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| **Stages** |

1. Build initial Angular prototype (150 hours)  
2. Convert into Mobile Application using NativeScript (200 hours)  
3. In Field Testing and Debugging (100 hours)  
4. Deployment, Hosting and Production Release ( 50 hours)  
 (500 hours) Total  
 **Front End (Angular)**  
  
1**. Initial Application setup**2**. Install Material Design and styles    
3. Build GPS Location Path Calculation Engine**

4. **Create Components**

* Exterior Map Component
  + Render static map of the GBC Exterior View image
  + Add location pin for starting location in Parking lot
  + Create Hot Spots on the Buildings, that allow for hovering and selecting destination
  + Use HTML5 Canvas to draw and overlay the direction path to destination Building
* **Building Floor Selection Component**
  + Dropdown selection control that lists the Building Floors
  + On Floor selection and Dialog with popup and render the Building Floor Plan image
* **Interior Map Component**
  + Render static map of the GBC Interior Building.
  + Determine the interior map to display based on the selected Building
  + Use HTML5 Canvas to draw and overlay the direction path to destination room
* **Room Selection Component**
  + Dropwdown selection control that lists the Room number of selected Building Floor
  + On Room selection, a location pin will appear on the destination room location

**5. Create Routes**

* Exterior Map routes to render components
* Interior Map routes to render components

**6. Create Services**

* **Exterior Location Service**
  + Determine static GPS starting points for Exterior Main Points (Parking Lot, Building A-C)
  + Calculation engine to determine the current User GPS position and destination position
* **Building Service**
  + A service that contains a list of the buildings and details
* **Interior Location Service**
  + Determine static starting points for the Interior Main Entrances
  + Calculation engine to determine the current User GPS position and the destination position
* **Interior Room Service**
  + A service that contains a list of Interior rooms (Ground Floor only) for a selected Building

**7. Connect Angular services to Backend Server**

* Http Client and RxJs library to call the backend API endpoints

**Backend (Node/Express/MongoDb)**

**[Node.js]**

**1. Initial Node.js Server setup**  
**2. Install and configure Express API**  
**3. Create Express API routes**

* Build routes to handle the HTTP Requests for Location Service
* Install middleware bodyparser and mongoose
* Build Mongoose queries to return data from MongoDb

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4. Create DTO Models and Mongoose Schemas  
  
**[MongoDb]**  
  
1. Initial Setup for Mongo Atlas Cloud hosting