



NORTH CAROLINA DMV SOFTWARE DEVELOPMENT PROPOSAL

Reducing Wait Times

And Improving Customer Experience

PREPARED FOR

Torre Jessup and NCDMV Executive Board
N.C. Division of Motor Vehicles

PREPARED BY

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JUN 10, 2019

Torre Jessup and NCDMV Executive Board
N.C. Division of Motor Vehicles

3101 Mail Service Center
Raleigh, NC 27697-3101

Dear Torre Jessup and NCDMV Executive Board,

Re: NCDMV Software Development Proposal

We are aware that NCDMV has been plagued by problems of long wait times and low customer satisfaction for a long time. We fully understand the DMV is attempting to improve its service efficiency and customer experience, and we also recognized that the Executive Board is making efforts and taking many actions to solve these problems. After comprehensive analyses, our development team would like to offer you a software system development proposal, which can serve as a great approach to upgrading the services you provided and to alleviating current situations involving problems at the DMV.

We believe a client-oriented software system designed and developed by our team will assist the DMV's future operations and significantly reduce customers wait times at the offices. Our team embraces technical excellence and clear communication, and our best developers will ensure you receive the best outcome.

We know that the NCDMV is a unique client providing indispensable services for a large number of customers, and we strive to deliver a practical, innovative and affordable proposal and to deliver on time and within budget.

Please let us know if you would like to get in touch with us. You may also wish to meet us in person to see our portfolio of previous work, to learn more about our development teams, and to further discuss this system project.

Finally, we realize that you are very busy and wanted to thank you in advance for your time spent reviewing our proposal.

Yours Truly,

Project Development Team Leads

Joan Xia, Jordon Brown



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EXECUTIVE SUMMARY

The DMV is a place where all drivers have to visit in order to drive in this country legally. They provide a service that is critical to the lives of the majority of Americans. There are over 225 million people that are registered to drive in the United States today, which means that there are millions of people who visit the DMV in their respective states each year in order to complete tasks dealing with driving.

All states have DMV offices that most people can agree that they dread having to make visits to. North Carolina, a state that is in the top ten when it comes to the number of drivers, has a DMV system that many know are inefficient and quite time-consuming. These issues regarding the long lines and wait times in North Carolina DMV have been brought to the forefront recently in the news as leaders of the NCDMV have taken to the news, addressing the issue and stating things being done to help this situation. However, these recommendations such as online reservations and recommendations to arrive early are ones that have proven to be ineffective as for the lines are still long as well as the wait times. This situation calls for a solution to help speed these processes up.

In our analysis, we have confirmed that a solution we are proposing would be the key to combat the issues with the current systems put in place for the DMV. Our data collection assisted the development team to identify the major problems and to better understand the users' concerns and requirements. We established a timeline and estimated budget and working hours, listing out all the tasks we would follow to perform in different stages. The feasibility test also indicated the practicability and significance of this software system. As the agenda states, eight developers will accomplish the whole development cycle in four months.

1. Project Objectives

Our project aims to improve customer experience in the DMV by developing a software system to assist the DMV's queuing service and reservation process. The software system should alleviate the current situation of long wait times:

- Facilitating the allocation of different customer services;
- Accelerating the check-in procedure;
- Significantly reducing waiting times at the DMV;
- Allowing more people to acquire efficient services.

In regards to user experience, this system should be easy-to-use for drivers of all ages. We look forward to incorporating the system into the existing myNCDMV app or developing a myNCDMV Xpress mobile App for future data cooperation and promotion.

2. Problems

The N.C. Division of Motor Vehicles faces the problems of slow operation and long waiting time, receiving negative feedback from customers blaming its inefficiency and bad customer services for the poor customer experience there.

The NCDMV does not provide estimated times for the services that they provide. The current system cannot calculate the waiting time, and only allows the customers to wait to speak with the representative inside the door, to receive a number and find a seat. Prior to that, some locations force drivers to wait in lines outside before they can even speak to someone, particularly in Triangle areas. These DMV visit can take up several hours just waiting. Without calculating the amount of time a customer has to wait in line for services, they can not even provide an estimated waiting time, leaving customers hoping that they will be called soon and not actually having a good idea of when they will be seen.

Recently, the wait times at the DMV continue to get longer due to the demand for the Real ID along with the higher demand for services in the summer months. The extremely long waits and slow services irritate many visitors. Though the DMV has taken several approaches such as promoting online services, setting up appointments, and visiting early, none of them served as an effective solution to the problem.

Our proposed software system will convert these time-wasting processes to online procedures providing more flexibility to users. We hope our system could become an effective strategy for the NCDMV to successfully reduce its wait times for driving services and ultimately enhance its customer experience.

3. Opportunities

MyNCDMV Mobile App is being developed and becoming increasingly powerful. It uses friendly Chatbots and other Advanced AI technology to provide more customized online services including renewal of vehicles and licenses, paying registration taxes, changing information, and ordering personalized plates, etc. These online features with the assistance of Chatbots can help users skip the trip to the DMV and demand the service easily.

Furthermore, NCDMV is attempting to improve its services by distributing and arranging different tasks at the same time. To be more specific, the examiners help candidates doing driving knowledge tests while handling other quick transactions. These types of arrangements keep more workers on stations and add more efficiency to overall operations.

It is also good to know that the NCDMV is streamlining the HR process, hiring more people to fill out the positions. Currently, it posts and keeps updating opening jobs on many websites to attract more candidates. It also simplifies the application procedures to ensure that any qualified applicants can get admitted and take staff training in the shortest amount of time.

We believe that these positive aspects will contribute to the solution of long wait times at the DMV. Our future project implementation will also take these opportunities into account.

4. Data Collection Methods

Our data collection consists of three phases: Secondary Data Research, Questionnaire Survey, and In-depth Interviews. We would like to follow this order to carry out each method during certain periods of development.

The secondary data collection will be conducted by the development team before starting the whole project development cycle. This part of the research aims to explore more possible solutions relating to long waiting time issues. The data collection will especially focus on the operations of the DMV in other states. For instance, whether other states are in similar circumstances, and what effective approaches they have taken to solve these problems. By gathering and analyzing the statistical data like the average waiting times, customer satisfaction rates, etc., our developers can better understand NCDMV's position and set up a blueprint for the whole project.

Cooperating with the data from the secondary research, we will generate a ~25 questions anonymous survey targeting NC residents and local NCDMV customers. This survey intends to find out the masses' attitudes toward NCDMV operations and services. We expect the survey result will reveal the deficiencies of local DMV and help us recognize the most common pain points and requirements from the users, so our development team can address these specific customer needs while designing and implementing the software system.

After acknowledging the inadequacy of current NC DMV services and its customer requirements, the in-depth interview will occur with the help of NCDMV workers and our developers. We aspire to collect more insightful data from face-to-face interviews with DMV customers and operators and also want to make sure our data collection covers all demographics, so the system can be applied to all types of users. These detailed insights from interviews will also be valuable for future implementation and maintenance.

List of Interview Questions for NCDMV Executives and Officers:

Process:

1. What is the process of walk-in registration at the reception desk?
2. Is the current registration and calling system easy-to-use?
3. What parts of the system do you expect can be improved on?
4. What's the process of the driving knowledge test and the road test? How long do they usually take? What other services are provided in the DMV Office? On Average how long does it take to complete one transaction?
5. What are the services or transactions that require visitors to show in person?
6. What are the most popular services required by customers at the office?
7. How are the different services arranged? What's the process of calling waiting numbers in line?
8. Are there any customers that do not show up when the numbers were called?
9. Are there any reasons why or concerns about why the DMV has not updated its software system?

Data:

1. Do you collect the information regarding the number of transactions/visiting every day at the office?
2. Do you track the waiting times each customer spend after they check in with the reception?
3. What ideal waiting time do you expect average customers to spend at the office?
4. Do you plan to put more services online?
5. What's the percentage of renewal/registration payment services that are transacted online?

General:

1. As a DMV Officers/Managers, have you ever felt the job is too overwhelming?
2. Do you think hiring more officers will alleviate current situations?
3. NCDMV recognized the problem of long wait times and has taken many strategies to solve this issue. Do you know any of them? Which one do you think works best?
4. Would you like to learn to use a new system?
5. Is there any similar project that has ever been done before? Are there resources available to design and implement a new system?
6. Are there any other features that you would want to add into the software besides the line-up and reservation system?

5. Feasibility Analysis

This software system is relevant to all NCDMV operators and customers and will notably impact their future working and visiting experience. We expect our system to be practical and perform all the functionalities we've designed, and we also hope it will be user-friendly and achieve all the goals we've made. The following feasibility analyses are conducted from three aspects:

Technical Feasibility

- **Developers**

- Our ideal developer team is composed of one project manager, three software developers, two UX/UI designers, one business analyst, and one data analyst. This eight people group will be selected by our development group and the NCDMV Executive Board, so they will have sufficient knowledge of both app development and NCDMV operations. This concise team will ensure the whole project can be smartly managed and will be constantly under the correct path towards our final goals.

- **Users**

- Our data collection will cover all types of DMV customers, including people of different ages, genders, education levels, and occupations. Therefore, our design and implementation will take several different demographics into account to make sure the software system is practical and accessible for everyone. The new system incorporated with the MyNCDMV App will also accelerate the adoption process.

Operational feasibility

- **Objectives**

- The project aims to reduce wait times at NCDMV and to enhance customers experience. Our development team fully understands the existing problems, opportunities, and the goals we have. We are also able to accomplish various tasks, therefore the system will follow the agenda to achieve these objectives.

- **Day-to-day Operation**

- Following the schedule plan, the software system will be implemented by our experienced developers. It will be user-friendly to all types of users and will collaborate with the existing NCDMV system and MyNCDMV App. Neither the DMV visitors or operators will have trouble learning to use these new functionalities.

Economic Feasibility

- **One-time cost: ~\$250,000**

- Development Costs: ~\$222,000
 - Project manager: ~\$35,000
 - 3 software developers: ~\$100,000
 - 2 UX/UI designers: ~\$55,000
 - Business analyst: ~\$25,000

- Data analyst: ~\$25,000
 - Other: ~\$2,000
- New software: ~\$2,000
- New Hardware: ~\$3,000
- Training: ~\$3,000
- **Recurring cost for 1 year: ~\$10,000**
 - Maintenance: ~\$8,000
 - Data Storage: ~\$2,000
- **Benefits**
 - Intangible benefits:
 - Reduced customer wait times
 - Improved operational efficiency
 - Improved customer satisfaction
 - Improved service quality
 - Improved public image
 - More transactions handled daily
 - More flexible management
 - More contemporary system
 - Less overwhelmed DMV office
 - Fewer negative reports
 - Fewer representatives at Reception needed
 - Tangible benefits for 1 year: ~\$150,000
 - Increased online & offline transaction: ~\$50,000
 - Express fees: ~\$40,000
 - Reduced representatives: ~\$50,000
 - Reduced public relation cost: ~\$10,000

6. Alternative Solutions

Virtual line-up System

A software system which allows the customers to check in without being in the DMV building will reduce the time they spend in the office. They can enter their personal information and choose the service they required on their way to the DMV. The system will give them the numbers and estimated waiting times, and keep update the line by its real-time monitoring, so the users can plan their schedules and know when they should show up in the office, instead of just waiting on the seats. Customers who got the number but failed to show up immediately when they were called will be moved backward and need to wait for a certain period of time till there is another free spot.

DMV Express Lane

A separate express lane and several special work stations especially handling some quick transactions under 15 minutes will also help DMV increase its operational efficiency. We design this express lane for the weekday workers and students who don't have a flexible schedule and treasure their times. Customers who want to skip the long lane and do quick transactions by paying an amount of fee to join this express lane. Only limited transactions will be performed in these express station as we want to keep the lane move as fast as possible. We expect this solution will also bring in more income to support DMV day-to-day operations in the future.

Appointment Only

The DMV could set up a system similar to that of a doctors office where customers are required to set up an appointment to visit. This would prevent crowded waiting rooms from accumulating and allow people to be seen at a certain time. However, heavily relying on the appointment system requires special officers to handle different reservations by making phone calls, tracking systems.

7. Proposed System Development

Our proposed solution is an all-inclusive mobile app functionality integrated into current MyNCDMW system that would help them spend less time waiting at the DMV. Drivers can use their existing MyNCDMV account to log in and enter their information about their visit in order to receive different types of services in the office.

In the beginning, the app will filter out the customers who have chosen the services that are also available online. It will first recommend the users to perform online transactions instead of directly joining the virtual line. This step will further promote online services and reduce the number of visitors to the DMV office.

After that, users who would like to share their locations with the system can see the information about nearby DMV offices, to find out which one is least occupied and determine the specific location they are heading to. They will also be informed whether the services they required are available in those locations. Before heading to the office, users will join a virtual line, receiving numbers and estimated time of their meeting, so they can decide when to leave and hit the road. The system will constantly update the meeting time based on the operations in the DMV office. This process will effectively improve the customer experience as they skip the long waiting times. It will also reduce the number of people who keep waiting inside the office building.

For customers who don't have time to get into the virtual lines and directly visit the DMV offices, they will make choices: to pay to join the express lane and get the services in thirty minutes or to wait in the building as usual. Many current DMV visitors response that if there is such an option, they would like to pay that amount of fee to finish the transaction in the shortest amount of time.

Our system also intends to make improvements to the current mobile systems we have. We would like to open more available services online, adding map and location tracking functions, and expand the current appointments schedule with a more advanced algorithm. We firmly believe that this new software system will let more customers enjoy their trips to the DMV office.

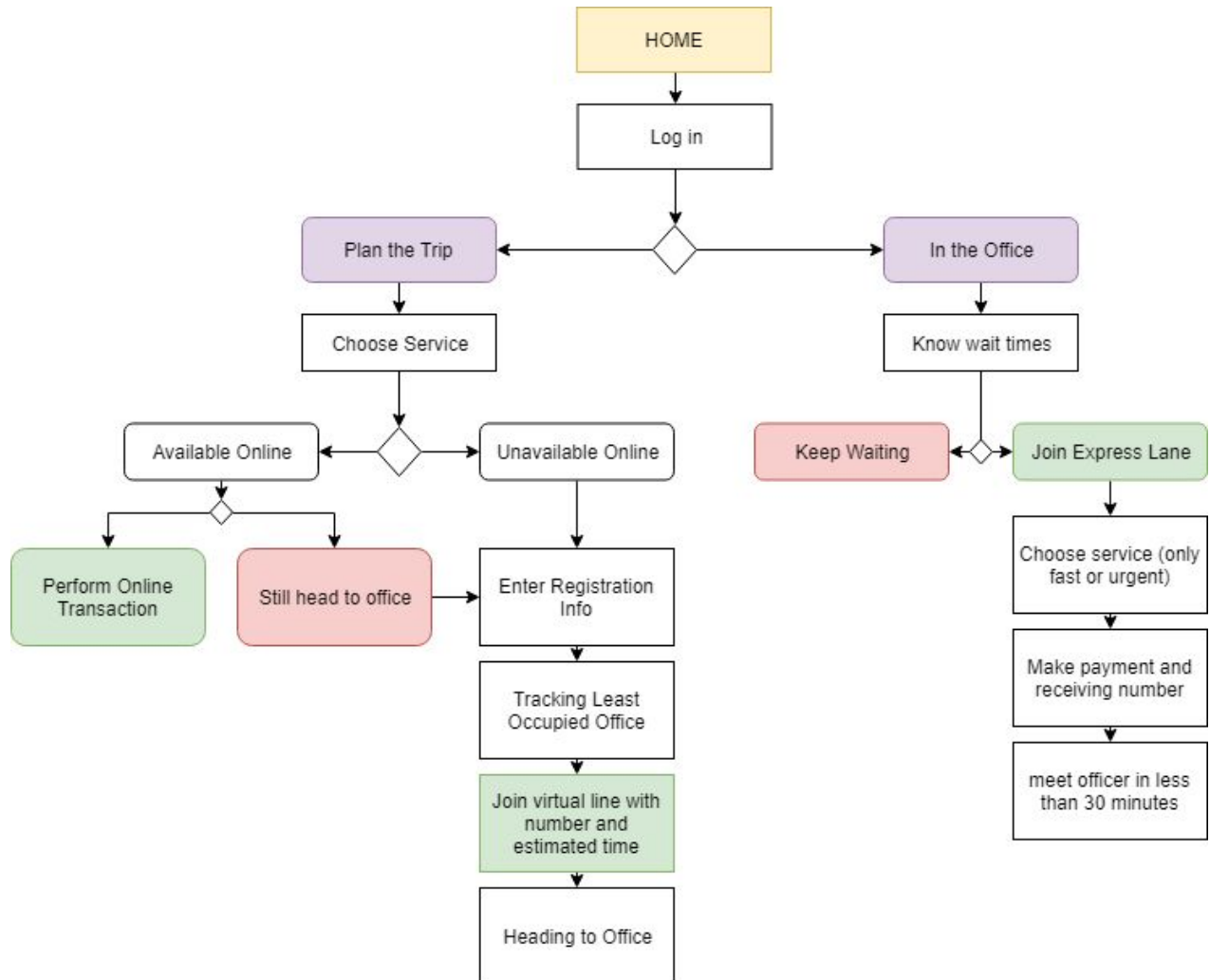
8. Schedule of Development

Total estimation of man-hours: 350 Hrs

Milestone	Tasks	Reporting	Hrs	Date
1 - Planning 42 Hrs				
1.1	Problem Statement	None	4	06/15/19
1.2	Secondary Data Collection	None	10	06/16/19
1.3	Access Size	None	2	06/19/19
1.4	Recruit	None	20	06/19/19
1.5	Design a word plan	Email Report	3	06/22/19
1.6	Establish management procedure	None	2	06/22/19
1.7	Create a preliminary budget	Client Meeting	1	06/22/19
2 - Analysis 73 Hrs				
2.1	Analyze secondary data	None	8	06/23/19
2.2	Construct and send out Survey	None	10	06/24/19
2.3	Collect and Analyze Survey Data	None	10	06/29/19
2.4	Define user requirements	Client meeting	10	06/30/19
2.5	Analyze current functionalities	None	15	07/01/19
2.6	Create new functionalities	Email report	20	07/05/19

3 - Design 40 Hrs				
3.1	Organize functionalities	None	15	07/09/19
3.2	Transfer functionalities into deliverable design documents	Email report	25	07/14/19
4 - Implementation 90 Hrs				
4.1	Create Database	None	15	07/18/19
4.2	Import existing client data	None	5	07/21/19
4.3	Clean up the data	None	5	07/24/19
4.4	Create GUI	Client meeting	30	08/01/19
4.5	Integration with Database	None	15	08/05/19
4.6	Integration with myNCDMV App	None	20	08/10/19
5 - Testing & Maintenance 105 hrs				
5.1	Internal white box testing	None	20	08/15/15
5.2	Internal black box testing	None	20	08/20/15
5.3	Public testing	None	30	08/27/15
5.4	Collect and analyze feedback	Email report	10	08/30/15
5.5	Revise	Email report	10	09/01/15
5.6	Close down and publish	Client meeting	5	09/05/15
5.7	1st maintenance	Email report	10	10/05/15

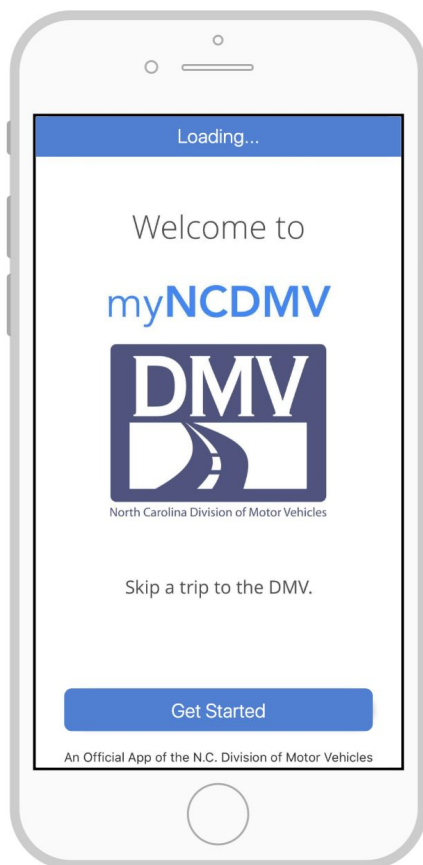
9. Information Architecture



10. Wireframes Prototype

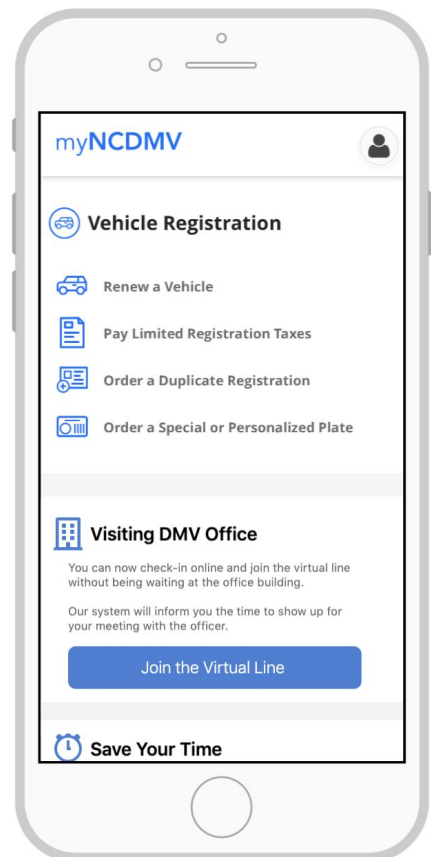
With Interactivity

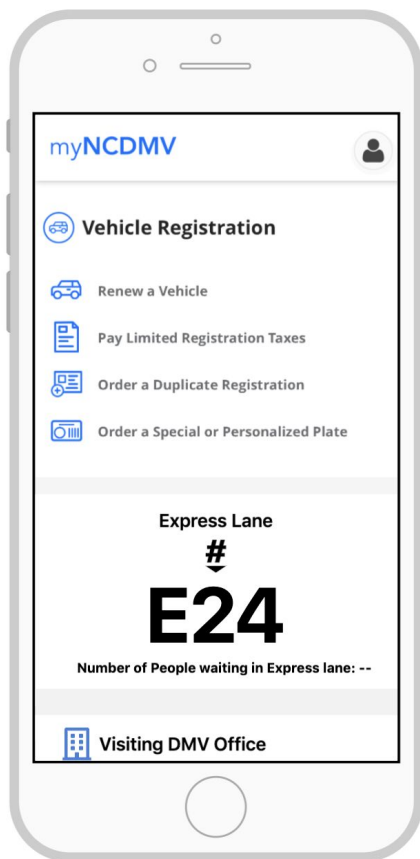
1. Initial Loading Page and Home Page



← **Initial Loading Page**
With NCDMV Logo and
Welcome

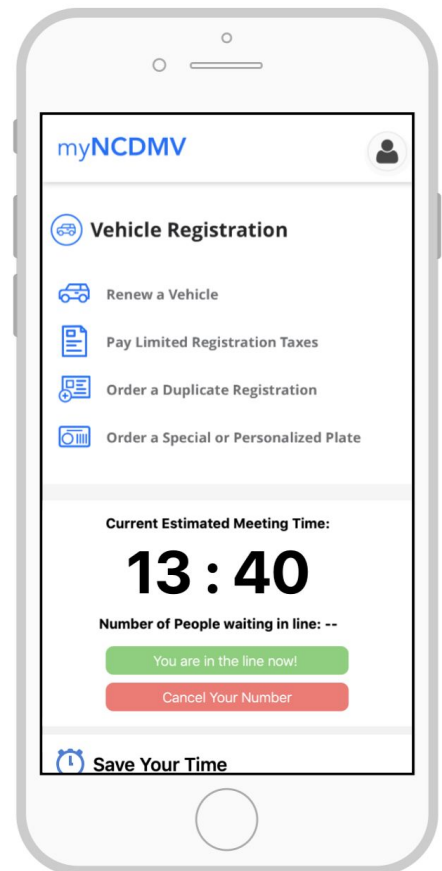
Initial Home Page
Including Online Services
Section, Virtual Line
Section, Express Lane
Section, Help Section,
and Profile →





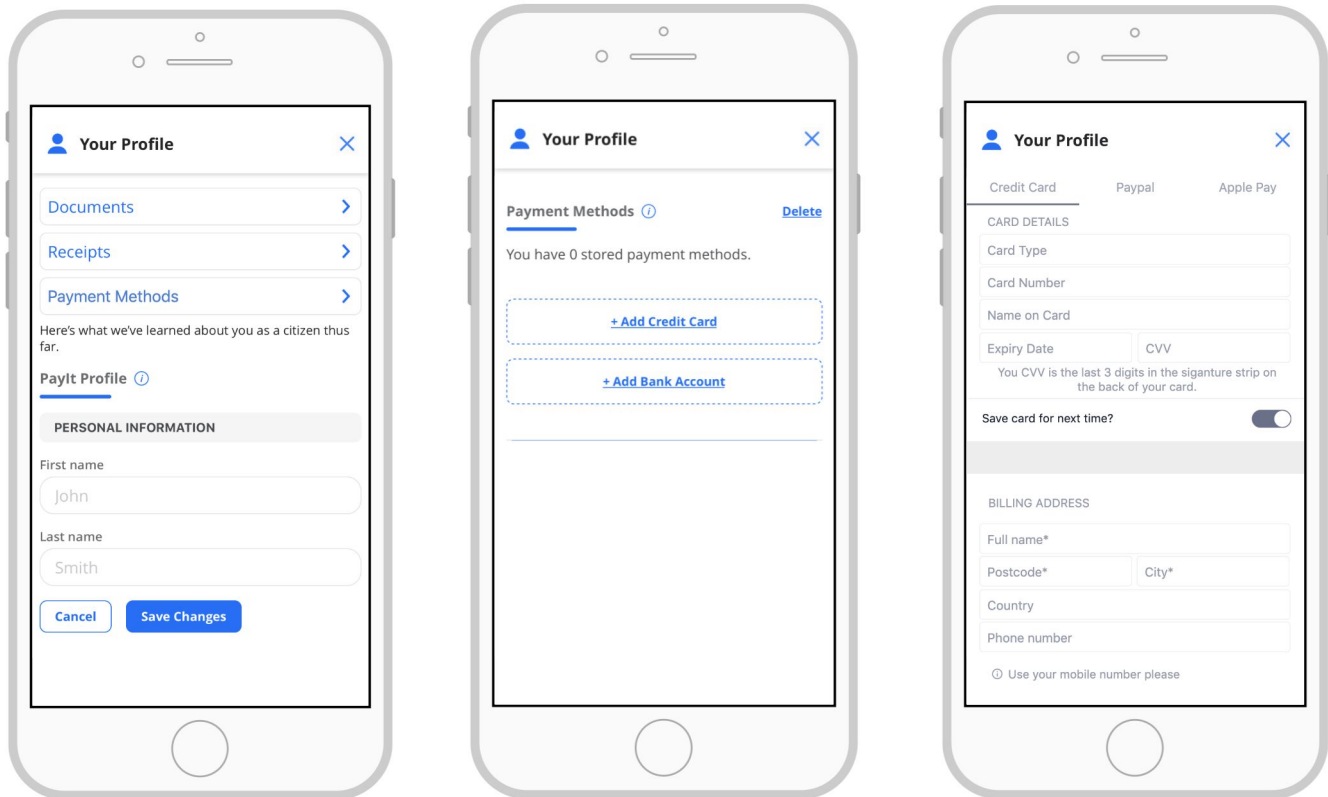
← **Home Page** after
joining Express Lane

Home Page after joining
the virtual waiting line →



After joining Virtual Line or Express Lane, sections on the home page will change in order to better assist users to track their activities. Other functions like Profile and Online Services are still active.

2. Profile Page and Payments Methods Pages



Profile

Payment Methods

Payment Methods 2

Click the icon on the top right of the Homepage will enter primary Profile Page. This Page also includes adding and changing payment methods functions for Online Service Transactions and paying Express Lane fee. The Payment Methods 2 also is quick-linked to Express Lane Page 5. This aims to facilitate users to make any changes to the payment while joining the Express Lane.

3. Virtual Line-Up Functionality Pages

These pages help users to check-in and to join the line step by step. It includes seven pages. Users can click forward to continue to the next step, or stop the process at any time and back to the homepage.

1. Explain Virtual Line-up System
2. Enter essential information
3. Choose service
4. Choose office location
5. Confirm the trip
6. Knowing estimated waiting time
7. Join the Line
8. Back to the homepage

After they receive the number and estimated time, it will go back to the homepage, which will update, showing its current progress in the line. Users will also receive a notification when their waiting time is less than 15 minutes. This ensures that they won't skip the number, or can cancel the progress if they can't make it.

Please See Next Page.

myNCDMV



To join the virtual line, you are required to enter your basic information including your name and driver license ID. You also need to indicate the service you requires.

After completing the check-in, we will place you in the line and ensure you to meet our officers as soon as possible.

Please plan your schedule after receiving the estimated meeting time.

Skipping the number will place you at the end of the line.



myNCDMV



Name

First Name

Last Name

Basic Info

Date of Birth

Driver License ID

ID Exp. Date



myNCDMV



Service Required

Option 1



myNCDMV



DMV Office Location

Option 1



myNCDMV



Confirm Your Trip

First Name

Last Name

Date of Birth

ID

ID Exp. Date

Service Name

Location



myNCDMV



Current Estimated Waiting Time:

10s

Number of People waiting in line: --

Join the Virtual Line



myNCDMV



Current Estimated Meeting Time:

13 : 40

Number of People waiting in line: --

You are in the line now!

Cancel Your Number





NCDMV NOTIFICATION

9m ago

Your meeting will start in 15 minutes!
Please make sure you will be in the office to avoid
skipping the number!

**Current Estimated Meeting Time:****13 : 40****Number of People waiting in line: --**

You are in the line now!

Cancel Your Number



4. Express Lane Functionality Pages

These pages help users to check-in and join the line step by step. It includes six pages. Users can click forward to continue to the next step, or stop the process at any time and back to the homepage.

1. Identify office location
2. Enter essential information
3. Choose service
4. Explaining convenience fee
5. Choose payment methods and make payment
6. Receive number
7. Back to homepage

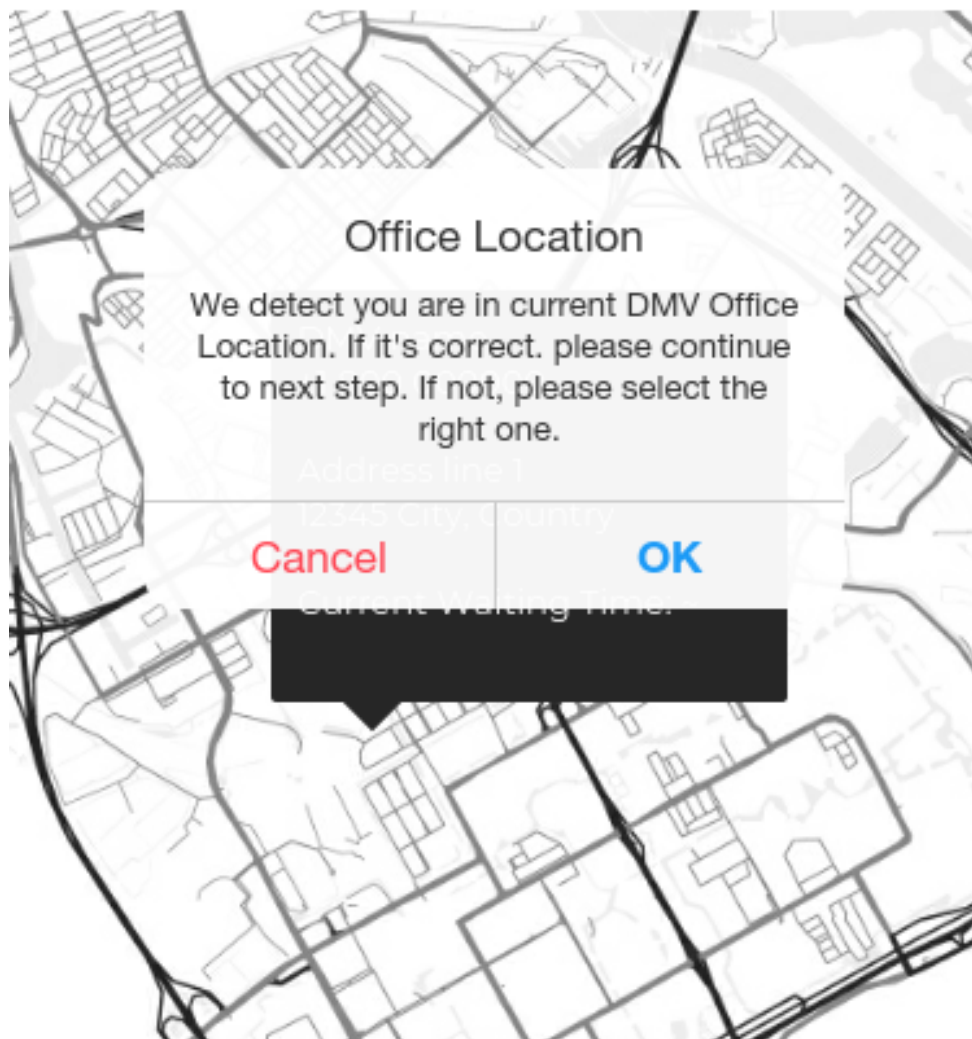
The location tracking will help users identify their current office location to reduce the rate of error. Users can modify or add their payment methods while making the payments.

Please See Next Page.

myNCDMV

**Office Location**

Option 1



myNCDMV



Office Location

Option 1



myNCDMV



Name

Basic Info



myNCDMV



Service Required

Option 1



Reminder:

The Express Lane only handles quick transactions under 15 minutes. Services like driving knowledge test and road test are not supported in this lane.



myNCDMV



The Express Lane charges \$-- to ensure you will meet our officer in less than 30 minutes.

If you are willing to pay this convenience fee, please continue to make payment.

The fee is not refundable.



myNCDMV



Credit Card

Paypal

Apple Pay

Payment Card

Card 1



Card Holder Name

First Name

CVV

First Name

[Modify your Payment Information](#)

The Express Lane will charge you \$-- to ensure you receive the service within 30 minutes.

Confirm Payment



myNCDMV



Payment transaction confirmed.

You're in the Express Lane now,
please stay in the office in order to avoid
skipping the number.



E24

Number of People waiting in Express lane: --



11. Promotion

We would like to integrate our project into the MyNCDMV App, so as there are already many promotions of this existing app on the official website, these new functions will be easily introduced to both current users and new users.

We also look forward to adding more ads in various office locations, so customers who are waiting in the office and don't know about this system can have much time to download the app and learn to use the software.