

CS4760 Project Assignment 6 - App Description 2
Urban Green Stormwater Management
Group 4

- **App Idea**

The Urban Green Stormwater Infrastructure app (UGSI) allows a user to learn about the importance of having green spaces within our urban environments. The user can learn about the various types of UGSI, why we need more of these spaces, and how they assist with draining excess water to reduce flooding. The educational section of our app will include text information and visual examples of these spaces. A map will be included showing known UGSI spaces, to allow the user to visit it themselves.

In addition to learning about UGSI, the users can identify green stormwater infrastructure in their own urban environments and upload pictures and location data for researchers to analyze. Pictures of urban flooding can be used by researchers to later identify where more green spaces could be needed. Users can categorize the green infrastructure with their best guess of which category the space falls into. Researchers can also review the data within the app, both in table format and map view.

Our stretch goals also include additional features, time permitting. We would like to allow the photos that users upload to be screened by researchers, and after they are approved, appear on the map. Users could also be able to create an account, and compete with other users to see who can upload the most photos.

- **Users**

- Researchers
 - Use the data collected by users (pictures, geolocation) to identify areas that are more prone to flooding due in part to lack of green spaces. The Researchers could also use the app as any other user would in the field to tag locations that they find. Researchers will have access to a database where the information is uploaded.
- Students (High school level)

- Students could learn more about their surrounding environments and flooding prone areas by using the education section of the app.
- Teachers
 - Teachers could integrate the app into their curriculum as an interactive way to learn about green stormwater infrastructure. While this is not a specific goal of the project it was suggested as an option by the researchers.
- Users interested in green stormwater infrastructure
 - Users that are interested in green spaces and their impact on flooding can download this app to learn more about their importance. These users are more likely to engage in uploading pictures and geolocation of the spaces for research purposes than other users might be.
- All other users
 - Any user could use the app to learn more about why green stormwater infrastructure is important. This user group covers a large demographic of potential users, but more likely of older age.
- **Major Workflows**
 - Home page
 - Users will land on this page when visiting the website. A map will be shown of the current green stormwater infrastructure in a given area, and a sidebar with navigation options will be shown on the left side of the page.
 - Users can select labeled buttons to navigate to other workflows from this left sidebar.
 - How to use/Features
 - Education
 - Picture upload
 - Users can collapse the sidebar, and pan/zoom around the map to get a closer look at the green stormwater infrastructure, and surrounding areas to identify impermeable ground nearby (concrete areas that don't let water drain).
 - Education
 - Why green stormwater infrastructure is important for our urban areas.

- What types of green stormwater infrastructure exist.
- What are we trying to learn now (current research).
- What you (the user) can do to assist with stormwater draining.
- Research view
 - Researchers will have access to both a table and map view of the data that the app contains.
 - Two buttons at the top of the page will allow the researcher to switch between the two views.
 - When user uploaded location data/pictures, researchers will be able to to “approve” or “deny” the uploads, after which they will appear on the user map.
- How to use app
 - Users will be met with a simple page containing what features the app has
 - Under each listed feature, a short “how to use” paragraph will be included. Photos will also be included as necessary.
 - There will also be links under each feature explanation where the user could go to that feature directly after learning about it.
 - At the top/bottom of the page, there will be a button that allows the user to return to the homepage
- Upload picture/categorize
 - When users select upload new green area, they will be taken to a new page
 - The page will briefly explain what they should try to include in the photo (flooding, part or all of a green area)
 - User chooses “take photo” or “upload photo”
 - Take Photo:
 - The user will be prompted with a pop up that photo/location access will be needed
 - “Allow access to camera prompt”
 - Possibly “allow access to location” prompt, depending on our photo metadata findings.

- User can verify they would like to upload by selecting “confirm upload” button
 - Upload Photo:
 - Taken to a page with an upload file button
 - The button opens a devices file explorer to allow the user to select the photo they would like to upload
 - User can verify they would like to upload by selecting “confirm upload” button
 - A “thank you!” Pop up will appear after the user uploads a photo, also verify to them that the upload worked.
 - Users will be returned to the homepage after upload.
- **Views** – Now that you have a clearer vision of the app, you can list major views (pages) that your app will have. You can also list the widgets of the views.
 - Map Page
 - Map shows locations of green stormwater infrastructure in a given area
 - A left sidebar will allow the user to navigate to different pages of the app.
 - Education Page
 - Teaches users about the importance of green stormwater infrastructure.
 - How to use page
 - Explanation of the app's features and how to use them.
 - Picture upload Page
 - Where users will take/upload pictures of green stormwater infrastructure that they find in their daily lives.
- **Data** – Your list of data types can be more complete and more specific.
 - Green Stormwater Infrastructure education data
 - Provided by researchers, why these areas are important for us
 - Green stormwater infrastructure Map data
 - Research that has been already collected and will be included in the map
 - Photo Data
 - User uploaded photos of green stormwater infrastructure that they see in their daily lives

- GPS Data
 - Photo uploads are tagged with location data, so the researchers can accurately include that area in their research.
- Categorization data
 - Users can categorize the green stormwater infrastructure that they find and upload. This data may or may not be used by researchers, or at least screened before research use
- Stretch goals
 - Dimensions of the green space (user provided)
 - Research view
 - Account data
 - Username, login
 - Number of uploads
 - Comments
- **Anticipated Challenges** – Now that you have a clearer vision of the app you identify challenges. These challenges include both usability and implementation challenges. Usability challenges are generally related to errors that user may make.
 - Implementing an interactive map
 - Users have the expectation that digital maps will work similarly to google/Apple Maps. We need to ensure that most map features that are common to other mapping software are present with ours so most users will know how to navigate already. The map will also need to be centered around the current research area, but may need to be expanded if user uploads are eventually included in the map (stretch goal).
 - Database server
 - We will need to determine where this would be hosted. The database won't be huge, and should only need three points of data per row initially (excluding stretch goals); GPS data, picture, user categorization.
 - User engagement
 - Most of the current research data is specific to the thumb area of Michigan. Users who are distant from this area may be less engaged with the map.

- User permissions
 - Users will likely need to allow the app to have access to location and camera data. Most devices tag pictures with location data by default, so location access may not be needed if this is the case. This is likely to vary from device to device (smartphone vs laptop).
- Image Licensing
 - Many of the images provided to us as examples may not be able to be used for our application. We need to ensure that the images we use are properly licensed for our specific use case. Ideally, select from royalty free images if possible.