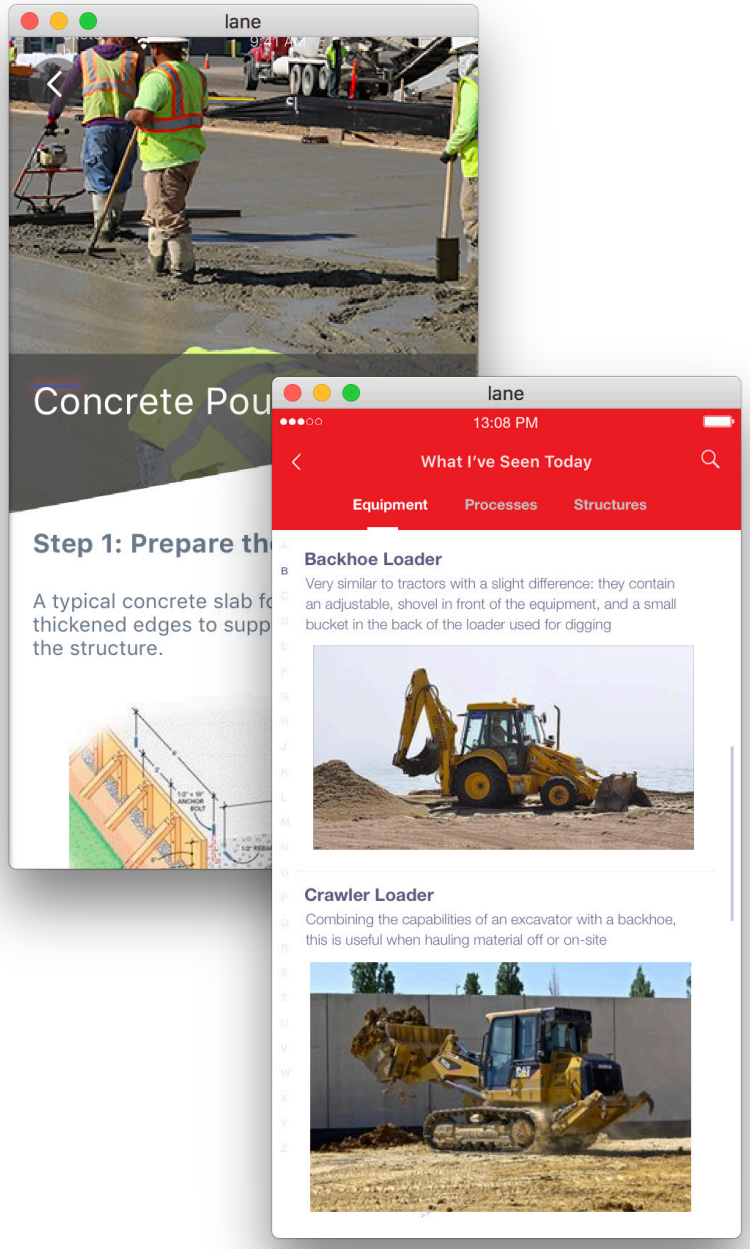

Mobile Service & Emerging Technology

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In This Book...

Task

Design a mobile application for Lane Construction, a company involves in various different public construction tasks, mostly during the asphalt-paving process. The mobile application should take advantage of the functions embedded inside a phone, such as its camera, microphone, gyrometer, accelerometer, Bluetooth, and NFC. Aside from that, the mobile application should also use two out of four designated emerging technologies.

The students are supposed to come up with their solutions for their clients by doing background researches, generate the solutions, design the visual graphics and layout plans for future investments.

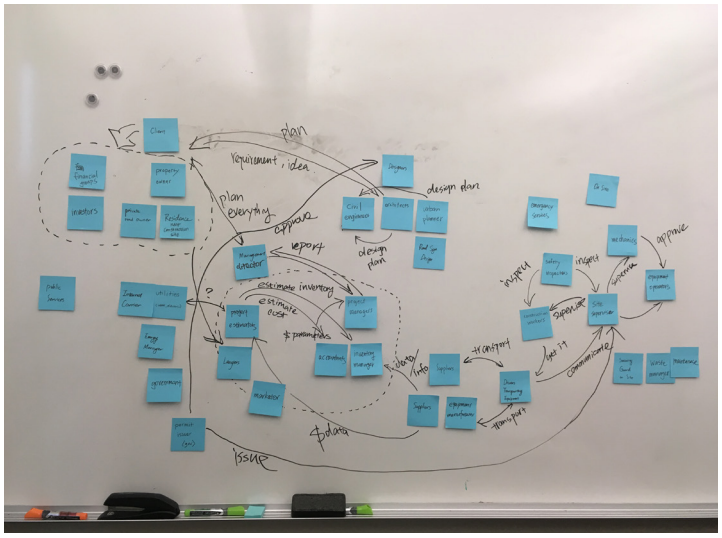
3 Background Research
6 The First Solution: On-Site Simulator
8 The Second Solution: Progress Tracker
10 The Third Solution: Educational Outreach

Background Research

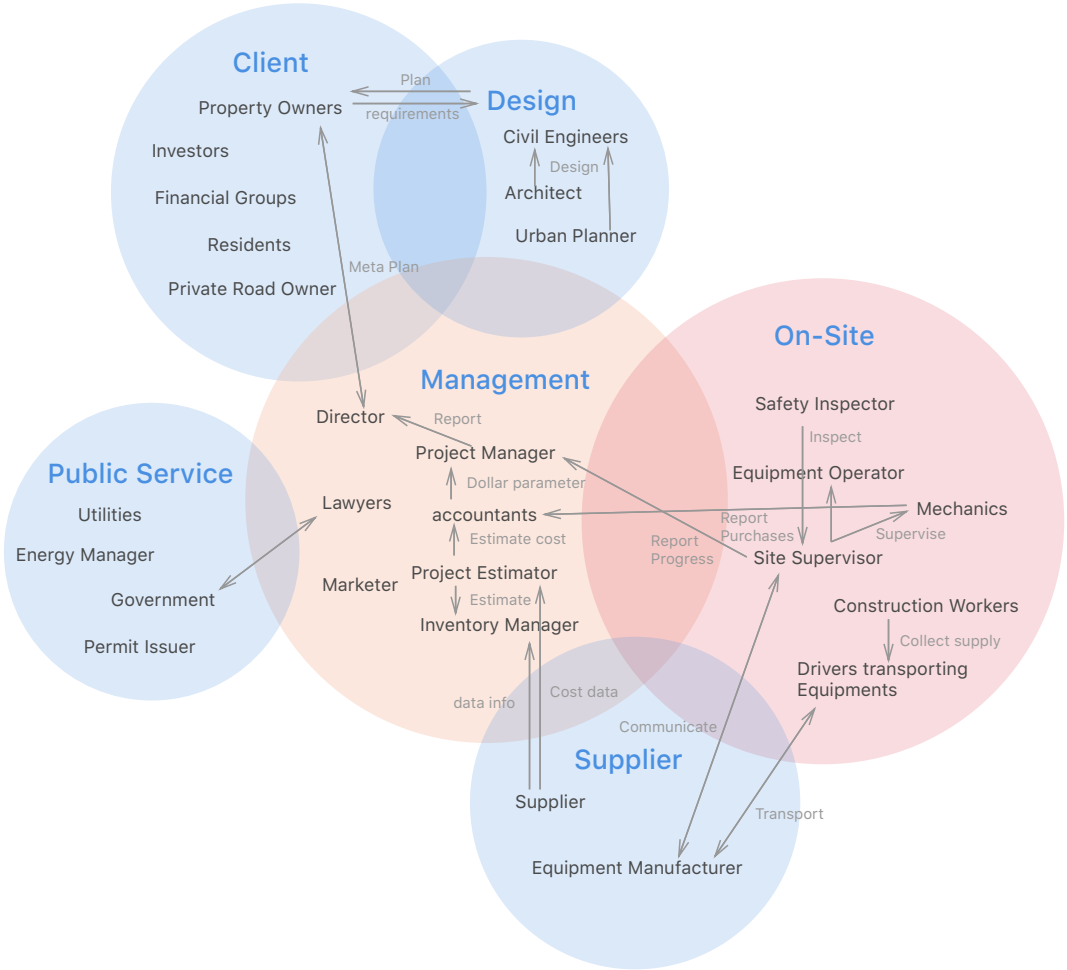
Lane Construction Corporation is a company that mainly handles public projects, such as the construction of airport, bridges, pipes, highways, roads, tunnels, etc. They also rent their equipment to other construction companies while they are not in use.

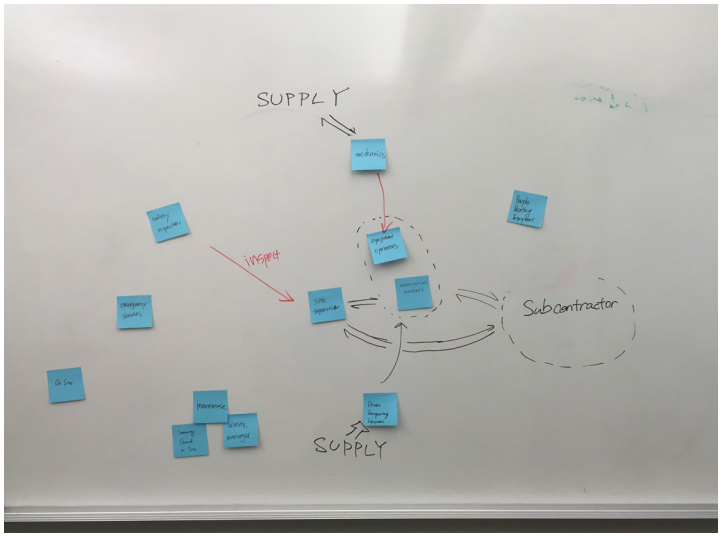
During this process, Lane would need to handle many internal and external affairs: Since they are mostly dealing with public projects, not only do they need to communicate with their clients for future investments, they would also need to go through supply chains, regulatory permits and the community which is their actual user.

For the first version of the stakeholder map, we made a list of people who are involved (indirectly or directly) in Lane's projects, and group them together to show the stakeholder network. The stakeholder map greatly enhanced our recognition and helped dig out potential relationships between different roles.



The first version of our stakeholder map





Left: a more organized stakeholder map. The "management" circle and the "on-site" circles are highlighted, because we believed these two groups create the most interesting interactions and are one of the most valued relations for Lane.

Top: A stakeholder map focused mostly on the on-site part. We believed the on-site construction creates the most interesting interactions.

Top: The assumptions and their reverse assumptions. The orange texts are the "reversed" parts.

Bottom: The low-fidelity sketch. For the first re-assumption, we developed a task manager, where workers can assign / checkout their tasks remotely. For the second one, we designed a status tracker for the architect/client/managers' on-site visits. For the third assumption, we created an App to give workers a kick-start tool and to familiarize them with the equipment.

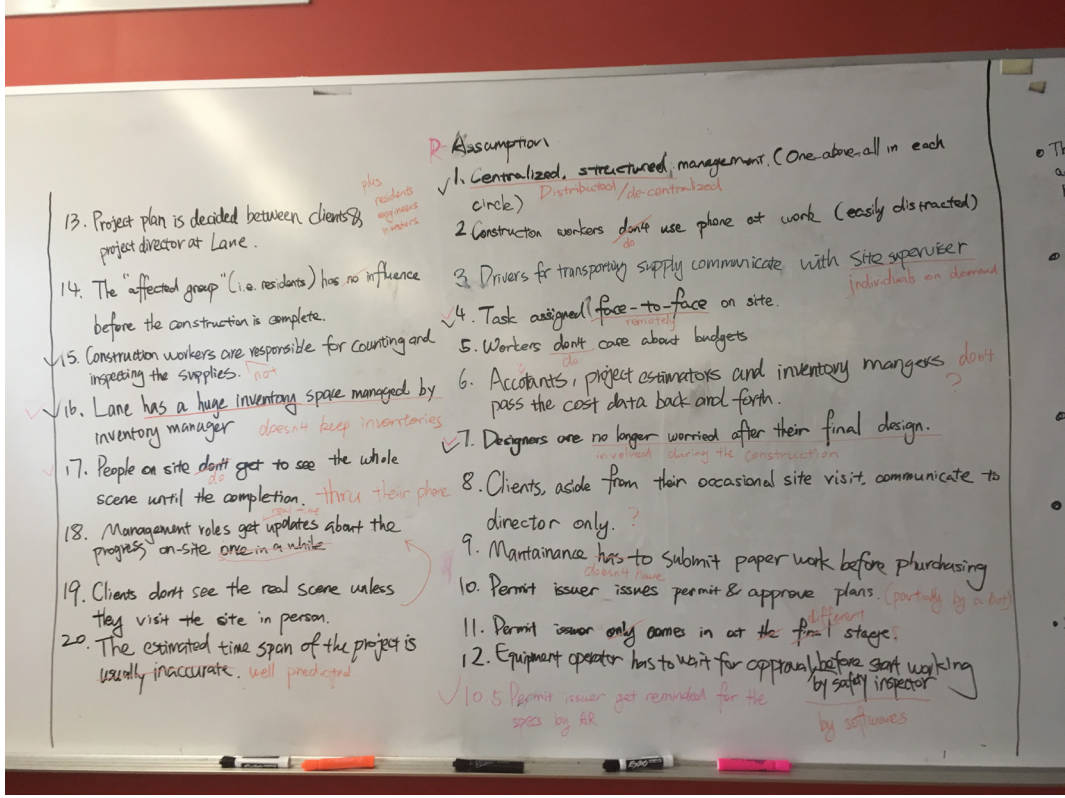
Reverse Assumptions and Speedy Sketch

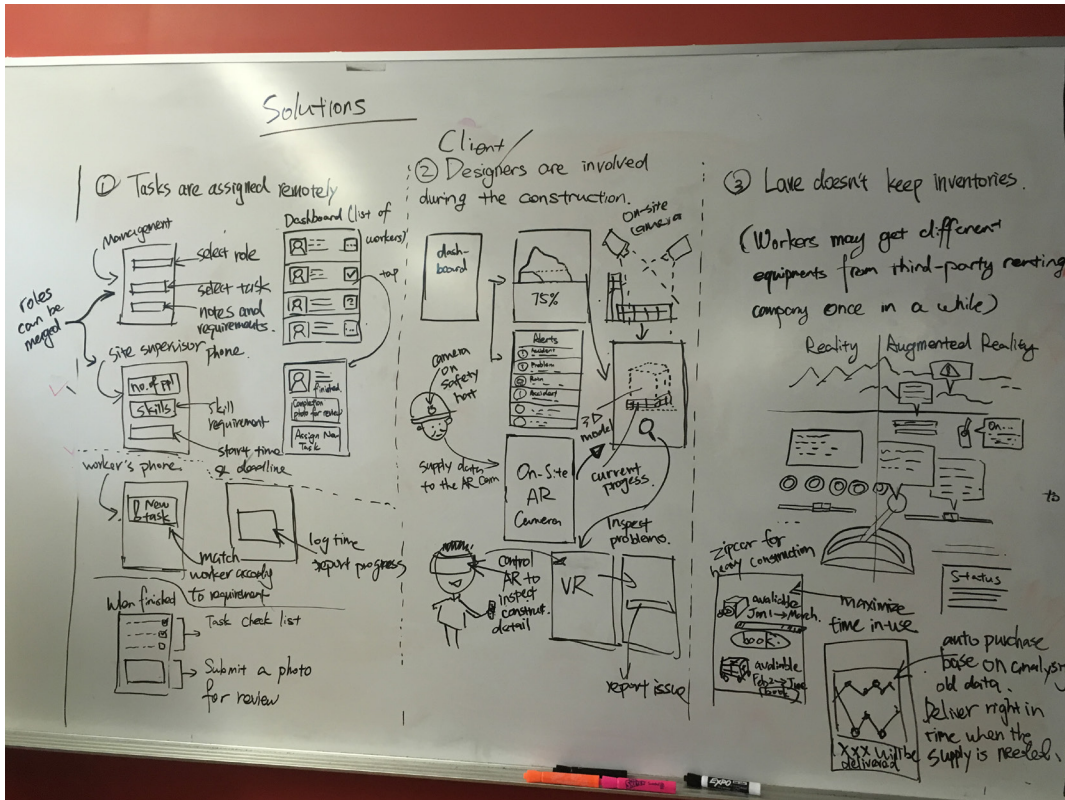
During studio, we came up with 20 assumptions we made for Lane, assumptions that would typically occur during Lane's interactions with other roles. We then started to think out of box by "reverse" those assumptions, and tried to find proper solutions to address those needs.

We came up with three different assumptions for Lane:
- Tasks are assigned face to face on site.
- Designers are no longer worried after their final design.
- Lane has a huge inventory space managed by inventory manager.

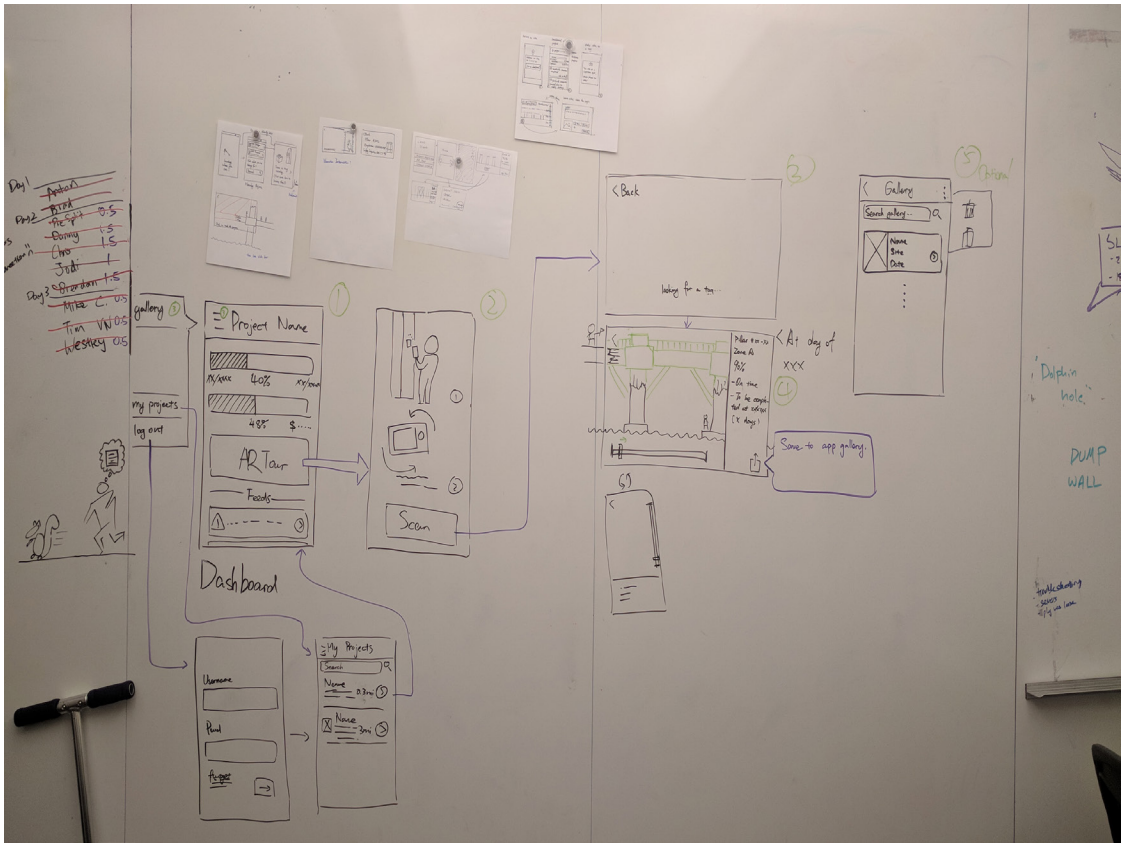
Reversing them gave us the following:
- Task are assigned **remotely**.
- Designers are **involved** during the construction phase.
- Lane **doesn't keep** their own inventories.

We then did a speedy sketch, taking turns to improve each other's low fidelity mobile App design.





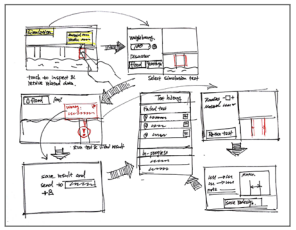
First Solution
On-Site Simulator

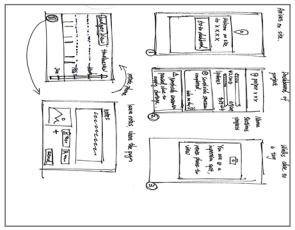


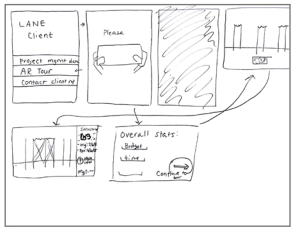
After assumption prototyping, we came up with a tool that would help the site visitors who care about the construction but lack the necessary technical knowledge to imagine the details. This was inspired by our re-assumption prototype, but modified slightly so that it facilitates the site visit for both the designers and the clients.

When pointed at certain structures, this tool would be able to recognize the objects and simulate its usage scenarios given certain conditions (70 years from now, under flood, earthquakes, etc). Then the result will be overlayed onto the camera graphics with augmented reality technologies.

The low fidelity sketches we drew for the sense-making App. We each came up with our own interpretations (those pinned on the top left of the pictures) and then merged those into one.







Some of our sketches from this phase. Although they did not appear during the final design, we reused some of the designs to generate new interactions.

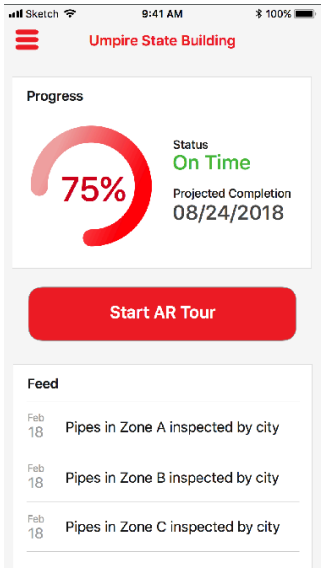
We proposed this because we thought this one had more potential amongst the three -- The first one already exists, the third one lacks practicability. This one embraced many great virtues: it brought Lane more investments by visually explaining the details. This is a task that only a phone can perform in that it requires the flexibility that a desktop computer doesn't have. It also distinguished itself from a web application since it required access to many other phone functionalities. Moreover, we believed this phone app would enhance the constructor-client relationship because it explained better to its audiences what is happening behind each placement of steels, bricks, etc., and make the design more trust worthy. If it is an architect who visit their site during the construction as a construction administrator, they might as well use the App to explain to the workers about their design decisions.

In-Class Critiques And Feedback

However, during the in-class critique, people wondered over the App's practicability. Specifically, people thought that all the simulations would have been pre-processed before the construction even started, and that should leave no problems for the clients or the workers. Also, the use case was not well defined: We needed to specify who would be downloading the App and carry it with them on site, where they will be looking at, who will accompany with them during the site visit (if any).

Based on the feedback, we decided to discard the extreme condition simulation, and focus solely on tracking the progress and give prediction based on the real-time data, which leads to our second solution.

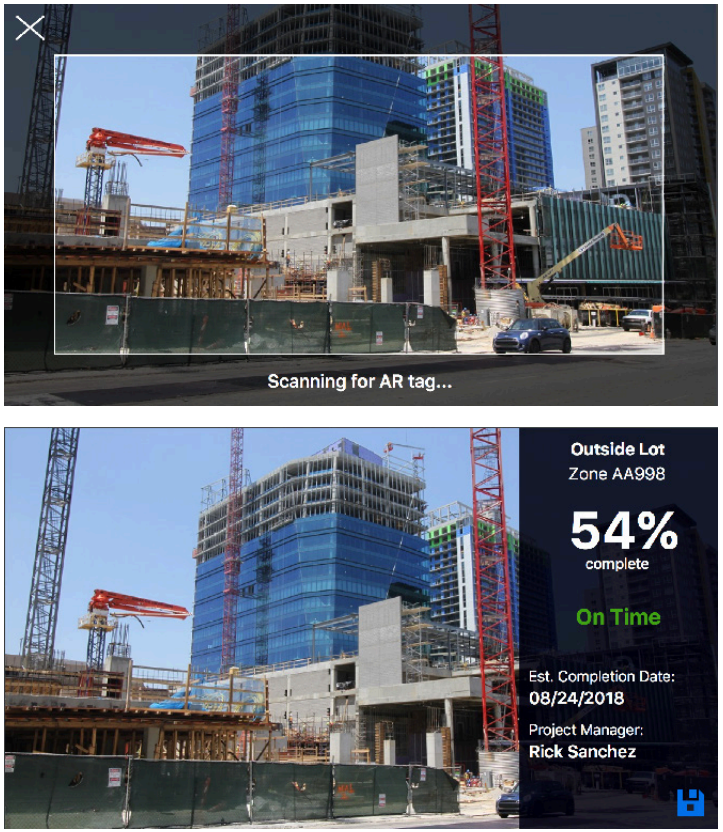
Second Solution
Progress Tracker



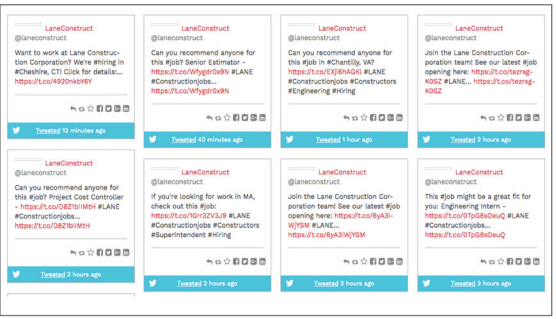
A dashboard for the client when they log in. The dashboard includes an overall status tracker, as well as alarm feeds to guide the clients for their site visit.

We switched from an extreme-condition structural simulator to a project progress tracker. They are similar in that they both use AR technologies to reproduce a certain scene that is not happening in front of the users yet. However, the progress tracker focused more on the tasks and its completion rate.

When a client is visiting the site, they might care the most about where they are in the entire timeline, and whether they are going to finish the project online. The App is embedded with an AR camera. Whenever it is pointed at a tag on an object (for example, an unfinished pillar), the computer will identify the object, and use the real time data to report its status, and calculate its expected completion time. Besides, the client might also be specifically interested in updates since their last visit. A dashboard with a feed of updates would help guide the visitors during their tour, suggesting where they shall look at.



Scanning the object would return the current status of the target.



Left: Lane's twitter feed. They are all about recruiting.

Right: 173 job openings on the U.S. continent.

The feedback we received from the instructors was that we still need to specify the use case in detail and, more importantly, how this visit will be valuable and continuously valuable to Lane.

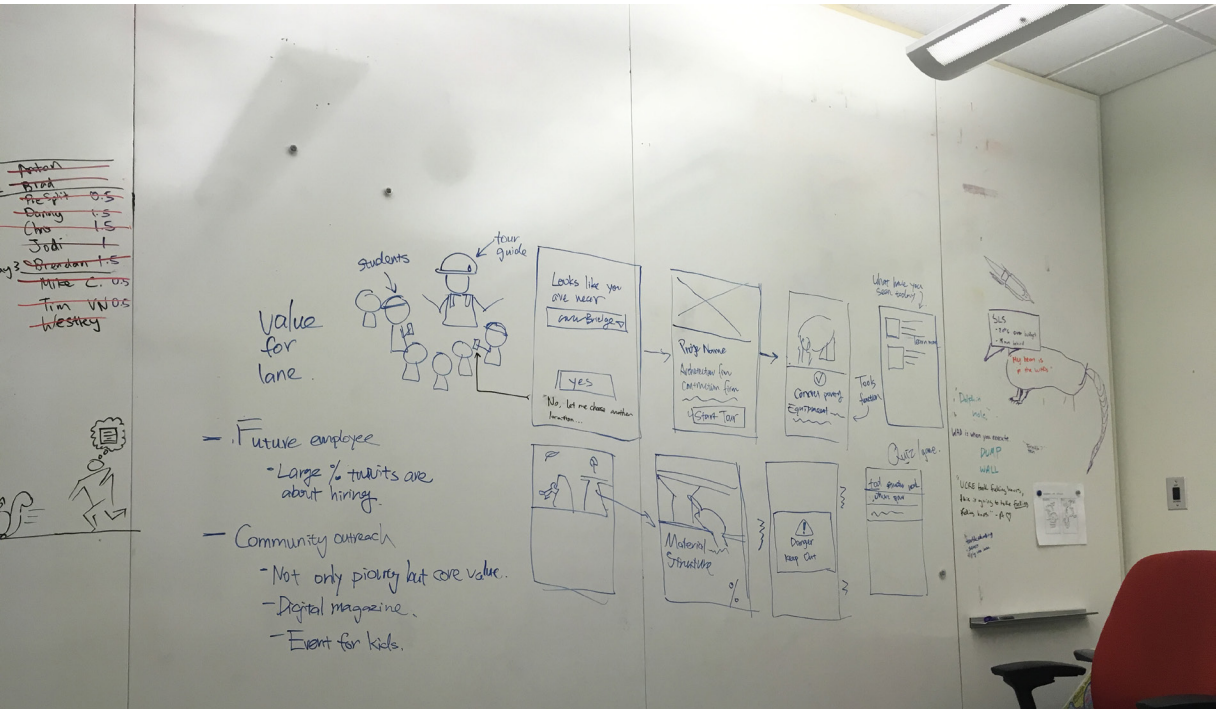
Further Research

We decided to do more research on the company after we received the class feedback. Then it became clear to us that Lane is constantly hiring: Lane's twitter feed is almost always about recruitment. They also have many job openings across the country.

Another interesting fact we noticed is that many schools and organizations would arrange construction site visits for students who would like to have construction-related job in the future, and Lane hosts those visits, too.

With these in mind, we decided to merge the two ideas (hiring and educational site visit) together, and create an App that would facilitate Lane's community outreach program. And this leads us to our third solution -- educational outreach.

Third Solution
Educational Outreach

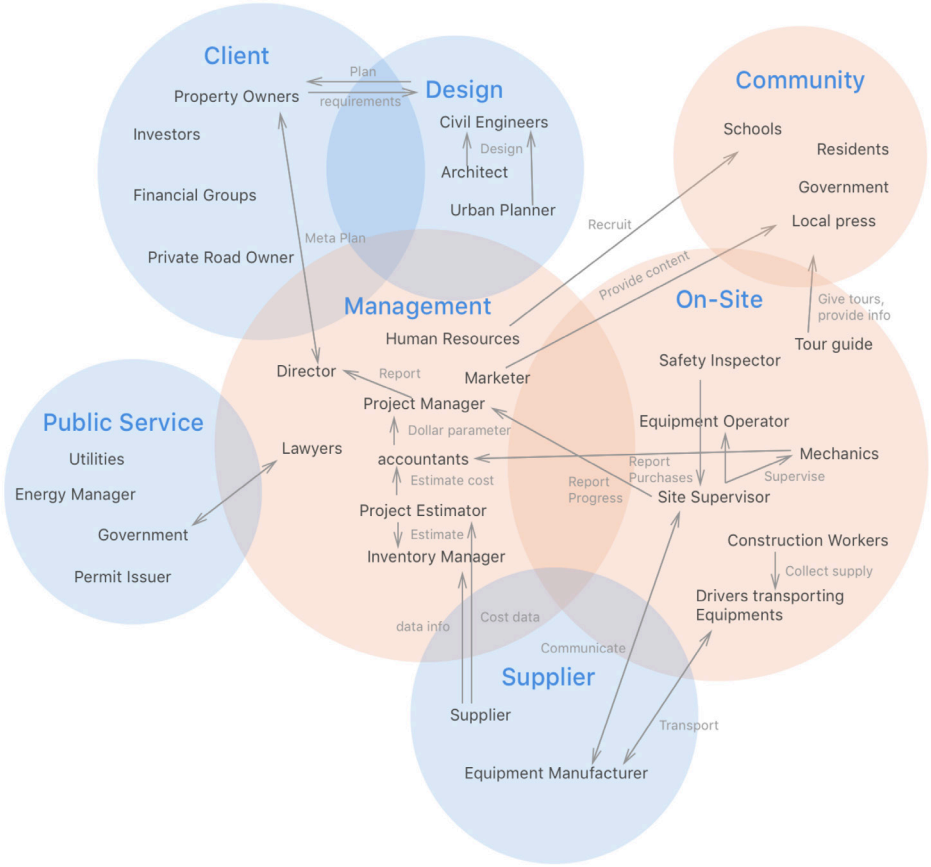


Screen map for the second solution, showing both use cases and low fidelity sketches.

Our new tool -- an App that will facilitate the site visit -- also make use of the AR technology. In a typical site visit, there would be a big group of students, and although a guide would be there to tour students around, sometimes students might still get lost in the tour guide's introduction, or they might simply want to explore the site by themselves. This is where an AR camera would be helpful. Students can look at where they want, as a supplement of the tour guide's instructions.

Use Case

With this as the backbone of our design, we generate this new idea. Now students would, with their teacher's instruction, download the app before their site visit. They might also get a question sheet from their teacher, reminding them where to look at during the visit. When they arrive on site, the students will be introduced to someone from Lane as their tour guide. Throughout the tour, the students would use their phones as another way to explore aside from tour



We updated our stakeholder map to include the category "community". This creates more interactions between the circles.

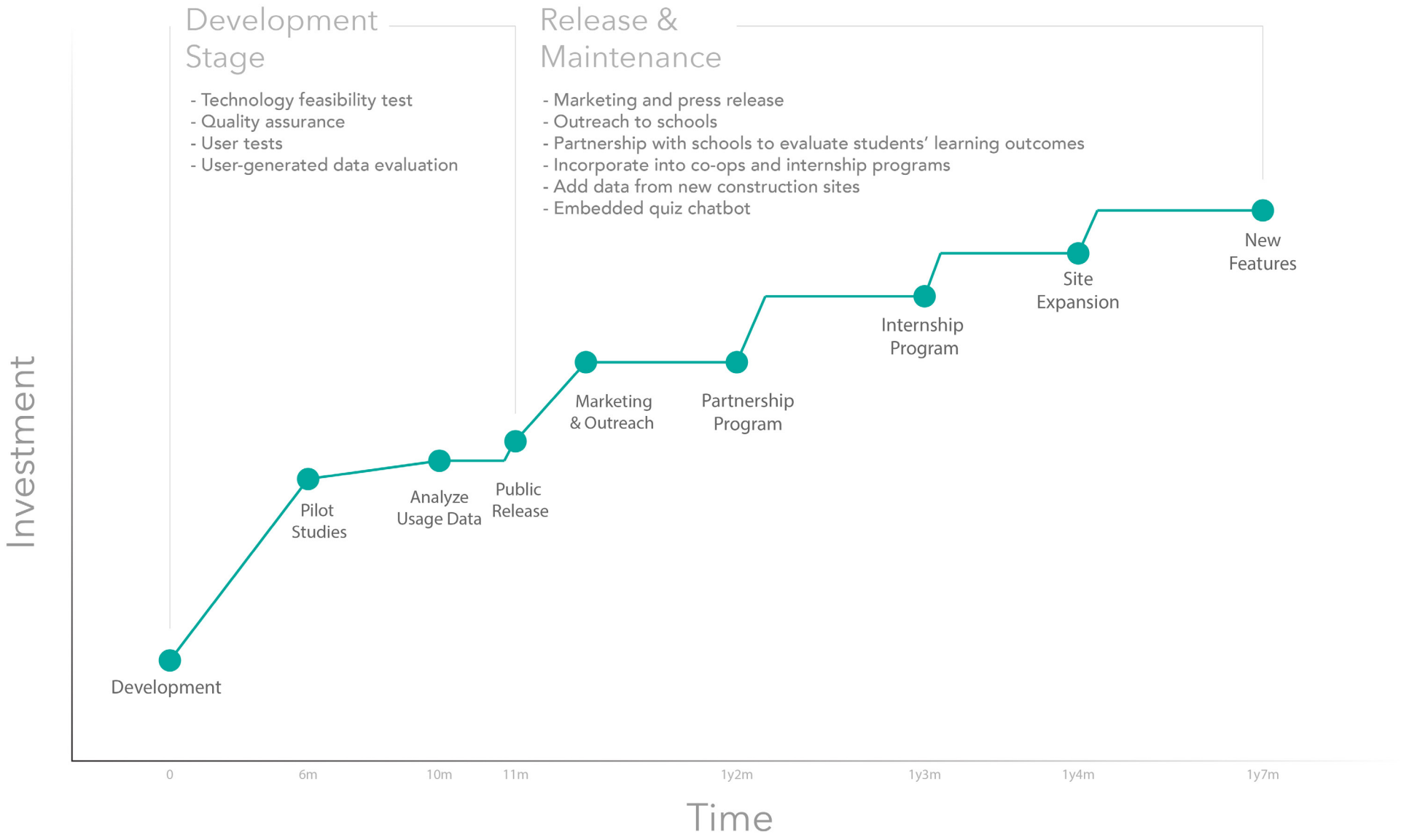
guide's introductions. The first time they boost the App, the students' location will be default to the closest construction site nearby. After that, they would be asked for basic profile information. During the tour, students can use their camera, which will display a variety of different icons, indicating different "point of interests", overlaying on top of workers, environments or equipment. Then the students would tap on those icons to acquire further information, and meanwhile this point of interests would be collected into their gallery. When the students are finished with their tour, they can easily go back to the gallery and check their collection of the day, and answer the questions from the teacher.

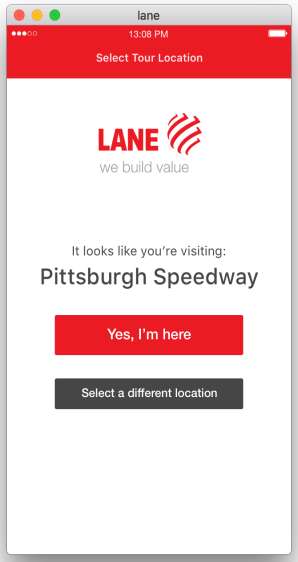
Road map and Future Data Instrumentation

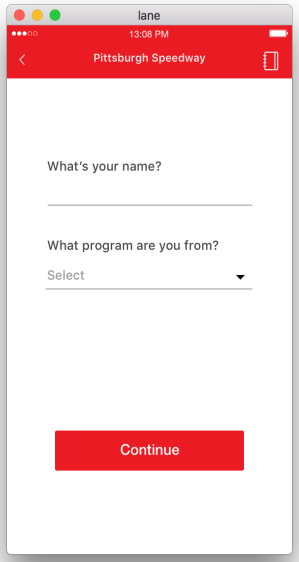
The core of our pitch is to attract future investment into the project. To illustrate the future of the App, we produced a road map. After we are finished with the development, we would be focusing on marketing and partnerships to gain better engagement with the local community. There would be value exchanges during this process, where people will be engaging in their enhanced field trips and learning more about the industry, while Lane would also create their desired local impact, which brings them more contracts and new hires. Schools may also partner with Lane to assess students' learning. The App will also be incorporated into internships and Co-ops for future construction-site managers. After these, the team will move on to expand the current frame to new sites, and add more features like a chat bot for an on-site quiz.

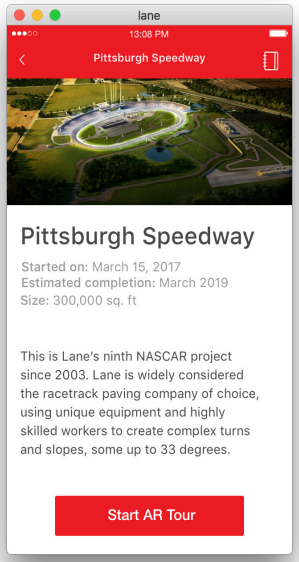
While in use, the App will be collecting information about the visitor profile, when they are visiting, where they are looking at, and what they might be reviewing after the visit, etc., as a feedback to help Lane learn the outcome of these visit for better assessment.

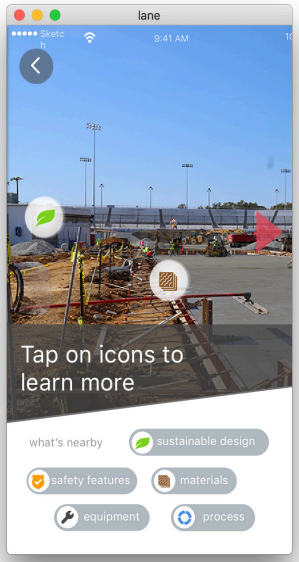
Road map showing the future investment against time.

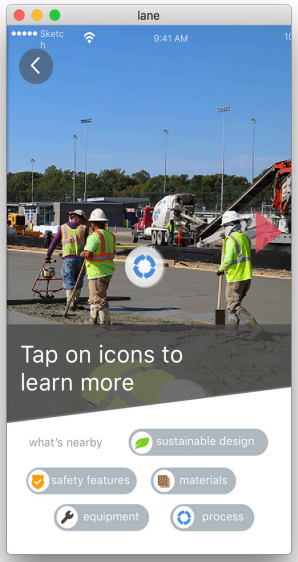


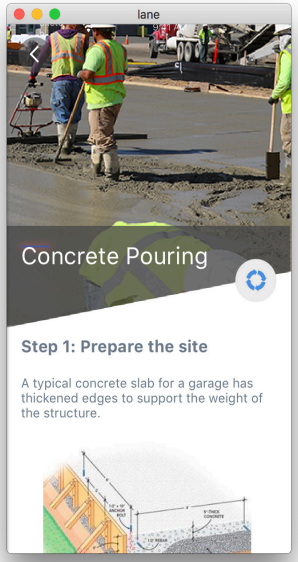


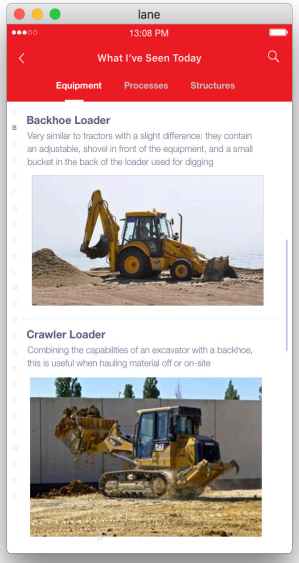












Our final design.
1) Auto-location detection.
2) Profile page.
3) Home page.
4-5) Screens with icons overlay.
6) Information page after the user click into an icon.
7) Gallery collecting all the point of interests.