

General Workflow Instructions for capturing 360° images using Theta V, editing in Photoshop, and publishing to Google StreetView

This document attempts to give step-by-step instructions for capturing and publishing 360° imagery to Google Street View. It was created as part of a small mini—grant project in which the University of Northern Iowa GeoTREE Center (<https://www.geotree.uni.edu/>) worked with Orchard Hill Elementary in Cedar Falls, Iowa to go through process of capturing 360° imagery and publishing to Google Street View.

This document was prepared by Ben Gavin and edited by John DeGroot from the UNI GeoTREE Center (Spring 2018)

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Ricoh Theta V

The Ricoh Theta V is a 360° camera comprised of two 180° fish eye lenses. These fish eye lenses automatically stitch together two separate photos in order to achieve the 360° effect. For our purposes, we will consider the image below to be the back of the camera.



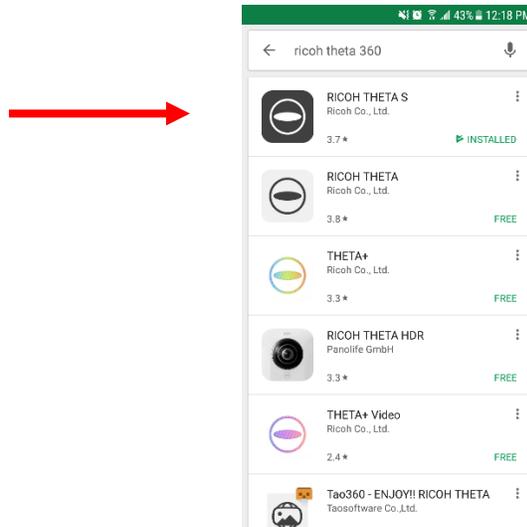
Camera Setup

1. Buttons
 - Back
 - Capture
 - This button is used to capture images. For our project, we will not be using this button.

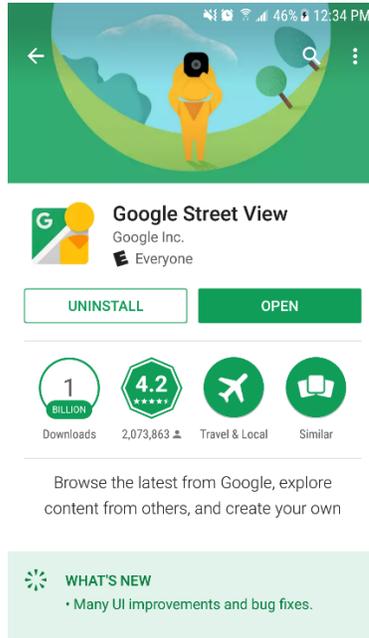
- Left Side
 - Power
 - Located at the top, this button powers on/powers off the camera.
 - WiFi
 - Located in the middle, this button is used to turn on the camera's internal WiFi, necessary for connecting a smart device to the camera.
 - Photo/Video toggle
 - Located at the bottom, this button is used to switch between photo and video modes. For this project, we will only be using photo mode.

Necessary Apps to Download

1. You will need to download the Ricohh Theta S app from your respective app downloading service (Google Play, Apple Store) in order to capture photos on the Ricoh Theta V from your smart device.
 - a. The Ricoh Theta app will automatically create a folder where your 360° photos will be stored. This folder will be created in your smart device's default photo gallery.



2. **You will potentially need this app depending on your role (just taking photos or taking photos and publishing to Street View).** The Google Street View app is used to publish images to Google servers where they will appear on Google Street View. Publishing to Street View requires a Gmail account (UNI account works).



Connecting your Smart Device to the Ricoh Theta V

1. Begin by powering on the camera
 - a. Three blue lights should appear on the front of the camera: One small dot above the capture button, a blinking WiFi symbol, and a camera. Ensure that the camera mode  is selected and not the video mode  by pressing the toggle button on the right side of the camera. If the WiFi symbol is not lit, tap the button on the right side that enables the internal WiFi.
2. Next, connect to the camera through your smart device's WiFi settings by selecting "THETAXS00288025" (this was written for use at UNI GeotREE Center, you will have a different #). If this is your first time connecting, you will need to enter the serial number as the password. The serial number are the numbers subsequent to the "THETAXS", in this case, **00288025**. This number can be found on the bottom of your camera or in the WiFi settings.
 - a. **NOTE:** You will not be able to connect or use the internet on your smart device if you are connected to the camera.

3. You are now connected to the Ricoh Theta V.

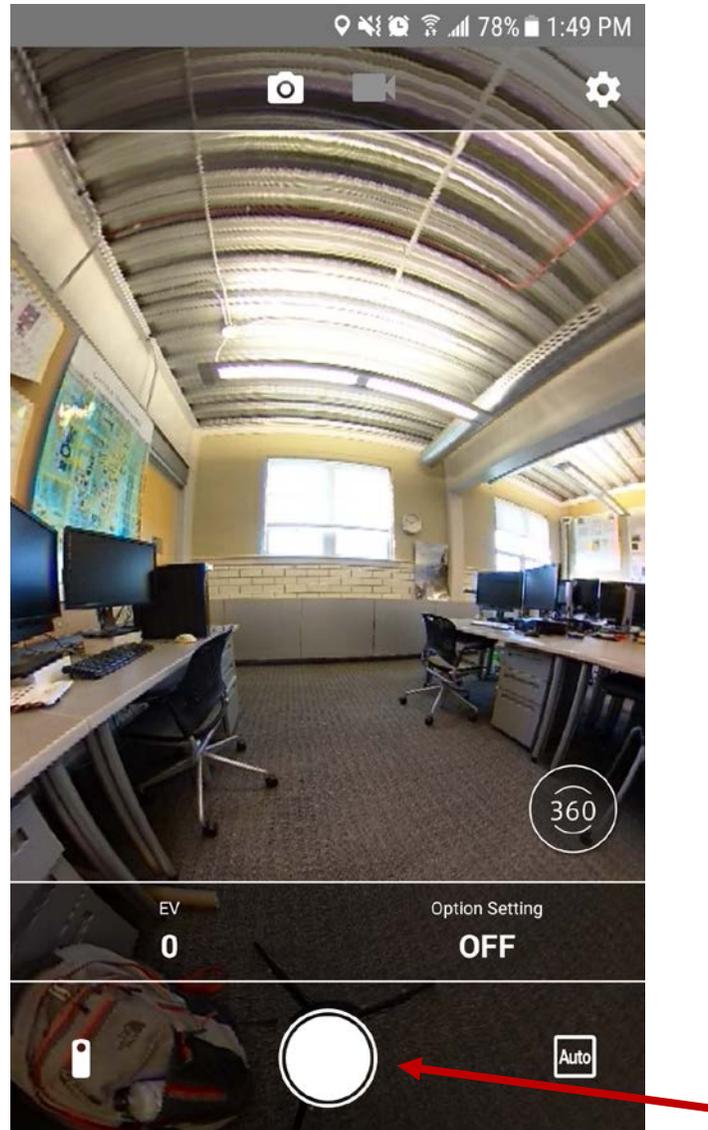
Capturing Photos in the Ricoh Theta App

1. Open the Ricoh Theta app on your smart device.
2. If the app doesn't open in camera mode automatically, you can access it by pressing the small

Ricoh Theta logo located at the bottom right of your screen,  as seen below.



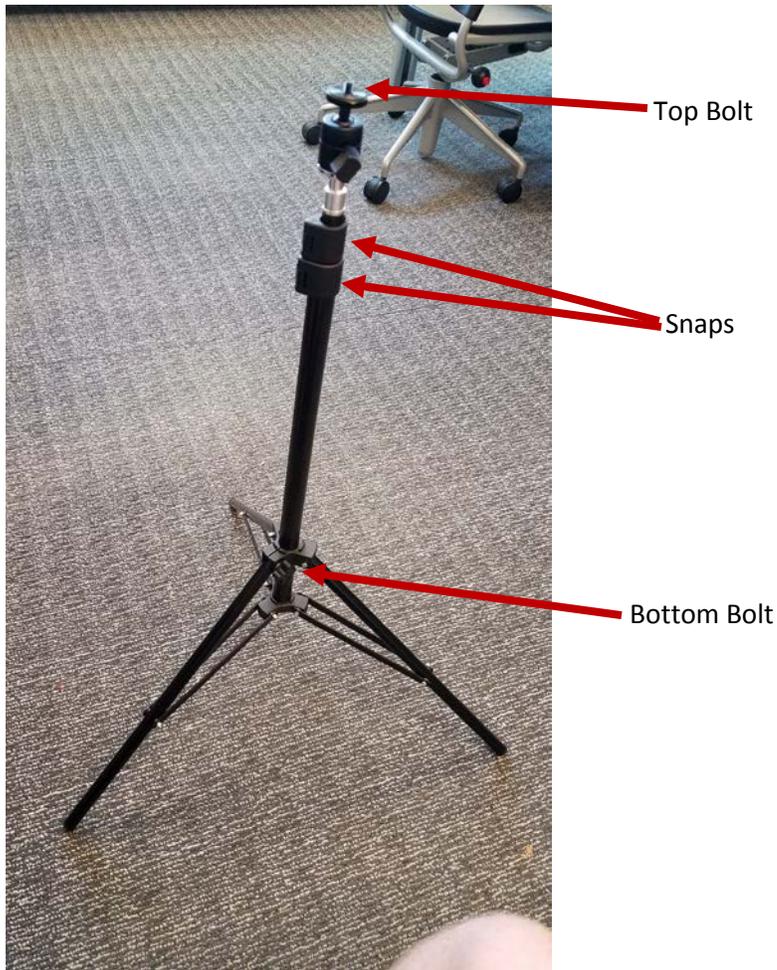
3. Once you've clicked  and see the screen below, you're ready to capture an image from your smart device by pressing the large white button located at the bottom of screen.



4. After you take this photo, your image will take a few seconds to synthesize (process) and then be stored on both your phone and on the Ricoh Theta V device itself. The Ricoh Theta app will automatically create an album/folder titled “RICO THETA” in your image gallery on your smart device.

Mounting Camera to Tripod

1. Extend the tripod legs by loosening the bottom bolt on the center bracket and pushing down on that bracket. Ensure that your tripod legs look similar to the photo posted below. Note that this is taken at an angle and you want the tripod standing straight up.
2. Extend the tripod by undoing the two snaps and pulling up on the mount. Snap the two snaps back into place once the tripod is fully extended.



3. Line up the threads on the bottom of the Ricoh Theta V with the top bolt of the tripod
4. Twist in a clockwise fashion until camera is snugly fastened to the tripod. Do not over tighten the camera, only twist until you're met with resistance.

Method for Google Street View Capture

1. After connecting your smart device to the Ricoh Theta V and you've mounted the camera on the tripod, you're ready to capture photos for Google Street View.
2. There is no need to capture sidewalks that are next to streets, as Google has most likely captured the images along the street with their Street View car.
3. **WHEN GOING OUTSIDE, ALWAYS KEEP A HAND ON THE TRIPOD IF THE CAMERA IS ATTACHED TO IT!** The wind is liable to knock the tripod and camera over, breaking the camera. Always have a hand on the tripod at all times.
4. Find a starting location.
5. Make sure the front of the camera is facing in the direction that you will move.
6. Crouch down next to the tripod with one arm around the tripod in order to make sure it doesn't tip over. By being below the camera it will make it easier to edit you out later before publishing.

AGAIN, WHILE CROUCHING, HUG THE TRIPOD OR KEEP A HAND ON IT to make sure it doesn't tip.

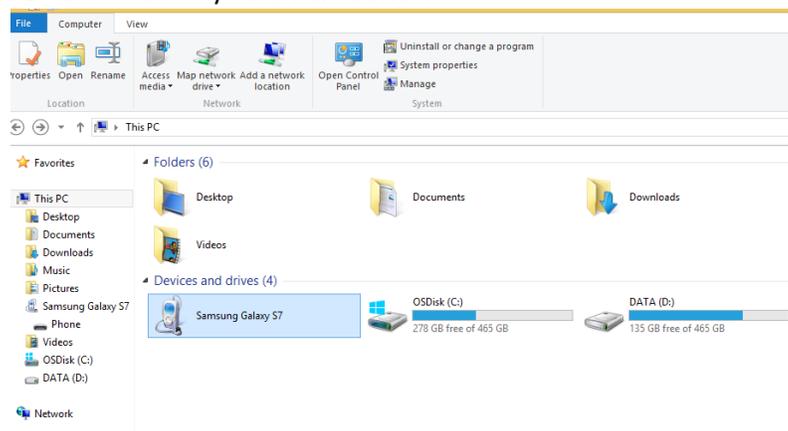
7. Capture your first image as you did in steps above. Again it will take a few moments to process/synthesize.



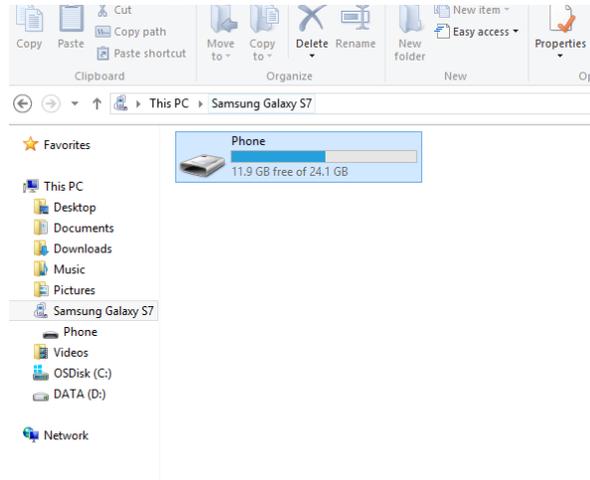
8. Count off 10 steps in the direction of which you want to proceed. **NOTE:** Google Street View instructions suggest one photo for every 10 feet when capturing images outside, which equates to 5 steps for the average person. In our practical experience 10 normal steps will work fine.
9. Make sure to capture the intersections of pathways, as we may be capturing the sidewalks that intersect your current path at a later date. It is ok if you're step count is under the required 10 steps or if it's over up to 3 steps as long as you catch the intersection.
10. Have a little fun with this as well. If you see a scenic shot, don't be afraid to take it.
11. Once you've captured the images you want, it's time to edit the pictures.

Editing Photos in Adobe Photoshop

1. Connect your smart device to your computer by using a USB cable.
 - a. Make sure your device is unlocked and accessible to the computer.
2. Open Adobe Photoshop by going to **Start Menu > All Programs > Adobe Creative Cloud > Adobe Photoshop.**
3. In Adobe Photoshop, click on the **File > Open.**
 - a. You should be prompted with a file explorer window.
 - b. Navigate to your smart device which should be located in **This PC** and under **Devices and Drives**. Double click on your smart device.



c. Double click again to access the hard drive.

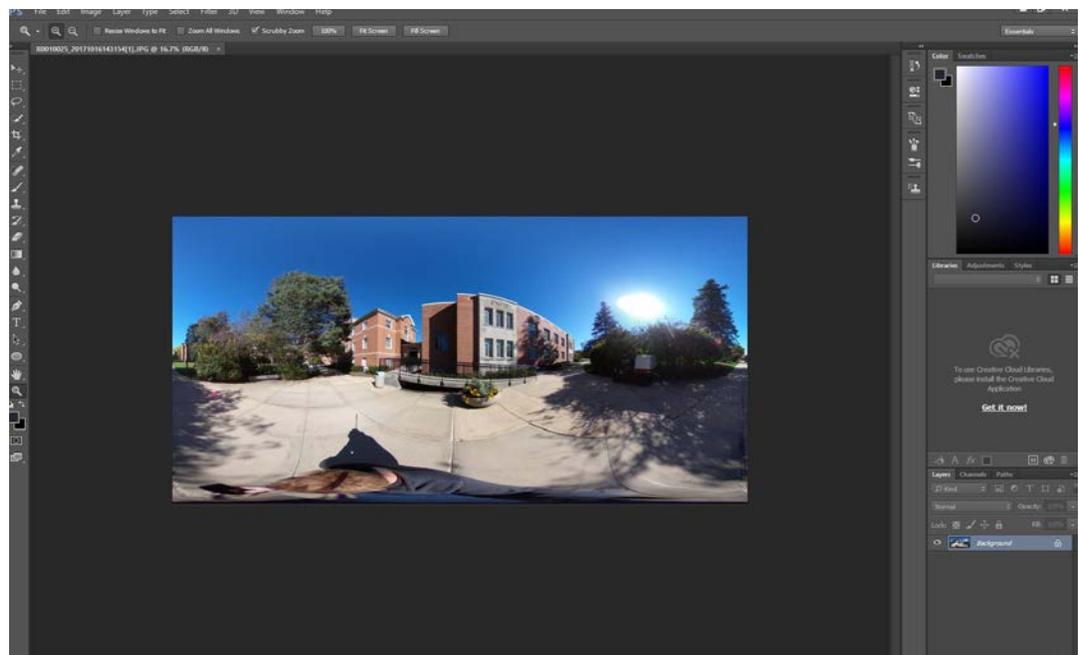


d. Navigate to the file where your “RICOH THETA” folder is located. This is generally in either a folder titled “Pictures” or “DCIM”.

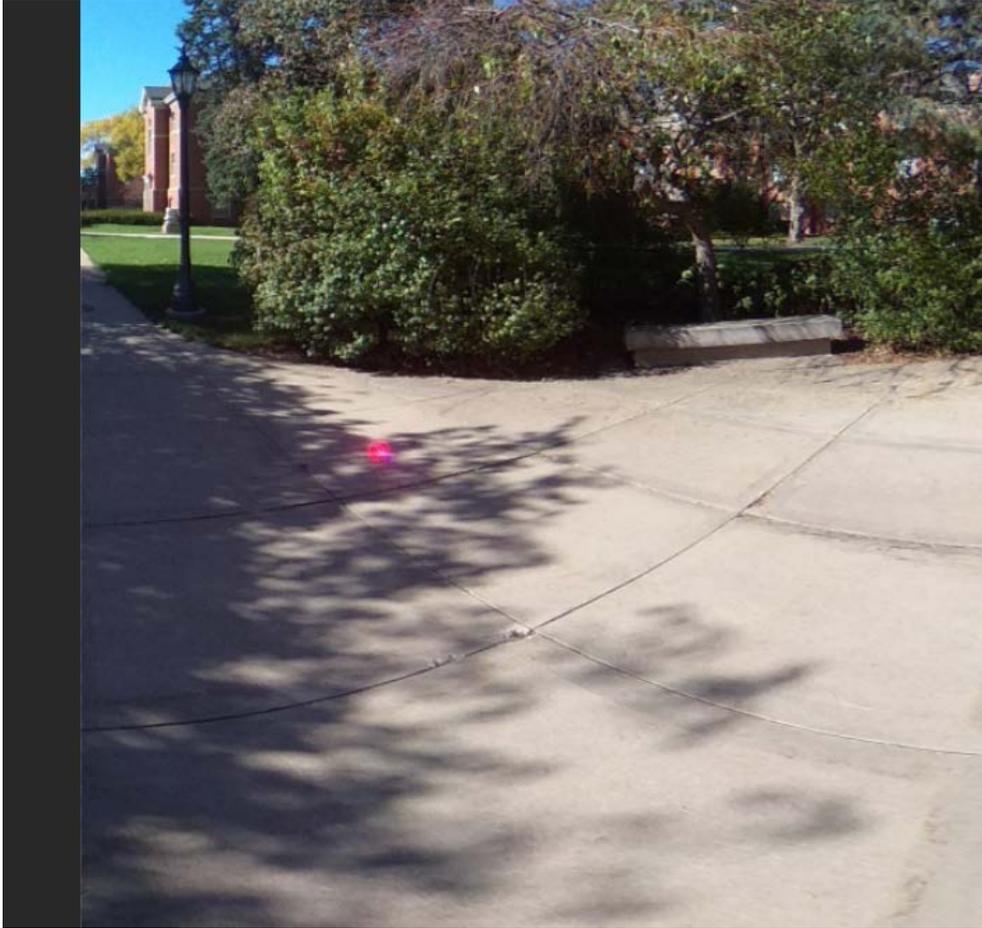
e. Select the first photo you wish to edit and then click **Open**. **NOTE:** You should edit and save these photos in the order you captured them. This helps to keep these photos organized.

f. Your photo should open in Adobe Photoshop.

4. You should have something similar to the image below opened up.

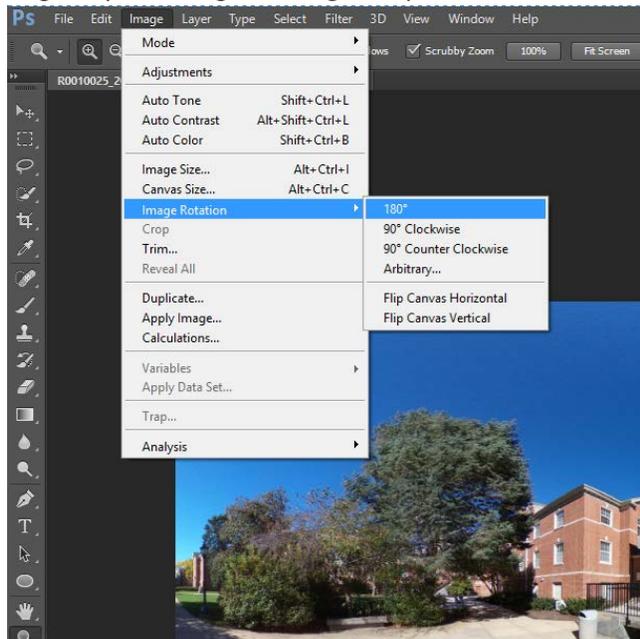


5. First, we want to check the image for any red dots that have appeared in the image. There may be 2 red dots and they can generally be found near the left and right edges of the photo. We've found one here near the left edge of the image.

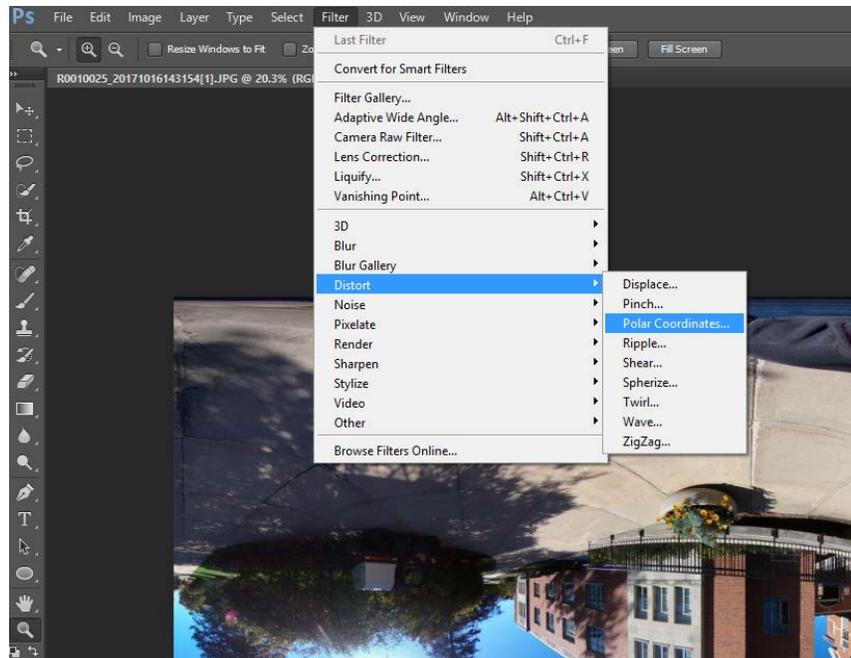


6. Zoom in on the dot using the **Zoom Tool**  located on the left side of the Photoshop window, near the bottom. Click, hold, and drag to zoom in and out.
7. When you're zoomed in comfortable, select the **Clone Stamp Tool**  on the left side of the Photoshop window.
 - a. You can change the size of the Clone Stamp Tool by clicking on the Clone Stamp Brush Preset picker near the top left of your screen .
 - b. When the Clone Stamp Tool is selected and set to the desired size, hover it over a section of the image you would like to use to "clone" over the red dot. For instance, the red dot in the above image is located on a shadowy patch of cement, so I would want to hover the Clone Stamp Tool over a section of shadowy cement.

- c. Press and hold the **Alt** key on your keyboard. Your Clone Stamp Tool should change from a circle to a circle with crosshairs.
 - d. Click on the area that you wish to clone and then release the **Alt** key.
 - e. You should now hover your Clone Stamp Tool above the red dot, right click and hold, and begin to brush away the red dot.
 - f. You'll notice a small + sign will appear and begin to follow your brushes near where you selected an area to clone with the Alt key. This is the area that is being cloned, so if that + sign goes over a leaf, a leaf will be cloned onto where you're brushing.
 - g. If you make any mistakes, hold **Ctrl + Alt** and then tap the **Z** key as many times as you wish to undo your mistakes.
8. Once the red dots are removed, we can now remove yourself and the tripod from the photos.
- a. Begin by selecting the **Image** drop down menu and selecting **Image Rotation > 180°**



- b. After the image has been rotated, go to the top of the window and click **Filter > Distort > Polar Coordinates**



- c. The Polar Coordinates window appears.
 - i. Make sure that **Rectangle to Polar** is selected and click **OK**.
- d. The photo should now look similar to the image below. This gives us a floor plan layout to work with.



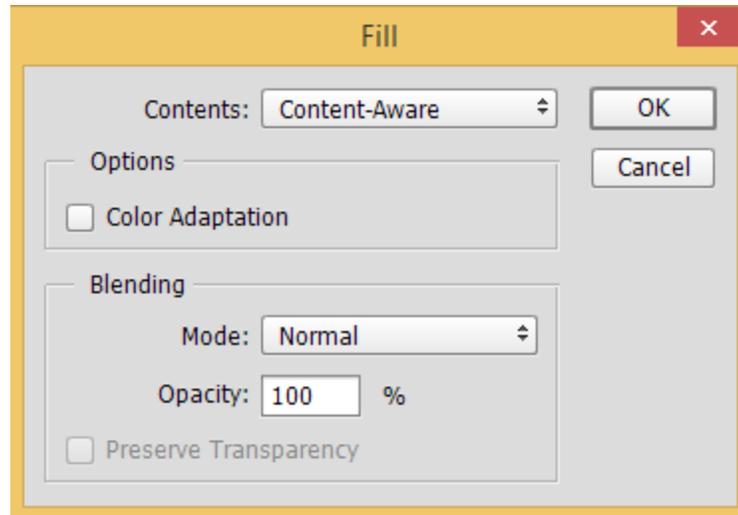
- e. Zoom in on yourself and the tripod.
- f. Select the **Lasso Tool**  on the left side of the Photoshop window.
- g. While this tool is selected, click and hold while tracing around the outline of your body and shadow.



- h. When you outlined around yourself, release your mouse button. Your outline should be highlighted like the image below.



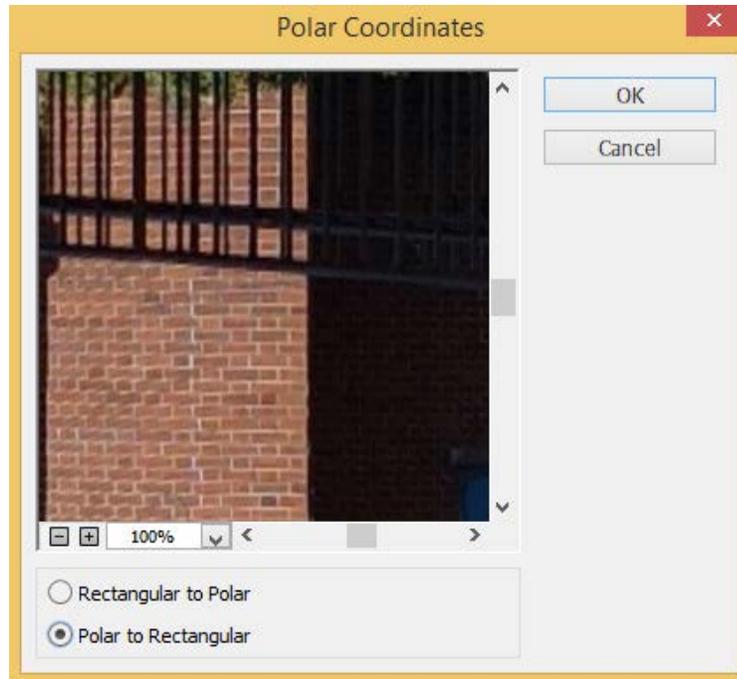
- i. Press the **Delete** key on your keyboard. You should be prompted with the **Fill** dialog window.



- j. Ensure that **Contents:** selection is set to **Content-Aware** and that **Mode** is set to **Normal** and **Opacity** is set to **100**. Click **OK**.
- k. You should now be removed from the image. **NOTE:** If need be, the Clone Stamp Tool can be used to touch up the area if anything looks severely out of place.



- l. Make sure to click anywhere in the image once to remove the Lasso Tool outline and complete the removal of yourself.
9. Now we need to set the image back to its original settings so it can be saved and later uploaded to Google Street view.
 - a. Select **Filter > Distort > Polar Coordinates** again to open the Polar Coordinates dialog.
 - b. This time, change the selection to **Polar to Rectangle** and select **OK**.



- c. The image should be back to its 180° rotation.
 - d. Next, go and select **Image > Image Rotation > 180°** to set your return your photo back to 360° format.
10. Now you can save the image by going to **File > Save As** and selecting or creating a folder of your choice to begin saving your photos in. As stated before, edit and save these photos in order of which you captured them. Name them systematically, such as "Camp_1, Camp_2, Camp_3...." just as long as we know what general order to follow with these photos. This allows us to better manage the photos in Google Street View if photos need to be removed or manually placed in their location.

Uploading Edited Photos Back to your Smart Device

1. When you have your 20 photos edited and saved to your folder, you're ready to upload those photos back to your smart device.
2. You'll want to create a new folder in your Phones "PICTURES" folder and name it something of your choice.
 - a. Right click when in the "PICTURES" folder, and select **New Folder**.
 - b. Title it as you wish.
3. Select the edited 360° images you wish to upload back to your smart device, right click and copy or you can drag and drop.
4. Paste the images in the folder you created. Your edited 360° photos are now back on your device.

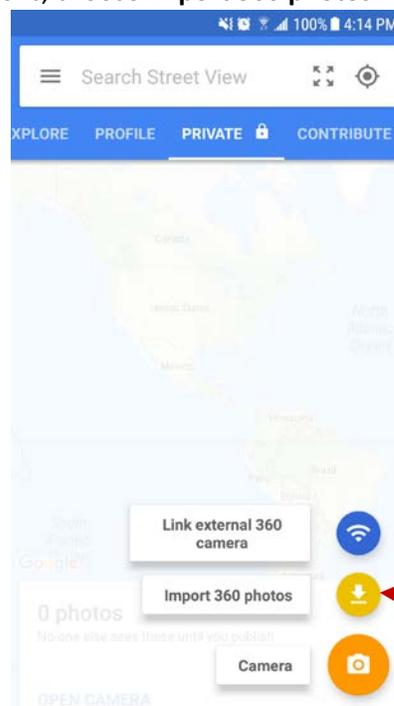
Uploading Images to Google Street View

NOTE: It's generally easier to manage these photos in Google Street View by editing and uploading only 20 photos at a time. If you upload many photos at once, they will be hard to find and place in their correct spots.

1. Open the Google Street View app that you had previously downloaded on your smart device.
 - a. Make sure your smart device is disconnected from the Ricoh Theta V.
2. Near the top of the window, select the **Private** tab.

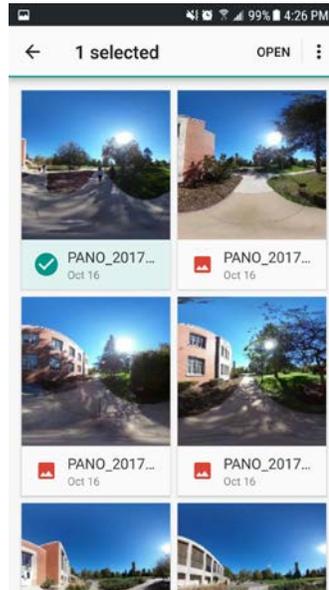


3. Near the bottom right of the screen, you'll notice a small orange circle with a camera in it. Tap on that camera. **NOTE:** If the circle is blue, you are still connected to the Ricoh Theta V and need to disconnect.
4. You'll be presented with 3 options, choose **Import 360 photos**.

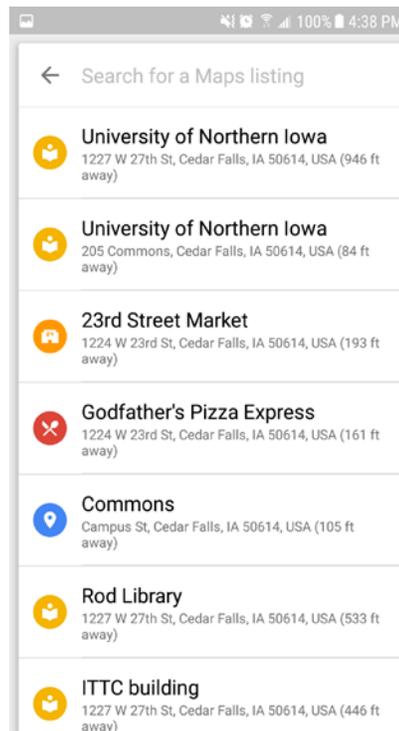
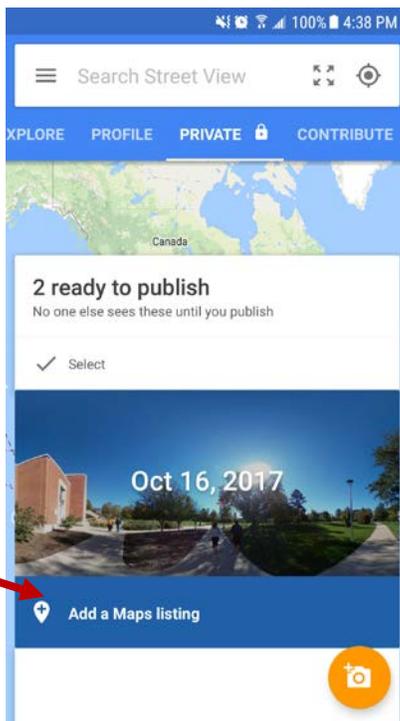


5. Depending on the smart device you're using, you may need to navigate to the folder/album that you created to save your 360° images.

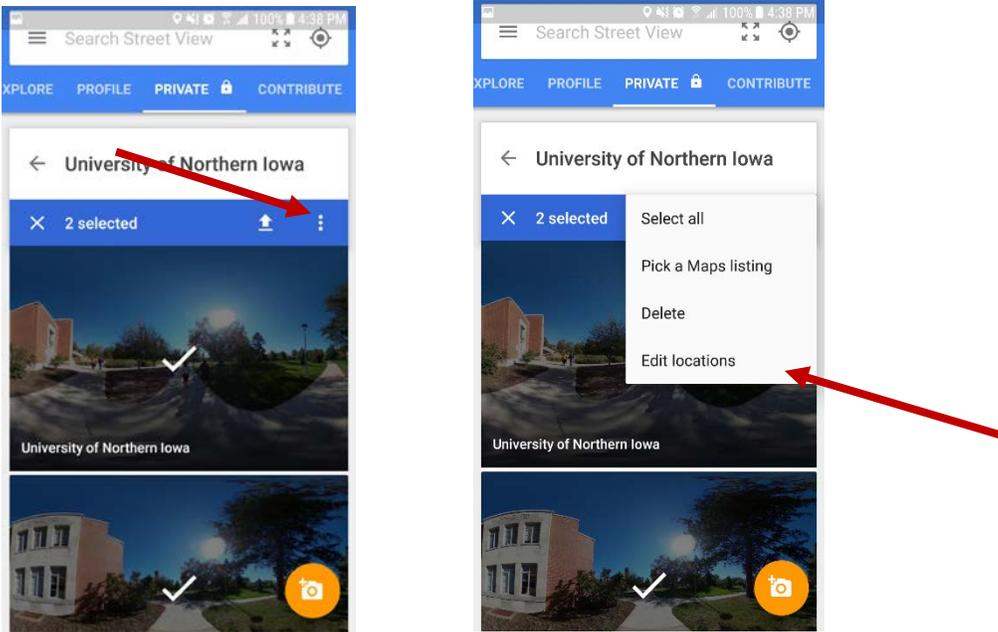
- When you've navigated to that folder, press and hold the first image you wish to upload until a check mark appears next to the image's file name. From here, you can tap on the rest of the 20 photos you wish to upload.



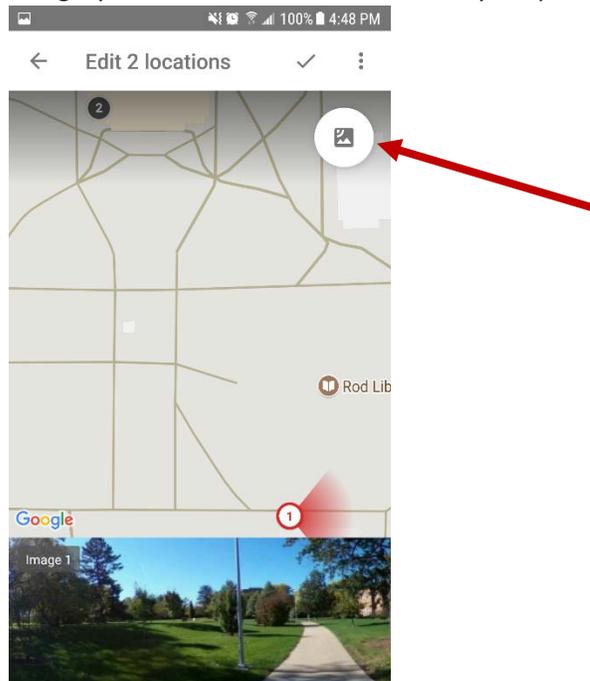
- When All are selected, tap **OPEN** near the top right of your screen.
- The photos will be imported to your private section and will not be available to the public until you publish them.
- From here, you can pick and choose a map listing by tapping on the "Add a Maps listing" selection. This enables you to add a listing of your choice which keeps your photos grouped together.



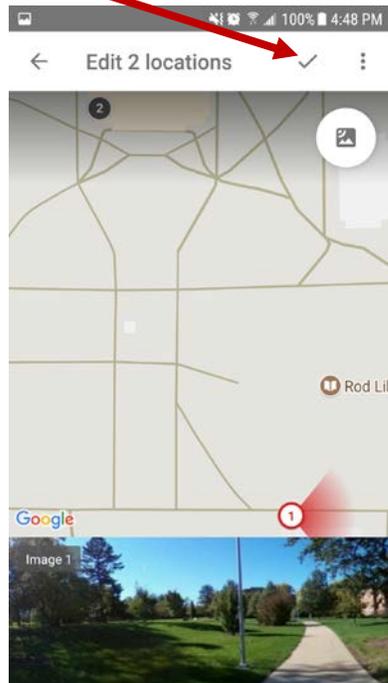
10. You can also edit the location of your photo by tapping the 3 dots next to the upload selections and tapping **Select all** and then again tapping the 3 dots and selecting **Edit locations**. This will also allow you to edit the locations of your photos, which may be necessary if you're phone wasn't receiving an adequate GPS signal during the time the photo was captured.



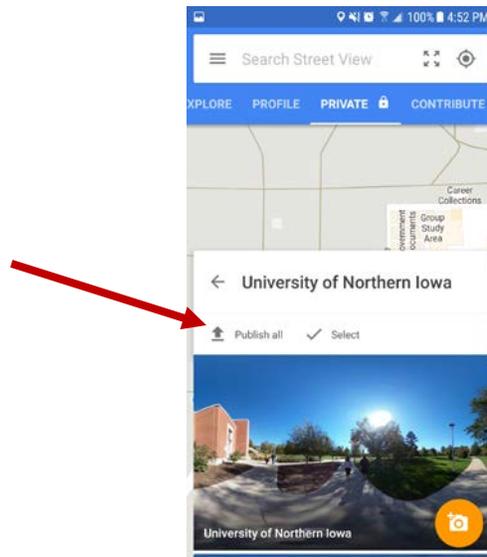
11. Tap and manually move photos to appropriate locations on the map. Make sure to zoom in and place them directly on the path where they were taken.
12. It may help to switch to satellite imagery for visual references of where your photos need to go.



13. When finished, tap the check mark on the top right of your screen, or click back to go back and cancel changes.



14. When you're satisfied with your map listing and photo locations, tap the **Publish All** selection in the **Private** tab section.



15. Your photos are now uploaded to Google Street View and will be available for display on desktop after the appropriate processing time.

Trouble Shooting

1. If any problems are encountered when trying to connect a smart device to the Ricoh Theta V camera, restart both the camera and smart device.

