**Needs Identification and Problem Statement**

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**Project goal:** development of a solution to allow EllisDon’s construction team in the field to easily view multidisciplinary Building Information Model (BIM) in Virtual or Augmented Reality (VR/AR) on a mobile device. This increases productivity since there is less information lost in the transition and interpretation between 3D and 2D models of the building. This allows for less people to work on buildings over a much shorter time period.

**Needs and Design Constraints:** (Priorities: 1 [Crucial], 2 [Highly desirable], 3 [Desirable])

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| **Needs** | **Additional notes** | **Priority** |
| Ability to view 3D BIM in VR/AR | * Customize the view and isolate the multidisciplinary systems of that room. | **1** |
| Compatibility | * Should be compatible with common mobile devices and tablets using iOS or Android | **1** |
| Affordable | * The software application should be open source and free to use. * The product must be $50 or less * Be able to use affordable VR/AR systems | **2** |
| Easy to use | * User friendly, regardless of the technical skill level * Training and ease of implementation documentation should be provided | **1** |
| Offline use | * Should be able to download 3D model and view anywhere | **1** |
| Versatility | * Allow use of different files/building models * Access 2D model * Access to multiple users | **3** |
| User Interface | * Be able to change rooms/floors * View dimensions | **2** |
| VR/AR Functionality | * Compatible with VR/AR platforms such as Google Cardboard * For AR, first-person view preferred | **3** |

The client has requested that compatibility and ease of use be some of the most important aspects of the deliverable. It is essential that the software be accessible on both iOS and Android, display the 3D model in a VR environment, be user friendly, and be available offline. Functions that would be seen as assets include compatibility with VR/AR headsets, access to the 2D model, and access to multiple users.

**Problem Statement:**

EllisDon’s construction team requires an affordable, versatile, and easy-to-use software to view multidisciplinary Building Information Model (BIM) via VR/AR technology on commonly used mobile devices.

**Benchmarking:**

Since our task is to view the BIM our benchmarks will be against other methods of understanding plans.

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| **Products** | **Performance** | **Comfort** | **Ease of Use** | **Cost** |
| **Our solution (AR)** | 8/10  Be able to view multidisciplinary BIM through VR. | 7/10  Cardboard VR goggles are relatively uncomfortable. | 10/10  No information will be lost in the transfer as it stays in 3D and does not go to 2D. | < $50  Access to a phone and cardboard goggles. |
| **BluePrints** | 6/10  The level of detail and scale is fixed not allowing for optimizing the sketch for specific zones. | 6/10  Manipulating a large sheet of paper on job sites is awkward. | 6/10  Blueprints can be difficult to read at times leading to confusion and delayed work. | < $300  Printing blueprints can be expensive and a burden to store correctly. |
| **Digital Blueprints** | 7/10  Digital blueprints have more options and flexibility such as zoom and editing. | 8/10  Easily stored in a bag and held in the hand. Very easy to walk with. | 7/10  Following a drawing on a screen can lead to confusion and loss of information | > $500  Need to own a tablet capable of opening/editing a PDF. |