWS.TITLE | The title of an announcement | varchar(255) | Attribute/Element |
| ANNOUNCEMENT\_NEWS.TYPE | The type (announcement/event) of an announcement | varchar(50) | Attribute/Element |
| ASSESSMENT\_RATE.AMOUNT | Amount of payment or charge | decimal | Attribute/Element |
| ASSESSMENT\_RATE.ASSESSMENT\_YEAR | The year an assessment is scheduled for (if yearly assess.) | int | Attribute/Element |
| ASSESSMENT\_RATE.CHANGED\_BY | The unique id of the board member who made the change | int | Attribute/Element |
| ASSESSMENT\_RATE.IS\_YEARLY\_ASSESSMENT | A boolean indicating if the assessment is designated yearly | tinyint | Attribute/Element |
| ASSESSMENT\_RATE.RATE\_ID | The unique identifier of a an assessment rate | int | Attribute/Element |
| ASSESSMENT\_TYPE.ASSESSMENT\_DESCRIPTION | A description of what the assessment if for | text(65535) | Attribute/Element |
| ASSESSMENT\_TYPE.TYPE\_ID | A unique identifier for an assessment type | int | Attribute/Element |
| BOARD\_MEMBER\_ADMIN.ASSESS\_FINES | A boolean indicating board member privilege | char(1) | Attribute/Element |
| BOARD\_MEMBER\_ADMIN.CHANGE\_MEMBERS | A boolean indicating board member privilege | char(1) | Attribute/Element |
| BOARD\_MEMBER\_ADMIN.CHANGE\_RATES | A boolean indicating board member privilege | char(1) | Attribute/Element |
| BOARD\_MEMBER\_ADMIN.MEMBER\_ID | A boolean indicating board member privilege | int | Attribute/Element |
| BOARD\_MEMBER\_ADMIN.MEMBER\_ROLE | A boolean indicating board member privilege | varchar(255) | Attribute/Element |
| CREDIT\_CARDS.ACCOUNT\_ID | The account id the credit card is associated with | int | Attribute/Element |
| CREDIT\_CARDS.CARD\_ID | A unique identifier for a credit card | int | Attribute/Element |
| CREDIT\_CARDS.CARD\_NICKNAME | A user provided nickname of a credit card | varchar(50) | Attribute/Element |
| CREDIT\_CARDS.CARD\_NUMBER\_HASH | A hash of the full credit card number | varchar(255) | Attribute/Element |
| CREDIT\_CARDS.CARD\_NUMBER\_LAST\_4 | The last four digits of a credit card | varchar(4) | Attribute/Element |
| CREDIT\_CARDS.CARD\_TYPE | The credit card type/provider | varchar(50) | Attribute/Element |
| CREDIT\_CARDS.CREATED\_AT | The date/time of the credit card creation in the system | timestamp | Attribute/Element |
| CREDIT\_CARDS.EXPIRY\_MONTH | The expiration month of a credit card | int | Attribute/Element |
| CREDIT\_CARDS.EXPIRY\_YEAR | The expiration year of a credit card | int | Attribute/Element |
| CREDIT\_CARDS.IS\_ACTIVE | A boolean for if the card is still active | tinyint | Attribute/Element |
| CREDIT\_CARDS.IS\_DEFAULT | A user defined boolean designating a default card | tinyint | Attribute/Element |
| CREDIT\_CARDS.UPDATED\_AT | A date/time when the card was updated | timestamp | Attribute/Element |
| DOCUMENT.CATEGORY | A category of a document type, or its purpose | varchar(50) | Attribute/Element |
| DOCUMENT.CREATED | The date/time a document was created | datetime | Attribute/Element |
| DOCUMENT.CREATED\_BY | The unique id of the board member who published the document | int | Attribute/Element |
| DOCUMENT.DESCRIPTION | The description of the document | text(65535) | Attribute/Element |
| DOCUMENT.DOCUMENT\_ID | The unique identifier of a published document | int | Attribute/Element |
| DOCUMENT.FILE\_BLOB | A large binary object | longblob | Attribute/Element |
| DOCUMENT.FILE\_MIME | Multipurpose Internet Mail Extensions of a file | varchar(255) | Attribute/Element |
| DOCUMENT.FILE\_NAME | Name of a file | varchar(255) | Attribute/Element |
| DOCUMENT.TITLE | The title of a document | varchar(255) | Attribute/Element |
| MESSAGE.CREATED | The date/time a message was created | datetime | Attribute/Element |
| MESSAGE.MESSAGE | The actual message content | text(65535) | Attribute/Element |
| MESSAGE.MESSAGE\_ID | The unique identifier of a message\_id | int | Attribute/Element |
| MESSAGE.PARENT\_MESSAGE\_ID | The identifier of a message that is being replied to | int | Attribute/Element |
| MESSAGE.RECEIVER\_ID | The owner id of the receiver a message | int | Attribute/Element |
| MESSAGE.SENDER\_ID | The owner id of the sender of a message | int | Attribute/Element |
| MESSAGE.UPDATED\_ON | The date/time a message was updated | datetime | Attribute/Element |
| NOTIFICATION\_PREFERENCES.CHARGES\_ENABLED | A user's choice to receive charge related email notification | tinyint | Attribute/Element |
| NOTIFICATION\_PREFERENCES.DESCRIPTION | The description of the notification preference | varchar(255) | Attribute/Element |
| NOTIFICATION\_PREFERENCES.EMAIL\_ENABLED | A user's choice to receive emails in general | tinyint | Attribute/Element |
| NOTIFICATION\_PREFERENCES.MESSAGES\_ENABLED | A user's choice to receive message related email notification | tinyint | Attribute/Element |
| NOTIFICATION\_PREFERENCES.NEWS\_DOCS\_ENABLED | A user's choice to receive announcement or document notifications | tinyint | Attribute/Element |
| NOTIFICATION\_PREFERENCES.PAYMENTS\_ENABLED | A user's choice to receive payment notifications | tinyint | Attribute/Element |
| NOTIFICATION\_PREFERENCES.PREF\_ID | A unique identifier of | int | Attribute/Element |
| OWNER.EMAIL | The email address of an owner | varchar(255) | Attribute/Element |
| OWNER.FIRST\_NAME | The first name of an owner | varchar(50) | Attribute/Element |
| OWNER.IS\_TEMPORARY\_PASSWORD | Whether or not a password is temporatyr and must be changed | tinyint | Attribute/Element |
| OWNER.LAST\_NAME | The last name of an owner | varchar(50) | Attribute/Element |
| OWNER.NOTIFICATION\_PREF\_ID | The unique id of user preference choice | int | Attribute/Element |
| OWNER.OWNER\_ID | The unique identifier of an owner | int | Attribute/Element |
| OWNER.PASSWORD\_HASH | The hashed password of an owner | varchar(255) | Attribute/Element |
| OWNER.PHONE | The phone number of an owner | varchar(20) | Attribute/Element |
| OWNER.VOTING\_RIGHTS | The current voting rights of an owner based on account balance | char(1) | Attribute/Element |
| OWNER\_BOARD\_MEMBER\_MAP.BOARD\_MEMBER\_ID | The unique id of a board member postion | int | Attribute/Element |
| OWNER\_BOARD\_MEMBER\_MAP.END\_DATE | The end date of the relation between owner and board member position | date | Attribute/Element |
| OWNER\_BOARD\_MEMBER\_MAP.OWNER\_ID | The unique id of an owner | int | Attribute/Element |
| OWNER\_BOARD\_MEMBER\_MAP.START\_DATE | The start date of the relation between owner and board member position | date | Attribute/Element |
| OWNER\_MESSAGE\_MAP.IS\_READ | Whether a message has been read yet | tinyint | Attribute/Element |
| OWNER\_MESSAGE\_MAP.MESSAGE\_ID | The unique id of a message | int | Attribute/Element |
| OWNER\_MESSAGE\_MAP.OWNER\_ID | The unique identifier of an owner | int | Attribute/Element |
| OWNER\_SURVEY\_MAP.OWNER\_ID | The unique identifier of an owner | int | Attribute/Element |
| OWNER\_SURVEY\_MAP.RESPONSE | The user reponse to a survey | int | Attribute/Element |
| OWNER\_SURVEY\_MAP.RESPONSE\_DATE | The date/time of an user survey response | datetime | Attribute/Element |
| OWNER\_SURVEY\_MAP.SURVEY\_ID | The unique identifier of a survey | int | Attribute/Element |
| PAYMENT.ACCOUNT\_ID | The unique id of an account | int | Attribute/Element |
| PAYMENT.CARD\_ID | The unique id of a credit card | int | Attribute/Element |
| PAYMENT.DATE\_OF\_PAYMENT | The date/time of a payment | datetime | Attribute/Element |
| PAYMENT.OWNER\_ID | The unique identifier of an owner | int | Attribute/Element |
| PAYMENT.PAYMENT\_AMOUNT | The amount of an payment | decimal | Attribute/Element |
| PAYMENT.PAYMENT\_DESCRIPTION | The description of an payment | varchar(255) | Attribute/Element |
| PAYMENT.PAYMENT\_ID | The unique id of a payment | int | Attribute/Element |
| PROPERTY.CITY | The city a property is present in | varchar(255) | Attribute/Element |
| PROPERTY.PROP\_ID | The unique id of a property | int | Attribute/Element |
| PROPERTY.STATE | The state a property is present in | varchar(255) | Attribute/Element |
| PROPERTY.STREET | The street that a property is on | varchar(255) | Attribute/Element |
| PROPERTY.UNIT | The unit address of a property | int | Attribute/Element |
| PROPERTY.ZIP\_CODE | The zip code a property is present in | varchar(10) | Attribute/Element |
| PROPERTY\_OWNER\_MAP.OWNER\_ID | The unique identifier of an owner | int | Attribute/Element |
| PROPERTY\_OWNER\_MAP.PROPERTY\_ID | The unique identifier of an property | int | Attribute/Element |
| PROPERTY\_OWNER\_MAP.PURCHASE\_DATE | The purchase date of a property | date | Attribute/Element |
| PROPERTY\_OWNER\_MAP.SELL\_DATE | The sell date of a property | date | Attribute/Element |
| SURVEY.ANSWER\_1 | A text based answer for a survey (required) | text(65535) | Attribute/Element |
| SURVEY.ANSWER\_2 | A text based answer for a survey (required) | text(65535) | Attribute/Element |
| SURVEY.ANSWER\_3 | A text based answer for a survey (optional) | text(65535) | Attribute/Element |
| SURVEY.ANSWER\_4 | A text based answer for a survey (optional) | text(65535) | Attribute/Element |
| SURVEY.CREATED\_BY | The unique board member id of the individual who created the survey | int | Attribute/Element |
| SURVEY.END\_DATE | The day that a survey ends | datetime | Attribute/Element |
| SURVEY.MESSAGE | The day that a survey begins | text(65535) | Attribute/Element |
| SURVEY.RESULTS\_SENT | Whether or not results have been sent via message to members | tinyint | Attribute/Element |
| SURVEY.STATUS | The current status of a survey (active/inactive) | varchar(20) | Attribute/Element |
| SURVEY.SURVEY\_ID | The unique id of a survey | int | Attribute/Element |
| VIOLATION\_TYPE.TYPE\_ID | The unique id of a violation type | int | Attribute/Element |
| VIOLATION\_TYPE.VIOLATION\_DESCRIPTION | The description of a violation | text(65535) | Attribute/Element |
| VIOLATION\_TYPE.VIOLATION\_RATE | The rate for a violation | decimal | Attribute/Element |

# 8. The Scope of the Product

## 8a. Product Boundary

Since this solution is generalized and will not be built for a specific client and based off their specific needs, the analysis of the Business Use Cases (BUCs) and Product Use Cases (PUCs) are directly aligned, meaning that the BUCs are and will be the same as the PUCs.

|  |  |
| --- | --- |
| Product Use Case # | **1** |
| Product **Use Case** | **Message Communication** |
| **Description** | Owners can send messages to the HOA board or other homeowners for inquiries, concerns, or general communication. |
| Actors | Homeowner, HOA Board member |
| Preconditions | Owner is logged into their account. |
| Triggers | Owner initiates a message from their account. |
| Main Flow | Owner selects recipient(s) and composes the message.  Owner sends the message.  Recipients receive the message and can respond if necessary. |
| Postconditions | Message is stored in database and available for viewing by recipient. |

|  |  |
| --- | --- |
| Product Use Case # | 2 |
| Product **Use Case** | **Owner Makes a Payment** |
| **Description** | Owners can make online payments for HOA dues, fines, or other fees securely through the website. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account and has selected payment items. |
| Triggers | Owner initiates a payment transaction. |
| Main Flow | Owner selects payment items and enters payment details.  Payment gateway processes the transaction securely.  Owner receives payment confirmation. |
| Postconditions | Payment is processed, and the owner's account balance is updated. Voting rights are restored if they were disabled |

|  |  |
| --- | --- |
| Product Use Case # | **3** |
| Product **Use Case** | **Survey Participation** |
| **Description** | Owners can participate in surveys posted by the HOA board to gather feedback on community matters. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account and accesses the available survey. |
| Triggers | Owner selects a survey to participate in. |
| Main Flow | Owner answers survey questions.  Owner submits the survey responses.  Survey module compiles and stores the responses. |
| Postconditions | Survey response is stored in database and anonymous results are available for viewing by community members and report is generated for board members. |

|  |  |
| --- | --- |
| Product Use Case # | **4** |
| Product **Use Case** | **Account Past Due** |
| **Description** | The system notifies owners when their account balance is past due, outlining the outstanding amount and providing payment options. |
| Actors | Homeowner |
| Preconditions | Owner has unpaid dues or fines. |
| Triggers | Account balance becomes overdue based on due dates. |
| Main Flow | Owner voting rights are disabled.  Owner receives a notification about the past due status.  Owner accesses their account to view details.  Owner makes a payment to settle the past due balance. |
| Postconditions | Past due balance is cleared, and the notification is resolved. |

|  |  |
| --- | --- |
| Product Use Case # | **5** |
| Product **Use Case** | **Property Sale** |
| **Description** | Owners can notify the HOA when they sell their property, facilitating a smooth transition for the new homeowner |
| Actors | Homeowner, Board Member, Administrator |
| Preconditions | Owner is selling their property and wishes to inform the HOA. |
| Triggers | Owner initiates the property sale notification. |
| Main Flow | Owner fills out the property sale notification form with new owner details.  HOA board member or administrator verifies and updates the property ownership records.  New owner accesses their account to view details. |
| Postconditions | New Account created, new owner created, new owner able to access account |

|  |  |
| --- | --- |
| Product Use Case # | **6** |
| Product **Use Case** | **User Authentication** |
| **Description** | Owners can securely log into their accounts to access HOA services and information. |
| Actors | Homeowner |
| Preconditions | Owner has a registered account. |
| Triggers | Owner attempts to log in. |
| Main Flow | Owner enters their credentials (username/email and password).  Authentication system verifies the credentials.  Owner gains access to their account dashboard.  Login date/time is updated |
| Postconditions | Owner is successfully logged into their account. |

|  |  |
| --- | --- |
| Product Use Case # | **7** |
| Product **Use Case** | **Contact Information Update** |
| **Description** | Owners can update their contact details including phone number and email, to ensure accurate communication from the HOA. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account. |
| Triggers | Owner accesses the account settings to update information |
| Main Flow | Owner selects the contact information section.  Owner edits the necessary details.  Owner saves the updated contact information. |
| Postconditions | Owner's contact information is updated in the system. |

|  |  |
| --- | --- |
| Product Use Case # | **8** |
| Product **Use Case** | **Communication Preferences** |
| **Description** | Owners can manage their opt-out preferences for receiving specific types of communications from the HOA, such as message, announcement, and account notifications. |
| Actors | Homeowner |
| Preconditions | Owner is logged into their account. |
| Triggers | Owner accesses communication preferences settings. |
| Main Flow | Owner selects communication types they wish to opt out of.  Owner saves the updated preferences. |
| Postconditions | Owner's communication preferences are updated, and they receive only desired communications. |

|  |  |
| --- | --- |
| Product Use Case # | **9** |
| Product **Use Case** | **Announcement Publication** |
| **Description** | Board members can post announcements to inform homeowners about important community updates, events, or policy changes. |
| Actors | Board Member |
| Preconditions | Board member is logged into their account and creates a new announcement. |
| Triggers | Board member initiates the announcement publication. |
| Main Flow | Board member creates the announcement, including details and media if necessary.  Board member publishes the announcement. |
| Postconditions | Announcement is displayed on the HOA website for homeowners to view. |

|  |  |
| --- | --- |
| Product Use Case # | **10** |
| Product **Use Case** | **Assessment Rate Adjustment** |
| **Description** | Board members can update assessment rates for the new fiscal year, ensuring accurate billing for homeowners. |
| Actors | Board Member |
| Preconditions | Board member has the authority to adjust assessment rates and reviews financial data. |
| Triggers | Start of a new fiscal year or financial review period. |
| Main Flow | Board member reviews financial data and community needs.  Board member adjusts assessment rates based on the analysis. |
| Postconditions | New assessment rates are applied, and homeowners are informed about the changes. |

|  |  |
| --- | --- |
| Product Use Case # | **11** |
| Product **Use Case** | **Issuing Fines** |
| **Description** | Board members can issue fines to homeowners for violations of community rules or non-compliance with regulations. |
| Actors | Board Member |
| Preconditions | Board member identifies a violation and decides to issue a fine. Board member is logged into their account.  Board member has the authority to issue a fine. |
| Triggers | Identification of a violation |
| Main Flow | Board member documents the violation, including evidence and details.  Board member issues the fine, specifying the violation type, violation date, amount due and due date. |
| Postconditions | Fine is recorded in the homeowner's account, and the homeowner is notified. |

|  |  |
| --- | --- |
| Product Use Case # | **12** |
| Product **Use Case** | **Role Modification** |
| **Description** | Board members can modify homeowners' roles within the community, granting or revoking privileges based on their involvement or responsibilities. |
| Actors | Board Member |
| Preconditions | Board member identifies a violation and decides to issue a fine. Board member is logged into their account.  Board member has the authority to issue a fine. |
| Triggers | Identification of a violation |
| Main Flow | Board member reviews homeowner roles and responsibilities.  Board member modifies the homeowner's role as needed. |
| Postconditions | Homeowner's role is updated, granting, or restricting privileges accordingly. |

|  |  |
| --- | --- |
| Product Use Case # | **13** |
| Product **Use Case** | **Survey Creation and Publication** |
| **Description** | Board members can create and publish surveys to gather feedback and opinions from homeowners on community matters. |
| Actors | Board Member |
| Preconditions | Board member identifies the need for homeowner feedback on a specific topic. |
| Triggers | Need for community input or decision-making. |
| Main Flow | Board member reviews homeowner roles and responsibilities.  Board member modifies the homeowner's role as needed. |
| Postconditions | Survey is published and available to homeowners for submission. |

|  |  |
| --- | --- |
| Product Use Case # | **14** |
| Product **Use Case** | **Document Upload and Publication** |
| **Description** | Board members can upload and publish documents, such as meeting minutes, policy updates, or community guidelines, for homeowners' reference. |
| Actors | Board Member |
| Preconditions | Board member has relevant documents to share with homeowners. |
| Triggers | New document creation or update to existing documents. |
| Main Flow | Board member uploads the document, providing a title and description.  Board member publishes the document for homeowners to access. |
| Postconditions | Document is available for homeowners to view and download. |

## 8b. Product Use Case Table

The product scope diagram is a useful summary of all the interfaces between the product and other automated systems, organizations, and users. If there are a manageable number of PUC’s – say less than twenty – then the PUC diagram is useful as a graphical way of summarizing the PUC’s relevant to the product. But in practice we have found that a Product Use Case Table is more useful because it can handle larger numbers of PUCs and it precisely identifies the input and output data that defines the boundary of each PUC.

Product Use Case (PUC) Summary Table

|  |  |  |  |
| --- | --- | --- | --- |
| PUC No | PUC Name | Actors/Users | Input & Output |
| 1 | Message Communication | Owner | Messages |
| 2 | Owner Makes a Payment | Owner | Payment, Account Balance |
| 3 | Survey Participation | Owner | Survey Response |
| 4 | Account Past Due | Owner | Notification, Voting Rights |
| 5 | Property Sale | Owner, Board Member, Administrator | Notification, New Account, New Owner, New Login information |
| 6 | User Authentication | Owner | Login credentials, Login Date/Time |
| 7 | Contact Information Update | Owner | Phone number, email |
| 8 | Communication Preferences | Owner | Opt out preference |
| 9 | Announcement Publication | Board Member | Announcement, Notification |
| 10 | Assessment Rate Adjustment | Board Member | Assessment rate |
| 11 | Issuing Fines | Board Member | Violation type, violation date, fine |
| 12 | Role Modification | Board Member | Owner rights |
| 13 | Survey Creation and Publication | Board Member | Survey, Notification |
| 14 | Document Upload and Publication | Board Member | Document, Notification |

# 9. Functional Requirements

## 9a. Functional Requirements

### 1. **Message Communication:**

|  |  |
| --- | --- |
| PUC # / Desc | 1. Message Communication |
| Requirement # | 1.1 - Message Composition |
| Description | The system must allow homeowners to compose messages with a subject, body, and optional attachments. |
| Fit Criterion | Verify that homeowners can enter a subject, compose a message, attach files if necessary, and proceed to send the message. |

|  |  |
| --- | --- |
| PUC # / Desc | 1. Message Communication |
| Requirement # | 1.2 - Message Sending |
| Description | The system must enable homeowners to send messages to specific recipients, including HOA board members or other homeowners. |
| Fit Criterion | Verify that homeowners can enter a subject, compose a message, attach files if necessary, and proceed to send the message. |

|  |  |
| --- | --- |
| PUC # / Desc | 1. Message Communication |
| Requirement # | 1.3 - Recipient Notification |
| Description | The system must send a notification to the recipient when a new message is received. |
| Fit Criterion | Verify that recipients receive real-time notifications (email or in-app) when they receive a new message |

|  |  |
| --- | --- |
| PUC # / Desc | 1. Message Communication |
| Requirement # | 1.4 – Message Viewing |
| Description | Recipients must be able to view received messages, including the subject, sender, message body, and attachments. |
| Fit Criterion | Confirm that recipients can access and view the complete message content along with any attachments |

### 2. **Online Payment:**

|  |  |
| --- | --- |
| PUC # / Desc | 2. Online Payment |
| Requirement # | 2.1 – Secure Payment Gateway |
| Description | The system must provide a secure payment gateway for homeowners to enter payment details. |
| Fit Criterion | Test payment gateway integration to ensure it encrypts and securely processes payment information. |

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| --- | --- |
| PUC # / Desc | 2. Online Payment |
| Requirement # | 2.2 – **Item Selection for Payment** |
| Description | Homeowners must be able to select items for payment, such as HOA dues, fines, or other fees. |
| Fit Criterion | Verify that homeowners can add items to the payment cart and proceed to payment |

|  |  |
| --- | --- |
| PUC # / Desc | 2. Online Payment |
| Requirement # | 2.3 – **Payment Confirmation Receipts** |
| Description | The system must generate payment confirmation receipts for homeowners. |
| Fit Criterion | Confirm that homeowners receive email receipts and see on-screen confirmation after successful payment. |

### 3. **Survey Participation:**

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| --- | --- |
| PUC # / Desc | 3. **Survey Participation** |
| Requirement # | 3.1 – **Clear Display of Survey Questions** |
| Description | The system must display survey questions clearly, including options for response. |
| Fit Criterion | Verify that survey questions and response options are presented legibly and intuitively to homeowners. |

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| --- | --- |
| PUC # / Desc | 3. **Survey Participation** |
| Requirement # | 3.2 – **Survey Response Submission** |
| Description | Homeowners must be able to select and submit survey responses. |
| Fit Criterion | Confirm that homeowners can choose answers and successfully submit their survey responses. |

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| PUC # / Desc | 3. **Survey Participation** |
| Requirement # | 3.3 – **Survey Results Compilation** |
| Description | Survey results must be compiled and made available to authorized personnel. |
| Fit Criterion | Verify that survey results are accurately compiled and accessible to designated administrators for analysis. |

### 4. **Account Past Due:**

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| --- | --- |
| PUC # / Desc | 4. **Account Past Due** |
| Requirement # | 4.1 – **Account Monitoring for Due Dates** |
| Description | The system must monitor due dates and identify past due accounts. |
| Fit Criterion | Verify that accounts with overdue balances are flagged and identified in the system |

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| PUC # / Desc | 4. **Account Past Due** |
| Requirement # | 4.2 – **Past Due Notifications** |
| Description | Notifications about past due balances must be sent to homeowners via email or in-app messages |
| Fit Criterion | Confirm that notifications are sent to homeowners with overdue accounts, and recipients acknowledge receipt. |

### 5. Property Sale:

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| --- | --- |
| PUC # / Desc | 5. **Property Sale** |
| Requirement # | 5.1 – **Property Sale Form** |
| Description | The system must provide a form for homeowners to enter details of the property sale. |
| Fit Criterion | Verify that the form captures necessary details, such as new owner information and sale date. |

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| PUC # / Desc | 5. **Property Sale** |
| Requirement # | 5.2 – **Property Ownership Records Update** |
| Description | HOA administrators must verify, and update property ownership records based on the notification. |
| Fit Criterion | Confirm that administrators can review submitted forms, update records, and send confirmation to both the old and new homeowners. |

### 6. User Authentication:

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| --- | --- |
| PUC # / Desc | 6. User Authentication |
| Requirement # | 6.1 – User Accounts |
| Description | The system must accommodate separate accounts for all homeowners |
| Fit Criterion | Verify that every homeowner has a user account that is linked to their account. |

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| PUC # / Desc | 6. User Authentication |
| Requirement # | 6.2 – **Credentials Verification** |
| Description | The system must verify homeowner credentials during login attempts. |
| Fit Criterion | Verify that homeowners can log in using correct credentials and are denied access with incorrect credentials. |

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| PUC # / Desc | 6. User Authentication |
| Requirement # | 6.3 – **Password Reset** |
| Description | Homeowners must have the option to reset their password through email verification. |
| Fit Criterion | Confirm that homeowners receive password reset emails, can successfully reset passwords, and regain access. |

### 7. Contact Information Update

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| PUC # / Desc | 7. Contact Information Update |
| Requirement # | 7.1 – Contact Details Editing |
| Description | The system must allow homeowners to edit and update their contact details, including address, phone number, and email. |
| Fit Criterion | Test updating each field separately, confirming that changes are saved and displayed correctly in the homeowner's profile. |

### 8. Opt-Out Preferences:

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| PUC # / Desc | 8. **Opt-Out Preferences** |
| Requirement # | 8.1 – **Communication Type Opt-Out** |
| Description | The system must provide options for homeowners to select communication types to opt out of. |
| Fit Criterion | Verify that homeowners can opt out of specific communication types, such as newsletters or promotional emails. |

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| PUC # / Desc | 8. **Opt-Out Preferences** |
| Requirement # | 8.2 – Preference Update Confirmation |
| Description | Homeowners' communication preferences must be updated and reflected in subsequent communications. |
| Fit Criterion | Confirm that homeowners do not receive opted-out communication types after updating their preferences. |

### 9. **Announcement Publication:**

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| PUC # / Desc | 9. **Announcement Publication** |
| Requirement # | 9.1 – Announcement Creation |
| Description | The system must allow board members to create announcements with titles, content, and optional attachments. |
| Fit Criterion | Verify that board members can compose announcements, attach files, and save them for publication. |

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| PUC # / Desc | 9. **Announcement Publication** |
| Requirement # | 9.2 – Announcement Publication |
| Description | Announcements must be published and displayed to homeowners upon approval. |
| Fit Criterion | Confirm that published announcements are visible to homeowners immediately after approval by board members. |

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| PUC # / Desc | 9. **Announcement Publication** |
| Requirement # | 9.3 – New Announcement Notifications |
| Description | Homeowners must receive notifications about new announcements. |
| Fit Criterion | Verify that notifications are sent when a new announcement is published, and homeowners acknowledge receipt. |

### 10. **Assessment Rate Adjustment:**

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| PUC # / Desc | 10. **Assessment Rate Adjustment** |
| Requirement # | 10.1 – Assessment Rate Review |
| Description | The system must allow board members to review and adjust assessment rates for the new fiscal year. |
| Fit Criterion | Verify that board members can access and modify assessment rates based on financial data and community needs. |

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| PUC # / Desc | 10. **Assessment Rate Adjustment** |
| Requirement # | 10.2 – Homeowner Notification of Rates of Change |
| Description | Homeowners must be notified about changes in assessment rates. |
| Fit Criterion | Confirm that homeowners receive notifications about changes in assessment rates, and homeowners acknowledge receipt. |

### 11. **Fines Issuance:**

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| PUC # / Desc | 11. Fines Issuance |
| Requirement # | 11.1 – Fines Issuance |
| Description | Board members must document violations, including details and evidence according to the governing laws and covenants. Fines must be issued to homeowners with specified violations, amounts and due dates. |
| Fit Criterion | Confirm that fines can be issued, recorded, and homeowners receive notifications specifying the violation, fine amount, and due date. |

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| PUC # / Desc | 11. Fines Issuance |
| Requirement # | 11.2 – Fines Issuance |
| Description | Board members must be able to remove a fine if it is successfully contested by the homeowner |
| Fit Criterion | Verify that a board member can remove a fine from a homeowner account and the balance of the account reflects |

### 12. **Role Modification:**

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| PUC # / Desc | 12. Role Modification |
| Requirement # | 12.1 – **Role Access for Board Members** |
| Description | Board members must have access to homeowner roles and privileges. |
| Fit Criterion | Confirm that board members can view and modify homeowner roles and privileges based on community needs. |

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| PUC # / Desc | 12. Role Modification |
| Requirement # | 12.2 – **Role Modification and Access Granting** |
| Description | Homeowners' roles must be updated, granting, or restricting privileges accordingly. |
| Fit Criterion | Verify that homeowners' roles are updated as per the board's modifications, and homeowners can access granted privileges. |

### 13. **Survey Creation and Publication:**

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| PUC # / Desc | 13. **Survey Creation and Publication** |
| Requirement # | 13.1 – **Survey Question Creation** |
| Description | Board members must create survey questions with multiple-choice options. |
| Fit Criterion | Verify that board members can compose survey questions and specify answer options. |

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| PUC # / Desc | 13. **Survey Creation and Publication** |
| Requirement # | 13.2 – **Survey Publication** |
| Description | Surveys must be published, allowing homeowners to participate. |
| Fit Criterion | Confirm that surveys are accessible to homeowners, and they can submit responses. |

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| PUC # / Desc | 13. **Survey Creation and Publication** |
| Requirement # | 13.3 – **Survey Response Storage** |
| Description | Survey responses must be stored and made available for analysis. |
| Fit Criterion | Verify that survey responses are accurately recorded and accessible to authorized personnel for analysis. |

### 14. **Document Upload and Publication:**

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| PUC # / Desc | 14. **Document Upload and Publication** |
| Requirement # | 14.1 – **Document Upload and Metadata** |
| Description | Board members must upload documents with titles, descriptions, and optional categories. |
| Fit Criterion | Confirm that documents can be uploaded, and metadata such as titles and descriptions are stored accurately. |

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| PUC # / Desc | 14. **Document Upload and Publication** |
| Requirement # | 14.2 – **Document Publication and Categorization** |
| Description | Documents must be published and categorized for easy homeowner access. |
| Fit Criterion | Verify that documents are organized into categories and are accessible to homeowners based on these categories. |

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| PUC # / Desc | 14. **Document Upload and Publication** |
| Requirement # | 14.3 – **Document Download Capability** |
| Description | Homeowners must be able to download documents for offline access. |
| Fit Criterion | Confirm that homeowners can download documents, and the downloaded files are accessible and intact. |

# 10. Look and Feel Requirements

## 10a. Appearance / Style Requirements

The product will embody a cohesive and visually appealing digital space. Although it would be more applicable to adjust the appearance to a HOA's brand identity, the website will remain more generalized and feature intuitive navigation, readable typography, and high-quality visuals. Use of consistent user interface elements, colour contrast, and interactive cues will ensure a seamless user experience. By upholding these standards, the website will create an inviting and user-friendly environment, fostering positive interactions for all users.

# 11. Usability and Humanity Requirements

## 11a. Ease of Use Requirements

The intent of the solution is to provide a platform that is easy to use and intuitive to the most inexperienced user. The task that a user needs to perform on the system will be minimal and every action should provide proper feedback for the user. Navigation should be intuitive and limited. All portions of the site will be accessible from every screen, so the user is not able to find specific actions. The product is a tool to take care of needed homeowners association business and should make the lives of the user easier and not harder for these tasks. Tasks for normal users will be limited to the basic actions. Board members will have additional tasks which should guide them through the process of each action.

## 11b. Learning Requirements

This product should be easily used by any homeowner without any prior training on the product. They should be able to complete any of the required tasks on the website, view all content and communicate effectively after the first usage and retain the ability to utilize the site afterwards.

## 11c. Understandability and Politeness Requirements

This product is a tool to replace certain practices that the users should already be familiar with and will not change those practices or the terminology utilized in previous systems.

## 11e. Accessibility Requirements

This product will conform with the Americans with Disabilities Act.

## 11f. Convenience Requirements

This product will inform users of new announcements, news, messages, fines, assessments, and surveys that are available to them on the website. Notification of these events outside of the product allows them to go and view the content within the product without having to check it constantly for updates.

# 12. Performance Requirements

## 12a. Speed and Latency Requirements

The response time of the product should not discourage the user from further use of the product.

## 12b. Safety-Critical Requirements

There are no safety-critical requirements for this product.

## 12c. Precision or Accuracy Requirements

All monetary values within the product will be accurate within 2 decimal places.

## 12d. Reliability and Availability Requirements

The product shall be available for use 24 hours per day, 365 days per year.

## 12e. Robustness or Fault-Tolerance Requirements

The product should conduct backups of the database on a scheduled basis to ensure data recovery when needed. The product is not viewed as an essential service during the time of a disaster and will most likely be unavailable as long as service connections are unavailable.

## 12f. Capacity Requirements

The product is intended for use by a homeowners association which is on average a few hundred homeowners. The product will accommodate service for all homeowners at all times.

## 12g. Scalability or Extensibility Requirements

The product can grow with the community as needed with the addition of new properties within the community.

## 12h. Longevity Requirements

The product shall be expected to operate within the defined maximum maintenance budget for a minimum of five years.

# 13. Operational and Environmental Requirements

## 13a. Expected Physical Environment

The operating environment for this product is the typical suburban home.

## 13b. Wider Environment Requirements

There are no additional requirements that relate to greenness, conservation, recycling, global warming, saving the planet.

## 13c. Requirements for Interfacing with Adjacent Systems

There are no requirements to interface with partner applications and/or devices that the product needs in order to successfully operate.

## 13d. Productization Requirements

There are no additional requirements that are necessary to make the product into a distributable or saleable item. It is also appropriate to describe here the operations needed to install a software product successfully. The product will be functional as it stands.

## 13e. Release Requirements

There are no existing contractual commitments or maintenance agreements that might be affected by the new product. These commitments or maintenance agreements can be made when the product is purchased by an association.

## 13f. Backwards Compatibility Requirements

This product doesn’t have any backwards compatibility requirements as it is a new product and an update to one.

# 14. Maintainability and Support Requirements

## 14a. Maintenance Requirements

The product will come with a maintenance agreement with the developer for 5 years. Requests for improvements or changes to the product may be requested through the developer. Maintenance of the product is expected to have minimal downtime impact on the product and will be conducted in the night hours to minimize downtime.

## 14b. Supportability Requirements

The product is intended to be entirely self-supporting once the initial roles are set up. An administrator account will be available to make necessary changes if they are required.

## 14c. Adaptability Requirements

This product is expected to be accessible via web browser on any mobile or desktop device.

# 15. Security Requirements

## 15a. Access Requirements

User: Homeowner

Access: Public information, their own personal information, personal messages, and personal financial information

User: Board Member

Access: Ability to publish public information, assess fines, assign user roles

Administrator:

Access: Ability to assign user roles, reset account information as required

## 15b. Integrity Requirements

This product shall prevent incorrect data from being introduced and protect itself from intentional abuse.

## 15c. Privacy Requirements

The product shall make its users aware of its information practices through privacy notices, notify users of any changes to the privacy policy and shall protect privacy information in accordance with relevant privacy law. Only data which is required to conduct homeowners association business will be collected.

## 15d. Audit Requirements

This product will retain information pertaining to user login activity for audit purposes.

# 16. Cultural Requirements

## 16a. Cultural Requirements

There are no current cultural requirements established for this product.

# 17. Compliance Requirements

## 17a. Legal Compliance Requirements

The product will be implemented so as to comply with Payment Card Industry Data Security Standard (PCI DSS), ADA (Americans with Disabilities Act), GDPR (General Data Protection Regulation).

## 17b. Standards Compliance Requirements

There are no standards compliance requirements for this product.

# 18. Open Issues

There are currently no open issues to be reported for this solution.

# 19. Off-the-Shelf Solutions

## 19a. Ready-Made Products

There is a wide variety of solutions that could be available to an homeowners association if they are willing to pay the cost for the solutions. Typically, HOAs do not spend extra money on commitments such as these, although there are great benefits to them. Existing options include custom web development, homeowner association management software, community management platforms, website builders and other open-source management systems. Custom web sites can deliver everything that is needed but also require ongoing maintenance and updates as well as a higher level of technical expertise. The cheapest option that could be customized to the exact needs of any HOA would be the open-source content management systems. However, these require a high level of expertise, someone committed to creating and maintaining the product and offer extremely limited support.

# 20. New Problems

## 20a. Effects on the Current Environment

There are currently no new problems to be addressed with this product in terms of the effects on the current environment.

## 20b. Effects on the Installed Systems

There are currently no new problems to be addressed for this product in terms of the effects on the installed systems.

## 20c. Potential User Problems

There are currently no new problems to be addressed for this product in terms of potential user problems.

## 20d. Limitations in the Anticipated Implementation Environment That May Inhibit the New Product

There are currently no new problems to be addressed for this product in terms of limitations in the anticipated implementation environment that may inhibit the product.

## 20e. Follow-Up Problems

There are currently no follow problems to be addressed for this product.

# 21. Tasks

What steps have to be taken to deliver the product? This section highlights the effort required to build the product, the steps needed to buy a solution, the amount of effort to modify and install a ready-made solution, and so on.

## 21a. Project Planning

Project Initiation:

#### Goals / Objectives

* Define goals and purpose of the solution.
* Identity stakeholders and requirements

#### Study Feasibility

* Technically achievable
* Is the chosen vehicle appropriate?
* Are there constraints that prevent completion.

### Requirements:

#### Stories / Use Cases

* Detailed stakeholder requirements
* User stories and use cases.

### Design:

#### Database

* Entity Relationship Analysis
* Entity Relationship Diagram
* Fine tune as more requirements is identified.
* Finalize (Cannot adjust indefinitely)

#### User Interface

* Low fidelity mock-ups (multiple)
* User views planning
* Identify number of pages/forms are required.

## 21b. Planning of the Development Phases

### Development

#### Database

* Initial build with all tables, keys, constraints, sequences, and triggers needed.
* Adjust database and model as necessary to meet requirements.
* Generate and loading of initial data.
* Finalize

#### APEX Application

##### Page creation

* Skeleton pages based on user stories and requirements.
* Basic layout and appearance

##### APEX Component Integration

* Navigation, reports, forms, calendars
* Pages meet user requirements.

##### Design

* Basic responsive design

##### Business Logic

* Validation and process for both client-side and server-side for data integrity
* Dynamic Actions, PL/SQL, and SQL coding for manipulate data based on and achieved required functionality.

##### Authentication

* Configure authentication methods, define roles and privileges for the user groups.
* Restrict access to data and pages based on roles and privileges.
* Generate login information for all users.

##### Testing

* Testing all functionality within the application to include forms, links, views, security.

##### Documentation

* User documentation guide

# 22. Migration to the New Product

## 22a. Data That Has to Be Modified or Translated for the New Product

Due to this product being produced without specific requirements from a client, it is unknown whether a database migration will be required or if manual input will be required.

# 23. Risks

The risks associated with the development of this product are limited in the planning and development phase of the product. As there are no existing obligations to fulfil, there are no timelines that must be met to meet contractual obligations. The risks inherent with the product itself can be categorized into user adoption, legal & compliance issues, and data security & privacy. These topics are quickly outlined below.

### 1. User Adoption:

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| --- | --- |
| Risk | Resistance to change, low user adoption rates, or inadequate training. |
| Description | Users typically are resistant to change and may find it difficult to adapt to the new platform, leading to underutilization or dissatisfaction. |
| Mitigation | Provide user-friendly interfaces, comprehensive training sessions, and ongoing support to assist users in acclimating to the new system. |

### 2. Legal and Compliance Issues:

|  |  |
| --- | --- |
| Risk | Violation of legal regulations or HOA bylaws |
| Description | Failure to adhere or adapt the product to meet legal requirements or bylaws could lead to legal actions, fines, or disputes within the community. |
| Mitigation | Initial review before fielding to any new potential customer and regular legal review of the platform, ensuring compliance with local laws, and transparent communication with homeowners about any changes. |

### 3. Data Security and Privacy

|  |  |
| --- | --- |
| Risk | Unauthorized access, data breaches, or loss of sensitive homeowner information. |
| Description | The storage of personal and financial data of homeowners makes the system a target for hackers. A breach could lead to legal consequences. |
| Mitigation | Implement security measures and encryption protocol, perform routine security audits and backups, and comply with established data protection laws |

# 24. User Documentation and Training

## 24a. User Documentation Requirements

User documentation and basic walkthrough of tasks the are to be routinely completed by both homeowners and board members will be provided online within the product.