BUSINESS PROCESS ANALYSIS

Barkan Management

Composed By:
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EXECUTIVE SUMMARY

Executive Summary

A real estate management organization needs to look after all it's apartments and condos to attract residents, especially when located in a city that has thousands of college students, both US citizens and international. Our client is Barkan Management, one of the biggest real estate management in the DMV region. Parkside Apartments, one of the most sought-after condominium in College Park, is one such property managed by Barkan Management, and we have decided to focus on improving a few methodologies in terms of residents' security and distribution of packages to the resident's comfort.

We began by studying all the facilities provided at Parkside as extensively described online and brainstormed on what could be a few areas with room for improvement. We met with four residents from Parkside and conducted an unstructured, broad interview that allowed them to speak freely of how they feel about the facilities provided by Parkside Management. Based on their responses, we figured out that amongst the most talked about issues were having a simpler mail package retrieval system, and a more secure entry system.

We then conducted a broader survey with a larger set of residents using a google form. After summarizing results obtained, we arranged a meeting with the building manager and discussed what were the main issues that concerned her. We also talked about the issues brought up by residents and asked her if she was aware of these issues, and whether anything had been done to remedy them.

Considering the first issue, the entrance to Parkside building is secured with an RFID security system which requires scanning a key fob that has an in-built RFID code. It is a pocket – sized security token that has a built – in One factor authentication or RFID. However, this RFID code is same for all the key fobs which is not encrypted either and hence it can be misused as someone might get it duplicated for a cost as low as $15. Also, if a resident loses it he/she needs to pay a fine of $100 to get his/her key fob replaced. There have been past cases of unidentified and suspicious people entering the building premises and hence improving the security is crucial for residents.

Secondly, there's a central mailroom in which all the packages delivered by the courier services are collected and stored by the management. However, residents don't have a 24x7 access to this mailroom. It is opened thrice a day during office hours on weekdays. This schedule does not benefit the working residents as they need to manage their schedule for accessing the mailroom or else sometimes their package may get misplaced.

We began by developing the Data flow diagrams and ER diagrams to identify the external entities, processes and data stores involved in the system. We analyzed the correctness of our diagrams using Visible Analyst software and made changes as per the error reports generated from it. We defined the flow of information within the proposed system and the authorized users who will interact with it and will be benefited by it. Candidate solutions were compared based on their characteristics and feasibility, and a proposed solution was obtained.

After obtaining a go ahead with the design schematics, we began preparing a detailed implementation plan for the building management. Since a specific COTS product was already zeroed in on, RFQs were sent out to vendors. The most feasible vendor was awarded a contract comprising of delivery,

installation, and maintenance of two input lock entry systems. Construction schedule was planned, parallel and abrupt delivery plans were drawn for secured entry system, and mail package delivery system respectively.

Our client was extremely satisfied with our work as it provided a solution, along with complete set of rationale that made it the ideal way to move forward. She believed she could present our report and findings in the next board meeting, and convince stakeholders to give this project a go-ahead.

EVALUATION LETTER FROM CLIENT

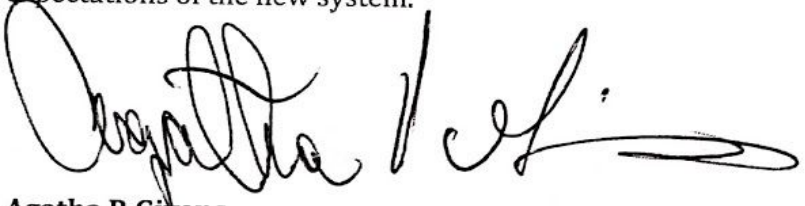
To Whomsoever it May Concern

8125 48th Avenue
College Park MD - 20740

This is with regard to the consulting assignment undertaken by the students of Robert H Smith School of Business under BUDT758N.

The student consultants carefully surveyed the operations of Parkside Apartments managed by Barkan Management to find areas that could benefit from a systemic optimization. The system handling distribution of packages and the building entry system were identified as the target enterprise. As per the initial understanding, the end result would include details and implementation strategies of their advocacy; this understanding was honored and met with highest standards of delivery.

The student consultants studied and evaluated the current system to its granular details and supplemented their findings with timely reports. The iterative deployment and the contingencies to ensure failsafe nature of the systems are commendable. They made detailed recommendations centric around the optimization of the current system. The recommendations are coherent with our expectations of the new system.



Agatha R Givens

Building Manager, Barkan Management
Parkside at College Park

Date: 05/14/19

STATEMENT OF WORK

INTRODUCTION

We are a team of five, pursuing a Master of Science in Information Systems at the University of Maryland. As a part of our program, we are partaking as a team of consultants for Barkan Management.

INDUSTRY BACKGROUND

Property management is the operation, control, and oversight of real estate management indicates a need to be cared for, monitored and accountability is given for its useful life and condition. This is much akin to the role of management in any business.

Property management is also the management of personal property, equipment, tooling, and physical capital assets that are acquired and used to build, repair, and maintain end item deliverables. Property management involves the processes, systems, and manpower required to manage the life cycle of all acquired property as defined above including acquisition, control, accountability, responsibility, maintenance, utilization, and disposition.

For example, the owner of a single family may engage the services of a property management company. The company will then advertise the rental property, handle tenant inquiries, screen applicants, select suitable candidates, draw up a lease agreement, conduct a move in inspection, move the tenant(s) into the property and collect rental income. The company will then coordinate any maintenance issues, supply the owner(s) with financial statements and any relevant information regarding the property etc.

In the United States, owners who manage their own property are not required to have a real estate license in many states; however, they must at least have a business license to rent out their own home. Owners who do not live near the rental property may be required, by local government, to hire the services of a property management company. Some states with high tourism numbers, such as Hawaii, have strict property management rules.

The most common business model used by property management companies in the residential space that manages multi-home units and single-family homes is a percentage of rent. The property owner, in this case, signs a property management agreement with the company, giving the latter the right to let it out to new tenants and collect rent. The owners don't usually even know who the tenants are. The property management company usually keeps 10-15% of the rent amount and shares the rest with the property owner.

PROBLEMS

- Secured Entry Vulnerability
  A key fob is provided to every resident of Parkside along with their own respective apartment keys. A key fob can be defined as pocket-sized security tokens that have a built-in, one-factor authentication or RFID. When the key fob is within close proximity to the access reader, the system unlocks the door to enter Parkside to allow entry to the individual.
  However, The key fobs which are given to the residents are not unique. They all have the same code and not encrypted either. As a result, they can be easily duplicated, and pose a security threat if lost.
  Residents are also forced to pony up a fee of $100 upon loss of the key fob, which, as it so happens, can be duplicated at vending machines for as little as $15.

- Central Mailroom Access
  As a token of courtesy, even though not technically obligated to do so, Barkan Management routinely collects and stores all packages addressed to all apartments at Parkside, in a central mailroom.
  Access to this mailroom, however, is not given to residents on-demand and is opened thrice a day, during office hours, on weekdays only. As a direct conflict of interest, working residents aren't home at any of allotted slots. Other residents too, often have to adjust their schedules in order to accommodate the arbitrary acts of collecting their packages from within the same building. While residents are glad that Barkan Management collects, stores, and disburses packages on their behalf, they aren't too satisfied with the current process in place.

SCOPE OF PROJECT

The scope of this project has been gated to improving the security and package disbursement system at one of Barkan's managed properties, Parkside at College Park.
Parkside Condominium has 128 apartments, of which 108 are managed by Parkside. While Barkan also has a dominant presence in several locations along the east coast, Parkside happens to be one of the older establishments and has a set of problems specific to itself, that aren't observed in other locations.

PROJECT OBJECTIVES

- Optimize disbursement of packages
  Once our proposed solution is implemented, it will reduce the time and effort taken by management to collect and store the delivered packages as well as the residents will have easier, faster and timely access to the packages.

- Upgrade secured entry system
  Our proposed solution will replace, or upgrade the existing security system that can uniquely identify each resident, and minimize costs incurred by both, the residents, upon the loss of the key fob, in form of a penalty, and by the management, to produce spare key fobs.
  Our solution will also bring in a better-secured method of entry, that is difficult to infiltrate.

MEASURES OF SUCCESS

- Timelines: The estimated completion date of the proposed solution can be evaluated by tracking the timelines of the deliverables of the project.

- Customer satisfaction: Customer satisfaction will be assessed through feedback forms. Client satisfaction will be evaluated by seeking constant feedback. Also, feedback forms will be arranged to analyze and review the findings.

- Number of security incidents and events: It is the percentage or number of issues raised by the customer if the proposed solution does not work. If the customer needs assistance or is unable to enter the building because of the newly implemented security system, those will be considered as tickets or issues of the solution. Also, if the customer raises concerns regarding the newly implemented package pickup system, then these issues will also be taken into account to evaluate the performance of the solution.

- Percentage of customer issues solved: This metric will be used to keep a track of the timely resolution of issues satisfactorily.

- Reduction in turnaround time: Evaluate the reduction in time taken to provide residents access to their packages.

CONSTRAINTS

All the important decisions of Barkan Management Inc. are taken by the board which includes the apartment owners in Parkside. Due to this, there are budgetary constraints and limited availability of resources. Parkside condo is managed by Agatha Givens and her newly appointed assistant. The assistant is being trained and has limited knowledge of how the facility functions. Due to this, there is limited client availability and the team has to adjust according to the management's schedule.

POINTS OF CONTACT

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ACCEPTANCE

Date: 02/25/2019

By initialing each page and signing below, I Agatha R. Givens, in my capacity as Building Manager, of Parkside at College Park agree to and accept the terms set forth in this Statement of Work.

By: _____
Signature

Building Manager
Name and Title

APPROVED SYSTEM ANALYSIS REPORT

Here is a summary of the fact findings and information gathering techniques used in studying the current systems:

1. Online Research

The team researched about Parkside apartment listings on different websites like www.apartmentratings.com, www.apartments.com and went through the reviews. These reviews helped us gather information about what issues the residents face at Parkside and how well are those issues resolved by the management.

We also read up on Barkan's properties, operations, services, and USPs on their official website, www.barkanco.com.

2. Interview with residents

We interviewed four residents at Parkside to know what issues they face and what can be improved by the management to resolve those. We came across multiples issues that the residents faced. While some problems were of lesser concern than others. For instance, one resident mentioned inconveniently scheduled elevator and boiler maintenance repairs. Amongst the more alarming problems was the method of entry to the building. Key fobs are issued to residents that they use to authenticate and gain entry into the building. Two of the residents we interviewed had misplaced their key fobs and had to pay a fine of $100 to obtain a new key fob. Worse even, this posed a threat to all the residents in that, in the wrong hands, it could be gravely misused.

Further, the residents complained of having to accommodate scheduled package collection time slots decided by the management, which happen to clash with working hours for a major share of residents. They wanted the management to work on the mailroom access so that residents with full-time jobs could have better access to their packages, and not be bound by the management schedule.

3. Surveying existing residents

Based on issues that surfaced while interviewing the residents, we took survey with a larger set of residents. We requested the building manager to share a google form with the residents so that their responses could be recorded and tabulated. We realized which problems were common and required urgent attention. Information collected from the survey helped us narrow the scope of project and focus on two key issues - secured entry vulnerability and central mailroom access.

4. Interview with Agatha Givens, Building manager at Parkside

Being the building manager, interviewing Agatha Givens provided us with proper insights on how different maintenance issues are resolved. Some of the interview questions were:

- How long have you been managing Parkside?
- How much decision-making power resides with you?
- What members constitute the board that makes decisions at Parkside?
- Describe some of the issues that Parkside faced and what measures were taken to resolve them?
- Can you describe a time when you proposed a change/solution which was not implemented by the board?
- What improvisations and/or new changes have you successfully implemented at Parkside?

- Can you shed light on why the residents can collect packages at fixed times only?
- Were efforts taken to address the issues existing in the security system? Can you elaborate on it?

The following summarizes her answers to the questions:
Agatha has been working as a building manager at Parkside for six years and is now well aware of the activities and issues arising at Parkside. She has limited decision making power when it comes to vital changes since most of the decisions regarding Parkside are taken by the board which comprises of the upper management of Barkan Inc. and owners of Parkside apartments. However, decisions like setting rent amount, deciding the marketing strategies, scheduling maintenance drives and compliance inspections rest with her. She also executes safety measures like clearing the sidewalks from snow, ensuring the floors are dry and maintained to avoid tripping as well as keeping the hazardous materials away from the building occupants. She mediates and oversees meetings with various stakeholders like homeowners and residents. She also conducts reviews and timely inspections to make sure the building standards are in compliance with current codes and guidelines.

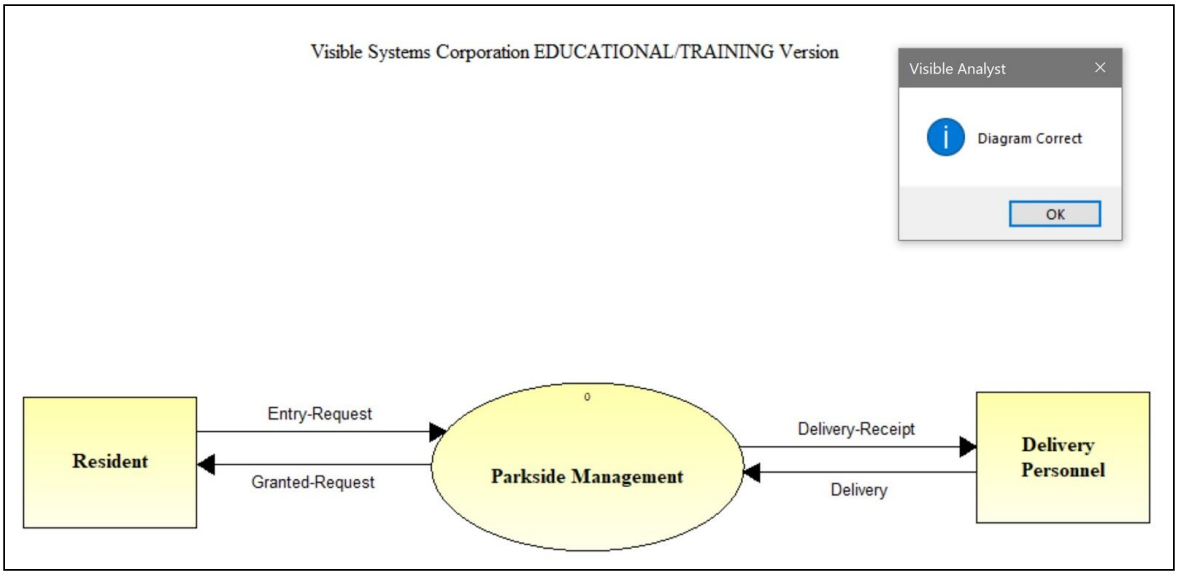
According to Agatha, some of the issues that Parkside faces and measures she took to resolve them were:

- Parkside being a 35-year-old condo, a lot of legacy equipments keep breaking down and frequent repairs are required. Issues like hot water problems were resolved by replacing the old boiler with a new one. Recently, she scheduled elevator maintenance drive during spring break to cause minimal inconvenience as many residents were away.
- The limited rent payment options being a concern to the residents, Agatha put forth this issue in front of the board and advocated online payment options. However, the board having a limited budget rejected her proposal.

Regarding the limited time slots for package collection, Agatha explained that collecting and storing packages wasn't a part of her job role and that the packages would have been kept outside the building normally. In fact, the three time slots afforded to the residents take a considerable amount of bandwidth from Barkan's resources that otherwise would have been consumed to perform other tasks. Further, the security concern regarding fobs raised by her in front of the Board never reached an actionable conclusion and was eventually sidelined.

System Models of Current System

Process Models



Context level DFD

Description:

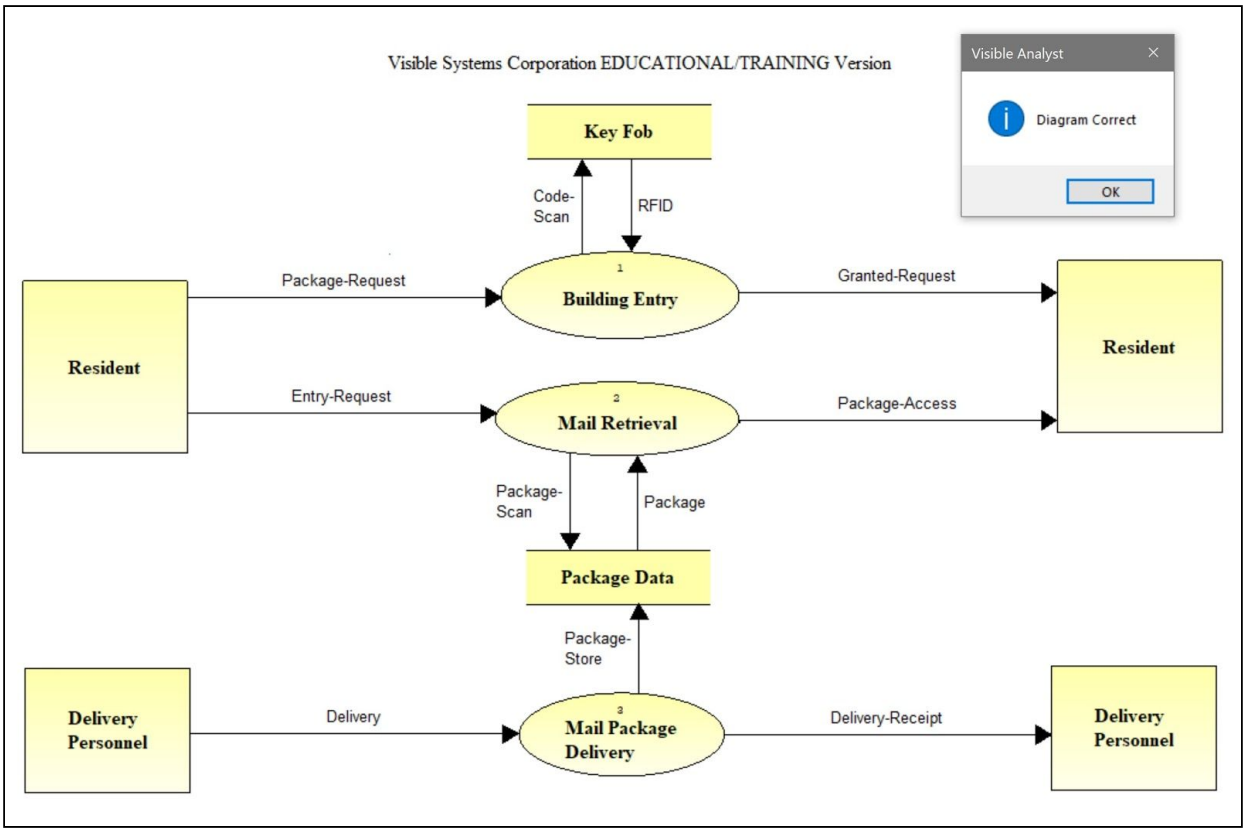
1. System as a Process: Parkside Management
This process encompasses processes undertaken by Parkside Management staff, like issuing key fobs and routine collection of packages.

2. Entity: Resident
This entity embodies the leasees of condominiums at Parkside. They interact with the system to engage in processes like obtaining a key fob, scanning it to gain secured entry, and collecting packages from the common mail room.

3. Entity: Delivery Personnel
This entity embodies package delivery personnel from various courier services that interact with the system to both, deliver packages, and collect packages for returns.

Error Report:

Diagram Correct (*Report from Visible Analyst*)



Level 0 DFD

Description:

1. Process: Building Entry

The residents of Parkside secure access to the building by using the fob. Every leasee is provided with a fob. Everytime a person scans the fob, the RFID is verified and then only the access is granted.

2. Process: Mail Retrieval

Building management schedules time slots when residents are allowed access to mail room to retrieve their packages.

3. Process: Mail Package Delivery

All packages delivered by the dispatcher are kept in the mailroom. Delivery receipts are signed by the dispatcher.

4. Process: Mail Returns

All the package returns by residents are placed in the mailroom. The delivery personnel retrieves the packages from the room to return it to the provider.

5. Data Store: Fob

A coin-sized Key Fob is used by the residents to enter the building. The fob contains an RFID chip with a code that is scanned by the secured entry system to authenticate residents.

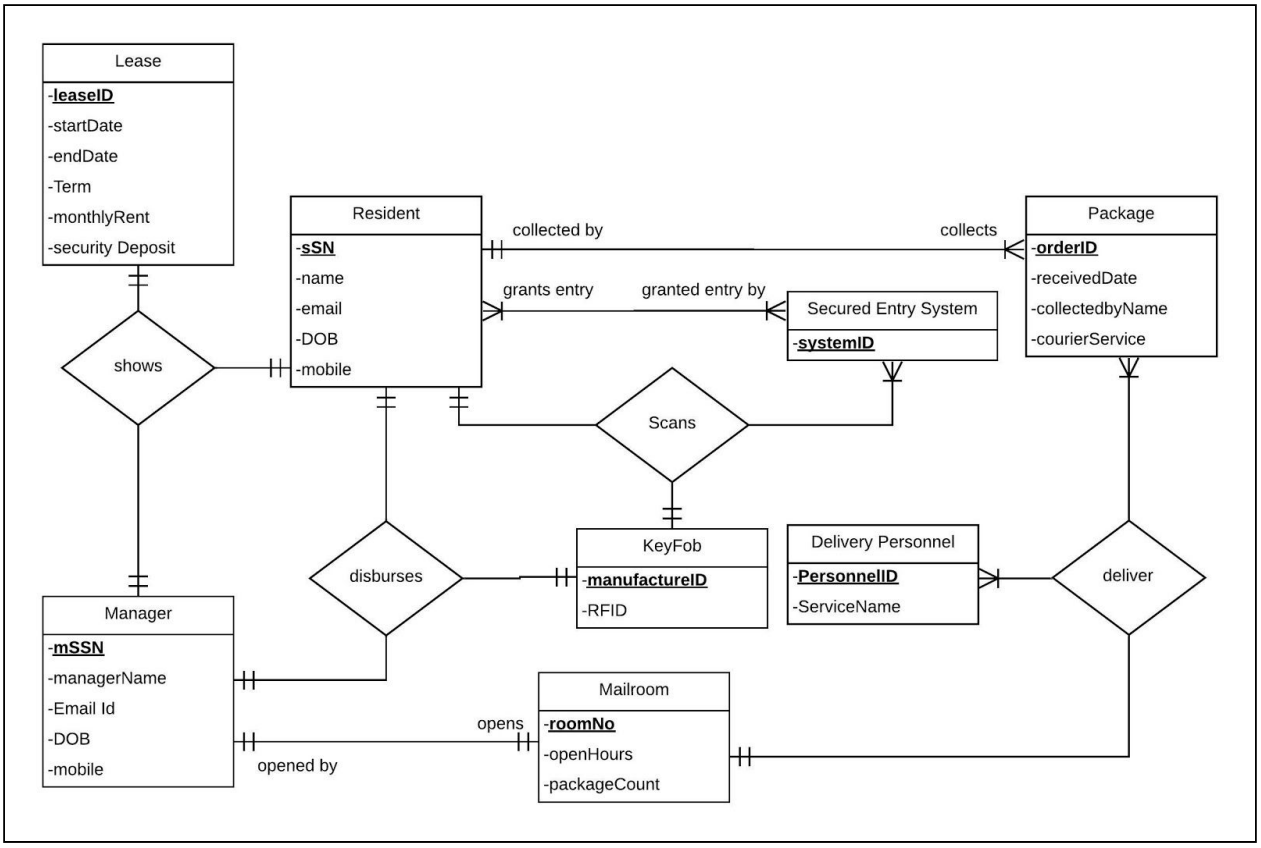
6. Data Store: Package Data

All the packages delivered at Parkside are stored in a mailroom from where the residents collect them during specified timings.

Error Report:

Diagram Correct (*Report from Visible Analyst*)

Process Models



Entity Relationship Diagram

Business Rules:

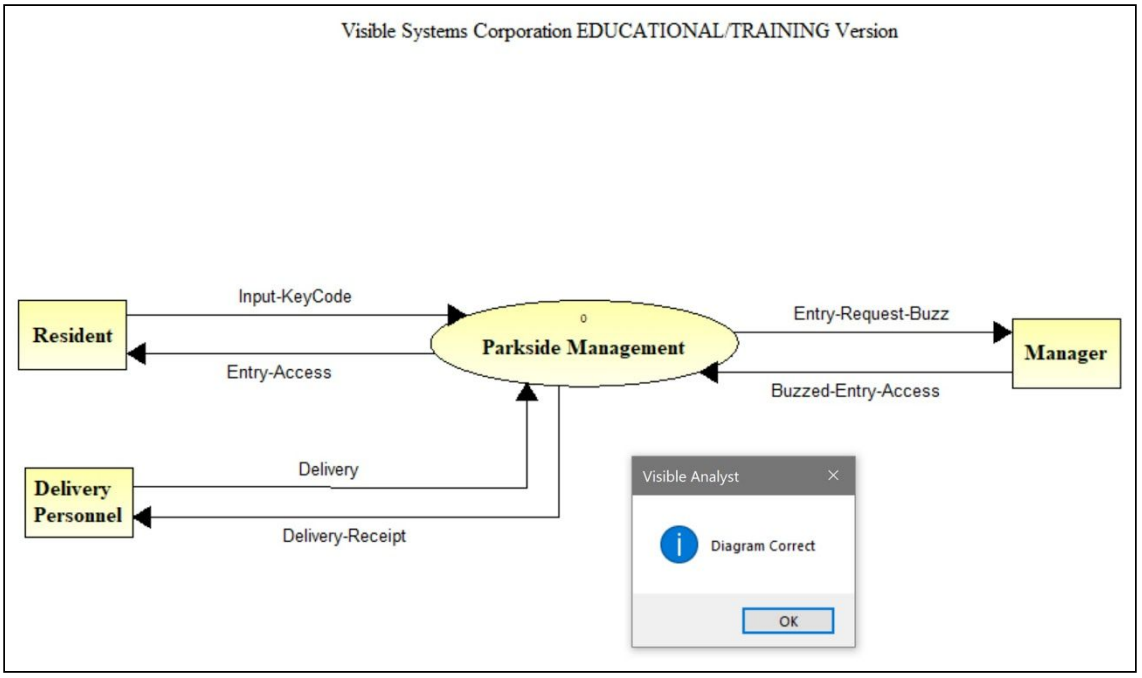
1. Exactly one resident shows exactly one lease to exactly one Manager.
2. Exactly one manager disburses exactly one Key Fob to exactly one resident.

3. Exactly one resident scans exactly one Key Fob at one or more Secured Entry Systems.
4. One or more security systems grant entry to one or more residents.

5. One or more Delivery Personnel deliver one or more packages to exactly one mailroom.
6. Exactly one manager opens exactly one mailroom.
7. Exactly one resident collects one or more packages.

SYSTEM MODELS OF PROPOSED SYSTEM

Process Models



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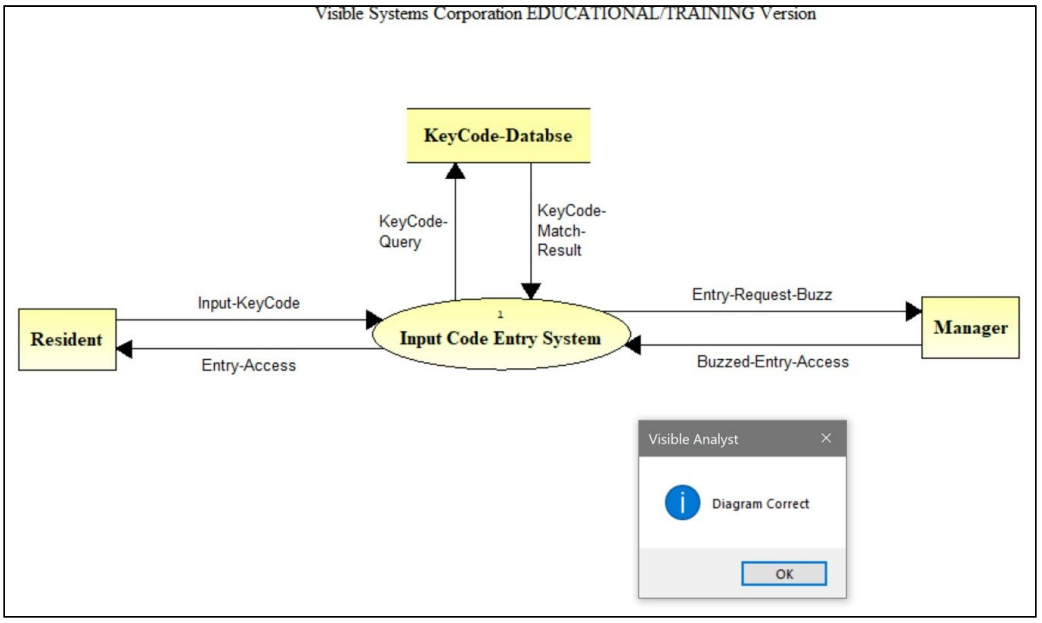
2. Entity: Resident
This entity embodies the leasees of condos at Parkside. They interact with the system to engage in processes like obtaining a key fob, scanning it to gain secured entry, and collecting packages from the common mail room.

3. Entity: Delivery Personnel
This entity embodies package delivery personnel from various courier services that interact with the system to both, deliver packages, and collect packages for returns.

4. Entity: Manager
This entity represents the building manager, responsible for the proper execution and smooth functioning of all operations at Parkside Apartments.

Error Report:

Diagram Correct (*Report from Visible Analyst*)



Level 0 DFD - Secured Building Entry System

Description:

1. Process: Input Code Entry System

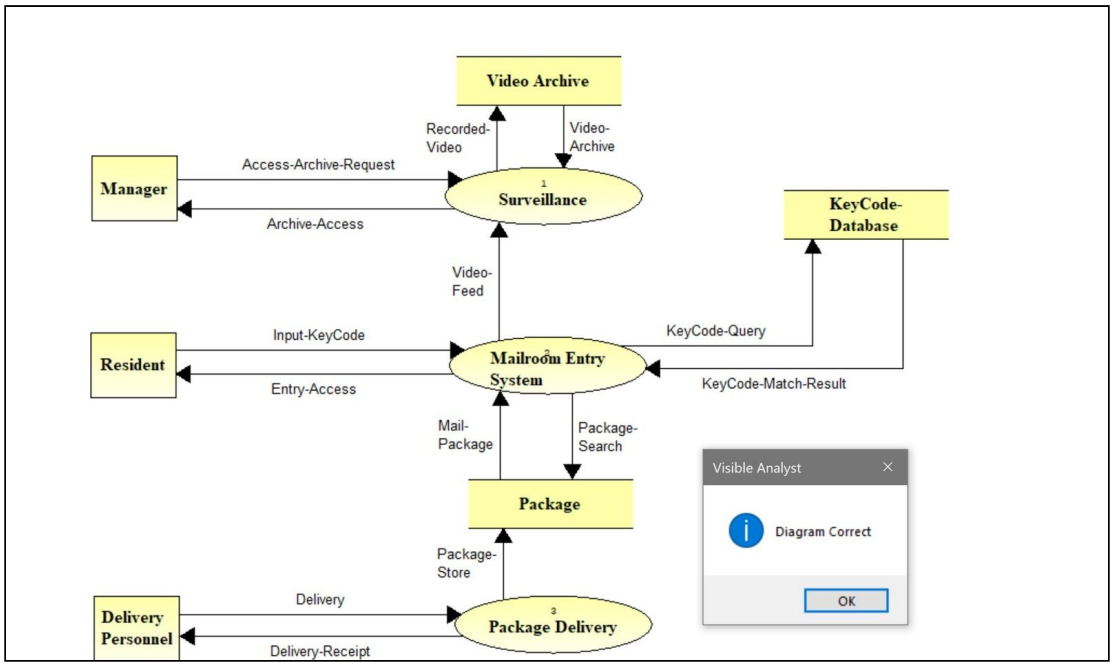
This process is at the core of the proposed system. The resident shall interact with the system by entering his unique keycode to validate himself and gain entry into the building.

2. Data Store: KeyCode Database

This datastore shall hold and update keycode combinations of all residents at Parkside Apartments. This datastore will be referred when validating a person at the secured entrance to the building.

Error Report:

Diagram Correct (*Report from Visible Analyst*)



Level 0 DFD - Secured Building Entry System

Description:

1. Process: Surveillance

This process helps the manager monitor activity by the mailroom when required. This process helps ensure no package is wrongfully retrieved by a non-recipient.

2. Process: Mailroom Entry System

This process is at the core of the proposed system. The resident shall interact with the system by entering his unique keycode to validate himself and gain entry into the building.

3. Process: Package Delivery

This process facilitates the delivery personnel access, deliver packages, and collect package receipt.

4. Data Store: KeyCode Database

This datastore shall hold and update keycode combinations of all residents at Parkside Apartments. This datastore will be referred when validating a person at the secured entrance to the building.

5. Data Store: Package

This datastore represents all the packages addressed to and arrived at Parkside Apartments, delivered by the Delivery Personnel.

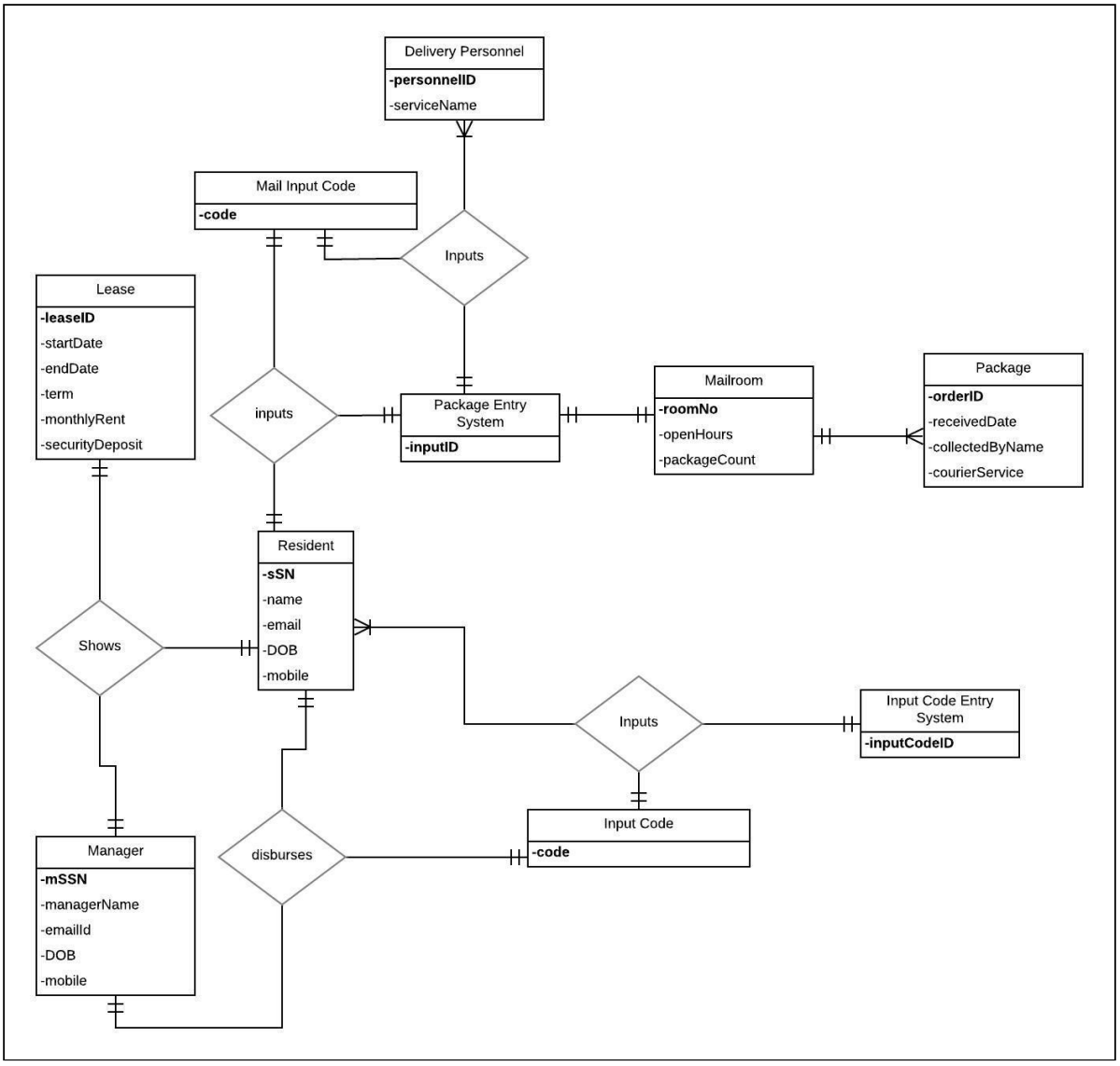
6. Data Store: Video Archive

This datastore holds video archives recorded by the mailroom, and is available at random access to the building manager.

Error Report:

Diagram Correct (*Report from Visible Analyst*)

Data Models



Entity Relationship Diagram

Business Rules:

1. Exactly one Resident shows exactly one lease to exactly one Manager.
2. Exactly one Manager disburses exactly one input code to exactly one Resident.
3. One or more Residents input exactly one input code in exactly one Input Code Entry System.

4. One or more Delivery Personnel inputs exactly one input code to exactly one Package Entry System.
5. Exactly one resident inputs exactly one mail input code in exactly one Package Entry System.

7. Exactly one Package Entry System allows access to exactly one Mailroom.
8. Exactly one Mailroom holds one or more Packages.

CRUD Matrix

Data Stores/Processes	Surveillance	Mail Entry System
Keycode Database		
-keyID		CRUD
-ResidentName		R
-phonenumber		R
-sSN		R
Video Archive		
FootageDate	R	
FootageFile	CRD	
Duration	R	

Mailroom Retrieval System

Data Stores/Processes	Key Code Entry System
Keycode Database	
-keyID	CRUD
-ResidentName	R
-phonenumber	R
-sSN	R

Secured Entry System

PHYSICAL SYSTEM DESIGN

Candidate System Solutions Matrix

Characteristics	Candidate 1	Candidate 2
	Mailroom with 24/7 Input Code Entry Access	Individual Mailboxes on each floor
Mode of Access: Describes how residents will access their mail packages.	Input Code: residents will use a unique input code to access the existing mailroom holding packages for all residents.	Unique Keys: Residents will use a physical key unique to their own individual mailbox on their floor.
Benefits: Brief description of the benefits that would be realized for this candidate.	Quick access by delivery personnel Access to packages 24/7	Easy access to packages Easy retrieval Privacy and Security of packages
Policies to Abide By: Description of what and how many regulations, laws, and policies will have to be satisfied while setting up proposed solution	Only needs to abide by the Fire Safety Regulations, which the room already does.	Will have to abide by many laws, regulations, and codes of conduct, a few of which are Fire Safety Regulations, Maryland State Building Code of Conduct, Elevator Safety Regulations, USPS mailbox regulations, etc
Storage Area: Proposed system setup.	Mail room situated on the second floor which holds packages for all residents	Individual Mailboxes on each floor in the central lobby opposite the elavator, with one mailbox per apartment.
Handling of Large Packages: A description of how and where large packages will be stored	Easy to handle large and heavy packages since an entire room is storage area	Large packages that don't fit in the mailbox will be stored in the building management office
Acquisition Method: Description of what materials and/or services need to be procured to implement proposed solution	None	Contractor to build, deliver, and setup mailboxes for each level in the building
Chance of Breach: Brief description of how secure the proposed system will be to intended attempts of breaching	Medium to high: Every resident can potentially have access to all packages within the building	None to Low: A package can only be accessed by the intended recepient
Ease of Operation: Description of amount of learning or inconvenience incurred in using the system upon completion	Moderately Easy; residents need to go to the second floor lobby to access their packages	Easy: Residents can access their mailboxes on the same level as they stay.
Maintainence Required: Brief Description of proposed solution maintainence after implementation	Low maintainence required since only a single electronic component	No electronic components required. However, timely maintainence of 128 locks and keys
Management Required: Description of amount of effort required by management to facilitate smooth functioning of proposed candidate	Little Management effort required, residents and delivery personnel can access mailroom easily using mail input code	Considerable effort required: Delivery personnel will have to drop off packages to individual mailboxes. Additionally, residents will have to access management office to access large packages.

Secured Entry System

Candidates

Candidate 1: Physical Key

The most common and basic mechanism to enter a premise or building is the traditional lock and key system. A key is given to all the residents of Parkside. The building manager is responsible for the distribution of these physical keys and if lost, it has to be reported to her and charge the resident for replacement. Even though these mechanical keys are useful, they have major security concerns that must be taken into account when designing the key management system.

Candidate 2: Input Code Entry System

Input Code Entry System is a keyless system where, each resident has an unique code which he or she inputs to enter the building. A database management system will be required to store all the unique inputs codes. The building manager will be responsible for managing the database system.

Candidate 3: Biometric Entry System

A biometric entry system uses fingerprint to identify and grant access to only those who are authorized. A database will be required to store all the fingerprints of the residents. This database will

be managed by the building manager. This system has maximum robustness and reduces the inconvenience to carry an extra fob or key.

Candidate 4: KeyCard Entry System

In a key-card entry system, a scanner is installed outside the building premise which will read the unique input code embedded in the magnetic strip of the card. A software will be used to manage and keep a track of all codes. This system will require a database to store all the codes. This database will be managed by the building manager. This proposed candidate solution is extremely reliable and secured.

Characteristics	Candidate 1	Candidate 2
	Mailroom with 24/7 Input Code Entry Access	Individual Mailboxes on each floor
Mode of Access: Describes how residents will access their mail packages.	Input Code: residents will use a unique input code to access the existing mailroom holding packages for all residents.	Unique Keys: Residents will use a physical key unique to their own individual mailbox on their floor.
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Mailroom Retrieval System

Candidates

Candidate 1: Mailroom with 24/7 Input Code Entry Access

Residents will use a unique input code to access the existing mailroom holding packages for all residents. All residents will have 24/7 access to this mailroom. This eliminates the management effort to give timely access to the residents.

Candidate 2: Individual Mailbox on each Floor

In this proposed solution, there will be an individual mailbox on their floor. The resident will use the physical key to access it. Since these are individual mailboxes, residents have easy access to the packages. This solutions is secured and residents privacy is maintained.

Feasibility Analysis Matrix

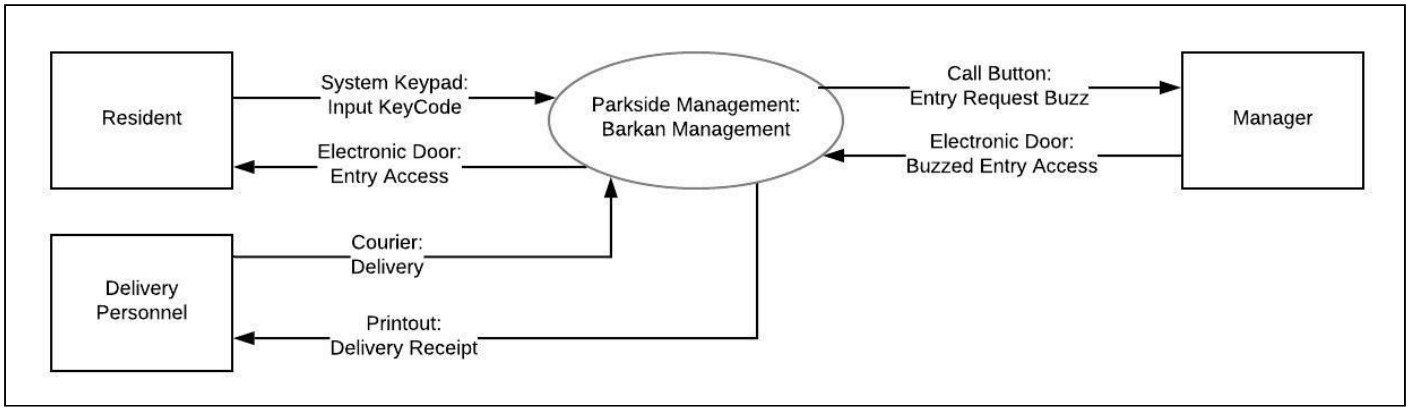
Feasibility Criteria	Wt	Candidate 1	Candidate 2	Candidate 3	Candidate 4
		Physical Key	Input code Entry system	Biometric Entry	Keycard Entry System
Operational Feasibility **Functional:** A description of to what degree the candidate would benefit the organization and how the well system would work **Political:** A description of how well received this solution would be from both user management, user and organization perspective	**40%**	While physical key eliminates the expenses incurred after loss of keyfob(which is part of the existing system), it does not provide adequate security. It leaves the building vulnerable to unintended entry **Score: 50**	Eliminates the need of carrying a physical device to enter the building. Provides security, however prone to being breached. The input code can be easily intercepted. **Score: 70**	Provides robust security, no need to carry any physical device and cannot be intercepted/mimicked. **Score: 90**	Provides security and actual hashing information is encrypted. However, keycard prone to being stolen or lost. **Score: 80**
Technical Feasibility: **Technology:** An assessment of the maturity, availabiltiy (or ability to acquire), and desirability of the computer technology needed to support this candidate **Expertise:** An assessment to the technical expertise needed to develop, operate, and maintain the candidate system	**30%**	Little to no expertise needed to maintain this system. No technology involved. Handymen easily available to install the system. **Score: 100**	System available COTS. Professionals needed to set it up. **Score: 85**	System available COTS. Computaational power needed to verify fingerprints in real time. Professionals needed to set it up. Moderate effort needed to maintain and update the database **Score: 60**	System available COTS. Professionals needed to set it up. **Score: 85**
Economic Feasibility **Cost to develop:** **Payback period (discounted):** **Net Present Value (end of month 3):** **Detailed Calculations:**	**20%**	**Cost to develop:** $60 **Payback period (discounted):** 0.08 **NPV:** $1440 *See Attachment A* **Score: 95**	**Cost to develop:** $180 **Payback period (discounted):** 0.36 **NPV:** $1320 *See Attachment A* **Score: 90**	**Cost to develop:** $330 **Payback period (discounted):** 0.64 **NPV:** $1170 *See Attachment A* **Score: 60**	**Cost to develop:** $1350 **Payback period (discounted):** 2.3 **Net Present Value:** $150 *See Attachment A* **Score: 50**
Schedule Feasibility: An assessment of how long the solution will take to design and implement	**10%**	Two days to set up the system. Two weeks to distribute the keys to the residents. **Score: 85**	One week to setup the system. Two weeks to assign key codes to residents. **Score: 80**	One week to setup the system. Two weeks to populate resident's biometrics in the database. **Score: 80**	One week to setup the system. One week to procure and activate custom keycards. Two weeks to assign keycards to residents. **Score: 70**
Ranking		**77.5**	**79.5**	**74**	**74.5**

Secured Entry System

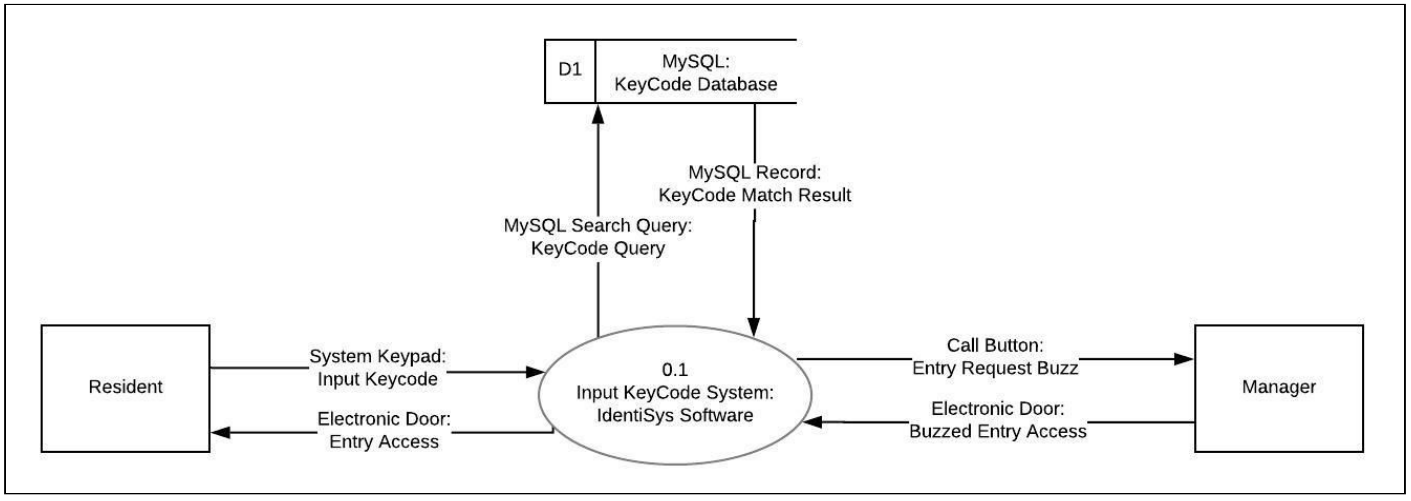
Feasibility Criteria	Wt	Candidate 1	Candidate 2
		Mailroom with 24/7 Key Fob Access	Individual Mailboxes on each floor
Operational Feasibility **Functional:** A description of to what degree the candidate would benefit the organization and how the well system would work **Political:** A description of how well received this solution would be from both user management, user and organization perspective	40%	Minimal changes required to implement the proposed system. Minimal management involvement required **Score: 80**	Substantial involvement of management. Major changes required to implement this solution. **Score: 60**
Technical Feasibility: **Technology:** An assessment of the maturity, availabiltiy (or ability to acquire), and desirability of the computer technology needed to support this candidate **Expertise:** An assessment to the technical expertise needed to develop, operate, and maintain the candidate system	30%	System needed to allow secured entry, CCTV needed to monitor activity. **Score: 70**	No surveillance needed. Technology needed to install the mailboxes on each floor. **Score: 85**
Economic Feasibility **Cost to develop:** **Payback period (discounted):** **Net Present Value (end of month 5):** **Detailed Calculations:**	20%	**Cost to develop:** $180 **Payback period (discounted):** 0.12 **NPV:** $2320 *See Attachment A* **Score: 100**	**Cost to develop:** $2150 **Payback period (discounted):** 0.36 **NPV:** $350 *See Attachment A* **Score: 80**
Schedule Feasibility: An assessment of how long the solution will take to design and implement	10%	One week needed to install secured entry system and surveillance **Score: 85**	Approximately 60 days required to manufacture, deliver and install mailboxes on each floor of the building **Score: 95**
Ranking		**81.5**	**75**

Mailroom Retrieval System

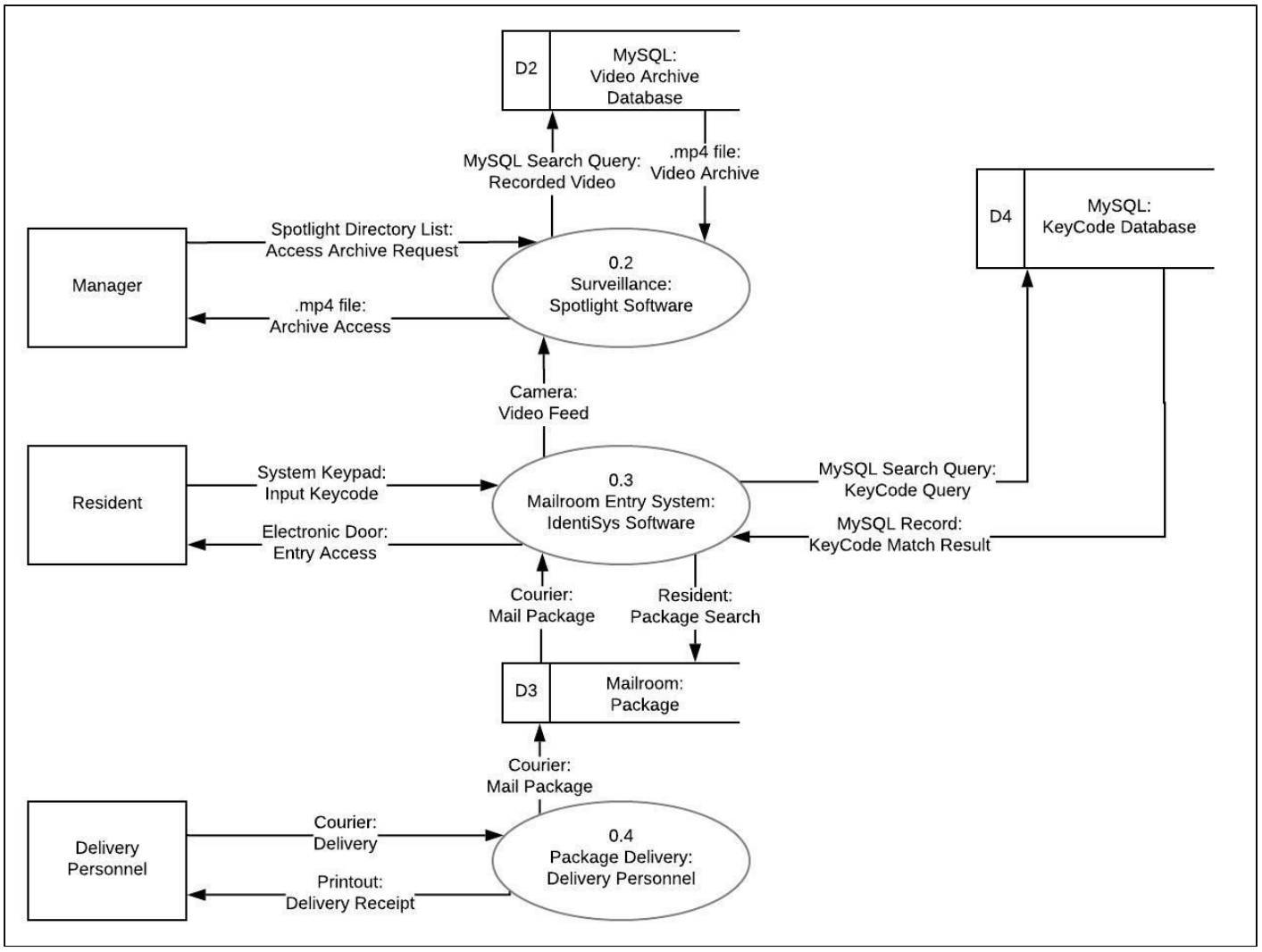
Physical DFDs



Context Level Physical DFD

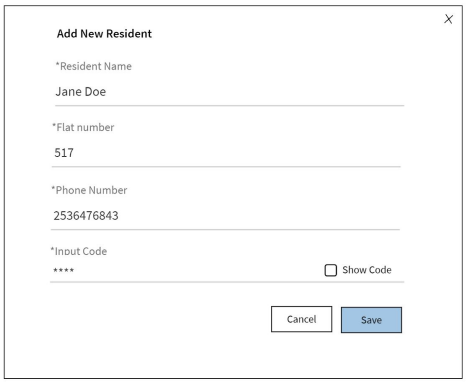
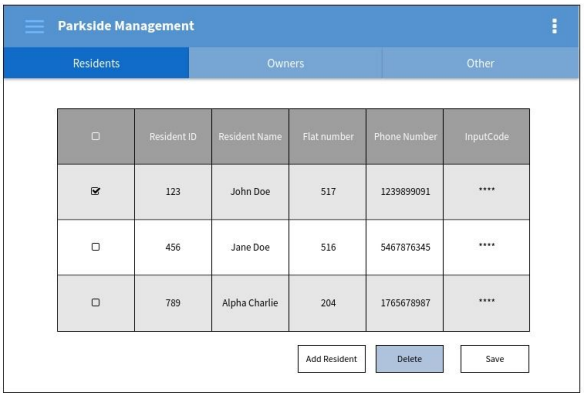
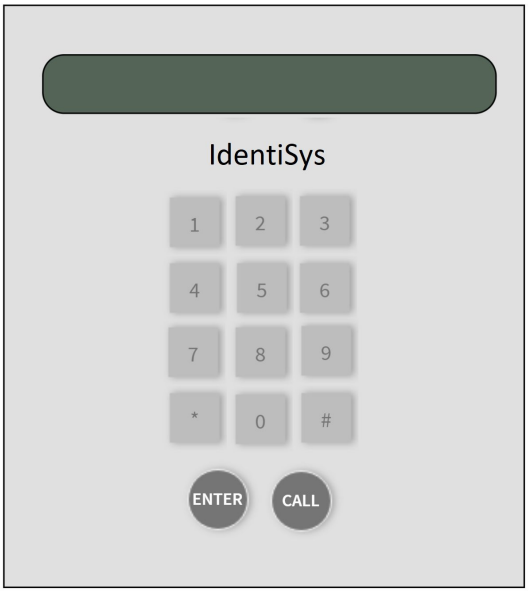
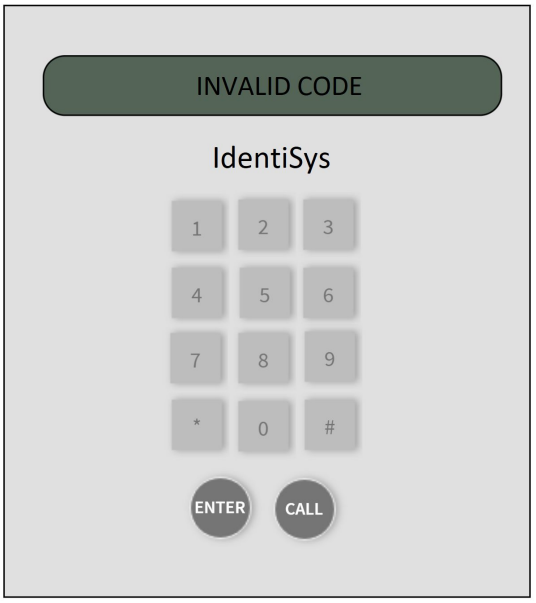


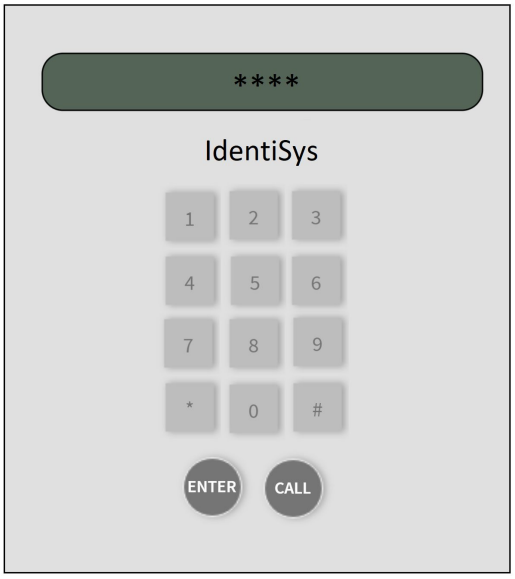
Level 0 Physical DFD -Secured Entry System



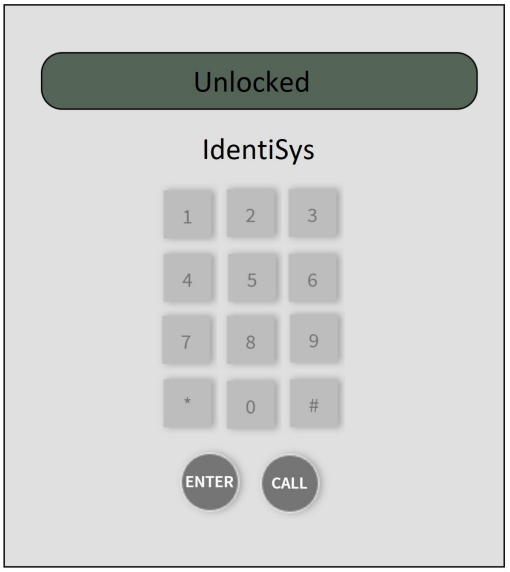
Level 0 Physical DFD - Mailroom Retrieval System

Input and Output Design

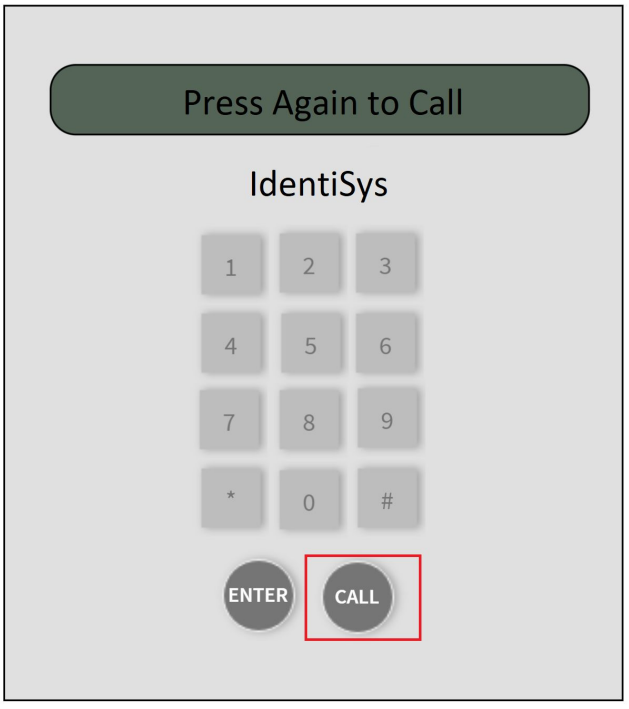
Input	Output
	
Building manager can add new resident details in the keycode database through this input screen.	Building manager can view the resident details like Resident Name, Flat Number, Phone Number, Input Code through this output screen.
	
Resident will enter the input code through this screen and upon pressing enter button , if the code is valid, will gain access to the building.	If the Resident enters incorrect input code, then the system will display the message - INVALID CODE



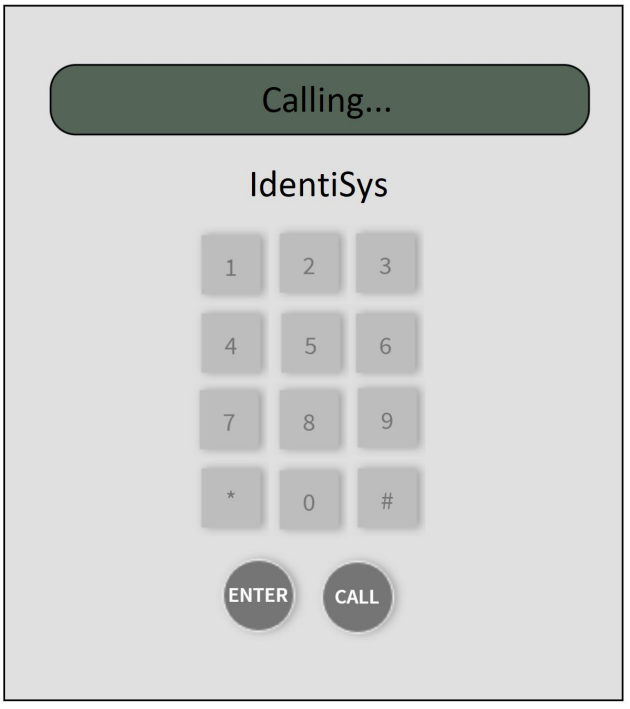
The resident inputs his/her input code as indicated



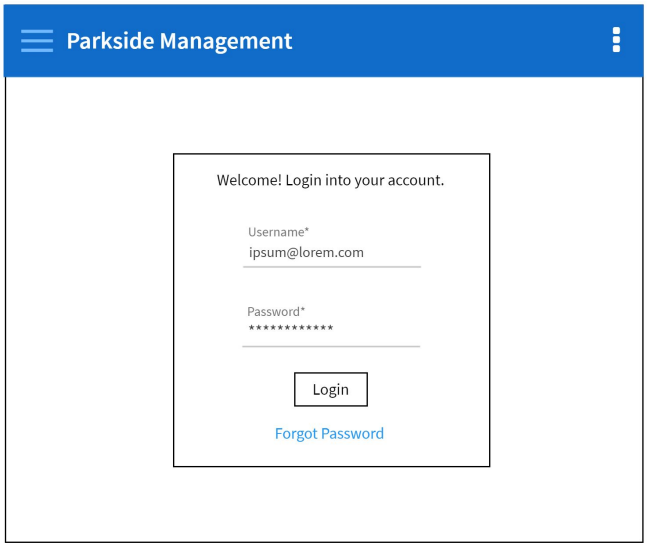
The resident inputs his/her input code as indicated



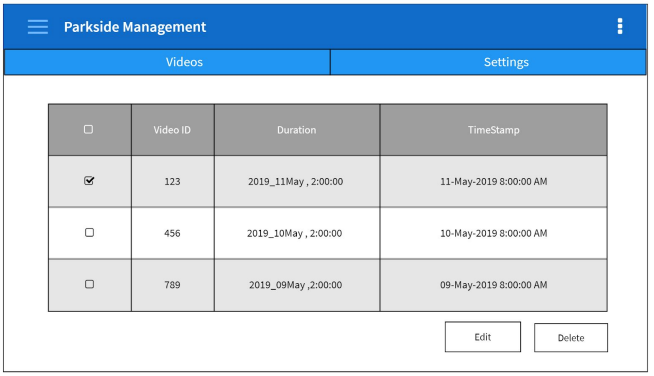
Upon failing to enter the correct input code, the call button can be pressed to request the management to allow entry into the building



'Calling…' informs the Resident that the manager has been notified.



Login page of Parkside Management to authenticate the manager



The manager can view the video archive recorded from the Mailroom

IMPLEMENTATION PLAN

Implementation Plan:

Procurement Phase

After detailed survey the requirements potential vendors had to be identified. Documenting the specification and quality standards of the proposed system was followed up by the decision to outsource the order to vendors which were filtered based on the customer reviews and their product roster. The procurement framework was adhered to ensure that we cover all the potential errors in judgement.

1. An internal analysis was conducted which involved brainstorming sessions and consulting SME to identify and document the features of the system within the budget constraints.
2. An assessment of supplier market was done to filter down to vendors that did not only provide the product with given specifications but also provided excellent customer service which was an essential driver of the delivery and post-delivery phase of the project
3. Matching the documented requirements led us to 3 major vendors who satisfied the criteria set forth by the consulting committee. These were namely - “Codelocks Inc.”, “Masterlock”, “GoKeyLess”.
4. Since this aspect was the crux of the project, it had to be ensured that the outsourcing process was carried out with utmost care such that the product fits into the framework developed internally by the consultants.
5. Implementation of the sourcing strategy revolved around rigorous documentation and creation of contingencies to ensure judicious use of budget and timely delivery of the project.
6. RFQ was sent out to the potential vendors. The market for Keyless entry systems is extremely competitive, in addition the top 3 contenders were sent the RFQ which would ensure best bid from the participating vendors which was agreed upon as $100 with Codelocks Inc signing the contract.

Construction Phase

The main objective of the system was to acquire and test a functional system that meets the standards of systemic optimizations created by the consultants and agreed upon by the client. This idea was central to the construction phase where after every major milestone the team went back to the drawing board to map the progress and to ensure that the project progress followed the specifications and motives defined in its inception. A critical aspect of this phase was to ensure failsafe nature of the system. Since the entry system and the mail disbursement system are fundamental to the convenience of the residents of the apartments, a set of strategic contingencies had to be built into the system to facilitate the given motive. Care had to be taken to ensure that the current lifestyle and methods of entry/procurement weren’t disrupted.The new system had to be constructed such that it works perfectly with the current key which the residents were assigned. Smooth integration via dynamic construction strategies were key to the success of the project. The construction phase was a two-part venture – first phase of system setup was completed in 1 week and the second part of assigning residents their respective codes was completed in two weeks.

Delivery Phase

Delivery phase is the most fragile phase of the projects since it involves the system interacting with its end user. This phase encompassed the process of database installation and deployment. The database contains the exhaustive list of the residents and their respective entry codes. A rigorous testing of the new system had to be done before handing it over to the client. A complete set of tests were created to test and emulate every possible scenario that the entry and package retrieval system could endure in its lifetime like, but not limited to, incorrect code input, power failure, system failure, database failure. After much deliberation a time span of one week was devoted for this phase. It included testing, transition and deployment of the new system.

One of the contingencies to ensure smooth transition was to allow the two systems - The old and the new systems to coexist such that the users could get used to the new system but at the same time the old system was kept operational for backup. To ensure a robust and comprehensive product delivery two sets of documentations were curated. System documentation was delivered to the building manager and one-page user documentation that the users interacting with the new system could refer to.

LESSONS LEARNED

Lessons Learned:

As time progresses, the project team understands the processes and data flows in the system in a realistic way. This is true for all projects. We proposed the improvements in the secure entry system and updates to the central mailroom access for the Parkside apartments. The entrance is secured with a simple RFID embedded key fob scanner which is same for all the residents. Also, the packages are collected and stored in a mailroom by the management and can be accessed by the residents on weekdays during office hours.

Coming up with solutions for both the problems was challenging since the time frame was limited and we realized that we could have reduced the project scope in the initial phases. The solutions suggested involved creating data flow and entity – relationship diagrams, finding errors in it using Visible Analyst and again correcting them. We interviewed a few residents to understand what are their expectations and how much will each entity be involved in the system. We should have involved a larger resident population in the interviewing process so as to get more information and clear understanding of the issues at hand.

Finally, we should have opted for a more agile and efficient model like Discovery Prototyping of iterative development instead of the traditional Waterfall model. We tried to create solutions based on the responses we received from the manager during our first meeting and should have involved her more throughout the process.

APPENDIX

Attachment A

Secured Entry System	Physical Key	Input Code	Biometrics	Keycard
Costs				
COTS:	$0.00	-$100.00	-$250.00	-$1,250.00
Installation:	-$50.00	-$30.00	-$30.00	-$50.00
Annual Maintainance:	-$10.00	-$50.00	-$50.00	-$50.00
	-$60.00	-$180.00	-$330.00	-$1,350.00
Total Benefits				
Month 1	$440.00	$320.00	$170.00	-$850.00
Month 2	$940.00	$820.00	$670.00	-$350.00
Month 3	$1,440.00	$1,320.00	$1,170.00	$150.00
Month 4	$1,940.00	$1,820.00	$1,670.00	$650.00
Month 5	$2,440.00	$2,320.00	$2,170.00	$1,150.00
Secured Entry System	**Physical Key**	**Input Code**	**Biometrics**	**Keycard**
Payback Period (in months)				
	0.08	0.36	0.64	2.3
Secured Entry System	**Physical Key**	**Input Code**	**Biometrics**	**Keycard**
Net Present Value (end of month 3)				
	$1,440.00	$1,320.00	$1,170.00	$150.00
Legend				
Monthly Revenue	$500.00			

Mailroom System	Common Mailroom with KeyFob Access	Individual Mailboxes on each floor
Costs		
COTS:	-$100.00	-$2,000.00
Installation:	-$30.00	-$100.00
Annual Maintainance:	-$50.00	-$50.00
	-$180.00	-$2,150.00
Total Benefits		
Month 1	$320.00	-$1,650.00
Month 2	$820.00	-$1,150.00
Month 3	$1,320.00	-$650.00
Month 4	$1,820.00	-$150.00
Month 5	$2,320.00	$350.00
Secured Entry System	**Common Mailroom with KeyFob Access**	**Individual Mailboxes on each floor**
Payback Period (in months)		
	0.12	0.36
Secured Entry System	**Common Mailroom with KeyFob Access**	**Individual Mailboxes on each floor**
Net Present Value (end of month 5)		
	$2,320.00	$350.00