# Community Health Maps Lab Series:

## Lab 1A—Field Data Collection With iOS (Apple Devices)

**Objective: Understand Field Data Collection**

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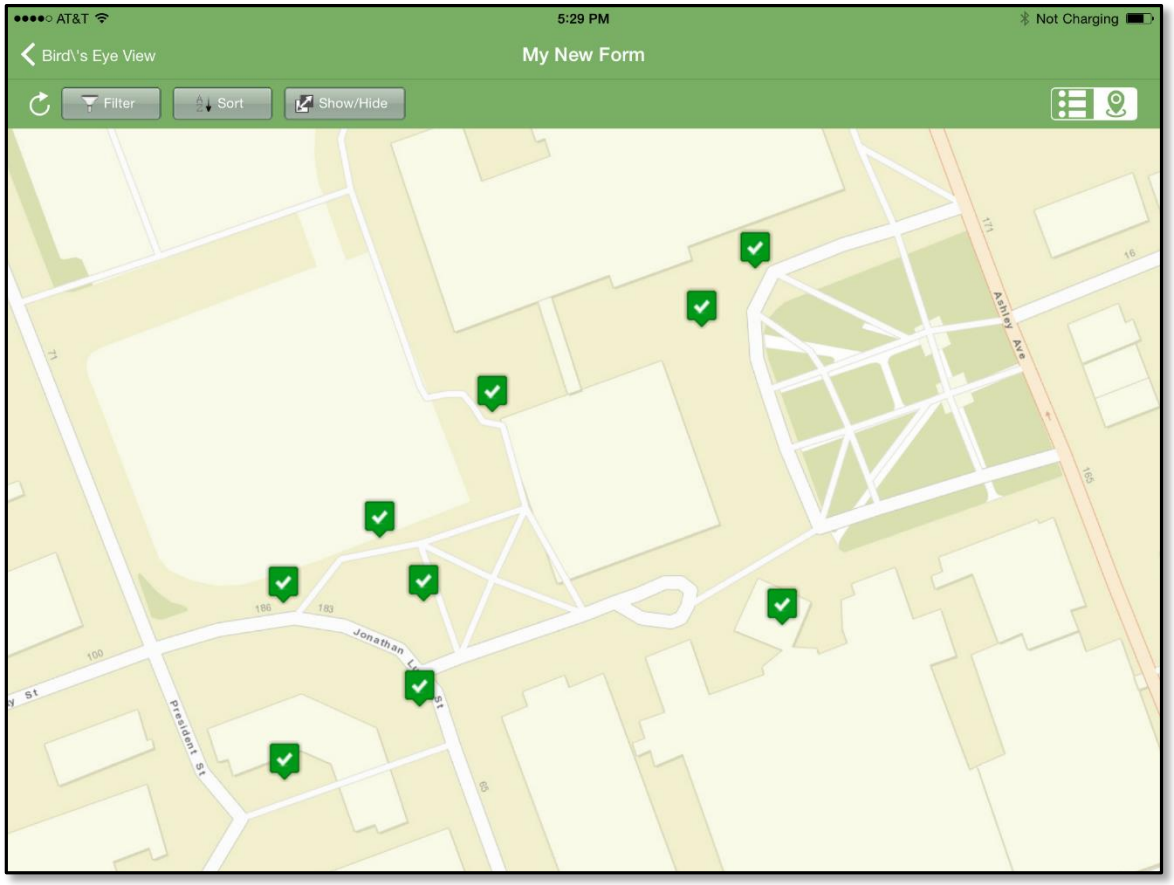


This course is a collaborative effort between the National Library of Medicine, the Center for Public Service Communications, and Bird's Eye View.

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# 1. Introduction

Rather than focusing on the use of expensive GPS receivers, we envision the use of smartphones and tablets for these reasons:

- Most community-based organizations already have them
- Many know how to use them
- They're intuitive
- They're portable
- They come with an onboard GPS receiver (iPhone 5 uses GPS + GLONASS)
- Have onboard cameras
- Can connect to wireless networks
- Access to the Internet
- Email is available
- "There's an app for that!"

Equally as important, they are accurate enough for most public health community mapping needs. For a discussion on their accuracy read this Community Health Maps blog post on smartphone accuracy.

There are a myriad of data collection apps available. Part of choosing one comes down to the operating system you are using. In this lab, students will explore field data collection using iPads and iPhones. You will learn how to use the free app iForm.

This lab includes the following tasks:

- Task 1 – Create an account on iFormBuilder.com
- Task 2 – Develop a data collection form
- Task 3 – Install the iForm app on your mobile device
- Task 4 – Collect field data
- Task 5 – Download data from the server

# 2. Objective: Explore and Understand Field Data Collection

In this lab exercise, you will learn how to set up an iPad or iPhone to collect health care facility locations, including the name, facility type, facility contact information, collector's name, the date, and photographs of each. You will then go outside with your configured iOS device and collect some field data. In the final task, you will learn the options for viewing the data on the mobile device.

# 3. How Best To Use Video Walkthrough With This Lab

To aid in your completion of this lab, some lab tasks have an associated video that demonstrates how to complete the task. The intent of these videos is to help you move forward if you become stuck on a step in a task, or if you wish to see every step required to complete the tasks.

We recommend that you do not watch the videos before you attempt the tasks. The reasoning for this is that while you are learning the software and searching for buttons, menus, and other features, you will better remember where these items are and, perhaps, discover other features along the way if you discover them on your own. With that being said, please use the videos in the way that will best facilitate your learning and successful completion of this lab.

# 4. Lab Tasks

## Task 1. Create an Account on iFormBuilder.com

The mobile iForm app you will be using for field data collection has a companion website: http://www.iformbuilder.com/. Here you can establish a free account. Later you will be using this site to develop your data collection form.

1) To begin you will establish a free online account at the iFormBuilder website.
   a) Open this web page.
   b) Click **Start Free Account.**
   c) Fill in the Company Name, E-mail address, and Phone #.

**Figure 1. iFormBuilder website**

   d) You will receive an email asking you to activate your account.
   e) Follow the instructions in the email to activate your account.

## Task 2. Develop a Data Collection Form

Watch a Task 2 Video Walkthrough on YouTube.

Now that you have an iFormBuilder account you will learn how to design a data collection form.

In this task, you will identify the data you will collect in the field. The form builder site allows you to design a custom questionnaire form. There are over 40 different data elements to choose from while designing your form, such as text, number, date, time, multi-select, pick list, location (coordinates), and images (photographs).

It is important to think about your data collection project goals prior to developing your form. The table below shows an example of a data collection form for public health facility locations. The input name is on the left. The field collector will see that question on the mobile device. On the right is the iForm input type. This is the type of data collected. Below we will walk through how to build this form. After walking through this example, you will be ready to design your own form!

| Input Name | Input Type |
|---|---|
| What is the site name? | text |
| What is the facility type? | pick list |
| What is the phone number? | phone number |
| Take a photo | image |
| Record the location | location |
| Latitude | text |
| Longitude | text |
| Data Collector Name | text |
| Today's Date | date |

**Table 1. Sample form**

## Getting Started

1) Open a web browser and go to the iFormBuilder website.
2) Click **Sign in** (upper right) and log into your account with your email and password.
3) Once you are logged in there will be a navigation bar along the top with the following tabs: **Data** | **Forms** | **Users** | **Company** | **Support**.
4) You will be on the **Data** tab by default whenever you login. The **My Data** window is displayed. With your free account come three sample forms: *Building Inspection*, *Start Here*, and *Talk With Our Team*. You will be creating a new one. (NOTE: Below there is a fourth that Bird's Eye View created that you will not see.)

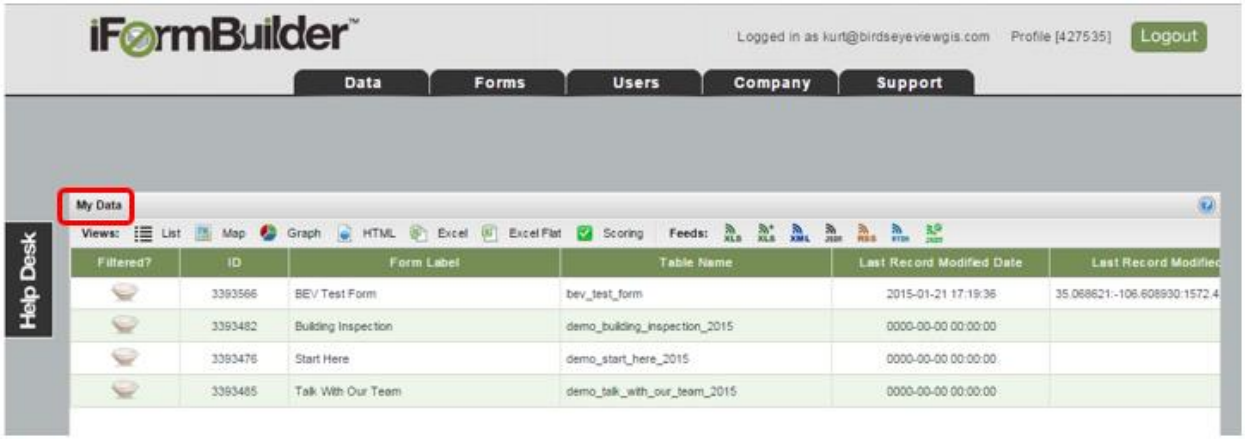



**Figure 2. iFormBuilder control panel**

## Creating a New Blank Form

1) Click on the **Forms** tab and choose **Form Builder**.

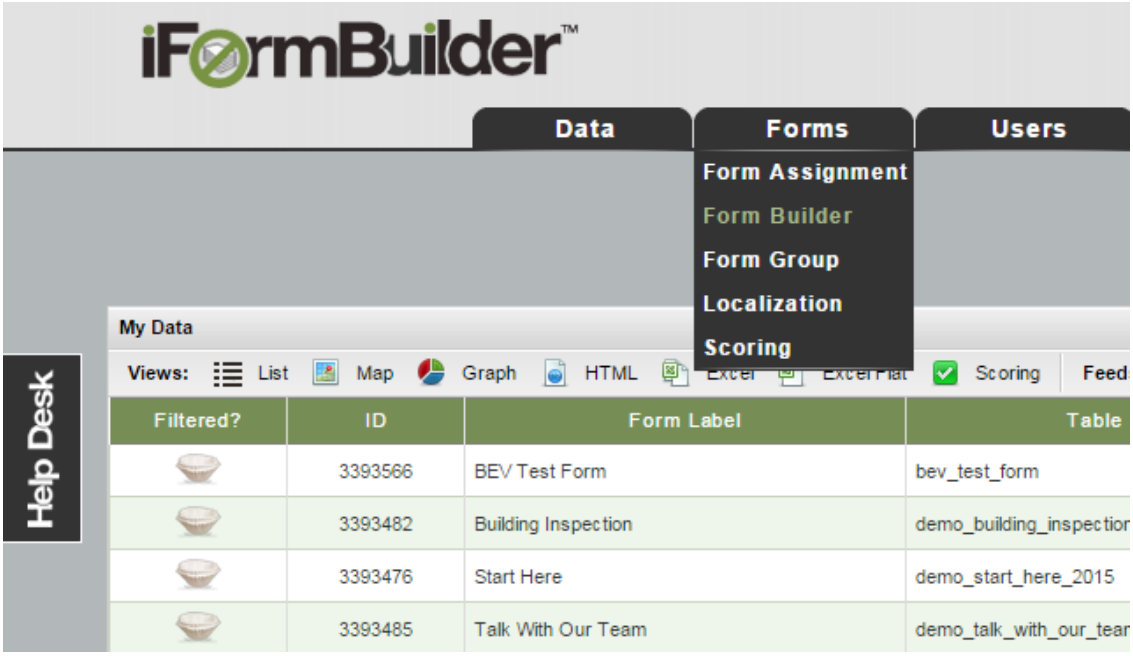



**Figure 3. Opening the Form Builder from iFormBuilder**

2) From here, you can select a pre-existing form, load it, and edit it. You can also create a new form.
3) Click **Create New Form**.

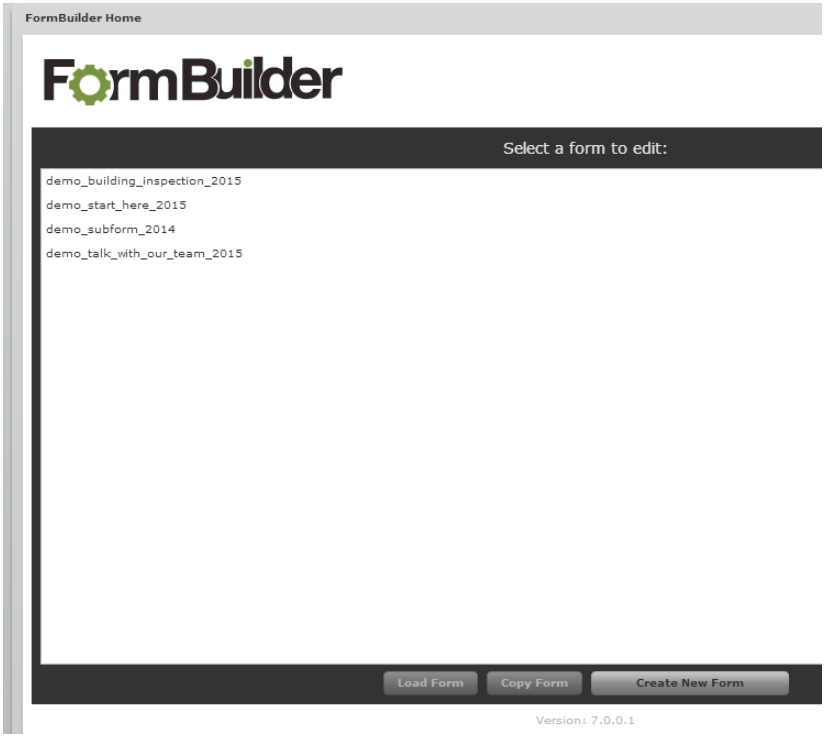



**Figure 4. Select a form to edit window**

4) The **Edit Form Properties** window opens.
   a) Enter "*Health Care Facilities*" as the **Form Label**. The **Table Name** will be entered automatically. The **Form Label** is how the form will appear on the mobile device. The **Table Name** is the name of the table in the iForm cloud database. Use the default **Table Name**.
   b) You are given other options here.
   c) Enter a **Description** and choose a **Form Icon**.

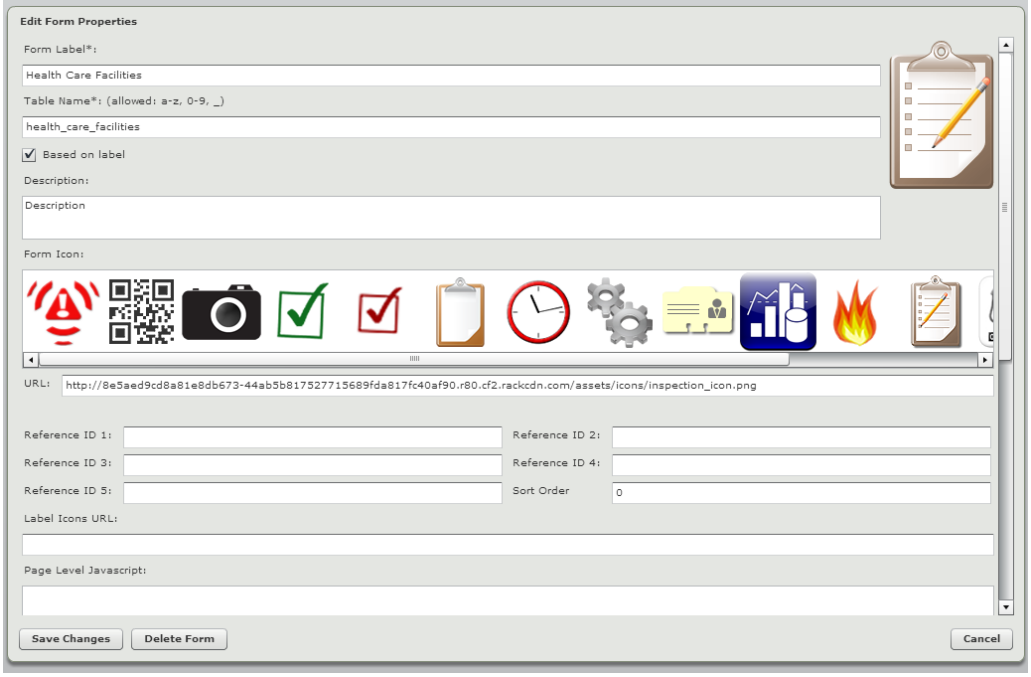



**Figure 5. Edit Form Properties**

5) Once done, click **Save Changes.**
6) The form will then load into **Device View.**

## Adding Form Inputs

The **Device View** shows an approximation of how the form will look on the mobile device. To the right are **Element Properties**. To add questions to your form, you choose **Add New Input,** then you define its parameters from the **Element Properties** panel.

1) Click **Add New Input** to add the first input to the form.
2) On the right, the **Element Properties** window allows you to define the input. It opens to the **Common** section by default.
   a) For the **Label,** type "*What is the site name?*" This is the text that appears on the device.

      By default, the **Based on label** check box is enabled for the **Data Column Name**. When checked, this option uses the **Label** text as the **Data Column Name**. It simply replaces spaces with underscores because database column names cannot contain spaces. If your **Label** is formed as a sentence, it may be best to uncheck **Based on label** and name the column name something shorter.

b) Uncheck **Based on label** and enter a **Data Column Name** of "*site_name*". The **Element Properties** should now resemble Figure 6.

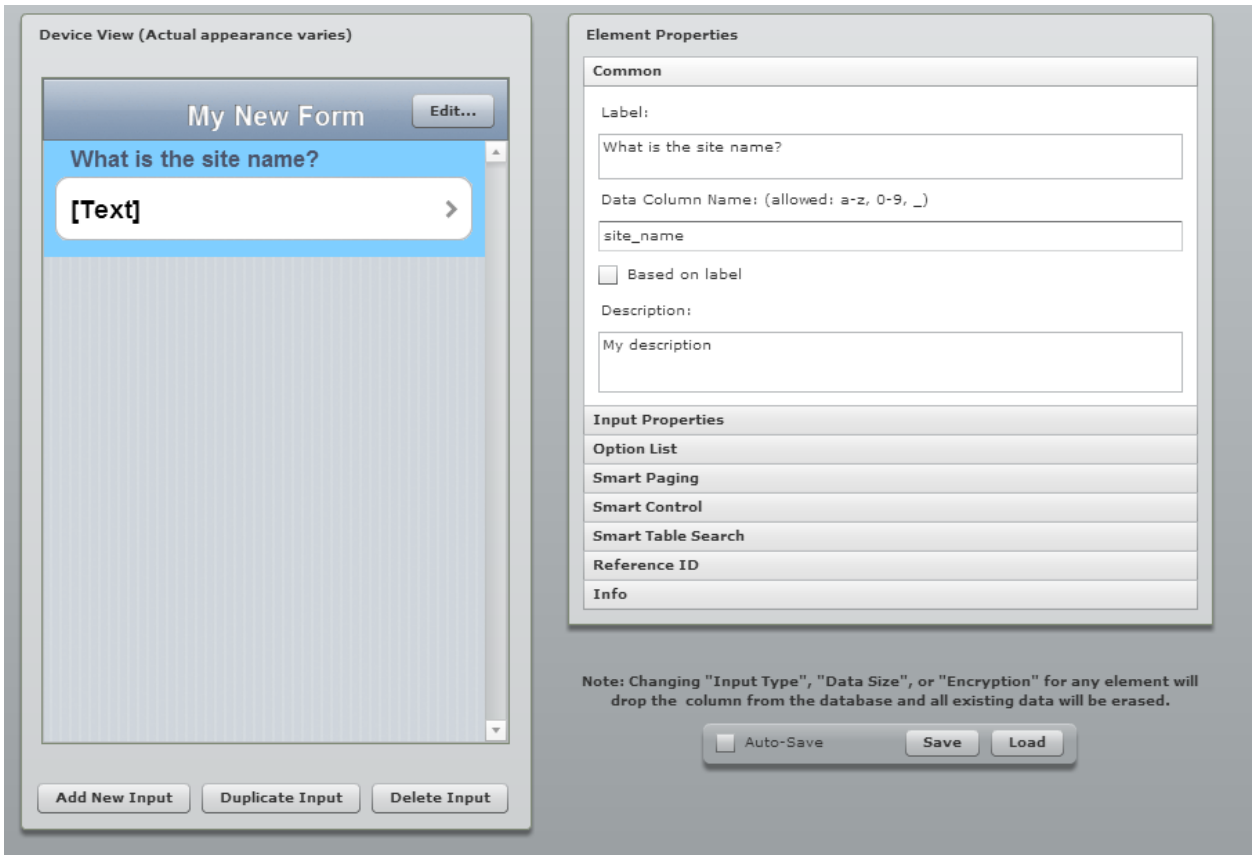



**Figure 6. Device View**

Next you will define what type of input this will be: text, number, date, time, multi-select, location (coordinates), and images (photographs), etc.

c) Click on the **Input Properties** section to open it. This input will be a text column. Click the dropdown arrow for **Input Type** and choose **Text**.

d) Click the **Required** check box. This will make Site Name a required element. Field data collectors will not be able to submit the form until it is populated. Because we always want the site name recorded, that is appropriate. You may want some inputs to be optional.

   You can also specify the **Data Size**. By default it is 50 characters wide. If you anticipate entering site names longer than 50 characters, increase this value.

e) Keep **Data Size** at 50.

**Figure 7. Input Type Element Property**

3) Checking our conceptual form in Table 1, the next input we need to add is *Facility type*. On the **Device View** click **Add New Input**.
4) In the **Common** section of **Element Properties** give it a label of "*What is the facility type?*"
5) Uncheck **Based on label,** and give it a **Data Column Name** of "*facility_type*".
6) Click on the **Input Properties** section. Set the **Input Type** to **Pick List**. This will give the data collector a list of options to choose from. If you have a list of the potential site types, this option will minimize data entry errors. Make it a **Required** input.
7) Click on the **Option List** section, and then click **Option List Manager**. In the **Option List Manager** is a series of Option Lists provided for you. However, you will create a new custom list.
   a) Click the button to create a new blank list.
   b) "*# My Option List*" appears at the top of the list.
   c) Select it and rename the option list to "*Health Care Facilities*".
   d) Click in the text box under **Options in list** and type the first facility type: "*Hospital*".
   e) Continue typing the remainder of the list below and as shown in Figure 8:
      - Clinic
      - Community health center
      - Urgent care
      - Nursing home
      - Hospice
      - Laboratory
      - Other

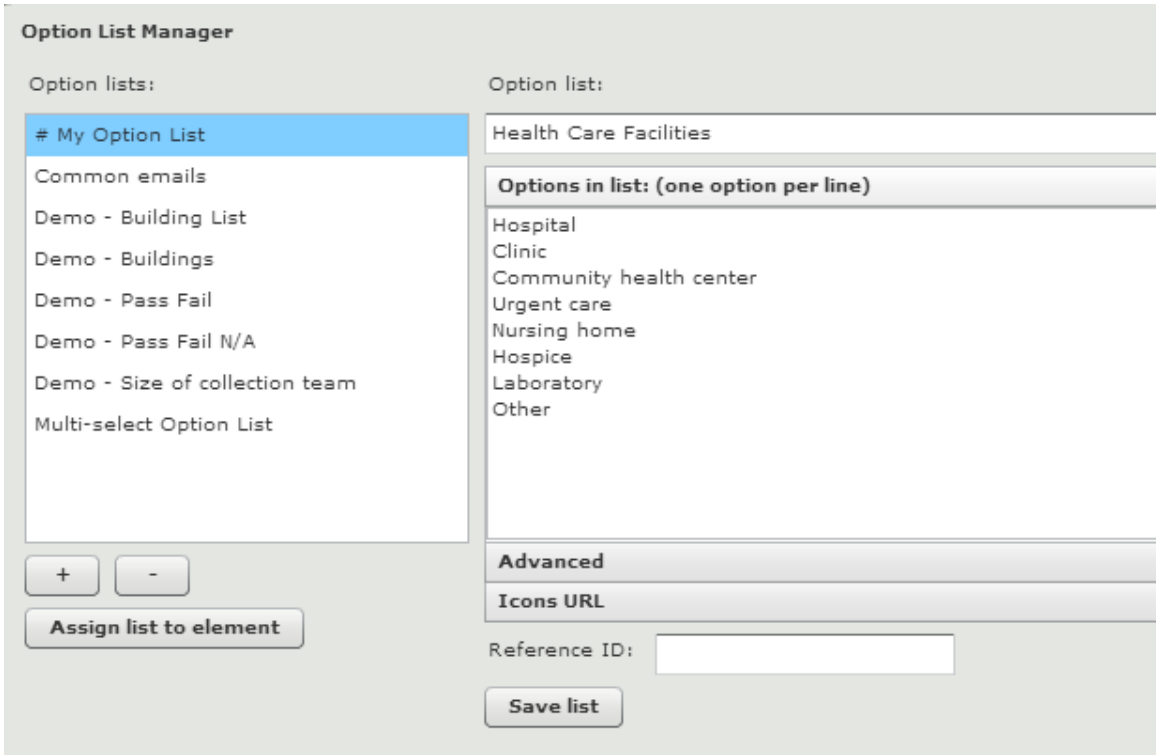



**Figure 8. Option List Manager**

f) Click the **Save list** button when done.

g) Select the **Health Care Facilities** list and click **Assign list to element**.

h) You will now see the Option list displayed in the **Element Properties**.

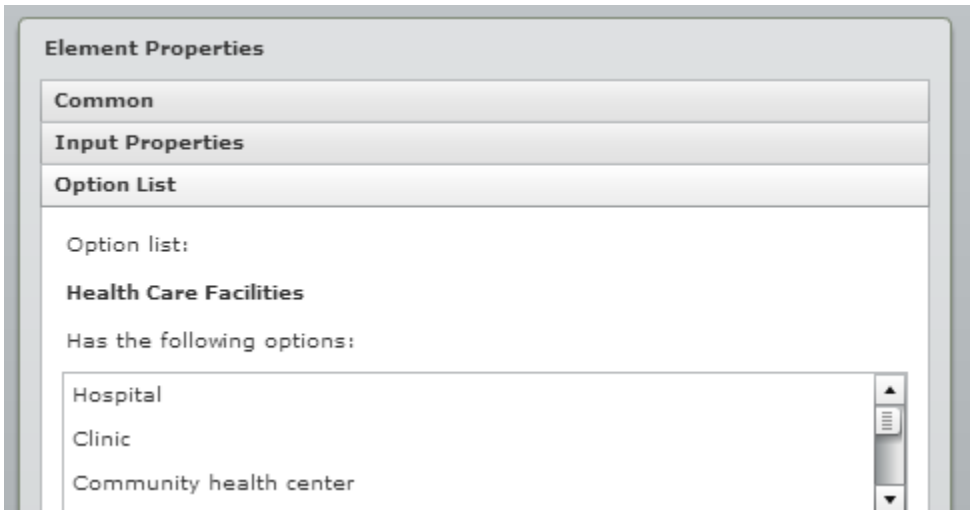



**Figure 9. Health Care Facilities assigned as the Option List**

The first two elements have now been added.

8) Below is the table of inputs for this form. The two you've added are crossed out. Use what you know to add the Phone Number, Photo, and Location (in red text) elements.

| Input Label | Input Data Column Name | Input Type |
|---|---|---|
| ~~What is the site name?~~ | ~~site_name~~ | ~~text~~ |
| ~~What is the facility type?~~ | ~~facility_type~~ | ~~pick list~~ |
| What is the phone number? | phone_number | phone number |
| Take a photo | photo | image |
| Facility Location | facility_location | location |
| Latitude | lat | text |
| Longitude | lon | text |
| Collectors Name | cname | text |
| Today's Date | date_collected | date |

**Table 2. Data collection form progress**

9) Click **Save** to save the form at this point.

## IMPORTANT: Making the Location Information Mappable

The input type of **Location** saves seven data elements into the *facility_location* column (see screen shot below). To be able to bring the data into a GIS, we want to parse out the latitude and longitude values and write them out to their own data columns. To do this you will create latitude and longitude inputs separately.

| | |
|---|---|
| Latitude: | 35.068636 |
| Longitude: | -106.608938 |
| Altitude: | 1585.661377 |
| Speed (m/s): | 0.000000 |
| Horizontal Accuracy (m): | 10.000000 |
| Vertical Accuracy (m): | 48.000000 |
| Time: | 3:07:10 PM MST |

**Figure 10. iForm location input data elements**

1) Create a Latitude input.
   a) Common
      i) **Label** = *Latitude*
      ii) Uncheck **Based on label**
      iii) **Data Column Name** = *lat*
   b) Input Properties
      i) **Input type** = Text
      ii) Check **Required**
2) Click the **Smart Control** section. Type *facility_location.latitude* into the **Dynamic Value** section. This will tell iForm to parse out the latitude value from the facility location column and put it into this column. The syntax is <*field name.latitude*>.

**Figure 11. facility_location.latitude added to the Dynamic Value section**

3) Create a Longitude input
   a) Common
      i) **Label** = *Longitude*
      ii) Uncheck **Based on label**
      iii) **Data Column Name** = *lon* (**Note**: *Long* is a reserved keyword and cannot be used for a column name.)
   b) Input Properties
      i) **Input type** = Text
      ii) Check **Required**
4) Click the **Smart Control** section. Type *facility_location.longitude* into the **Dynamic Value** section.
5) Finally use what you have learned to add the Collector's Name and Today's Date inputs.
6) Click **Save** to save the changes to the form.

# Task 3. Install the iForm App on Your Mobile Device

Now that you have created your form, you will set up your mobile device with the iForm app.

**iTunes NOTE:** You will need to have iTunes installed on your computer. If you don't have iTunes installed, you can download the installer from the iTunes website.

1) Create an AppleID and an iTunes account. Details on how to do that can be found on the iTunes support page.
2) Open the App Store on your Apple device. Search for iForm. Locate the app and click Get to install it. You may be prompted to enter your Apple ID. The app is free of charge and can be found at the iTunes App Store.

**NOTE**: Make sure **Location Services** is enabled. Open **Settings** and scroll down until you find the iForm app settings. Ensure that **Location** is enabled.

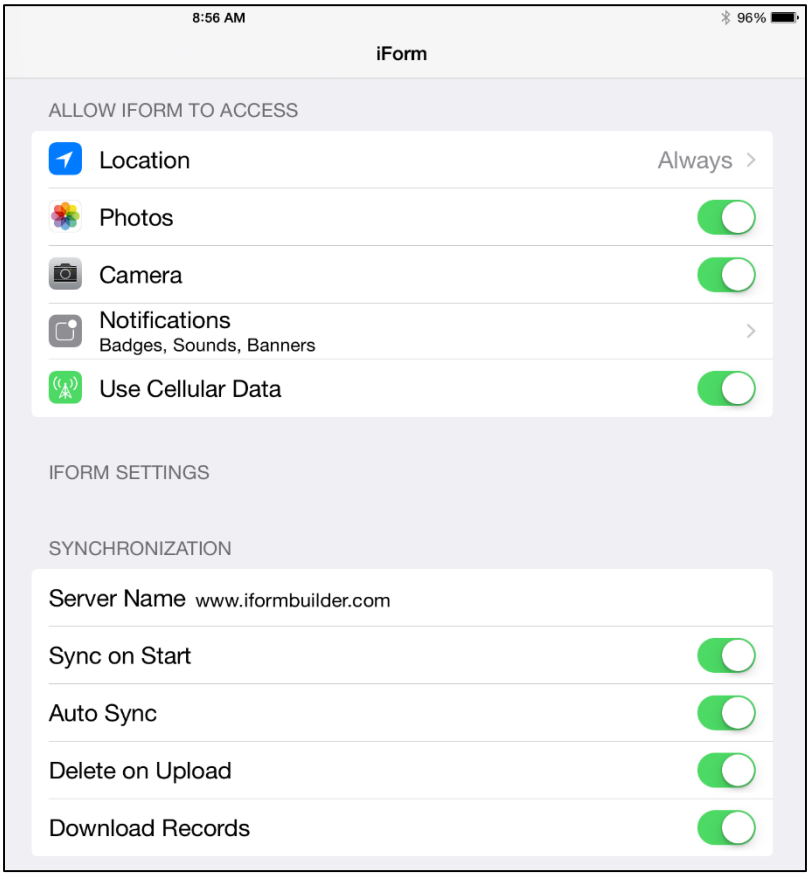



**Figure 12. iForm location services enabled on iPhone**

# Task 4. Collect Field Data

Now you are ready to collect some data. Identify an area that will be suitable. Since you may not have easy access to an area with numerous health care facilities, for the purposes of this exercise the data can be fictional. Simply go to an area with many buildings. While collecting data you can just pretend that houses, etc., are health care facilities of different types.

1) Open iForm. You will be prompted to log in using the username (usually your email address) and password provided in your confirmation email.
2) Once you tap Sync, or login, all forms and records that are associated with your username will be downloaded to your device. (**Note**: Make sure you are within cellular or Wi-Fi coverage for this step.)
3) Head out to the field data collection location.
4) When you are ready to collect your first records, select the *Health Care Facilities* form.

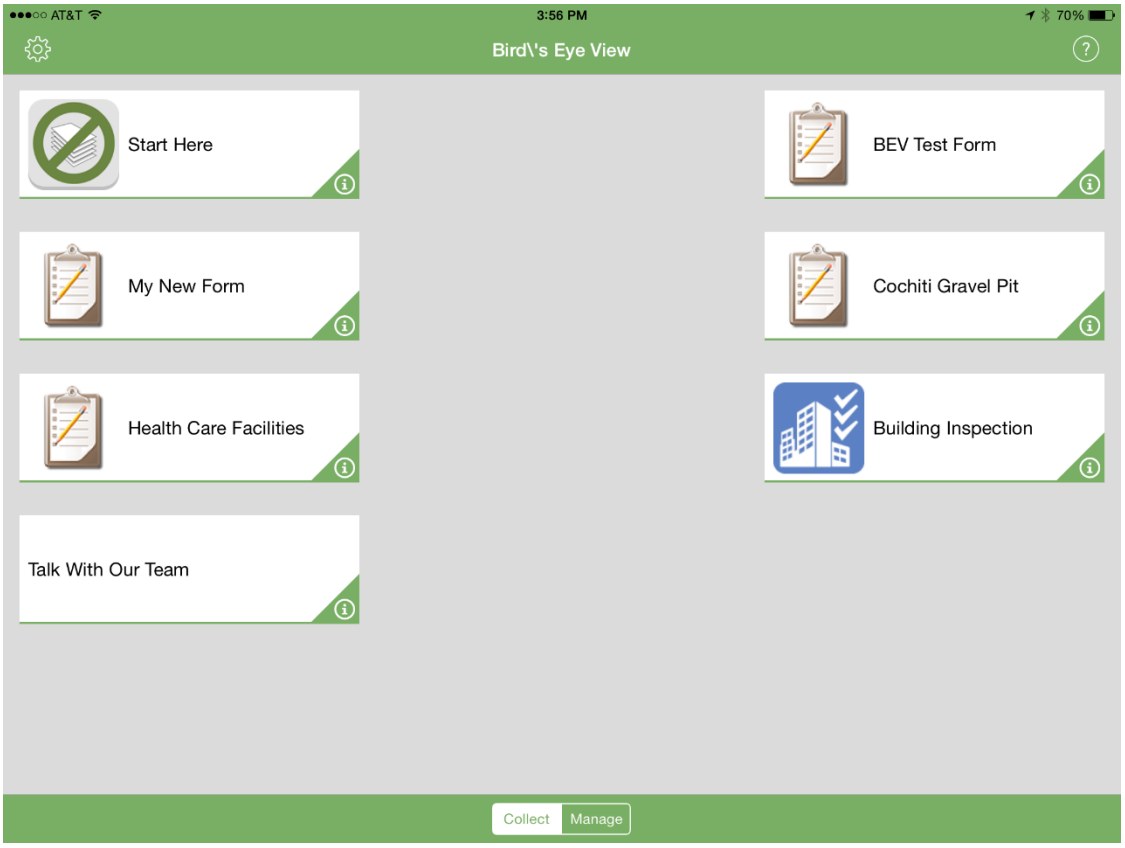



**Figure 13. The home screen of iForm showing the available data collection forms**

5) Click on the first input and answer the question.

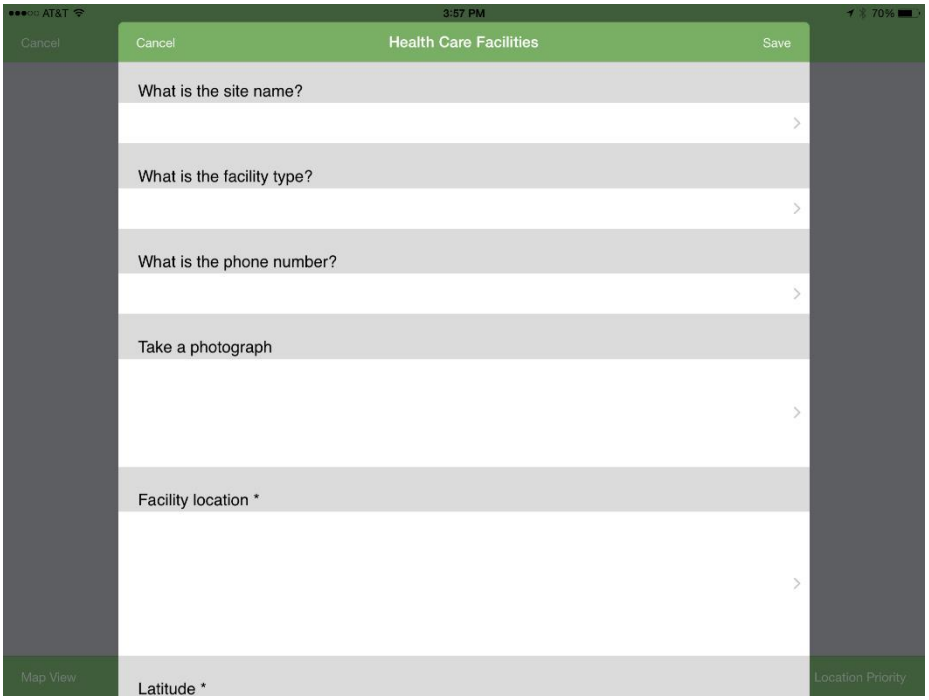



**Figure 14. A data collection form open on an iPad**

6) Repeat until finished and click **Done** at the bottom of the screen. The **Latitude** and **Longitude** inputs are populated automatically, unless you've set them up incorrectly. They should require no action on your part in the field.

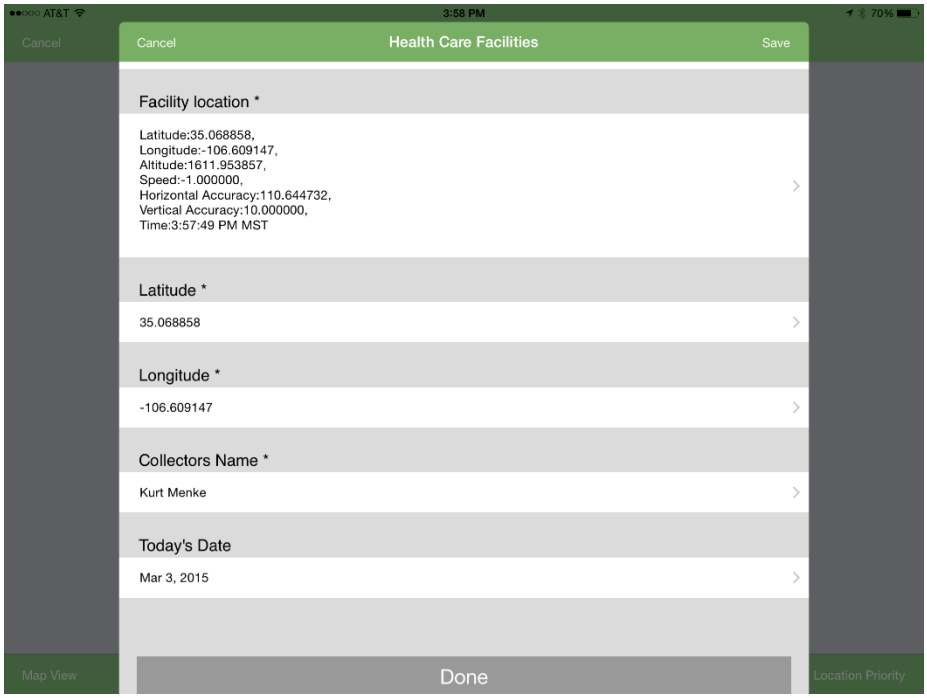



**Figure 15. The bottom of the data collection form showing Latitude and Longitude populated**

7) If you are within a wireless or Wi-Fi network, the data will sync immediately with your iForm cloud account. If not, it will sync when you enter cell coverage. When the data syncs it will be available in the iForm Builder cloud.

8) After a record has recorded, the tabular record will be displayed while the app attempts to sync. Once that tabular view closes, the form will still be open as indicated by the form name at the top of the window. Click the + sign when you are ready to collect the next location and repeat steps 5 & 6. Clicking the **Back** button takes you back to the iForm Home screen.

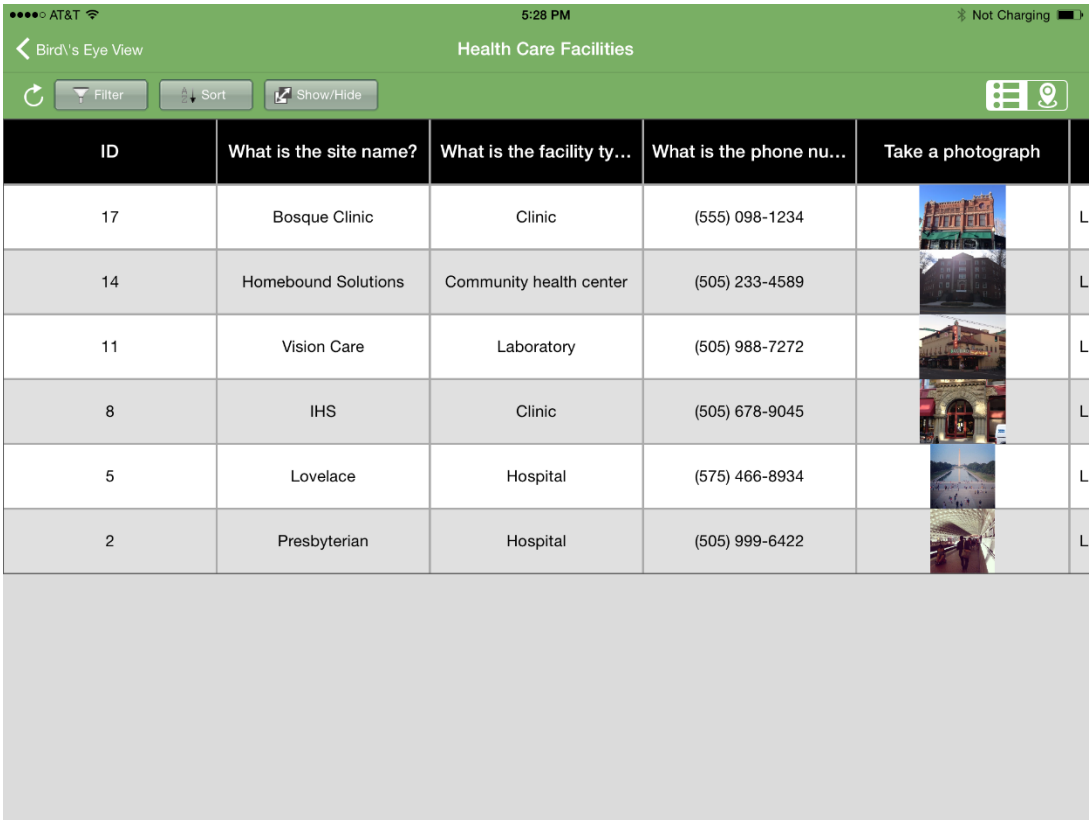
**Figure 16. Data collection form after data submittal**

## A Note on Collecting Data Outside of Cellular or Wi-Fi Coverage

Being beyond cellular or Wi-Fi coverage will not affect your ability to collect data. The GPS receiver on the mobile device, and the camera, still work. The data will sync with the iForm cloud as soon as you re-enter coverage.

## Viewing the Data on the Mobile Device

1) After you have collected at least 6 data points, access the iForm Home screen by clicking the **Back** button.
2) Click the **Manage** button at the bottom of the Home screen.
3) Select your data collection form.
4) Your data will be presented in tabular form. The records can be **Sorted** and **Filtered** by the data columns. The Show/Hide button can be used to turn data columns on and off.




| ID | What is the site name? | What is the facility ty... | What is the phone nu... | Take a photograph |
|---|---|---|---|---|
| 17 | Bosque Clinic | Clinic | (555) 098-1234 | |
| 14 | Homebound Solutions | Community health center | (505) 233-4589 | |
| 11 | Vision Care | Laboratory | (505) 988-7272 | |
| 8 | IHS | Clinic | (505) 678-9045 | |
| 5 | Lovelace | Hospital | (575) 466-8934 | |
| 2 | Presbyterian | Hospital | (505) 999-6422 | |

**Figure 17. Data form open in tabular view**

5) Click the **Map View** button. The data points are displayed as icons on a basemap. Clicking on the points will open a pop-up window containing the attributes you recorded for each.

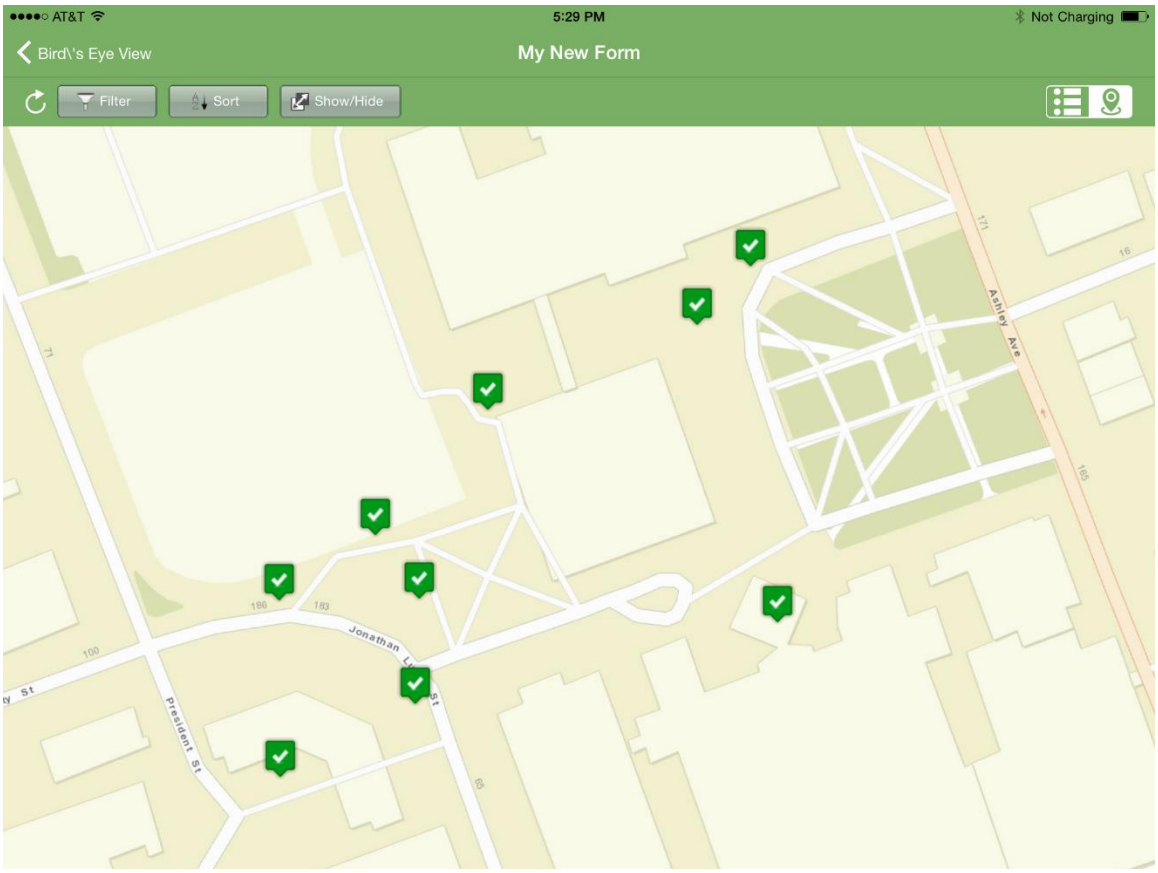



Figure 18. Data form open in map view

# Task 5. Download Data From the Server

Once you've collected data you'll want to work with it.

1) Log in to iFormBuilder.com. You will automatically be taken to the **Data** tab. Once data has been synced from the device, it will be immediately available in a variety of formats.
2) There are **Data Views** and **Data Feed** options across the top.

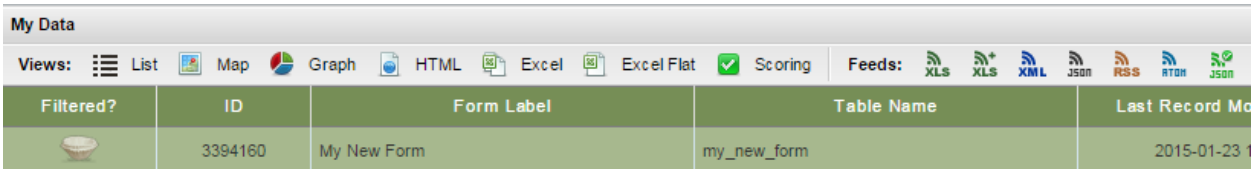



Figure 19. Data download options

3) **Data Views** are different ways of displaying the data in the web browser and include:
   - List – shows the data in a list form
   - Map – shows the data on a map
   - Graph – shows a graph of data records by field
   - HTML – displays the data on an HTML form
   - Excel – shows the data in an Excel format
   - Excel Flat – shows sub-forms as additional tabs in a spreadsheet view
   - Scoring – shows data as a series of forms

4) **Data Feeds** are different formats available for data download and include:
   - XLS
   - XLS +
   - XML
   - JSON
   - RSS
   - ATOM
   - JSON +
5) Select the form
6) Click on **Feeds** | **XLS** and download the spreadsheet.

# 5. Conclusion

In this lab you learned how to design a data collection form using iForm. You went outside and collected some data and previewed the data on the mobile device. You then downloaded the data. In the next lab you will learn how to bring the data into QGIS.

# 6. Challenge Assignment

Now that you are familiar with setting up a custom data collection form, you will design a new form for your own data collection project.

- Identify a data collection project of interest to you that can be accomplished nearby.
- Think about the types of data you will need to gather. Once you have a list of items you want to collect, list out the questions and data input types you will need to create.
- Create your data collection form.
- Collect data.
- Preview on the mobile device.