CityPay

Alcoholic Salamanders

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Phase 1A: CityPay Description

CityPay: A mobile utility payment app for Flint residents

Flint residents currently face several issues with regards to their drinking water and bills. One of these problems is the poor setup and design of the interface for the online website for bill paying of water and property taxes. The online website is set up so poorly, that many residents would rather go to City hall to pay their bills, than try to figure out how to use the website. With our design we plan to make online transactions a lot easier, with automatic payments to make the bill paying process a lot more convenient and to avoid late fess. As of now the current website setup entails a user to click on a link that redirects them to another site, requesting a user to sign in or create an account. After sign in, the user must search for their address, which seems redundant, because if you have an account it should remember the address. Once the address is found then you can go through and enter the payment information for the selected address. This brings up another design flaw, because if a user was to click on the wrong address, then the bills for the wrong address could be getting paid. When using technology, typically its key objective is to make things easier for users, not to confuse them and make the process harder. As a team we have decided to design a mobile app to enable Flint residents to easily pay their water and property taxes. To accomplish this, we will survey and interview current Flint residents to get information on what they like about the current payment process, and what they would like to see changed about it. From this information, we will then plan and design a new app and interface that will meet the design requirements. The primary inspiration behind this app is to capitalize on mobile app popularity to help lessen the burden on residents when trying to pay their bills in the city of Flint. Eventually, hoping to expand to more cities that face this similar problem.

Phase 1B: CityPay Proposal

Section 1: CityPay: A mobile utility payment app for Flint residents

Paying bills online is commonplace for most people these days, however, Flint and other Michigan cities have had poorly functioning and degraded websites in which residents must use in order to recompense their housing statements. Paying bills should be quick and simple so everyone can participate and not have to worry about late payments which are concerns that many house owners can attest to. While addressing these concerns, the creation of an intuitive, modern, and effortless online and mobile service that everyone can use to simplify their billing process is the primary reasoning behind this application.

Section 2: Related work

With the number of smartphone users in the United States estimated to hit 270 million by 2020 (Iia, 2018), cities and municipalities are starting to realize the benefits of having their own smartphone app (Sherman, 2012). While Flint currently has a website where citizens can pay their bills, having an application would allow for easier and quicker payments, which has the added benefit of increasing revenue for the city. Due to the increased use of smartphones, studies have shown that the future of payments is in mobile development (Weichert, 2017), and being able to adapt to this changing landscape will allow the city easier access to funds, and the citizens easier access to pay. With this widespread use of smartphones, the process of designing and developing mobile applications has moved out of the niche market and into commonality (Nguyen et al., 2011), and using tools that are readily available, anyone can build their own mobile application right on their smartphone.

Currently, Flint residents can either travel to city hall, or use the city's website to pay their water bill and property taxes. While many residents may not have any issue with going downtown or using the website, if they had the option to use an app that is both faster and easier, most would probably take it. Even though the adoption of mobile payment services has been slow, creating an app that is user-friendly and based on user feedback will help create a positive social influence, which will increase adoption speeds (Park et al., 2018).

According to Nielsen (2014), users download apps every day but not every application is used. In fact, some are never used, or are often deleted soon after being downloaded. Undoubtedly, mobile apps have become an integral part of user's mobile experiences; people often spend an average of 30 hours per month on their mobile apps. According to research conducted by Google and Ipsos MediaCT (2015), one in four installed apps is never used. However, by working with our stakeholders we can design an app that the users not only want to use but will continue to use.

2.1 Threats to Mobile Payment Systems

When designing a mobile payment application, the security, threats, and challenges of creating, maintaining, and protecting that application must be considered. Mobile payments or using smartphones as a virtual wallet such as Apple pay, Samsung Pay, and Chase Pay to make purchases, have grown in popularity since 2011, however, consumers are also increasingly concerned about their security when using mobile payment applications. 21 percent of respondents were reluctant to enter their payment card details into their smartphones, and 19 percent said they believed paying with their phones could lead to fraud in a survey from Accenture (2016). Mobile payment methods offered by major providers tend to be secure than physical cards or cash because mobile wallets use methods such as encryption and tokenization

to mask account numbers when you pay on mobile, but, mobile payments are still not immune to intrusions. The three security threats to mobile wallets are malware, SSL/TLS vulnerabilities, and data breaches according to research conducted by Yong Wang, MobiSecServ, (2016). Cyber criminals use malware to remotely commandeer smartphones and other devices or steal user' passwords and other private information. Malware infection typically results from an unwitting user clicking on a sketchy ad or a phony link sent by a malicious third party. Computers tend to be more vulnerable than cellphones, but mobile malware is a growing threat. Cybersecurity firm McAfee (2016) reported in April that the number of mobile malware samples doubled in 2016 year-over-year. SSL/TLS vulnerabilities include successful attacks on a security protocol that is designed to protect users, which defies its purpose and jeopardizes the integrity, confidentiality and authenticity of information transmitted. Furthermore, no one is immune to data breaches because mobile apps collect a tremendous amount of personal data on users. Breaches usually begin with just a public copy of an application with bugs in the code that a hacker can reverse engineer and tamper with.

Keeping all these security threats in mind as important issues to consider in the design process, some solutions would be the understanding that cellular phones are still considered more secure than computers, security features of third-party browsers such as our proposed application need to adhere to the same security of banking apps, and the fact is that nothing is entirely safe from data breaches so precautions must be in place to help prevent catastrophic damage. SSL/TLS vulnerabilities are not easily preventable so due diligence and constant updating from these threats would have to be considered in our applications design process. Lastly, regular security updates, application security testing, enhancing the authentication process such as multi-factor authentication, and monitoring of the application would decrease the risk of user data breaches and must be considered in the design process.

Section 3: Methodology

In order to collect data for our application, we want to gather information by administering interviews in person and online surveys to Flint residents. The questions will be finding out what they like about the current website, how they are currently paying the bill and new possible designs for our application. We will take into account that people are bad at telling us what they want or need and instead use the surveys to tell us what they're good at. These questions will include current app features from utility paying based applications in order to allow people to choose ones that they would like included in the application.

While designing our application, we will keep the answers in mind to not only design the best possible interface, but also we expect the results will inform us what Flint residents want in the application. Even though we are only planning to target Flint residents for this project and

application, we still plan on reaching a wide range of people in these surveys, including students, adults, the elderly, anyone who wants a more simple way of paying their utilities.

To analyze the data, we will look at answers and feedback from both the online survey and in-person interviews and compare the answers to how people interact with the current utility app examples and the time it takes to use them. While examining users, we will keep in mind who the user is and how much computer experience they may or may not have. Keeping all of this in mind will allow us to develop an application that has the most functionality and user-friendly interface.

Section 4: Deliverable

The use of smartphones and smartphone applications is something that is here to stay. Most people would likely agree that using a smartphone app is usually faster and easier than trying to use a website. That is why our application is trying to capitalize on mobile application popularity, by offering an application to help lessen the burden on Flint residents when trying to pay their utility bills. Our app will incorporate many things, such as viewing water and property tax bills, showing past bill history to ensure you're being charged correctly, and having the cities late policy clearly displayed, which should help residents in keeping their water from being shut off. The website allows automatic payments already, and we plan on integrating this feature in our app so that users will not have to worry about forgetting to pay their bills. Our users will have the ability to set up an account, which will remember their info, address, and payment information. Our goal is to combine all these features into one application to make the bill paying process easier, faster and less confusing for all Flint residents.

Phase 2: CityPay Task-Centered Analysis, Prototypes and Evaluation

Section 1: Task and Requirements

1.1: Introduction

April 25, 2014 was the last time that the city of Flint and its residents had clean drinking water. This same city on average also pays about $864 a year for water, which isn't safe to drink, cook or bathe with. That is nearly double the national average of water bills (Wisely 2016). To add to all of this mess, when it comes time each month to pay the water and property tax bills, there isn't even an easy, quick way to do so.

The current situation to pay the utility bill, a resident can either go to city hall to pay in person, pay by check or pay using their website. Our online survey showed us that if a resident pays their own bill, that they all choose to do so using the website (Appendix 4). The current website design is very difficult to use, outdated and poorly designed. For example, if a resident goes to pay their bill they have to click on a link that redirects to another website that asks them to sign in or create an account. After signing in, the user must search for their address, which is redundant, because if you have an account it should automatically remember the address, but it doesn't, so each time you have to search for your address. Once the address is found, the user can go through and enter payment information for the selected address. This system has many flaws, one being, if the wrong address is selected the wrong bills could be getting paid. Another, if a resident was to miss a payment, or not pay in full; the system will also charge a late fee on top of that. However, there is nowhere on the site that shows the late fee policy, so you must know this in advance and calculate yourself how much the late fee will add and add it in yourself. On the next payment cycle, if you do not pay in full including the late fee your water will most likely be turned off, without potentially even knowing why. When using technology, one main objective is make things easier for users, not to confuse and make a simple process like this even harder.

That's why we've decided to develop a mobile application so allow residents to pay their utility bills on an easy, user-friendly system to make at least part of the process a little more manageable. Our application will allow users to view their current bills and past bills, so they have the ability to compare the rates. It will also have an ability to view usage reports, this allows users to graphically see the amount of consumption they use month by month. There will be the option to set up pay alerts that will send a notification to the user to remind them to pay their bill. This can help residents to remember to pay their bill, so they won't be charged with the late fees as mentioned previously. If a user doesn't want to receive a notification, then they can also sign up for automatic payments, this will automatically pay the bill each month without any user input. This ensures timely payments, and never any late fees. Guest pay will also be available for elderly or residents who don't have access to a mobile smartphone. This allows the residents family to be able to pay their utility bill, if they are unable to do so. There will also be a customer support tab that allows users to communicate not only within the app if there's a problem, but

also with the city if there's an issue with the bill itself. Some of the constraints that we faced along the way are that some people might not feel comfortable having their personal records and payment information saved onto an application. This is a major privacy issue, and not everyone will want to use a mobile application solely for this reason. The next constraint is that we weren't able to contact someone who works for the city to conduct an interview. We were hoping to get the perspective of someone who deals with the website and collecting payments, to see if their perspective was different than that of the residents.

Flint residents have enough problems with the water itself, we want to design an application that makes the paying process a lot easier than what is currently in place. This application will be very user-friendly and designed for all users, so even people with less computer knowledge would be able to use our application.

Expected Users:

The following descriptions are what we believe to be the expected users for our mobile application. This includes their expected work or activity done using our application and what they will use our application for.

Flint Residents: Flint residents are the ones that are the main expected users of this system. The application is centered on them, allowing them to pay their utility bill on a mobile application for the first time ever. Through this application it will allow residents to view current and past bills, usage reports, set up payment reminders, set up automatic payments and contact customer support for any problems or questions they might encounter when dealing with this application.

Resident's Family: The resident's family also can come into play, if a resident is either too old, doesn't like to pay online or doesn't have a smartphone. This will allow a family member to set up a guest pay account and pay the utility bill for the resident. The account will have to be approved through the resident, allowing access to their information.

City Officials: City officials will play an important role in our system. They will report water usage and property taxes to the clerks. This information will be used to generate the amount due each month for each resident. They will also be involved with the customer support, if a resident finds an issue with their bill, they can contact customer support and potentially have to deal with a resident if the online operators can't fix the problem.

Clerks: Clerks will also have a role in our system. They will track payments, send late fees and report the bills for each resident from the city officials. They will also be involved with customer support, if an online operator can't answer a question from resident.

Online Operator: The online operators will run the customer support feature in our system. They will be the ones that residents can contact either through direct message, email or phone

call when a problem arises. If the problem is within the app itself, the online operators can try to help a customer through it, unless it's a bug that must be fixed by the developers. If the problem is with the bill itself, they can try to help or contact the clerk or city official to figure out the solution.

Task Examples:

The following task descriptions are for our envisioned system, it will show how eventual users will perform their tasks.

(1) Lauren, a resident of Flint, has to pay her utility bill. She has a paper copy, but it only shows the amount due. Lauren questions her usage amount and notices her charges are different than normal. She opens the application and shows the full bill. She compares this month's usage to last months, realizes it's correct and then pays the bill.

Discussion. This task contains many typical customer activities, it deals with the customer receiving a bill, seeing the amount, wanting to view the changes between each bill, and paying the bill. Most of these tasks are done frequently, and are important.

(2) Mr. Walwrath, a resident of Flint, calls customer service when he realizes he forgot to pay his bill. He is a busy man, and often forgets to pay the bill. Customer service directs him that the new amount will be added to his next bill. Mr. Walwrath asks if there is a way to set up a reminder on the website for him to pay his bill, customer service directs him to the application where he can set up payment alerts for the due date of his bill. He chooses to be reminded the day before the bill is due.

Discussion. This tasks contains a typical customer, it deals with a missed payment, a call to customer service, and payment alert set-up. This task is infrequently done, but still important.

(3) John Doe, a family member of a resident of Flint, is trying to help his mother pay her utility bill. She doesn't know how to log on to her account on the website, and is too sick and immobile to go downtown to pay her bill. John Doe is from out of town, and can't take the payment himself. He message customer service, where they recommend that him and his mother set up guest pay. John goes to the application and puts in the necessary information and his mother agrees to the terms, allowing John to make the payments for his mother.

Discussion. This task contains a typical customer and a family member. It deals with an elderly lady wanting to pay her bill, but can't remember her login or go downtown, her son is trying to help, but is also of no use. With guest pay, it allows John to pay his mother's bill for him. This task is infrequent, but still important.

(4) John Doe, a resident of Flint, just received his utility bill in the mail. He notices that the water bill is higher than normal, but there isn't a usage report on the bill or on the website. He wishes he could show his wife how much water she uses, when contacting customer service, they direct him to view usage report widget. When John clicks on it, he is able to view graphs of the amount of water used from month to month. He shows this to his wife as to why it is important to take a quicker shower.

Discussion. This task contains a typical customer; it deals with usage report problems, contacting customer service and viewing usage reports on the application. This task is frequent, and important.

(5) Mr. Beegle, a resident of Flint, frequently forgets to pay his utility bill. He doesn't mind receiving notifications, but doesn't always have the time to get to them right away. He goes to the website to set up automatic payments, but can't figure out how to do it. He becomes frustrated, and downloads the application. On the application he realizes that he only has to click a few buttons and he has his utility bill set up on automatic payments.

Discussion. This is a typical customer, trying to set up an automatic payment, but can't because of the website's poor design. Then tries to use the application and can very easily. This task is rare, but still quite important.

(6) Mr. Gay, a resident of Flint, an elderly man doesn't like to pay in person. He struggles getting out and finds the people at the service center difficult to deal with. The mobile application was introduced to him and he had a question about his bill. Mr. Gay then clicks on customer support and is able to call an online operator who then communicates with the service center to get his bill straightened out.

Discussion. This is a typical customer, who has issues when dealing with customer service at the payment center. When using the application he finds that when he has a question the online operators are able to handle his problems without him having to do very much, but describe his problem. This task is frequent, and important.

(7) Adam, a city official, spends his days at work gathering resident's water usage and property tax information. When he has the report generated, he then sends this information to the clerk, where it is inputted into their accounts. When there are questions, he is available to help if needed.

Discussion. This is a typical worker's activity; it deals with reporting bill information, and responding to questions. Dealing with bill information is frequent and important; answering questions is rare and less important.

These task examples will define how our system will be set up and different ways it can be used, that the current system doesn't offer. After all, technology should be making our lives easier, rather than more difficult. We hope that our mobile application will stick to that and be a major upgrade over the current system in place, to make the lives of Flint residents just a little better one step at a time.

Research Methods:

To develop our mobile application, we investigated many different methods to gather information about our users. We considered the many options, and weighed the pros and cons of each. We had an advantage with one of our group members being a resident of Flint, this allowed us to see for ourselves how the current system works and understand the frustrations of the residents. One problem we had was we lacked the knowledge of how the majority of residents were paying. We had thought that paying on the current website would probably be the most convenient way to pay, but were unsure if the elderly or people who didn't have access were using this method. Another problem was our application would be getting mixed up into resident's personal information including: names, addresses and payment information this limited some of the information that we were able to generate. This made us realize that the best way to find out about the residents of Flint was to host interviews with Flint residents if they chose to accept, and also to offer and online survey for Flint residents only that allowed people to stay anonymous.

Interviews: We were able to conduct five interviews with Flint residents, we were hoping to also meet a city official or clerk, but with the limited time we weren't able to get that arranged. The results of our five participants can be found in Appendix 2. The questions were used to figure out if people liked the current website design and if they were open to a new application. What we found when conducting interviews was mostly on target with what we had thought coming in, but were surprised at some responses. Of the five interviews, only two used the current website, which was disappointing. The two who used the website both found the website hard to use, but with time to figure it out was eventually manageable. Another person used to use the website, but found it so frustrating that they would rather go downtown than waste the time of using it. Everyone interviewed believed that having something better to pay their utility bills like an application, would make it easier and would use it if it worked. However one person did express some concern of having their information (payment, personal records) in an application, but still would be open to learn more about it. We also found that everyone would feel comfortable receiving notifications from a mobile application. Not everyone is always comfortable with this, but most agreed that it would help them remember better. We had a very interesting participant say that; he wouldn't just want to be reminded about a bill due date, but also a usage reminder. For example; you could set a water limit per month in gallons, once you got close or hit the limit it would send you a reminder to slow down. Or if a pipe was to burst, the application could send a notification saying that you're using a lot of water right now for a long period of time. Having a notification system like this could save someone lots of money and potential damage. This was

something we hadn't thought of for the alert system, and a really good option to explore further. One other interesting thing we discovered, is that of the four applications we displayed to have the participants view and discuss, we found that none of them were very well liked. They all chose a favorite, but they found problems in all of them. This definitely showed us, what we shouldn't incorporate in our application.

Surveys: For the survey, we received 26 responses. The survey had eight questions that were used to find out about how people were paying their water bill, the difficulty of that current process and if they believed having a mobile application would better the experience of paying the utility bill. The results of our survey can be found in Appendix 4. Our data was pretty mixed, of all the people surveyed, they all paid the bill on the current website, and just over half of them (14) found the process neutral or worse as an experience. This contradicts our interviews, because all of those people believed that the process was difficult and our survey was pretty split down the middle between difficult and easy. Some more strange data we obtained was that 21 out of 26 people said that if a mobile application to pay bills existed they would use it, but it was also found that 18 people used websites over mobile applications. Overall, this data wasn't extremely useful to us, although it did express that almost all people would be interested in a mobile application to pay utility bills. The data was so mixed and seemed to contradict itself in other questions, that getting a general basis from this won't lead us in the right direction.

Section 1.2: Tentative List of Requirements

From the task examples listed above, we have compiled a list of major requirements below:

Must Include:	**Should Include**:	**Could Include**:
View Bills	Usage Reports	Guest Pay
Customer Support	Alert System	Automatic Payments

Must Include: View bills and customer support were placed into the must include category. Viewing bills is extremely basic, and very crucial to our application. The whole point of our application is to allow residents to pay their utility bills from our application, and that is simply not possible if they can't even view their bill to know what they're trying to pay. Customer support was also placed in here, because no matter how perfect we try to make this application or how perfect the city is on reporting usage, there will be some bugs or errors along the way. That's why it's of the utmost importance that residents have a way of contacting someone from customer support no matter if it's an issue with a bill, or even a problem with using the

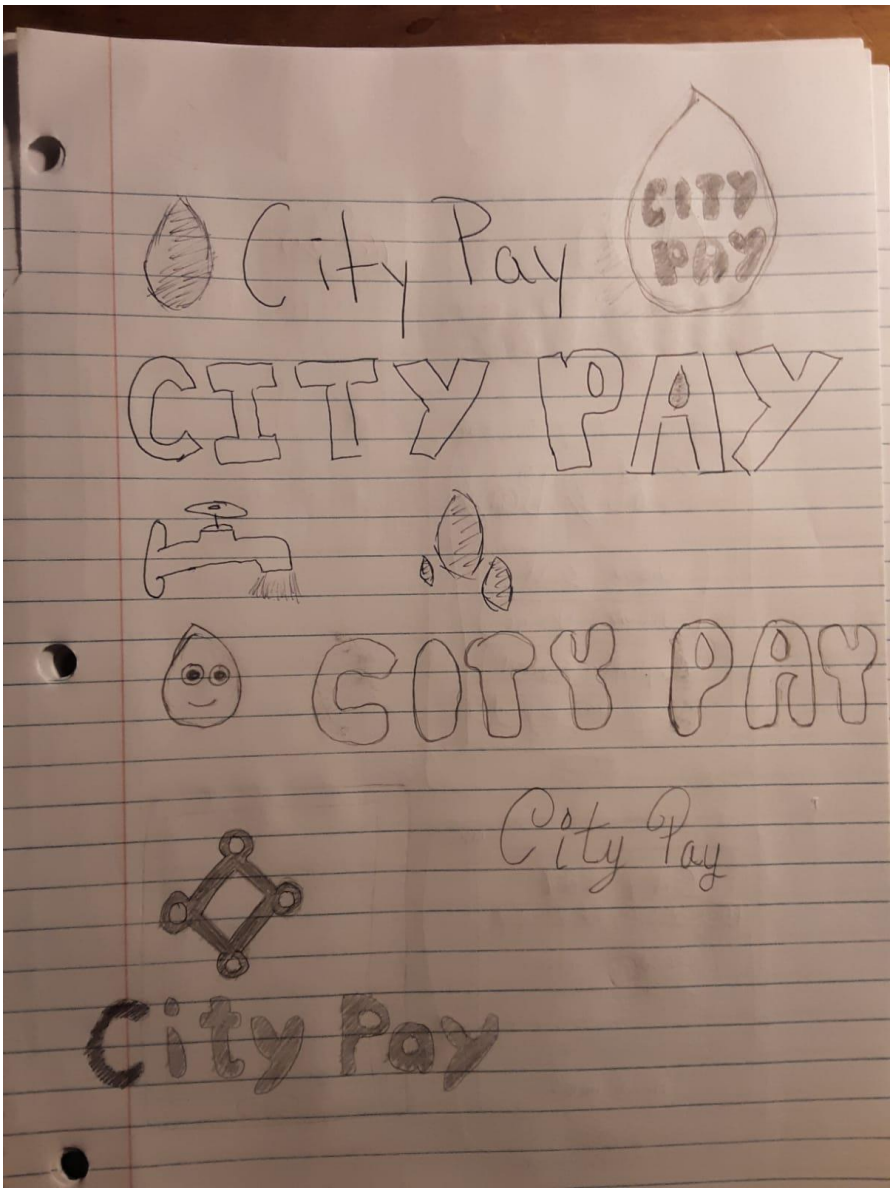
application. Being able to reach help quickly and easily is a must when designing our application.

Should Include: Usage reports and alert system were placed into the should include category. Usage reports should be included, because unlike the website, it gives residents a month-to-month breakdown of water consumption. Not only does this allow residents to see how much they are consuming, but also if they think there is a problem with their bill they can compare it themselves from previous months to see if the bill is correct. This could save the consumer time, because normally if there was a problem they would have to contact customer service immediately, but having this feature allows the resident to do a check of their own and if they find it to be correct move on without having to contact customer service. Alert systems were also placed here, because it allows the application to send notifications to the resident to remind them to pay their bill. This alert system will be totally customizable to the resident of when receiving alerts, or if they want to receive them at all. This is very helpful way to remind residents to pay their bills, before being hit with a late fee or possible water stoppage.

Could Include: Guest pay and automatic payments were put into the could include category. This was placed here, because it allows for a family member to set up an account (approved by the homeowner) that gives them access to pay the bill. This could be included, because if a resident was elderly, or don't have access to a smartphone this allows another person to pay the bill without them having to worry about it. This only could be included, because the homeowner could realistically also just give access to their account, instead of having a family member make a guest account. However, that is a privacy issue and not everyone would want to give access to their account and could feel more comfortable using a guest account to pay. Automatic payments is included here, because only some users are concerned with this feature (Appendix 4). Being able to set up an automatic payment without having to worry about it each month is an important feature. Some residents seem not to be to concerned with this, rather it's, because they want to make sure the payment goes through or may not always have sufficient funds available.

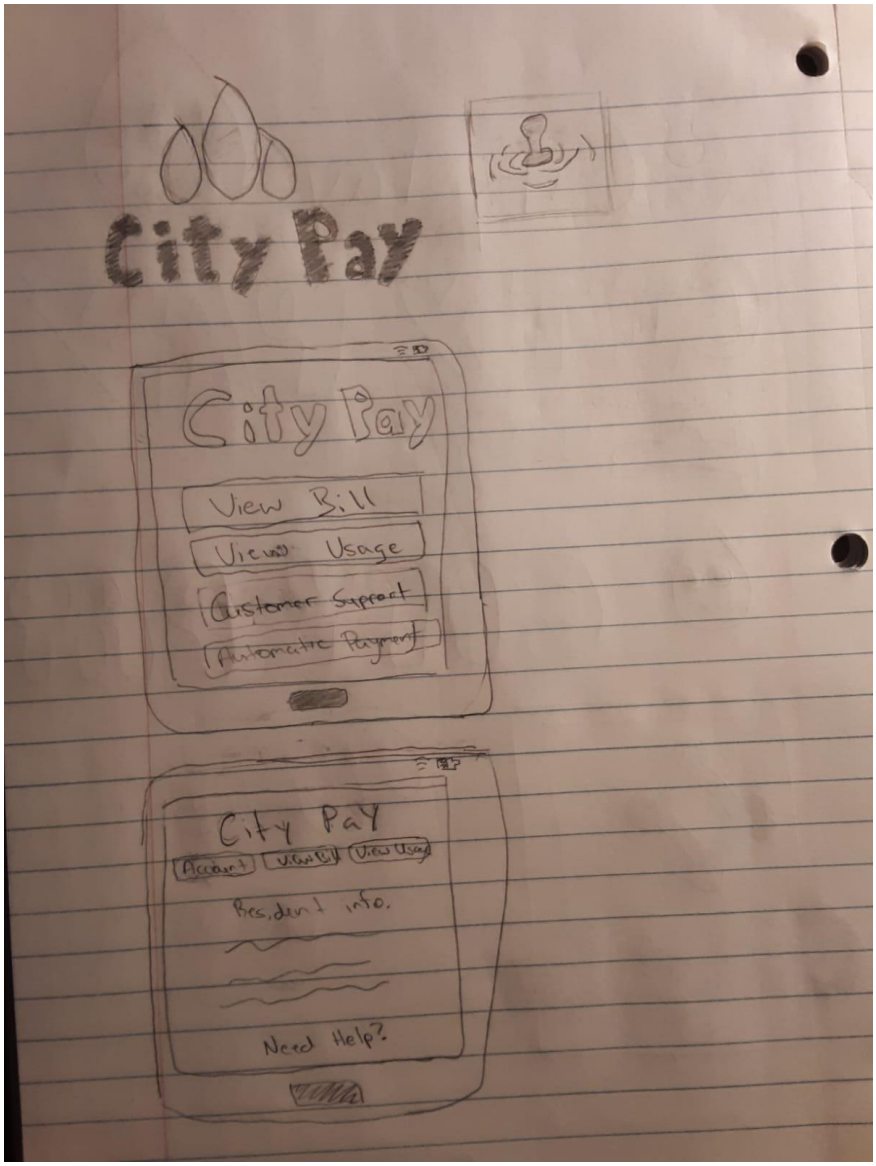
Section 2: Sketches

1.



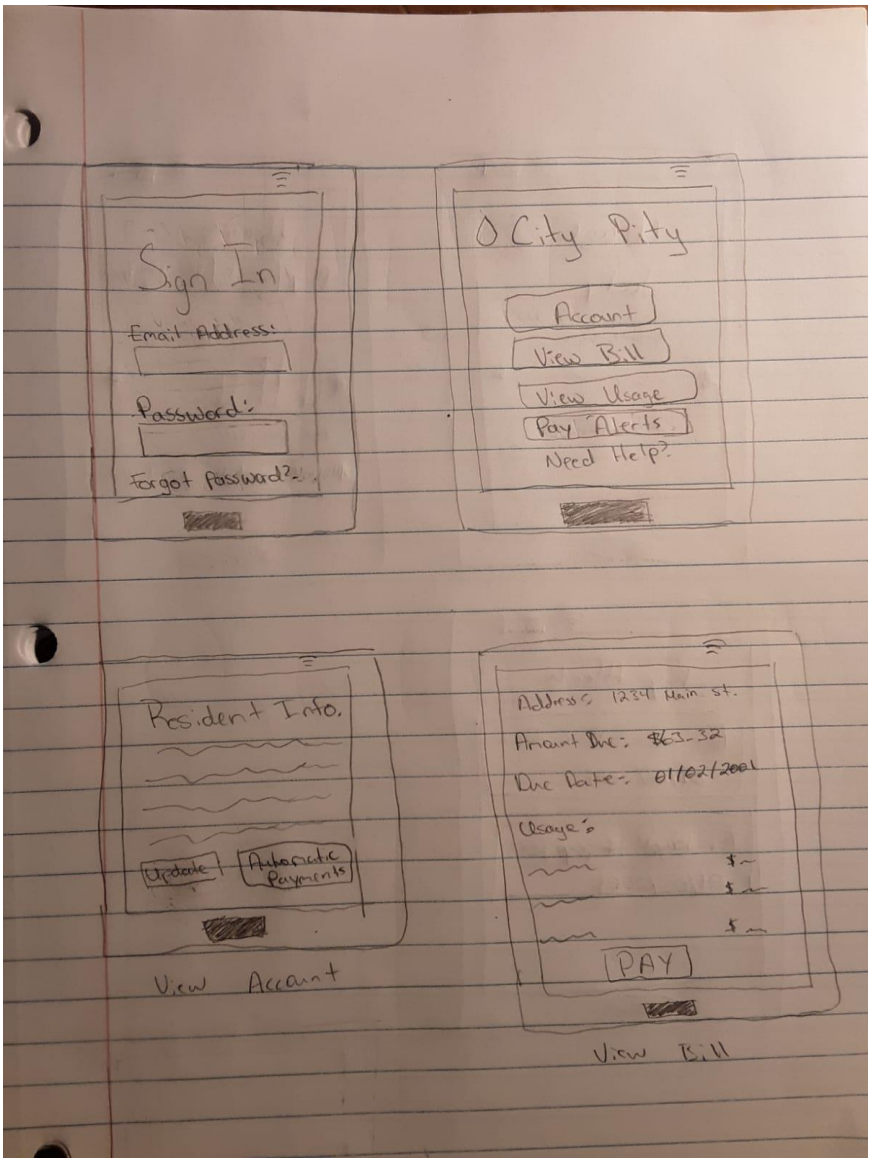
Sketches with potential logo and font designs for the application.

2.



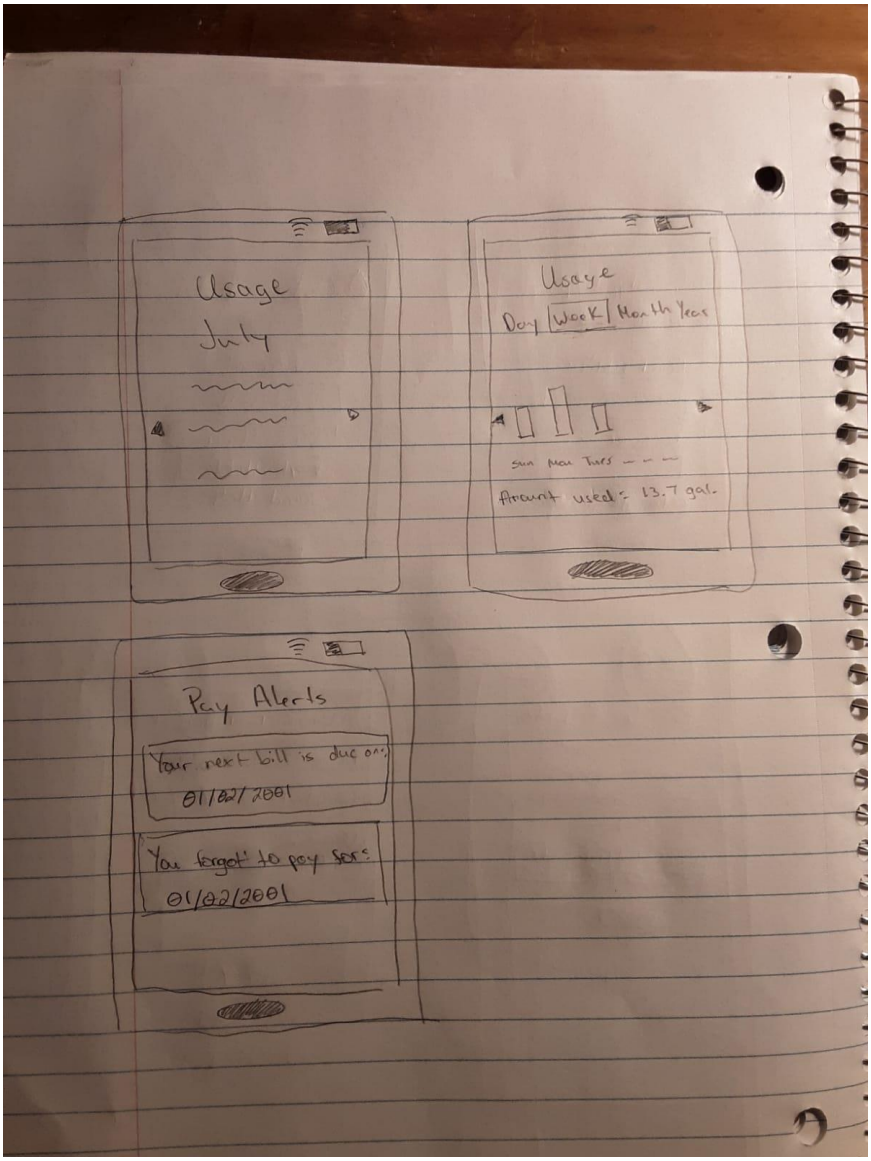
These sketches were early designs for the main menu and an extra logo design. The top design has a simple and easy to understand listing of features that would bring users to other pages when clicked or touched. The bottom design was “tab” focused and would display information relating to the tab when clicked or touched.

3.



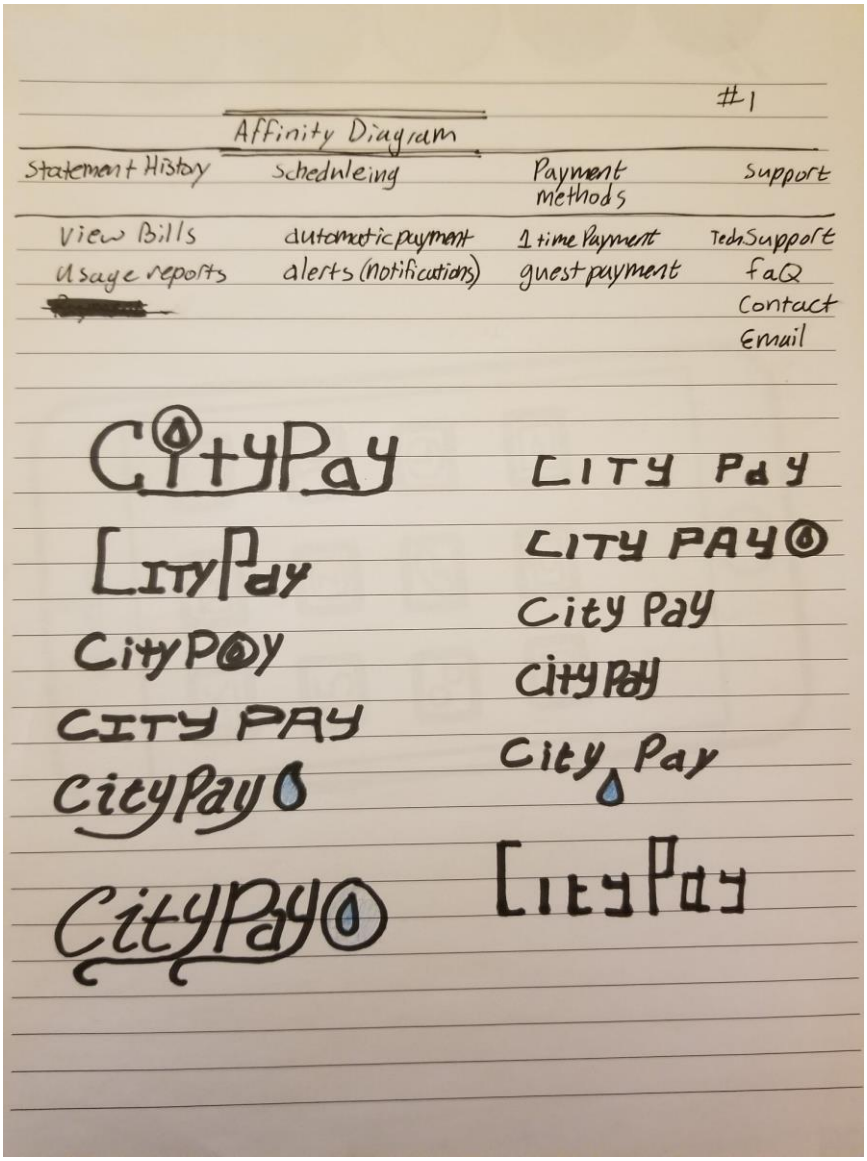
The four sketches here illustrate a sign-in screen, a main menu, and two possible screens after a user clicked or touched a button on the main-menu.

4.



The above three sketches were designed to illustrate potential menu screens for water usage with graphs and graphical pay alerts.

5.

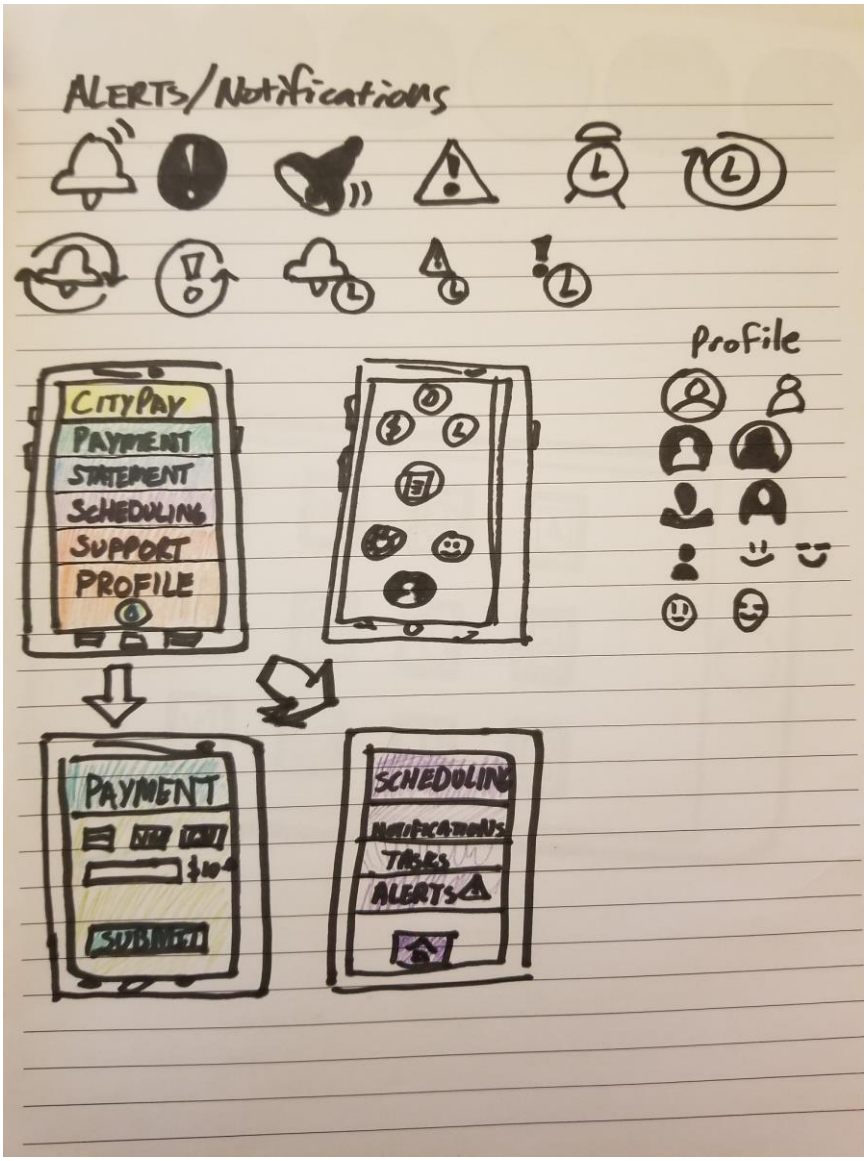


We had started out with this mock of an affinity diagram after determining core features that the application would use. We had determined these features after evaluating the data collected from both the online survey and the in-person interviews. Using this affinity diagram, we started creating several sketch ideas that included or alluded to the chosen features. Also, on this page of sketches are potential font and logo designs.

6.

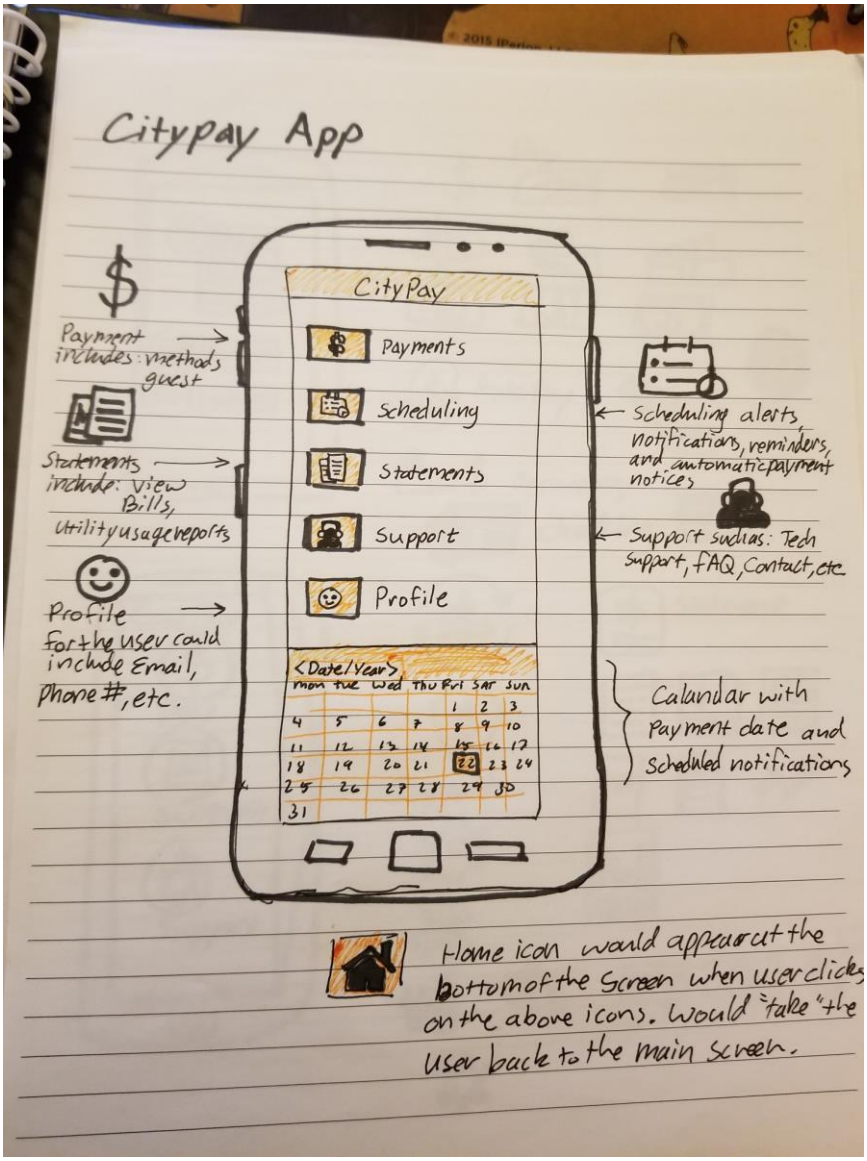
This series of sketches include two User interface designs. The idea behind the top one is that each user action would be listed next to an icon for easy association. When the user clicked or touched the icon/description a drop-down list would appear next to the icon for further actions, however, the worry behind this design would be too much screen clutter. The second sketch would be based on existing application user interfaces. You have a simple icon with the description beneath it that once clicked or touched would bring the user to another page with further actions. The potential problem with this design is that it doesn't stand out from other applications and could cause confusion for users when they are trying to remember where to find certain features. Also, on this page are numerous icons designed for the main features that we would integrate into the application.

7.



This collection of sketches includes two more application designs as well as designs for alerts, notifications, and user profile icons. The sketch on the left has no icons but would be color coded to the features that when clicked or touched would open a user interface that would be colored based on the main feature. This way the user would hopefully be able to quickly and effortlessly navigate through the application because the separate menus would be more understandable. The two sketches below help illustrate that thought process with the payment menu being color coded blue and the scheduling menu being color coded purple. Based on the interviews we had however, there was a resounding number of interviewees that preferred icons over lots of text. Thus, the sketch to the right was the designed with the intention of using nothing but icons and no text. It would function similarly to the other user interface with the exception of being able to grab and move the positions of the icons for a more personalized user experience.

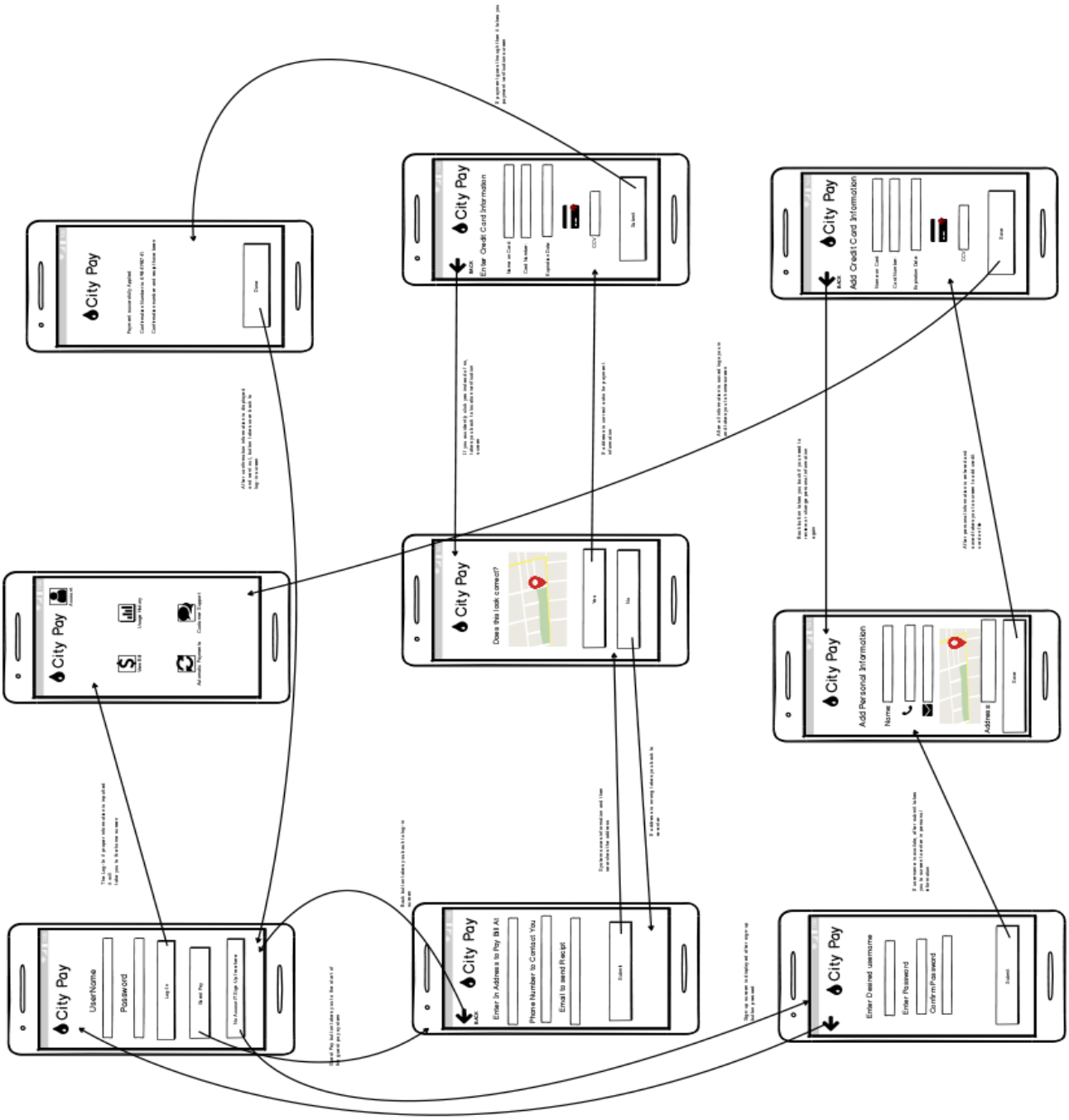
8.

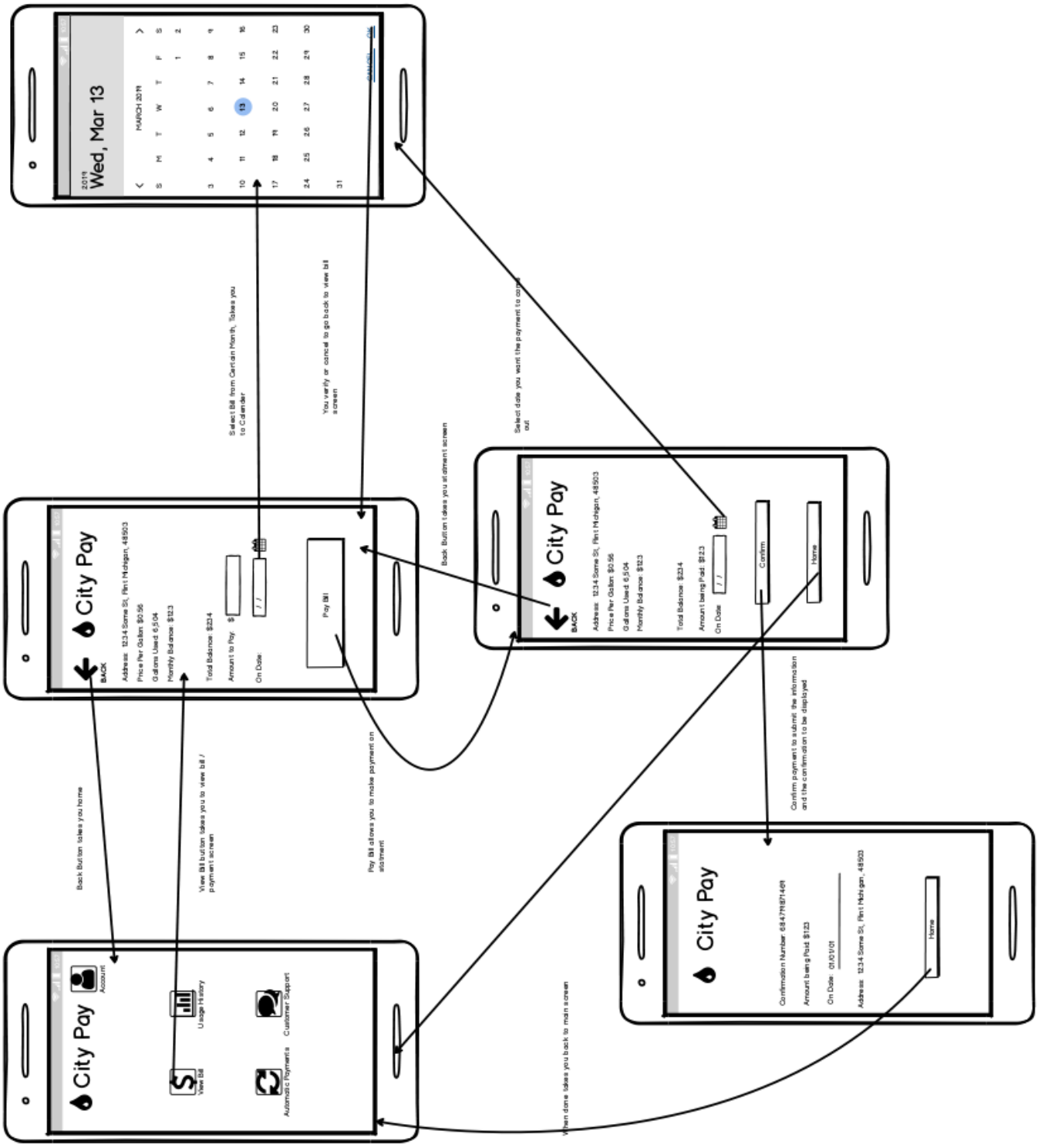


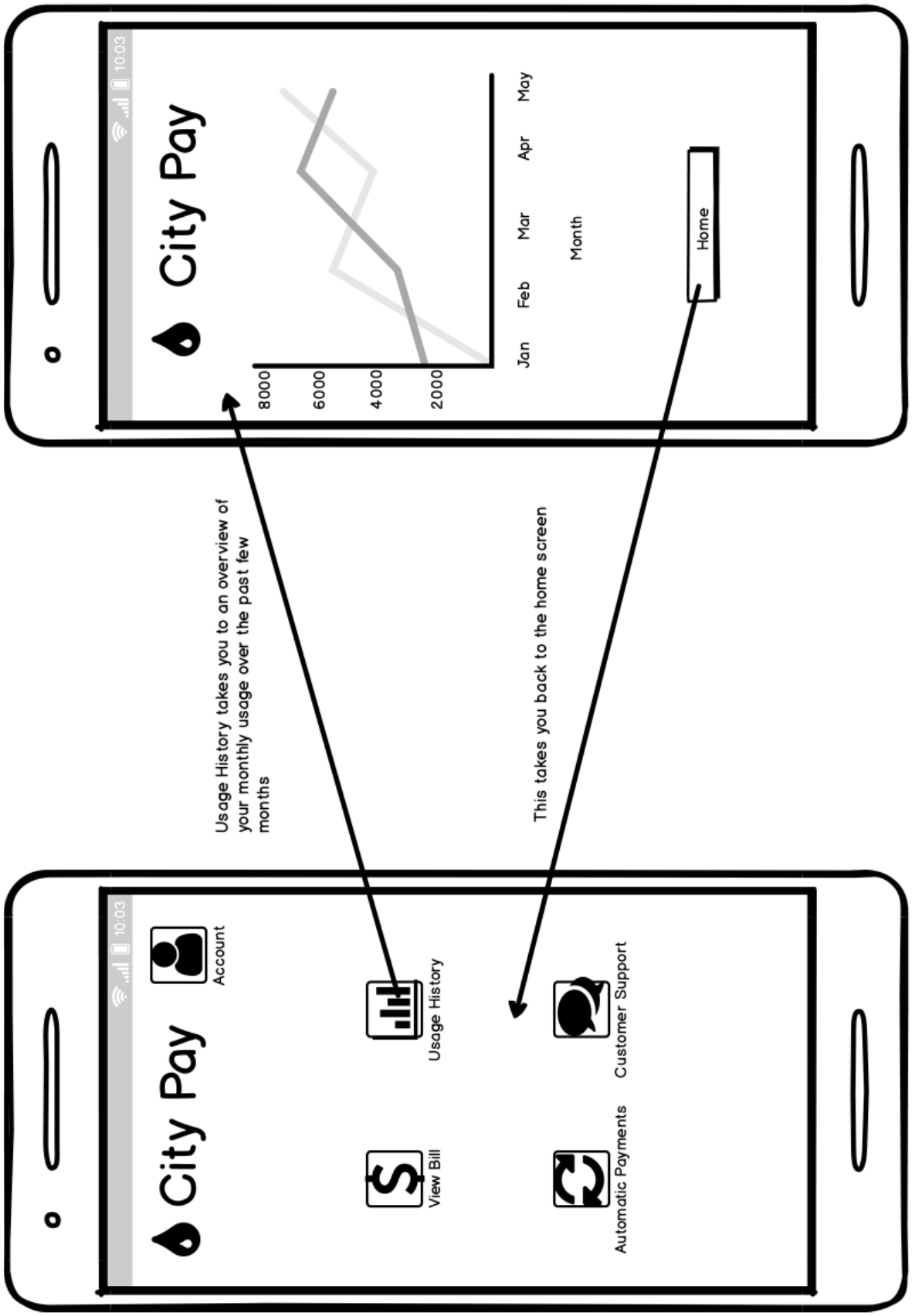
This sketch was of a more “finalized” design based on the collected data of the in-person interviews and the online survey. It has a simple design scheme with icons and a small amount of text with inclusion of a calendar at the bottom of the screen that would show a bill due date as well as the dates for scheduled notifications, alerts, or automatic payments. The problem with this design would be the location of the calendar, which was discussed and determined that it could be moved to the scheduling menu instead of taking up room on the main menu.

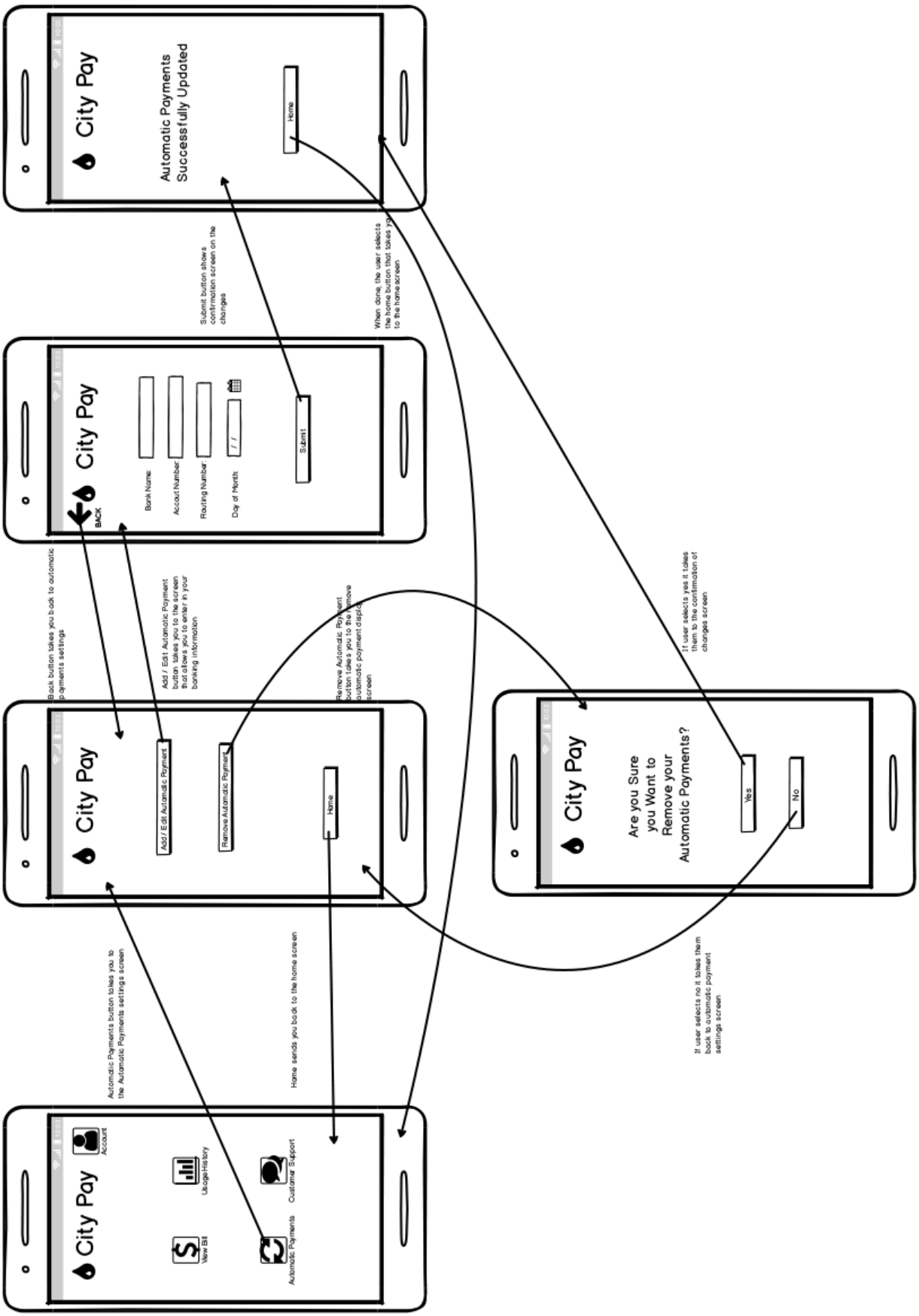
Section 3: The First Prototype, Task-Centered Walkthrough, Informal User Evaluation

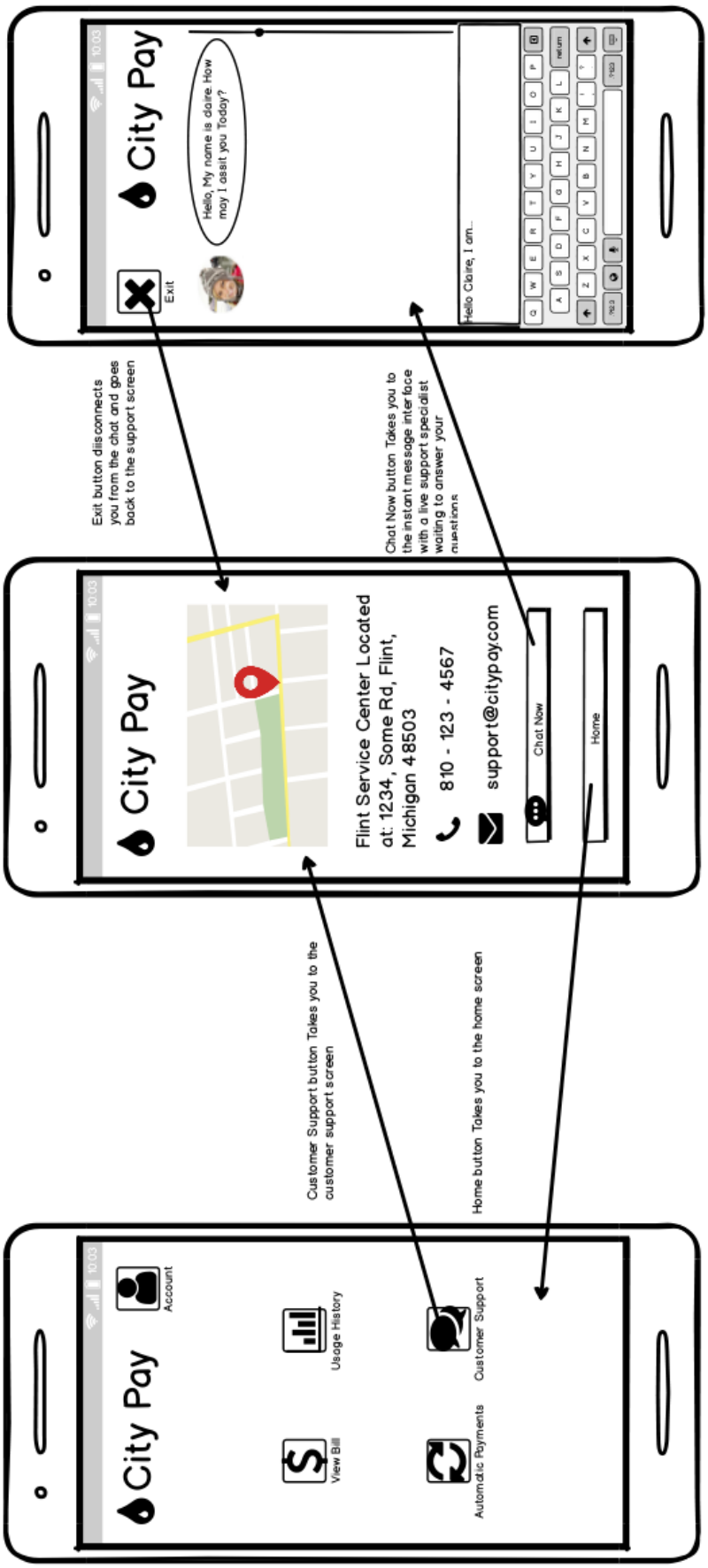
Section 3.1: Prototypes

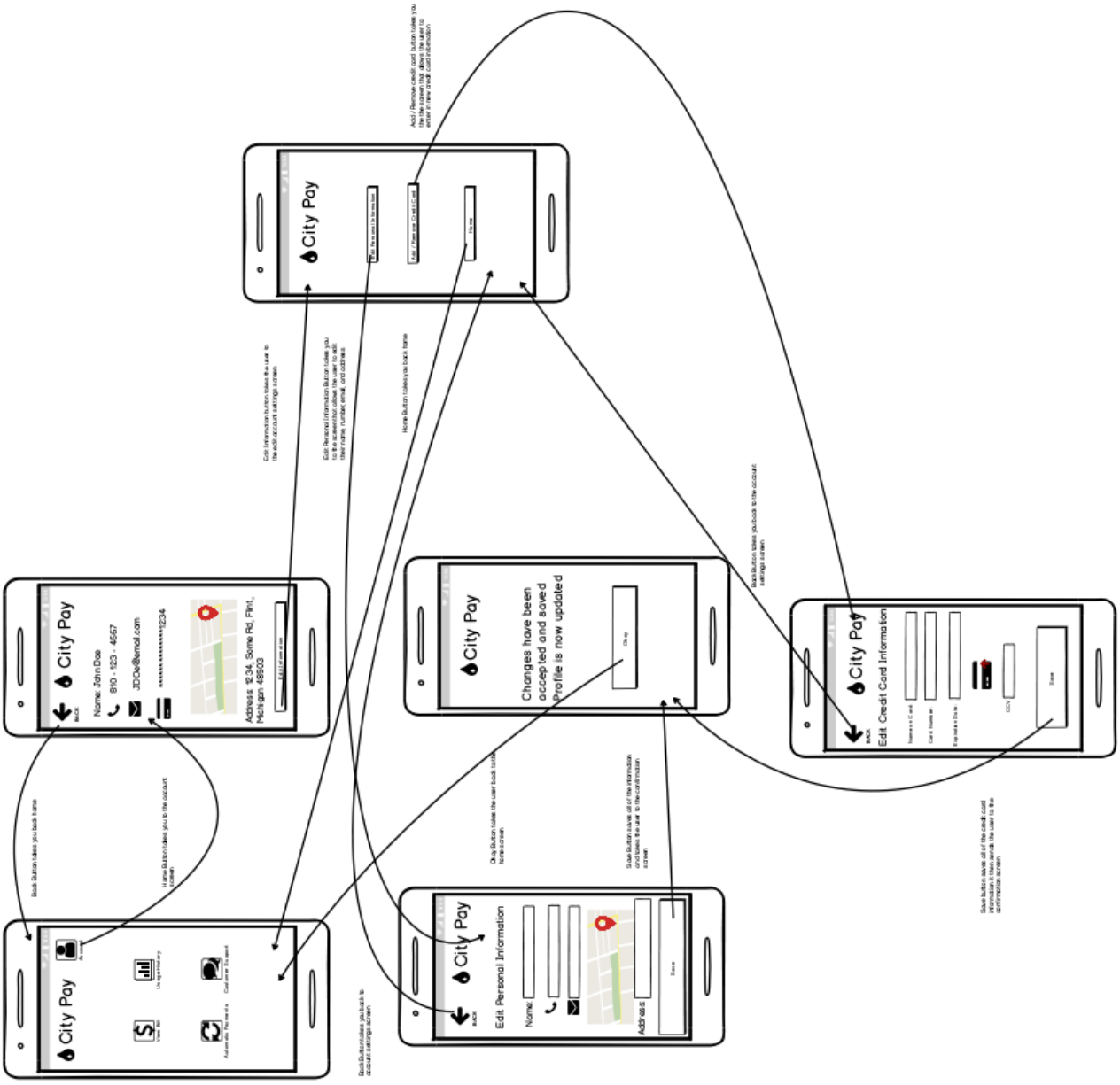


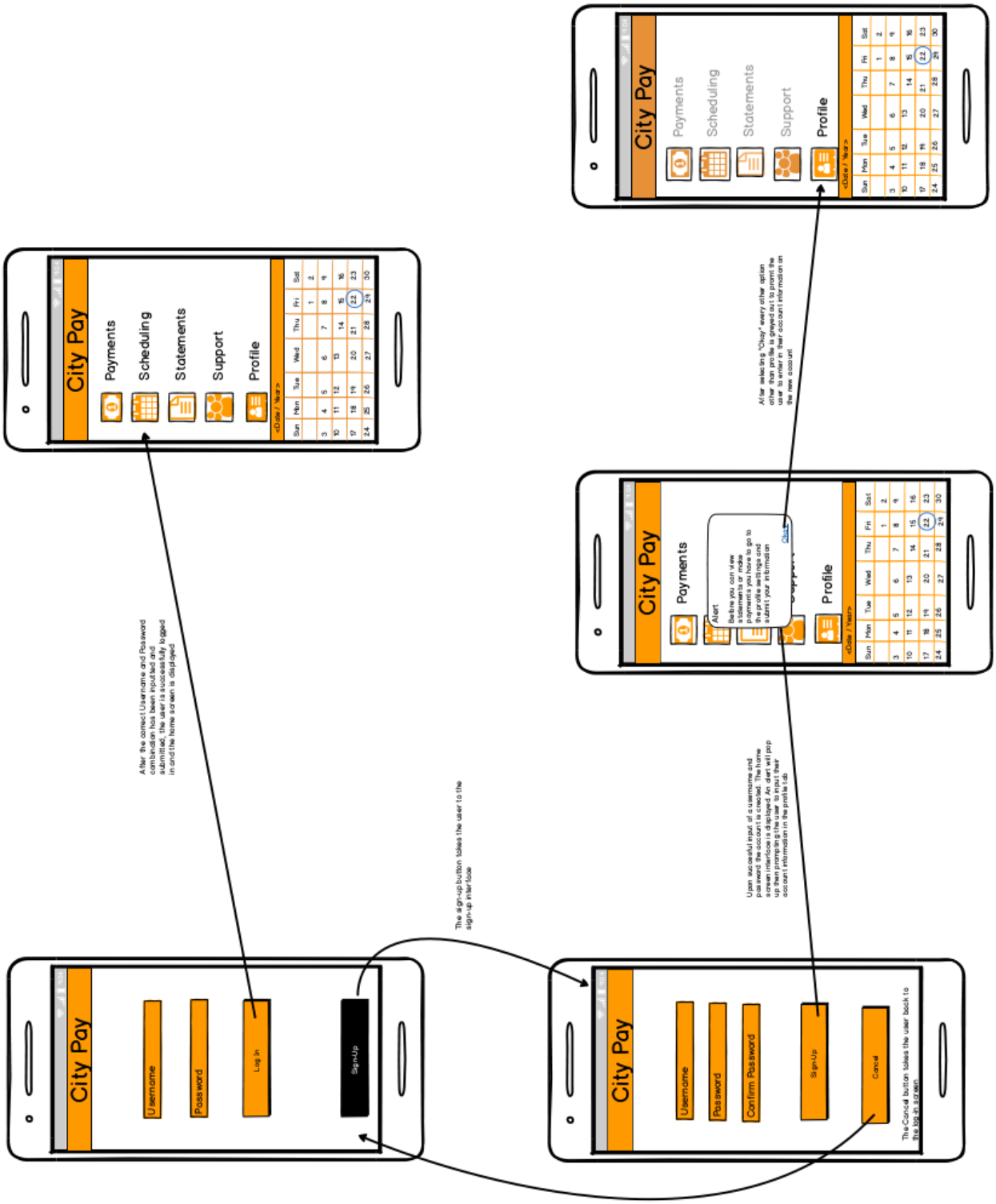

2019
Wed, Mar 13
MARCH 2019
City Pay
Account
Usage History
View Bill
Customer Support
Automatic Payments
BACK
Address: 1234 Some St, Flint Michigan, 48503
Price Per Gallon: $0.56
Gallons Used: 6,504
Monthly Balance: $123
Total Balance: $234
Amount to Pay: $
On Date:
Pay Bill
Confirm
Home
Confirmation Number: 68477f4871491
Amount being Paid: $123
On Date: 01/01/01
Address: 1234 Some St, Flint Michigan, 48503
Back Button takes you home
View Bill button takes you to view bill / payment screen
Select Bill from Certain Month, Takes you to Calendar
You verify or cancel to go back to view bill screen
Pay Bill allows you to make payment on statement
Back Button takes you statement screen
Select date you want the payment to come out
Confirm payment to submit the information and the confirmation to be displayed
When done takes you back to main screen

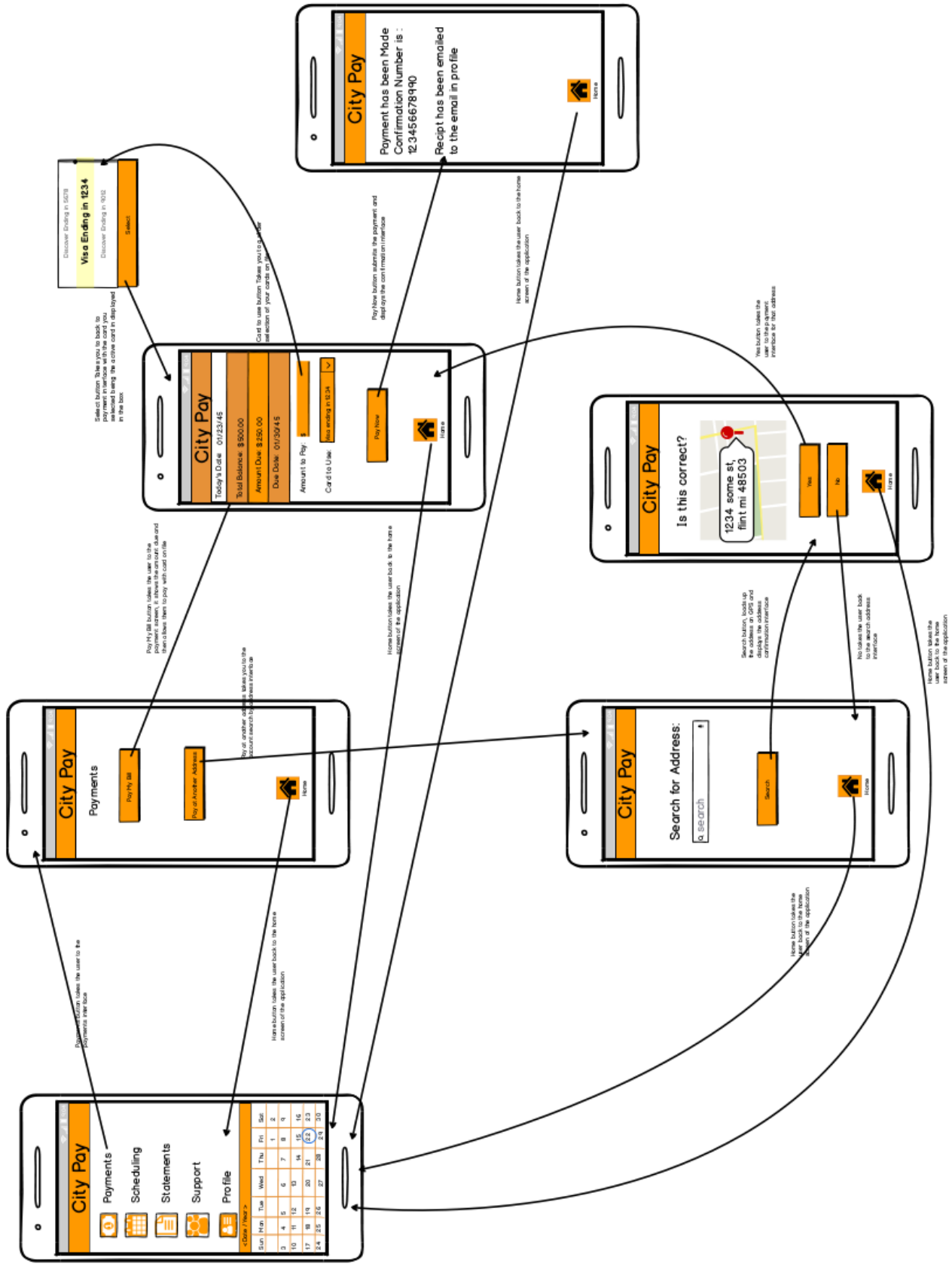

City Pay
Account
Usage History
View Bill
Customer Support
Automatic Payments
Usage History takes you to an overview of your monthly usage over the past few months
This takes you back to the home screen
City Pay
8000
6000
4000
2000
Jan
Feb
Mar
Apr
May
Month
Home

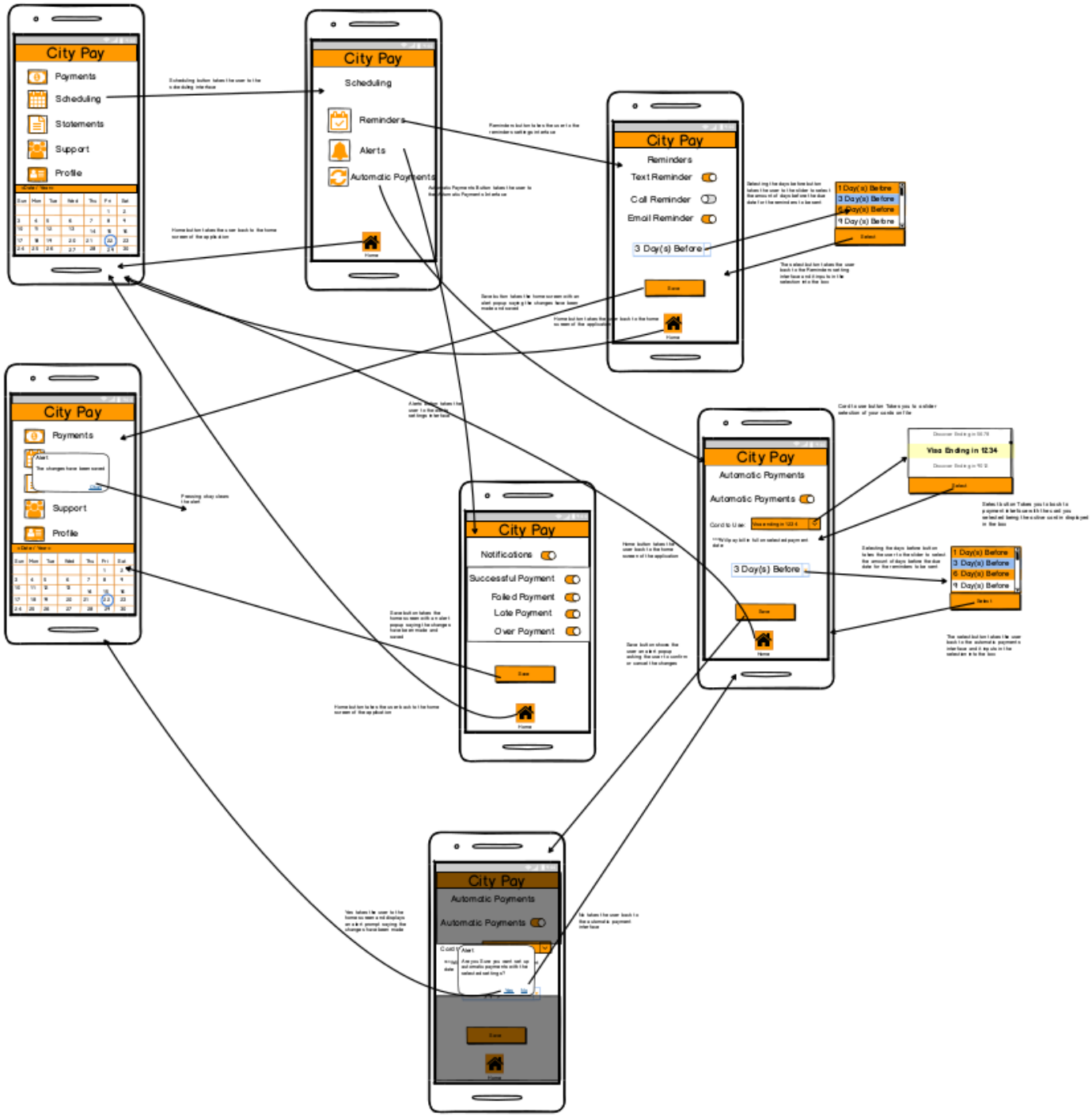

City Pay
Account
View Bill
Usage History
Automatic Payments
Customer Support
Automatic Payments button takes you to the Automatic Payments settings screen
Home sends you back to the home screen
City Pay
Add / Edit Automatic Payment
Remove Automatic Payment
Home
Back button takes you back to automatic payments settings
Add / Edit Automatic Payment button takes you to the screen that allows you to enter in your banking information
Remove Automatic Payment button takes you to the remove automatic payment dialog screen
City Pay
BACK
Bank Name
Account Number
Routing Number
Day of Month
/ /
Submit
Submit button shows confirmation screen on the changes
When done, the user selects the Home button that takes you to the home screen
City Pay
Automatic Payments Successfully Updated
Home
City Pay
Are you Sure you Want to Remove your Automatic Payments?
Yes
No
If user selects yes it takes them to the confirmation of changes screen
If user selects no it takes them back to automatic payment settings screen

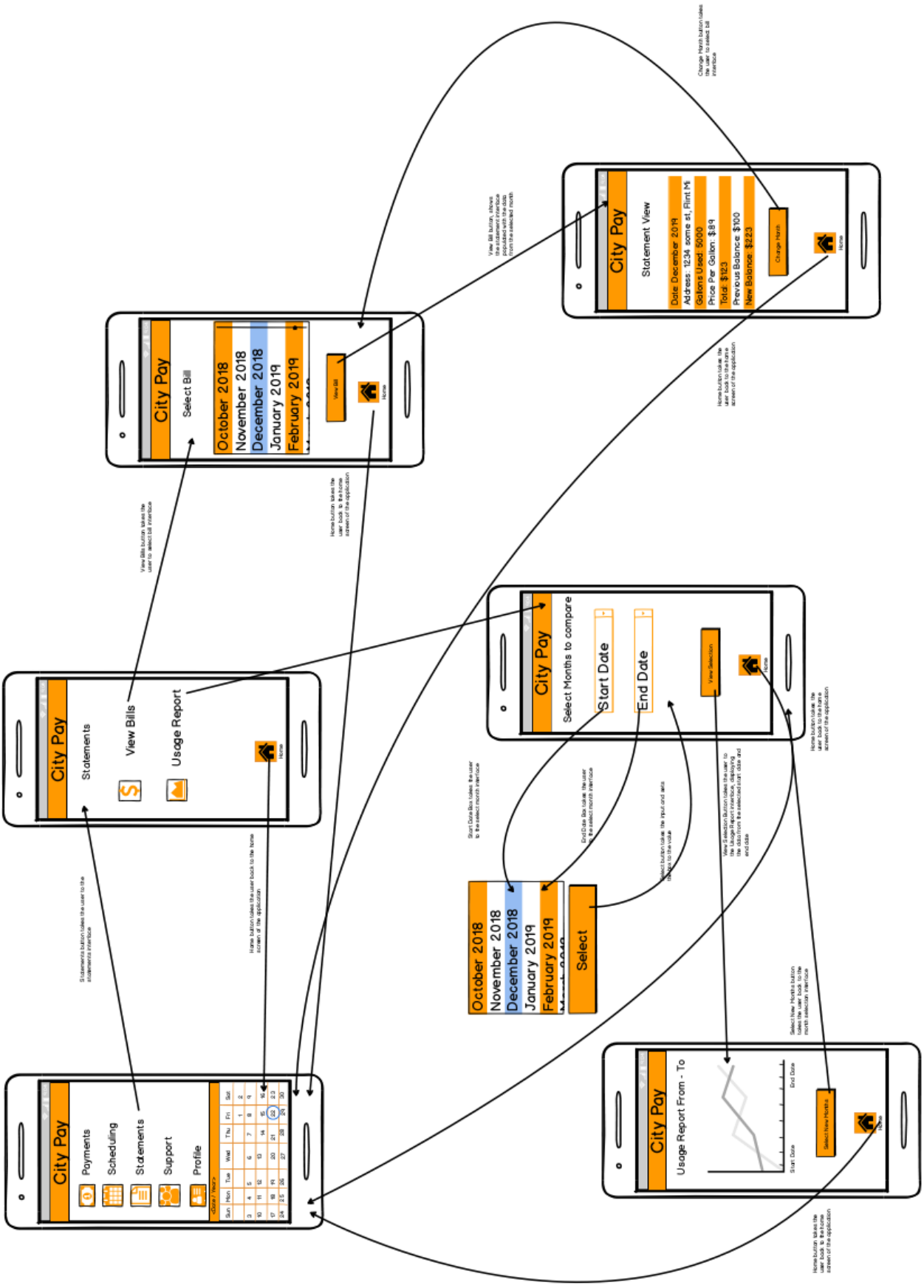

City Pay
Account
Usage History
View Bill
Customer Support
Automatic Payments
Customer Support button Takes you to the customer support screen
Home button Takes you to the home screen
City Pay
Flint Service Center Located at: 1234, Some Rd, Flint, Michigan 48503
810 - 123 - 4567
support@citypaycom
Chat Now
Home
Exit button disconnects you from the chat and goes back to the support screen
Chat Now button Takes you to the instant message interface with a live support specialist waiting to answer your questions
City Pay
Exit
Hello, My name is claire How may I assit you Today?
Hello Claire, I am...

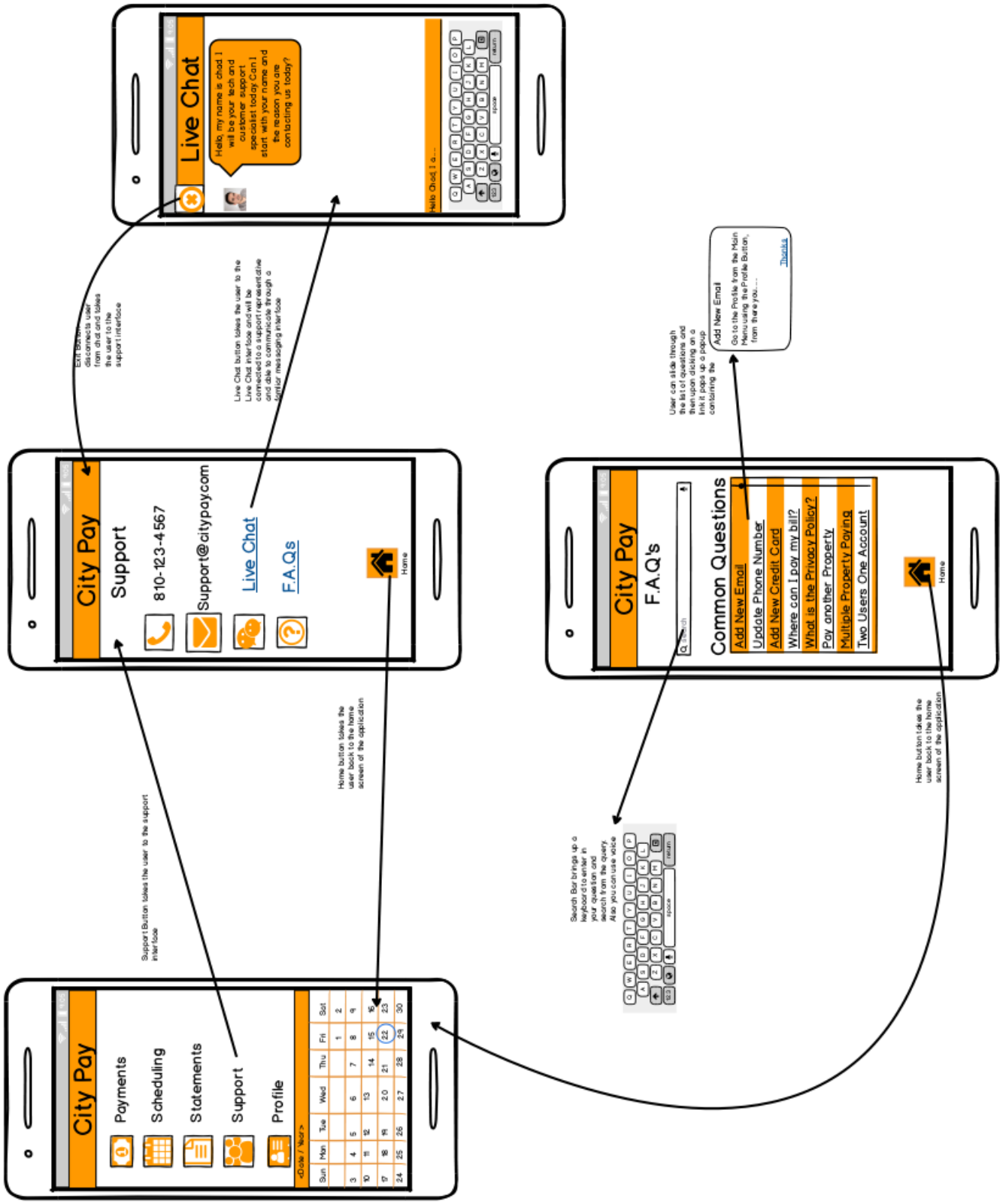

City Pay
Name: John Doe
810 - 123 - 4567
JDOe@email.com
Address: 1234, Some Rd, Flint, Michigan 48503
Edit Information
Edit Personal Information
Name
Address
Save
Changes have been accepted and saved. Profile is now updated
Okay
Edit Credit Card Information
Card Number
Expiration Date
CVV
Save
Add / Remove credit card button takes you to the screen where the user is able to add or remove credit card information.
Edit Information button takes the user to the edit account settings screen.
Edit Personal Information button takes you to the screen where the user is able to edit their personal information.
Home Button takes you back home
Back Button takes you back to the account settings screen.
Okay Button takes the user back to the home screen
Save Button saves all of the information and takes the user to the confirmation screen
Back Button takes you back home
Home Button takes you to the account settings screen
Back Button takes you back to account settings screen
Save button saves all of the credit card information and takes the user to the confirmation screen

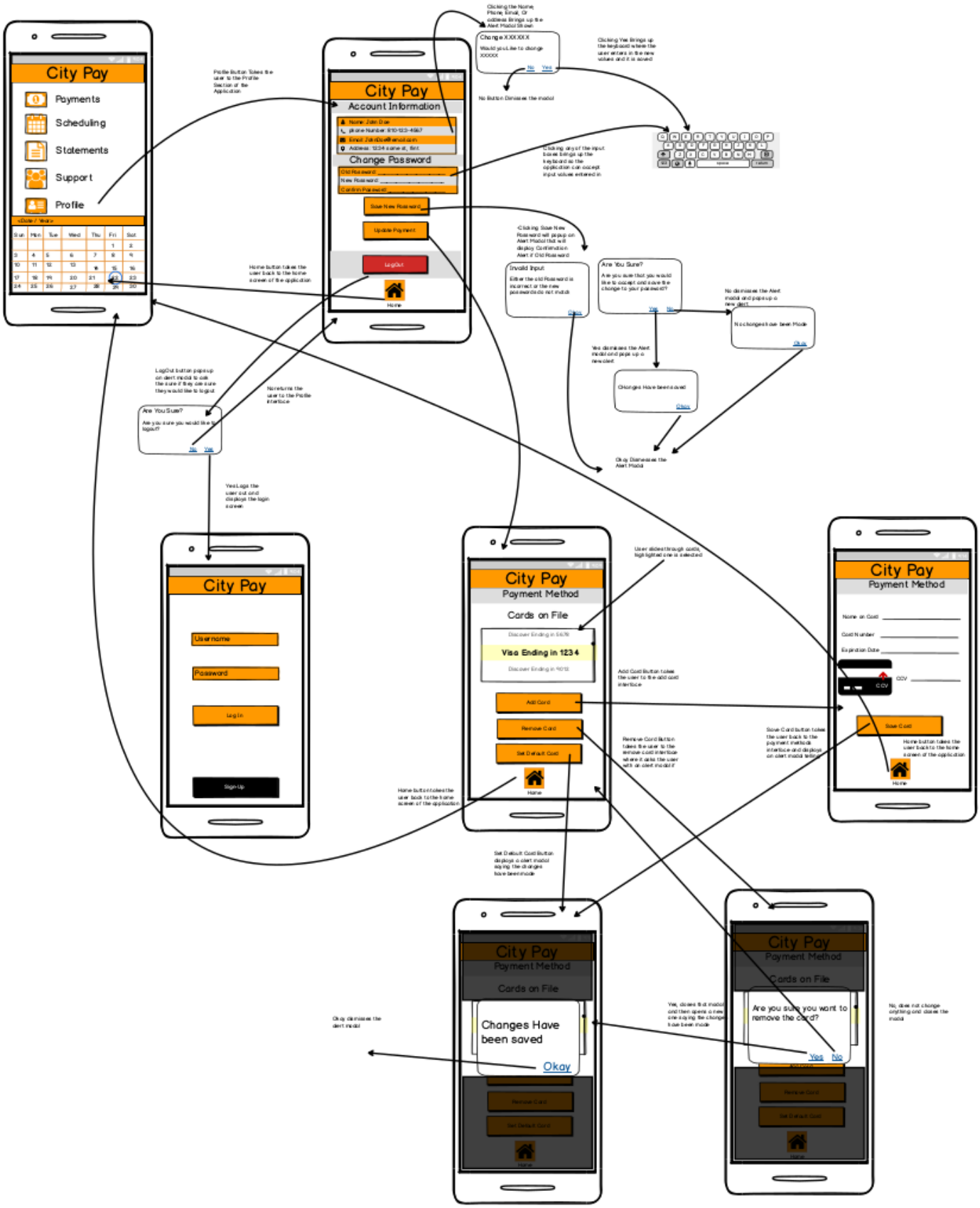

City Pay
Username
Password
Log In
Sign-Up
City Pay
Username
Password
Confirm Password
Sign-Up
Cancel
City Pay
Payments
Scheduling
Statements
Support
Profile
City Pay
Payments
Alert
Before you can view statements or make payments you have to go to the profile settings and submit your information
Profile
City Pay
Payments
Scheduling
Statements
Support
Profile
After the correct Username and Password combination has been inputted and submitted, the user is successfully logged in and the home screen is displayed
The sign-up button takes the user to the sign-up interface
Upon successful input of a username and password the account is created. The home screen interface is displayed. An alert will pop up then prompting the user to input their account information in the profile tab
After selecting "Okay" every other option other than profile is greyed out to prompt the user to enter in their account information on the new account
The Cancel button takes the user back to the log in screen


City Pay
Payments
Scheduling
Statements
Support
Profile
Pay My Bill
Pay at Another Address
Home
Search for Address:
a search
Search
Is this correct?
1234 some st.
flint mi 48503
Yes
No
Today's Date 01/23/45
Total Balance $500.00
Amount Due $250.00
Due Date 01/30/45
Amount to Pay $
Card to Use
Visa ending in 1234
Pay Now
Payment has been Made
Confirmation Number is :
12345667890
Recipit has been emailed
to the email in profile
Visa Ending in 1234
Select


City Pay
Payments
Scheduling
Statements
Support
Profile
City Pay
Scheduling
Reminders
Alerts
Automatic Payments
City Pay
Reminders
Text Reminder
Call Reminder
Email Reminder
3 Day(s) Before
1 Day(s) Before
3 Day(s) Before
6 Day(s) Before
9 Day(s) Before
Select
Save
City Pay
Payments
Alert
Support
Profile
City Pay
Notifications
Successful Payment
Failed Payment
Late Payment
Over Payment
Save
City Pay
Automatic Payments
Automatic Payments
Card to Use:
3 Day(s) Before
Save
Visa Ending in 1234
Select
1 Day(s) Before
3 Day(s) Before
6 Day(s) Before
9 Day(s) Before
Select
City Pay
Automatic Payments
Automatic Payments
Alert
Are you Sure you want set up auto payments with the selected card?
Save


City Pay
Payments
Scheduling
Statements
Support
Profile
City Pay
Statements
View Bills
Usage Report
City Pay
Select Bill
October 2018
November 2018
December 2018
January 2019
February 2019
View Bill
City Pay
Statement View
Date December 2019
Address: 1234 some st, Flint MI
Gallons Used: 5000
Price Per Gallon: $.89
Total: $123
Previous Balance: $100
New Balance: $223
Change Month
City Pay
Select Months to compare
Start Date
End Date
View Selection
October 2018
November 2018
December 2018
January 2019
February 2019
Select
City Pay
Usage Report From - To
Start Date
End Date
Select New Months


Live Chat
Hello, my name is chad I will be your tech and customer support specialist today Can I start with your name and the reason you are contacting us today?
Hello Chad I a...
Exit button disconnects user from chat and takes the user to the support interface
Live Chat button takes the user to the Live Chat interface and will be connected to a support representative and able to communicate through a typical messaging interface
City Pay
Support
810-123-4567
Support@citypay.com
Live Chat
F.A.Qs
Home
User can slide through the list of questions and then upon clicking on a link it pops up a popup containing the
Add New Email
Go to the Profile from the Main Menu using the Profile Button, from there you....
Thanks
City Pay
F.A.Q's
Common Questions
Add New Email
Update Phone Number
Add New Credit Card
Where can I pay my bill?
What is the Privacy Policy?
Pay another Property
Multiple Property Paying
Two Users One Account
Home
Search Bar brings up a keyboard to enter in your question and search from the query. Also you can use voice
Home button takes the user back to the home screen of the application
Support Button takes the user to the support interface
Home button takes the user back to the home screen of the application
City Pay
Payments
Scheduling
Statements
Support
Profile
<Date / Year>


City Pay
Payments
Scheduling
Statements
Support
Profile
Account Information
Change Password
Old Password
New Password
Confirm Password
Save New Password
Update Payment
LogOut
Home
Change XXXXXX
Would you Like to change XXXXX
No
Yes
Invalid Input
Either the old Password is incorrect or the new passwords do not match
Okay
Are You Sure?
Are you sure that you would like to accept and save the change to your password?
No changes have been Made
Changes Have been saved
Are You Sure?
Are you sure you would like to logout?
Username
Password
Log In
Sign Up
Payment Method
Cards on File
Visa Ending in 1234
Add Card
Remove Card
Set Default Card
Name on Card
Card Number
Expiration Date
CCV
Save Card
Are you sure you want to remove the card?
Yes
No

Section 3.2: Walkthrough and Informal User Evaluation

First Task: View Bills

Problems:

- When the user is viewing the bill, there are some important details missing e.g. the cost per gallon of water, what the user being charged for.
- Since the bill doesn't have all the information on it, the user will not know if the bill is accurate
- A water bill can have many different layouts so we have to create one that works for all users

Successes:

- Although some details are missing, the user is able to pay their bill
- The user is able to see how much they owe for previous months

While doing the user evaluation, the user made a few comments about the details of the payment process. The water bill is missing some information such as what the user is being charged for, how many gallons of water the user used, penalties for late payment and a few other things. Our group intends to go back and fix this issue but we have to keep in mind that some water bills can be populated with a lot of information so we don't want to add too much. Some changes need to be made to the layout of the water bill. The "Total Balance" field should be below the "Amount Due" field since it is more intuitive. The user also commented on the wording for some of the fields. For instance, "Amount to Pay" should be "Payment Amount" since amount to pay describes how much a user must pay while payment amount tells us how much the user will pay. The reasoning behind this is it can cause confusion for the user so it's important to wording to describe exactly what the user is doing.

Despite some of the changes that need to be made, the process for paying a bill is straightforward and works well. The user enters and submits their payment information, then the user is prompted with a confirmation page. The users who evaluated our prototype said to keep the process the same since it's similar to how most online payments are done.

Second Task: Payment Alerts/Automatic Payments

Problems:

- Some users may not want notifications or recurring payments

Successes:

- The user is reminded to pay their bill
- The user can decide how often they need to be reminded to pay their bill
- The user is able to have recurring payments so they don't have to worry about missing a payment
- The user doesn't have to keep entering the payment information to pay their water bill

Some users may be forgetful or have a busy schedule so having some sort of reminder would be helpful. What works well is the user can choose how and when a notification is sent via email, phone or text. This ensures the user doesn't have to open the application to see the notifications since a lot of users open the application when they pay their bills, which may be once a month. The user also has the option to disable notifications if they don't want them. One of the users that evaluated the prototype liked the fact that they can control this feature since they believe notifications can be obtrusive. The system that is set up for recurring payment works well too. The users who evaluated the system said this feature is nice since it allows them to decide when a payment is made and they like how they can select which credit card or debit card they can use since they have more than one card and each one is used for different purposes.

The problem in the design is the name of the feature that allows for notifications to be sent is called "Scheduling". During the evaluation, both users said that if it would make more sense to change the name to "Notifications" since it's not exactly clear as what "Scheduling" is supposed to do. This is more of a suggestion than a problem with the design but the users who evaluated our prototype said it might be best to move the widget to disable the notifications and set up automatic payments to one of the main pages so the users who don't want notifications or automatic payments can find it quickly. Although we wouldn't necessarily say it's difficult to find, it's understandable that users who don't want this feature should take the least amount of steps to disable it.

Third Task: Guest Pay

Problems:

- A user can view another user's bill so this could be an invasion of privacy and a security issue.
- What should a user who is paying for another user's bill be able to see? Should they only be allowed to see the latest bill or have full access to the user's account?

Successes:

- The user is able to login into their account and pays their relative's water bill.
- Helps people who cannot make a payment on time due to problems with their health or schedule.

The problem in the design is there are no restrictions for a user viewing another user's bill. This could be an issue in privacy and security. It might be best to have the user who wants to pay for another user's bill to get the other party's permission to do so. However, if the user who is having their bill paid for isn't comfortable using a mobile application, then this will only create more work for the people who want to pay another user's bill. We are weighing our options and thinking carefully about the best route.

What works well is the process is somewhat similar to users paying their own bills. The only difference is this task requires a few extra steps. The steps to paying for another user's bill is straightforward. If the user is supposed to be paying for another user's bill, then all they can

see is the latest bill. This ensures some privacy and security, however, as mentioned above, we are taking into consideration what the user can and can't view.

Fourth Task: View Usage Reports

Problems:

- Since the water meter is read each month, it's not possible to tell how much water is used each day

Successes:

- The user is able to see their bill for the current month and previous months

What works well is the user can view an older water bill in case they have a question about it. This feature makes finding water bills easy since they are in one place so the user has access to all of them and doesn't have to worry about misplacing them. Another part of the design that works well is the

One of the problems in the design is viewing how much water a user used can be simplified. After clicking on the usage history button, the is taken to another page to where they select the start date and end date to see the amount of water used during that time. After that, the user is sent to another page where they can finally see a graph that shows them the amount of water they used.

Fifth Task: Customer Support

Problems:

- There are different forms of communication. Figuring out which one the users will use to complete their tasks may or may not be an issue

Successes:

- If the user has a question, they can get help from the customer support via email, phone number, or an online chat

For the most part, there are different ways the user can get help so they aren't restricted to one form of communication. This allows a user to use a form of communication that they are comfortable with. The user evaluation didn't reveal any issues. The only problem that might occur is that having too many different forms of communication might result in one of them not be used as much as the other ones. The users may prefer email and phone over live chat. If the live chat is not used, then there is no point in having a customer representative stand by to answer questions especially if they must be compensated for their services.

Appendices

Appendix 1: Interview Template

Name of Interviewee: _____

1. What system/method do you use to pay your utility bills? Please give a simple explanation.

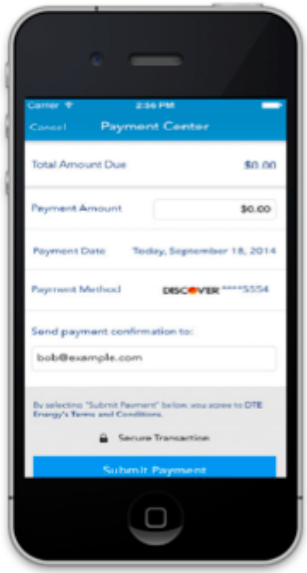
2. If you use the website, what do you think about it?

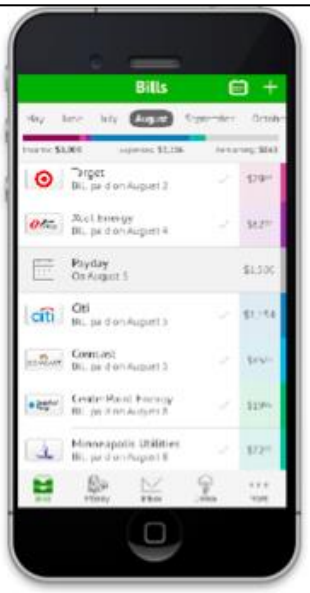
3. If you noticed any issues, what could be done to improve/change them?

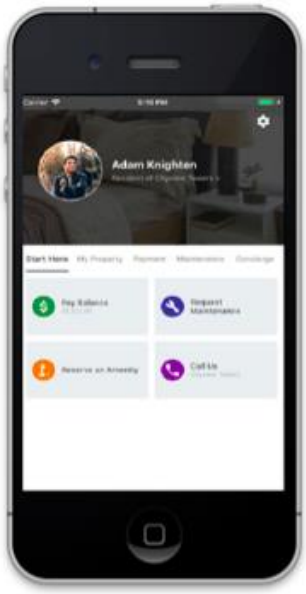
4. Do you think a mobile application would make it easier for you or others to pay their utilities?

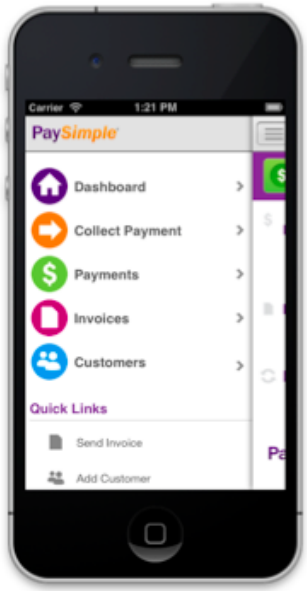
5. Would you feel comfortable receiving notifications from a mobile application? Do you foresee any issues with this type of alarm system?

6. Could you briefly describe what you like and dislike about the following applications?




Bills
Payday
On August 5
citi


Adam Knighten



7. Of the four applications, is there a favorite? Could you briefly describe why?

8. What would you improve or remove from your chosen application?

Appendix 2: Interview Transcription

1. Flint Resident Interviews: (Redacted, Mr. Walwrath, Mr. Beegle, Mr. Gay and Lauren)

a) What system/method do you use to pay your utility bills? Please give a simple explanation.
   i. I pay for all my bills online except for my water bills. I pay for my water bills at the Flint City Hall.
   ii. I used to pay only in-person, But I save time by using the website.
   iii. The website.
   iv. I pay in cash, at the service center.
   v. Check.

b) If you use the website, what do you think about it?
   i. The website is terrible. It's too broad and hard to find exactly what you're looking for. Even finding your account is a pain. I don't like the fact that they charge a fee to pay the bill. Two dollars for every hundred dollars, or something like that. It's convenient to use but it is too hard to access, it's too hard to use.
   ii. The website should be a one stop shop, but instead I find myself bouncing around from one website to another.
   iii. I think the site is easy to use after figuring it out.
   iv. I do not use the website.
   v. N/A.

c) If you noticed any issues, what could be done to improve/change them?
   i. Interviewee: The biggest thing for me is the city of Flint having an accessible website. I don't know what the website is called but it is widely government based. I could go on there and pay for somebody else's bills if I wanted. That part about it is way too broad. I feel like I should be able to go on the website and access, even if it wasn't just water if I wanted to go on there and see how much property tax I owe or my mom owes. It should just be the city of Flint. It eliminates the worry. When I get on there, I have to pick the state, county, city and then I have to pick the street. I should just be able to log in, set up an account and pay for ***my*** bills.
   Me: One of the things a member of my group has said is you could type in someone else's address and you could see their account, which is a security and privacy issue.
   Interviewee: Yeah and also when I type in our address it will bring up my account and also older accounts too. I've clicked on [an older account] one time and could see how much they owed. I should be able to log on and see what I owe. If I log on Comcast or Consumers, with my username and password, it tells me what I owe. I don't have to go and find my address, put my account number in and all that other stuff.
   ii. I think most of the issues are operator error, but if there were a simplified option or maybe some training offered I feel I could navigate it easier.
   iii. Consumers uses email notifications which is really helpful, the website could use a text alert or email so that its easier to notice and remember.
   iv. My issue is the workers at the service center are a bunch of dummies. Could give the workers at the secretary of state a run for their money.
   v. N/A.

d) Do you think a mobile application would make it easier for you or others to pay their utilities?
   i. Absolutely, especially with the youth. I'm getting older. All the times I've gone to go pay my water bills - I'm not saying young people don't have to pay their water bills because then they wouldn't have water - all the people there [Flint City Hall] are old people. I never see young people there. I just feel like that speaks volume. They are probably using the website, but are just as frustrated as I am. My wife and I talk about this all the time, we are thirty years old, we're both working, she's in school, I'm in school, our daughter is in school. We have moved so much and just having a mobile app would be great. It would be great to report usage [amount of water used] so I can tell my wife how much water she uses when she takes a shower.

ii. I am not sure how comfortable I would be with my information being in an app. But if it makes it easier and quicker, I would at least be open to learn about it.
iii. Yes, it would be easier. Anything done on a phone is more convenient and notifications would be a benefit.
iv. I do not own a fancy phone. My phone is 6 years old and makes calls. That is all I need it to do. I get out of my house by paying my bills. I do mail some bill payments in by check for my credit cards.
v. Yes, it would be very beneficial and a lot easier to pay the bill.

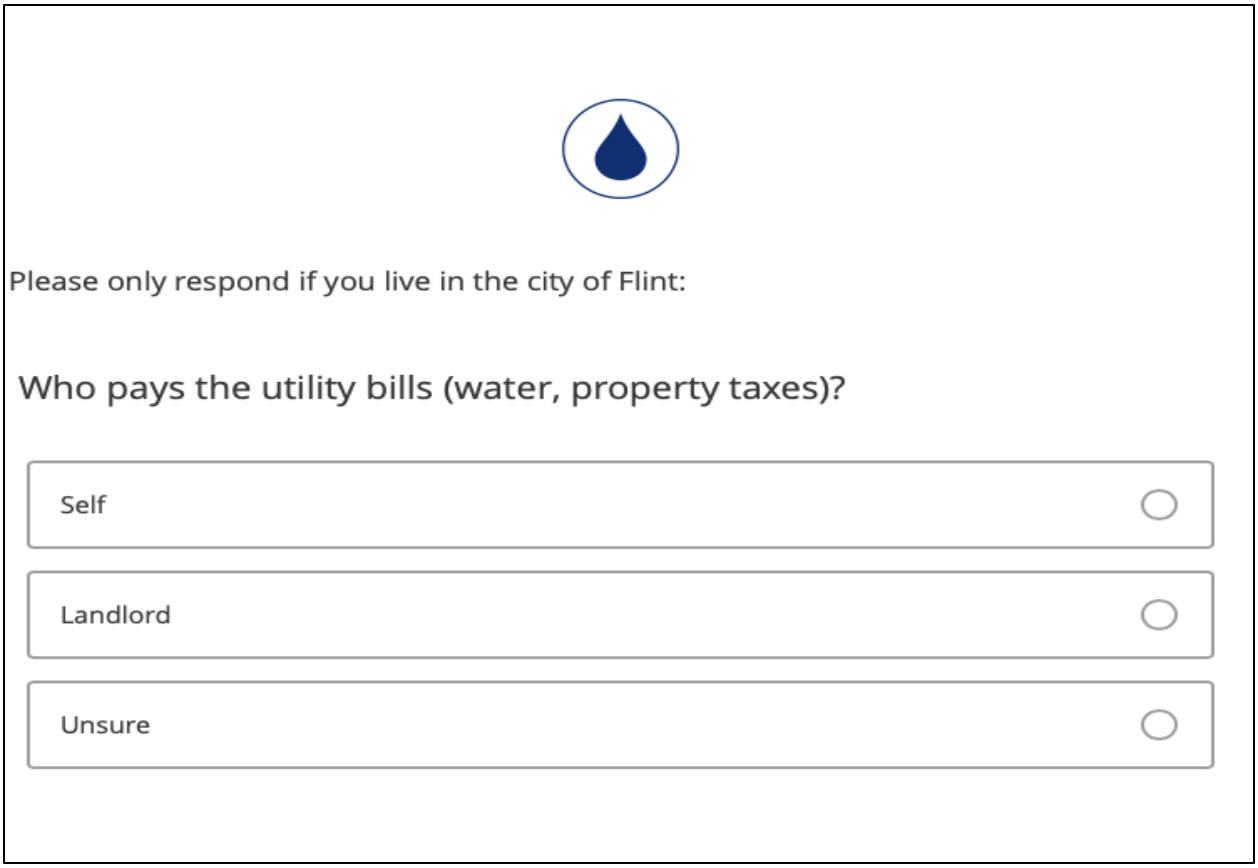
e) Would you feel comfortable receiving notifications from a mobile application? Do you foresee any issues with this type of alarm system?
i. Yeah, especially it was a usage thing. Like setting limits. Once you hit this, hey, you got to shut the water off. No, I think of any issues with it. Our pipe burst in the back, about a month ago. We were at work. If there was something like, oh you're using a lot of water right now or something like that because we didn't know the pipe was broken until we came home and I don't know how long that pipe was broken for. We got home at five, so if it started at two, and we got a notification at 2:30 saying hey you're using a lot of water, then at least I could have sent my neighbor to check what's going on.
ii. I would feel better if it sent me notifications; I tend to be a little forgetful.
iii. Yes. If there are any issues with then I can just turn them off of my phone.
iv. N/A.
v. Yes, very comfortable. I wouldn't have any issues with this, notifications can always be set to your preference.

f) Could you briefly describe what you like and dislike about the following applications?
i. I don't really need the profile picture. I like how the buttons are laid out. I really like the menus. This one seems cluttered to me because I see different stuff on here. It seems like it is the actual payment, which that's fine. (Points to the Secure Transaction label) I like to see that it's secure.
ii. I do not know any of the applications, but it looks like the text is small. I have trouble reading my phone screen already. But I do like that they seem to have the similar idea of showing you your bills on your phone.
iii. I like the display. It makes the information clear and easy to see what you need. It's kind of boring to look at. I like the type of information displayed, the colors used, and the symbols. Don't like the amount of info displayed. I really like the cleanness of this application. I do not like that there isn't any descriptions of the bills or what the symbols mean. Needs more information. Like how colorful this application is and the symbols are easy to understand with the descriptions. Do not like the display, it's kind of confusing. Should have used a different example.
iv. I dislike people that are lazy and need an expensive phone to do simple tasks like pay their bills. I never have been late on a payment or had my water shut off and I wouldn't leave it up to my phone to oversee that it stays that way. So I don't like any of the pictures I see.
v. I like that it's simple and has big text. I like that it shows all bills in one place, but doesn't show the total. I like that it's an easy place to contact customer service. I like that you can send an invoice.

g) Of the four applications, is there a favorite? Could you briefly describe why?
i. I like the bottom left because of the menus. It's nice and organized and easy to navigate.
ii. My favorite is the last one. The buttons look nice and big. The options are different colors so I can remember what color means what if I have trouble reading my screen.
iii. The second example because I like the spreadsheet style and the layout of information.
iv. If I had to choose, I would pick the second one. I can view all my bills in the same place. I have a similar method I use to organize my bills on my kitchen table.
v. My favorite is the second, because it shows all payments and a monthly breakdown.

h) What would you improve or remove from your chosen application?
   i. I know these are screenshots, but the only thing is the login. I would want to make sure it has a log in because I wouldn't want anybody else looking at my account, especially when it comes to money transactions. But other than that, I really like menus. I like to be able to look and see where I am going.
   ii. I would remove the grey words at the bottom. It seems like it could be hard to read for an old feller like me. Maybe make the words all dark for us with old eyes.
   iii. Could have the information broken-down into layers. Hide the content of the bill until you click on it to see more information.
   iv. I would improve the app by including the mailing address for where to send my checks or the building address on where to pay my bill. I prefer to pay all my bills in cash.
   v. I would add a total and remove the inbox.

Appendix 3: Survey Template



If you make the payment, how do you pay the utility bills?

- Online
- By mail
- In-person

How would you rate the process of paying the utility bills?

Very Difficult	Difficult	Neutral	Easy	Very Easy
○	○	○	○	○

When paying online what's the most important features?
Please allocate 100 points to the below options:

One-click pay	0
Graphs of usage	0
Summary of bill	0
Customer Support information	0
Budget planner	0
Total	0

Please allocate 100 points to how often you use the following:

Website	0
Phone application	0
N/A	0
Total	0

If it existed, would you use a mobile application to pay the utility bills?

- Yes
- No
- Maybe

In the past year, how many times have you forgotten to pay the utility bills?

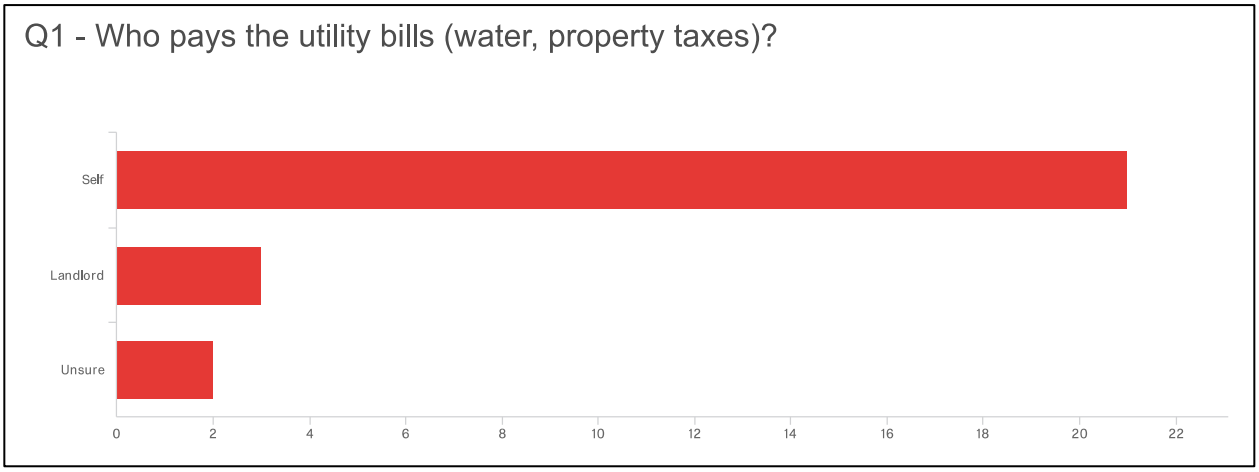
- 0-3
- 4-7
- 7-10
- More than 10

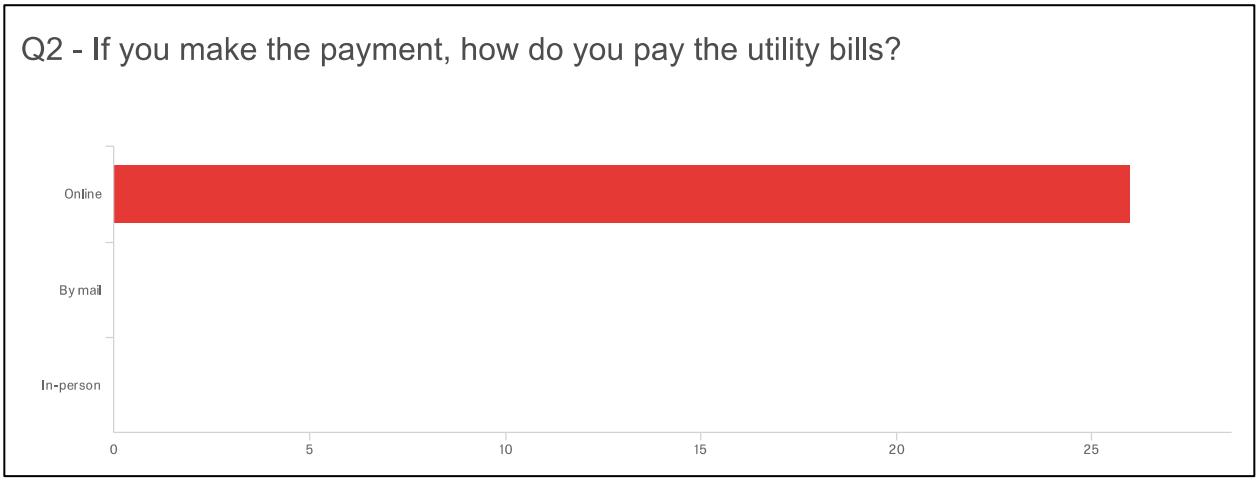
If a mobile app existed to pay utility bills, do you believe that you would remember to pay?

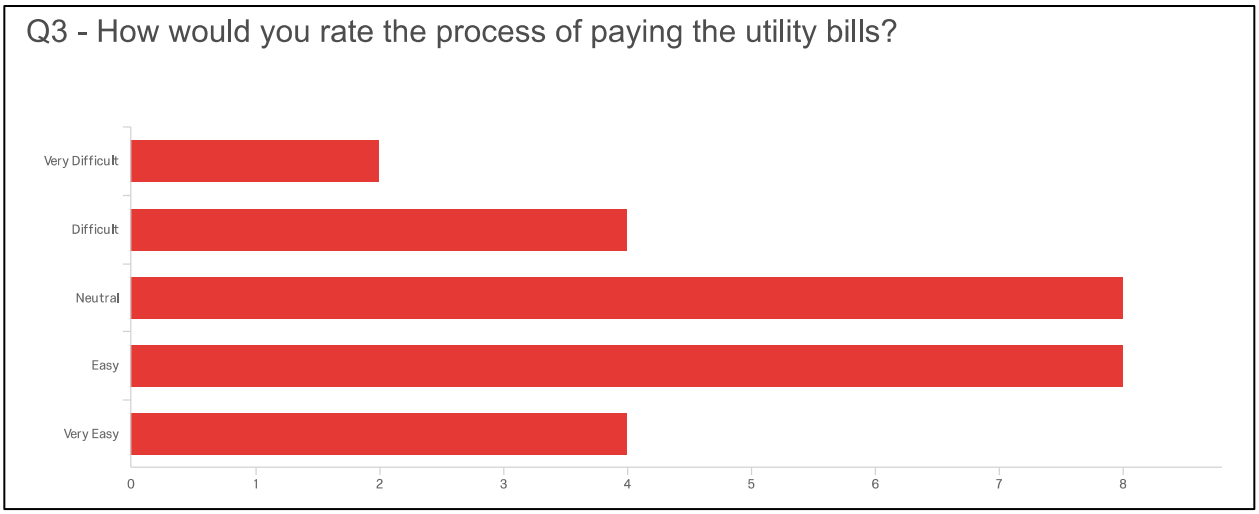
- Yes
- No
- Maybe

Submit

Appendix 4: Survey Results







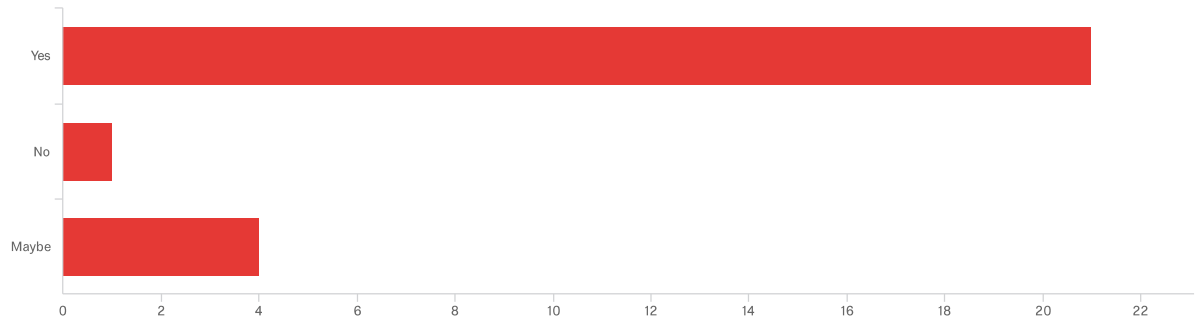
Q4 - When paying online what's the most important features?Please allocate 100 points to the below options:

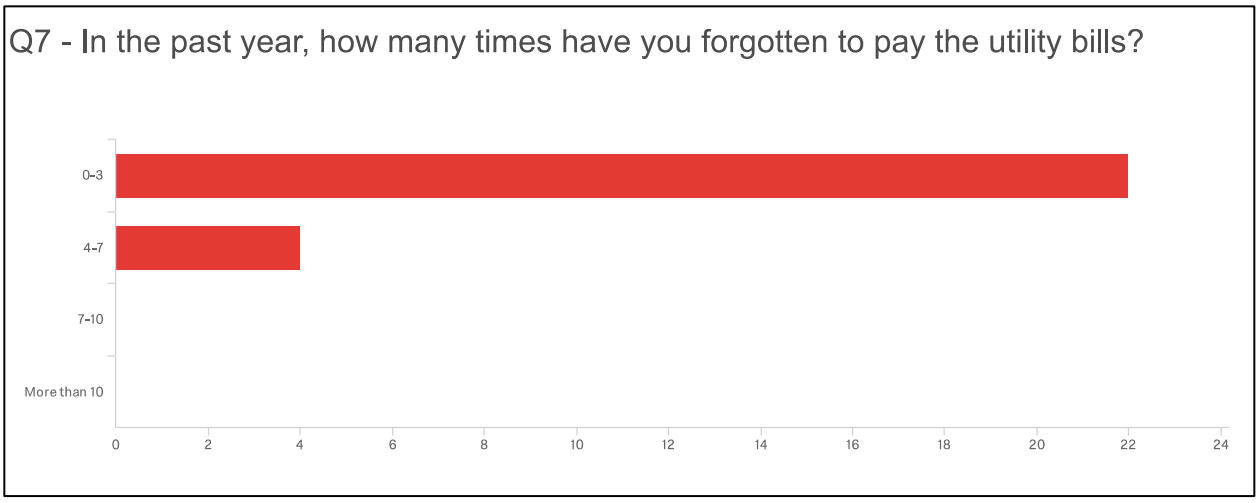
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	One-click pay	0.00	80.00	38.00	22.95	526.54	26
2	Graphs of usage	0.00	40.00	16.08	10.68	113.99	26
3	Summary of bill	0.00	65.00	27.50	14.63	213.94	26
4	Customer Support information	0.00	30.00	10.46	9.42	88.79	26
5	Budget planner	0.00	80.00	7.96	15.29	233.88	26

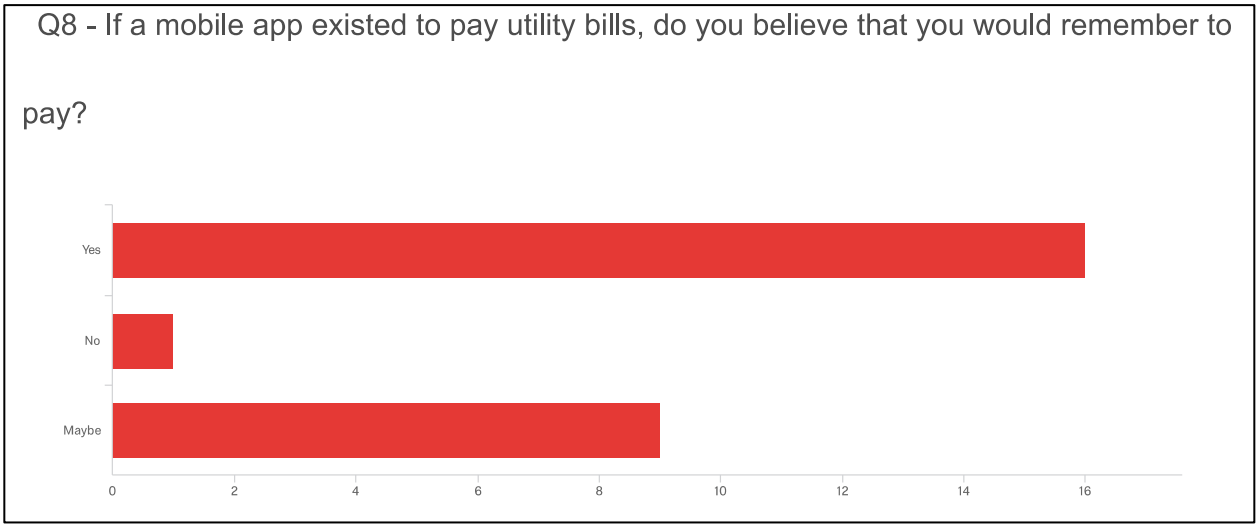
Q5 - Please allocate 100 points to how often you use the following:

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Website	0.00	100.00	69.73	33.12	1096.81	26
2	Phone application	0.00	100.00	28.58	32.59	1061.78	26

Q6 - If it existed, would you use a mobile application to pay the utility bills?




Q7 - In the past year, how many times have you forgotten to pay the utility bills?
0-3
4-7
7-10
More than 10
0
2
4
6
8
10
12
14
16
18
20
22
24


Q8 - If a mobile app existed to pay utility bills, do you believe that you would remember to pay?
Yes
No
Maybe
0
2
4
6
8
10
12
14
16

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