



Raise The Roof

Jake Pennington | Barrett Nield | Wyatt Davis | Aaron Templeton



## Table of Contents

<b>Executive Summary</b>	<b>3</b>
<b>Background and Technical Requirements</b>	<b>4</b>
<b>Requirements Analysis</b>	
• <b>System Architecture</b>	<b>5</b>
• <b>Personnel</b>	<b>7</b>
• <b>System Features</b>	<b>8</b>
<b>Timeline</b>	<b>11</b>
<b>Appendix</b>	
• <b>Use Cases</b>	<b>12</b>
• <b>UI Sketches</b>	<b>18</b>



## Executive Summary

Contractors and construction companies spend wasted hours writing out all of the details of project proposals, bids, and invoices by hand. Poorly organized files and spreadsheets prove to be a barrier for these companies. A demanding schedule and difficult clientele are among some of the many problems that contractors face on a daily basis. Contrack is an intuitive solution.

Contrack automates the bid creation process and enables company managers to review and track their companies' bids and projects. Contractors enter job information such as materials, costs, and estimated labor. With the use of the application's customizable algorithm, bid proposals become readily available with a single action.

End-users can define various project types and create a list of materials that are needed for each project.

Management-level employees will have access to dashboards that present current bids and their statuses. These dashboards will also provide visualization and analytic material that will depict the overall success of the company.

Service-level employees will be able to record project information, create bid estimates, and develop official bid proposals. Service employees will also be able to revise and update existing bids.

Contrack supports the creation of teams, allowing managers to add employees to their team. Contrack supports the following roles: Admin, Owner, Manager, and Employee.

This software is unprecedented and incomparable due to its simple and easy to learn user interface. In addition, Contrack will not require a premium service subscription. This software is structured to allow members at every level of the organization to easily manage current projects and view analytics about employee and project successes.

## Background and Technical Requirements

Existing software in the contract bidding market include CoConstruct, B2W Estimate, and WeBuild. Contrack is distinguished from existing software due to its mobile interface. This allows for seamless data entry and on-the-spot bid estimate creation. In contrast, the majority of existing software programs are limited to a restrictive desktop view.

Contrack is also tailored toward the needs of smaller companies, while the existing market is almost exclusively designed and marketed for large to midscale corporations. Most importantly, Contrack provides a dashboard of analytic information, allowing companies to quantitatively measure their success.

Contrack's components and architecture consist of several common factors used in most modern applications. It is built using a REST API architecture style for the server. The server's application logic, algorithms, user authentication and permission systems are built in the Laravel PHP framework. All persistent data including company and user profiles, bid and job information, and product materials are stored and maintained using a MySQL relational database. The server and database will be hosted by Amazon Web Services which provides on-demand cloud-computing platforms and services.

The user interface of Contrack is constructed using the javascript framework Vue.js. The mobile version of this software utilizes React Native, a mobile device framework. Both Vue.js and React Native have templating engines which create layouts, partials, and other reusable code blocks. Our team is well-versed in each of these technologies, frameworks, and languages. This reduces the time spent learning new technologies, allowing us to streamline software development.

Users who desire to use the application will need a computer and/or mobile device with internet access. Modern web browsers such as Google Chrome, Firefox or Safari are preferred for optimal use. A mobile app will also be available to customers on the Google Play Store or the App Store.

# Requirements Analysis

## System Architecture

The system architecture of Contrack consists of four (4) main components: (1) REST API Server which will handle the app logic; (2) MySQL Database to store persistent data; (3) Web Application; and (4) Mobile Application. (See diagram below)

### REST API Server

The Server will be constructed using a REST API (Representational State Transfer Technology) to send and receive http requests from web clients and mobile applications. The Server will be built with the Laravel PHP framework, a free open-source framework intended for the development of web applications. The Server will handle the application logic and will follow a strict authentication policy to protect user information and data.

### MySQL Database

The database will store all of the persistent data for companies and users that choose to use Contrack. MySQL is an open-source relational database management system which will allow Contrack to establish relations between data tables. The Server will save and update information stored in the database and the database will tender to its instructions.

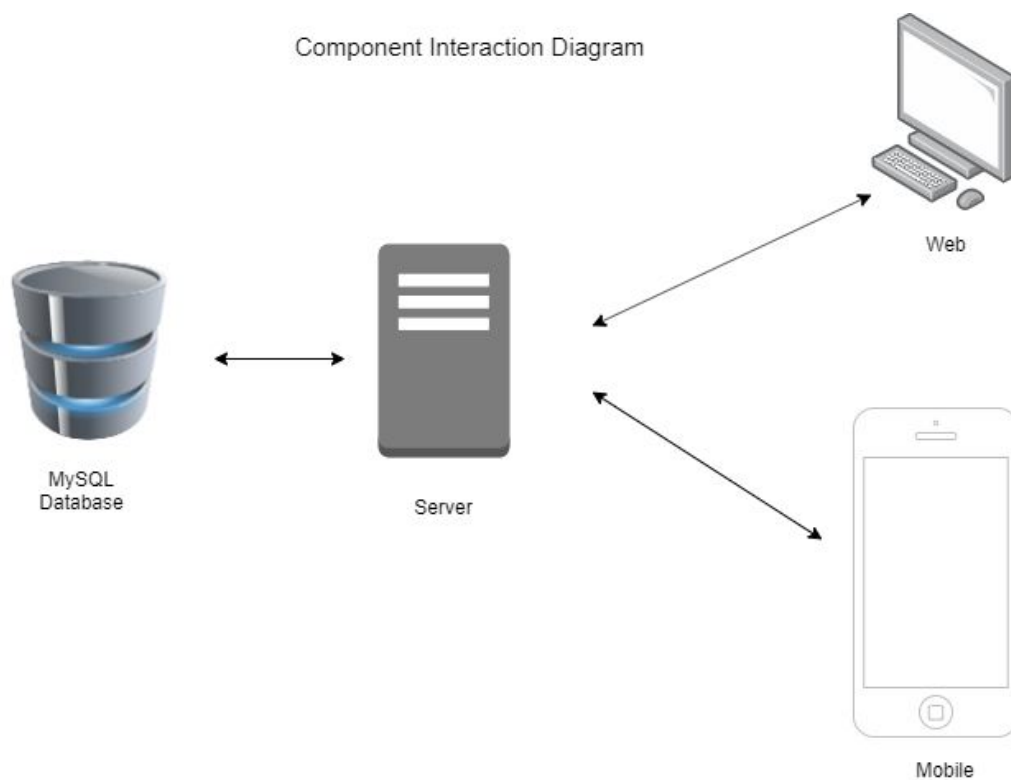
### Web Application

The Web Application will be stored on a remote server and will be delivered to end-users over the internet through a browser interface. The Web Application will be built with Vue.js, an open-source Javascript framework for building user-interfaces and single-page applications. End-users will interact with the Server via the Web Application and data related to the end-user will be displayed.

### Mobile Application

The Mobile Application will be available for download on the Google Play Store. It will be built using React-Native, an open-source mobile application

framework created by Facebook. End-users will interact with the Server via the Mobile Application in a similar manner to the Web Application. The Server will relay data to the Mobile Application at the request of the end-user.





## **Personnel**

### **Jake Pennington**

Responsibilities: Server & Database

Jake has professional experience using the Laravel framework as a full-stack developer. He has gained knowledge and expertise regarding servers and databases through his studies at the University of Utah.

### **Wyatt Davis**

Responsibilities: Server & Database

Wyatt will be working on these components because of prior experience with SQL databases both through studies at the University of Utah and experience as a software developer. Additionally, he feels comfortable learning new programming languages as he must frequently pick new languages up at work.

### **Barrett Nield**

Responsibilities: Web & Mobile Applications

Barrett will be responsible for these components because he is experienced in human computer interaction and will be able to apply that knowledge to the front end. He also enjoys design and can apply his experience to a clean frontend design.

### **Aaron Templeton**

Responsibilities: Web & Mobile Applications

Aaron is well versed in front-end development and has experience using Javascript frameworks like Vue.js and React-Native. He also has the necessary knowledge to build the mobile application and integrate proper design techniques and practices.

## System Features

Features	Priority	Backend Primary	Backend Secondary	Frontend Primary	Frontend Secondary	Description
Create/Edit Bids	1	Jake	Wyatt	Barrett	Aaron	Create and edit a bid for a project/job
Create/Edit Templates	1	Wyatt	Jake	Aaron	Barrett	Create and edit a project template
Create/Edit Materials	1	Wyatt	Jake	Barrett	Aaron	Create and edit materials for projects
Create Users	1	Wyatt	Jake	Aaron	Barrett	Company sign up and invitations
Bid-to-PDF	1	Jake	Wyatt	Aaron	Barrett	Printable and emailable invoice for a bid
Auto-Pricing Algorithm	1	Jake	Wyatt	Barrett	Aaron	Automated bid calculation based on materials and area
Analytics Display	1	Jake	Wyatt	Aaron	Barrett	Company wide analytics to track performance
Role Delineation	1	Wyatt	Jake	Aaron	Barrett	Admin, manager and employee roles that companies can manage
User Settings	1	Jake	Wyatt	Barrett	Aaron	Settings and preferences for each user
Developer Impersonation	1	Jake	Wyatt	Barrett	Aaron	Developer can login and view information specific to a user
Modifying Analytics Timeframe	2	Jake	Wyatt	Barrett	Aaron	Display analytical information during a certain time period



Displaying Analytics	2	Jake	Wyatt	Aaron	Barrett	Charts and graphs depicting company and user performance and other company metrics
Edit Users	2	Wyatt	Jake	Aaron	Barrett	Companies can manage their users
Todo List	2	Wyatt	Jake	Barrett	Aaron	List of tasks for each user
Subscription	2	Wyatt	Jake	Aaron	Barrett	Companies must subscribe to use the service
Photo Storage & Display	2	Jake	Wyatt	Barrett	Aaron	Upload photos of project areas
Upload/Export Projects	2	Wyatt	Jake	Aaron	Barrett	Export projects to csv and upload from csv
Upload/Export Materials	2	Wyatt	Jake	Barrett	Aaron	Export materials to csv and upload from csv
Bid-to-Excel	3	Jake	Wyatt	Barrett	Aaron	Export a bid for a project to excel
Animation of UI	3	Jake	Wyatt	Aaron	Barrett	Animations for user interaction with UI
Dark Mode	3	Wyatt	Jake	Barrett	Aaron	Dark theme for app
Project-File Storage	3	Jake	Wyatt	Barrett	Aaron	Upload documents related to the project
Google Maps Integration	3	Jake	Wyatt	Barrett	Aaron	Display project location on google maps
Tutorial	3	Jake	Wyatt	Aaron	Barrett	Teach the user how to use the app
Help Tab	3	Jake	Wyatt	Barrett	Aaron	Simple documentation for users to help them use the app

Audit Log	3	Wyatt	Jake	Aaron	Barrett	Display all the changes for a project. Type of version history
Google Calendar Integration	3	Wyatt	Jake	Aaron	Barrett	Integrate a google calendar with the app calendar
System Notifications	3	Wyatt	Jake	Aaron	Barrett	Notifications for users tasks, projects and related work

## Timeline

	Wyatt Davis	Barrett Nield	Jake Pennington	Aaron Templeton
Alpha	<ul style="list-style-type: none"> <li>Initial Mobile Interface</li> <li>Mobile Connection to Database</li> <li>Mobile Views</li> </ul>	<ul style="list-style-type: none"> <li>CRUD for Materials</li> <li>CRUD for Bids</li> <li>Pricing Algorithm</li> </ul>	<ul style="list-style-type: none"> <li>CRUD for Materials</li> <li>CRUD for Project Templates</li> <li>CRUD for Projects</li> <li>CRUD for Bids</li> <li>Bid to PDF</li> </ul>	<ul style="list-style-type: none"> <li>CRUD for project templates</li> <li>CRUD for Users</li> <li>Bid-to-PDF</li> <li>Analytics Dashboard</li> </ul>
Beta	<ul style="list-style-type: none"> <li>Mobile Login</li> <li>Mobile Account Creation</li> <li>Mobile Employee Dashboard</li> <li>Mobile Manager Dashboard</li> </ul>	<ul style="list-style-type: none"> <li>User Settings</li> <li>Analytics View</li> <li>Analytics Time Frame</li> <li>ToDo Lists</li> <li>Photo Storage and Display</li> </ul>	<ul style="list-style-type: none"> <li>Analytics Display w/ Filters</li> <li>Todo list</li> <li>Calendar</li> <li>Upload/Export Projects</li> <li>Upload /Export Materials</li> </ul>	<ul style="list-style-type: none"> <li>Analytics with charts</li> <li>Edit teams</li> <li>Subscription</li> <li>Upload/export projects</li> <li>Display friendly layouts</li> </ul>
Production	<ul style="list-style-type: none"> <li>Mobile File Uploading</li> <li>Mobile Tutorial</li> <li>Mobile Help Tab</li> <li>Ensure Operating System Parity</li> </ul>	<ul style="list-style-type: none"> <li>Upload and import materials</li> <li>Bid to Excel</li> <li>Dark Mode</li> <li>Project File Storage</li> <li>Maps Integration</li> <li>Help Tab</li> </ul>	<ul style="list-style-type: none"> <li>Role Delineation</li> <li>Bid to Excel</li> <li>Project file storage</li> <li>System notifications</li> <li>Google Maps integration</li> </ul>	<ul style="list-style-type: none"> <li>UI animation and transition</li> <li>Tutorial</li> <li>Audit log</li> <li>Google calendar integration</li> <li>System notifications</li> </ul>

## Use Cases

Number	Use Case 1
Title	Registration
Short Description	An administrator will have the ability to create new administrator, manager, and employee accounts
List of Steps	<ul style="list-style-type: none"><li>● Account Create<ul style="list-style-type: none"><li>○ Click button to create new user</li><li>○ Choose 'Administrator', 'Manager', or 'Employee' permissions for user</li><li>○ Give the user a name and initial password</li></ul></li></ul>
Related UI	See figure 12

Number	Use Case 2
Title	Login
Short Description	A user will be able to login to Contrack from the internet
List of Steps	<ul style="list-style-type: none"><li>● Login<ul style="list-style-type: none"><li>○ Fill in the Username and Password fields</li><li>○ Press Enter or click the Login button</li></ul></li></ul>
Related UI	See figures 6, 19

Number	Use Case 3
Title	Dashboard (Employees)
Short Description	An employee will be able to navigate previously created and assigned projects from their initial landing page
List of Steps	<ul style="list-style-type: none"> <li>● Project View               <ul style="list-style-type: none"> <li>○ Click header of project to view its details</li> <li>○ Edit or review project details</li> <li>○ Add additional materials, templates, quantities, square footage, etc.</li> <li>○ Add details in post i.e. bid success, initial bid accuracy, etc.</li> <li>○ Click confirmation button if changes were made</li> <li>○ Return to Dashboard view</li> </ul> </li> <li>● Bid Create               <ul style="list-style-type: none"> <li>○ Click the bid creation button on a project</li> <li>○ A PDF is generated that can be saved or printed via 3rd party programs in another tab</li> </ul> </li> </ul>
Related UI	See figure 29

Number	Use Case 4
Title	Analytics (Manager)
Short Description	A manager will be able to view analytics of employees under their care
List of Steps	<ul style="list-style-type: none"> <li>● Analytics View               <ul style="list-style-type: none"> <li>○ Click Analytics page to view display of data</li> <li>○ View differing data analysis of each employee i.e. bid success rate, bid accuracy, number of bids, etc.</li> <li>○ Click on employees to change to an employee's dashboard view</li> </ul> </li> </ul>
Related UI	See figure 1

Number	Use Case 5
Title	CRUD for Projects and Bids
Short Description	An employee or manager will have the ability to create, read, update, and delete projects.
List of Steps	<ul style="list-style-type: none"> <li>● Project Create <ul style="list-style-type: none"> <li>○ Click button to create new project</li> <li>○ Add materials, templates, quantities, square footage, etc.</li> <li>○ Click button to confirm creation of project</li> </ul> </li> <li>● Project Read <ul style="list-style-type: none"> <li>○ View a list of projects associated to the user</li> </ul> </li> <li>● Project Update <ul style="list-style-type: none"> <li>○ Click an existing project to edit</li> <li>○ Update materials, templates, quantities, square footage, etc.</li> <li>○ Click button to confirm update of project</li> <li>○ Click button to generate new bid</li> <li>○ View list existing bids associated to project</li> <li>○ Click button to delete existing bids associated to project</li> </ul> </li> <li>● Project Delete <ul style="list-style-type: none"> <li>○ Click button to delete project and associated bids from list of projects</li> </ul> </li> </ul>
Related UI	See figures 11, 18, 23, 24, 25

Number	Use Case 6
Title	CRUD for Projects Templates
Short Description	A manager will have the ability to create, read, update, and delete project templates. An employee will have the ability to read project templates.
List of Steps	<ul style="list-style-type: none"> <li>● Project Template Create <ul style="list-style-type: none"> <li>○ Click button to create a new project template</li> <li>○ Add materials to project template</li> <li>○ Click button to confirm creation of project template</li> </ul> </li> <li>● Project Template Read <ul style="list-style-type: none"> <li>○ View a list of project templates</li> </ul> </li> <li>● Project Template Update <ul style="list-style-type: none"> <li>○ Click an existing project template to edit</li> <li>○ Update materials</li> <li>○ Click button to confirm update of project template</li> </ul> </li> <li>● Project Template Delete <ul style="list-style-type: none"> <li>○ Click button to delete project template from list of projects</li> </ul> </li> </ul>
Related UI	See figures 13, 14, 15, 16, 26, 27, 28


Number	Use Case 7
Title	CRUD for Materials
Short Description	A manager will have the ability to create, read, update, and delete materials. An employee will have the ability to read materials.
List of Steps	<ul style="list-style-type: none"> <li>● Material Create <ul style="list-style-type: none"> <li>○ Click button to create a new material</li> <li>○ Define material name, price, etc.</li> <li>○ Click button to confirm creation of material</li> </ul> </li> <li>● Material Read <ul style="list-style-type: none"> <li>○ View a list of material</li> </ul> </li> <li>● Material Update <ul style="list-style-type: none"> <li>○ Click an existing material to edit</li> <li>○ Update material name, price, etc.</li> <li>○ Click button to confirm update of material</li> </ul> </li> <li>● Material Delete <ul style="list-style-type: none"> <li>○ Click button to delete material from list of projects</li> </ul> </li> </ul>
Related UI	See figures 7, 8, 9, 10, 20, 21, 22

Number	Use Case 8
Title	List of Bids
Short Description	A manager will have the ability to read and print any bid from his company.
List of Steps	<ul style="list-style-type: none"> <li>● View list of bids</li> <li>● Click button to print bid</li> </ul>
Related UI	See figures 2, 3



Number	Use Case 9
Title	Manager View of Employees
Short Description	Managers will be able to manage the members of their company.
List of Steps	<ul style="list-style-type: none"> <li>• Send invitation to employee to register and join the company</li> <li>• View list of employees</li> <li>• Click a button to edit the role of an employee</li> <li>• Click button to delete an employee</li> </ul>
Related UI	See figure 5

Number	Use Case 10
Title	Company settings
Short Description	An administrator will be able to set policies that everyone in the company must adhere to
List of Steps	<ul style="list-style-type: none"> <li>• Settings Change <ul style="list-style-type: none"> <li>○ Click button on administrator view to enter the company settings view</li> <li>○ Click on setting you wish to change and change it to the new setting that you desire</li> <li>○ Click to save new settings</li> </ul> </li> </ul>
Related UI	See figure 4



Number	Use Case 11
Title	User settings
Short Description	A user will be able to change their personal settings
List of Steps	<ul style="list-style-type: none"> <li>● Settings Change             <ul style="list-style-type: none"> <li>○ Click button on employee view to enter the user settings view</li> <li>○ Click on setting you wish to change and change it to the new setting that you desire</li> <li>○ Click to save new settings</li> </ul> </li> </ul>
Related UI	See figure 17

# UI Sketches

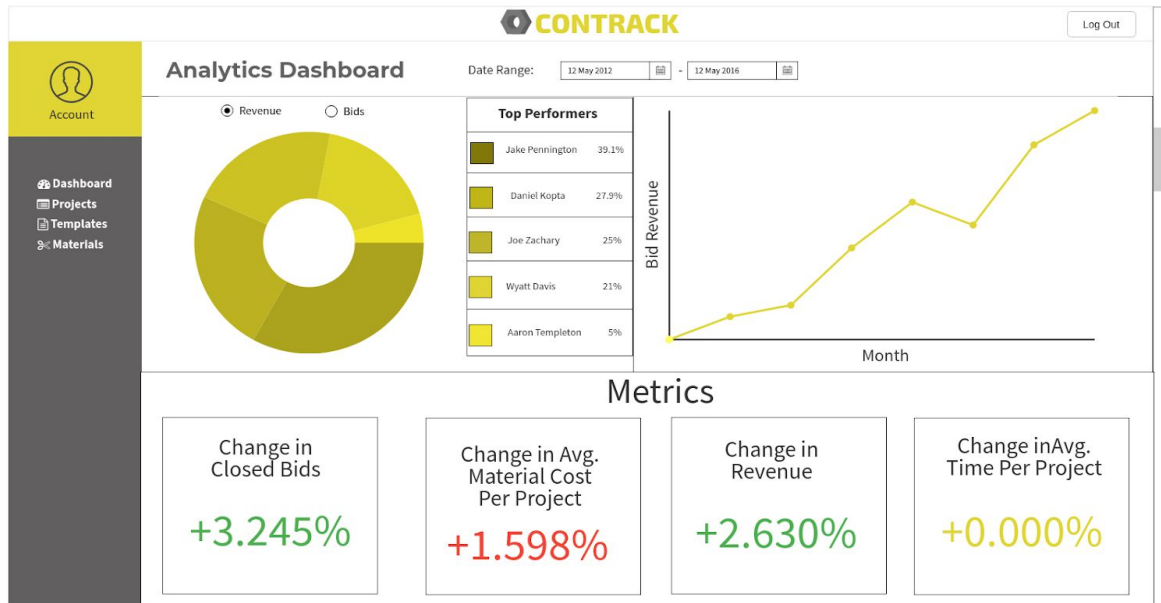


Figure 1

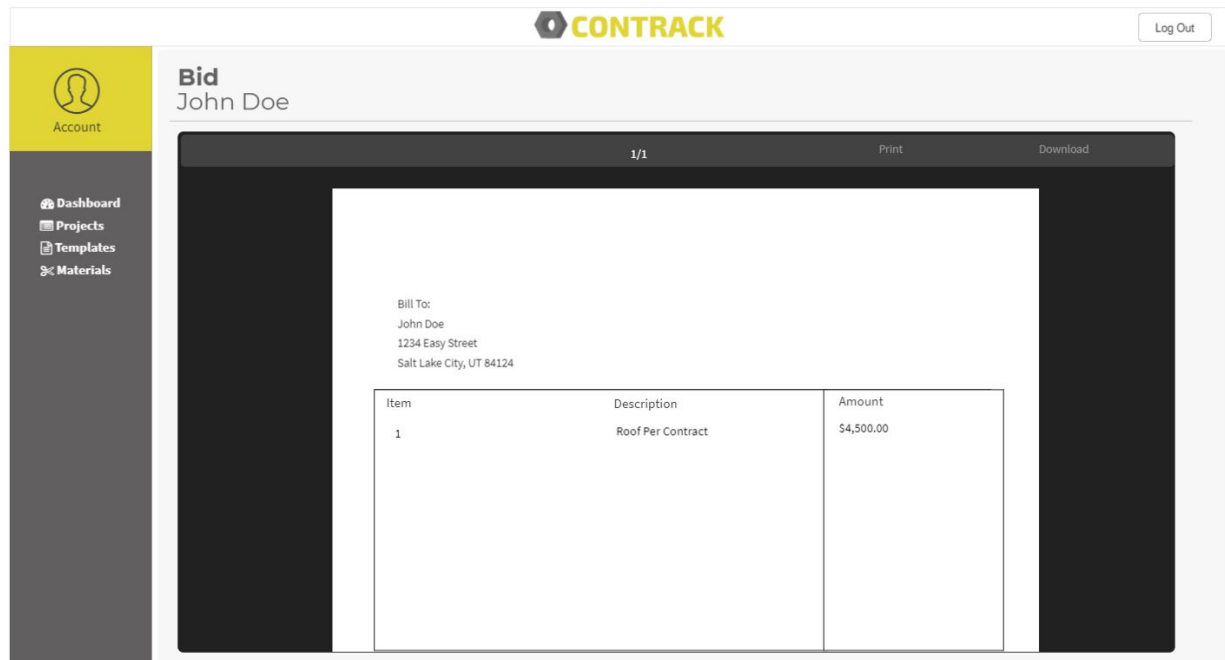


Figure 2

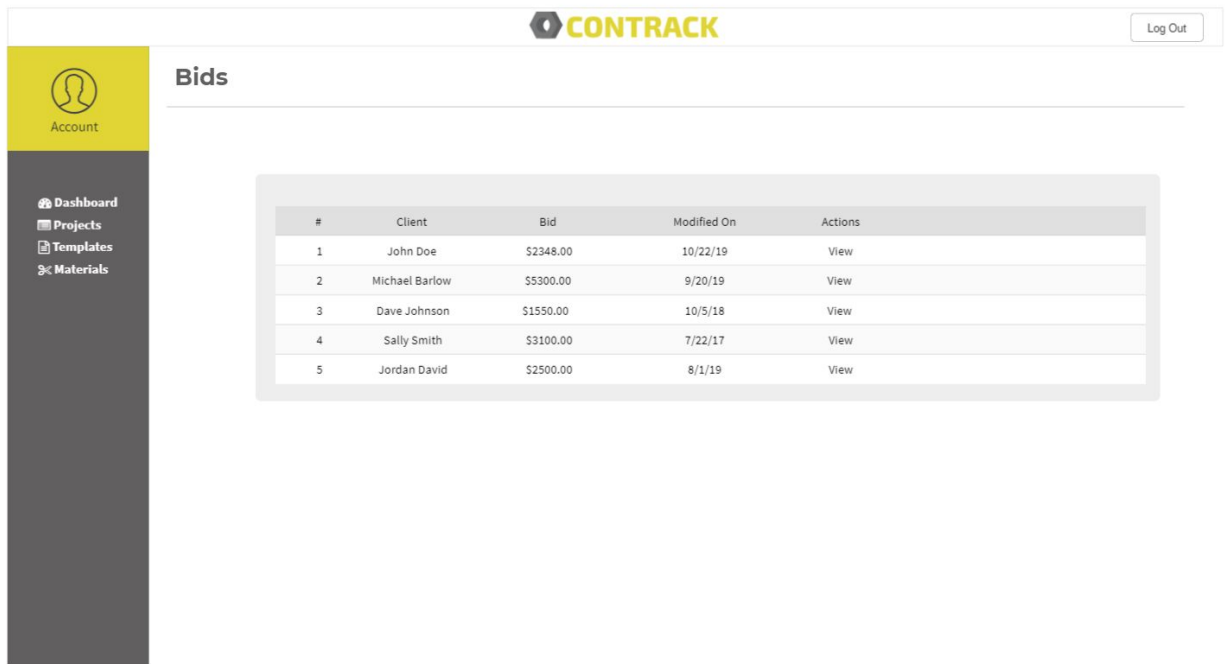


Figure 3

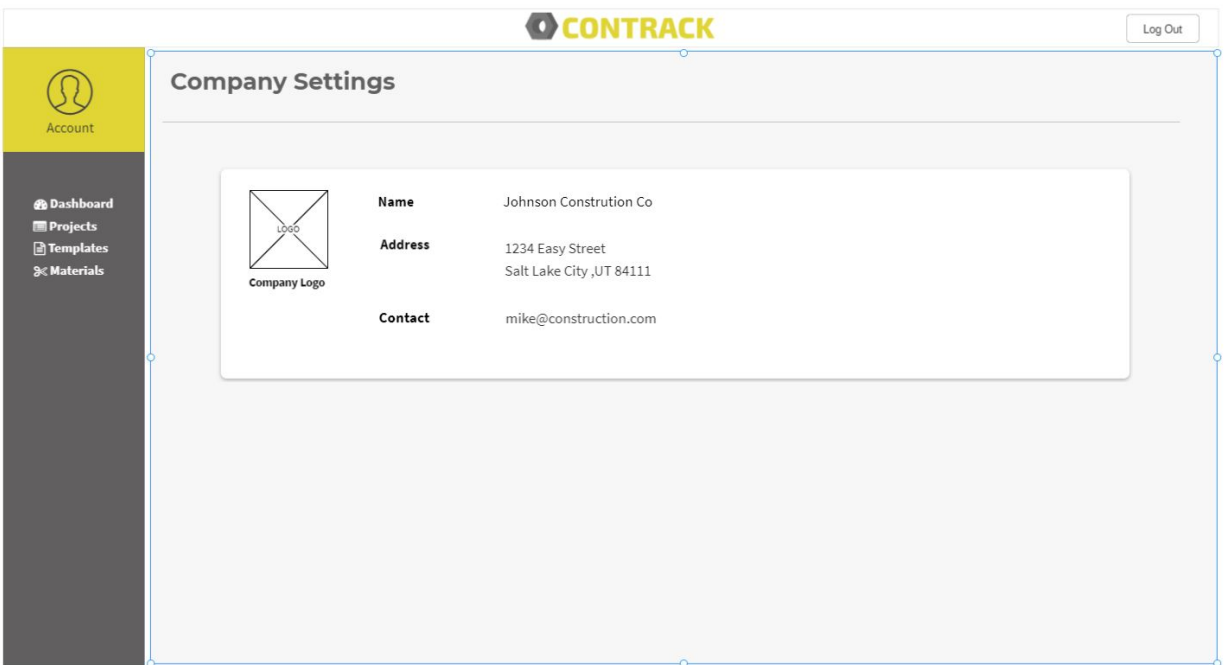


Figure 4

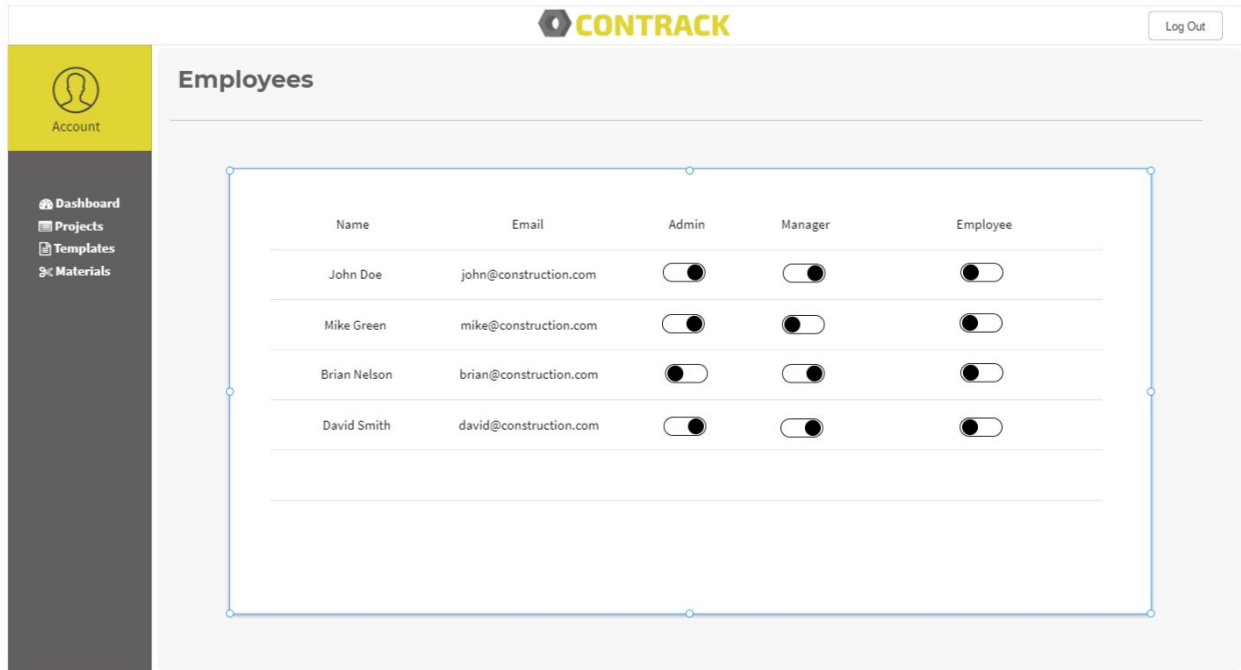


Figure 5

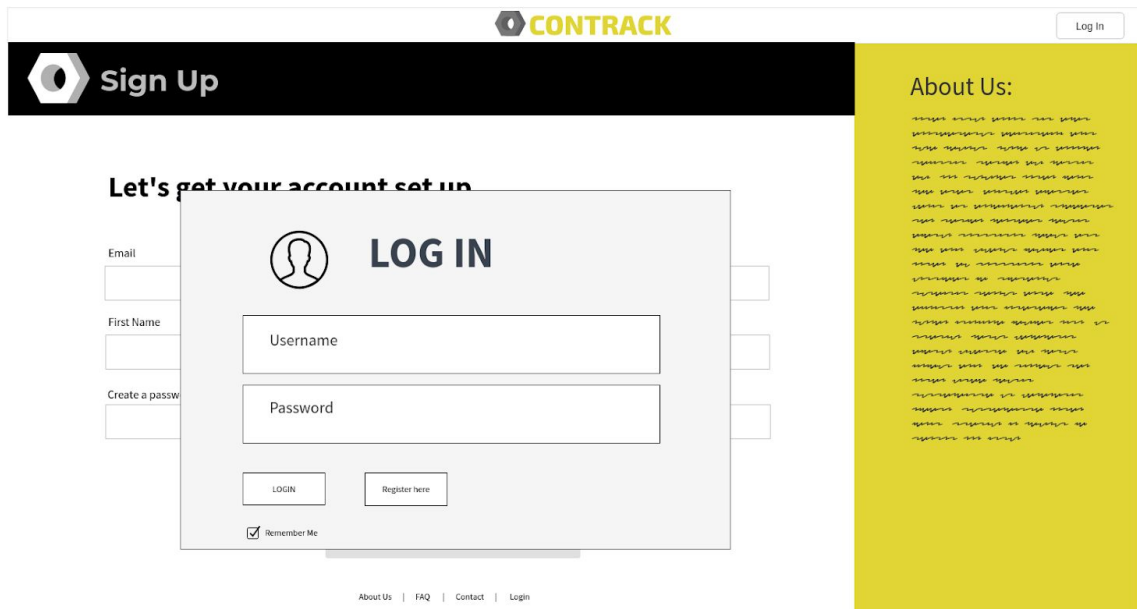




Figure 6


Log Out



Account

Dashboard

Projects

Templates

Materials

## Material - Create


**Name**


**Description**

**Price**

Save
Cancel

Figure 7


Log Out



Account

Dashboard

Projects

Templates

Materials

## Material

### Black Shingle

**Name**  
Black Shingle


**Description**  
Midnight Black Shingle made by Owens Corning

**Price**  
\$20.00 sq/ft.


Edit
Delete

Last Modified: 10/22/19  
Created on: 8/1/19

#### Creators



John Doe  
Manager



Mike Green  
Manager

Figure 8

Log Out

Account

Dashboard
Projects
Templates
Materials

## Material - Edit

### Black Shingle

**Name**

**Description**

**Price**

Save
Delete

**Creators**

X

X

Figure 9

Log Out

Account

Dashboard
Projects
Templates
Materials

## Materials

Add Material

#	Name	Price sqft	Actions
1	Black Shingles	\$20.00	View Edit
2	Roof nails	\$5.00	View Edit
3	Dry-in Roof Paper	\$15.00	View Edit
4	Drip Edge	\$15.00	View Edit
5	Vinyl Siding	\$25.00	View Edit

Figure 10

Log Out

Account

Dashboard

Projects

Templates

Materials

## Create a Project

Project Name:

Project Description:

Dimensions:

☒ Feet
☐ Meters

Height:
Width:

Cost Breakdown:

Tax Rate: %

Total Cost of Materials.....
\$2000.00

Total Cost of Labor.....
\$900.00

Total Extra Costs.....
\$1200.00

Tax.....
\$410.00

Discount.....
\$0.00

Total:
\$4510.00

Create Project

Materials:

#	Name	Cost per Unit	Quantity	Remove
1	Black Shingles	\$20	<div></div>	X
2	Roof Nails	\$5	<div></div>	X
3	Dry-in Roof Paper	\$15	<div></div>	X

Add

Cost of Labor:

☒ Number of Workers:

Select

Rate:
Hours:

or

☐ Flat Rate:

Other Costs:

#	Name	Cost	Remove
1	Equipment Rental	\$1000	X
2	Inspection Visit	\$200	X

Cost Name:
Cost:

Add

Figure 11

Log In

Sign Up

## Let's get your account set up

Email

First Name

Create a password

Organization Name

Last Name

Create a password

I agree Buffer Terms of service
☒

[Already have an account?](#)

Signup

About Us | FAQ | Contact | Login


About Us:


Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

Figure 12

24




Log Out

  
 Account

Dashboard  
 Projects  
 Templates  
 Materials

## Project Template - Create


**Name**


**Description**

**Materials**

Search

Figure 13


Log Out

  
 Account

Dashboard  
 Projects  
 Templates  
 Materials

## Project Template - Edit

Roof Template 1

**Name**

**Description**


This is the primary roof template for any roof with regular black shingles, paper, drip edge, and nails. no specialty

**Materials**

Search

Black Shingles
roof paper
nails

**Creators**



John Doe  
 Manager

Figure 14

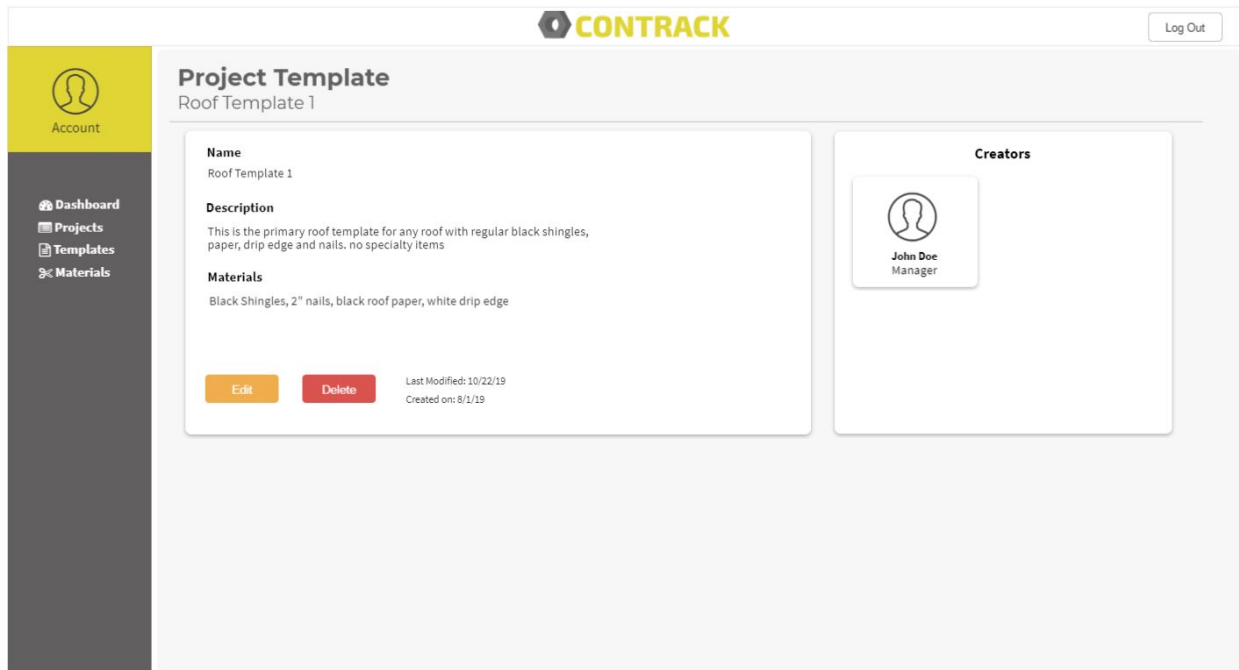


Figure 15

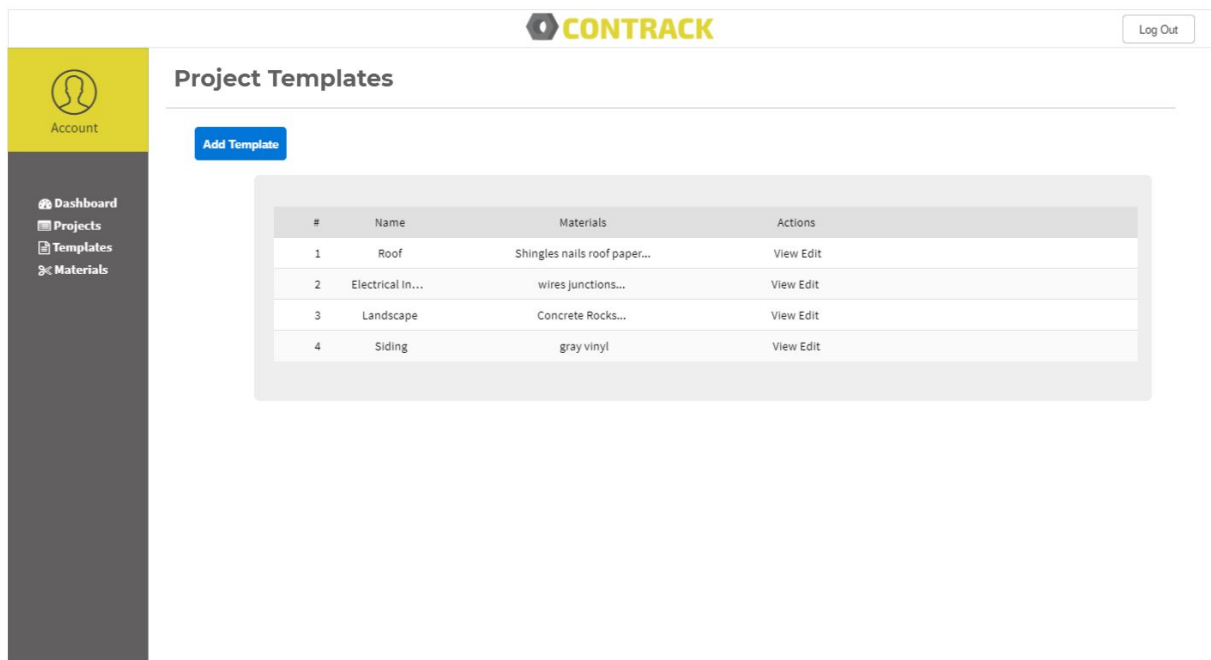


Figure 16

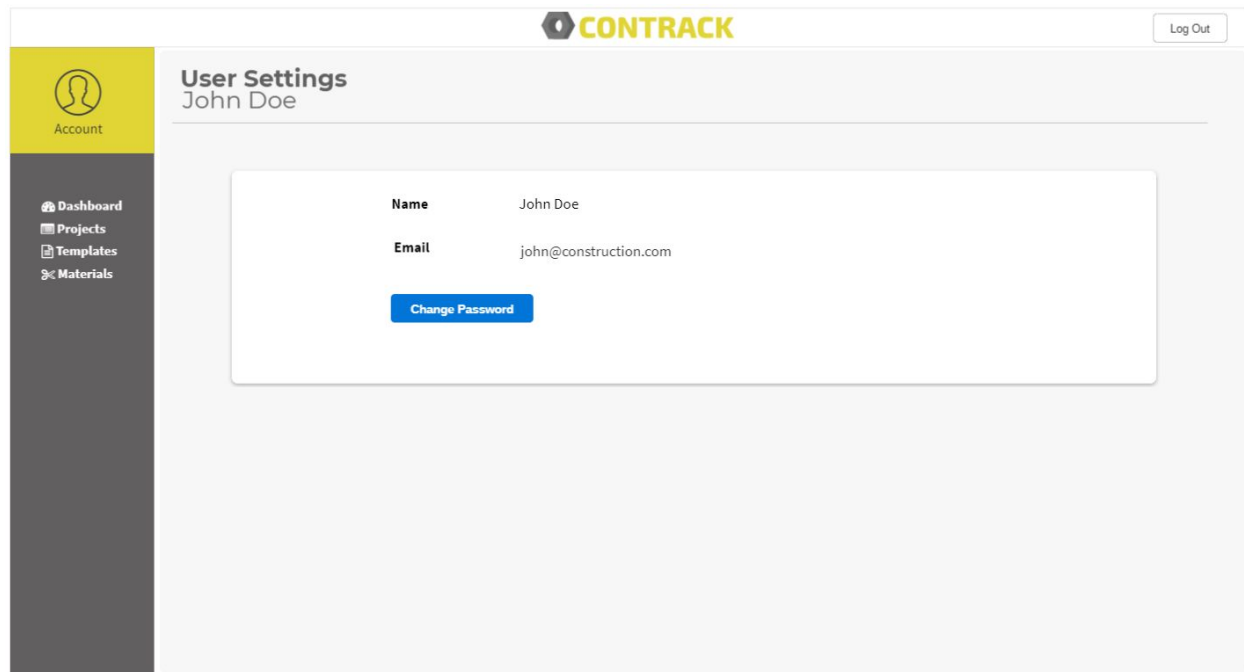


Figure 17

CONTRACK

Log Out

Account

Dashboard

Projects

Templates

Materials

Projects

















Number	Project	Customer	Bid	Edit	View	Delete
1	Doe House Roof	John Doe	\$2348.00			
2	Replace Barlow Home Roofing	Micheal Barlow	\$5400.00			
3	Johnson Living Room Extension	Dave Johnson	\$6543.23			
4	Redo Smith Gutter	Sally Smith	\$365.45			
5	Demolish and Rebuild the Johnson...	Jordan Johnson	\$10000.00			
	NEW PROJECT					

Figure 18

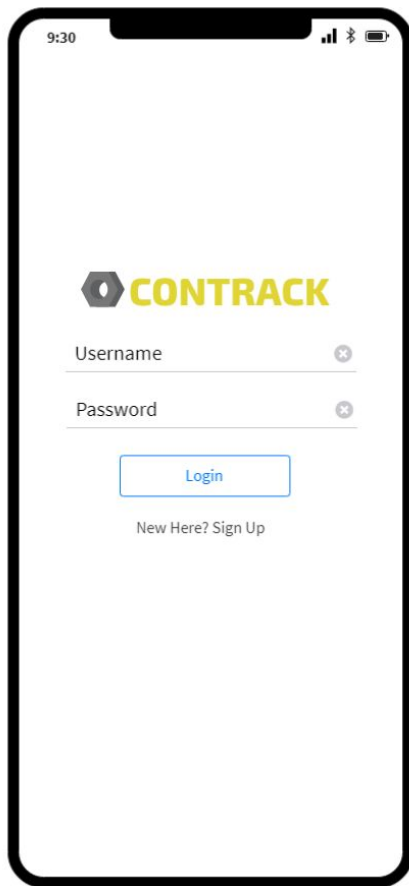


Figure 19

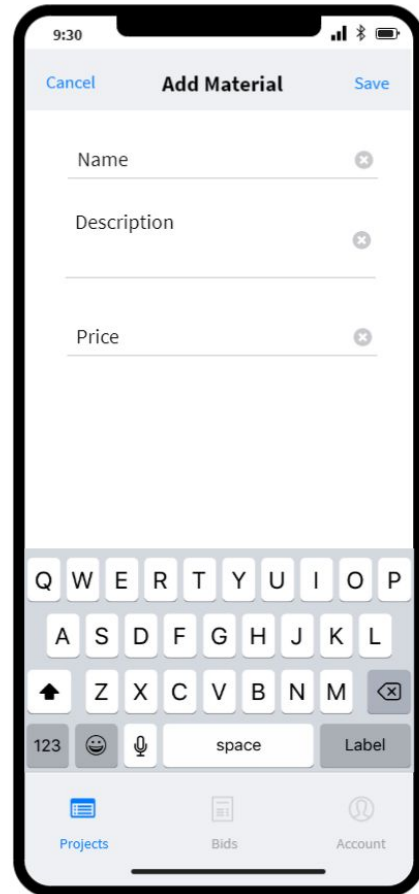


Figure 20

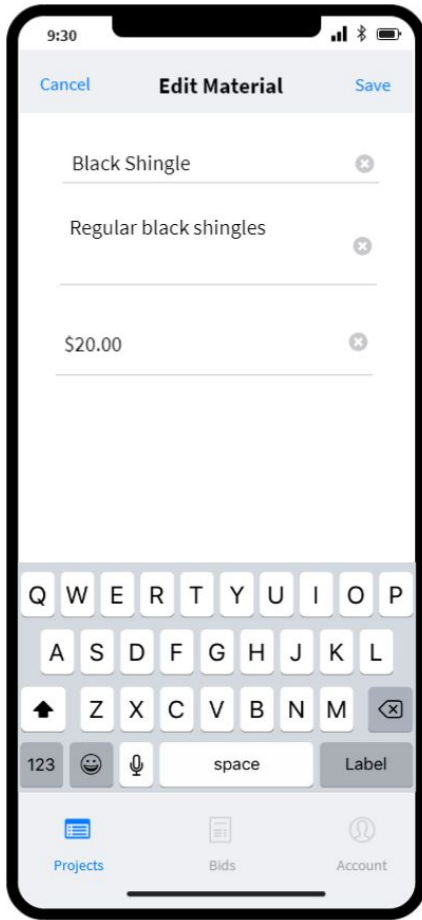


Figure 21

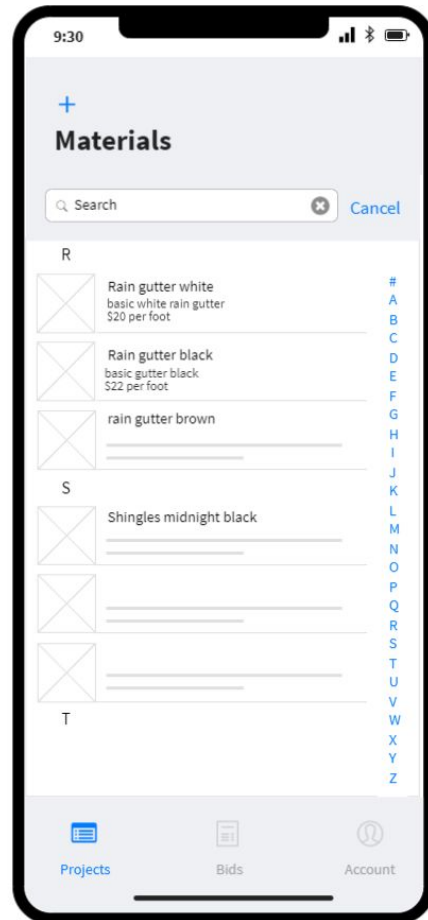


Figure 22

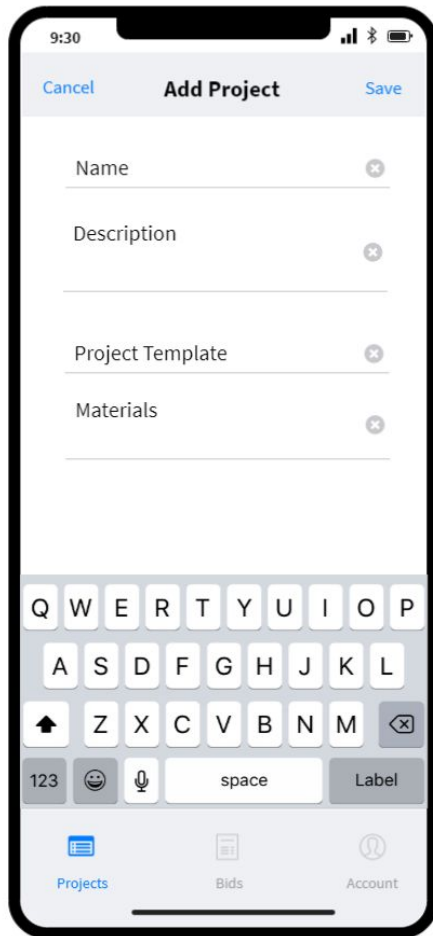


Figure 23

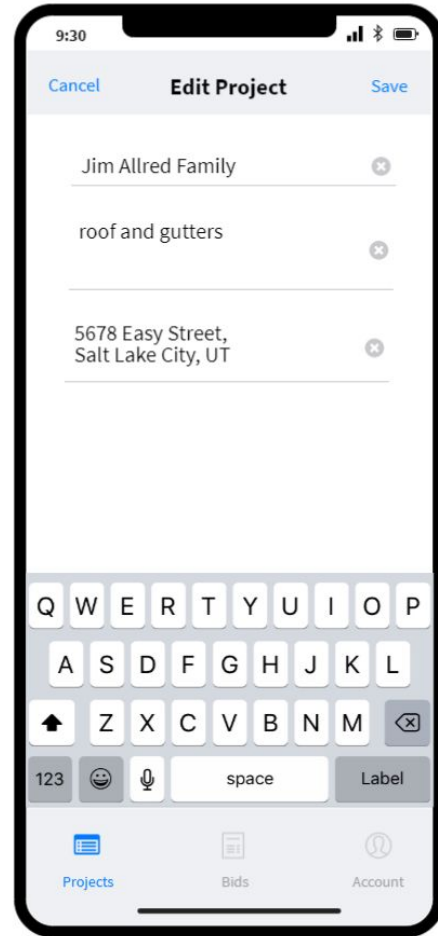


Figure 24

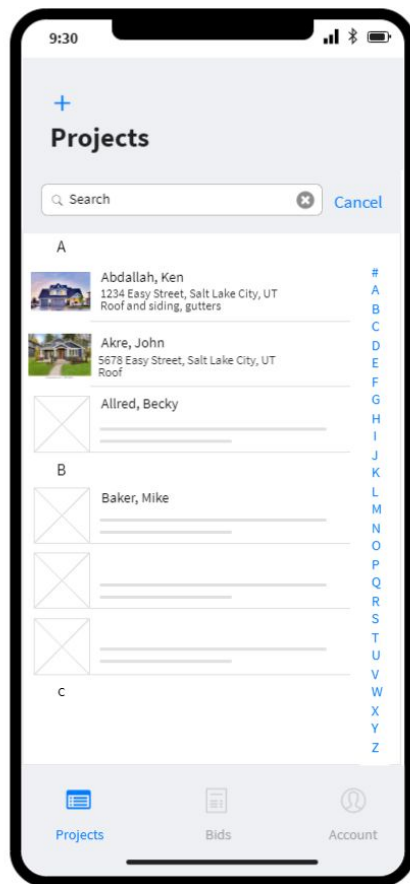


Figure 25

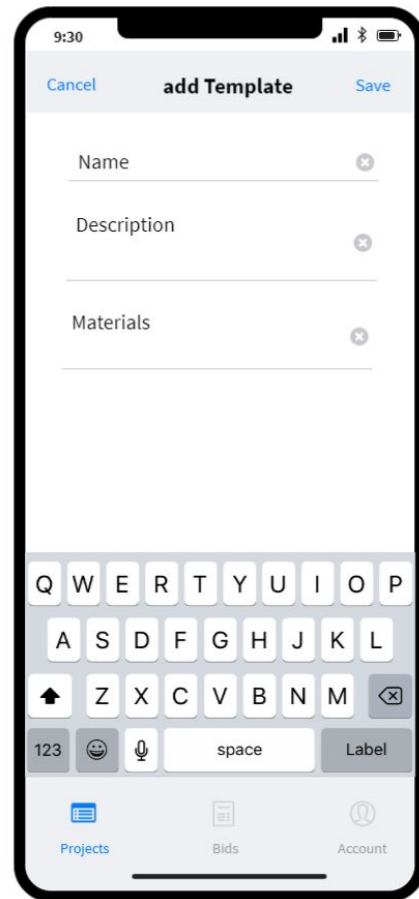


Figure 26



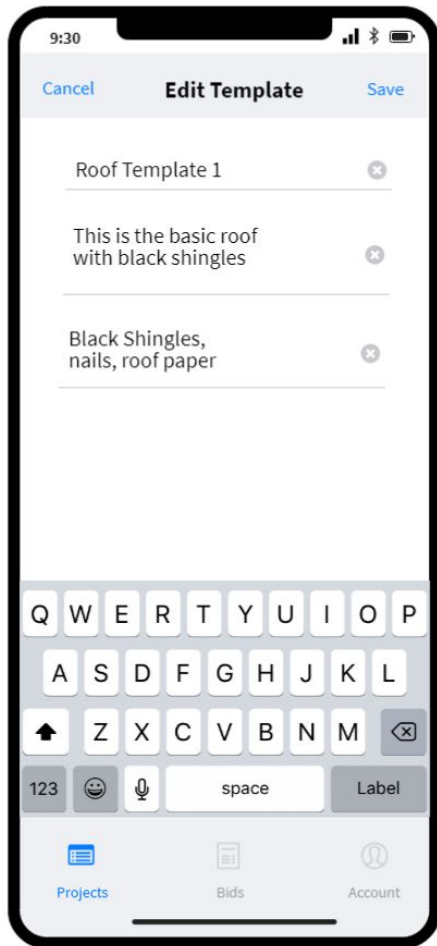


Figure 27

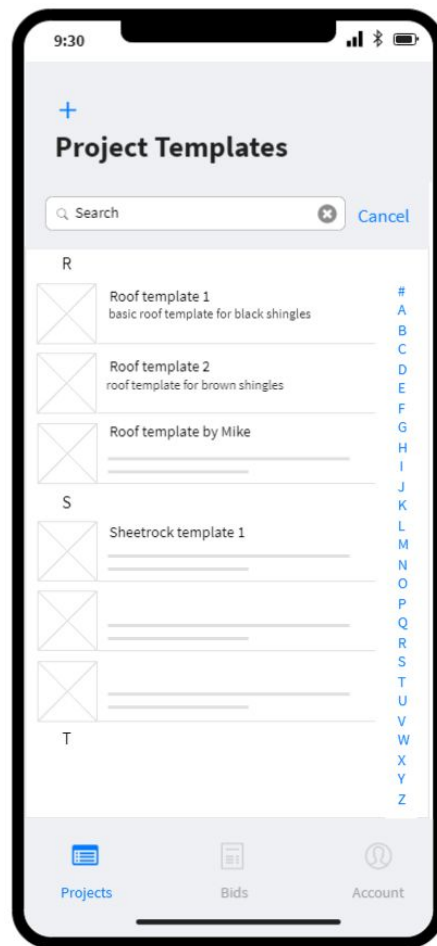


Figure 28

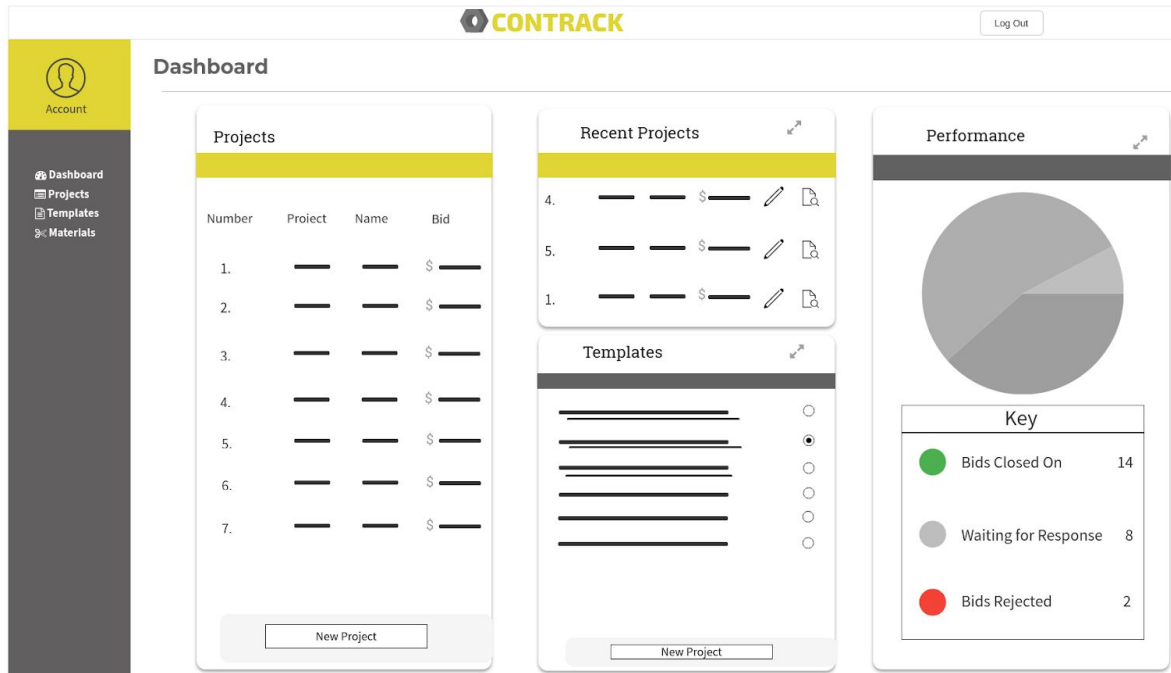


Figure 29