Mobile GIS Using ArcPad

18

Introduction

Mobile GIS is simply a field GIS, where the user use a mobile devices. The device is armed with a software called ArcPad, which that can perform special jobs in the field. The ArcPad mobile GIS can be used away from the office to capture data in GIS format and when user return to the office, the data can be integrated into ArcGIS as a complete database. The mobile ArcGIS has been used by a wide range of professional users of different disciplines, including; engineering, geology, farming, government, environment, and others. The mobile ArcGIS provides many benefits because of the following:

1. Users can capture and obtain data in real time.
2. Inspectors can update records in the field efficiently and quickly.
3. Incidents can be documented and reported from the field to the office using wireless communications.
4. Provide direct data to the decision-making.

The most common functions that Mobile GIS have been designed to serve are:

1. Field data capture, either by real-time editing of supplied digital maps, or by surveying and mapping in the field using GPS input to create new features (e.g. a manhole checking, or capturing a tree location)
2. Navigation with the GPS, where you can find your current location on a moving map. Display and use GoTo functions to locate destination points (e.g., relocating a well location)
3. Check to validate of an existing feature or updating (e.g., checking if geological fault exist)
4. Geocoding land, property, and infrastructure, then integrating this information with point-of-interest databases (e.g., a utility inspector conducting an asset audit)
5. Integration with enterprise databases from the field (e.g., a data librarian updating the location of Wi-Fi hot spots in a database)

Scenario 1: You are going to use Trimble Juno T41GPS as a receiver to capture field data. Your task will be achieved in two parts. Part one you will perform in the office using your ArcGIS to create a project containing the geodatabase and image need for field collection. Part 2 is to capture the locations of trees, sidewalks, and buildings on the main UWS Campus.

Part 1: Prepare the Data in the Office for ArcPad to Perform Field Work

The work consist of the following stages that needed to prepare the data for the field work

1. Convert the image to make it usable in Trimble Juno T41GPS with ArcPad.
2. Prepare the data in ArcGIS and integrate it in Mobile GIS by doing the following.
   a. Create a file geodatabase in ArcGIS call it **Campus**, to contain existing data for the field area.

Electronic Supplementary Material: The online version of this chapter (https://doi.org/10.1007/978-3-319-61158-7_18) contains supplementary material, which is available to authorized users.

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https://doi.org/10.1007/978-3-319-61158-7_18

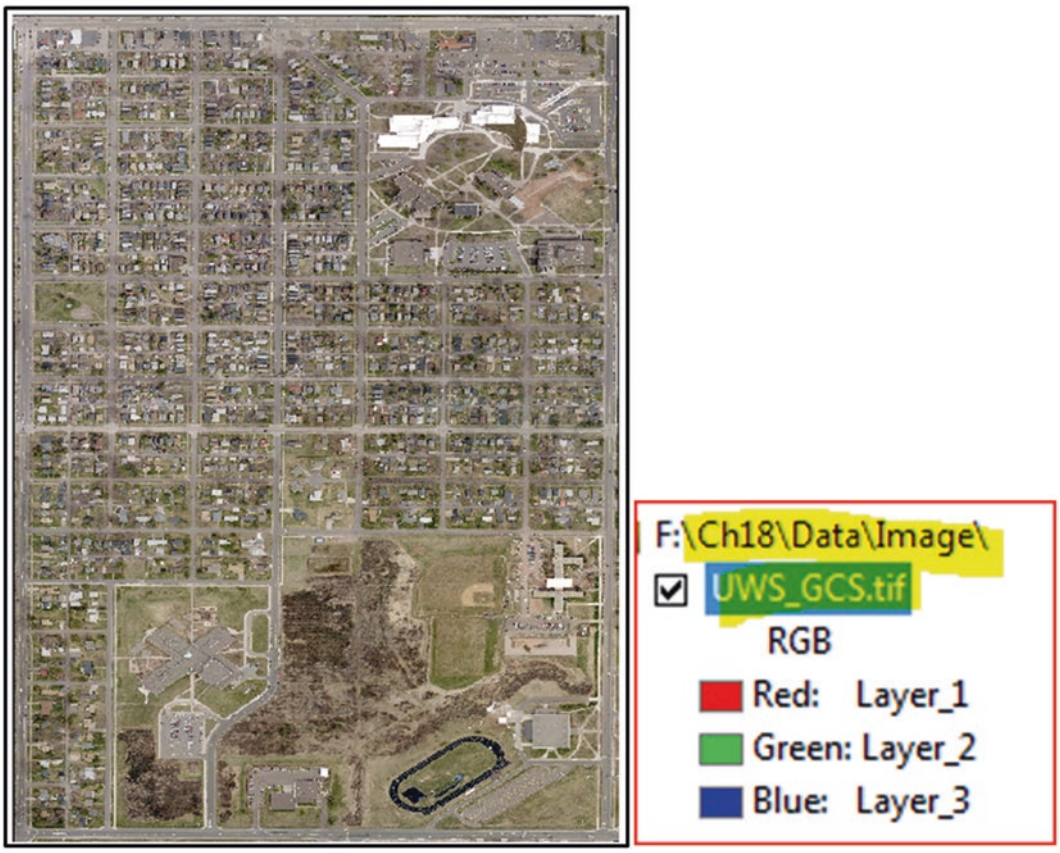
b. Create a feature dataset in the Campus geodatabase containing empty polygon, line, and point feature classes for field data entry.
c. Create a project containing all data needed for field data collection.

Prepare Raster Data for ArcPad Desktop

Convert Raster Format into GEOTif to Make It Usable in ArcPad Desktop

ArcPad supports raster image display including numerous industry-standard formats. In this exercise you are going to work with TIFF format (*.tif). We are going to use an aerial photograph downloaded from city of Superior registered in Douglas County projection (dc4). The image will be clipped to include only the UWS campus. Then it will be projected using the Projection Raster tool to project the image into latitude-longitude using the world datum (WGS84) and we are going to call it **UWS_GCS.tif**. After projecting the image we are going to do the following steps in order to make it usable in **ArcPad** desktop only. This step is important to perform in order to work with Trimble in the field.

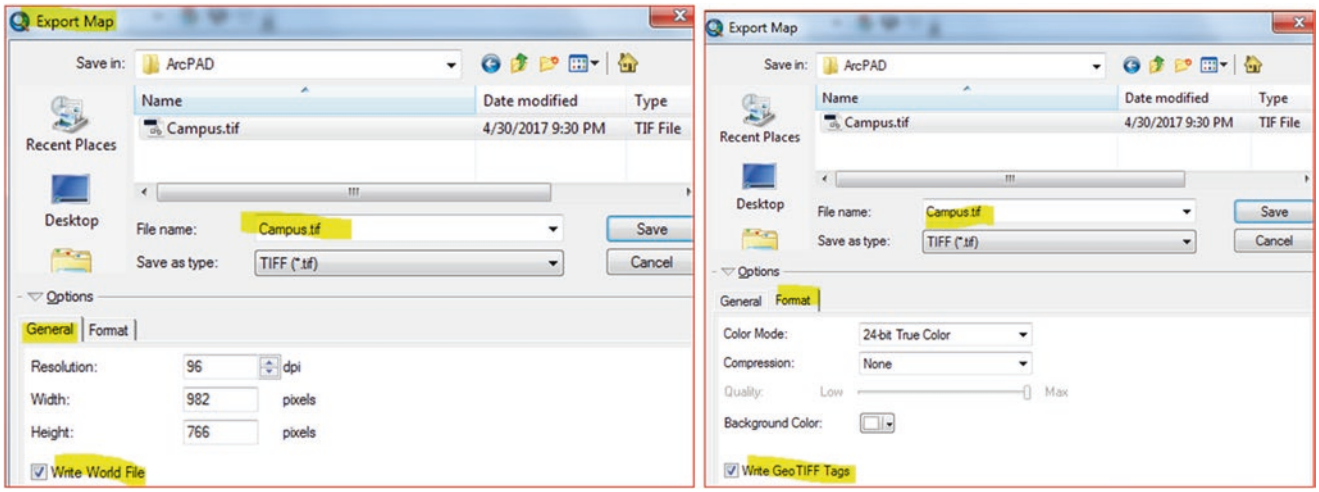
1. Start ArcMap
2. Browse to \\Ch18\ Data\image folder and integrate **UWS_GCS.tif**



Note: This image has a Tiff format and three bands.

3. Click File menu/Export Map
4. Save in: \\Ch18\ Data\ArcPad folder as Campus.tif
5. File name: Campus.tif
6. Save as type: TIFF (*.tif)
7. Click General tab/check “Write World File”
8. Click Format tab/check “Write Geo TIFF Tags”

9. Click Save



10. Start ArcPad on your computer desktop
11. Click New map, ArcPad will open\ Make sure the Main Tools  is checked
12. Click Add Layer  button

13. Browse to \\Data\ArcPAD folder
14. Check the Campus.tiff

15. OK

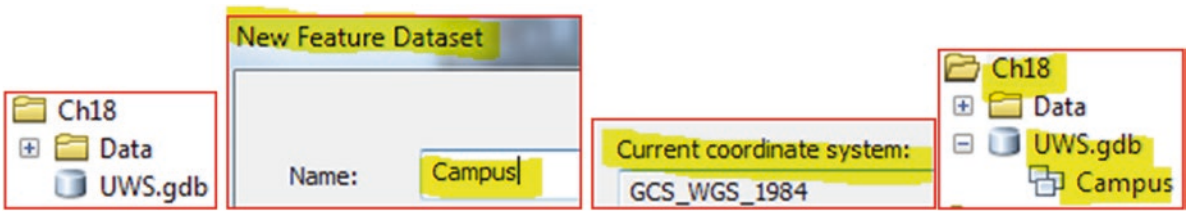
Result: The **Campus.tiff** is displayed in ArcPad, this means this image is now ready to be integrated into a mobile GIS.

Prepare File Geodatabase in ArcGIS and Integrate It into Trimble Juno T41GPS

The **UWS_GCS** image for this project is available in tiff format, which is an acceptable format to work with ArcPad. In this exercise you are going to build a file geodatabase and a feature dataset and register it in latitude-longitude using the WGS84 datum. After creating the Feature Dataset, you are going to create an empty polygon, line, and point feature classes. Then you will integrate the file geodatabase and the image UWS_GCS.tiff into the mobile GIS (Trimble Juno T41GPS). After this step, you will use the ArcPad software in Trimble Juno T41GPS to collect the data in the field using the **UWS_GCS.tiff** image as a background reference.

Create File Geodatabase in ArcMap

1. In ArcMap/open the Catalog window browse to Ch18
2. R-click Ch18\New\File geodatabase\ call it **UWS**
3. R-click **UWS** File geodatabase\New\Feature Dataset\call it **Campus**
4. Click Next
5. Select Geographic Coordinate Systems/World/**WGS 1984** coordinate for the **Campus Feature Dataset**
6. Next/Next/Finish

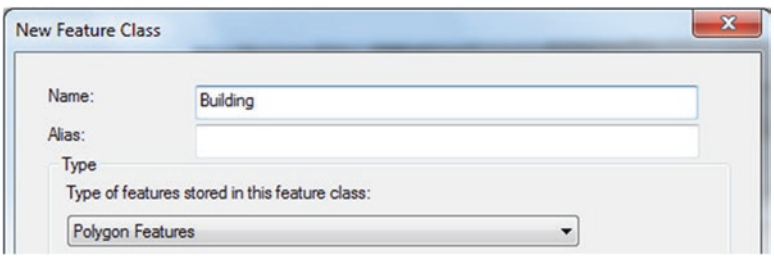


Result: The Campus Feature Dataset is now created and it is empty.

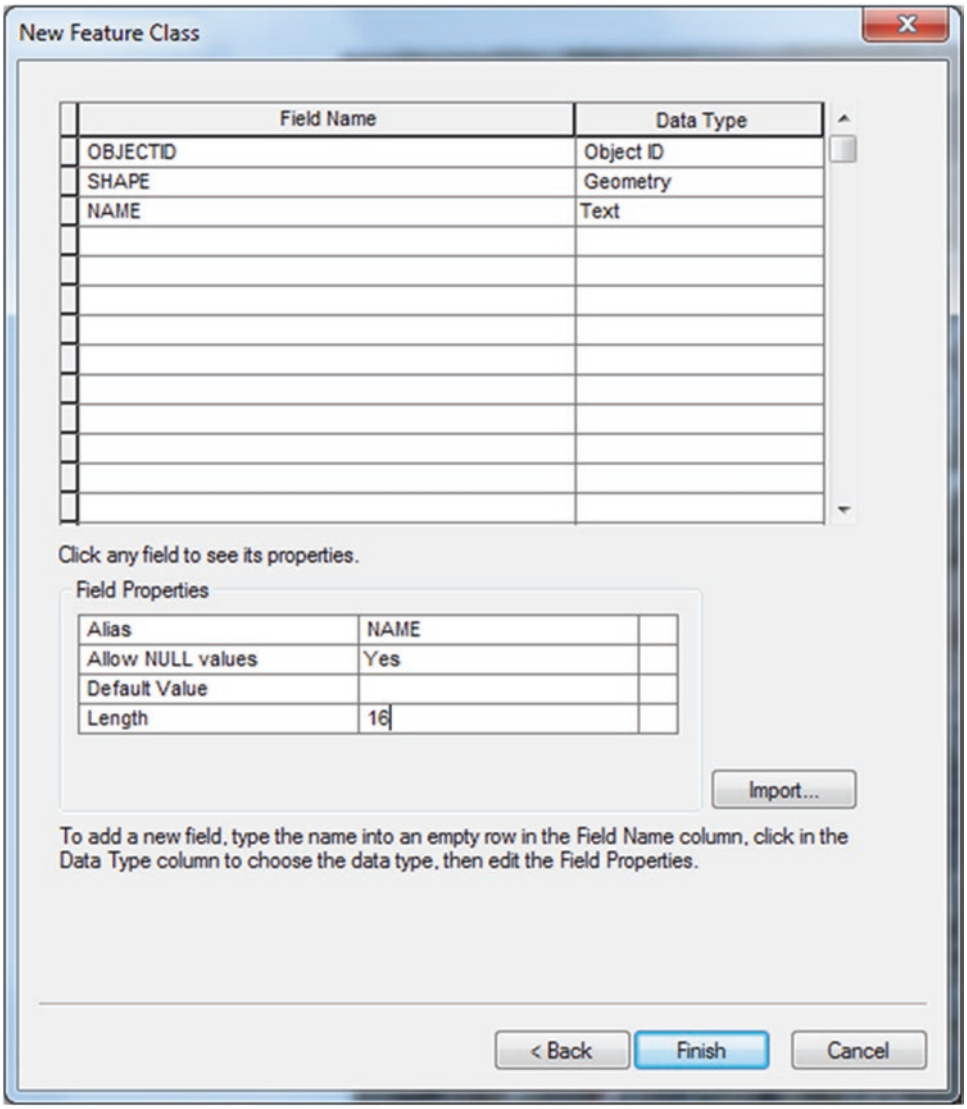
Next Step: Create polygon, line and point feature classes inside the **Campus Feature Dataset**.

Create a Polygon Feature Class

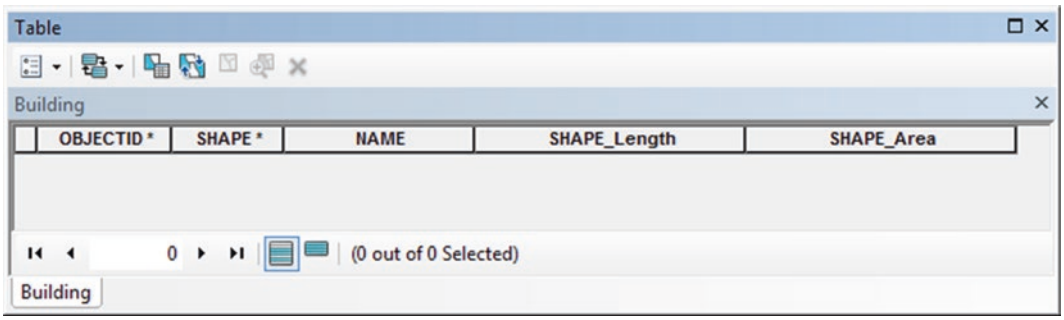
7. R-click **Campus Feature Dataset**/New/Feature Class
8. Name: **Building**
9. Type of feature stored in this feature class: **Polygon Features**



10. Next/Next/
11. Under Field Name/type NAME/
12. Under Data Type/select Text
13. Under Field Properties/Length = 16
14. Finish



Result: The **Building** feature class is added to the TOC, and the attribute table is empty.



Create a Sidewalk Feature Class

15. R-click **Campus Feature Dataset**/New/Feature Class
16. Name: **Sidewalk**
17. Type of feature stored in this feature class: **Line Features**
18. Next/Next/Finish

Result: The **Sidewalk** feature class is added to the TOC, and the attribute table is empty.

Create a Tree Feature Class

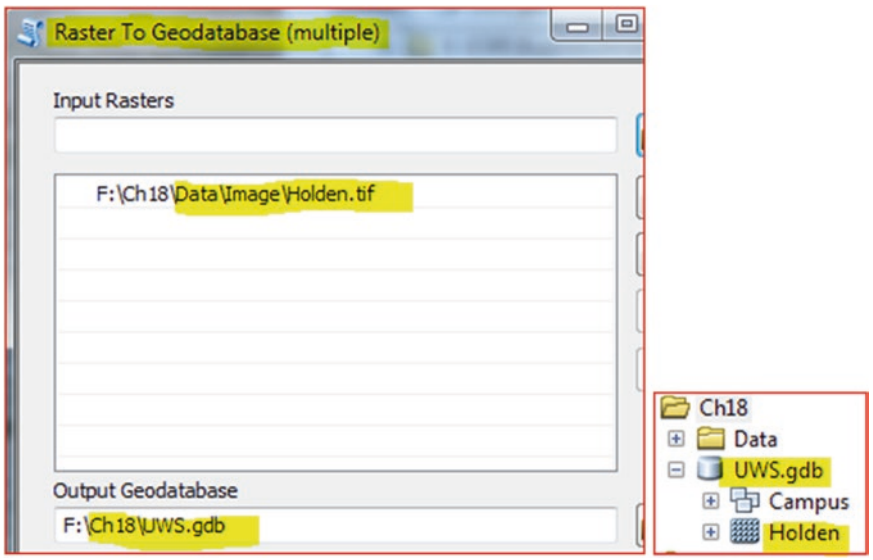
19. R-click **Campus Feature Dataset**/New/Feature Class
20. Name: **Tree**
21. Type of feature stored in this feature class: **Point Features**
22. Next/Next/Finish

Result: The **Tree** feature class is added to the TOC, and the attribute table is empty.

23. Integrate **Holden.tif** into ArcMap from\\Ch18\Data\Image

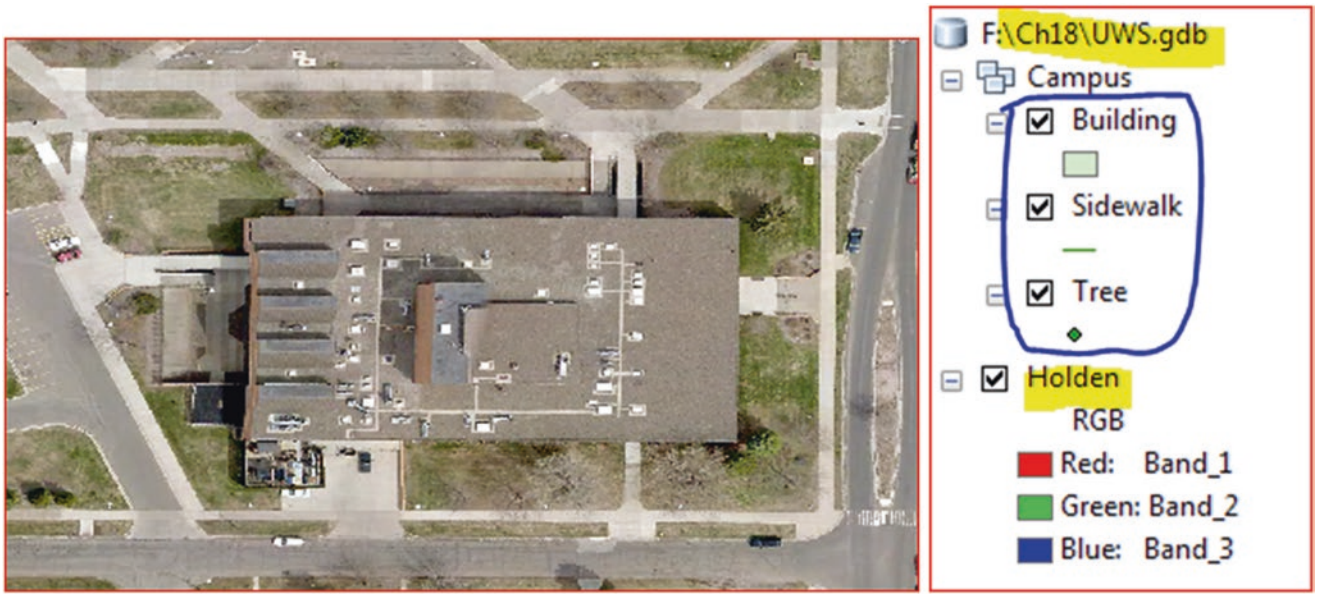
Import the Image (Holden.tif) into the UWS File Geodatabase

24. R-click UWS.gdb/Import/Raster Datasets
25. Input Rasters: \\Data\Image\Holden.tif /Add
26. OK



Result: The image is now part of the UWS file geodatabase.

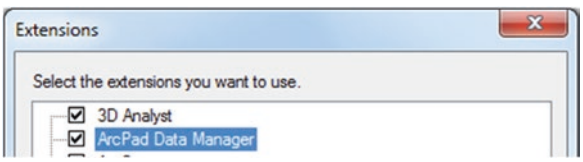
27. In ArcMap/File/New/Click Blank Map/OK
28. Click No (Save changes to Untitled?)
29. Integrate the **Holden.tif** from UWS.gdb, and **Building**, **Sidewalk**, and **Tree** feature classes from Campus Feature Dataset
30. In ArcMap Save the map as **UWS.mxd** in \\Data\ArcPad folder (you are going to use it later on).



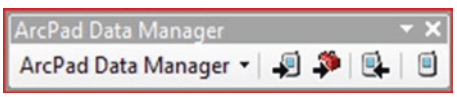
Using ArcPad Data Manager Tool to Transfer Data from ArcGIS into the Mobile GIS

At this stage, you are going to use the **ArcPad Data Manager** tool to transfer data from the **Campus Feature Dataset** and the **Holden.tif** image from **UWS.gdb** in ArcGIS into a mobile device (Trimble Juno GPS) for use with ArcPad in the field. All the data that is copied out, is automatically converted into a format that ArcPad can use.

31. In ArcMap/Customize/Extensions/make sure that ArcPad Data Manager is checked.



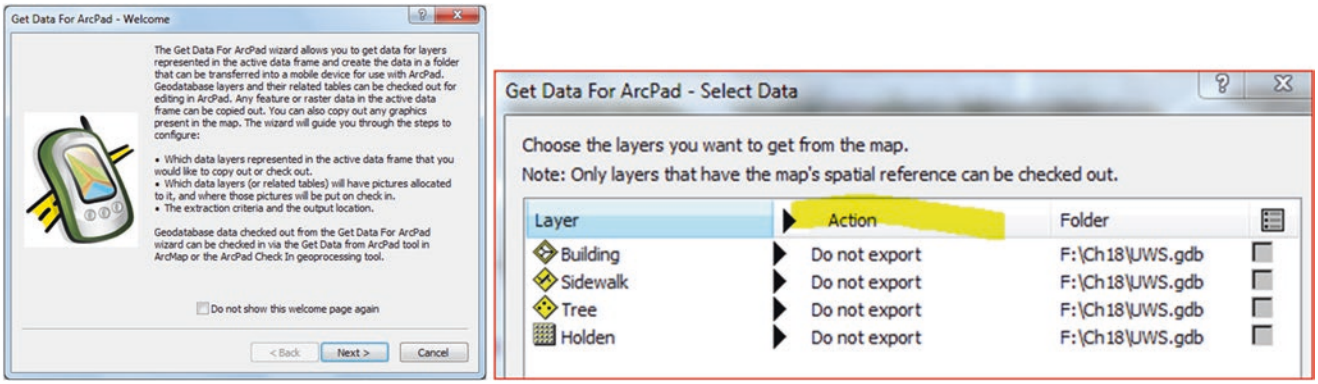
32. Customize/Toolbars/check ArcPad Data Manager



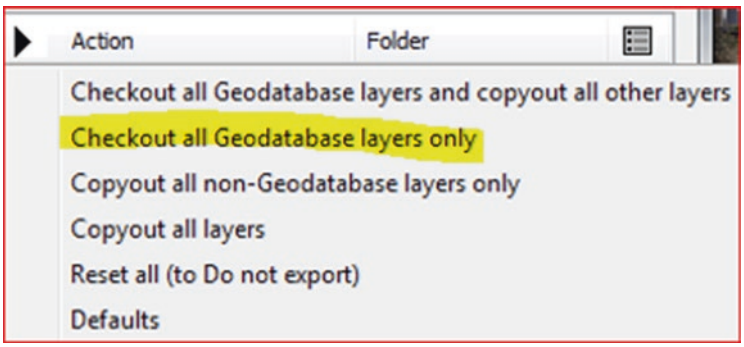
Result: The **ArcPad Data Manager** tool is displayed.

Before you start transferring the data make sure that all the data in the Campus Feature Dataset is displayed in the TOC (**Holden.tif**, **Building**, **Sidewalk**, and **Tree** feature classes).

33. Click Get Data For ArcPad button  (first icon)
34. Next
35. Click the **Action** menu header



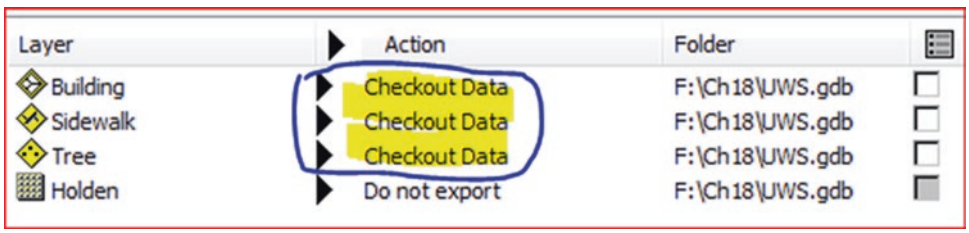
Note: In the "Select Data" dialog box, there are several options for how to export data under the "**Action**" column.



The menu has two options, the first is **Checkout** and the second is **Copyout**. A "**Checkout**" is only allowed for Geodatabase layers. **Copyout** is only for shapefiles or other layers not in a geodatabase.

36. Click Checkout all Geodatabase layer only

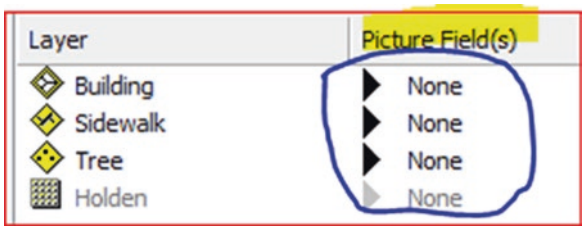
Result: Under **Action** the **Tree**, **Sidewalk**, and **Building** will displayed as **Checkout Data**.



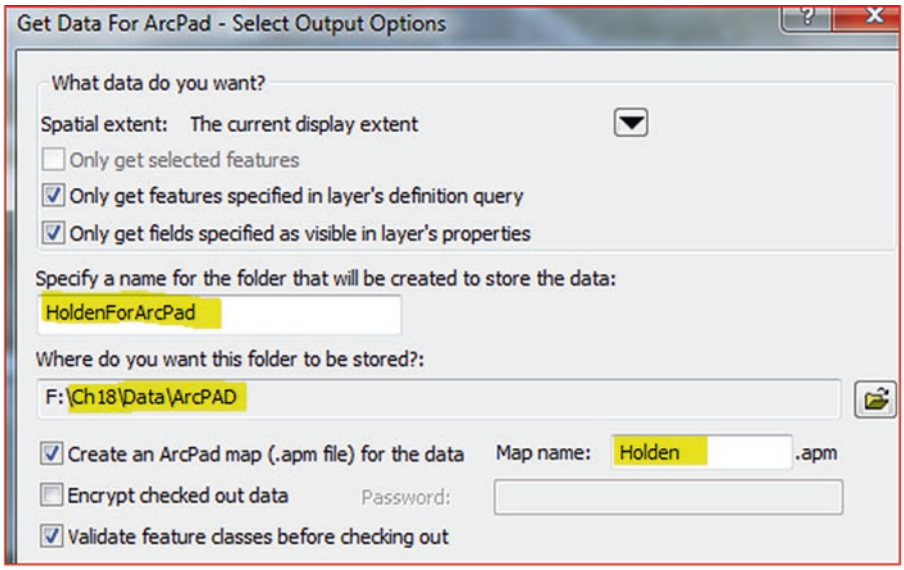
37. Click the **Holden** image under **Action**, and select **Export as Background TIFF**

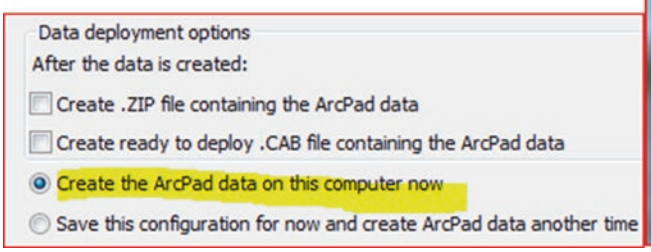
38. Click Next

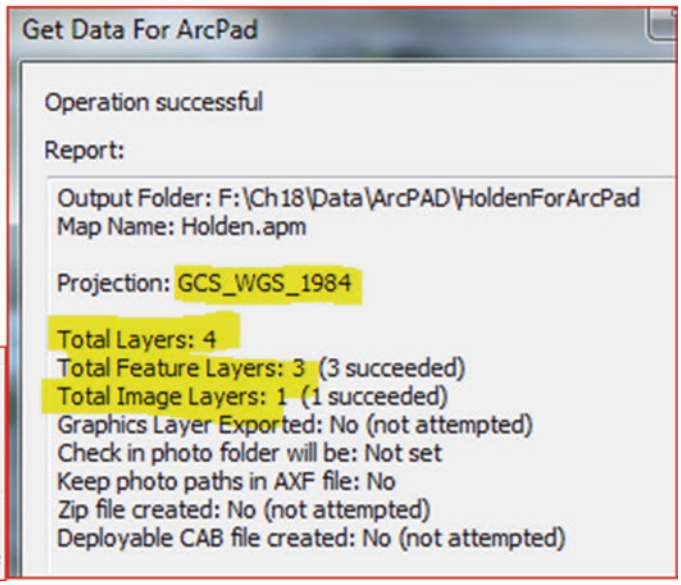
39. Click Next (because there are no pictures associated with the files)



40. Specify a name for the folder that will be created to store the data: **HoldenForArcPad**
41. Where do you want this folder to be stored: \\Ch18\Data\ArcPad folder
42. Map Name: **Holden**
43. Next
44. Make sure to check "Create the ArcPad data on this computer now"/Finish/OK

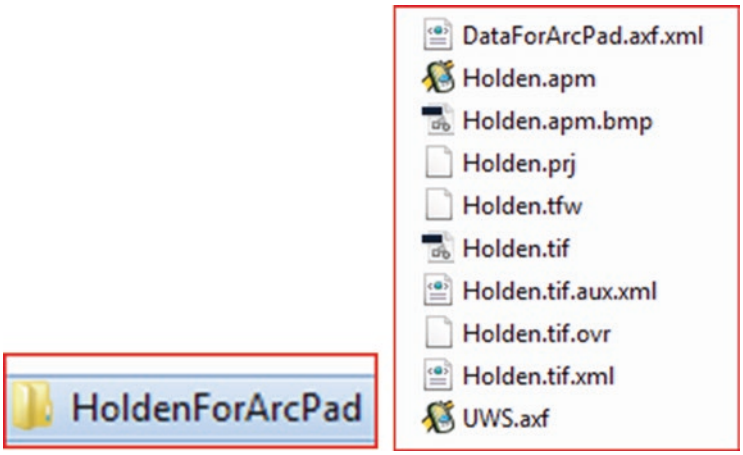






Result: A message will display stating that 4 total layers succeeded (3 layers and 1-image) and they are registered in latitude longitude and associated with WGS84.

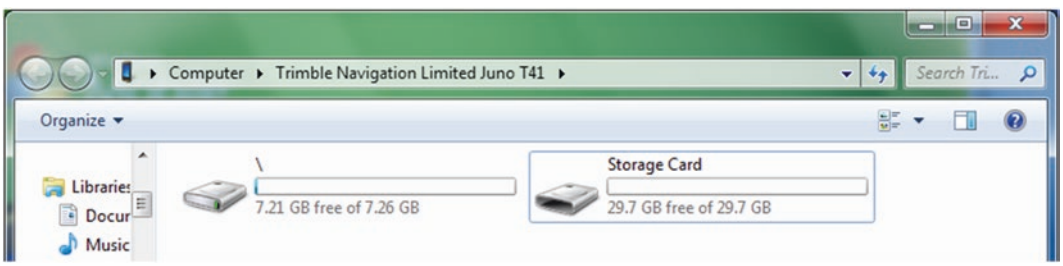
If you open the folder to \\Ch18\Data\ArcPad folder you will see **HoldenForArcPad**. This folder contains the files that are needed to be transformed into the Juno Trimble.



45. Connect to Trimble Juno

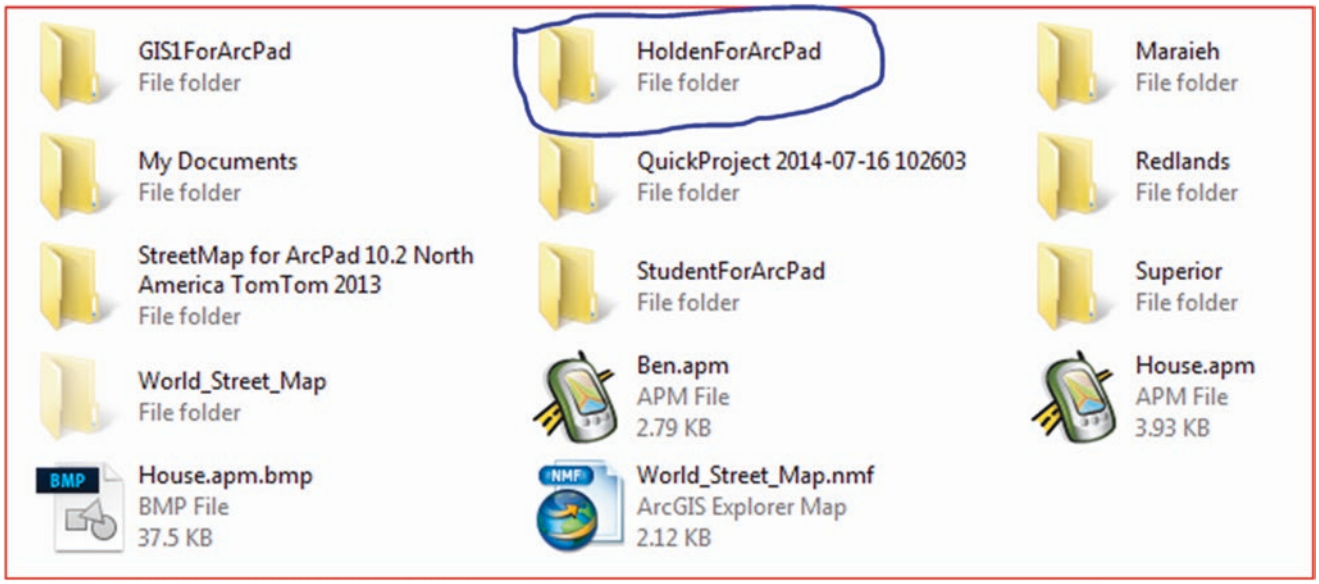
46. Click File Management/click “Browse the content of your device”

Result: You see two folders; the main memory and storage memory.



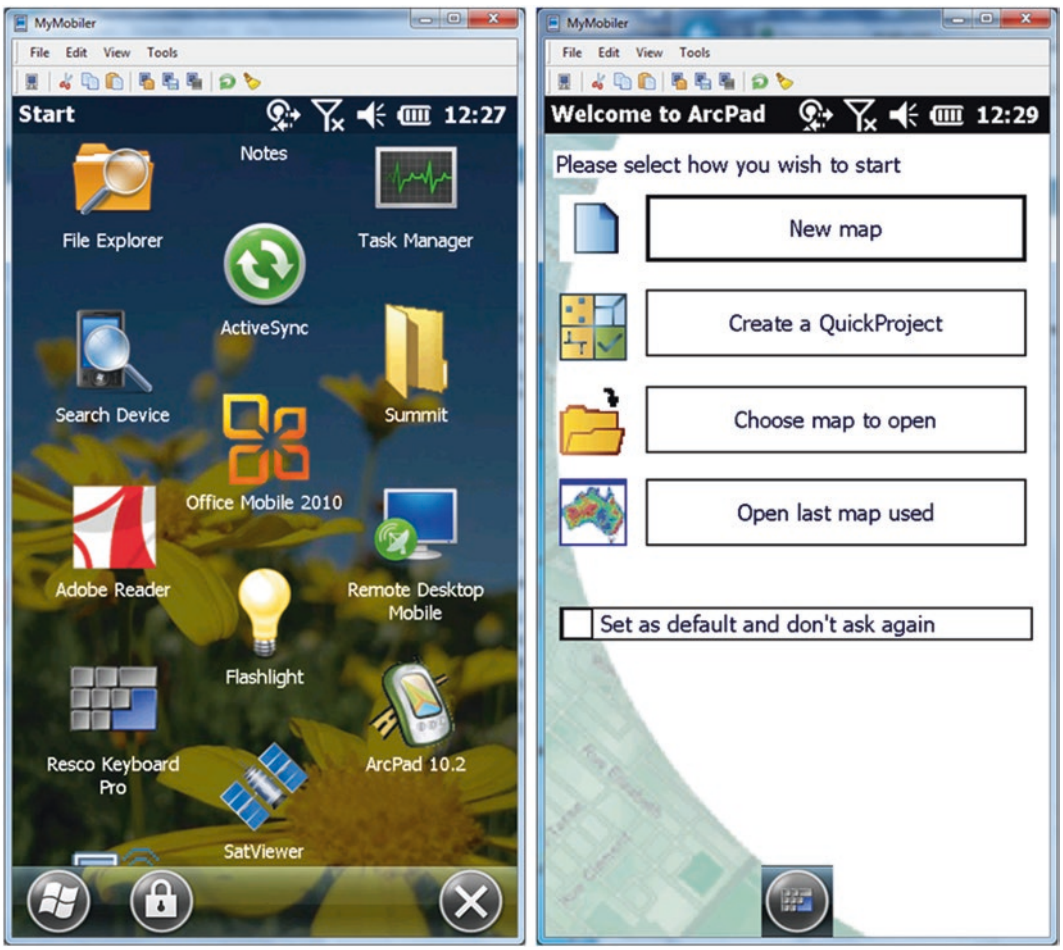
47. Open the Storage Card and copy the **HoldenForArcPad** from your PC to the Storage Card

Result: The **HoldenForArcPad** is copied in the Storage Card.

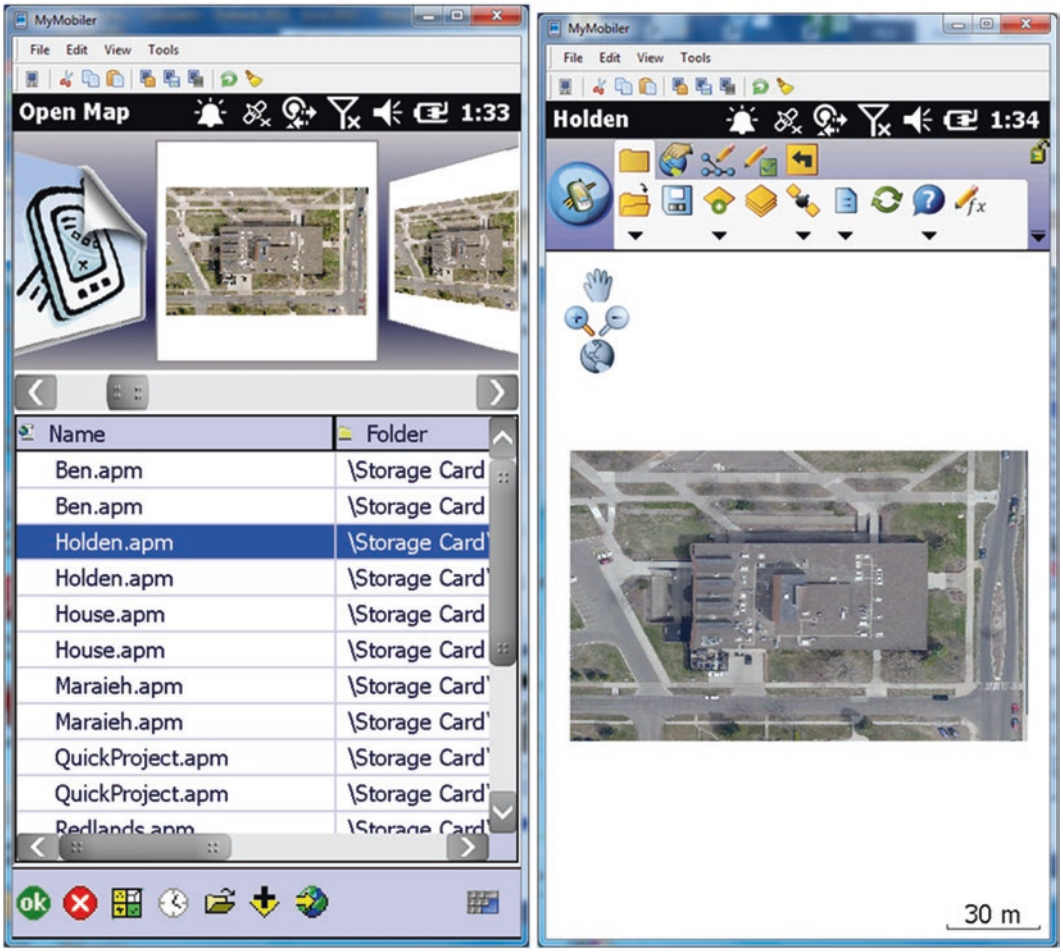


Starting ArcPad in Trimble Juno T41

48. Switch on Trimble Juno
49. On the Window Mobile, start ArcPad (Start/Program/click ArcPad)



50. Choose the option ‘Choose Map to Open’
51. Select “Holden.apm”
52. Click OK



Result: Now the map is displayed and will be used as a reference to digitize the Building, Sidewalk, and Tree layers.

Overview of ArcPad toolbars:
ArcPad tools are organized onto five toolbars, and the user can switch between them. The most important tools are the first four tools, as they are relative to this exercise. Here is a brief description for the four tool bars.

1. ***Main*** toolbar 
2. ***Browse*** toolbar 
3. ***Drawing*** toolbar 
4. ***Quick Capture*** toolbar 
5. ***Navigation*** toolbar 

I. The Main toolbar consists of nine buttons and they are
   1. **Open map** (Opens an ArcPad map, a file with a *.apm extension)
   2. **Save map** (Saves the current ArcPad map)
   3. **Add layer** (Adds one or more layers to the current map)
   4. **Table of contents** (Opens the Table of Contents dialog box)
   5. **GPS Active** (Activates or deactivates the GPS)
   6. **Options** (Opens the ArcPad Options dialog box)
   7. **Refresh** (Redraws the map)
   8. **Help** (Provide ArcPad help)
   9. **Quick Fields** (Turn Quick fields On for this map)

II. The Browse toolbar consists of seven buttons and they are

Zoom In (Zooms in on the map using the pen)

   1. Zoom to Full Extent (Zooms to the full extent of the map)
   2. Go Back to Previous Extent (Zooms back to the previous extent that you were viewing)
   3. Identify (Activates the Identify tool)
   4. Find (Opens the Find tool)
   5. Clear Selected Feature (Clears currently selected features)
   6. Quick Draw (Toggles the Quick Draw mode. This mode changes the way the map is displayed, uses less memory, and may improve performance of your map)

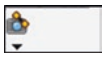
III. The Edit toolbar consists of eight buttons and they are

   1. Start/Stop Editing (This tool is used to select the feature that needs to be edited)
   2. Select (Activates the Select tool)
   3. Point (Activates the point feature for data capture, you can also activate line and polygon)
   4. Capture Point using GPS (Capture Point using GPS captures a point feature in the editable point layer using the current GPS position)
   5. Add GPS Vertex (Captures a single vertex in the current line or polygon feature using the current GPS position)
   6. Add GPS Vertices Continuously (Continuously captures vertices in the current line or polygon feature using the current GPS position)
   7. Feature Properties (Opens the Edit Form or Feature Properties dialog box for the selected feature)
   8. Offset Point (Activate offsets for point data capture)

QuickCapture toolbar

The QuickCapture toolbar, is a dynamic toolbar and its purpose is to provide you with a one-click ability to create new features in your map. You have to consider the following:

If you open ArcPad with no data, the **QuickCapture** toolbar displays only the Capture Photo with GPS.



If ArcPad open with data, the **QuickCapture** toolbar displays the Capture Photo, Capture Point, Capture Line, and Capture Polygon.

If the GPS is on and in the case of capturing a line or polygon features, tapping a tool in the QuickCapture creates the first vertices in the feature. To continue or complete the feature, use the tools on the Command bar. The Command bar consists of the following buttons

The Command bar consists of the following buttons:

1. Save Geometry Changes (Saves geometry changes to an existing feature)
2. Proceed to Attribute Capture (Ends the geometry capture of a new feature and proceeds to capture the feature's attributes)
3. Undo (Undo's the last edit made to a feature)
4. Pen Toggle (Activates or deactivates use of the pen or mouse for capturing features)
5. Cancel (Cancels edits to an existing feature's geometry or cancels the capture of a new feature)
6. Add GPS Vertex (Captures a single vertex in the current line or polygon feature using the current GPS position)
7. Add GPS Vertices Continuously (Continuously captures vertices in the current line or polygon feature using the current GPS position)

GPS Setting in Trimble

Before activating the GPS in the Trimble Juno T41, you need to set the GPS communication parameters in ArcPad to match the parameters set on the GPS receiver in Trimble. The most common communication parameters, are located in the GPS page of the GPS Preferences dialog box. You can use the Find GPS tool to search for your GPS, if you do not know which port on your mobile device your GPS is connected to. However, you will need to make sure that your GPS is connected and turned on, in order for the Find GPS tool to detect your GPS. The Port and Baud drop-down list options will be updated as the Find GPS searches for a connected GPS.

Example: In this device, you will see the following setting:

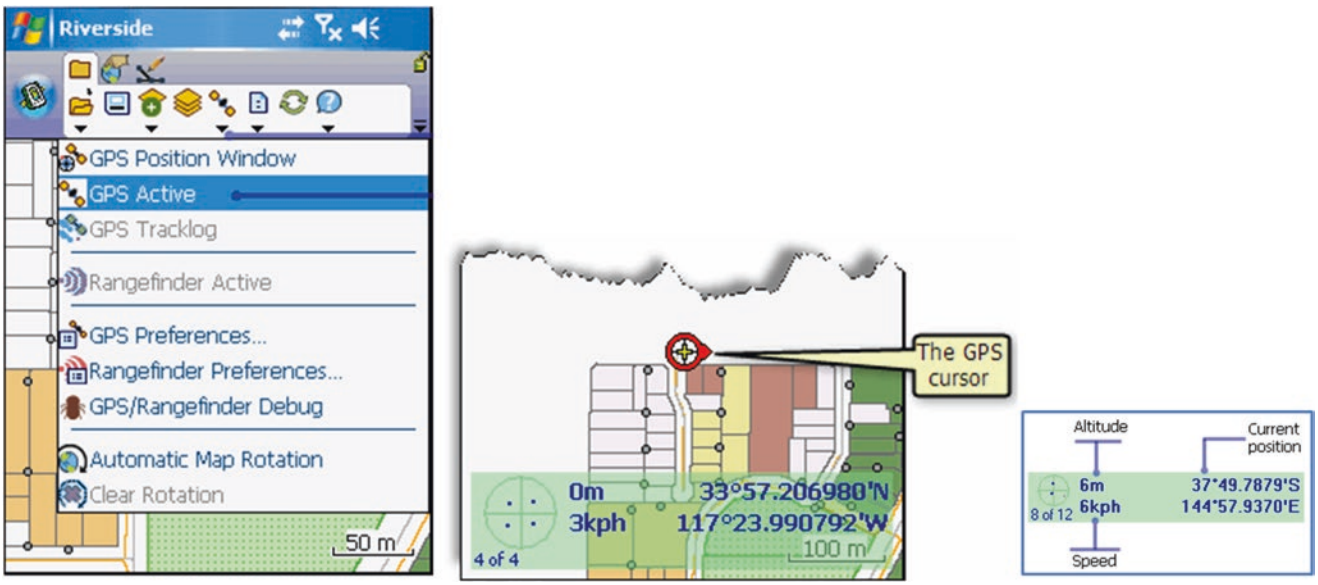
Protocol: NMEA 0183
Port: COM2
Baud: 4800

Note: Refer to your GPS receiver's manual for information on how to set the output GPS protocol and port communication parameters on the GPS receiver.

Activate the GPS

Before we start capturing the data in the field, you will have to activate the GPS and make sure that the GPS is receiving signals from the satellites.

53. Tap the arrow below the GPS Position Window button to display the dropdown list
54. Tap GPS Active



Result: The GPS cursor is displayed as a red circle with a cross inside it, and a small tail. The location (latitude–longitude), the altitude, and speed are also displayed.

Part 2: Capturing Data Using Trimble and ArcPad in the Field

There are two ways to start capturing the data.

I: Capturing Data using the Designed File Geodatabase
II: Quick Project

I: Capturing Data Using the Designed File Geodatabase

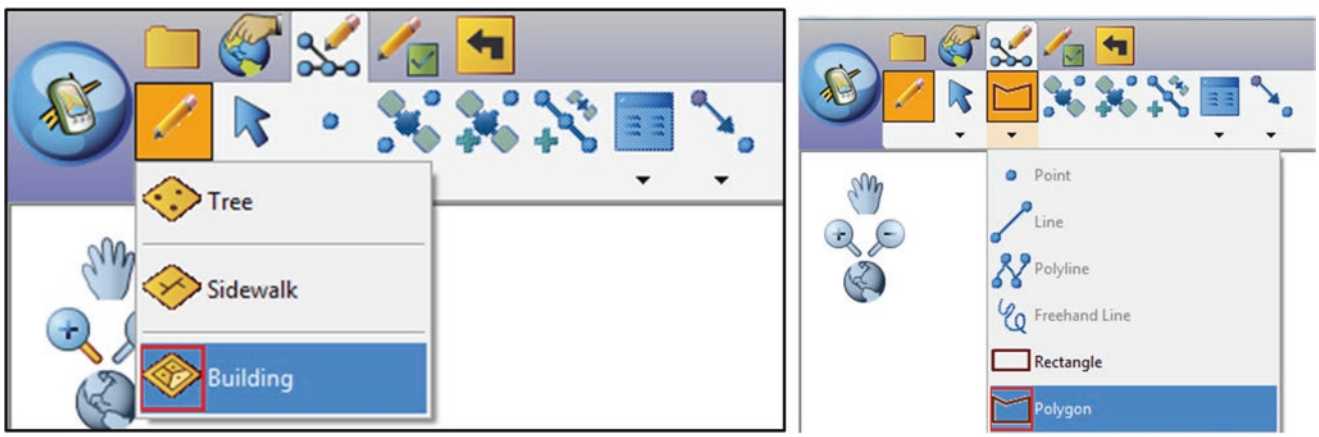
This is done if you are in an area and you would like to capture its features using the ArcPad. You should create a file geodatabase and create a different feature class for the feature that you want to capture. For example at the beginning we created three feature classes (**Tree, Sidewalk, and Building**) in the UWS file Geodatabase. Now you are going to capture the three feature classes and use the image (**Holden.tif**) as a background to guide you in the field. The image below shows the area that you are going to capture.

Capturing the Building, Sidewalk, and Trees in the Designated Study Area

Capturing the Holden Building

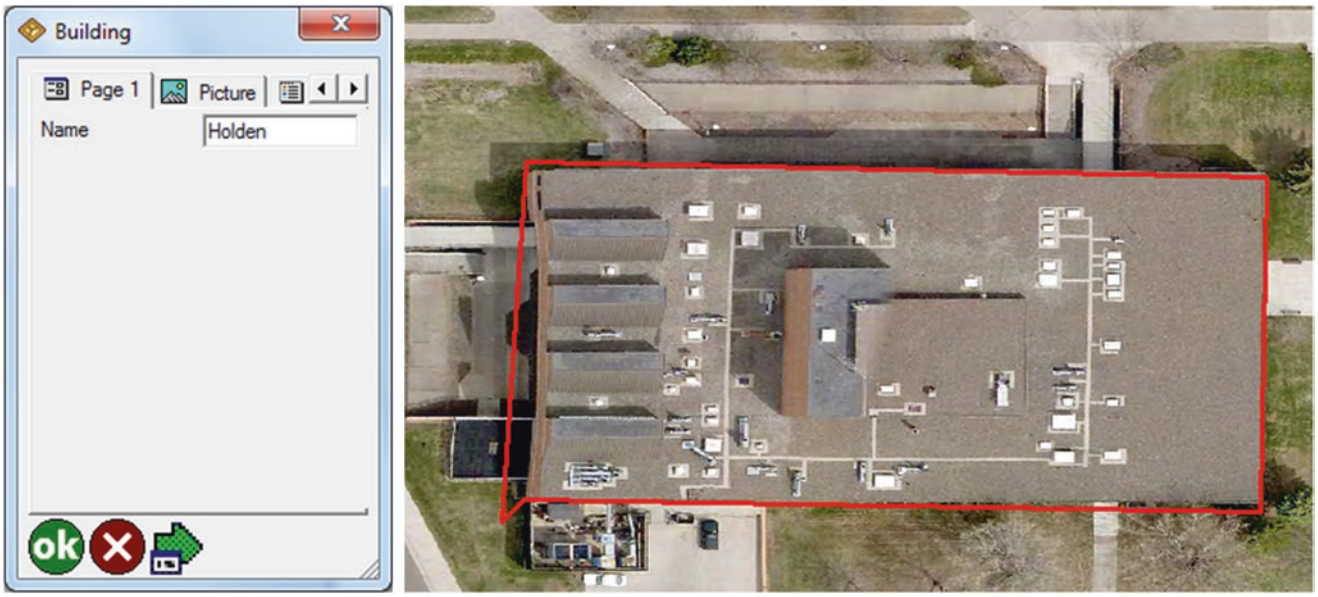
In order to capture the Holden building, the GPS needs to be activated before any of the GPS buttons on the Edit toolbar are enabled.

1. Click the "Drawing Tools" tab.
2. Click the "Start/Stop Editing" button and select the **Building** that you want to edit
3. Click the "Point Drop-Down List" button, and select **Polygon**.



Note: To start capturing the Holden building, you can use either the Add GPS Vertex (Captures a single vertex), or Add GPS Vertices (continuously capture vertices). The Add GPS Vertex and Add GPS Vertices Continuously buttons, are only enabled when the polygon feature type has been selected.

4. Stop at the corner of the building, click Add GPS Vertices and walk around the building. This will capture the perimeter of the **building**
5. Tap the **Proceed tool** on the Command bar when you finish adding your **Building**
6. The Building dialog box opens so that you can immediately enter information about the new Building
7. Type Name: Holden
8. Tap OK

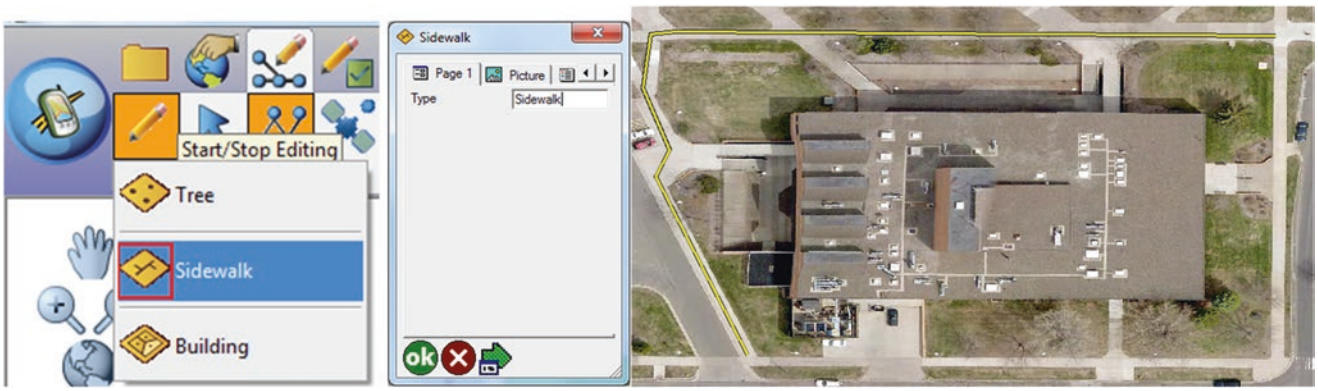


Result: The Holden building is captured and it is shown in red. The boundary of the building is not exactly delineated due to GPS accuracy. This offset will be corrected later on in the office using ArcMap.

Capturing the Sidewalk

The sidewalk around the Holden building needs to be captured using the GPS receiver like in the previous step. With the GPS activated, you will walk the length of the new sidewalk segment, and capture vertices for the length of the new sidewalk.

1. Tap the Start/Stop Editing button.
2. Tap the Sidewalk layer to select it for editing
3. Tap the Polyline feature tool (the Add GPS Vertex & Add GPS Vertices Continuously buttons are enabled)
4. Tap the Add GPS Vertex button, to capture a new vertex. Continue to do so until you have reached the end of the extended sidewalk



Result: The Sidewalks to the north, and to the west of the Holden building, are captured. It is shown in yellow.

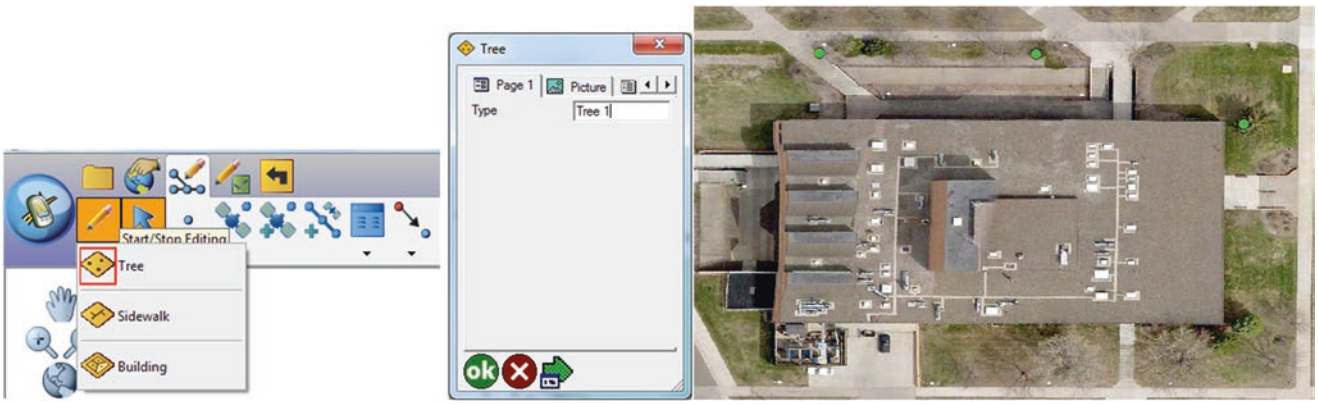
Capturing the Trees

The trees around the Holden building, need to be captured using the GPS receiver like in the previous step. With the GPS activated, you will stand at each tree and use the "Capture Point" button to capture the trees.

1. Tap the Start/Stop Editing button.
2. Tap the Tree layer to select it for editing
3. Tap the Point button on the Edit toolbar

Note: The Point button is now active, and ArcPad is in point-capture mode. Any tap on the screen will create a new point feature at the corresponding coordinates.

4. Tap the map at the location of a tree where you want to create the new point feature.
5. The Feature Properties dialog box is automatically displayed after the new point feature has been created.
6. Type: Tree 1
7. Tap OK
8. Continue capturing the rest of the trees



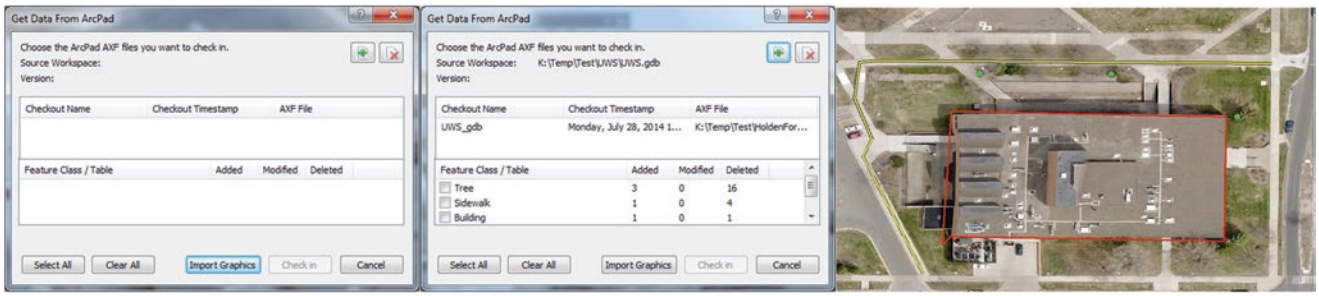
Result: Three Trees in northern part of the Holden building are captured and it's shown in green.

Get Data from ArcPad to ArcGIS

This tool allows you to check-in the edits made in ArcPad, back into the geodatabase from which the data was checked out.
To get the data from ArcPad to ArcGIS, the following steps should be done:

- The Trimble device should be connected to the PC
- You should copy the HoldenForArcPad from Trimble to your PC

1. Launch ArcMap and open the **UWS.mxd**
2. Click "Get data From ArcPad" button (4th icon) on the ArcPad Data Manager
3. Click **Add ArcPad AXF file** 
4. Browse to \\HoldenForArcPad in your PC folder
5. Highlight the **UWS_gdb.axf** and click Open
6. The **UWS_gdb.axf** will be integrated (**Tree, Sidewalk, Building**)
7. Click Select All button (the **Tree, Sidewalk, Building** will be checked)
8. Click the Check in button then
9. Click Yes to check in selected items
10. A dialog box will display with a report showing the results summary
11. Click OK
12. The features that you captured in the field will display



Result: The final map is shown.

Next step:

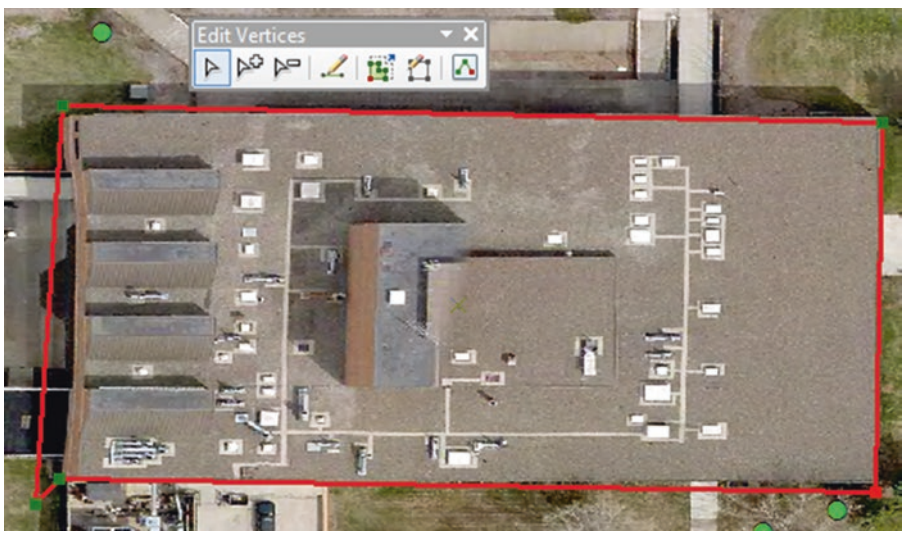
1. Continue capturing the entire sidewalk around the Holden building
2. Continue capturing the trees around the Holden building
3. Integrate the new capture data
4. Correct the geometry of the building, sidewalk and trees using the image as a reference

Note: When you go to the field and finish capturing the rest of the feature classes (Tree and Sidewalk), you should repeat the steps above and copy the data from ArcPad to your PC folder. Then integrate the data from ArcPad to ArcMap through the "Get Data From ArcPad" on the ArcPad manager. This step will not replace the previous data but will add to it the newly captured data.

Editing the Data of the Holden Building

The data capturing of Holden building using the GPS receiver, shows a displacement due to GPS accuracy. This can be corrected by "start editing" adding some vertex and correct the shape of the building using the image as a background reference.

1. R-click the Building in the TOC/Edit feature
2. D-click on the building feature [4 vertex (green), 1 node (red) and the Edit Vertices dialog box will display]



3. Click the Add vertex button on the Edit Vertices to add several vertices
4. Use your GIS skill to move the vertices to the right location to correct the building shape

Note: You might need to add other vertices during editing and make sure to zoom in during the editing process.

Quiz: Correct the sidewalk and the location of the trees.

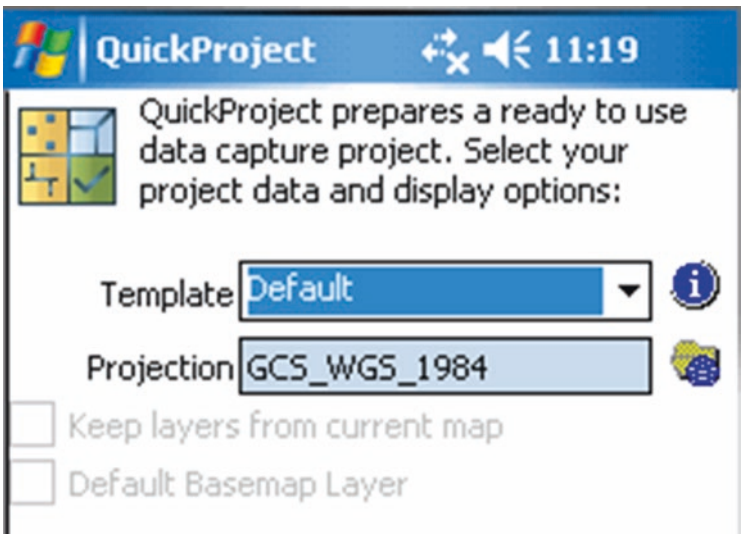
II: QuickProject

A QuickProject is a "ready to use" data capture project. The QuickProject tool creates a "ready to use" data capture project, providing a simple and efficient method for capturing data into three new layers (point, line, and polygon).

Launching ArcPad in Trimble starts with four options:

- New Map
- Create a QuickProject
- Choose map to open
- Open last map used

55. Click Create a QuickProject
56. Template: Default
57. Projection: GCS_WGS_1984
58. Click OK



Result: A new project folder called **QuickProject_YYYYMMDD_HHMM** is created.

Where:

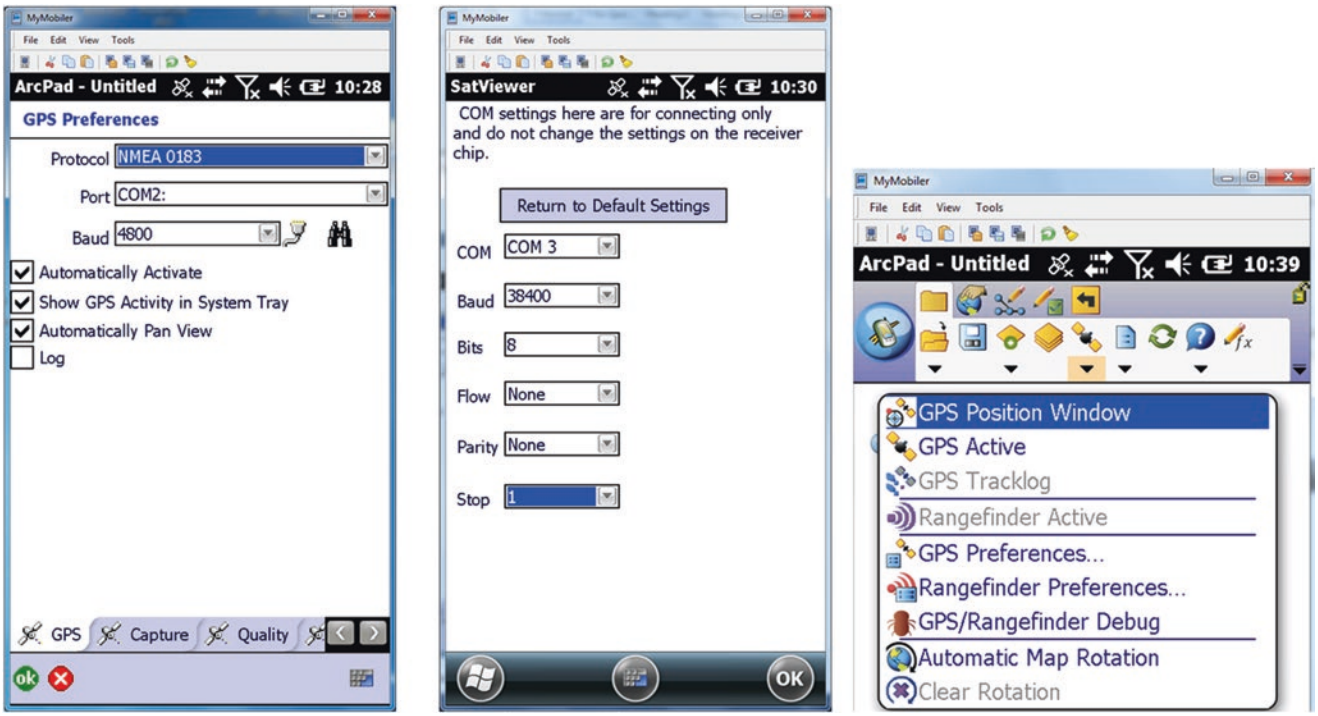
- YYYYMMDD is the current date,
- HHMM is the current time.

If you choose the Default Template and tap OK, the tool creates three new shapefiles in the project folder: Points.shp, Polylines.shp, and Polygons.shp. Each new shapefile has the following fields: Name, Category, Date, Comments, and Photo

Activate the GPS in Trimble

Before using the QuickProject, the GPS with ArcPad should be configured using one of the GPS protocols supported by ArcPad. The GPS Protocol and communication parameters in Trimble Juno T41, is set as follows

ArcPad/GPS Preferences **SatViewer/GPS/Advanced**



59. Tap the arrow below the GPS Active Icon/tap the GPS Active.

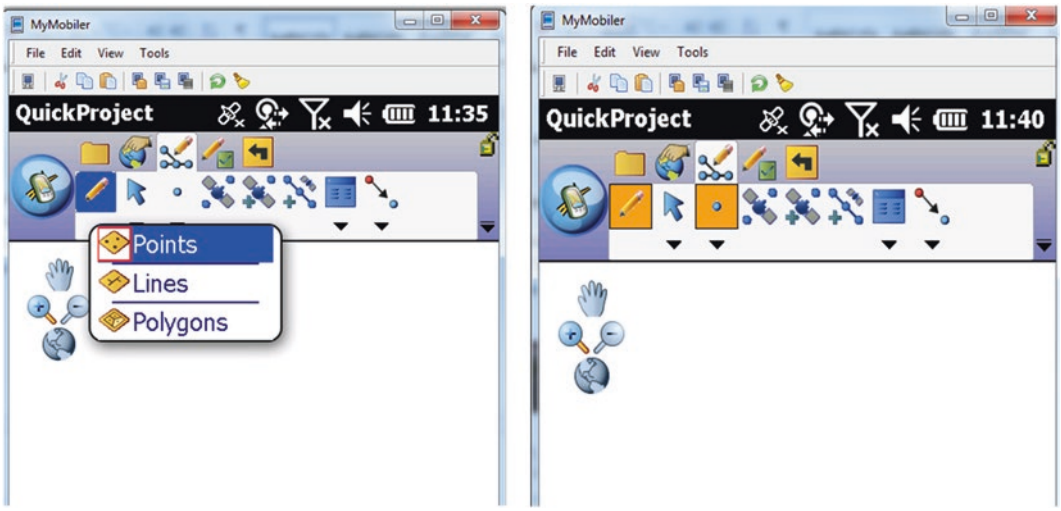
Result: The GPS cursor is displayed when the GPS is active, and is initially located at the current GPS position.

Capturing GPS Data (Point, Line, Polygon)

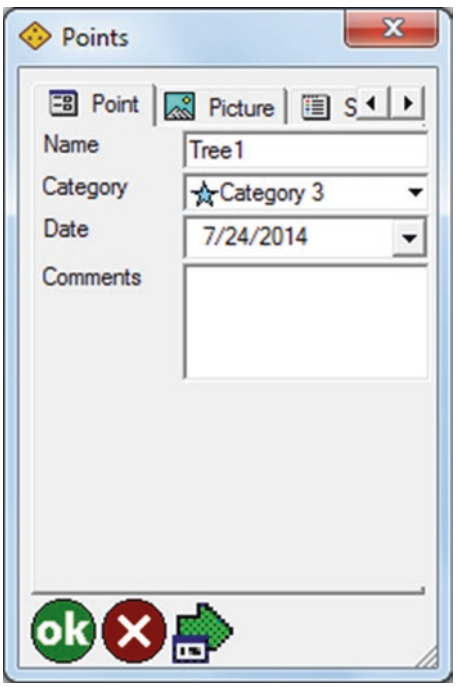
In this exercise you are going to capture the trees (point), sidewalks (line), and buildings (polygon) at the campus of UWS, as seen in the aerial photograph below. The first step is to capture some of the trees as a point feature. Before you start make sure that your GPS is activated.

Capturing Trees (Point Layer)

60. Find the area where you want to capture the tree
61. Click the Drawing Tools icon
62. Tap the Start/Stop Editing button
63. Tap the Points layer to select it for capturing
64. Tap the point feature tool (3rd icon)



65. Stand close to the tree you are going to capture and click Capture Point (4th icon)
66. The point dialog box will display
67. Name: Tree1
68. Category: select Category 3 (Star)
69. OK

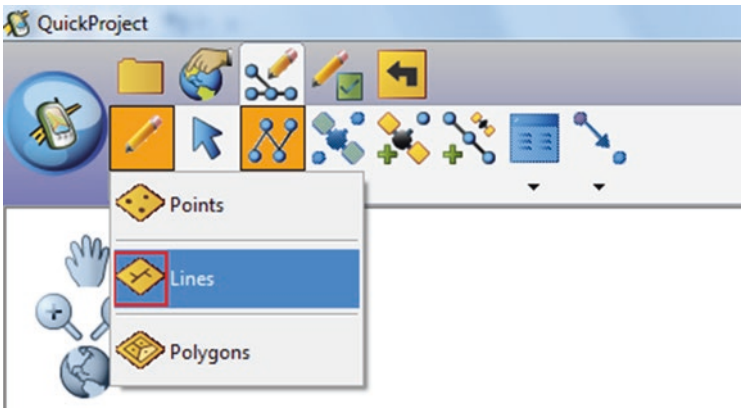


70. Continue to capture the rest of the trees in the designated area
71. OK

Result: The trees are captured in the northern part of Swenson building.

Capturing Sidewalk (Line Layer)

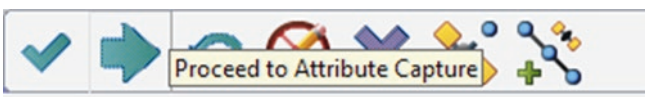
72. Tap the Lines layer to select it for editing.
73. Tap the Polyline feature tool.



74. Tap the Capture Vertex button (5th icon) at the beginning of Sidewalk to capture a new vertex.
75. Continue to do so until you have reached the end of the Sidewalk.

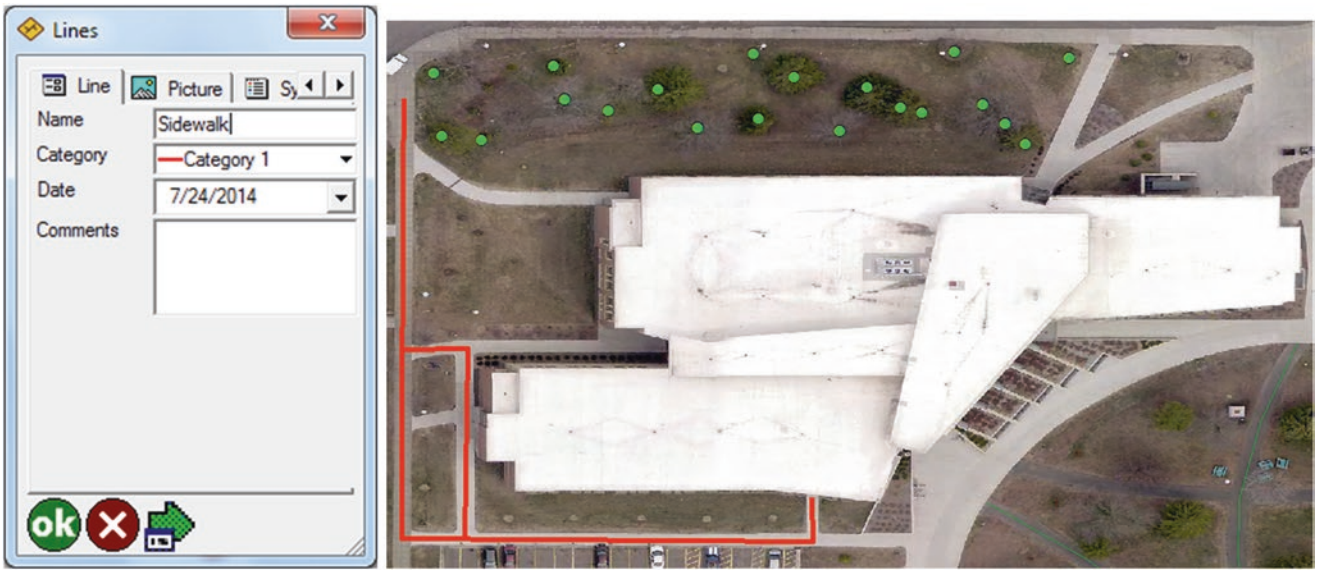
Note: You can also use the **Capture Vertices Continuously** button (6th icon) to capture vertices in streaming mode. Vertices are captured according to the "specified streaming vertices interval", which is set in the GPS Preferences dialog box.

76. Tap the **Proceed to Attribute Capture tool** (2nd icon) on the Command bar when you are finished adding your Sidewalk.



77. The feature dialog box opens, so that you can immediately enter information about the new Sidewalk.

78. Fill in the form as follows:



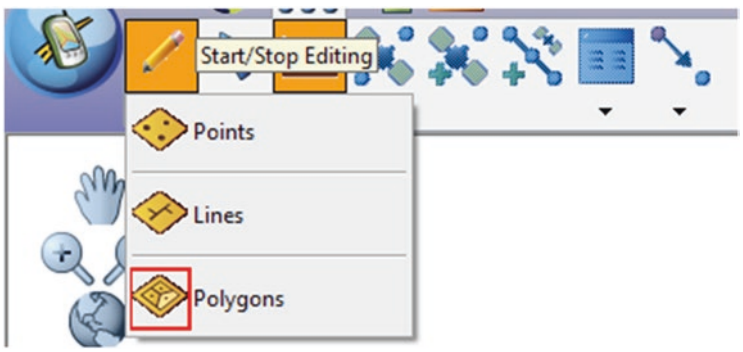
79. OK

Note: Your new Sidewalk has been added, and you are ready to move on to capture the building.

Capturing Building (Polygon Layer)

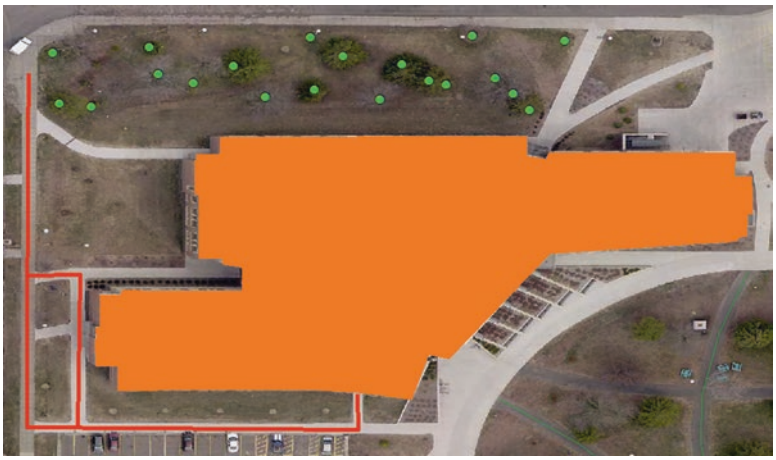
You are going to capture the Swenson building

80. Tap the Polygons layer to select it for editing.
81. Tap the Polygon feature tool.



82. Tap the Capture Vertex button (5th icon) at the beginning of the Swenson building to capture a new vertex.
83. Continue to do so until you have reached the end of the building.

Note: You can also use the **Capture Vertices Continuously** button (6th icon), to capture vertices in streaming mode as in the line capturing.

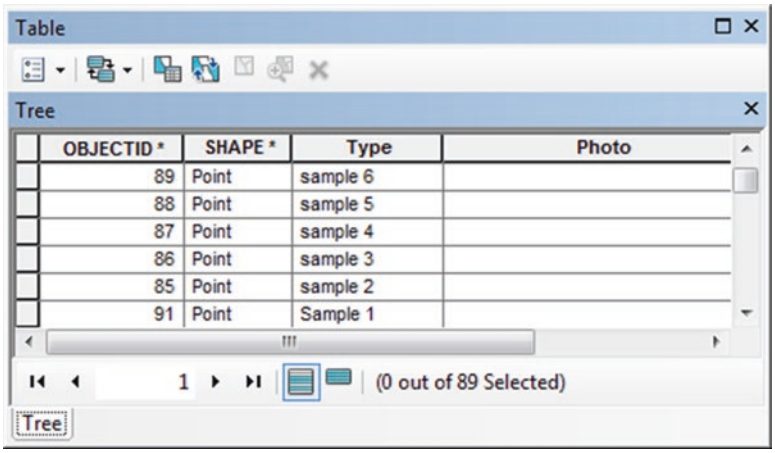


View the Picture That Was Captured in ArcPad in the Field Using Trimble

After using Get Data From ArcPad, fuse the ArPad manager in ArcMap to integrate the **Class_gdb.axf** file.

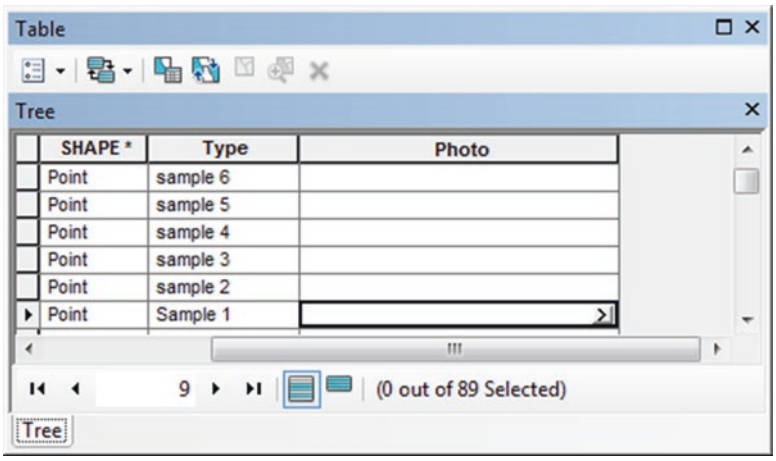
84. Open the attribute table of the tree

Result: You see under the "Type" field Sample 1, 2, 3. 4, 5, and 6. 4 pictures were taken for Sample 1, 3, 4, and 6.The pictures will be placed under the field "**Photo**".



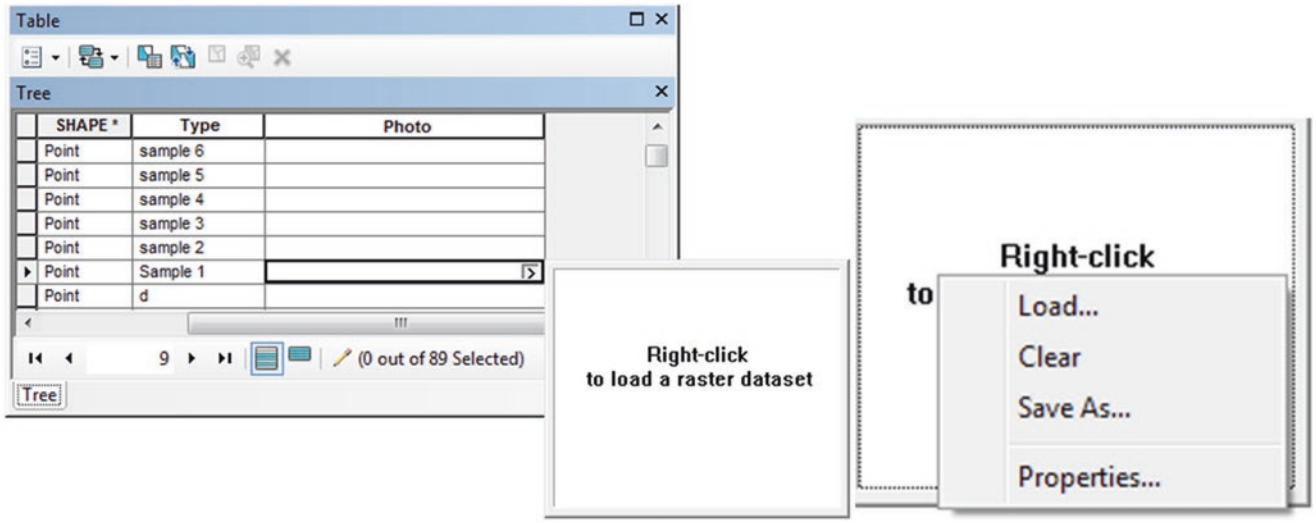
85. In the TOC/R-click Tree/Edit Features/Start Editing
86. Under the **Photo** filed click the row across the sample 1

Result: An Arrow and a line display below the Photo field in the attribute table.

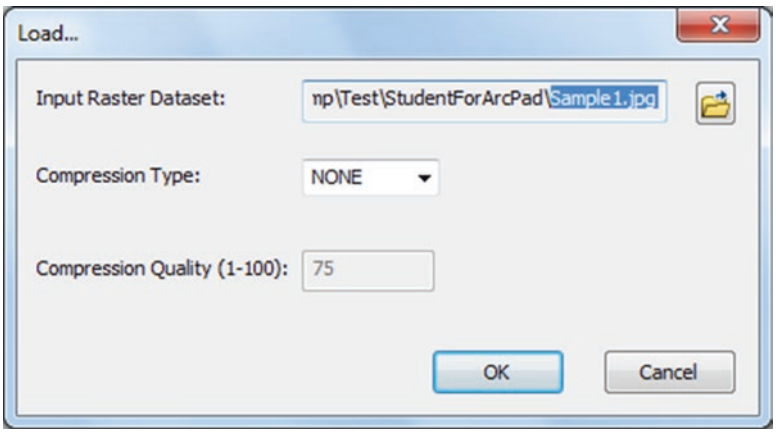


87. Click on the arrow

Result: A window display asking to r-click to load the picture is taken for Sample 1.

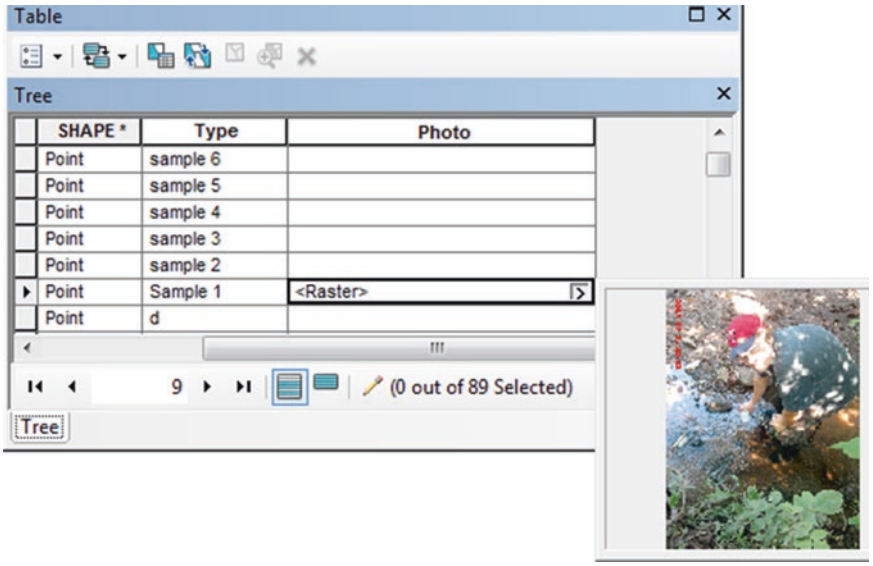


88. R-click inside the window/select load/browse to the location of the picture
89. Fill it as below

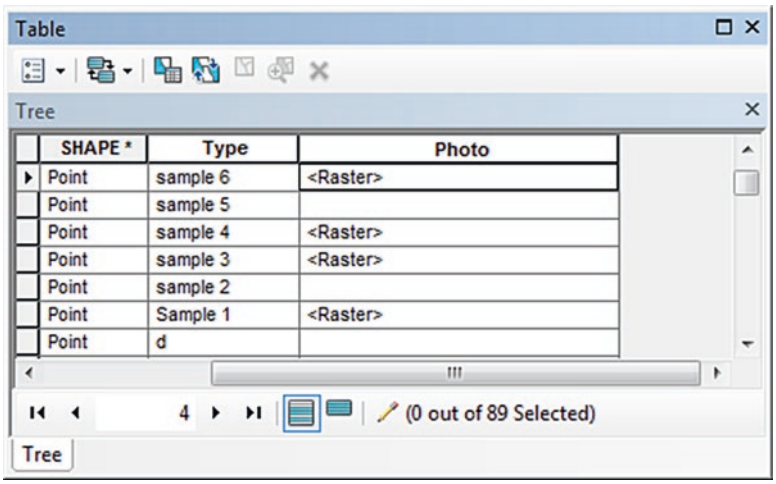


90. OK

Result: The raster is loaded <Raster>, if you click on the arrow the photo will display.

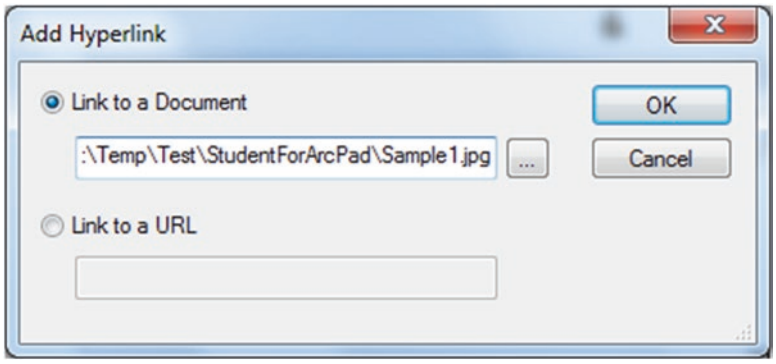


91. Repeat the above procedure for sample 3, 4, and 6
92. Editor Stop Editing



Create Map Hyperlink

93. R-click Tree/label Features
94. Zoom to the Area with Sample 1 to Sample 6
95. Click the Identify tool in the Tools toolbar
96. Click the point marker for Sample 1
97. In the Identify window/R-click Sample 1/Add Hyperlink
98. Click Link to a Document/browse \\StudentForArcPad\ select Sample1
99. Click Open/OK



100. Repeat the above procedure to link to Sample 3, 4, and 6
101. Click the Hyperlink tool on the Tools toolbar

Result: All features with hyperlinks available get a blue dot in the center.

102. Click on Sample 1/the picture display