

## Policies and Procedures

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W W W . A L L E G A N C O U N T Y . O R G / G I S

N O V E M B E R 2 3 , 2 0 2 0



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# Part I

# Brand



# — 1 —

## Awards

### 1.1 THE GIS CHAMPION AWARD

#### 1.1.1 GIS CHAMPION

An individual whose actions promote the use of GIS

#### GIS CHAMPION AWARD



Figure 1.1: Example GIS Champion Award

## Background

Though Allegan County has had a formal GIS department for over 20 years, few people have learned to use it.

## Statement of Problem

GIS is underutilized in Allegan County government. The county would benefit from more GIS use in its government. Currently there is no formal recognition of individuals that promote GIS.

## Analysis

The GIS Champion Award is a simple method of recognizing those that promote GIS in the county.

## Past GIS Award Recipients

- Ian Hanes
  - Karen
  - Brian Redmon
-

## GIS Champion Award Code

```
\documentclass[landscape]{article}
\usepackage{wallpaper}
\usepackage{niceframe}
\usepackage{xcolor}
\usepackage{ulem}
\usepackage{graphicx}
\usepackage{geometry}
%\geometry{tmargin=.75cm,bmargin=.25cm,
%lmargin=.8cm,rmargin=.2cm}
\geometry{tmargin=.25in,bmargin=.25in,
    lmargin=.25in,rmargin=.25in}
\usepackage{multicol}
\setlength{\columnseprule}{0.4pt}
\columnwidth=0.3\textwidth

\begin{document}
\centering
\scalebox{2.9}{
\color{green!30!black!60}
\begin{minipage}{.33\textwidth}
\font\border=umrandb
\generalframe
{\border \char113} % up left
{\border \char109} % up
{\border \char112} % up right
{\border \char108} % left
{\border \char110} % right
{\border \char114} % lower left
{\border \char111} % bottom
{\border \char115} % lower right
\centering
\includegraphics[height=1.5cm]{GIS_Logo_better.jpg}
\end{minipage}}

```

---

```
\vspace{-8mm}

\curlyframe[.9\columnwidth]{

\textrmcolor{green!10!black!90}{\small Allegan County GIS Services}
\vspace{.005in}

\textrmcolor{green!10!black!90}{\tiny Recognizes}\\
%\smallskip
\vspace{.005in}
\underline{\textrmcolor{green!30!black!60}{\textcolor{green!30!black!60}{Brian Redmond}}}
\\
\smallskip
\tiny Information Services Technician

%\smallskip
\textrmcolor{green!10!black!90}{\tiny for Excellence in}
}
\smallskip
\\
\textrmcolor{black}{\normalsize \textsf{Enabling
Employee Experiences}}}
\\
\vspace{.1in}
\textrmcolor{green!10!black!90}{\tiny on this day
\itshape September 21, 2018}
```

---

}

\vspace{.1in}

{\color{green!10!black!90}

\scalebox{.6}{

```
\begin{tabular}{ccc}
\cline{1-1}
\cline{3-3}
\\
Neil Besteman & & Bryan May \\
GIS Manager & & GIS Analyst \\
\end{tabular}

} % closes scalebox{.6} arg
} % closes blue!40!black
} % closes curlyframe arg
} % closes centering
\end{minipage}
} % closes scalebox{2.8} arg

\end{document}
```

## Part II

# Methods



# — 2 — *Documentation*

---

## 2.1 ABOUT DOCUMENTATION

### 2.1.1 HOW JALAPEÑO WORKS

#### PROBLEM AND ANALYSIS

#### Background

GIS Services has complicated and evolving workflows and uses everchanging technologies

lems with:

- version control
- finding the documentation
- disseminating the documentation

#### Statement of Problem

GIS documentation has traditionally been done in different formats and stored in many different files and folders in the county network. This has resulted in prob-

#### Analysis

The Jalapeño folder along with some open-source software provides a robust documentation tool for GIS documentation.

## Default sizes in Jalapeño

| Element              | Default Size |
|----------------------|--------------|
| Paragraph Heading    | Large        |
| Paragraph text       | normalsize   |
| Subparagraph Heading | large        |
| Subparagraph Text    | normalsize   |

Table 2.1: Default Sizes

Examples:

Schema Change Procedure large size

large size type

Schema Change Procedure Default size

default size type

Schema Change Procedure Large size

Large size type space neg point 3in here

Schema Change Procedure Large size

LARGE size type

Schema Change Procedure Default size

default size type

Schema Change Procedure large size

large size type

Schema Change Procedure Large size

Large size type

Schema Change Procedure LARGE size

LARGE size type

## C O L O R S

### Blues

HeaderBlueA \_\_\_\_\_  
HeaderBlueB \_\_\_\_\_  
HeaderBlueC \_\_\_\_\_  
HeaderBlueD \_\_\_\_\_  
HeaderBlueE \_\_\_\_\_

### Golds

HeaderGoldA \_\_\_\_\_  
HeaderGoldB \_\_\_\_\_  
HeaderGoldC \_\_\_\_\_  
HeaderGoldD \_\_\_\_\_  
HeaderGoldE \_\_\_\_\_

### Oranges

HeaderOrangeA \_\_\_\_\_  
HeaderOrangeB \_\_\_\_\_  
HeaderOrangeC \_\_\_\_\_  
HeaderOrangeD \_\_\_\_\_  
HeaderOrangeE \_\_\_\_\_

---

## Greens

HeaderGreenA \_\_\_\_\_

HeaderGreenB \_\_\_\_\_

HeaderGreenC \_\_\_\_\_

HeaderGreenD \_\_\_\_\_

HeaderGreenE \_\_\_\_\_

## Others

HyperlinkBlue1 \_\_\_\_\_

graphicOrange \_\_\_\_\_

## PROJECT NOTES :

- jalapeno folder is a git package <https://github.com/nbesteman/jalapeno>
- Project is coded with relative paths and jalapeno can be located anywhere.

## Project File Structure:

...\\jalapeno\\..

| folder        | description                        |
|---------------|------------------------------------|
| .git          | versioning repository for Jalapeño |
| documentation | resources used in Jalapeño         |
| processing    | .tex documents and build folders   |
| source        | common image files                 |
| temp          | untracked folder for temp storage  |

...\\jalapeno\\documentation\\..

| folder or file  | description                      |
|-----------------|----------------------------------|
| classDocs       | TeX class documentation          |
| DevNotes        | Notes and Mind Maps for Jalapeño |
| latexamples     | TeX example code                 |
| moduleTemplates | .tex templates                   |
| packageDocs     | TeX package documentation        |
| readingRoom     | Resources linked in Jalapeño     |
| unsorted        | Unsorted documentation           |
| gitnotes.txt    | git commands notes               |

## ...\\jalapeno\\processing\\..

| folder or file              | description   |
|-----------------------------|---|
| archive                     | Processing backup folder  |
| ...Part                     | Folders of book <i>parts</i>                                    |
| build                       | TEX folder for .pdf output and temp files                       |
| build\\referenceEntries.bib | Entries that appear in references                               |
| preamble.tex                | preamble code for all documents                                 |
| titlePages                  | Assortment of .tex title pages                                  |
| compileFull.sh              | pdflatex, bibtex, makeglossaries, makeindex, pdflatex, pdflatex |
| compileMainX2.sh            | pdflatex, pdflatex  |
| GISDocumentation.tex        | Master document code  |
| glossaryEntries.tex         | Entries that appear in glossary                                 |
| indexEntries.tex            | Entries that appear in the index                                |

## ...\\jalapeno\\processing\\preamble..

| folder or file            | description   |
|---------------------------|---|
| chapterStyles.tex         | Sets chapter title page attributes with Memoir Class                                    |
| colorDefs.tex             | Defines custom colors   |
| graphicsPath.tex          | Defines graphics variable   |
| pageLayoutCommands.tex    | Sets spacing and typeface for headings of Sections down to Sub-paragraphs in mainmatter |
| pageLayoutCommandsAlt.tex | Sets spacing and typeface for headings of Sections down to Sub-paragraphs in backmatter |
| pageStyles.tex            | Sets header and footer properties   |
| preamble.tex              | Preamble used to compile main document  |
| subSectionPreamble.tex    | Preamble used to compile any subsection document  |

## U S I N G T H E G L O S S A R Y

# Glossary Requirements

Glossary commands require a Perl interpreter. Activeperl is a free Perl interpreter and can be downloaded from:

<https://www.activestate.com/activeperl/downloads> (A typical installation adds Perl to your path). Compiling the glossary requires running the makeglossaries command either in a L<sup>A</sup>T<sub>E</sub>X IDE or in command line as described here. PDFLatex must be run first to create a .aux file that is used by makeglossaries to create an .gls file. After the .gls file is created, PDFLatex must be run again to insert the glossary at the \printglossaries location.

## Creating a new glossary entry

To **create a new glossary entry**: Add an entry to glossaryEntries.tex. Save it there and then use the makeglossaries command to recompile the .gls file.

## Rebuilding the glossary

To **Recompile the .gls**. In the (main document)build folder:

- Launch command prompt
- enter command: **makeglossaries GISDocumentation\***

Note that this command reads the .aux file and creates the .gls file. The .aux file is created by compiling with PDFLatex. If there is no .aux file the command will fail

## Using glossary terms in a subdocument:

In the subdocument you must add code to input the glossaryEntries file.  
ie. After the line:

```
\input{.../.../.../preamble}
```

Add the line:

```
\input{.../.../.../glossaryEntries}
```

---

## To use a glossary term in the subdocument:

In place of the term, use code referencing the key (in the glossaryEntries file):

- \gls{key}

## To add the glossary to the subdocument:

- Add the line \makeglossaries to the preamble of the subdocument.
- Add the line \printglossaries to the subdocument.
- Run makeglossaries in command line on the subdocument similar to how is described above.

## U S I N G T H E B I B L I O G R A P H Y ( R E F E R E N C E S )

### Bibliography requirements

Compiling the bibliography requires running bibtex either in a  $\text{\LaTeX}$  IDE or in command line as described here. PDFLatex must be run first to create a .aux file that is used by bibtex to create a .bbl file. After the .bbl file is created, PDFLatex must be run again to insert the bibliography at the \bibliography location.

### Inserting the bibliography

In the  $\text{\LaTeX}$  code:

```
\bibliography\{referenceEntries}
```

Inserts a bibliography called referenceEntries.bib from the same folder as the project .aux file

### Creating a new bibliography entry

To **create a new bibliography entry**: Add an entry to referenceEntries.bib. Save it there and then use bibtex to recompile the .bbl file.

### Rebuilding the bibliography

To **Recompile the .bbl**. In the (main document)build folder:

- Launch command prompt
- Enter command: **bibtex GISDocumentation**

Note that this command reads the .aux file and creates the .bbl file. The .aux file is created by compiling with PDFLatex. If there is no .aux file the command will fail

### To cite a bibliography source in a subdocument

In the place that you want the citation In the  $\text{\LaTeX}$  code:

```
~\cite[pg.#]{key}
```

## U S I N G T H E I N D E X

### Index requirements:

Compiling the index requires running the makeindex command either in a  $\text{\LaTeX}$  IDE or in command line as described here. PDFLatex must be run first to create a .aux file that is used by makeindex to create an .idx file. After the .idx file is created, PDFLatex must be run again to insert the index at the \printindex location.

### Creating a new index entry

To **create a new index entry**: Add an entry to indexEntries.tex. Save it there and then use the makeindex command to recompile the .idx file.

### Rebuilding the index

To Recompile the .idx In the (main document)build folder:

- Launch command prompt
- enter command: **makeindex GISDocumentation\***

Note that this command reads the .aux file and creates the .idx file. The .aux file is created by compiling with PDFLatex. If there is no .aux file the command will fail. Run PDFLatex first

### Access the index from a subdocument

In the subdocument you must add code to input the indexEntries file. For example:

After the line:

```
\input{../../../../../preamble}
```

Add the line:

```
\input{../../../../../indexEntries}
```

### To use a index term in the subdocument:

In place of the term, use code referencing the key (in the indexEntries file):

- \index {key}
-

## To add the index to the subdocument:

- Add the line \makeindex to the preamble of the subdocument.
- Add the line \printindex to the subdocument.
- Run makeindex in command line on the subdocument similar to how is described above.

## U S I N G T H E A P P E N D I C E S

---

## 2.2 DOCUMENT STORAGE CONCEPTS

### 2.2.1 GIS FILE STANDARD

#### FOLDERS INSIDE THE PROJECT

##### FOLDER

- archive
- build
- delivered
- documentation
- processing
- source

# — 3 —

## *Team Concept*

---

### 3 . 1 T E A M S T R U C T U R E

#### 3 . 1 . 1 P A I R E D P R O G R A M M I N G

A paragraph about pp from Joy Inc.



# **— 4 —**

## *Learning Concept*

---

### 4 . 1    L E A R N I N G   A N D   G R O W T H

#### 4 . 1 . 1    L E A R N I N G   A N D   G R O W T H   P L A N

##### S T R E N G T H   T O   L E V E R A G E

*Area of Focus:* Professional Development

##### GISP Certification

##### Critical Behaviors Goals

What specific behaviors do I model or exhibit in this competency or skill?

##### Development Activities

(assignments, coaching, formal training)

##### Results

What is the Key Performance Indicator (KPI)? How have I succeeded in adapting my behavior or what new skill did I learn.

## S T R E N G T H   T O   L E V E R A G E

*Area of Focus: Documentation*

### Maintain Metadata

#### Critical Behaviors Goals

What specific behaviors do I model or exhibit in this competency or skill?

#### Development Activities

(assignments, coaching, formal training)

#### Results

What is the Key Performance Indicator (KPI)?

How have I succeeded in adapting my behavior or what new skill did I learn.

Keep track of metadata in a dataset table.

## S T R E N G T H   T O   L E V E R A G E

*Area of Focus:*

### SMART Goal

### Critical Behaviors Goals

What specific behaviors do I model or exhibit in this competency or skill?

### Development Activities

(assignments, coaching, formal training)

### Results

What is the Key Performance Indicator (KPI)? How have I succeeded in adapting my behavior or what new skill did I learn.

---

## D E V E L O P M E N T   O P P O R T U N I T Y

*Area of Focus: Customer Focus*

### Customer Focus SMART Goal

#### Critical Behaviors Goals

What specific behaviors do I model or exhibit in this competency or skill?

#### Development Activities

(assignments, coaching, formal training)

#### Results

What is the Key Performance Indicator (KPI)? How have I succeeded in adapting my behavior or what new skill did I learn.

## D E V E L O P M E N T   O P P O R T U N I T Y

*Area of Focus: Teamwork*

### Teamwork SMART Goal

#### Critical Behaviors Goals

What specific behaviors do I model or exhibit in this competency or skill?

#### Development Activities

(assignments, coaching, formal training)

#### Results

What is the Key Performance Indicator (KPI)? How have I succeeded in adapting my behavior or what new skill did I learn.

---

## D E V E L O P M E N T   O P P O R T U N I T Y

*Area of Focus: Outreach*

### GIS Promotion to Local Stakeholders

Acheived through improved communication and networking

### Critical Behaviors Goals

What specific behaviors do I model or exhibit in this competency or skill?

### Development Activities

(assignments, coaching, formal training)

### Results

What is the Key Performance Indicator (KPI)? How have I succeeded in adapting my behavior or what new skill did I learn.

## 4 . 1 . 2   L E A R N I N G   L O O P

### L E A R N I N G   L O O P

#### Disconnect All Users

# Part III

# Service



# — 5 — Applications

## 5.1 FOR TREASURER DEPARTMENT

### 5.1.1 FORFEITURE DATA COLLECTION

#### PROBLEM AND ANALYSIS

#### Background

Treasurer department has an annual responsibility to properly document the tax forfeiture process. The LIS Department built an application in MS Access and MapInfo that consumed a daily export from BSA and was deployed to the field on a laptop. A digital camera was used for site photos and later imported into the laptop.

#### Statement of Problem

The current Tax Forfeiture workflow is built on MapInfo software and MS Access and executed on a laptop pc. Both MapInfo and MS Access are no longer supported in county workflows. ESRI software can be used to rebuild the workflow. *Forfeiture Data Collector Application, (Forfeiture App)* must be recreated in the ESRI framework.

#### Analysis

**Forfeiture App** will facilitate: *Mobile data collection on a handheld device,:* (**Mobile Interface**) and an *in office workflow to complete data processing,* (**Pre and PostProcessing**)

#### Mobile Interface

- Synchronize with data in the office (online)
- Collect data and photos of forfeiture sites (offline)
- Synchronize the collected data with data in the office (online)

#### Pre & Post Processing

- Produce and print a form for each site visited with required data and images

## DESIGN OVERVIEW

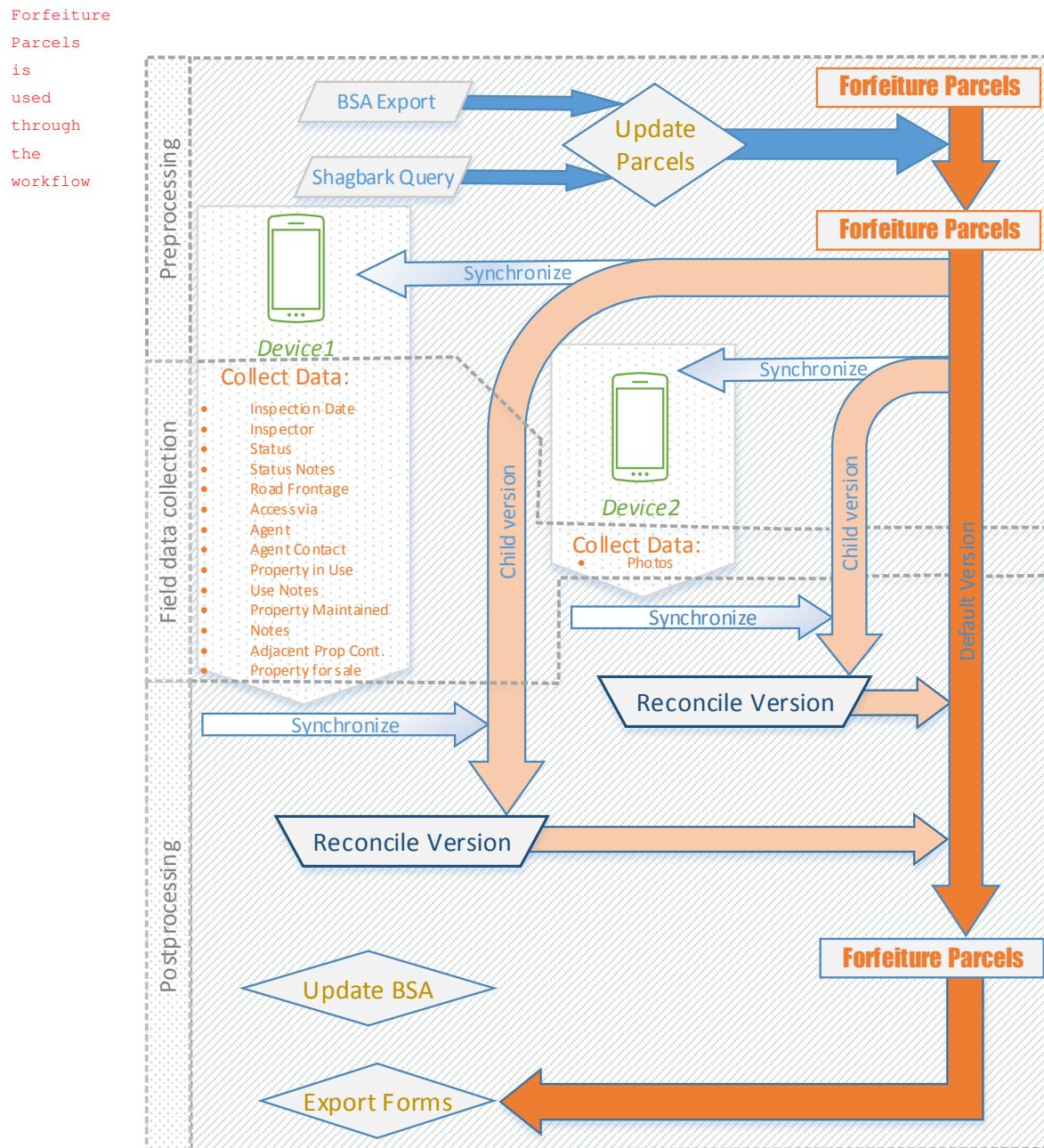


Figure 5.1: Project Design

## Forfeiture App Summary

There are **three parts** to the daily routine:

### 1. Preprocessing (in the office):

- Export current forfeiture list from BSA
- Update Forfeiture Parcels with BSA export
- Update Forfeiture Parcels with contaminated sites information
- Synchronize Forfeiture Parcels to Mobile Interface

### 2. Field data collection with Mobile Interface:

- Aids in navigation
- Provides a Checklist of data points for each site
- Attaches photos for each site
- Save results for synchronization in post-processing

### 3. Post-processing (in the office)

- Synchronize data and images collected in Mobile Interface to Forfeiture Parcels
  - Export form for each site
  - Print form for each site
  - Update BSA data
-

# Technologies Used in The Forfeiture App

## BSA Data

Details of parcels in the forfeiture process are managed in BSA Delinquent Tax.net. The Treasurer office does a BSA export of the parcels in need of a site visit in the pre-processing.

## ArcGIS Desktop

Tools are designed to preprocess and post-process forfeiture parcel data for fieldwork. The user will execute a preprocess script tool that prepares the data for field deployment. After fieldwork, a post process script tool synchronizes data from the fieldwork with the live data on the Allegan County network.

## ArcGIS Collector

A free mobile application developed and tested on Android is deployed to the field for data collection. The application is con-

figured to work offline (without an internet or cellular connection) by syncronizing before and after fieldwork. The user collects the necessary information on each forfeiture parcel in the field disconnected, and then uploads the changes when reconnected.

## Enterprise Geodatabase

Live data from a publishing geodatabase (ACPub), running on SQL Server database server (acintsql01) provides access to Forfeiture Parcels

## ArcGIS Portal

Forfeiture Parcels is served as a feature service (REST service) named TaxReversionParcels. A webmap on Portal, called the Forfeiture Field Map consumes the TaxReversionParcels exposing the data to editing. The Forfeiture Field Map is configured to work in the ArcGIS Collector App.

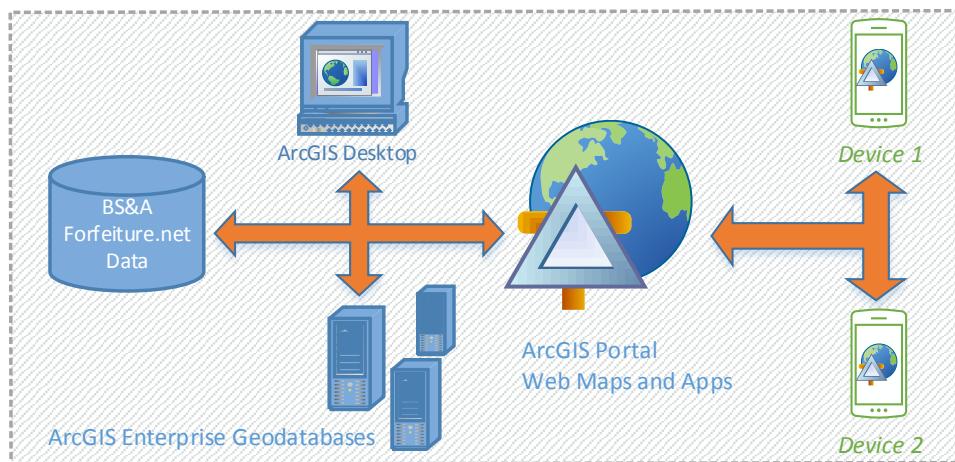


Figure 5.2: Technology Design

## DATA DETAILS

The data is located in a geodatabase called ACPUB. ACPUB is on SQL Server AC-INTSQL01.

Forfeiture Parcels Data

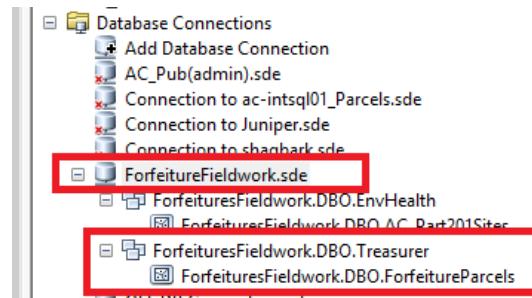


Figure 5.3: Live Data Location

Contamination Data

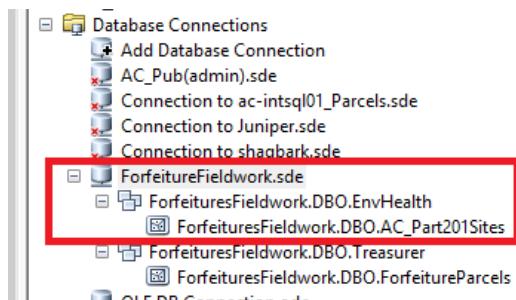


Figure 5.4: Contamination Feature Class

## ForfeitureParcels Feature Class Details

| Attribute Details            |                                 |                      |               |
|------------------------------|---------------------------------|----------------------|---------------|
| Field Name                   | Field Alias                     | Entry Type           | Note          |
| PropertyNumber               | Property Number                 | Prefilled            | NA            |
| Need2Print                   | Print Today                     | Dropdown             | Yes or No     |
| InspectionDate               | Inspection Date                 | Autofill or Dropdown | NA            |
| Inspector                    | Inspector                       | Dropdown             | NA            |
| Address                      | Address                         | Prefilled            | NA            |
| Status                       | Status                          | Dropdown             | NA            |
| StatusNotes                  | Status Notes                    | Open Entry           | 120Char       |
| Roadfrontage                 | Road Frontage                   | Dropdown             | Yes or No     |
| AccessVia                    | Access Via                      | Open Entry           | 30Char        |
| Agent                        | Agent                           | Open Entry           | 30Char        |
| AgentContact                 | Agent Contact                   | Open Entry           | 30Char        |
| PictureComments              | Picture Comments                | Open Entry           | 50Char        |
| PropertyInUse                | Property In Use                 | Dropdown             | Yes or No     |
| UseNotes                     | Use Notes                       | Open Entry           | 120Char       |
| PropertyMaintained           | Property Maintained             | Dropdown             | Yes or No     |
| PropMaintNotes               | Property Maintained Notes       | Open Entry           | 120Char       |
| PropertyContaminated         | Property Contaminated           | Prefilled            | Preprocessing |
| PropertyContaminatedNotes    | PropertyContaminatedNotes       | Prefilled            | Preprocessing |
| AdjacentPropertyContaminated | Adjacent Property Contaminated  | Prefilled            | Preprocessing |
| AdjPropertyContaminatedNotes | Adj Property Contaminated Notes | Prefilled            | Preprocessing |
| PropertyForSale              | Property For Sale               | Dropdown             | Yes or No     |
| GlobalID                     | GlobalID                        | NA                   | NA            |
| PostedDate                   | Posted Date                     | Dropdown             | Date          |
| Posted                       | Posted                          | Prefilled            | NA            |
| InList                       | In List                         | Prefilled            | Preprocessing |
| PostedInList                 | Posted In List                  | Prefilled            | Preprocessing |
| Acres                        | Acres                           | Prefilled            | NA            |
| Class                        | Class                           | Prefilled            | NA            |

Table 5.1: Dataset Details

## Webmap Details

The Forfeiture Field Map is made up of a feature layer and a basemap.

The screenshot shows the 'Forfeiture Field Map' details page. At the top, there's a blue header bar with the title 'Forfeiture Field Map' and a 'Edit' button. Below the header are two tabs: 'Overview' (which is selected) and 'Settings'. The main content area starts with a section titled 'Edit Thumbnail' containing a circular logo for 'ALLEGAN COUNTY MICHIGAN'. To the right of the logo, the text reads: 'Map for field data collection in annual tax forfeiture processing by bmay531 Last Modified: August 21, 2018'. Below this is a 'Web Map' link and a 'Add to Favorites' button. The next section is 'Description', which has a placeholder 'Add an in-depth description of the item...'. Under 'Layers', there are two listed: 'TaxReversionParcels' and 'World\_Street\_Map'. The 'Access and Use Constraints' section contains a placeholder 'Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.'

Figure 5.5: Web Map Details

## Feature Layer Details

TaxReversionParcels has been configured for offline use.

The screenshot shows the 'TaxReversionParcels' details page. It features a blue header bar with the title 'TaxReversionParcels' and an 'Edit' button. Below the header are three tabs: 'Overview' (selected), 'Data', and 'Visualization'. The main content area includes an 'Edit Thumbnail' section with a small thumbnail image. To the right, the text says: 'Map service exposing treasurer forfeiture data for edits by bmay531 Last Modified: August 20, 2018'. A yellow 'Feature Layer' icon is present. Below this is an 'Add to Favorites' button. The 'Description' section has a placeholder 'Add an in-depth description of the item...'. The 'Layers' section shows a single layer named 'Tax Reversion Parcels' with options to 'Open In' or 'Service URL'. The 'Access and Use Constraints' section has a placeholder 'Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.'

Figure 5.6: Feature Layer Details

## Basemap Details

- A tiled basemap service is used
- The infoserv user credentials are used for sharing
- The url for the shared service is:

[https://tiledbasemaps.arcgis.com/arcgis/rest/services/World\\_Street\\_Map/MapServer](https://tiledbasemaps.arcgis.com/arcgis/rest/services/World_Street_Map/MapServer)

The screenshot shows the ArcGIS Online interface for a specific map layer. At the top, there's a navigation bar with links for ArcGIS, Pricing, Map, Scene, Help, Sign In, and a search bar. Below the header, the title "World Street Map (for Export)" is displayed, with a "Overview" tab selected. To the right of the title, there are three buttons: "Open in Map Viewer" (highlighted in blue), "Open in Scene Viewer", and "Open in ArcGIS Desktop".

The main content area contains a brief description of the layer: "This layer presents highway-level data for the world and street-level data for many areas around the world. This layer is designed to support export of basemap tiles for offline use. ArcGIS Online Subscription required." It also shows a thumbnail image of a map snippet, a "Tile Layer by Esri" badge, and metadata: "Created: Oct 15, 2013 Updated: Aug 15, 2018 View Count: 39,772". Below this, there are two buttons: "Authoritative" and "Subscriber".

On the left side, there's a "Description" section with detailed information about the layer's purpose and capabilities. It mentions that the layer supports exporting small volumes of basemap tiles for offline use, including highways, major roads, minor roads, one-way arrow indicators, railways, water features, cities, parks, landmarks, building footprints, and administrative boundaries. It also notes that the map service supports exporting up to 150,000 tiles in a single request.

Below the description, there's a note stating that the layer is not intended to be used to display live map tiles for use in a web map or web mapping application. Instead, it should be used with the "World Street Map" service.

The "Service Information for Developers" section provides instructions for exporting tiles from the layer, mentioning the need to use the "Export Tiles" operation and referencing the "tiledbasemaps.arcgis.com" server.

On the right side of the page, there are sections for "Details" (listing source as "Map Service", size as "1 kB", and a five-star rating), "Owner" (listing "Esri"), "Managed by" (listing "esri"), and "Tags" (listing "World, Global, Europe, North America, United States, Southern Africa, Asia, South America, Australia, streets, street map, tile package, basemap, highways, roads, transportation, landmarks, parks, community, community basemap, map, AFA250\_base, current, esri\_basemap, general availability, export").

Figure 5.7: Basemap Source Description

## HARD COPY RECORD

screenshots: arcmap map arcmap tools portal screenshots sql server mgt screen  
shots phone screenshots

## ArcGIS Server

## ADMINISTRATIVE MANUAL

### Annual Setup

A new dataset for forfeiture parcels must be created each year.

The forfeiture information comes from BSA Forfeitures.net.

Parcel geometry and other attributes comes from ACParcelsCombined.

### To Connect to the Forfeiture Dataset

To Add a new database connection:

- Right Click on Add Database Connection
  - Enter these values into the tool

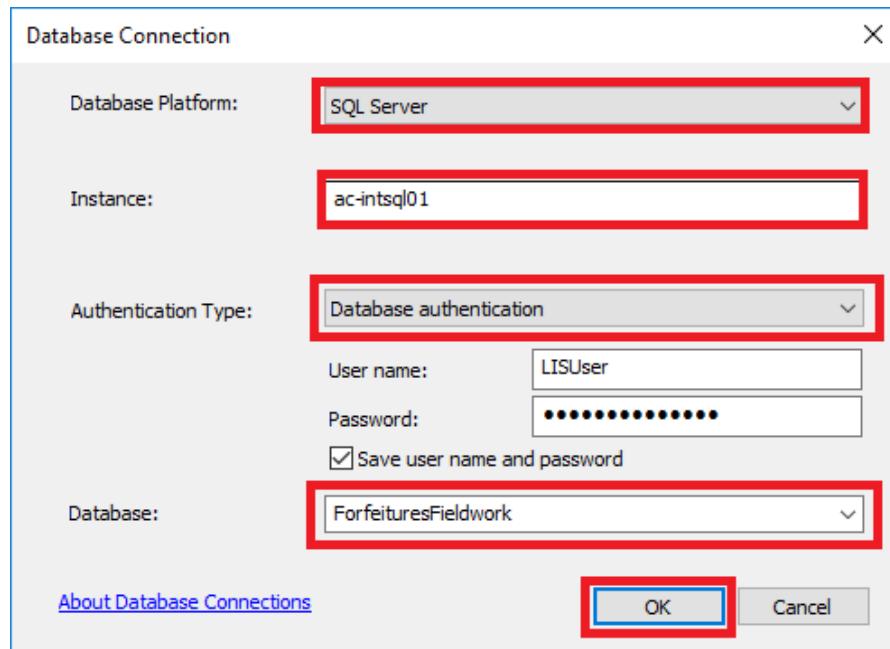


Figure 5.8: Add New Connection

Push **OK**

---

## Update the Forfeiture Dataset

To clear the features from the existing dataset:

- Use the Delete Feature Tools
- For Input Features:
  - ForfeituresFieldwork.DBO.ForfeitureParcels

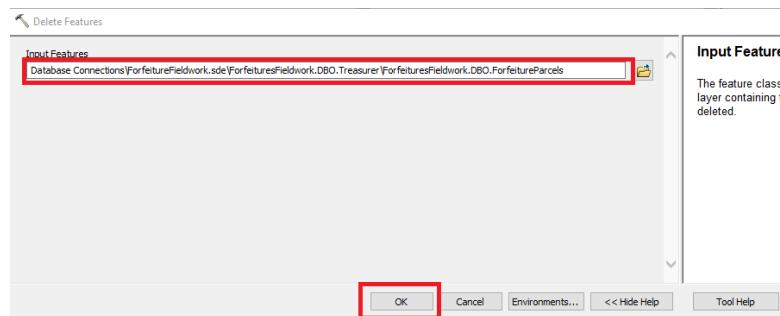


Figure 5.9: Annual Delete Features

Push **OK**

## Delete the attached table

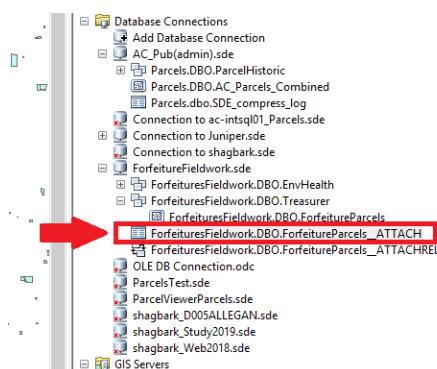


Figure 5.10: Delete Attached Table

## Create new connection to BSA server

A connection to BSA is used to get the latest forfeiture information.

### To Connect to the BSA Server

To Add a new database connection:

- Right Click on Add Database Connection
  - Enter these values into the tool

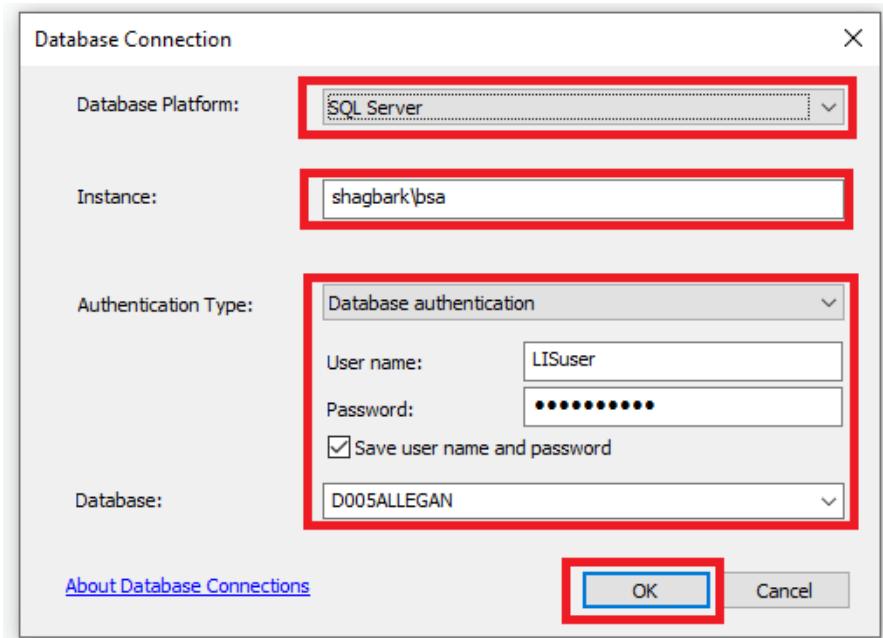


Figure 5.11: Connect to BSA Server

Push **OK**

---

## Create a Table Query For the New Data

- File ➔ Add Data ➔ Add Query Layer
- Select your connection (*shagbark\_D005ALLEGAN.sde*)

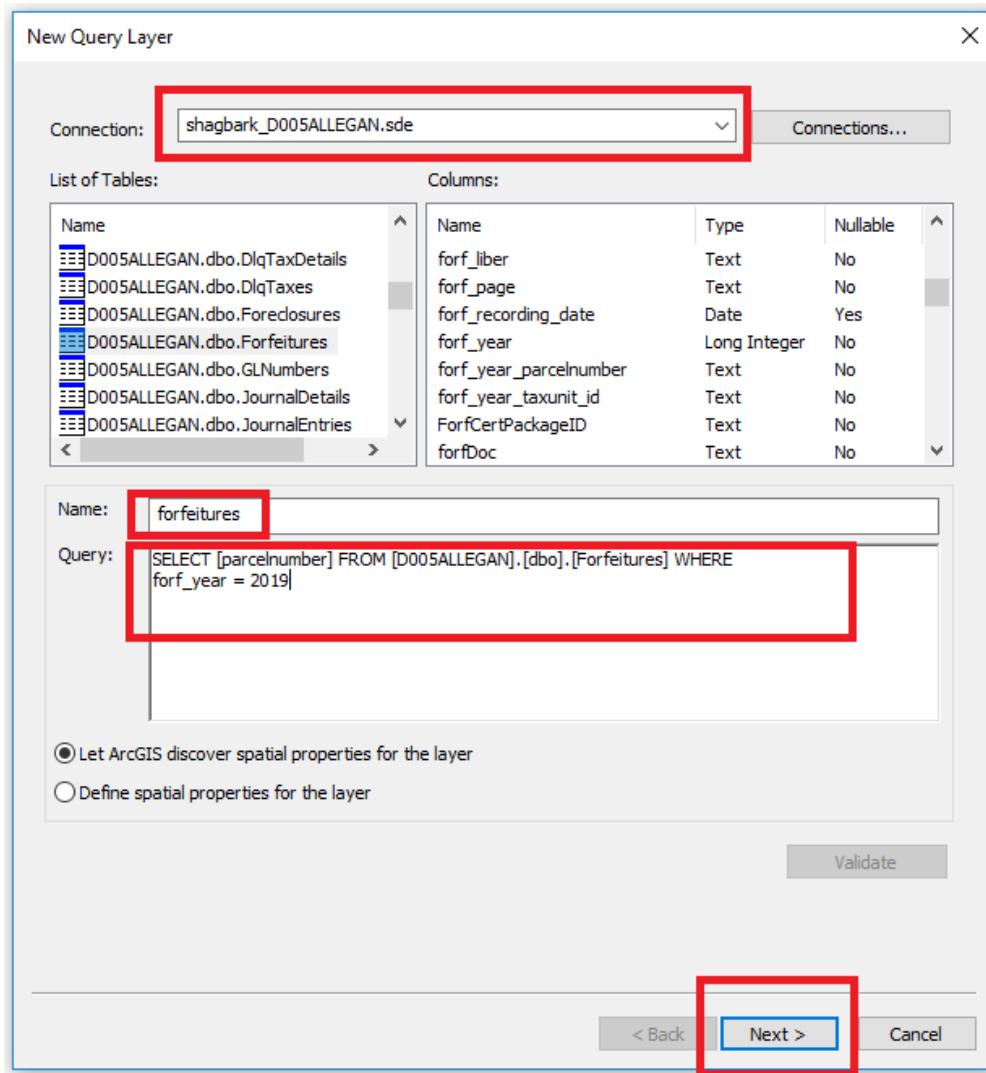


Figure 5.12: New Query Layer Dialog

Edit Query Text for current Year:

```
SELECT [parcelnumber] FROM [D005ALLEGAN] . [dbo] . [Forfeitures]
WHERE forf_year = 2020
```

## Select a Unique Identifier

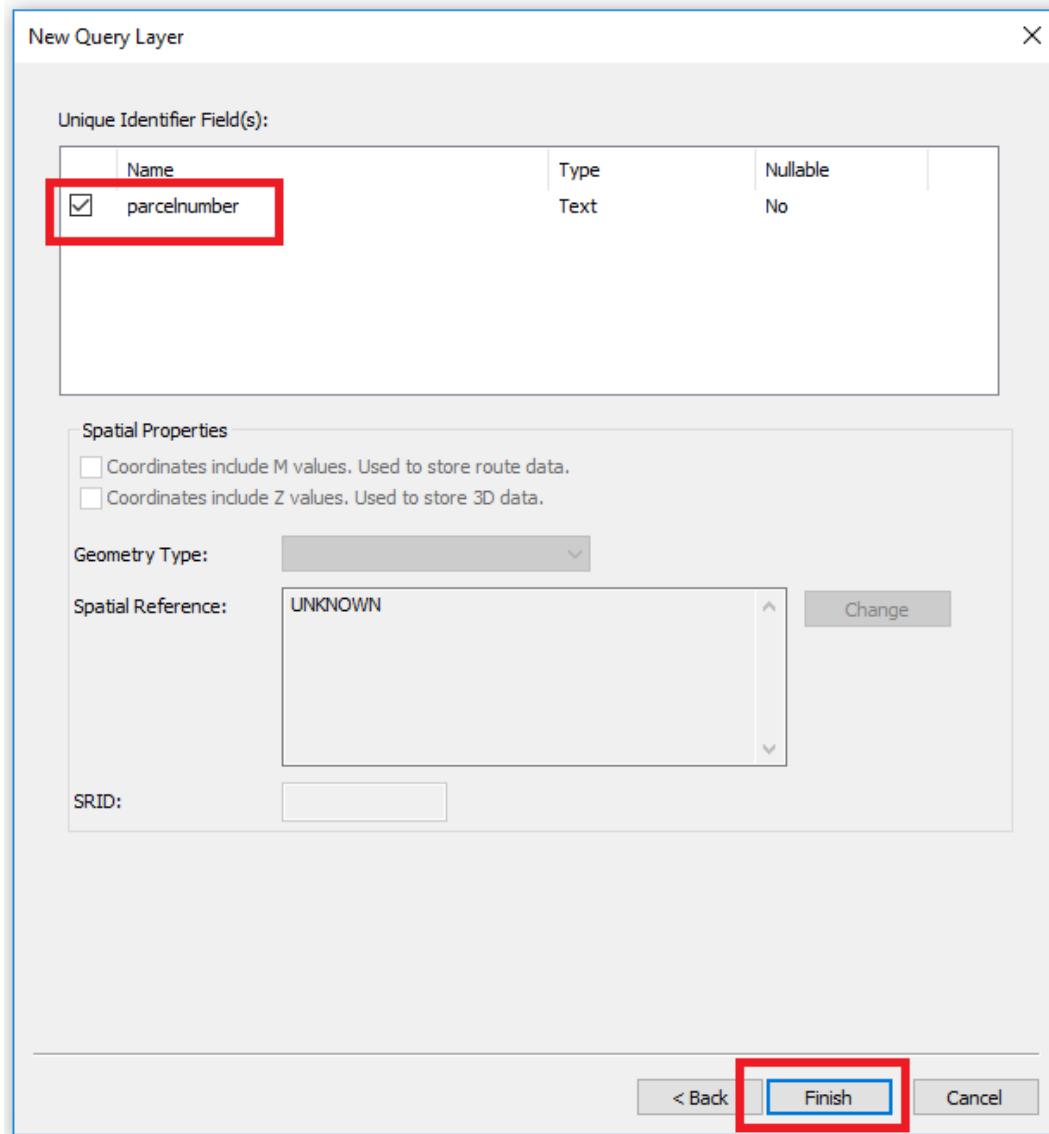


Figure 5.13: Query Layer Unique ID

Push **Finish**

## Table is added to the map

The screenshot shows the ArcGIS Pro interface. On the left, the 'Table Of Contents' pane displays a tree view of layers. A red box highlights the 'D005ALLEGAN' folder, which contains a sub-layer named 'D005ALLEGAN.DBO.forfeitures'. This layer is checked in the tree view. To the right, a 'Table' viewer window is open, showing the contents of the 'D005ALLEGAN.DBO.forfeitures' table. The table has two columns: 'parcelnumber' and 'ESRI\_OID'. The data consists of 905 rows of parcel numbers, each followed by its corresponding ESRI OID value. The table viewer includes standard navigation controls at the bottom.

| parcelnumber  | ESRI_OID |
|---------------|----------|
| 01-006-014-10 | 1        |
| 01-007-012-00 | 2        |
| 01-013-031-10 | 3        |
| 01-013-031-20 | 4        |
| 01-017-001-20 | 5        |
| 01-018-038-00 | 6        |
| 01-019-001-13 | 7        |
| 01-019-005-97 | 8        |
| 01-019-027-00 | 9        |
| 01-020-024-00 | 10       |
| 01-026-020-00 | 11       |
| 01-030-014-10 | 12       |
| 01-030-019-00 | 13       |
| 01-032-033-00 | 14       |
| 01-034-087-00 | 15       |
| 01-034-108-00 | 16       |
| 01-035-020-20 | 17       |
| 01-035-030-00 | 18       |
| 01-035-044-00 | 19       |
| 01-035-044-10 | 20       |
| 01-035-044-11 | 21       |
| 01-035-049-00 | 22       |
| 01-036-008-00 | 23       |
| 01-120-013-00 | 24       |
| 01-120-029-00 | 25       |
| 01-120-031-00 | 26       |
| 01-120-032-00 | 27       |
| 01-240-003-00 | 28       |
| 01-250-001-00 | 29       |
| 01-300-004-00 | 30       |
| 01-320-020-00 | 31       |
| 01-320-021-00 | 32       |
| 01-370-016-00 | 33       |
| 01-610-025-00 | 34       |
| 01-610-026-00 | 35       |
| 02-001-010-20 | 36       |
| 02-003-018-00 | 37       |
| 02-004-013-00 | 38       |
| 02-005-004-20 | 39       |
| 02-007-025-00 | 40       |
| 02-010-012-20 | 41       |
| 02-011-007-00 | 42       |
| 02-011-022-20 | 43       |
| 02-016-007-00 | 44       |
| 02-017-011-20 | 45       |
| 02-018-000-00 | 46       |

Figure 5.14: Forfeiture Table Added

## Add Parcels Layer to the Map

- Parcels are added to the map to provide parcel geometry and attributes
- Parcel year is = current year - 2
- I.E. Use ACParcelsCombHistoric2018 in 2020

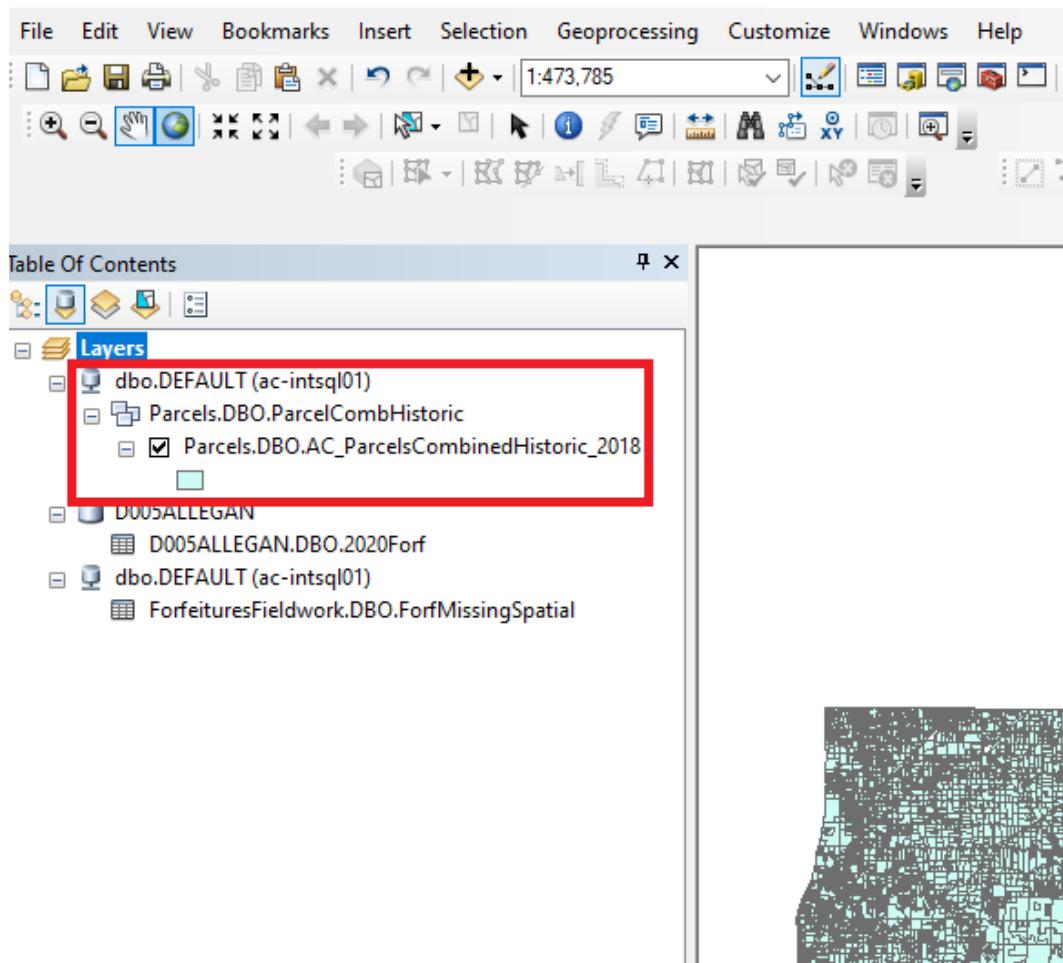


Figure 5.15: Parcels Layer Added

# Forfeiture parcel missing spatial data

A temporary join, selection, and export will save these

➤ Join Parcels to Forfeiture table

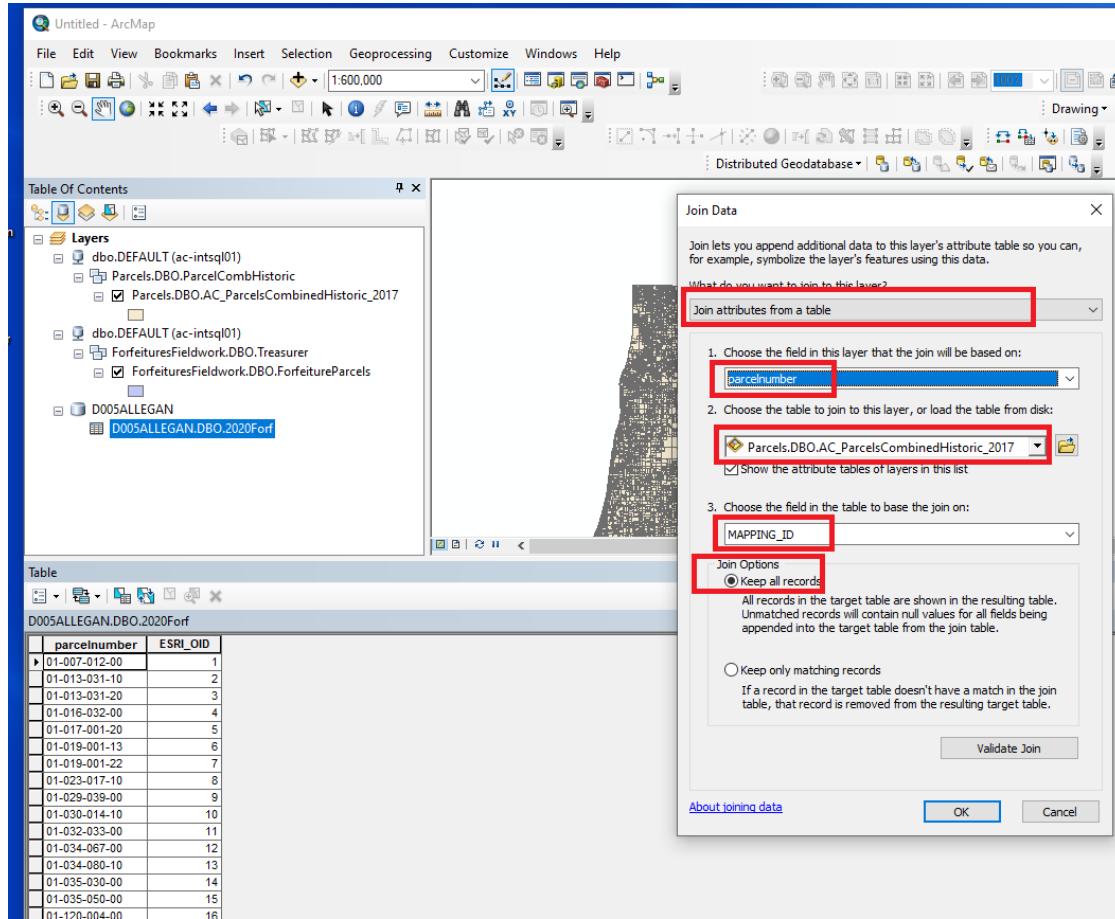
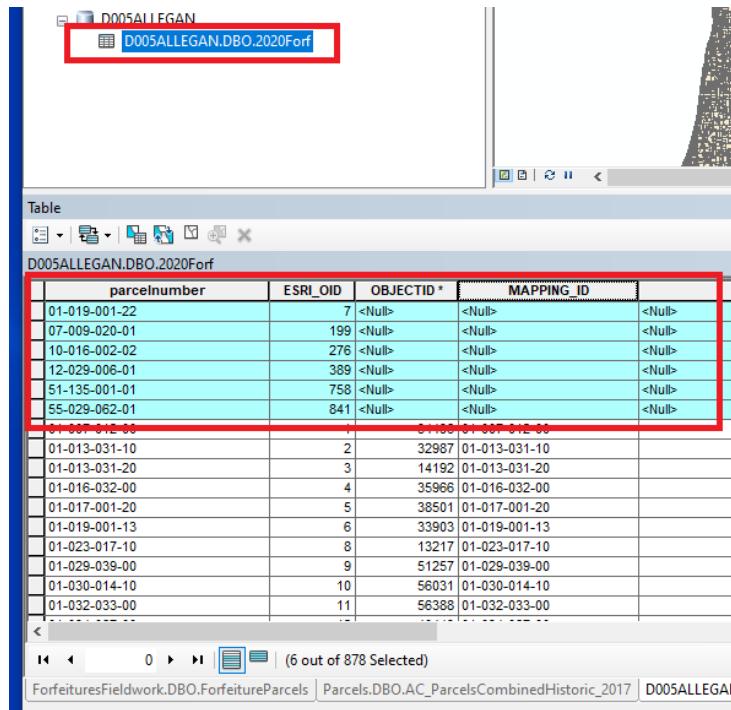


Figure 5.16: Join to Forfeiture Table

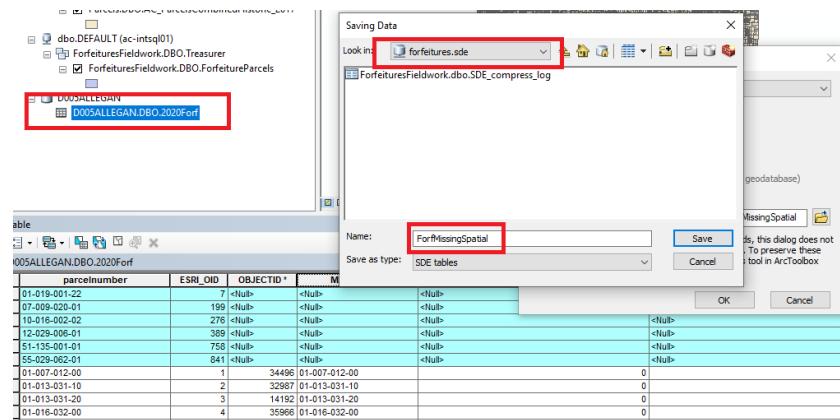
- Select any parcels missing spatial data



| parcelnumber  | ESRI_OID | OBJECTID * | MAPPING_ID    |
|---------------|----------|------------|---------------|
| 01-019-001-22 | 7        | <Null>     | <Null>        |
| 07-009-020-01 | 199      | <Null>     | <Null>        |
| 10-016-002-02 | 276      | <Null>     | <Null>        |
| 12-029-006-01 | 389      | <Null>     | <Null>        |
| 51-135-001-01 | 758      | <Null>     | <Null>        |
| 55-029-062-01 | 841      | <Null>     | <Null>        |
| 01-007-012-00 | 1        | 34496      | 01-007-012-00 |
| 01-013-031-10 | 2        | 32987      | 01-013-031-10 |
| 01-013-031-20 | 3        | 14192      | 01-013-031-20 |
| 01-016-032-00 | 4        | 35966      | 01-016-032-00 |
| 01-017-001-20 | 5        | 38501      | 01-017-001-20 |
| 01-019-001-13 | 6        | 33903      | 01-019-001-13 |
| 01-023-017-10 | 8        | 13217      | 01-023-017-10 |
| 01-029-039-00 | 9        | 51257      | 01-029-039-00 |
| 01-030-014-10 | 10       | 56031      | 01-030-014-10 |
| 01-032-033-00 | 11       | 56388      | 01-032-033-00 |

Figure 5.17: Select for Missing Spatial

- Export Parcels missing spatial to a table in the GDB



| parcelnumber  | ESRI_OID | OBJECTID * | MAPPING_ID    |
|---------------|----------|------------|---------------|
| 01-019-001-22 | 7        | <Null>     | <Null>        |
| 07-009-020-01 | 199      | <Null>     | <Null>        |
| 10-016-002-02 | 276      | <Null>     | <Null>        |
| 12-029-006-01 | 389      | <Null>     | <Null>        |
| 51-135-001-01 | 758      | <Null>     | <Null>        |
| 55-029-062-01 | 841      | <Null>     | <Null>        |
| 01-007-012-00 | 1        | 34496      | 01-007-012-00 |
| 01-013-031-10 | 2        | 32987      | 01-013-031-10 |
| 01-013-031-20 | 3        | 14192      | 01-013-031-20 |
| 01-016-032-00 | 4        | 35966      | 01-016-032-00 |

Figure 5.18: Export Missing Spatial

# Create current year Forfeiture dataset

## Create Join

- Create new join to *ACParcelsCombHistoricXXXX* of forfeitures on parcel numbers

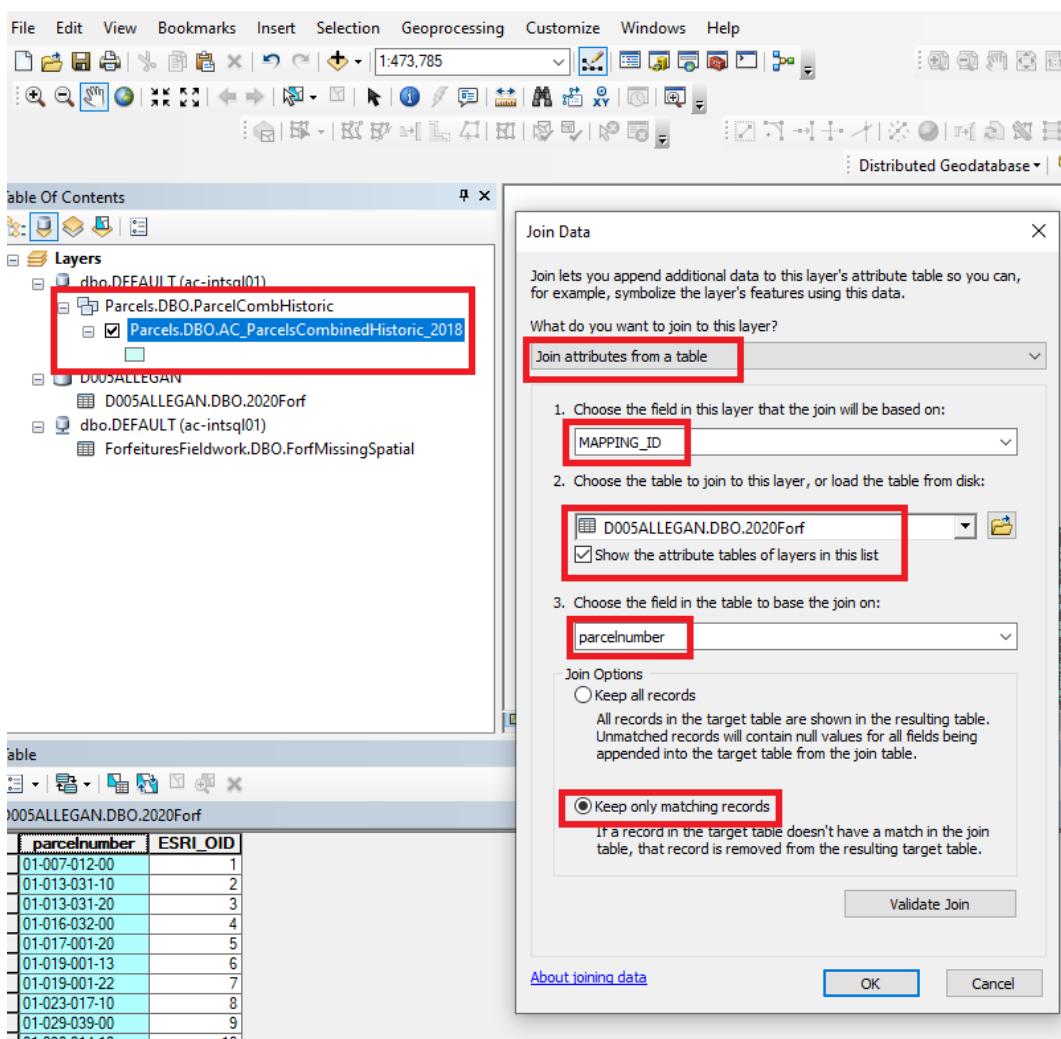


Figure 5.19: Join Parcels

## Export Joined Features to a temp location

- Right click  on joined feature class in TOC and choose export

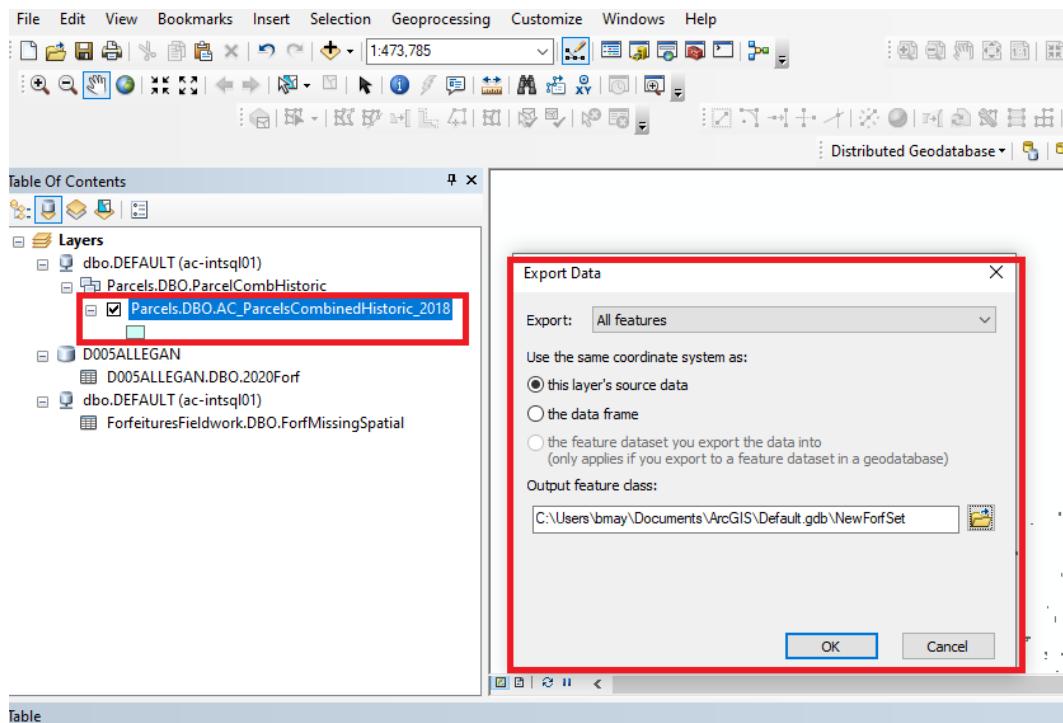


Figure 5.20: Export Joined Features

choose location and Push 

## Load data from temp location to forfeitureParcels

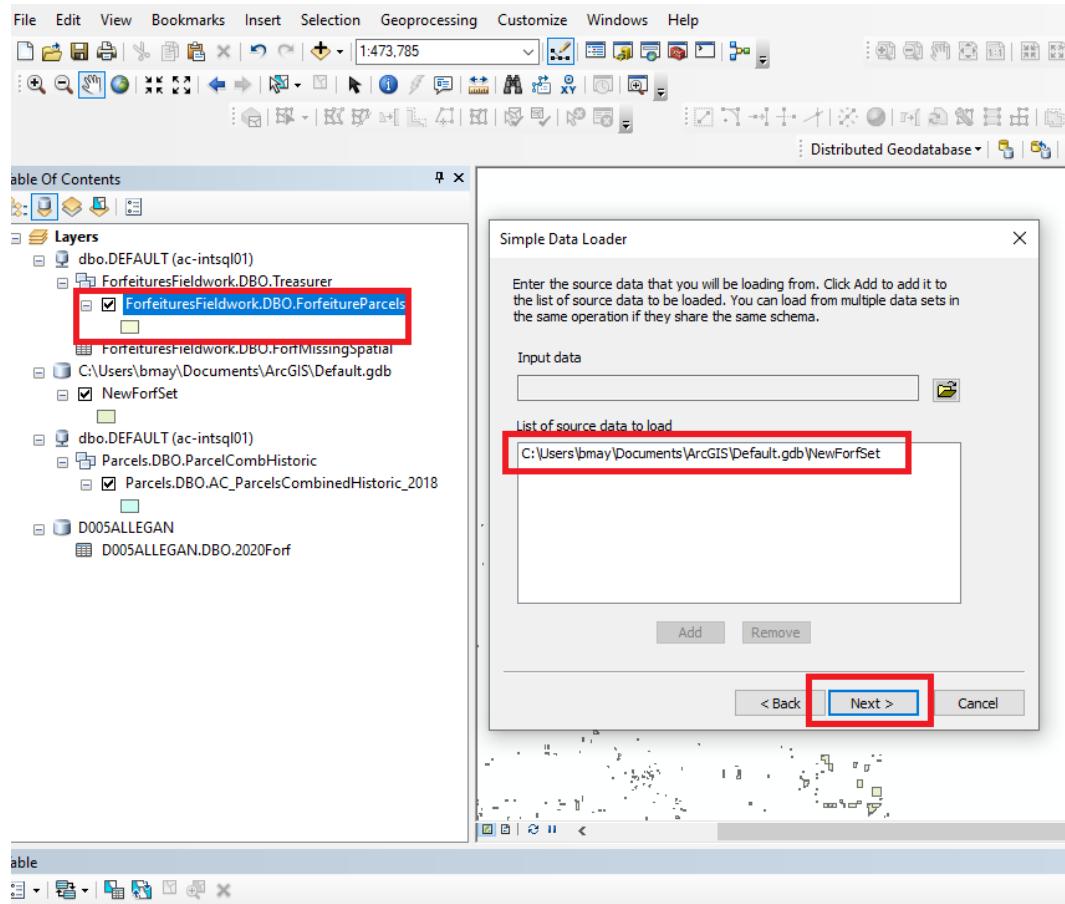


Figure 5.21: Load Data 1

choose features from a temp location

Push **Next**

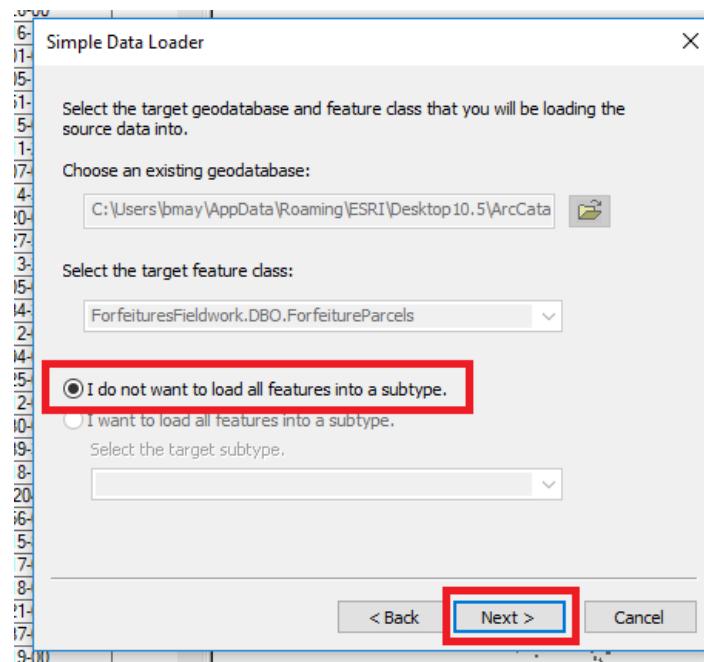


Figure 5.22: Load Data 2

---

## Match these fields

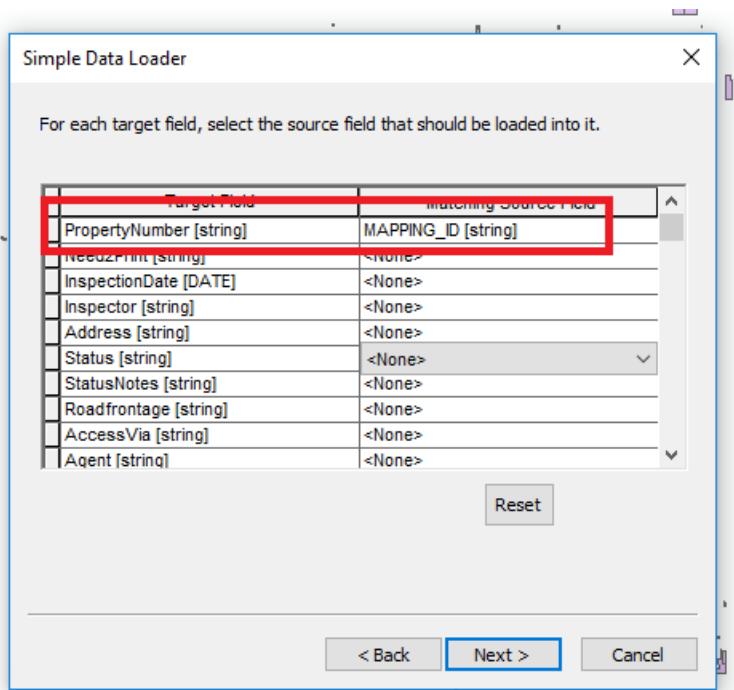


Figure 5.23: Match Fields 1

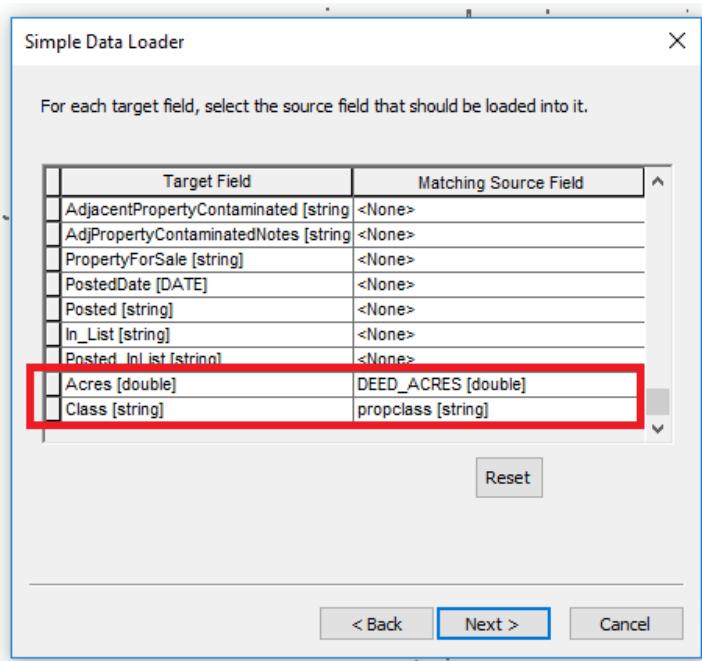


Figure 5.24: Match Fields 2

Push **Next**

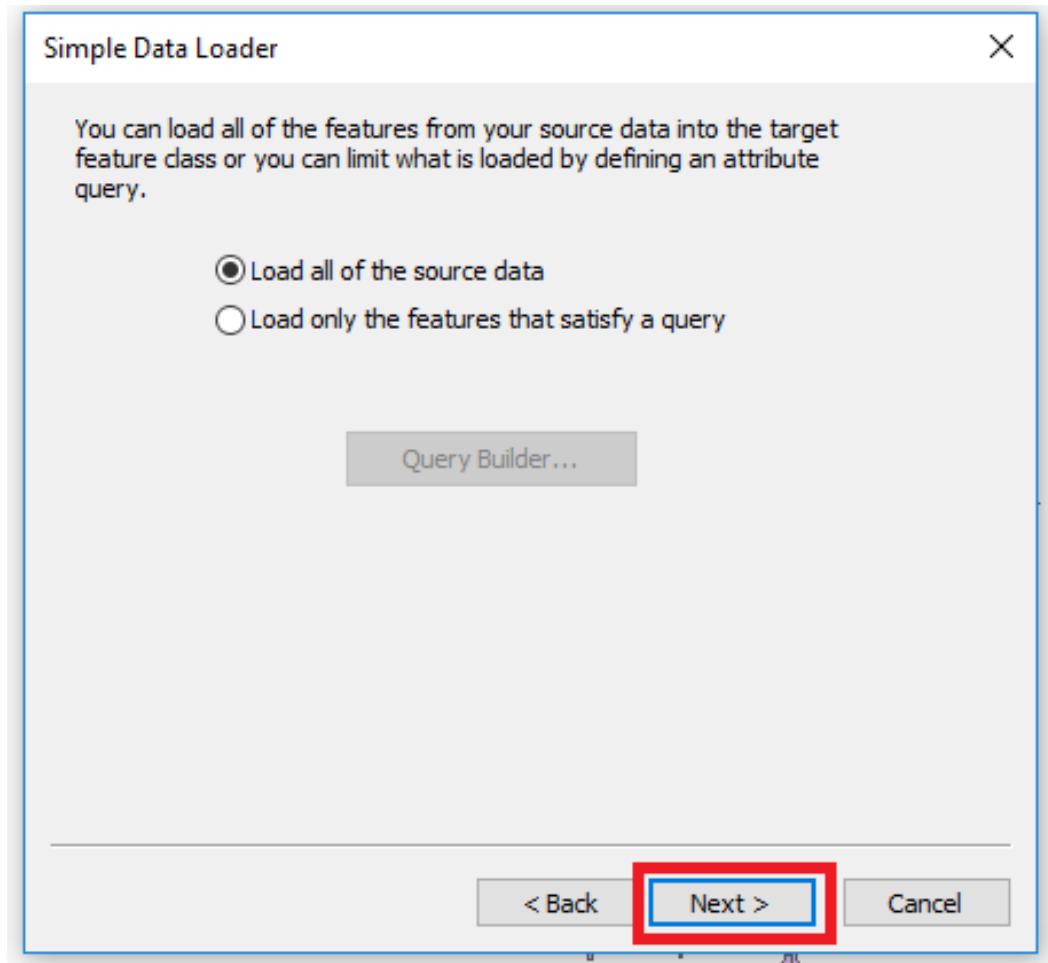


Figure 5.25: Load Data 3

Push **Finish**

# Calculate Initial Values

## Calculate In List value

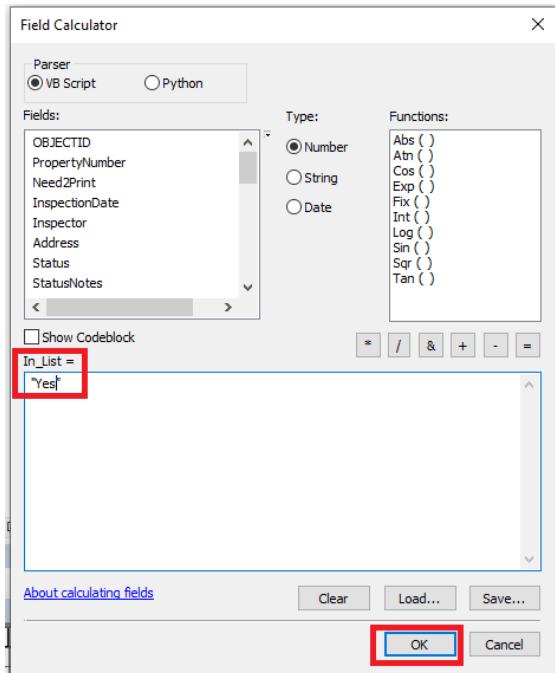


Figure 5.26: Calculate In List

## Calculate Posted Value

## Calculate Posted InList Value

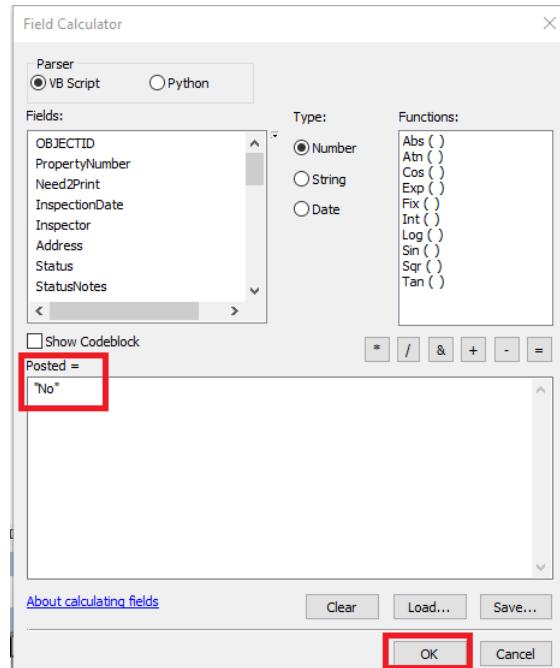


Figure 5.27: Calculated Posted

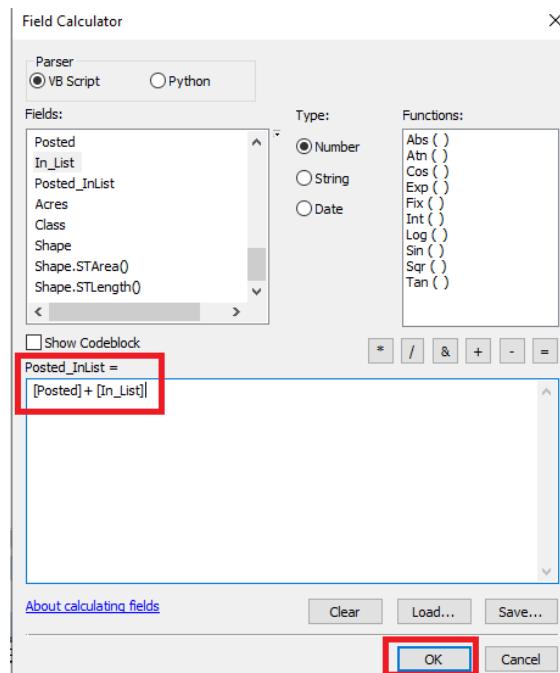


Figure 5.28: Calculate Posted in List

---

## Data Setup

### Register as versioned and Add Global IDs

Right Click ➔ Manage ➔ Register as Versioned

and

Right Click ➔ Manage ➔ Add Global IDs

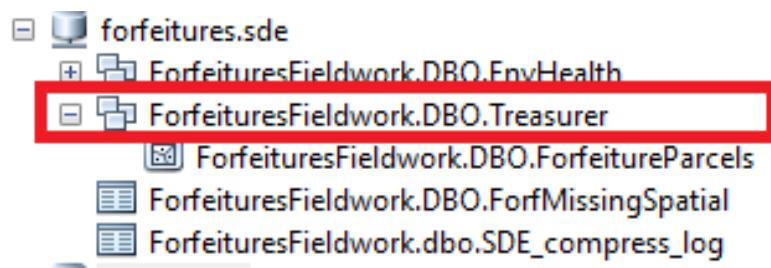


Figure 5.29: Setup Data

## Create Attachments

Attachments is for storing the photos for each feature.

Right Click ➔ Manage ➔ Add Attachments

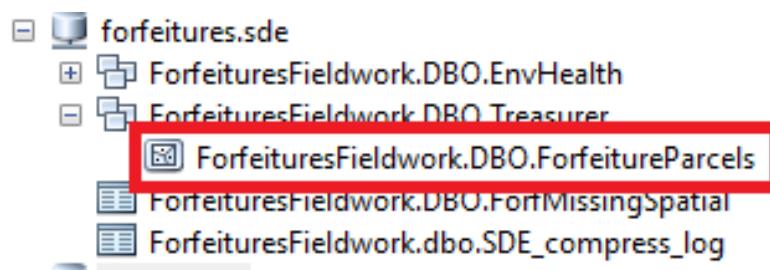


Figure 5.30: Create Attachments

## Calculate Acres in ForfeitureParcels

Right Click ➔ Acres Column ➔ Calculate geometry (acres)

## Setup Users in ArcGIS

Users that will run Pre and Post processing scripts must be created and given privileges on Treasurer Feature Data Set.

For any new users of the geoprocessing tools:

Use the create Database User tool

or

In Catalog ➔ Right click on ForfeituresFieldwork ➔ Administration ➔ Add User

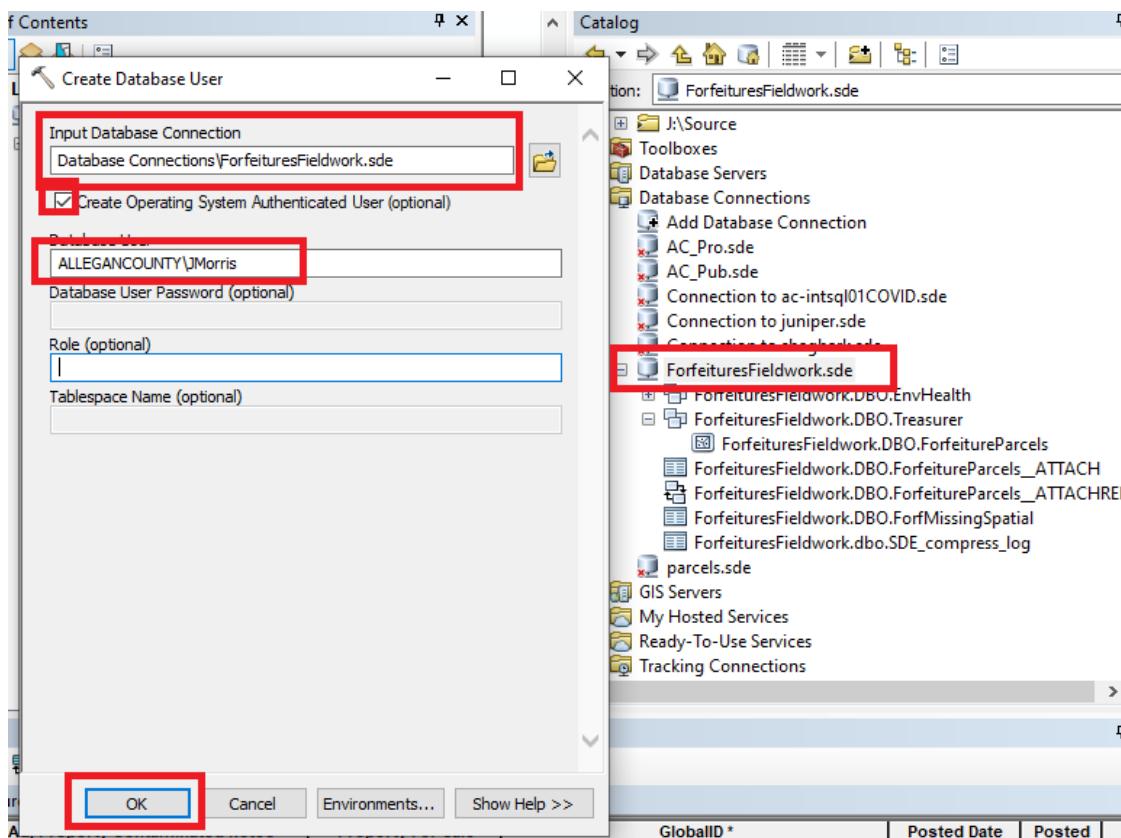


Figure 5.31: Add Db User

## Add New User to Feature Dataset

In Catalog, right click on Treasurer Feature Data Set

Manage Privileges Add Type new user

Push

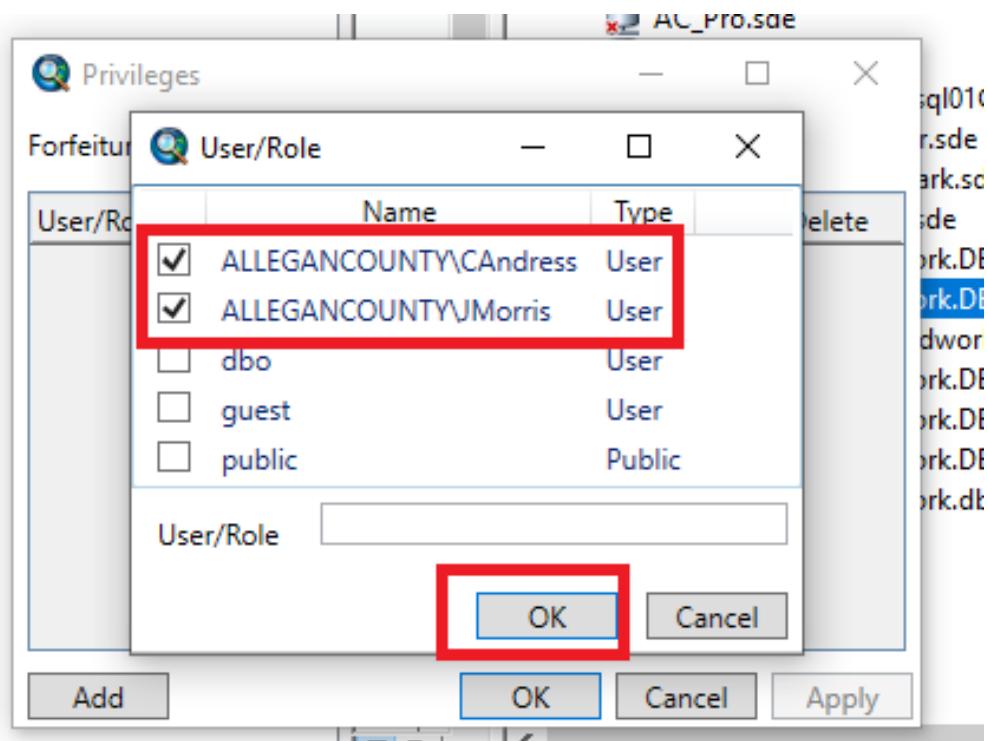


Figure 5.32: Add Feature Dataset User

## Extend Privileges for New User

In Catalog ➔ right click on Treasurer FDS ➔ Manage ➔ Privileges ➔ check boxes

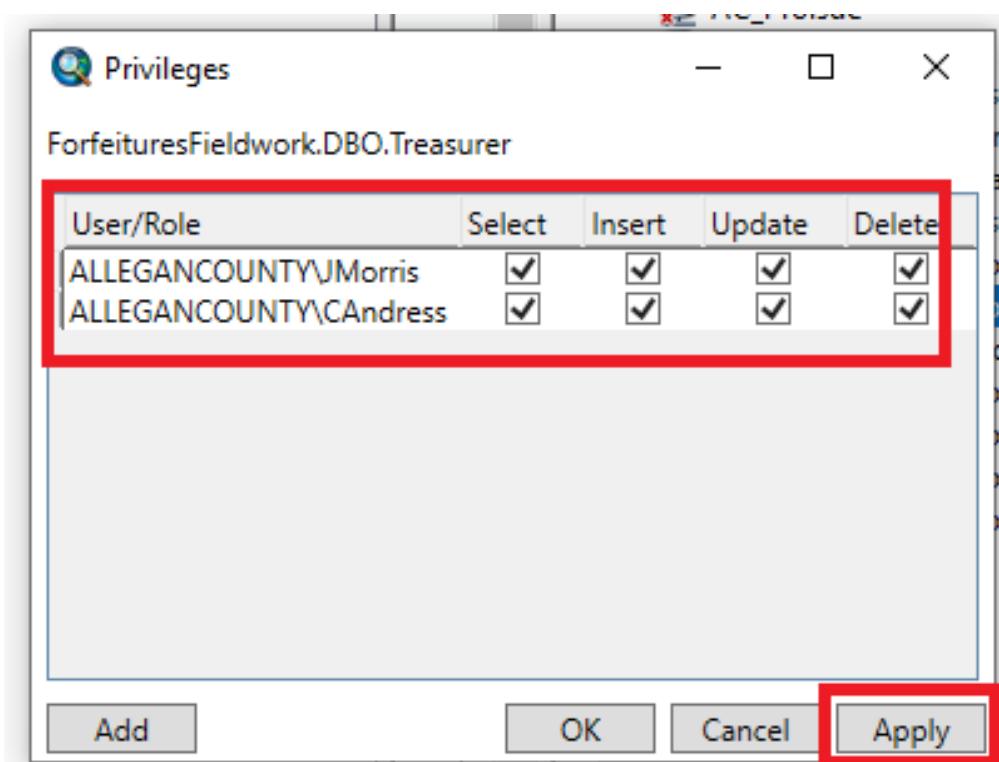


Figure 5.33: Extend Feature Dataset Privileges

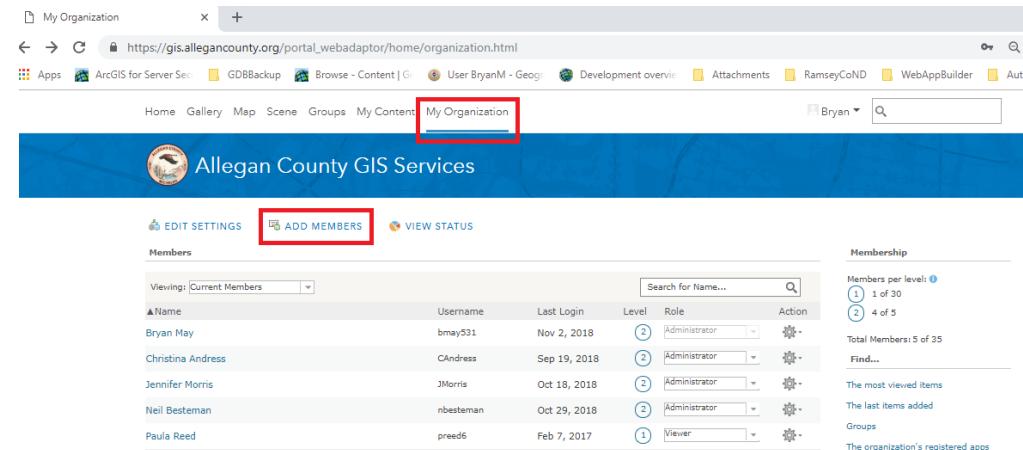
## Portal Setup

### Setup Users in Portal for ArcGIS

Users that will use the Collector for ArcGIS must have profiles added to and managed in the Allegan County GIS Portal site.

In Portal,  My Organization

Push Add Members



The screenshot shows the 'My Organization' page of the Allegan County GIS Services portal. At the top, there is a navigation bar with links for Home, Gallery, Map, Scene, Groups, My Content, and a search bar. Below the navigation bar is a banner for 'Allegan County GIS Services'. Underneath the banner, there are three buttons: 'EDIT SETTINGS', 'ADD MEMBERS' (which is highlighted with a red box), and 'VIEW STATUS'. The main content area is titled 'Members' and displays a table of current members. The table columns include Name, Username, Last Login, Level, Role, and Action. The members listed are Bryan May, Christina Andress, Jennifer Morris, Neil Besteman, and Paula Reed. On the right side of the page, there is a sidebar titled 'Membership' which shows 'Members per level' (1 of 30, 2 of 5) and 'Total Members: 5 of 35'. It also includes links for 'Find...', 'The most viewed items', 'The last items added', 'Groups', and 'The organization's registered apps'.

Figure 5.34: Portal Add User 1

## Add Members to Portal

Select Built in Member 

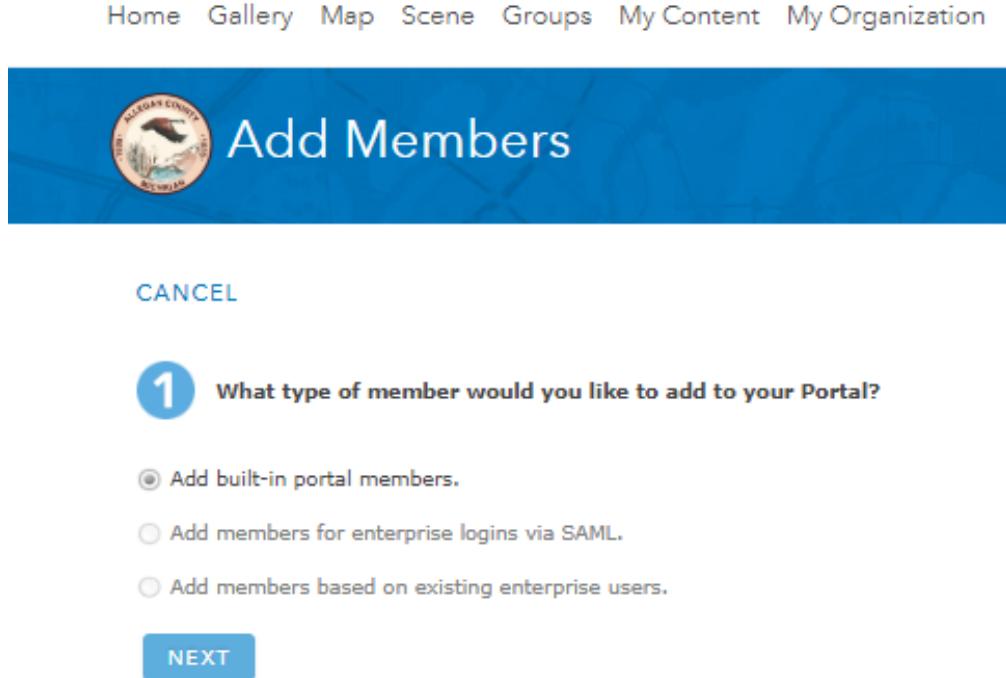


Figure 5.35: Portal Add User 2

Push  **Next**

Enter required info for new member

**Add Members**

**2** Create new Allegan County GIS Services logins one at a time or in batch from a file.  
Select any role for the member to be a part of. You must inform the member of their user name and password. If you do not have an email address for a particular user, use the administrator's email address.

Password may not be less than 8 characters.

One at a time    From a file

Email: \_\_\_\_\_

First Name: \_\_\_\_\_

Last Name: \_\_\_\_\_

Username: \_\_\_\_\_

Password: \_\_\_\_\_

Level     1     2

Role: Publisher

BACK    ADD ANOTHER    REVIEW ADDITIONS

Figure 5.36: Portal Add User 3

## Manage Treasurer Group

In Portal  Go to groups  Invite new user to the group

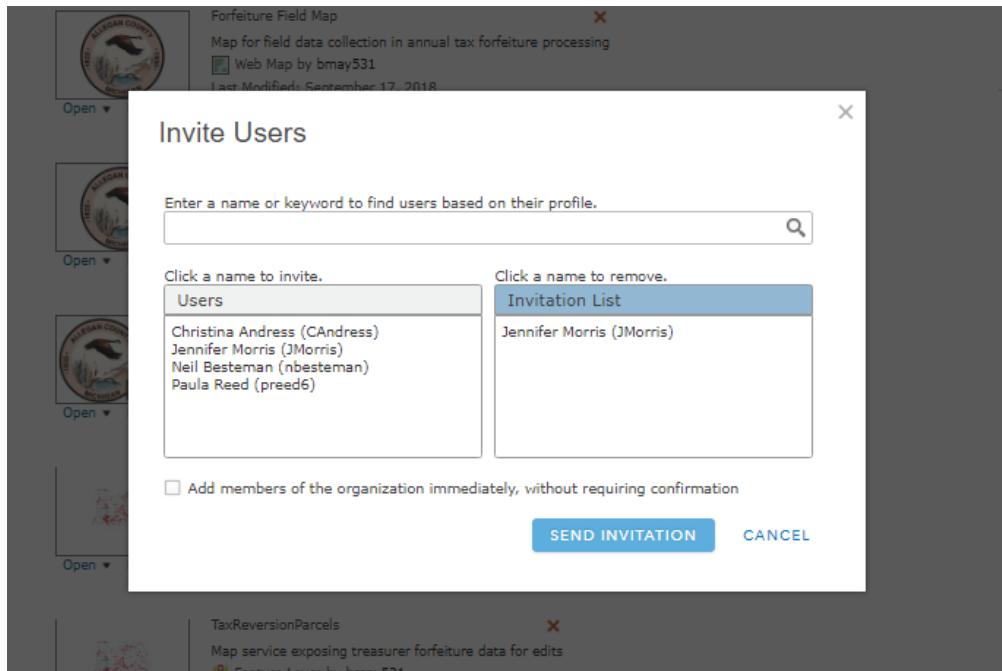


Figure 5.37: Portal Add User 4

## Share Portal Content with the group

Any content used by the group needs to be shared to the group

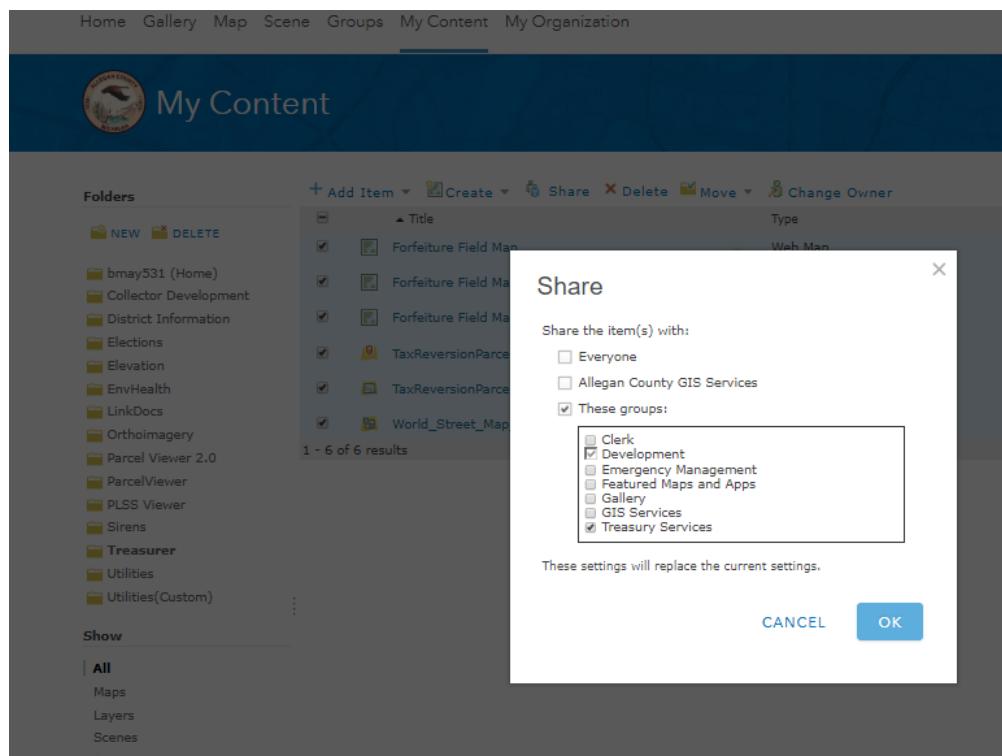


Figure 5.38: Portal AddUser 5

## Start services and webmap

### Find published MXD

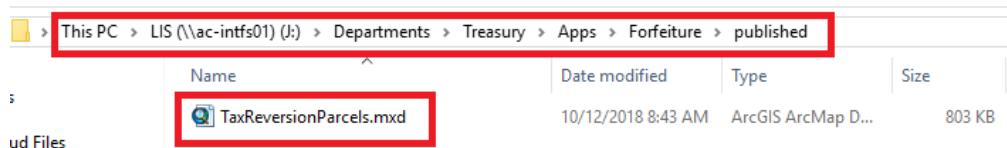


Figure 5.39: Published Mxd

## Publish Forfeiture Parcels Map Service

### General

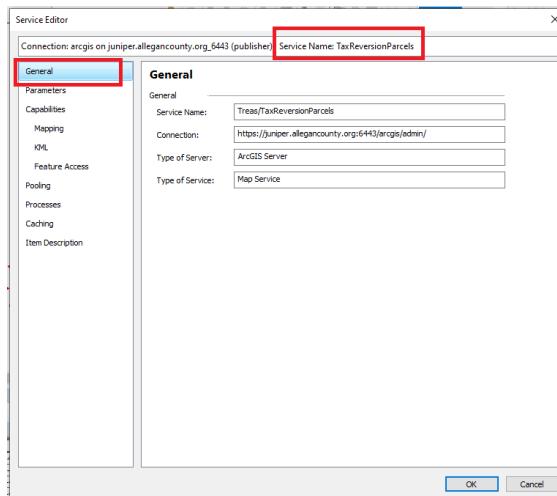


Figure 5.40: General

### Capabilities

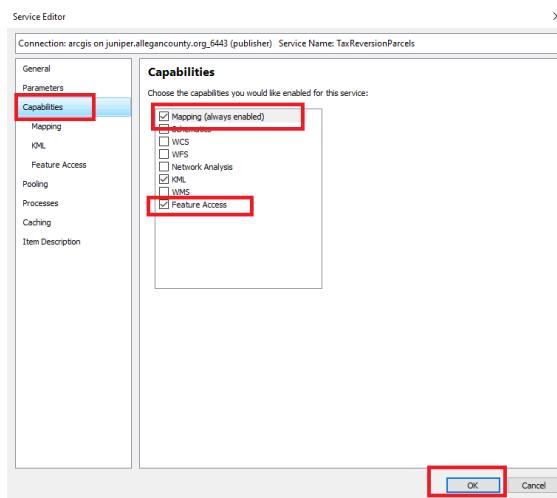


Figure 5.41: Capabilities

### Feature Access

---

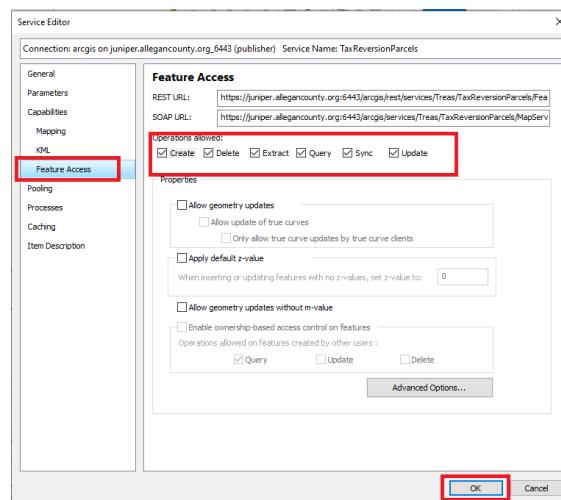


Figure 5.42: Feature Access

## Publish Service



Figure 5.43: Publish Service

## Schema Change Procedure

## Form Edits Procedure

## USER MANUAL

## Collection Device Setup

### Install Collector Classic

Available for IOS, Android, and Windows 10

This workflow supports Collector Classic on IOS

- Get Collector Classic from the App Store

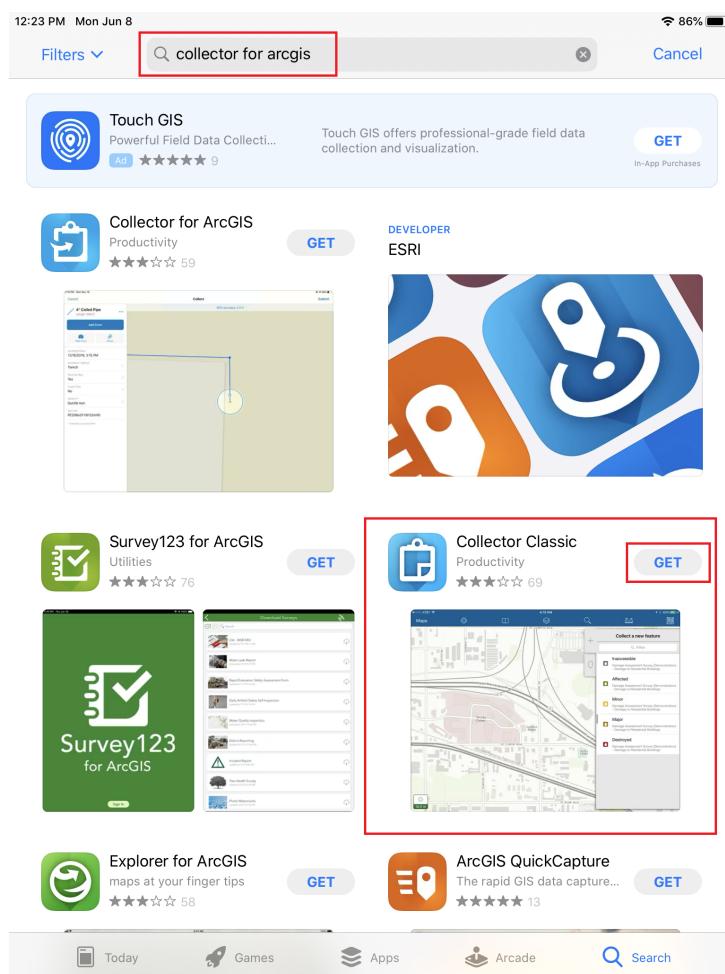


Figure 5.44: Download the App

## Configure Collector

Choose

**Sign in with ArcGIS Enterprise**

for Organization Website, Type:

`https://gis.allegancoounty.org/  
portal_webadaptor`

Push **OK** ➡

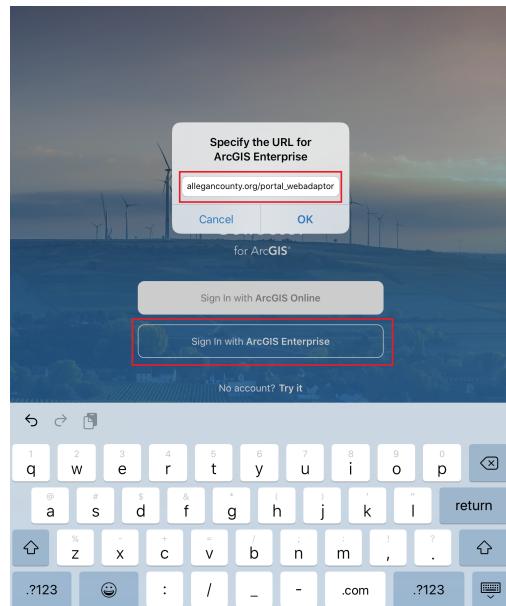


Figure 5.45: Collector Connection

Enter Credentials

Push **SIGN IN** ➡

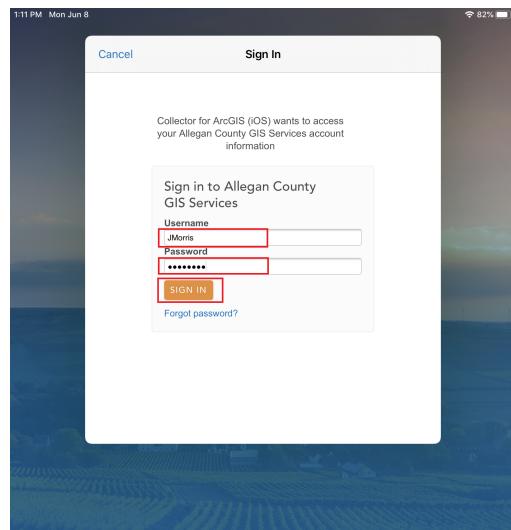


Figure 5.46: Enter Credentials

## Download the Forfeiture Field Map

There are 3 different versions of the map

- Forfeiture Field Map
- Forfeiture Field Map For Photos
- Forfeiture Field Map For Attributes

The cloud with one arrow indicates it is not on the device but is available for offline use

### Choose a Map

Push the cloud button

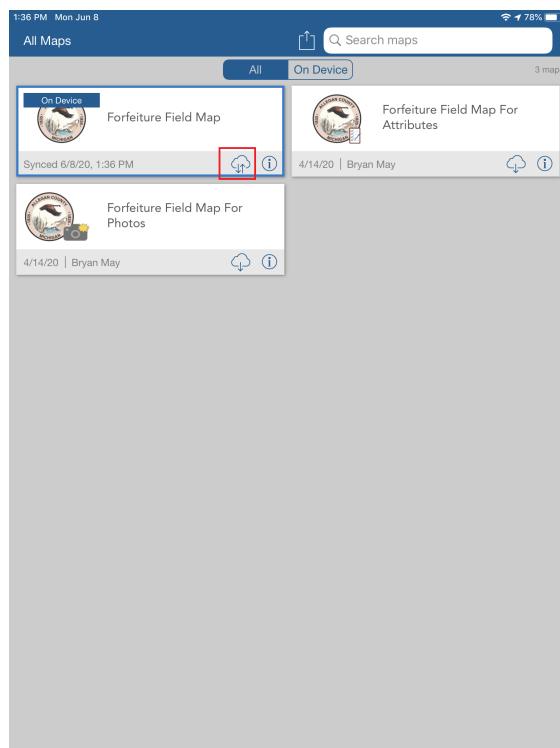


Figure 5.47: Collector Maps Menu

## Specify work area

Define Area of Interest

Note that a larger area takes longer to download but the basemap only needs to be downloaded once

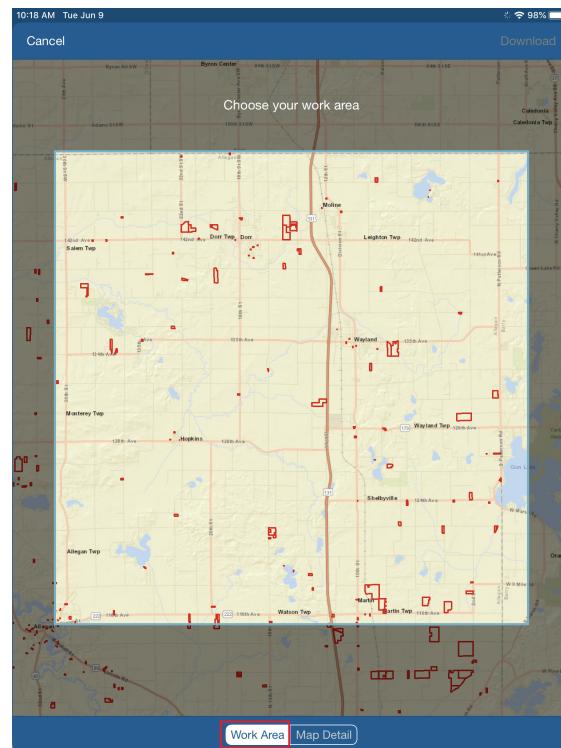


Figure 5.48: Choose Work Area (large)

Push Map Detail

Zoom into the level of detail desired

Push Download

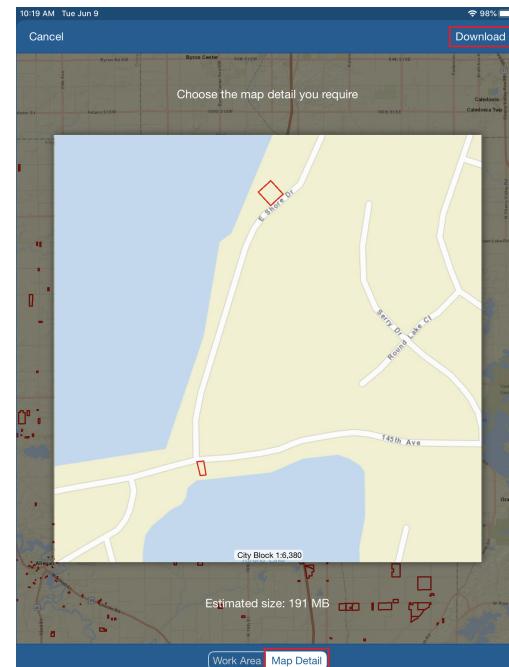


Figure 5.49: Choose Map Detail

## Preprocessing Routine

Each day the data must be prepared by executing the tool:

### 1. Preprocess

#### What the tool does:

- Exports current forfeiture list from BSA
- Updates webmap layers with results from BSA export

To use the preprocess tool:

In the Catalog window, navigate to:

J:\Departments\Treasury\Apps\Forfeiture\processing\ForfeitureToolbox.tbx

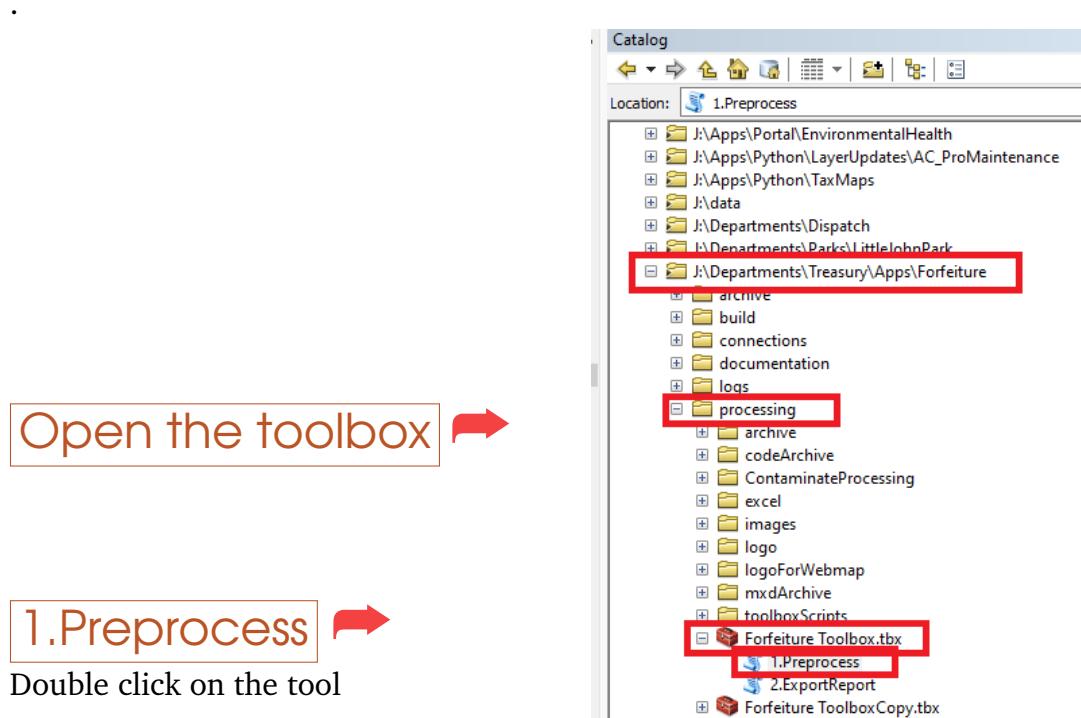


Figure 5.50: Processing Tools

## Preprocessing Routine Cont.

### Execute the Preprocess Tool

- Set parameters of the tool

In the tool, navigate to: <J:\Departments\Treasury\Apps\Forfeiture\source\Forfeitures.csv>

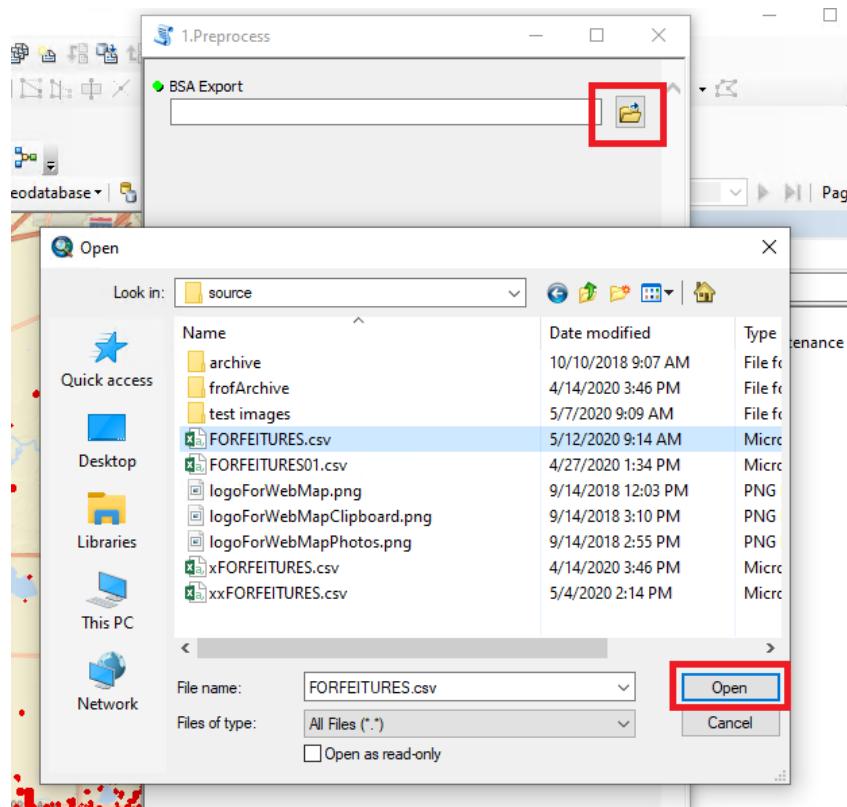


Figure 5.51: Select BSA Export

Push **Open** ➡

Push **OK** on the tool to execute ➡

## Fieldwork data is updated from BSA

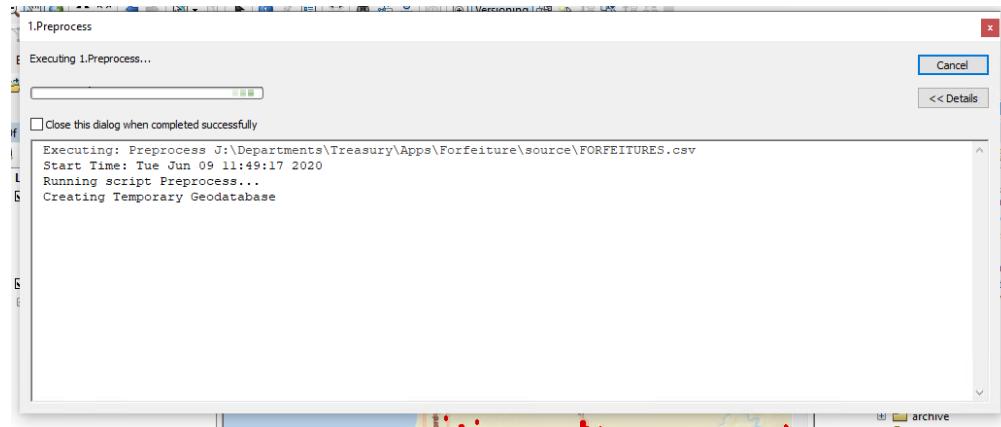


Figure 5.52: Preprocess Running

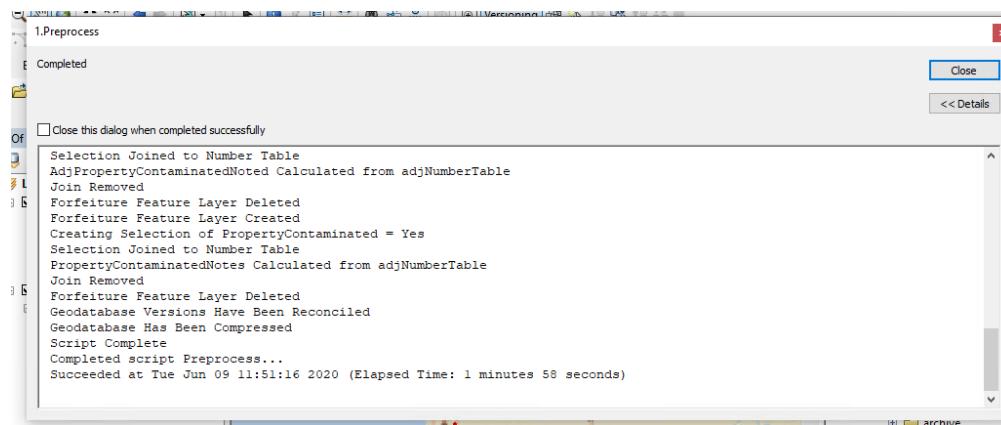


Figure 5.53: Preprocess Completed

Now that the fieldwork data is updated, mobile devices must be updated.

---

## Synchronize the Forfeiture Field Map

On the fieldwork devices:

Note the date and time

Push Sync ➔

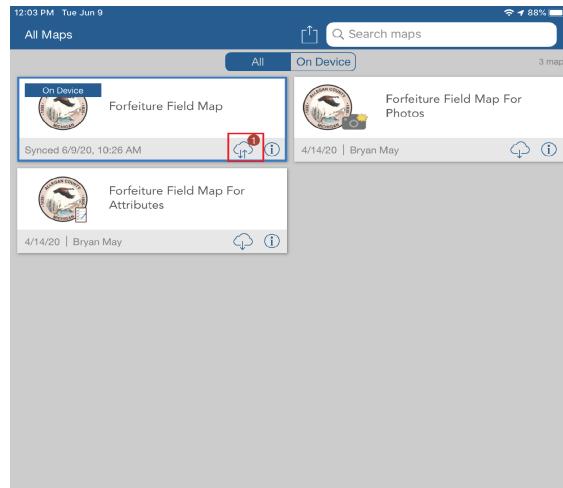


Figure 5.54: Map Downloaded

Note the date and time

If date has been updated then map  
is now synchronized

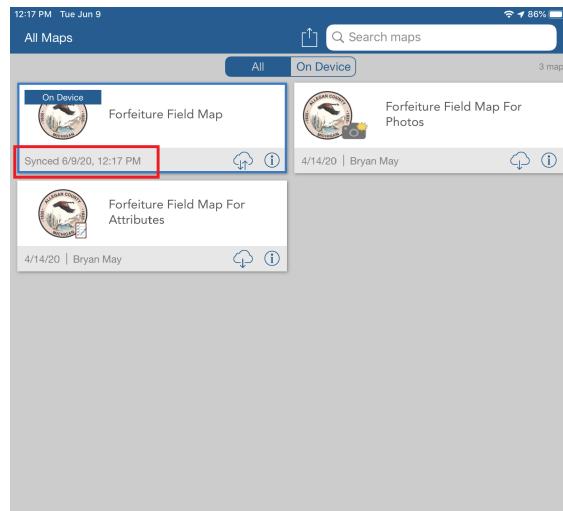


Figure 5.55: Map Synchronized

## Field Data Collection

### Data Entry Details

Attributes are of three entry types:

- Prefilled (in preprocessing)
- Dropdown
- Text box

### Mobile Device Summary

For each site visited,

- Select the desired parcel
- Push **Edit**
- Collect attributes or photos
- Update parcel on device

## Device 1 Field Operation

Select a Parcel →

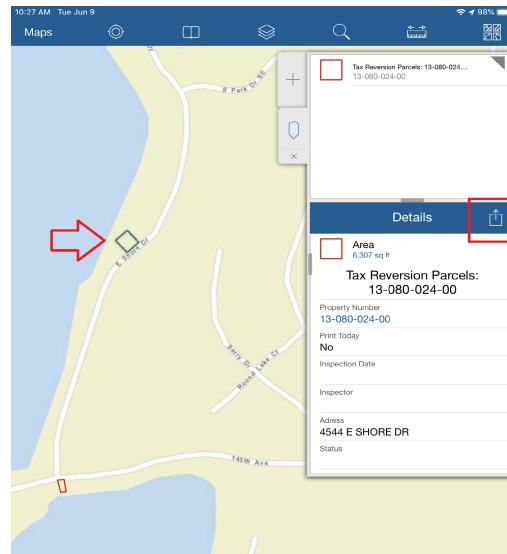


Figure 5.56: Select a Parcel

Edit →

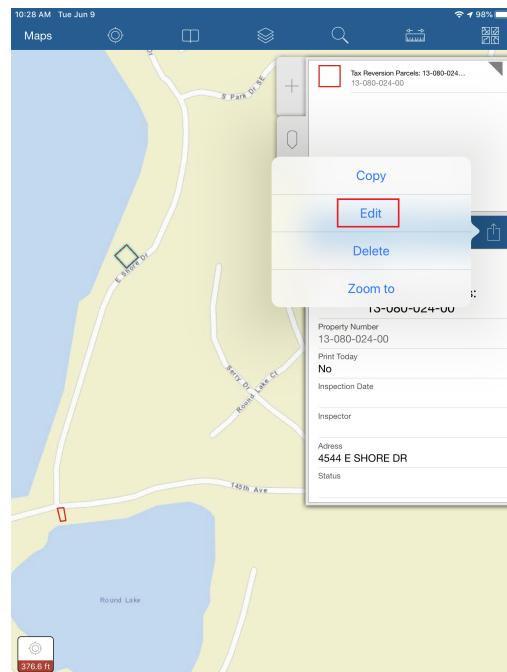


Figure 5.57: Edit Parcel

## Device 1 Field Operation

(cont.)

**Print Today** ➔

This will tag parcel for report production in postprocessing

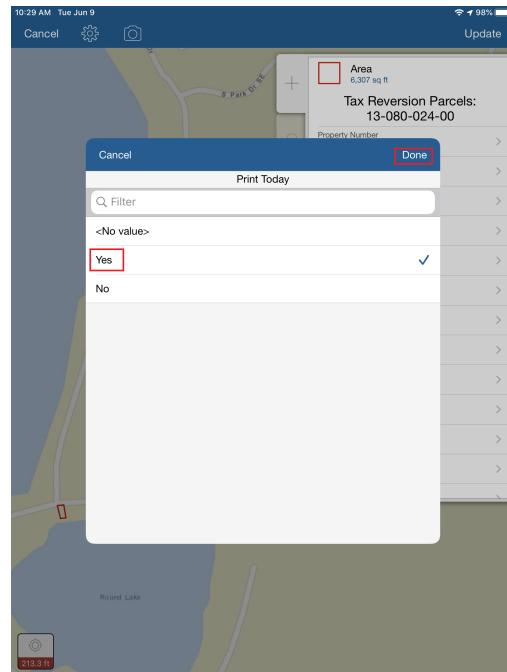


Figure 5.58: Print Today

**Inspection Date** ➔

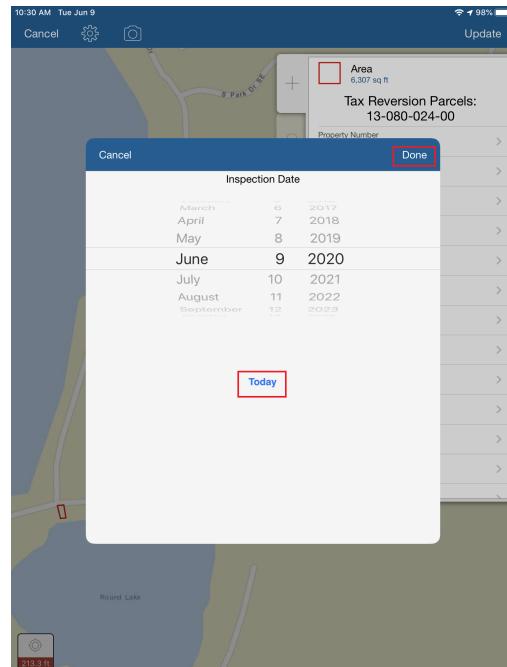


Figure 5.59: Enter Date

## Device 1 Field Operation

(cont.)

Inspector →

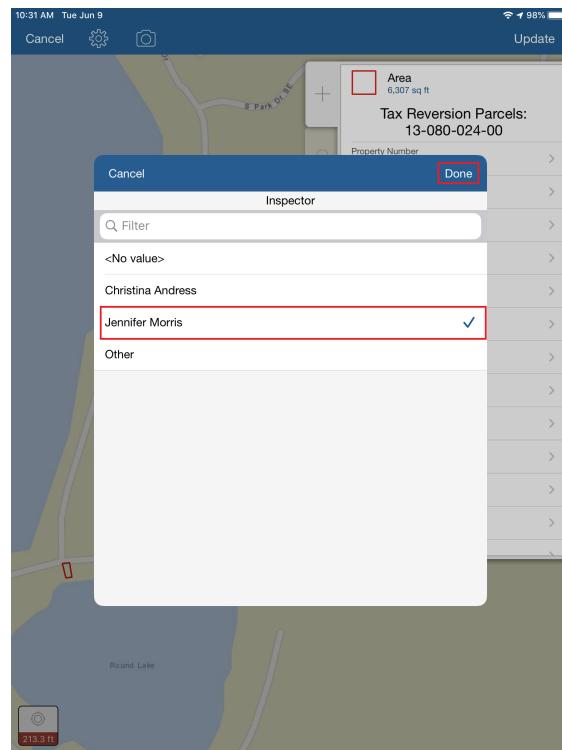


Figure 5.60: Select Inspector

## Device 1 Field Operation

(cont.)

Status

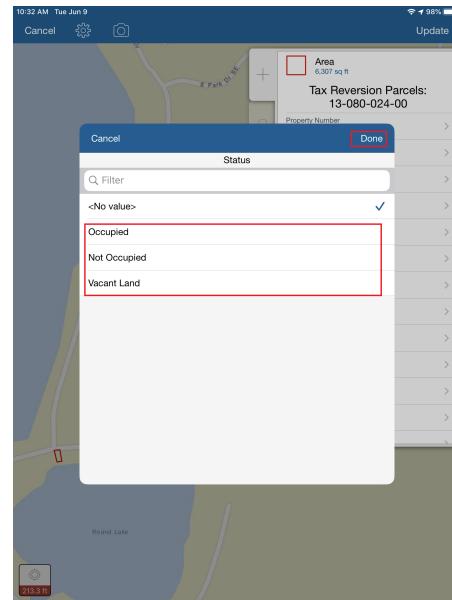


Figure 5.61: Occupied or Not

Status Notes

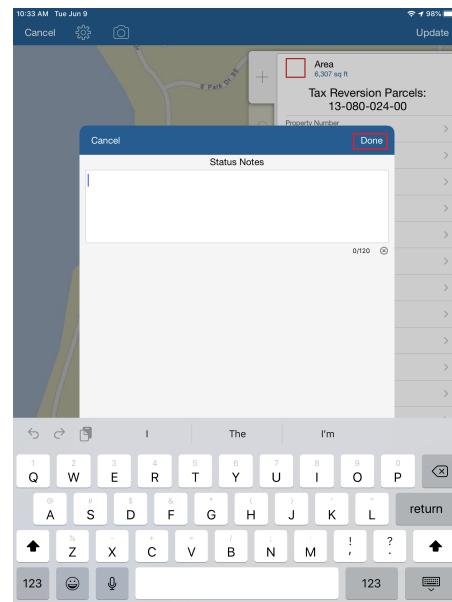


Figure 5.62: Enter Text

---

## Device 1 Field Operation

(cont.)

Road Frontage

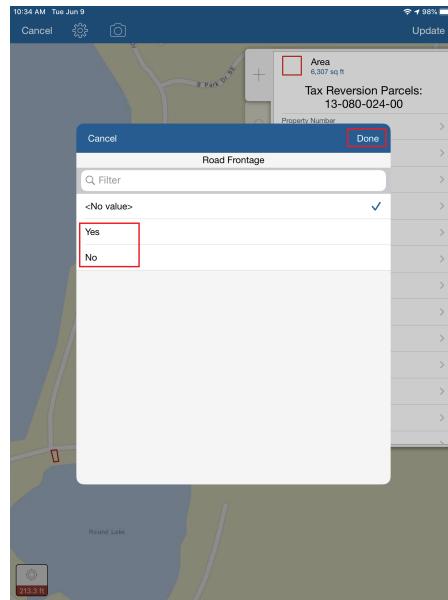


Figure 5.63: Road Frontage

Access Via

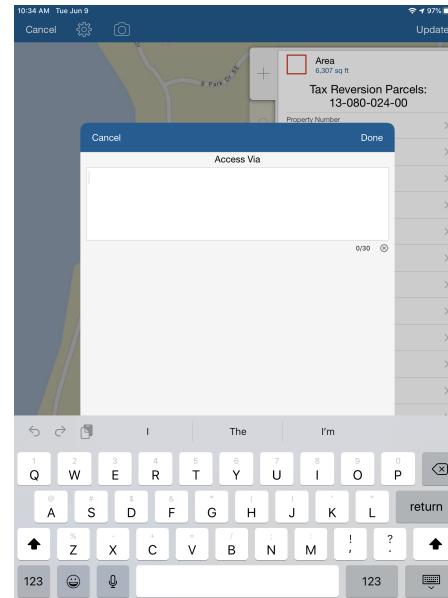


Figure 5.64: Enter Text

## Device 1 Field Operation

(cont.)

Agent 

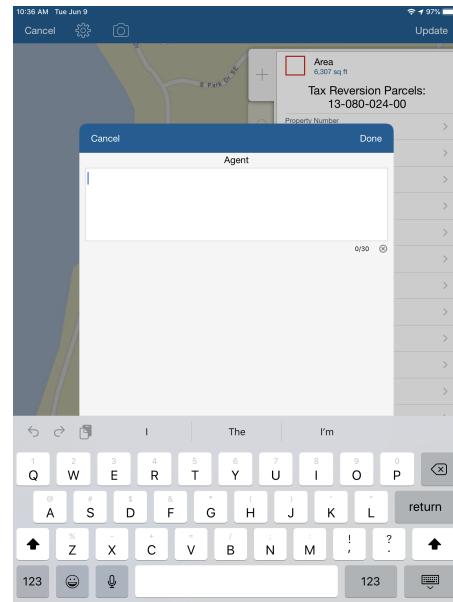


Figure 5.65: Enter Text

Agent Contact Info 

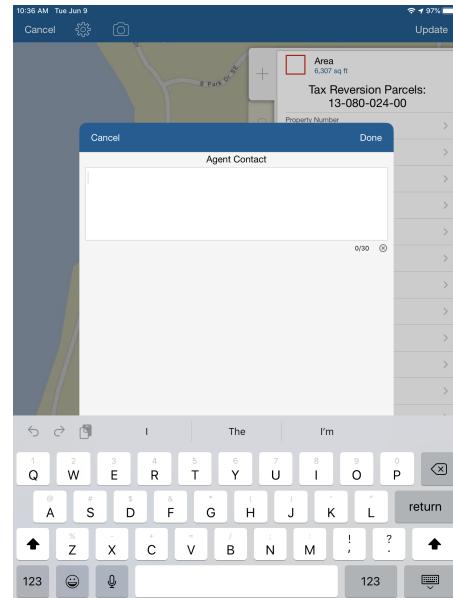


Figure 5.66: Enter Text

## Device 1 Field Operation

(cont.)

Property in Use ➔

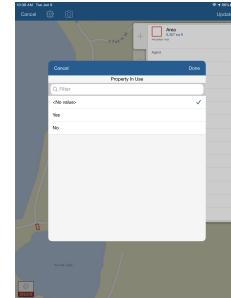


Figure 5.67: Yes or No

Use Notes ➔

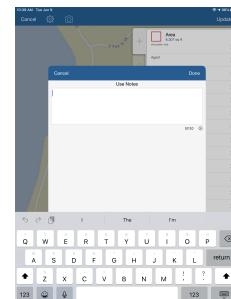


Figure 5.68: Enter Text

Property Maintained ➔

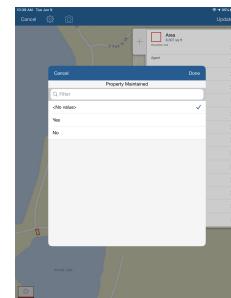


Figure 5.69: Yes or No

## Device 1 Field Operation

(cont.)

Maintenance Notes

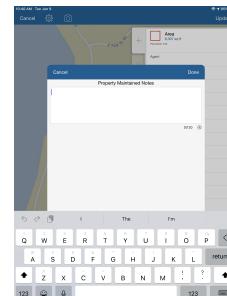


Figure 5.70: Enter Text

Property Contaminated

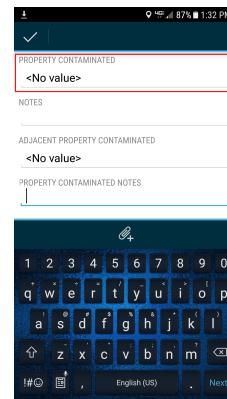


Figure 5.71: Prefilled

Property Contaminated Notes

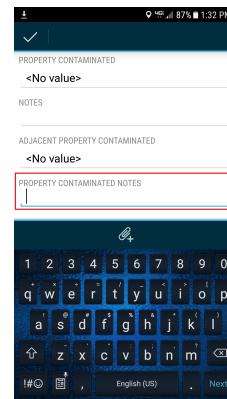


Figure 5.72: Prefilled

## Device 1 Field Operation

(cont.)

A screenshot of a mobile device screen displaying a form titled "PROPERTY CONTAMINATED". The form has a single text input field labeled "<No value>". Below the input field is a section labeled "NOTES" with a text input field containing the placeholder "ADJACENT PROPERTY CONTAMINATED". A red box highlights this notes field. A red arrow points from the text "(cont.)" to the top of this screenshot.

Figure 5.73: Prefilled

A screenshot of a mobile device screen displaying a form titled "PROPERTY FOR SALE". The form includes fields for "CLASS" (set to "401") and "PROPERTY IN USE" (set to "<No value>"). Below these fields is a section labeled "ADJ PROPERTY CONTAMINATED NOTES" with a text input field containing the placeholder "ADJ PROPERTY CONTAMINATED NOTES". A red box highlights this notes field. A red arrow points from the text "(cont.)" to the top of this screenshot.

Figure 5.74: Prefilled

## Device 1 Field Operation

(cont.)

**Property For Sale** ➔

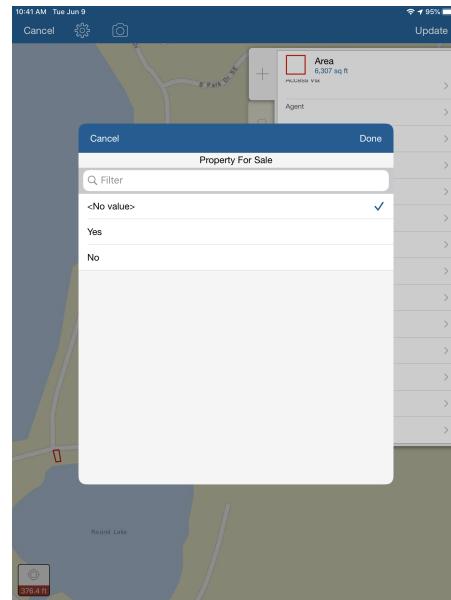


Figure 5.75: Yes or No

**Forfeiture Posted** ➔

This will turn this parcel from red to green in the map

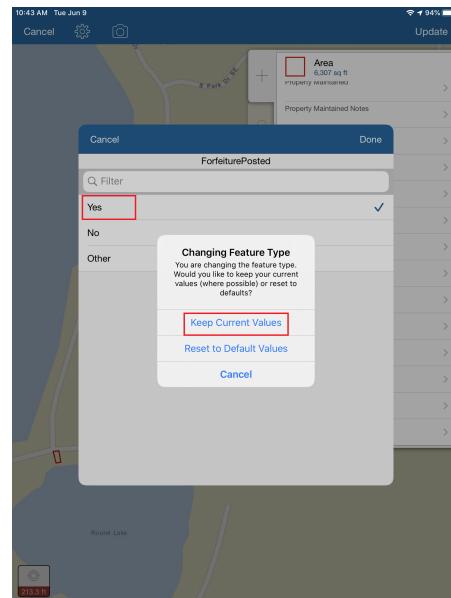
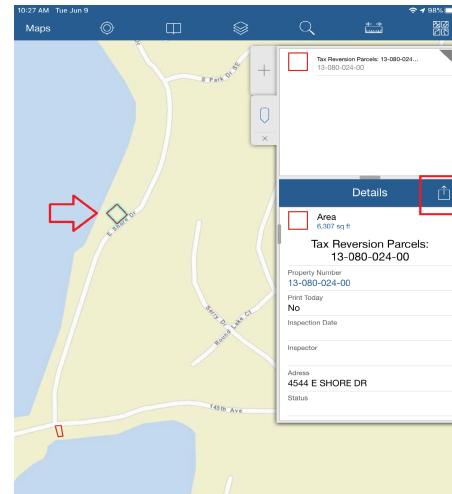


Figure 5.76: Forfeiture Posted

## Photos and comments

Can be added from the same device or another device

Select a Parcel 



Push Detail Button 

Figure 5.77: Select Parcel

Attachment 

Add 

Take Photo 

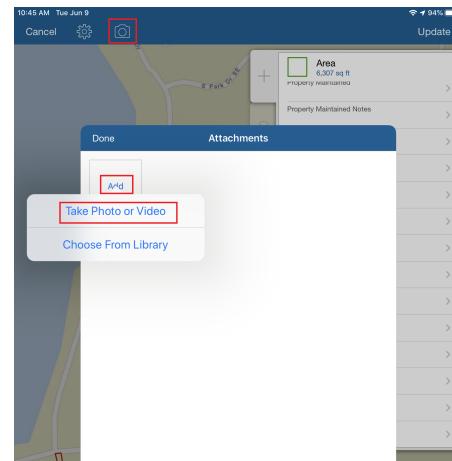


Figure 5.78: Add Attachment

Take Picture

Push Done 

Push Update 

## DAILY POST PROCESSING ROUTINE

### Synchronize Data

Any devices that were used for field data collection must be synchronized with the network production data.

### Synchronize the Field Collection Devices

So, if two devices were used:

On Device 1:

**Sync Attributes** ➔

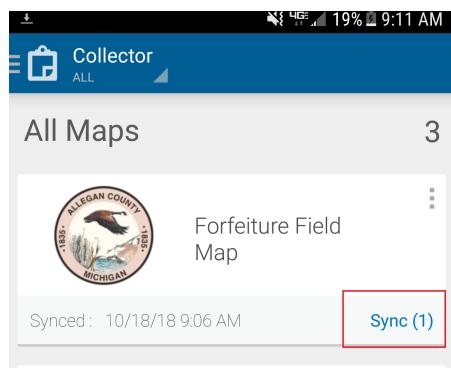


Figure 5.79: Sync

On Device 2:

**Sync Photos** ➔

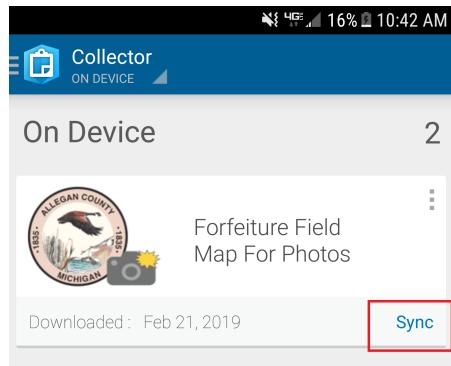


Figure 5.80: Sync Photos

## Reconcile Versions and Print Report

Each device that is synchronized corresponds to a version within the geodatabase.

The versions must be reconciled with the Reconcile Versions tool:

Find and open the Reconcile Versions Tool  
To find the tool **in ArcMap**:

Windows ➔ Search ➔

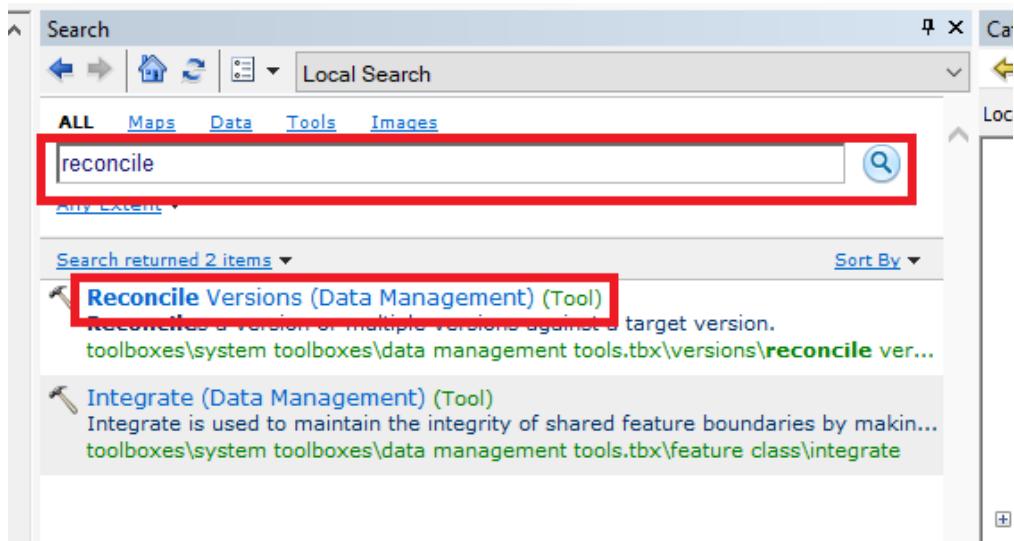


Figure 5.81: Search for Reconcile tool

## Reconcile Tool Setup

The tool uses these settings: ➔

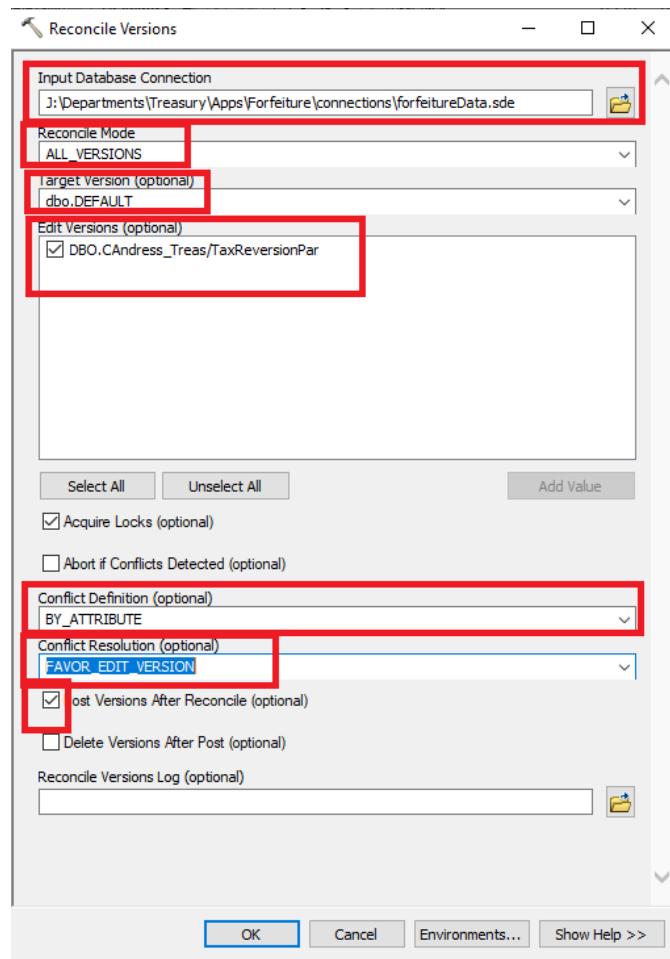


Figure 5.82: Reconcile Settings

Push OK to Run the tool ➔

Next is exporting reports for the sites visited

## Reconcile Versions and Print Report (cont.)

### Print Reports

Any parcel that is marked **Print Today** as **Yes** will generate a report.

Inspection reports are generated by running the tool:

Double click on the tool  
**2. Export Report**   
and press **OK**

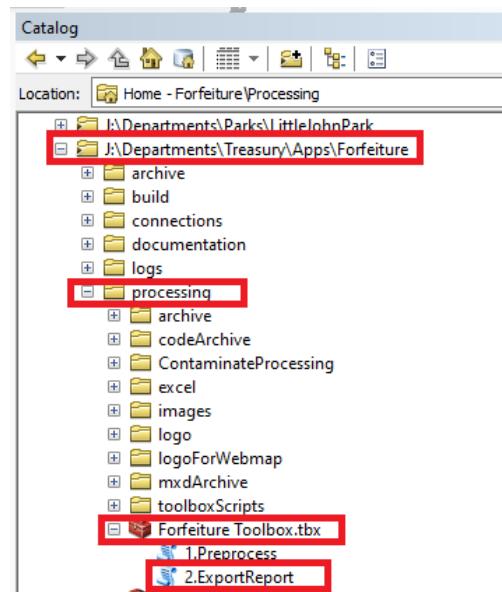


Figure 5.83: Double Click

Report is generated to:

J:\Departments\Treasury\Apps\Forfeiture\build\reports

## 5.2 FOR EQUALIZATION DEPARTMENT

### 5.2.1 TAX MAP PRODUCTION

#### PROBLEM AND ANALYSIS

##### Background

Equalization department (EQ) has an annual responsibility to produce a printed version of maps that show all of the tax parcels in the county for every tax year. The GIS Services Department(GIS) has traditionally provided this as a service to Equalization.

##### Analysis

**Tax Map Production Workflow** will facilitate: Creation of new tax maps for each new tax year.

##### People Involved in the Workflow

- GIS Analyst
- EQ Mapper

##### Statement of Problem

Annually, after March Board of Review, a tool is needed to create updated parcel maps for printing by Equalization and the local units.

##### Stages of the Workflow

- Data Updates
- Map Production Testing
- Map Style Refinement
- Map Production

# Tax Map Production Summary

The Four Stages of the workflow:

## 1. Data Updates Tax Roll Rollover:

- Update ACParcelsPublishing FDS from ACParcelsEditing FDS
- Prepare ACParcelsEditing FDS for the next year of use
- Add or delete quarter section index frames

## 2. Map Production Testing:

- Execute Tax Map Builder ArcPy Script on test units
- QA QC to verify updates

## 3. Map Refinement

- Symbols
- Labels
- Layer Order

## 4. Map Production:

- Execute Tax Map Builder ArcPy Script on all units
  - QA QC results
-

## Technologies Used in The Tax Map Workflow

### ArcGIS Enterprise

SQL Server Source Data:

- ACPo.SDE

### ArcGIS Desktop

ArcPy tools produce map pages using Data Driven Pages (DDP) functionality

### Production Data

- ACCadastral.gdb (File GDB Created From ACPo.SDE)

### Python

A Python interpreter to tune the TaxMap-Tool.py script

### Adobe Acrobat

Combine pdf pages into books by unit

## DATA UPDATE PROCEDURE

Run DB maintenance routine on AC\_Pro.sde first

### Updates to AC\_Pro.sde

Datasets involved:

- ParcelEditing
- ParcelPublishing
- TaxMapIndexFrames
- TaxMapLayers
- TaxMapUnitBounds

## Update Procedure

### Parcel Editing and Parcel Publishing

Annually, the ParcelEditing feature dataset (FDS) is used to update the ParcelPublishing FDS.

#### For each FC in ParcelPublishing

**Append and Clear:** load from Editing to Publishing and delete all from Editing

**Replace Pub:** Delete all in Publishing and load all from Editing and leave all in Editing

| Data Update Relation |                        |                  |
|----------------------|------------------------|------------------|
| FC in ParcelEditing  | FC in ParcelPublishing | Update Procedure |
| AC_COGO_LnEdits      | AC_COGO_Ln             | Append and clear |
| AC_DimensionsEdits   | AC_Dimensions          | Replace Pub      |
| AC_Gap_OverlapEdits  | AC_Gap_Overlap         | Replace Pub      |
| AC_PointsEdits       | AC_Points              | Replace Pub      |
| AC_Splits            | AC_Parcels             | Replace Pub      |
| AC_SubBlocksEdits    | AC_SubBlocks           | Replace Pub      |
| AC_SubdivisionsEdits | AC_Subdivisions        | Replace Pub      |
| AC_SublotsEdits      | AC_Sublots             | Replace Pub      |
| AC_TiebarsEdits      | AC_Tiebars             | Replace Pub      |

## TaxMapIndexFrames

As this is the index layer for the DDP, Quarter Section frames must be added or removed to account for added or removed subdivision features at this time.

## TaxMapLayers

Layers that are derived from other fcs for cartography purposes

- AC\_M\_Rd\_Lbl is a subset of AC\_Roads used only for less busy labeling
- AC\_MapID\_RR is a subset of AC\_Parcels used only for Railroad Labeling
- AC\_Road\_ROWS\_Tax is an aggregation of AC\_Road\_ROWS by unit

## TaxMapUnitBounds

Layers extracted from AC\_Units for bounding polygons in the locator Data Frame

---

## Workspace Folder Setup

Inside of J: $\Rightarrow$  Apps $\Rightarrow$  Python $\Rightarrow$  TaxMaps:

Copy the folder: **TaxMapsWorkspaceTemplate**

Into the years folder and rename to: **YYYY**

## Production Data Creation

In the source folder, create a new file GDB named AC\_Cadastral. Copy the following FDSs from AC\_Pro.sde:

- $\Rightarrow$  AdministrativeArea
- $\Rightarrow$  CadastralReference
- $\Rightarrow$  Hydrology
- $\Rightarrow$  ParcelPublishing
- $\Rightarrow$  Roads
- $\Rightarrow$  TaxMapIndexFrames
- $\Rightarrow$  TaxMapLayers
- $\Rightarrow$  TaxMapUnitBounds

## Map Production Setup

(In the new workspace folder)

Add a field to AC\_Parcels InUnit text 1 characters

Add a field to AC\_Subdivisions InUnit text 1 character

Add a field UnitText text 2 characters and calculate as 1st two digits of the unit number to:

- AC\_Parcels
- AC\_Road\_ROWS\_Tax
- AC\_Subdivisions
- AC\_Units

Update the tax year in the 2 .mxd s

### In ArcGIS Desktop

Use ArcMap Catalog to navigate to:

workspace folder ➔ processing ➔ Toolbox ➔ TaxMapTools.tbx

Right Click on the tool in Catalog and select properties.

Set the path to the script file in the tool for the current year.

---

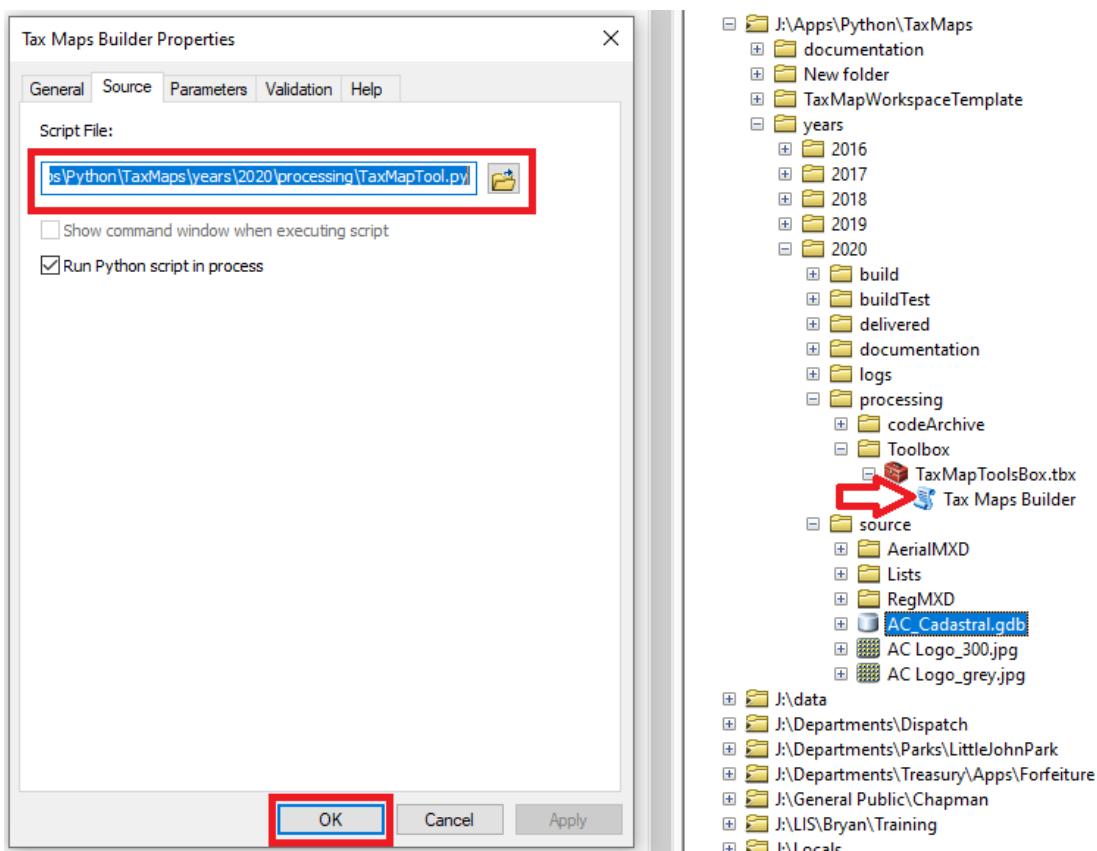


Figure 5.84: Set Path to Script

## Launch the Tax Map Builder Tool

Double click on the **TaxMapBuilder** script

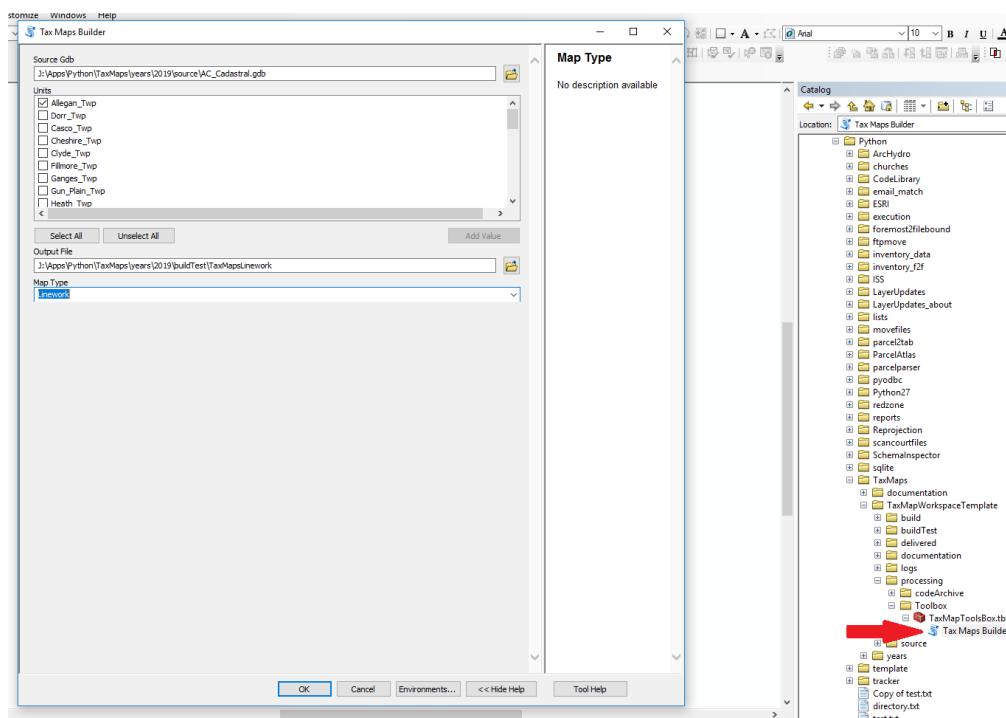


Figure 5.85: Tax Map Builder UI

## Execute the tool

Make selections in the tool from the appropriate locations in the workspace folder.

- Choose any combination of units to produce
- Select output location
- Choose aerial or linework type maps

## Map Refinement

Test groups of maps should be produced.

Any style improvements that can be made should be done at this time.

## Map Production

Use ArcMap Catalog to navigate to:

workspace folder → processing → Toolbox → TaxMapTools.tbx

Double click on the **TaxMapBuilder** script

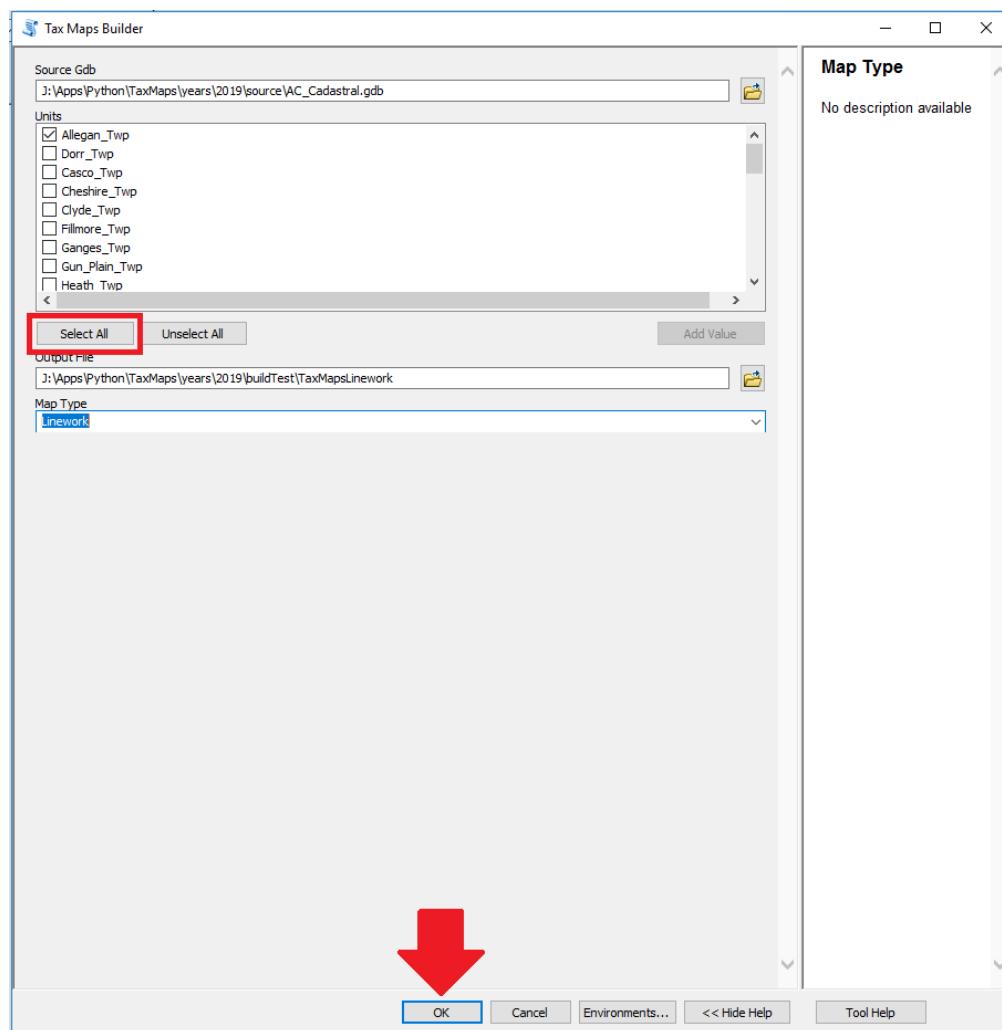


Figure 5.86: Tax Map Builder UI

Select All Units and Press OK

## Create Books from Pages

For each unit, organize the pages into the TaxMapUnitFolders.

Move the pages to the appropriate pdf folders inside the delivered folder of the workspace.

Combine all of the individual map pages into books using Adobe Acrobat and save to the PDF\_Book folder.

## Share the map books with Equalization

Copy the entire TaxMapUnitsFolder to:

J:  $\Rightarrow$  Departments  $\Rightarrow$  Equalization  $\Rightarrow$  TaxMaps  $\Rightarrow$  TaxMap Archive



# — 6 — *Tools*

## 6.1 BSA SUPPORT

### 6.1.1 ADDING A LAYER TO THE BSA GIS

#### TOOL SUMMARY

##### Background

B S And A features a GIS toolset that requires data layers to be added to map documents for visualization.

B S AND A is used within Equalization and by local assessors throughout the county.

##### Why the Tool is Needed

B S And A Users often ask ACGIS for data and assistance in using the data.

##### Who the Tool is For

User knowledge of B S And A.

B S And A installed.

GIS data source files on the local machine.

##### Takeaway

With the necessary data files, any B S And A user can add layers to a map within B S And A GIS

## ADD AN IMAGERY LAYER

### Step 1: Edit GIS Settings

In **Program Setup** ⇒ Select **GIS Settings...**

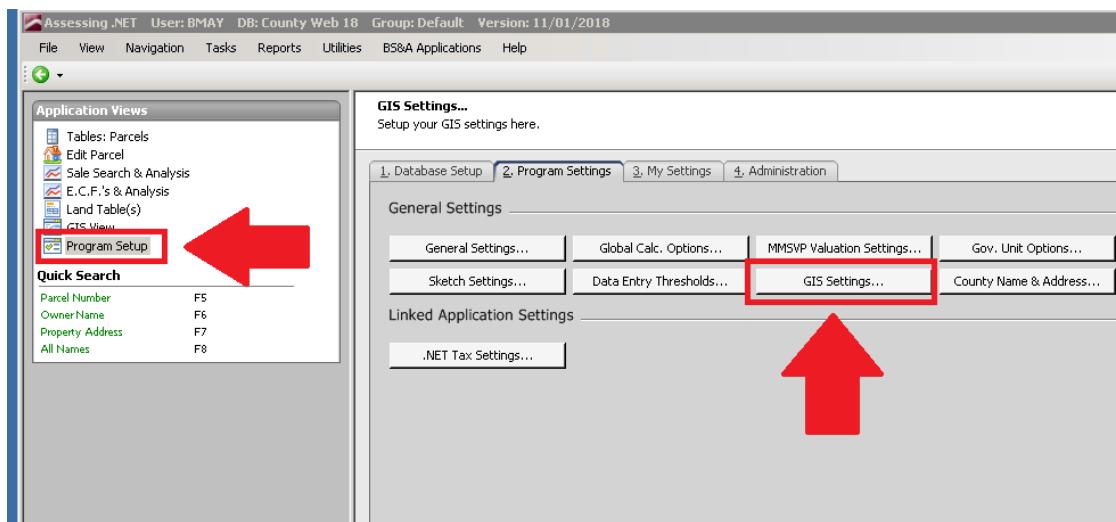


Figure 6.1: BSA Program Setup

## Step 2: Select Map To Edit

In **GIS Settings** ⇒ **Map Collections** ⇒

Double click on the map that you want to add a layer to

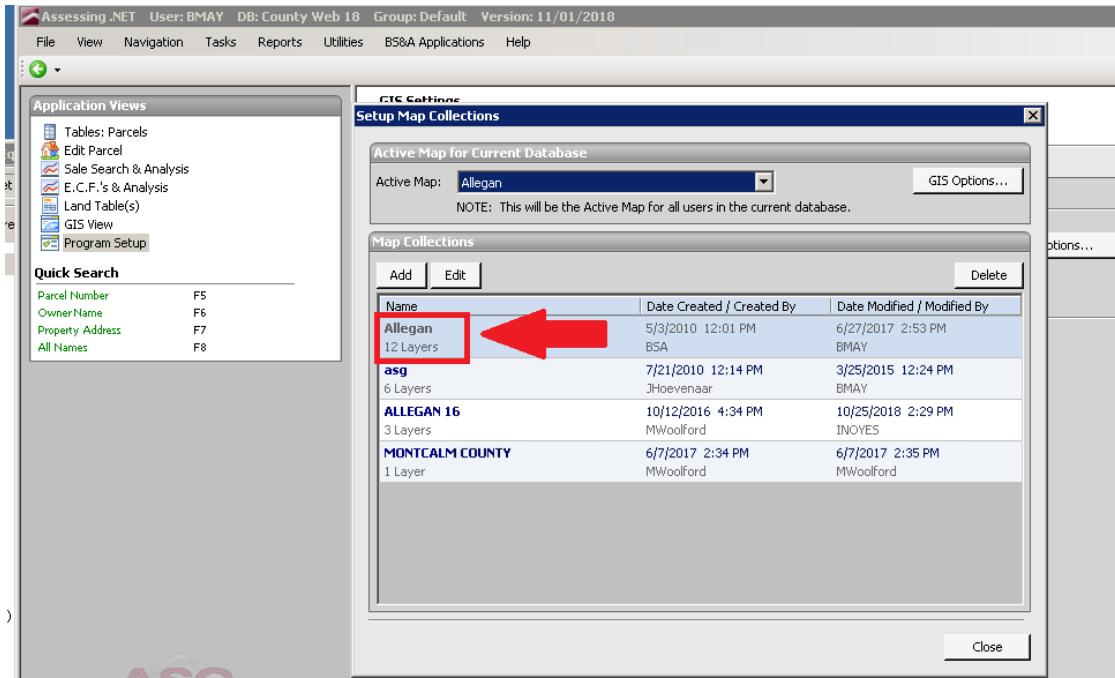


Figure 6.2: GIS Setup

## Step 3: Add Layer

Setup Layers ⇒ **Add**

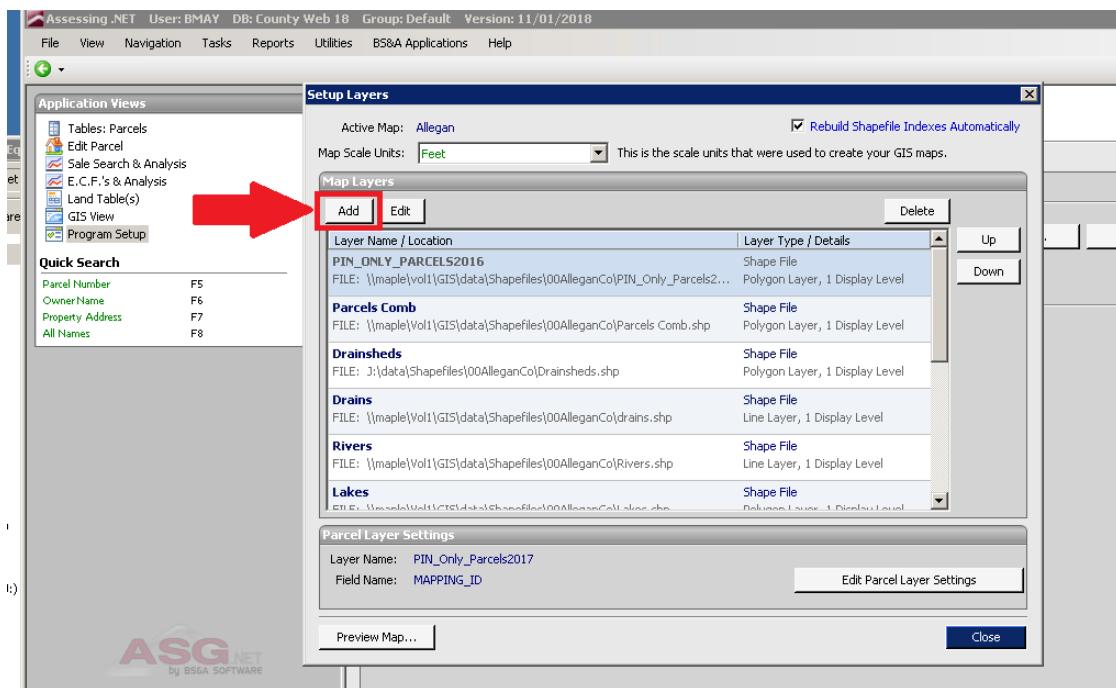


Figure 6.3: Layers Setup

## Step 4: Select Layer Type

Setup Layers ⇒ **Image** ⇒ **OK**

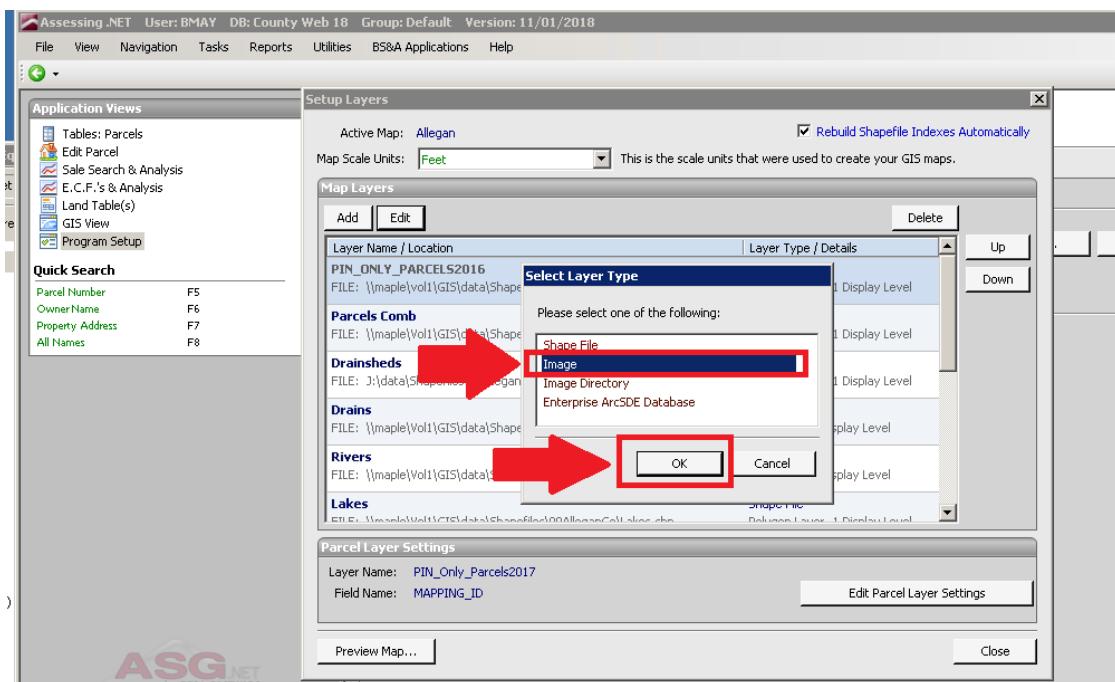


Figure 6.4: Select Layer Type

## Step 5: Add Layer From Local Drive

Navigate to Image File ⇒ **Open**

\*image files are often file type .sid

\*layer files are often file type .shp

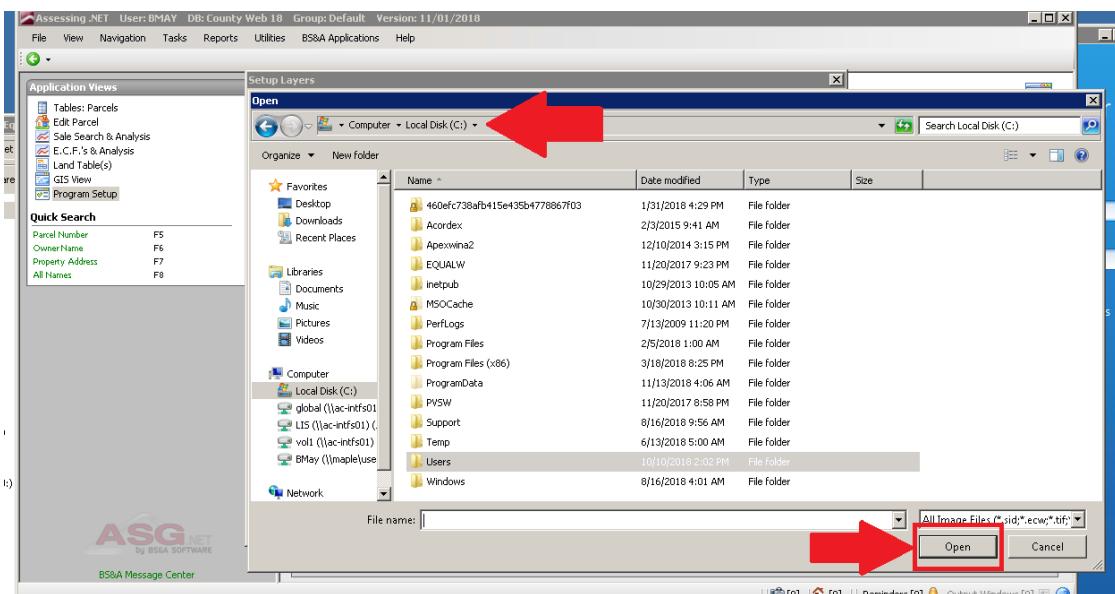


Figure 6.5: Add Layer From Drive

The new image should now be in the map

## 6.2 CORE DATA

### 6.2.1 GIS DATA MAINTENANCE

#### TOOL SUMMARY

## Background

Allegan County GIS Services works with various stakeholders to maintain authoritative data. Often mapping requests involve data maintenance and sometime require data schema alterations.

## Why is the Tool Needed

Though the variety of GIS data input and maps output required of the different stakeholders varies and is extensive, general workflow details can be synchronized. It is important that this workflow be platform in-

dependent and therefore may be described in somewhat general terms.

## Who is the Tool For

Allegan County GIS Services staff.

## Takeaways

This general workflow can be used to maintain authoritative data and fulfill mapping requests efficiently. This documentation will assist in evaluating and executing mapping requests that involve any core data edits.

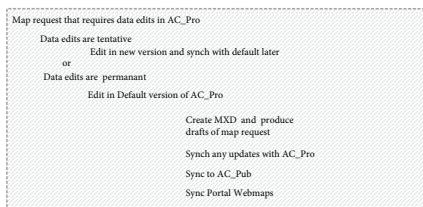


Figure 6.6: Workflow Summary

## O V E R V I E W

### Inputs

- Map request requiring edits in ACPro

### Outputs

- Maps
- Updates to ACPro
- Updates to ACPub
- Updates to Portal Maps

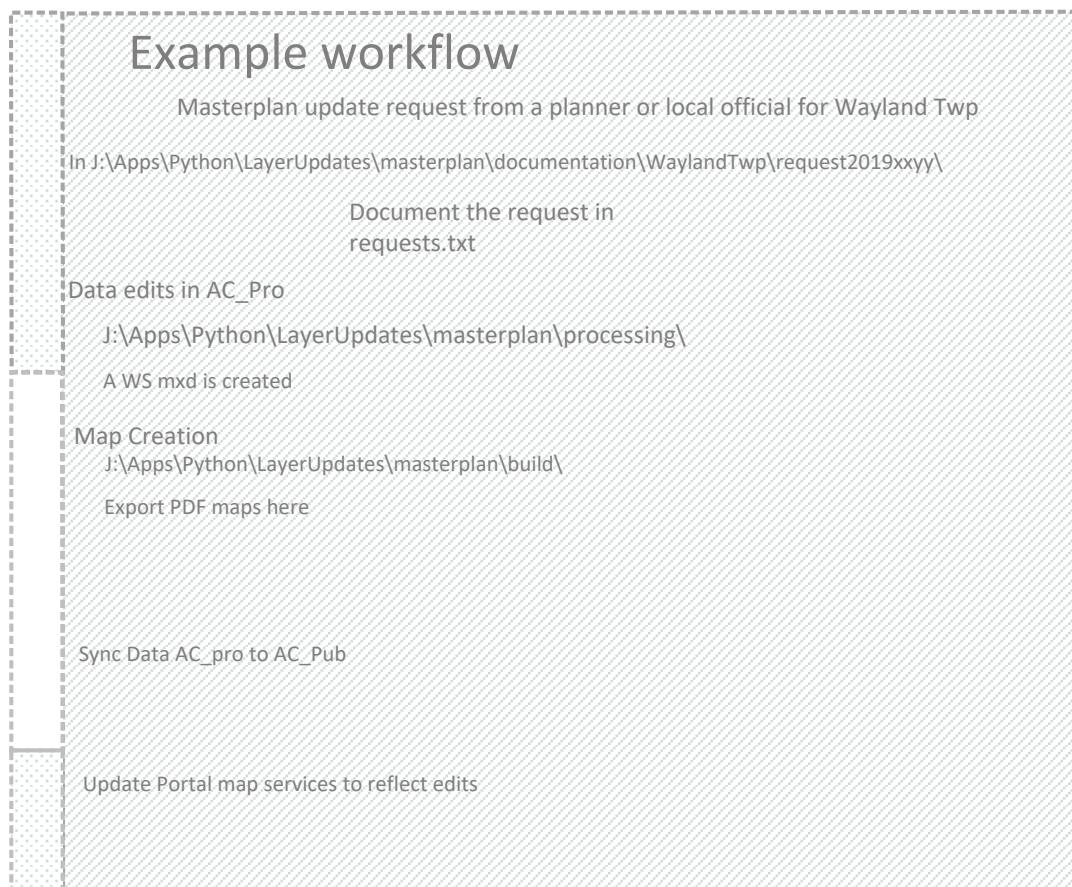


Figure 6.7: Workflow Overview

⇒ Push the Configure Button

#### 6.2.2 CONTROL POINTS

### M A I N T A I N I N G C A D A S T R A L C O N T R O L P O I N T S

## Install the Fabric Point Move to Feature Addin

⇒ Push the Configure Button

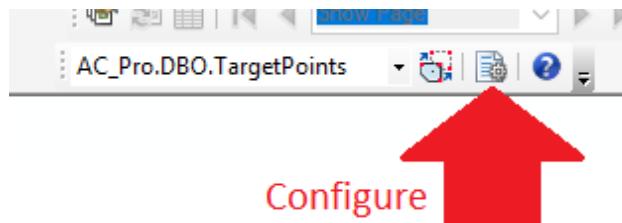


Figure 6.8: Fabric Point Move to Feature Addin

## Configure Addin

- Set Reference Feature Layer to TargetPoints
- Use point to point matching
- Use point layer field: PointID

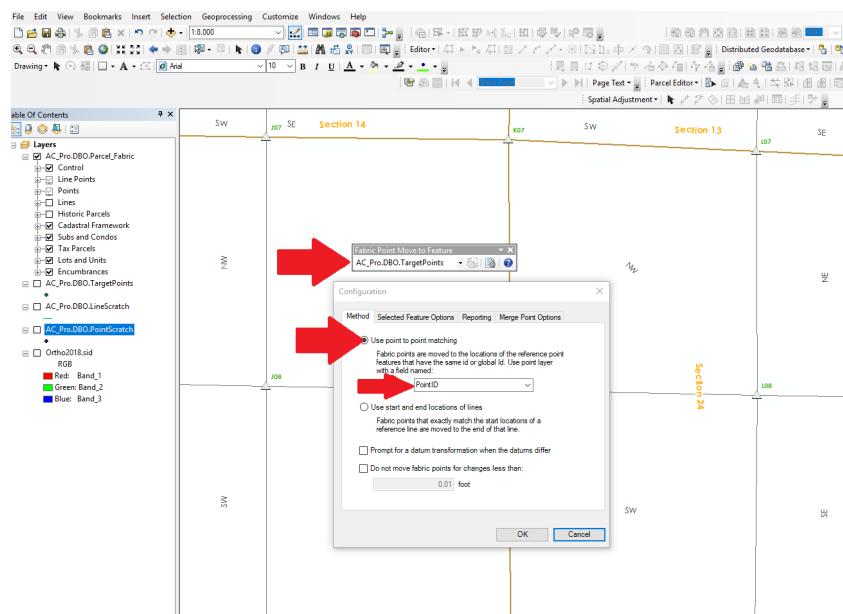


Figure 6.9: Addin Configuration Method

2

Configure Fabric Point Move to Feature addin Selected Feature Options

Move Fabric Points of the Selected Parcels

Push OK

FabricPointMoveToFeatureConfigSelectedFeatures.png

3

Identify position of new control point

Select TargetPoints in Create Features Templates

Create Target Point at location for new Control Point

createTargetPoint.png

4

Use Identify tool to find ObjectId of Control Point that is to be moved

Select the Target point PointID of the point its moving to

Edit Target Point pointID attribute to match associated fabric control point OID

updateTargetPointPointID.png

4.5

Push move point button

moveControlPoint.png

5

Open maintain control point tool

Select control Point

push edit button

maintainControlPointTool.png

6

Use Identify Tool to View X and Y vals for the point

copy x and y value from point(attribute window) to Control (maintain control tool)

push update

Save Edits

transferCoordinates.png

---

Identify position of new control point

Place Target Point

Update Target Point attributes to associated fabric point OID

Push move point button

Zoom to Control point

Open maintain control point tool

Select control Point

Edit button

Copy x and y value from

Identify tool x and y of points

Update button

## 6 . 3 C O R E D A T A S C H E M A

### P R O B L E M A N D A N A L Y S I S

#### Background

Allegan County GIS Services builds and maintains the geographic dataset used in workflows in and out of county government.

#### Statement of Problem

Geographic data must be both maintained and shared. Data is maintained

by Equalization and GIS Services. Data is shared with EH, EQ, Dispatch and the public.

#### Analysis

Here is where analysis of this problem goes

## DESIGN

## Overview

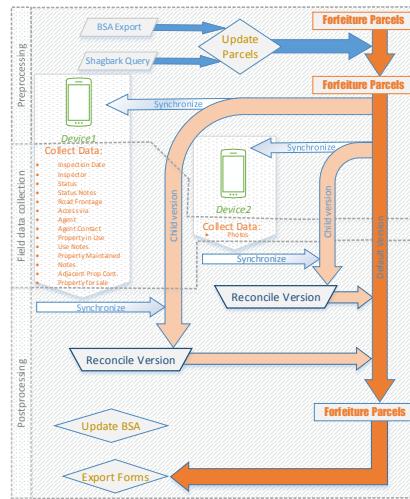


Figure 6.10: Project Design

## 6.3.1 PRODUCTION DATA AC PRO

### DOMAINS

## Directory Location

Managed at this location:

| File Explorer  |                    |                 |     |
|--|--------------------|-----------------|-----|
|  |                    | Organize        | New |
| This PC > LIS (\ac-intfs01 (J:) > Apps > Python > LayerUpdates > AC_ProDevelopment > domains |                    |                 |     |
| Name   | Date modified      | Type            |     |
| domainTables   | 1/22/2019 11:48 AM | File folder     |     |
| DomainMaintenance.txt  | 1/22/2019 10:14 AM | Text Document   |     |
| MasterStreetNamesDev.xlsx  | 1/16/2018 4:57 PM  | Microsoft Excel |     |
| ProDomainsDev.xlsx   | 1/22/2019 11:23 AM | Microsoft Excel |     |
| README.txt   | 12/18/2017 8:37 AM | Text Document   |     |
| roadTYPE.txt   | 12/29/2017 1:27 PM | Text Document   |     |

Figure 6.11: Directory Location of Workspace

## Domain Documentation

This is where...

⇒ Push the Configure Button

## 6 . 4 E S R I T O O L S

### C O G O T O O L S I N A R C G I S

#### COGO Workspace Setup

##### Navigate to the COGO Mapping document (MXD)

J:\Departments\Treasury\gis\COGO

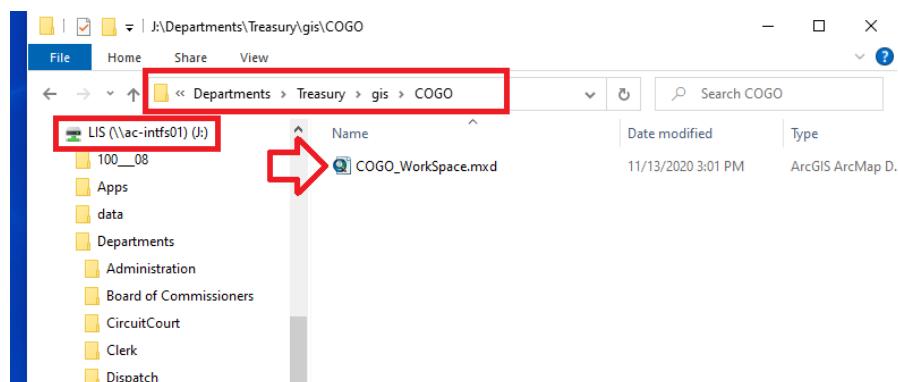


Figure 6.12: COGO Map File

#### Copy the file to your personal workspace

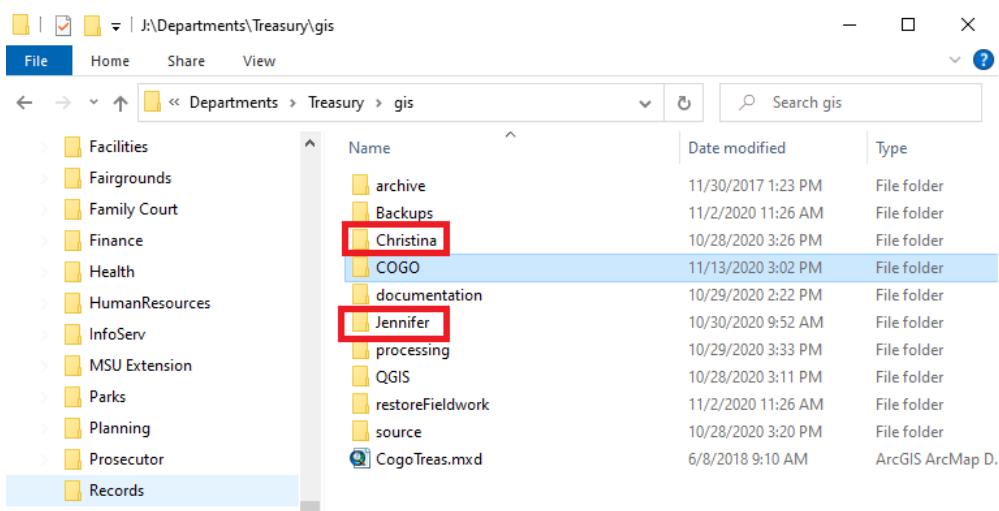


Figure 6.13: User Folder

Double click on COGOWorkSpace.mxd to open it

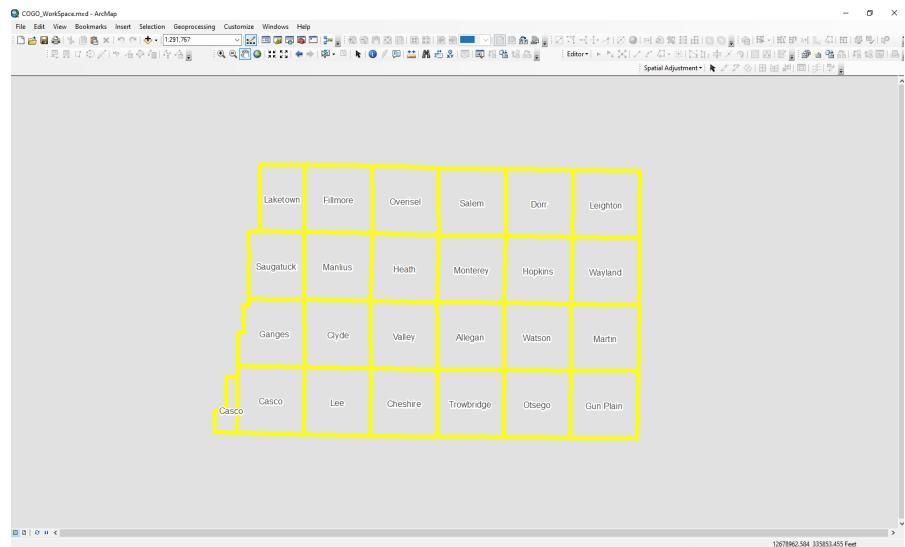


Figure 6.14: First Screen

To return to this extent at any time:

Push **Full Extent Tool**

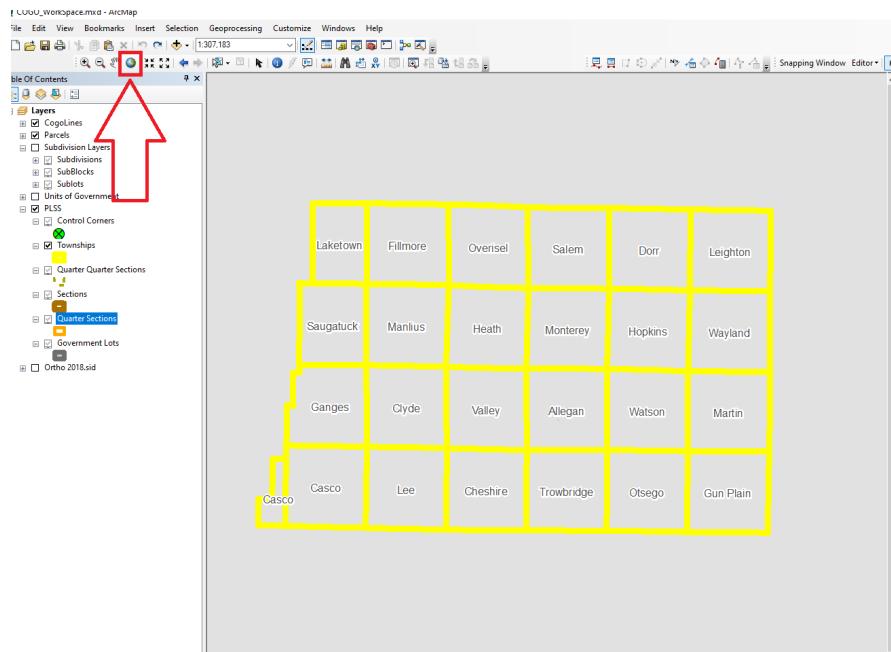


Figure 6.15: Full Extent Tool Result

## Set up editor options:

Push **Editor Toolbar Button** to get the dropdown

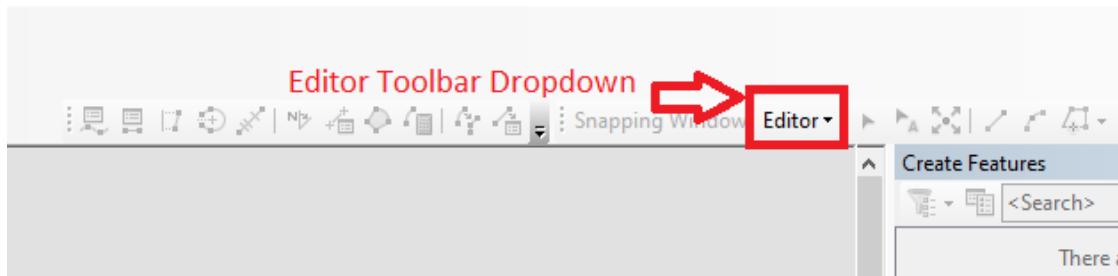


Figure 6.16: Editor Toolbar Button

**Editor Dropdown** ⇒ **Options**

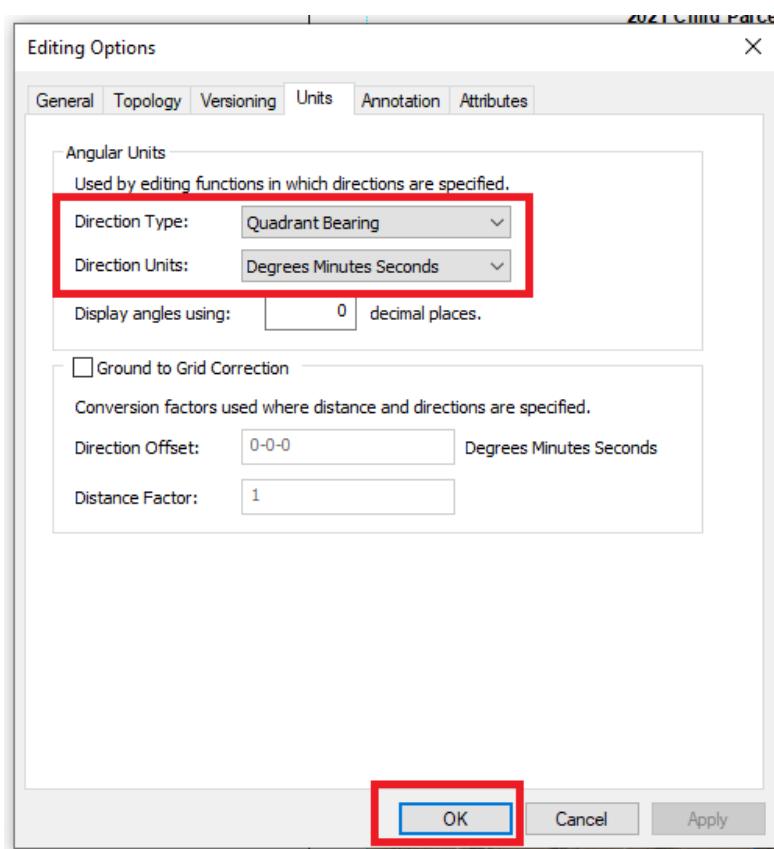


Figure 6.17: Editor Options

## Snapping Setup

Snapping settings are important for accuracy and precision in editing GIS data

### Enable Classic Snapping

Editor dropdown ⇒ Options ⇒ General ⇒ Use Classic Snapping

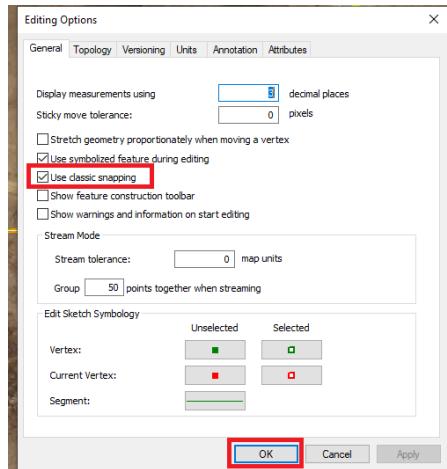


Figure 6.18: Enable Classic Snapping

### Enable Snap Tips

Snap Tips are text that show what you are snapping to

Editor dropdown ⇒ Snapping ⇒ Options

- Check the box for Show Snap Tips

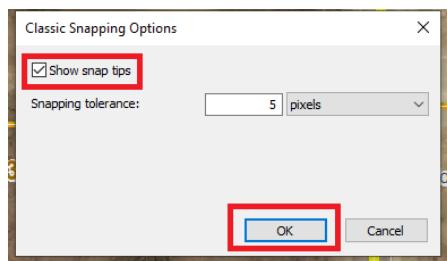


Figure 6.19: Enable Snap Tips

## Configure Snapping Window

For each feature layer in the map there are 3 options for snapping

**Vertex**, **Edge**, and **End**

Editor dropdown ⇒ Snapping ⇒ Snapping Window

These settings are a good start:

| Layer                    | Vertex  | Edge   | End                      |
|--------------------------|---|--|--------------------------|
| CogoLines                | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Parcel Labels            |  |  | <input type="checkbox"/> |
| Subdivisions             | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| SubBlocks                | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Sublots                  | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Units of Government      | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Control Corners          |  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Townships                | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Quarter Sections         | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Sections                 | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Quarter Quarter Sections | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |
| Government Lots          | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/> |

Figure 6.20: Snapping Window

For more information on Snapping:

[Link to Documentation on Classic Snapping](#)

## Find starting point for COGO sketch

### Using the Find Tool

If you have a parcel number near your area of interest, you can use the find tool to get there.

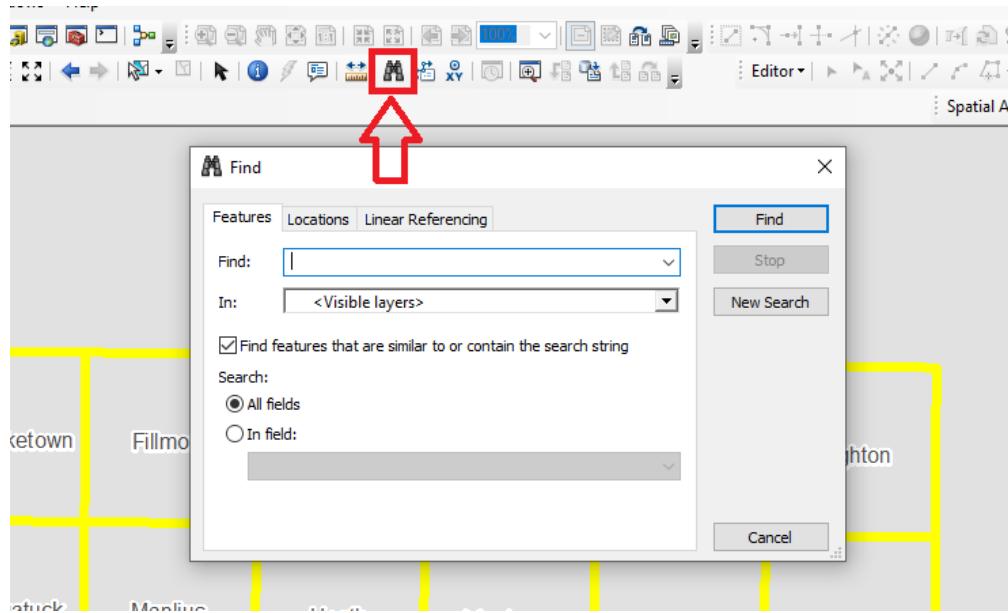


Figure 6.21: Find Tool

## Enter a parcel number into the Find Tool

Input the:

- parcel number
- Layer to search
- Field to search

Push **Find**

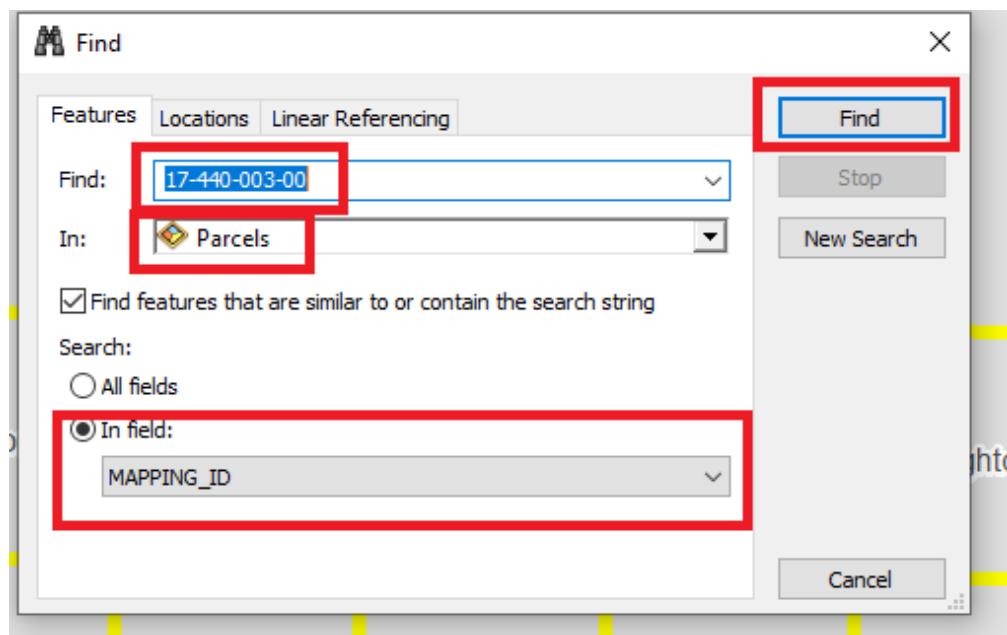


Figure 6.22: Tool Data

If find tool finds a match:  
right click on it and select zoom to

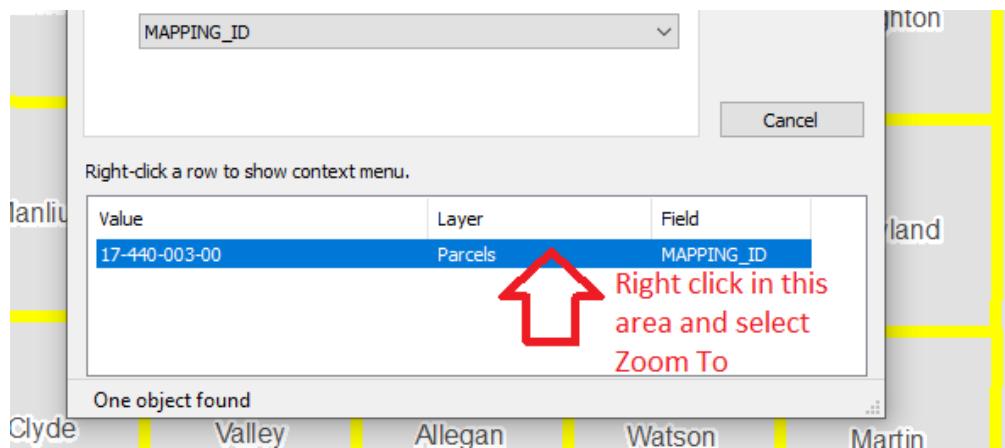


Figure 6.23: Match

Find a starting point for mapping by:

- Using the mouse wheel to zoom in or out
- Toggle layers on or off in the table of contents

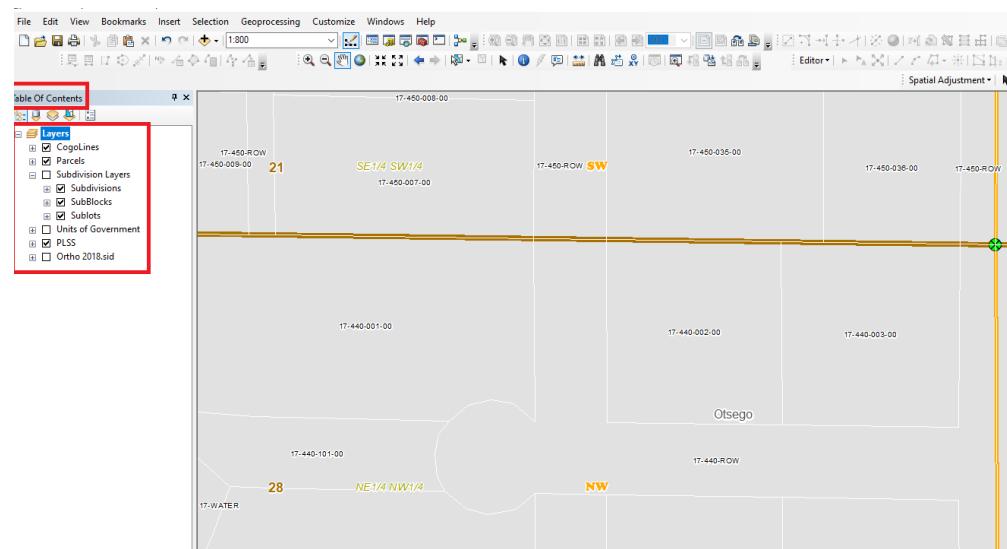


Figure 6.24: Reference Point

## Begin COGO Sketch

Start Editing

Push **template** and select CogoLines

In the editor toolbar: Push **Start Editing**

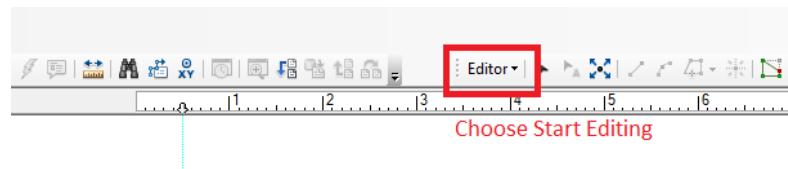


Figure 6.25: Editor Toolbar

In the start editing box, under source, select the Shareddata connection

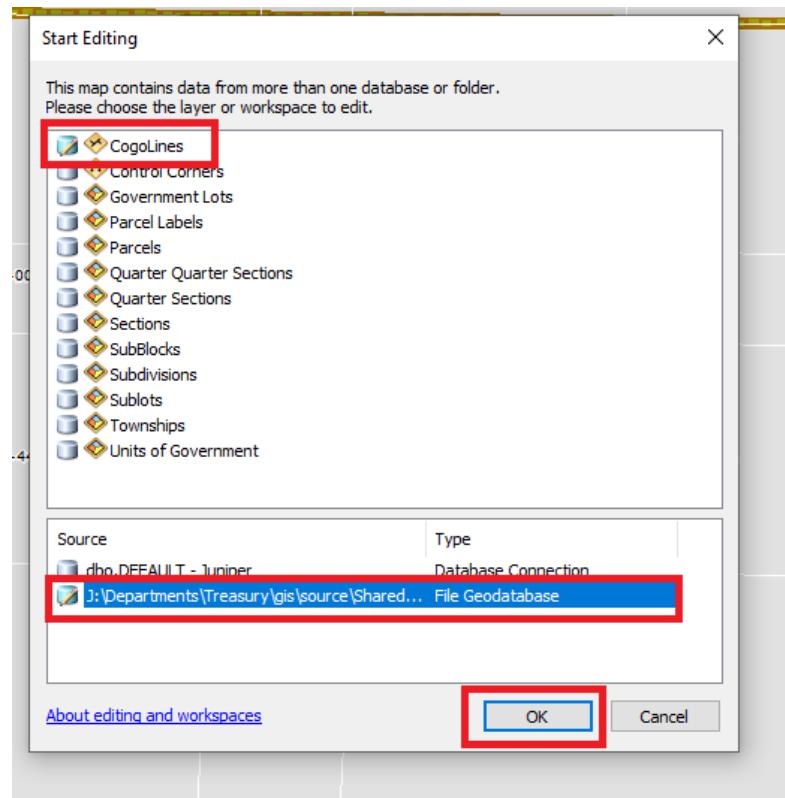


Figure 6.26: Start Editing

## Use the Traverse Tool on the COGO Toolbar

Once you have your starting point:

Push **Traverse** on the COGO toolbar

Push **Template** and select CogoLines

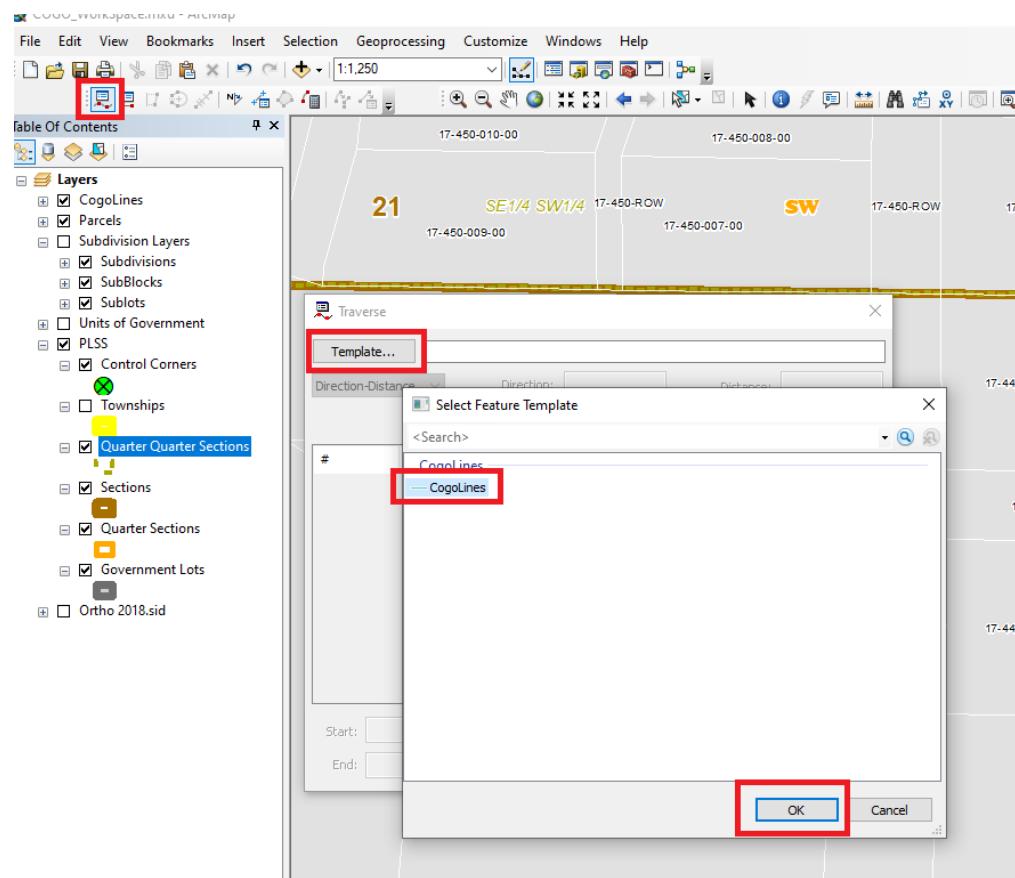


Figure 6.27: Launch COGO Toolbar

## Example Legal Description

Commencing at the South Quarter post of Section 17, Town 1 North, Range 15 West; thence South 88° 28' 49" East on the South section line, 654.51 feet to the West line of the East Half of the Southwest Quarter of the Southeast Quarter and the place of beginning of this description; thence North 00° 44' 38" East on said West line, 295.00 feet; thence South 88° 28' 47" East 295.36 feet; thence South 00° 42' 30" West parallel to the East line of the Southwest Quarter of the Southeast Quarter, 295.00 feet to the South section line; thence North 88° 28' 49" West on same, 295.54 feet to the place of beginning.  
Subject to any and all easements and restrictions of record, or otherwise. Subject to the rights of the public and of any governmental unit in any part thereof taken, used, or deeded for street, road, or highway purposes.

Figure 6.28: Sample Description

For this parcel, you can use the find tool to get to a nearby parcel or navigate to Lee Twp Section 17.

Once there, locate the South Quarter Post for the starting point for sketching.

## Select Starting Point for the Sketch

To the right of the Start box: Push 

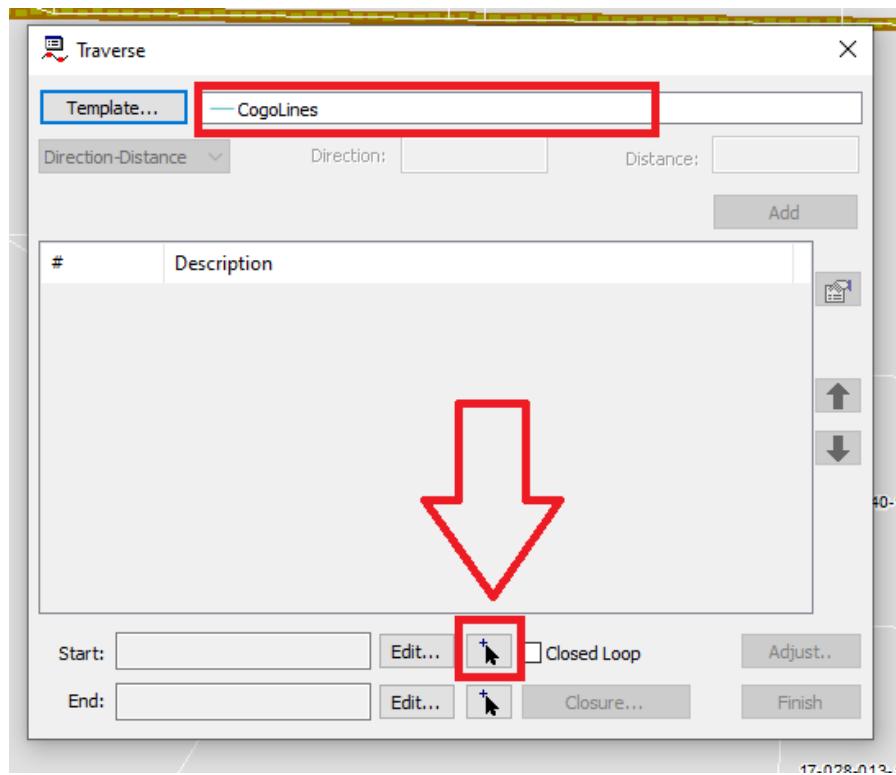


Figure 6.29: Start COGO

Click a starting point in the map

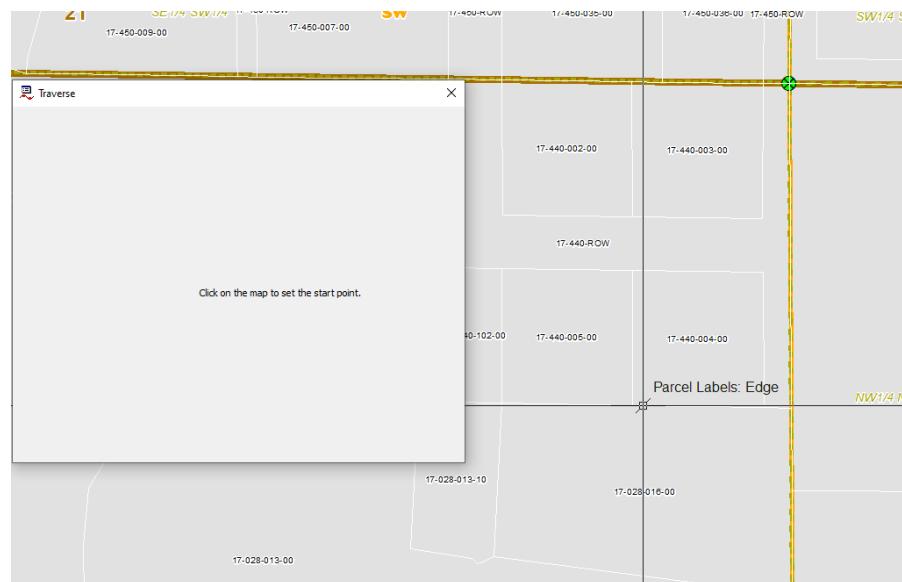


Figure 6.30: Click Starting Point

## Enter COGO Inputs

Enter direction and distance

Example:

From the South Quarter post of Section 17

**The entire traverse can be entered**

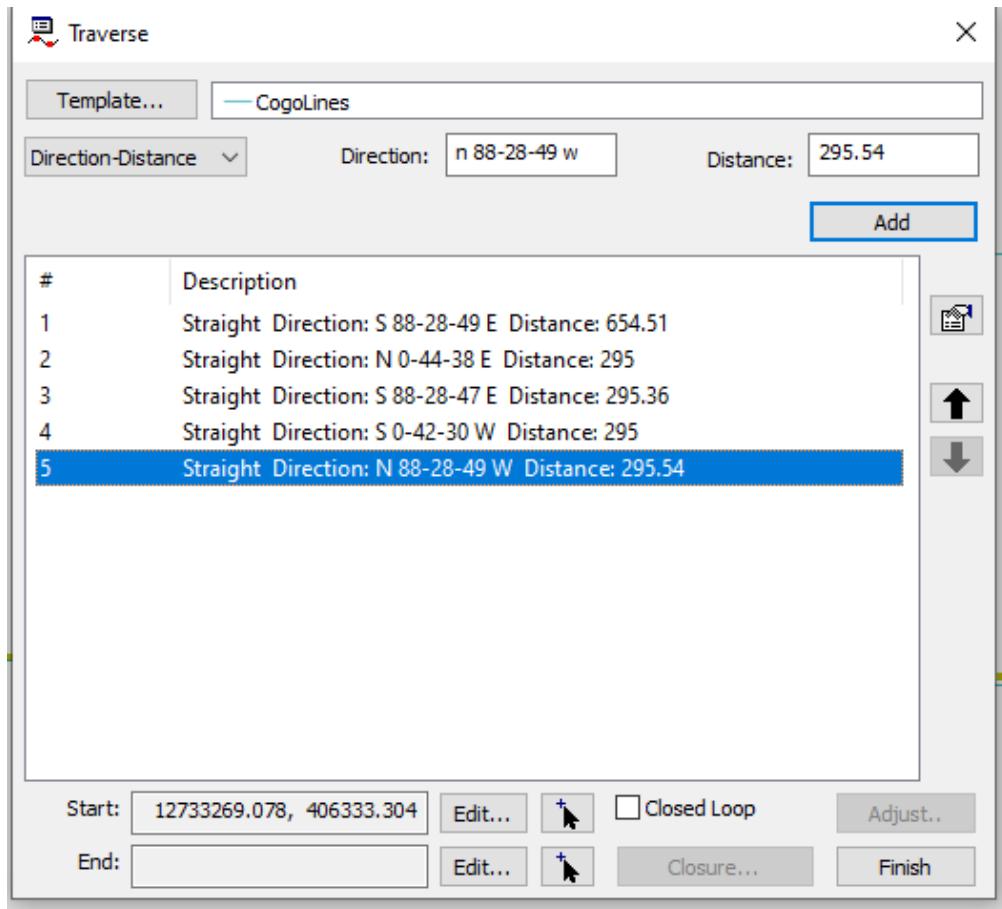


Figure 6.31: Sample Traverse

Push **Finish** and the lines are added to the data

## More Examples of Direction Distance Inputs

To go straight North:

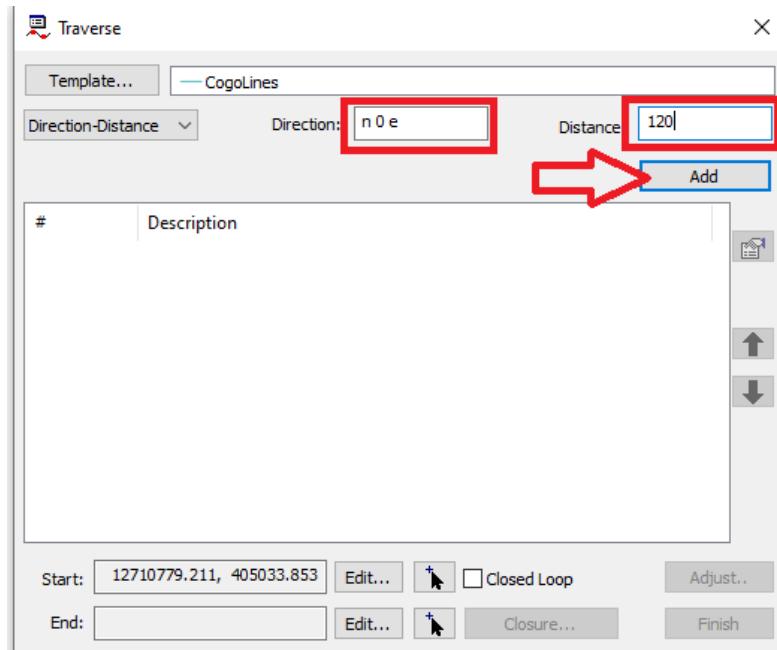


Figure 6.32: North Example Direction Distance

Push Add and the line is added to the sketch

Note that the sketch is only temporary at this point, lines can be reordered added and removed

## To go straight West:

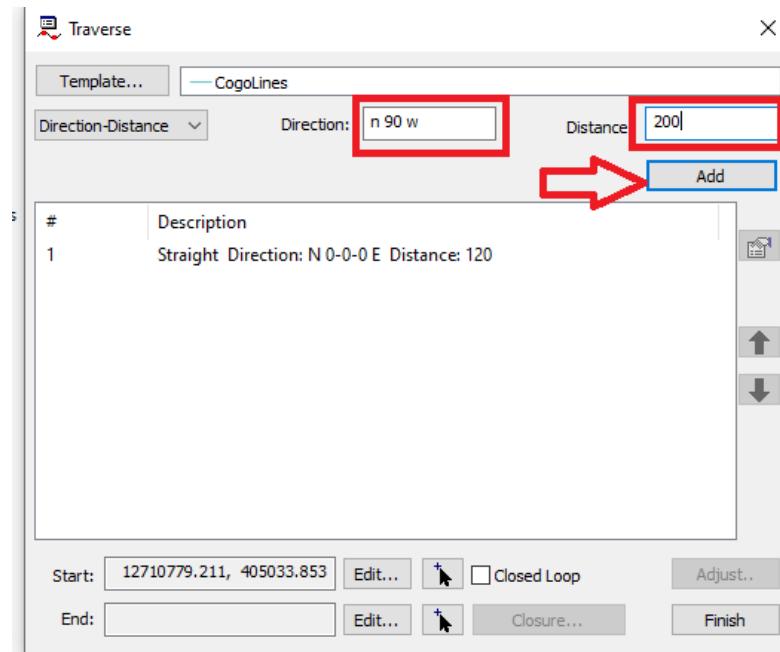


Figure 6.33: West Example Direction Distance

## To go straight South:

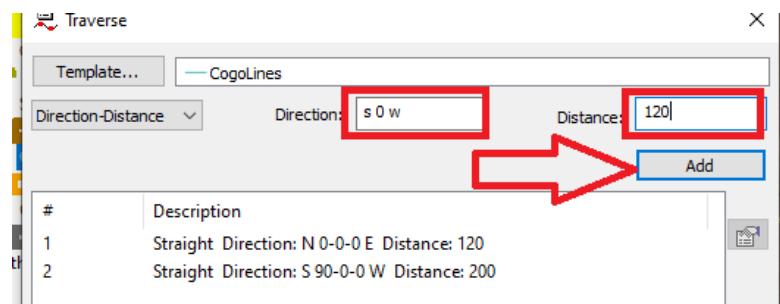


Figure 6.34: South Example Direction Distance

## To go straight East:

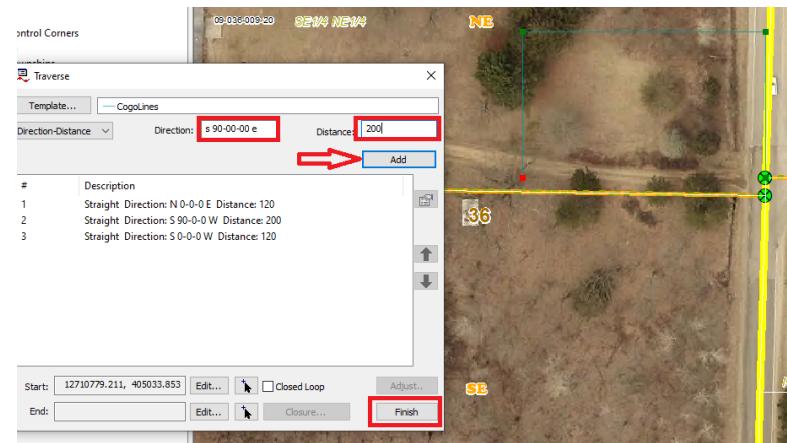


Figure 6.35: East Example Direction Distance

Note that anytime before you push finish you can add or remove lines and reorder lines

Push **Finish** and the lines are added to the data

## 6.5 GIS ADMINISTRATION

### Register a server with ArcGIS Server

#### Site Settings in Server Manager



Figure 6.36: Site Settings

## Add Fieldwork to Registered Databases

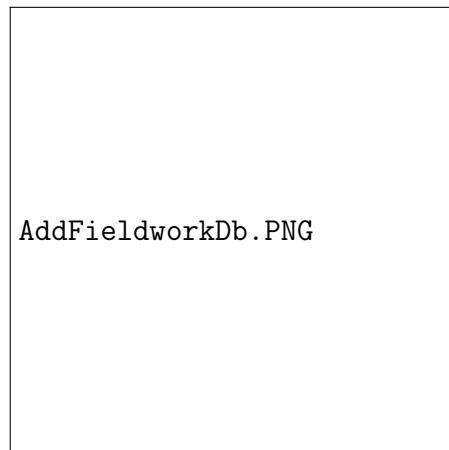


Figure 6.37: Add Fieldwork Database

## Register Database



Figure 6.38: Details of Registered Database

## 6.5.1 CONNECTING TO ARCGIS SERVER ADMIN DIRECTORY

### GENERATE A PORTAL TOKEN

#### Run the Python Script

```
import urllib, urllib2, json, ssl

username ="bmayxxx"
password = "gisRxxxxxxxxx"

tokenURL = 'https://gis.allegancounty.org/portal_webadaptor/sharing/#'
           'rest/generateToken/'

params = {'f': 'json', 'username': username, 'password': password, 'referer': '#'
          'https://portal.allegancounty.org'}
req = urllib2.Request(tokenURL, urllib.urlencode(params))
try:
    response = urllib2.urlopen(req)
except:
    gcontext = ssl.SSLContext(ssl.PROTOCOL_TLSv1)
    response = urllib2.urlopen(req, context=gcontext)
data = json.load(response)
token = data['token']
print(token)
```

[Copy the Portal Token](#)

---

## A R C G I S S E R V E R A D M I N L O G I N

### Login to Juniper

Windows R ➔ mstsc ➔ Juniper

### Connect to ArcGIS Server localhost

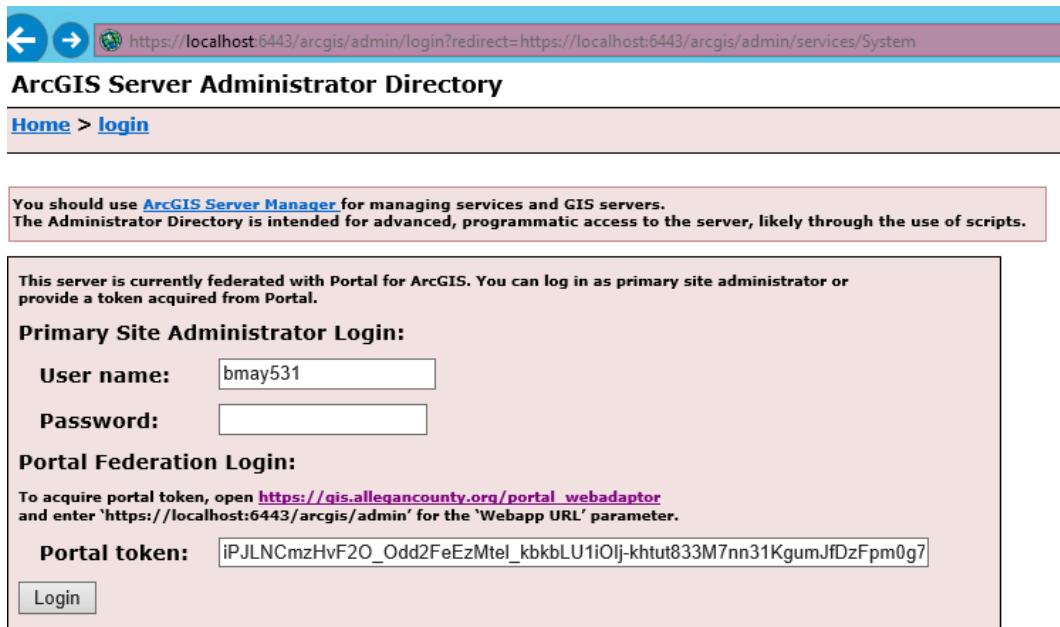
In a browser go to:

<https://localhost:6443/arcgis/admin/services/System>

UN: bmaxxxx

PW: gisRxxxxxxxxx

Paste in the Portal Token



Invalid credentials.

Figure 6.39: Login to Server Admin Directory

Push **Login**

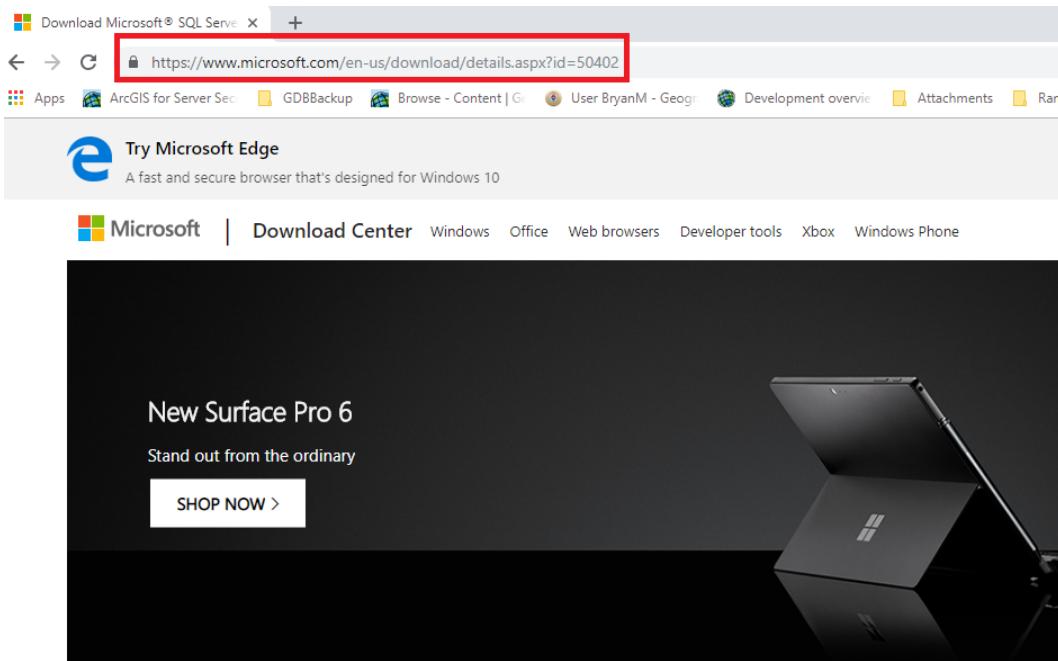
## 6.5.2 NEW CONNECTIONS IN ARCCATALOG

### INSTALL SQL SERVER ON CLIENT MACHINE

On client machine:

For any machine to connect to the Enterprise Geodatabase, SQL Server Native Client must be installed locally.

Search for sql server native client download on the internet



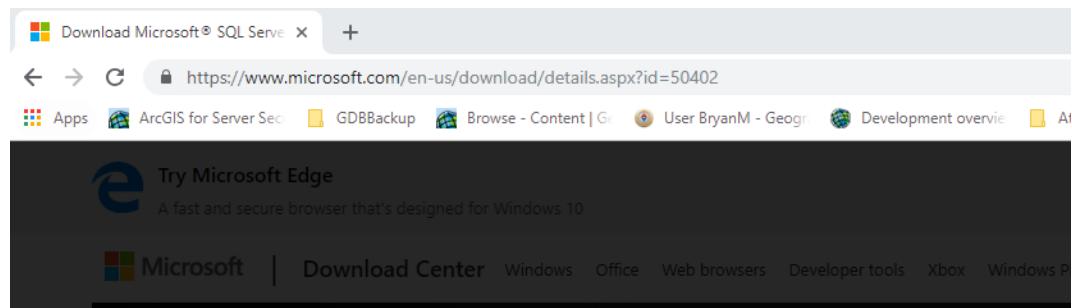
Microsoft® SQL Server® 2012 Native Client - QFE



Figure 6.40: SQL Server Client Search

## Select appropriate Version

Decide whether to get the 32bit or 64bit version



Choose the download you want

| File Name            |               | Size   |
|----------------------|---------------|--------|
| ENU\x64\sqlIncli.msi | For 64bit OS  | 4.8 MB |
| ENU\x86\sqlIncli.msi | For 32 bit OS | 3.0 MB |

Figure 6.41: SQL Server Client Search Choose

Download and Install

## CONNECT ARCGIS TO A SQL SERVER DATABASE

### In Catalog:

Double click on add database connection

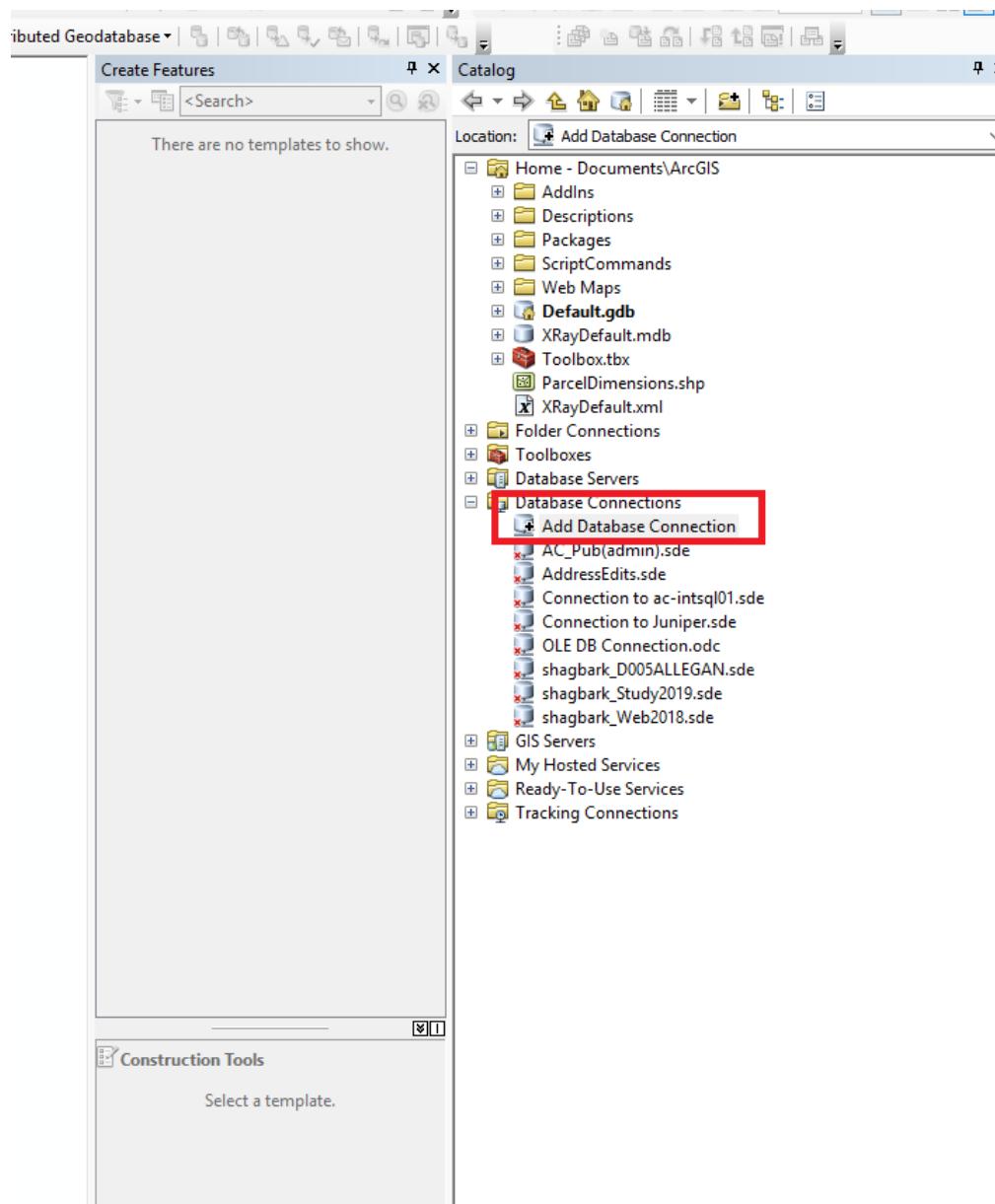


Figure 6.42: Catalog Add Db Connection

---

## NEW CONNECTION DIALOG

## Enter into the tool

- Select Database Platform
- Enter Instance Name
- Enter user name and password
- Check Save user name and password
- Select Database in dropdown

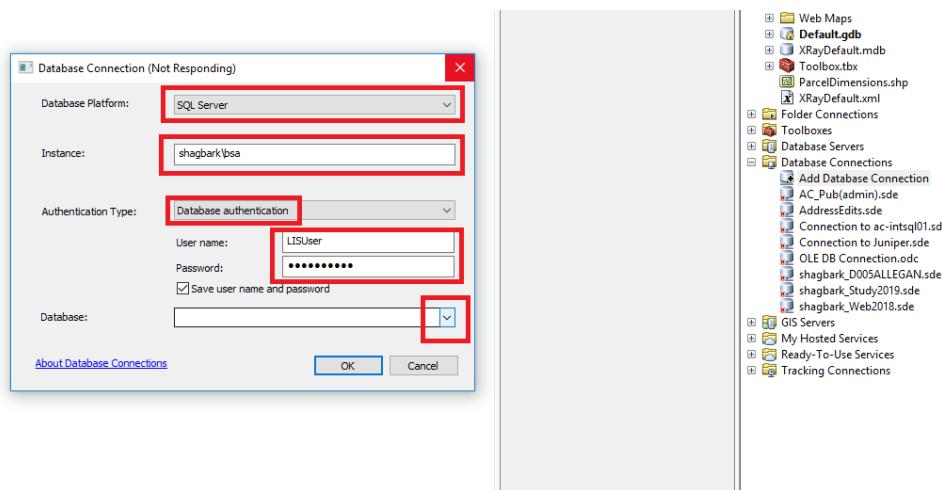


Figure 6.43: Catalog Add Database Connection

### 6.5.3 CREATE QUERY TO SQL DATABASE IN ARCGIS

#### ADD QUERY LAYER

In ArcMap:

Open the New Query Layer Dialog

Go to  $\Rightarrow$  File  $\Rightarrow$  Add Data  $\Rightarrow$  Add Query Layer In the connection dropdown select your connection

NOTE

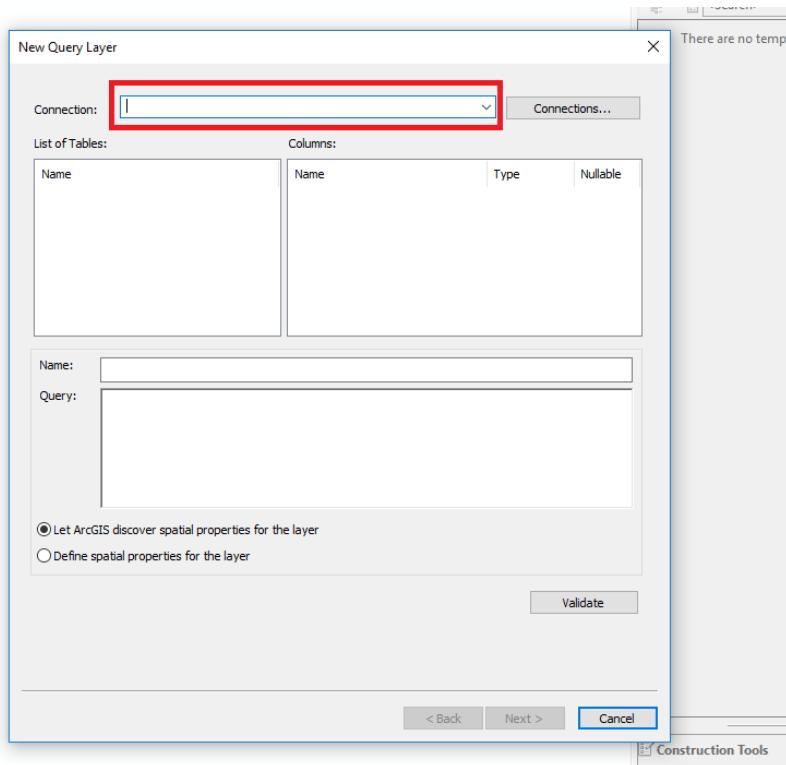


Figure 6.44: New Query Layer Dialog

## DETAILS OF THE QUERY LAYER

### Enter into the tool

- Choose connection
- Name the query
- Enter SQL query
- Press Next

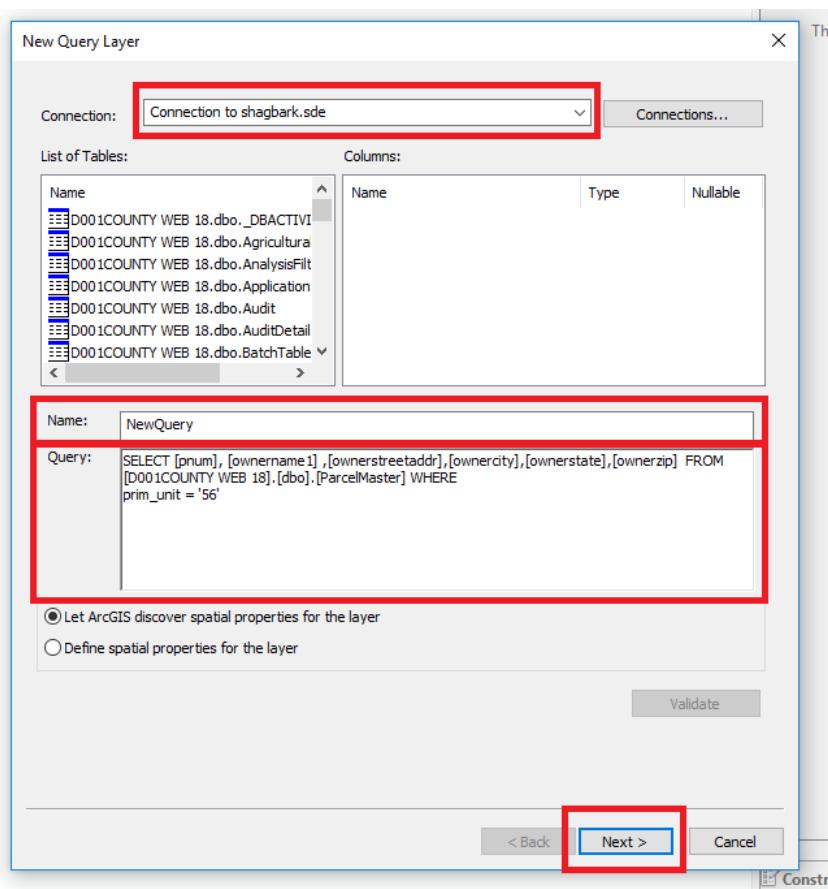


Figure 6.45: Query Layer Dialog Filled

## M O R E D E T A I L S O F T H E Q U E R Y L A Y E R

### Enter into the tool

- Select unique identifier field
- Click Finish

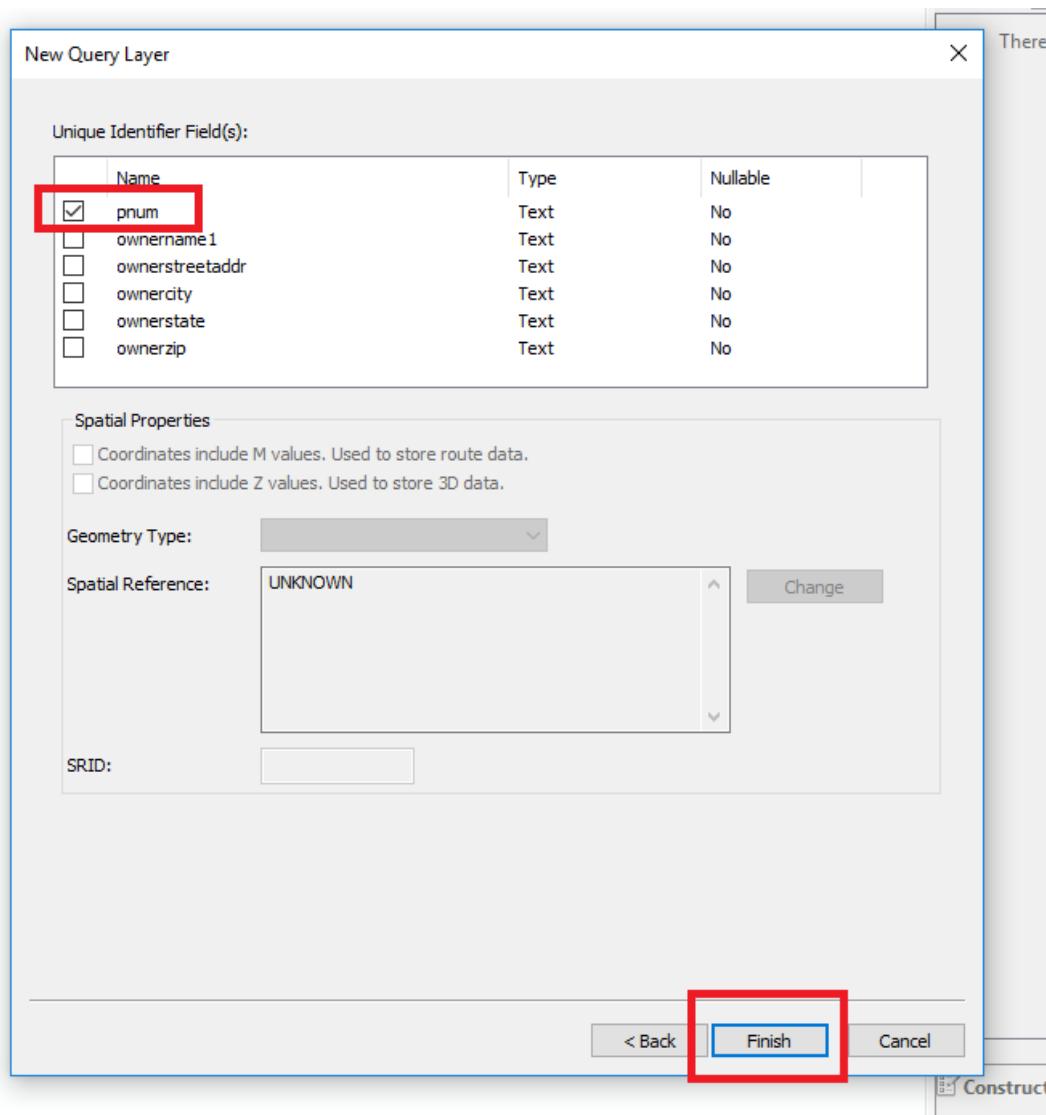
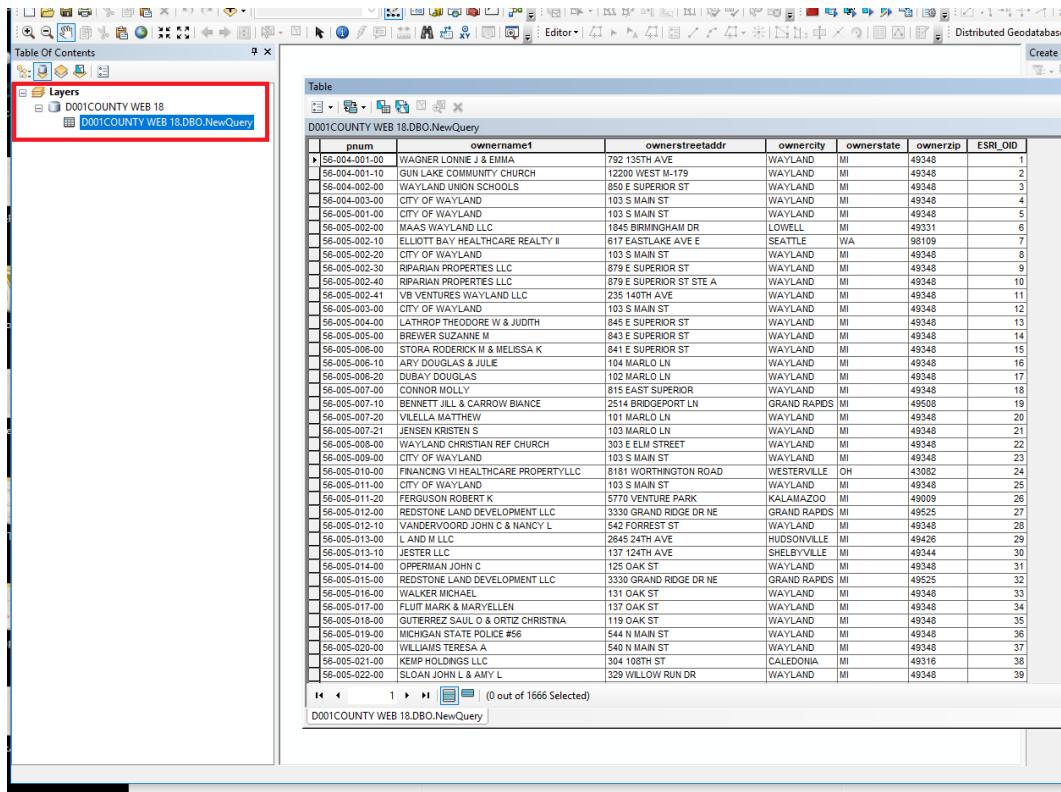


Figure 6.46: Select Unique Identifier

## OPEN RESULTS TABLE

### Verify the Query by Looking at the Table



The screenshot shows the ArcGIS Pro interface with the 'D001COUNTY WEB 18' project open. In the Table Of Contents pane, a red box highlights the 'Layers' section, which contains a folder named 'D001COUNTY WEB 18' and a feature layer named 'D001COUNTY WEB 18.DBO.NewQuery'. The main workspace displays a table titled 'Table' with the following columns:

| pnum          | ownername1                           | ownerstreetaddr         | ownercity    | ownerstate | ownerzip | ESRI_OID |
|---------------|--------------------------------------|-------------------------|--------------|------------|----------|----------|
| 56-004-001-00 | WAGNER LONNIE J & EMMA               | 792 135TH AVE           | WAYLAND      | MI         | 49348    | 1        |
| 56-004-001-10 | GUN LAKE COMMUNITY CHURCH            | 12200 WEST M-179        | WAYLAND      | MI         | 49348    | 2        |
| 56-004-002-20 | WAYLAND UNION SCHOOLS                | 850 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 3        |
| 56-004-003-00 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 4        |
| 56-005-001-00 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 5        |
| 56-005-002-00 | MAAS WAYLAND LLC                     | 1845 BIRMINGHAM DR      | LOWELL       | MI         | 49331    | 6        |
| 56-005-002-10 | ELLIOTT BAY HEALTHCARE REALTY II     | 617 EASTLAKE AVE E      | SEATTLE      | WA         | 98109    | 7        |
| 56-005-002-20 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 8        |
| 56-005-002-30 | RIPARIAN PROPERTIES LLC              | 879 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 9        |
| 56-005-002-40 | RIPARIAN PROPERTIES LLC              | 879 E SUPERIOR ST STE A | WAYLAND      | MI         | 49348    | 10       |
| 56-005-002-50 | VS VENTURES WAYLAND LLC              | 235 140TH AVE           | WAYLAND      | MI         | 49348    | 11       |
| 56-005-002-60 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 12       |
| 56-005-004-00 | ATHROP WOODCORE W & JUDITH           | 845 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 13       |
| 56-005-005-00 | SCHAFER SUSANNE M                    | 841 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 14       |
| 56-005-006-00 | STORA RODERICK M & MELISSA K         | 841 E SUPERIOR ST       | WAYLAND      | MI         | 49348    | 15       |
| 56-005-006-10 | ARY DOUGLAS & JULE                   | 104 MARLO LN            | WAYLAND      | MI         | 49348    | 16       |
| 56-005-006-20 | DUBAY DOUGLAS                        | 102 MARLO LN            | WAYLAND      | MI         | 49348    | 17       |
| 56-005-007-00 | CONNOR MOLLY                         | 815 EAST SUPERIOR       | WAYLAND      | MI         | 49348    | 18       |
| 56-005-007-10 | BENNETT JILL & CARROB BIANCE         | 2514 BRIDGEPORT LN      | GRAND RAPIDS | MI         | 49508    | 19       |
| 56-005-007-20 | VILLELLA MATTHEW                     | 101 MARLO LN            | WAYLAND      | MI         | 49348    | 20       |
| 56-005-007-21 | JENSEN KRISTEN S                     | 103 MARLO LN            | WAYLAND      | MI         | 49348    | 21       |
| 56-005-008-00 | WAYLAND CHRISTIAN REF CHURCH         | 303 E ELM STREET        | WAYLAND      | MI         | 49348    | 22       |
| 56-005-009-00 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 23       |
| 56-005-010-00 | FINANCING VI HEALTHCARE PROPERTY/LLC | 8181 WORTHINGTON ROAD   | WESTERVILLE  | OH         | 43082    | 24       |
| 56-005-011-00 | CITY OF WAYLAND                      | 103 S MAIN ST           | WAYLAND      | MI         | 49348    | 25       |
| 56-005-011-20 | FERGUSON ROBERT K                    | 5770 VENTURE PARK       | KALAMAZOO    | MI         | 49009    | 26       |
| 56-005-012-00 | REDSTONE LAND DEVELOPMENT LLC        | 3330 GRAND RIDGE DR NE  | GRAND RAPIDS | MI         | 49525    | 27       |
| 56-005-012-10 | VANDERVOORD JOHN C & NANCY L         | 542 FORREST ST          | WAYLAND      | MI         | 49348    | 28       |
| 56-005-013-00 | L AND M LLC                          | 2645 24TH AVE           | HUDSONVILLE  | MI         | 49426    | 29       |
| 56-005-013-10 | JESTER LLC                           | 137 124TH AVE           | SHELBYVILLE  | MI         | 49344    | 30       |
| 56-005-014-00 | OPPERMAN JOHN C                      | 125 OAK ST              | WAYLAND      | MI         | 49348    | 31       |
| 56-005-015-00 | REDSTONE LAND DEVELOPMENT LLC        | 3330 GRAND RIDGE DR NE  | GRAND RAPIDS | MI         | 49525    | 32       |
| 56-005-016-00 | WALKER MICHAEL                       | 131 OAK ST              | WAYLAND      | MI         | 49348    | 33       |
| 56-005-017-00 | FLUIT MARK & MARYELLEN               | 137 OAK ST              | WAYLAND      | MI         | 49348    | 34       |
| 56-005-018-00 | GUTIERREZ SAUL & ORTIZ CHRISTINA     | 119 OAK ST              | WAYLAND      | MI         | 49348    | 35       |
| 56-005-019-00 | MICHIGAN STATE POLICE #58            | 544 N MAIN ST           | WAYLAND      | MI         | 49348    | 36       |
| 56-005-020-00 | WILLIAMS TERESA A                    | 540 N MAIN ST           | WAYLAND      | MI         | 49348    | 37       |
| 56-005-021-00 | KEMP HOLDINGS LLC                    | 304 108TH ST            | CALEDONIA    | MI         | 49316    | 38       |
| 56-005-022-00 | SLOAN JOHN L & AMY L                 | 329 WILLOW RUN DR       | WAYLAND      | MI         | 49348    | 39       |

(0 out of 1666 Selected)

D001COUNTY WEB 18.DBO.NewQuery

Figure 6.47: Query Results Table

## 6.5.4 ENTERPRISE GEODATABASE MAINTENANCE

### ENTERPRISE GEODATABASE COMPRESSION ROUTINE

#### Disconnect All Users

To disconnect the GIS Server, stop all services

- In ArcGIS Server Manager ⇒ Site ⇒ GIS Server ⇒ Machines ⇒ Stop all Services

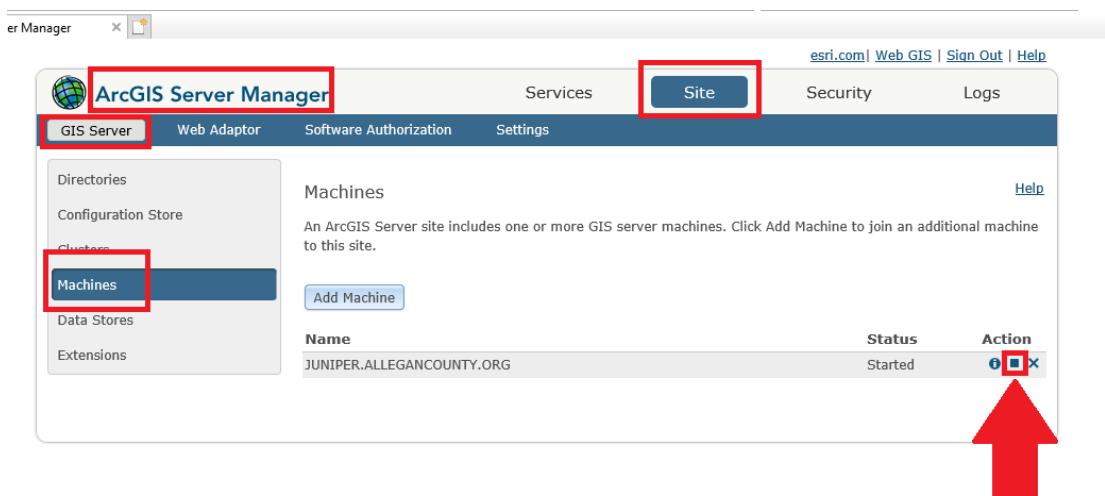


Figure 6.48: Stop ArcGIS Server

Use the Search tool to find the Rebuild Indexes Tool

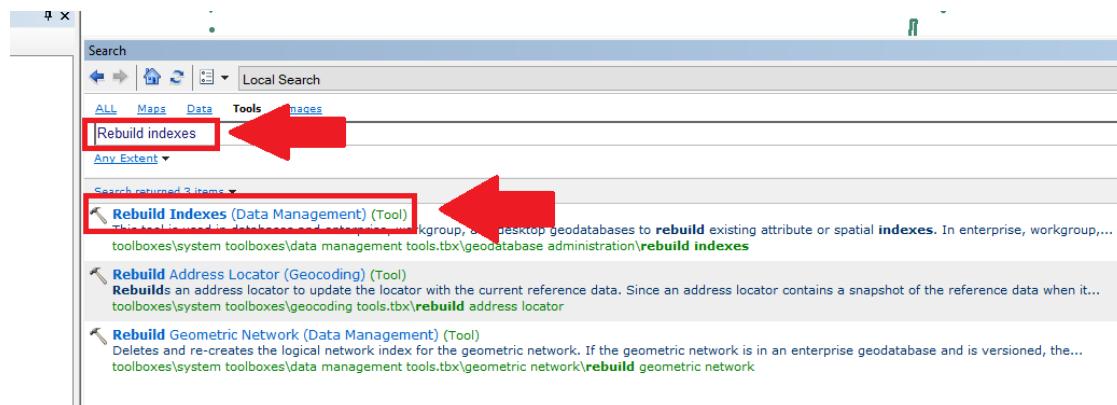


Figure 6.49: Find Rebuild Indexes Tool

## Rebuild Indexes

Select Connection ⇒ Include System Tables ⇒ Select All ⇒ Press OK

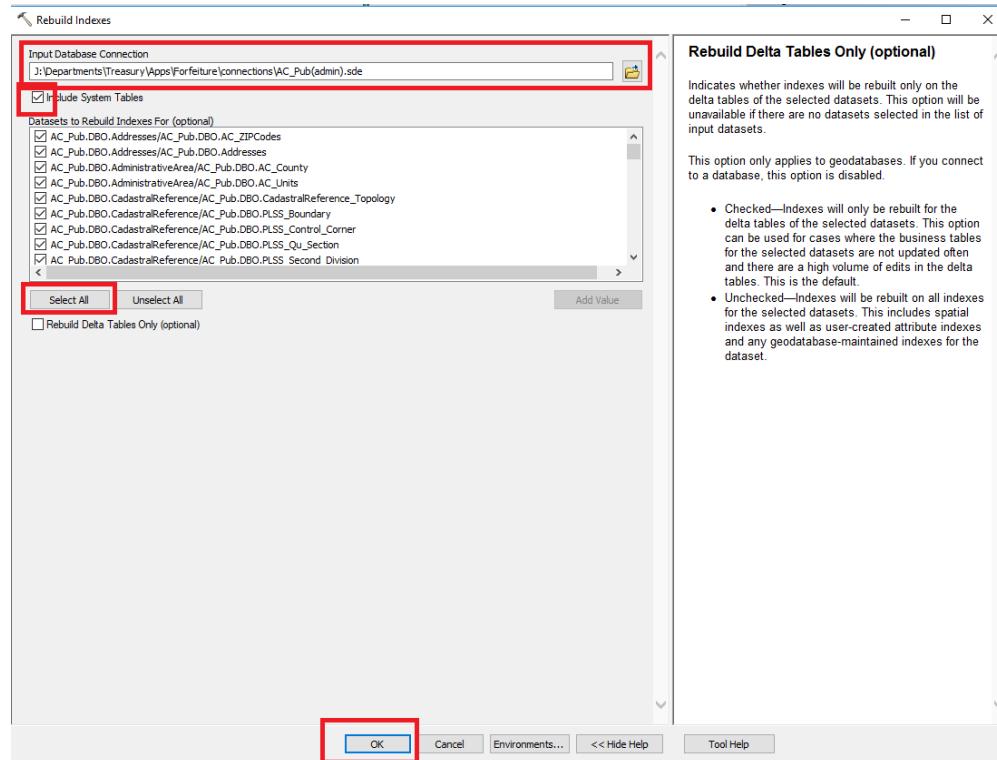


Figure 6.50: Rebuild Indexes Tool Operation

## Recalculate Statistics

In the Analyze Datasets Tool:

Select Connection ⇒ Include System Tables ⇒ Select All ⇒ Press OK

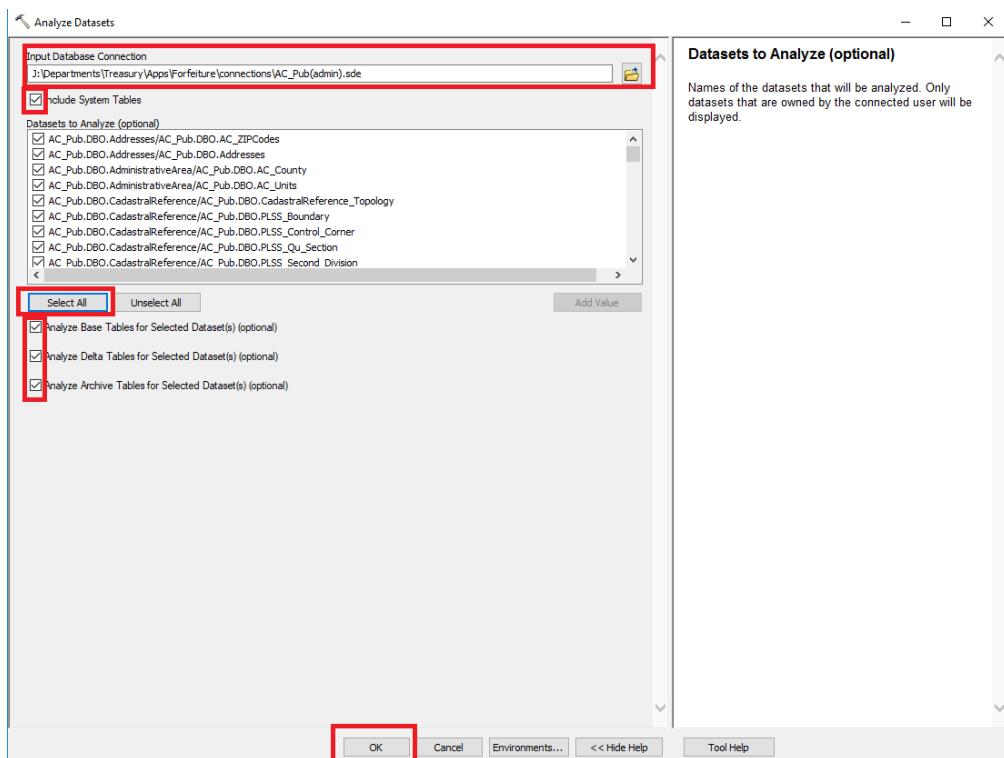


Figure 6.51: Recalculate Statistics

## Compress

Select Connection ⇒ Press OK

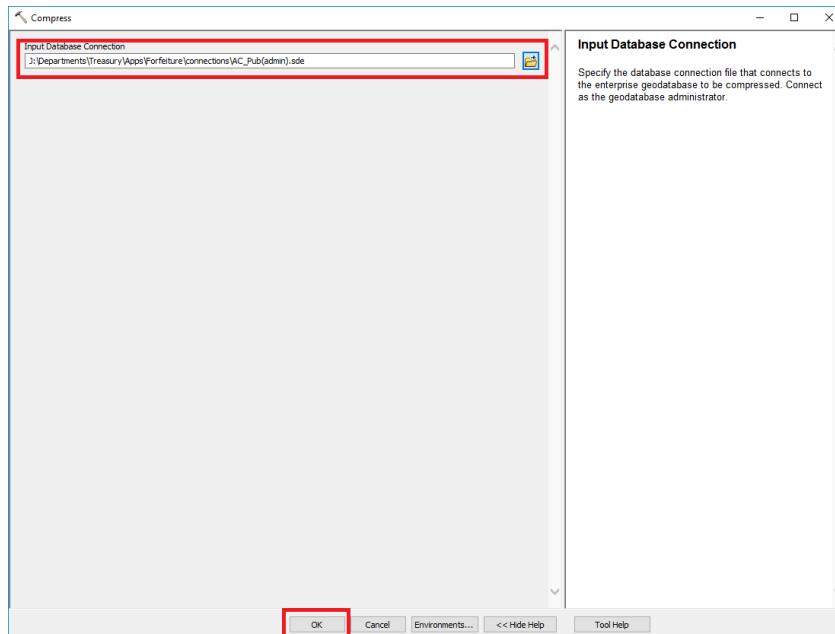


Figure 6.52: Compress

## Rebuild Indexes Again

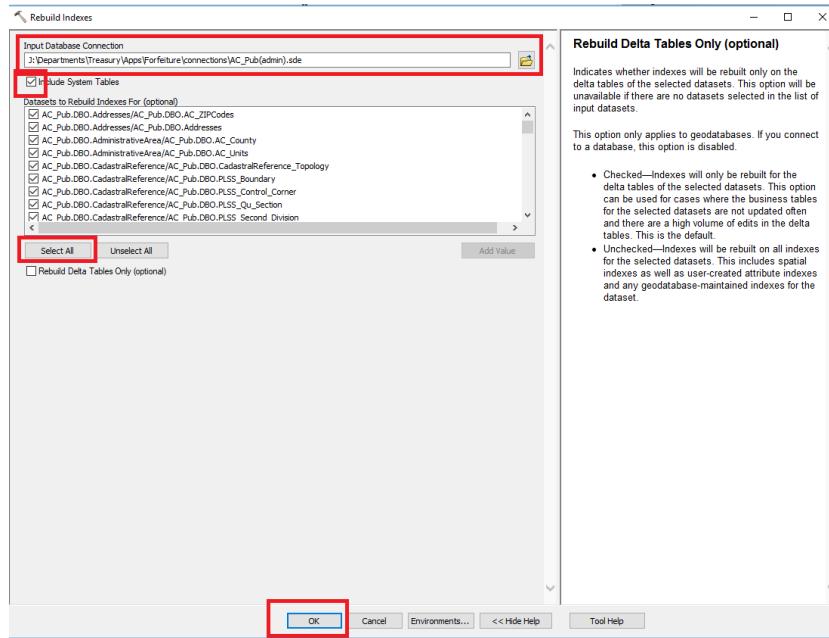


Figure 6.53: Rebuild Indexes Tool Operation

## Recalculate Statistics Again

In the Analyze Datasets Tool:

Select Connection ⇒ Include System Tables ⇒ Select All ⇒ Press OK

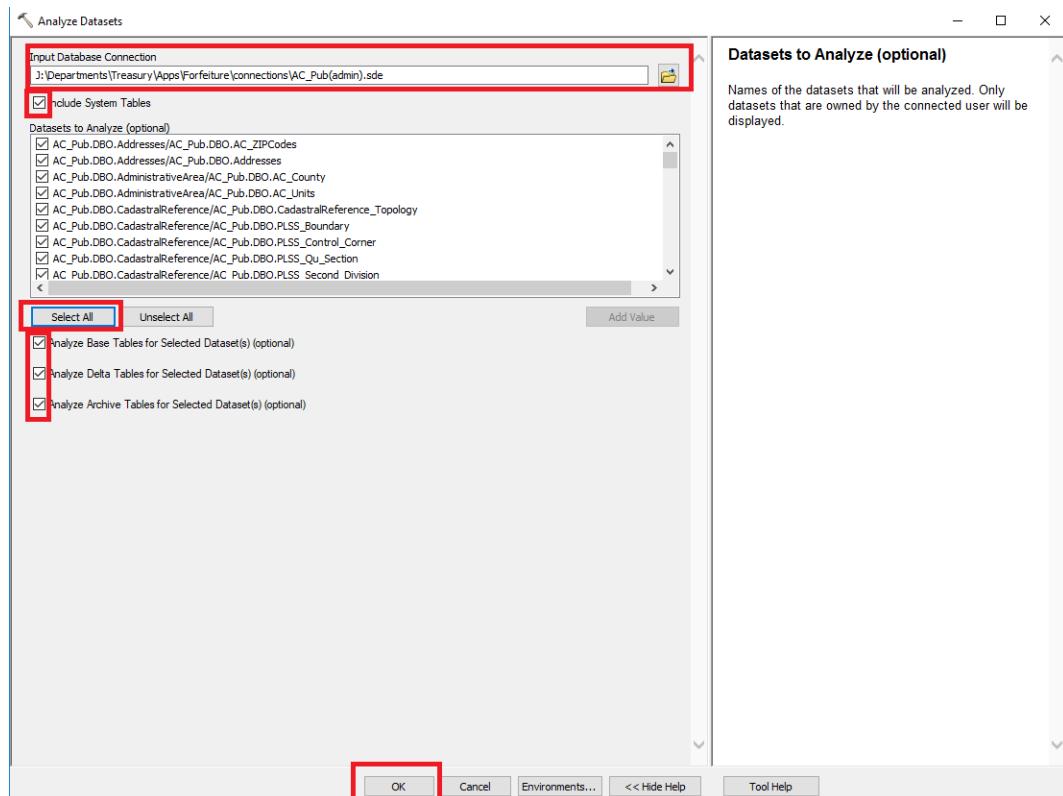


Figure 6.54: Recalculate Statistics

ENTERPRISE GEODATABASE  
PERFORMANCE TROUBLESHOOTING

## Editing Is Slow In a Specific Feature Dataset

This list of steps worked to improve performance in the ParcelEditing Feature Dataset. Note the highlighted steps are suspected to be important and discussed further here.

- Compress GDB
- Analyze Dataset
- Unregister Replicas
- Compress GDB
- **Unversion Dataset**
- **Restart the SQL Server**
- Delete Topology
- Recreate Topology
- **Register dataset as versioned**

## Unregister As Versioned

With all users disconnected

- In Catalog ⇒ ACPro ⇒ Problem Dataset ➔ Manage ⇒ Unregister As Versioned

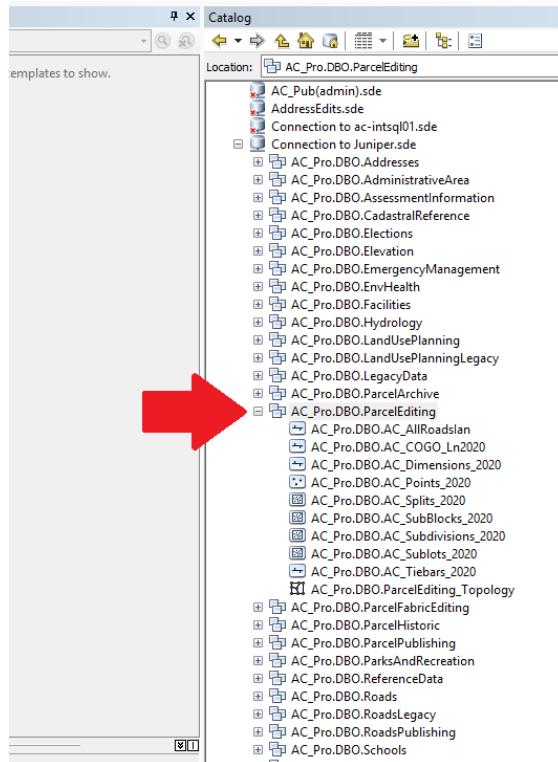


Figure 6.55: Unregister FDS as Versioned

## Restart the SQL Server

➢ In SQL Server Management Studio  Juniper ⇒ restart

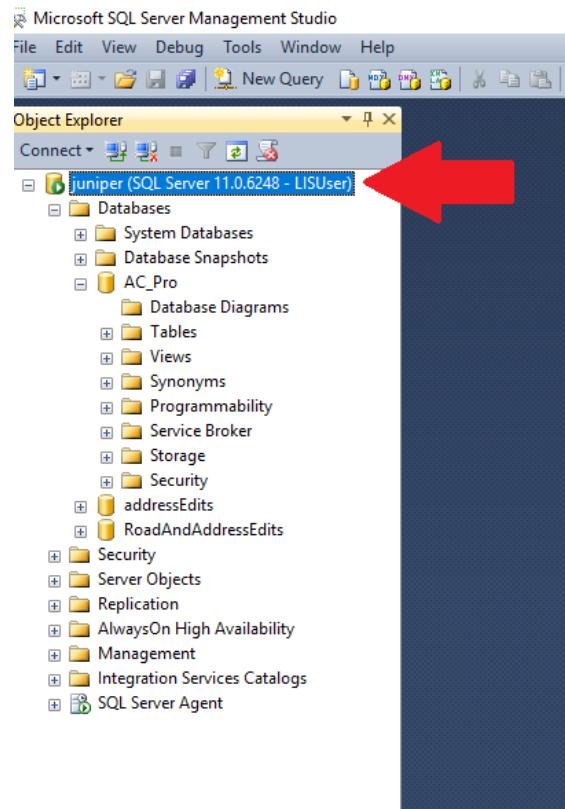


Figure 6.56: Restart SQL Server

## Register the FDS as Versioned

- In Catalog ⇒ ACPro ⇒ Problem Dataset ➔ Manage ⇒ Register As Versioned

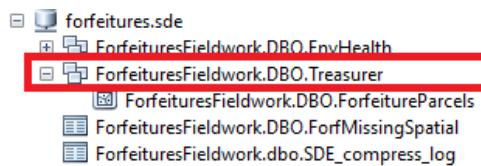


Figure 6.57: Register FDS as Versioned

### 6.5.5 MANAGING MAP SERVICES

#### TO STOP ARCGIS SERVER

## Launch ArcGIS Server Manager

Site ⇒ GIS Server ⇒ Machines ⇒ Stop the Server

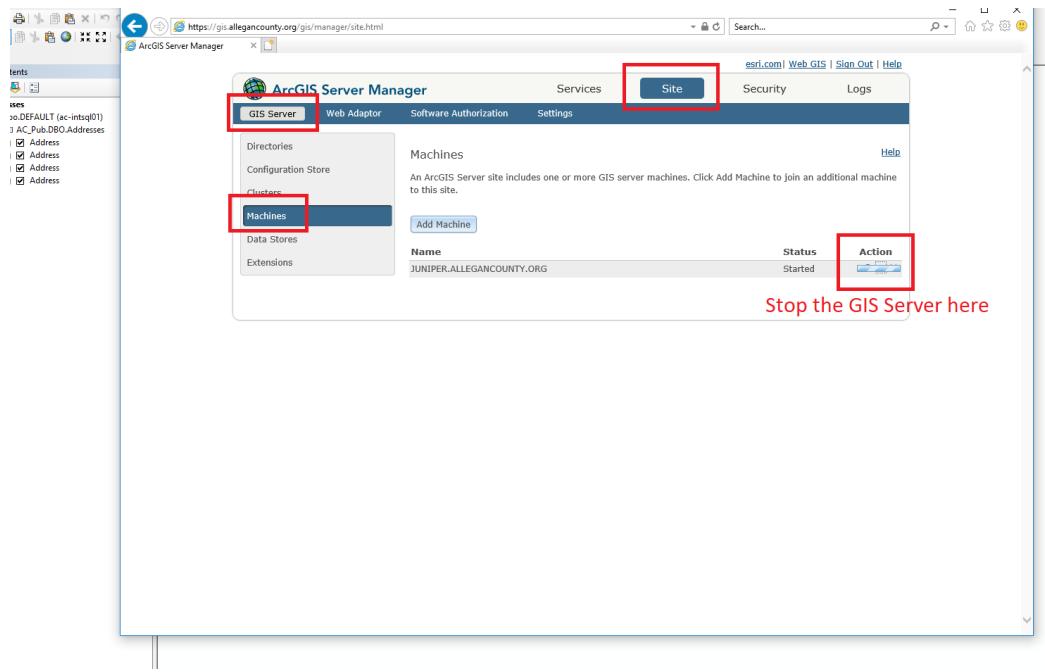


Figure 6.58: Stop the GIS Server

## F I X I N G D A M A G E D S E R V I C E S

### Error:

Service is currently being configured by another administrative operation

### Remedy:

This tech support article applies:

<https://support.esri.com/en/technical-article/000015549>

There are at least 2 ways to fix:

- Use the ArcGIS Server Account Utility
- Remove Lock Files

### Use the ArcGIS Server Account Utility

#### Access the GIS Server

To Log in to Juniper

windows R ⇒ mstsc

⇒ juniper

Use personal network credentials

---

## On the GIS Server (Juniper)

In Windows Search, find:

Configure ArcGIS Server Account  
Utility

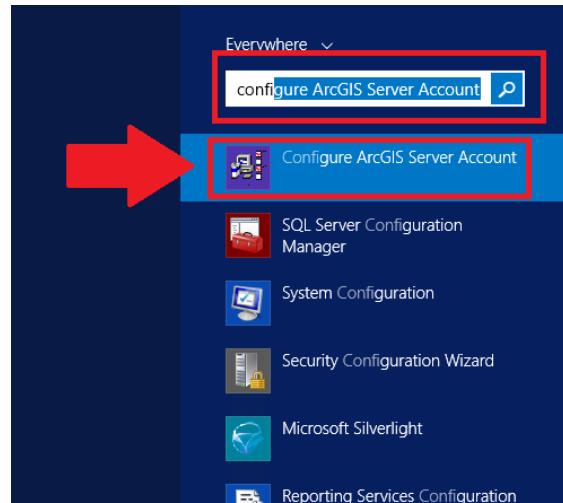


Figure 6.59: ArcGIS Server Account Utility

Use credentials:

PW: @lleganGxxxxxx

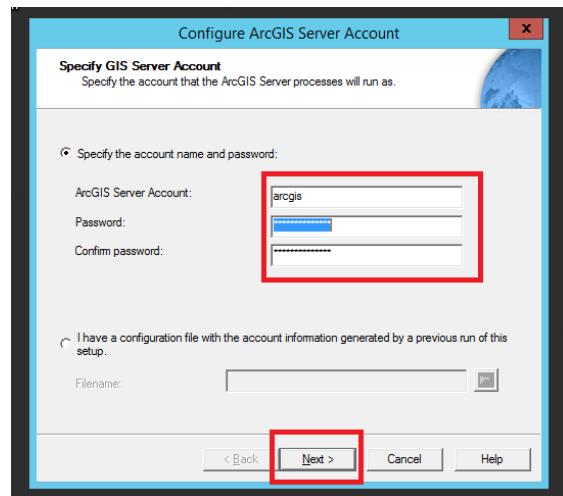


Figure 6.60: Account Utility Login

In the utility, paste these paths:

C:\arcgisserver\directories  
C:\arcgisserver\config-store  
C:\arcgisserver\logs

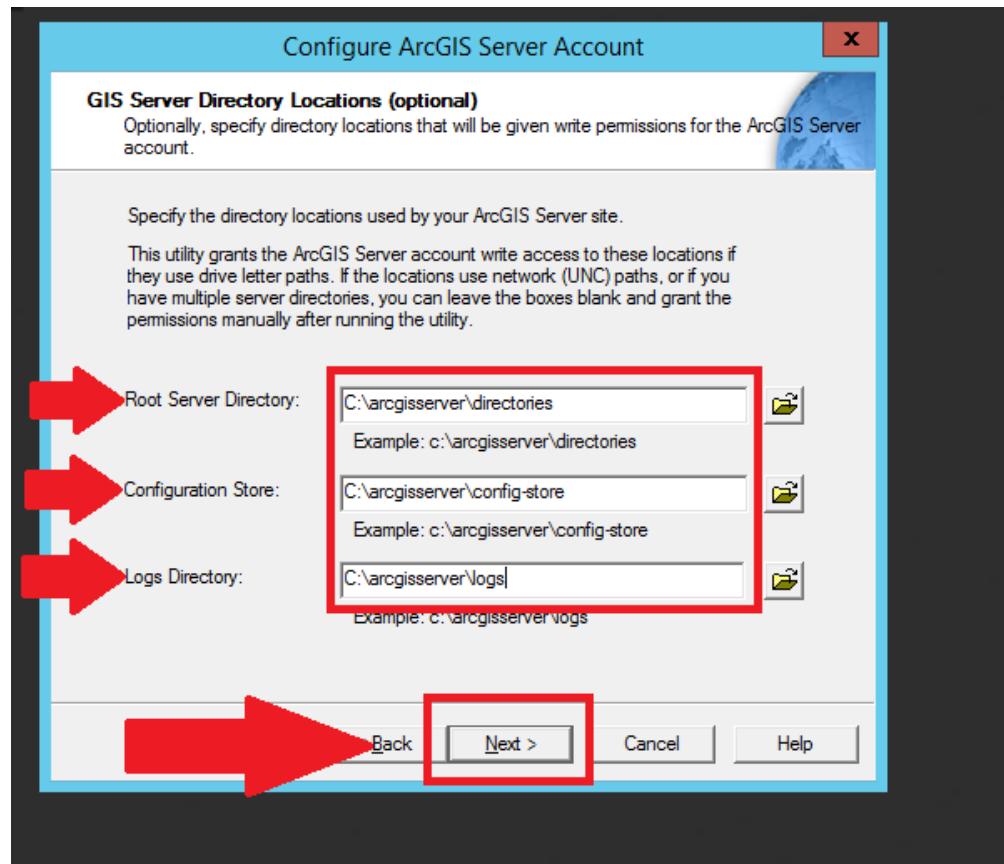


Figure 6.61: GIS Directory Locations Filled

Push **Next**

Select option **Do not export Configuration File**

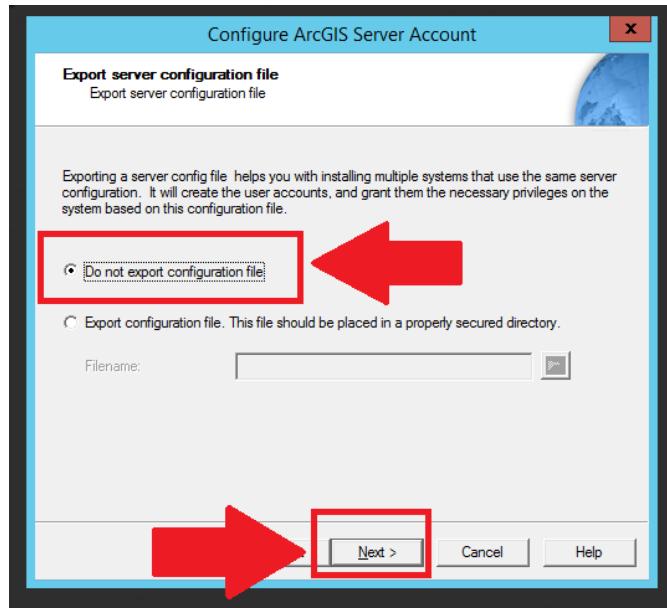


Figure 6.62: Do not Export Config File

Push **Next**

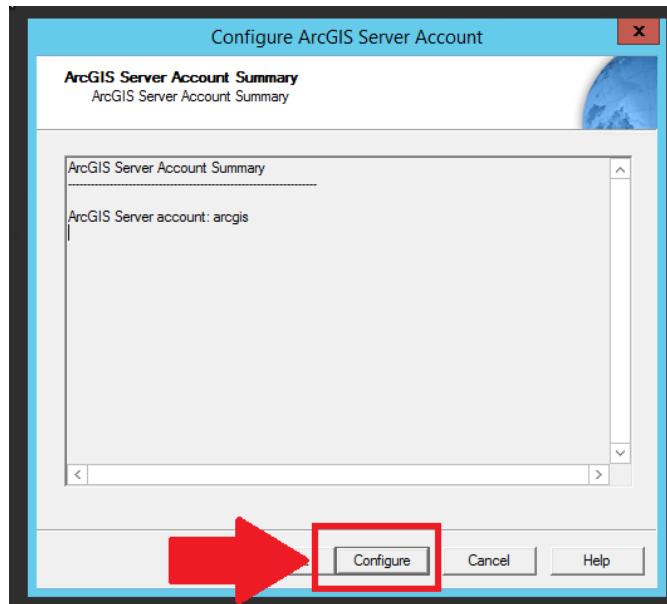


Figure 6.63: Configure Account

Push **Configure**

While the tool runs, open the service manager

In Windows Search, find: **Service Manger**

Launch **Service Manger** When the tool completes,

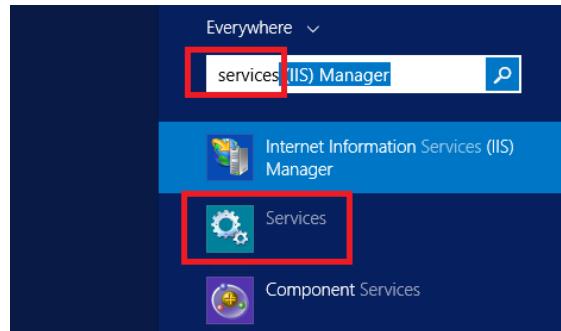


Figure 6.64: Search For Service Manager

Push **Finish**

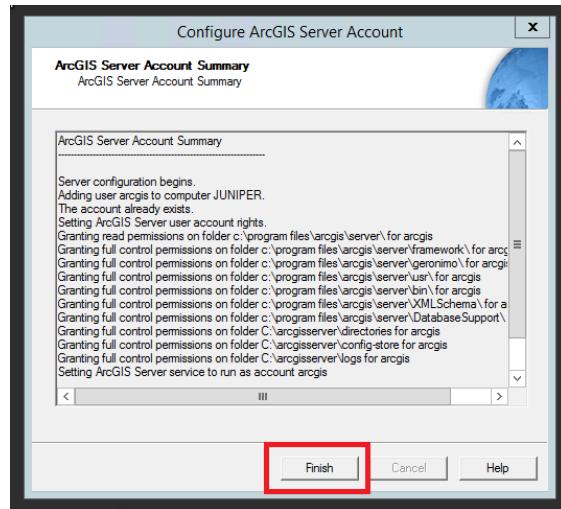


Figure 6.65: Finish On Configure

## Services Manager

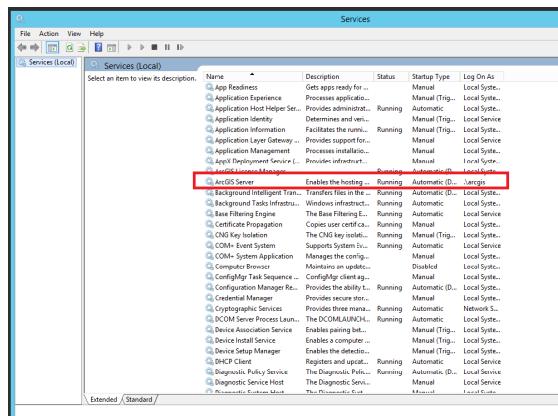


Figure 6.66: Open Services Manager

In services, select the ArcGIS Server service and restart the service. (Randy had to do this)

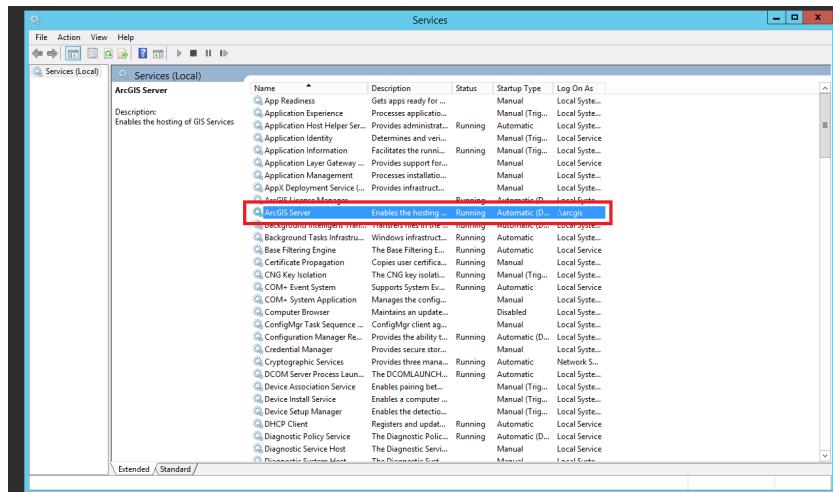


Figure 6.67: arcGis Service In Services Manager

## Quick and dirty fix

When a service get hung up in som admin process, you may get an error like:

### Error:

**Service is currently being configured by another administrative operation**

### Removing Lock Files

This may work, here is a blog about it

<https://community.esri.com/thread/103710> Network location for an example service

```
on juniper
C:\arcgisserver\config-store\services\ParcelViewer2\
PV2Adresses.MapServer\startup\JUNIPER.ALLEGANCOUNTY.ORG
```

Suggested Steps:

- 1) stop arcgis server services.
- 2) delete the lock files (\*.glock and \*.rlock )  
(in arcgisserver\config-store).
- 3) restart arcgis server service.
- 4) stop the pending stopping service and then start it.

mapservices would not stop so I try this:

<https://support.esri.com/en/technical-article/000012685>

Check permission levels for the arcGIS account ArcGisServerPermissions.PNG

---

If necessary, add the arcgis user to the permissions on the folders ArcGisServer-PermissionsAddUser.PNG

## 6.5.6 MANAGING GEODATABASE REPLICAS

### ADDING A NEW FEATURE CLASS TO A REPLICATOR

Source: <https://support.esri.com/en/technical-article/000010345>

#### Summary

Currently, there is no out-of-the-box tool to add a feature class to an existing replica. With ArcGIS Desktop, one must either recreate the replica or if the workflow allows, replicate the new feature class as a separate replica.

#### Steps:

The steps below outline how to recreate the replica using the Register Existing Data option in Desktop. These steps can be applied to both one-way and two-way replicas.

- Synchronize the changes between parent and child replica geodatabases using the existing replica so that the data is identical in each database, then Unregister the replica in both geodatabases. For two-way replicas, ensure that changes are synchronized in both directions and there are no outstanding edits before unregistering the replica.
- Create or import the new feature class into the parent geodatabase, and add the GlobalID.
- Register the newly added data as versioned.
- Copy and paste the new feature class to the child geodatabase using ArcCatalog.
- Note: that the GlobalIDs must have already been added to the feature class.
- For two-way replica or one-way full model, register the newly added data in child geodatabase as versioned.
- Using the parent geodatabase, add all the data that is to be replicated to a map in ArcMap.
- Click the 'Create Replica' tool on the Distributed Geodatabase toolbar.
- Select 'One way replica' or 'Two way replica' and click Next.
- Select 'Register existing data only'.
- Select the child geodatabase and specify a replica name.

- Click Next and click Finish.
- A new replica is created that includes the new data.

## 6.5.7 MANAGING GEODATABASE VERSIONS

### VERSION QUERIES

## SQL Queries

Four queries of SDEversions, SDEstates, sdestatelineages, and SDEcompresslog

```
use AC_Pub
select name, owner, version_id, state_id, parent_name
, parent_owner from
[AC_Pub].[dbo].[SDE_versions]
select * from [AC_Pub].[dbo].[SDE_states] order by state_id
select * from [AC_Pub].[dbo].[sde_state_lineages] order
by lineage_name,
lineage_id
select TOP(5) * from [AC_Pub].[dbo].[SDE_compress_log] order by
compress_end DESC
```

Query of SDEversions and SDEstates

```
use AC_Pub
SELECT v.version_id,v.creation_time,v.creation_time,
s.state_id, s.creation_time
FROM SDE_versions v
INNER JOIN SDE_states s ON v.state_id = s.state_id
```

---

## FINDING ORPHANED VERSIONS

### Remove orphaned versions

Follow the procedure: [Link to source](#)

Use SQL Server Management Studio to execute two queries and compare the results.

#### Step 1:

Execute the query:

```
use AC_Pub
SELECT ObjectID, name from dbo.GDB_ITEMS where
TYPE='4ED4A58E-621F-4043-95ED-850FBA45FCBC';
```

#### Step 2:

Execute the query:

```
use AC_Pub
SELECT name from [dbo].[SDE_versions]
order by name
```

---

Compare the tables

This graphic summarizes elements of the queries. Note the items from step two

```

use AC_Pub
SELECT ObjectId, name from dbo.GDB_ITEMS where TYPE='4ED4A58E-621F-4043-95ED-850FBA45FCBC';

```

code for versions  
in gdbItems

```

use AC_Pub
SELECT name from [dbo].[SDE_versions]
order by name

```

| ObjectID | name                           |
|----------|--------------------------------|
| 1 16497  | ProtoPubParcelPubReplica       |
| 2 16520  | ProtoPubLandUsePlanningReplica |
| 3 17074  | SchoolsReplica                 |
| 4 17542  | ElReplica                      |
| 5 17893  | EmergencyMgmt                  |
| 6 19929  | AddressesReplica               |
| 7 40149  | EnvHealthReplica               |

Matches

| name                           |
|--------------------------------|
| 1 CAddress_TablesToVersionPart |
| 2 DEFAULT                      |
| 3 JMone_TablesToVersionPart    |
| 4 SYNC_SEND_17893_0            |
| 5 SYNC_SEND_40559_12           |
| 6 SYNC_SEND_40965_7            |

No Matches

replica ID

generation #

Figure 6.68: Find Orphan Versions

that have no match in step one.

Orphaned versions can be removed by name in ArcGIS

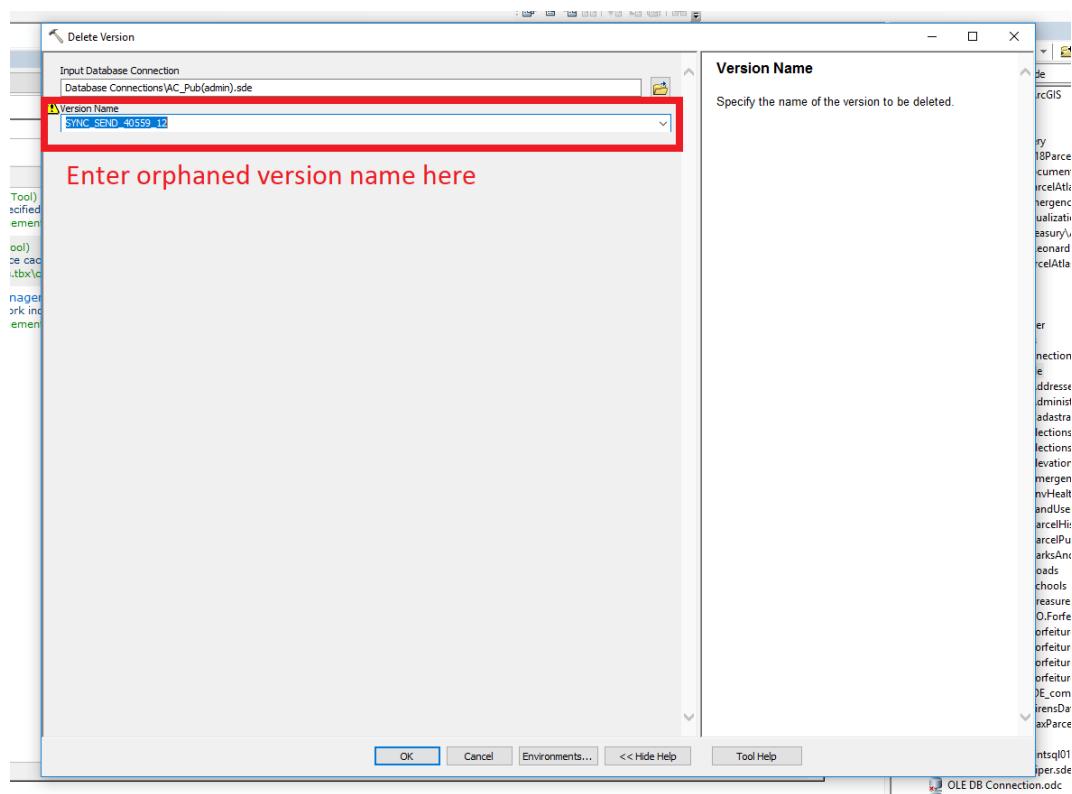


Figure 6.69: Delete Orphan Versions

## 6.5.8 MXD MANAGEMENT

### FIND / REPLACE TEXT OBJECT

#### Python Code

Python Code for finding and replacing a text object in a ArcGIS .mxd file. A snippet of this code may be found in the LayerUpdates/Zoning/processing folder. It is used to edit the .mxd files located there.

```
import arcpy
from arcpy import env

env.workspace = r"J:\Apps\Python\LayerUpdates\zoning\processing"
for mxdname in arcpy.ListFiles("*.mxd"):
    print mxdname
    mxd = arcpy.mapping.MapDocument(r"J:\Apps\Python\
        LayerUpdates\zoning\processing\" + mxdname)
    for elm in arcpy.mapping.ListLayoutElements
        (mxd, "TEXT_ELEMENT"):
        if elm.text.startswith('As ammended'):
            elm.text = elm.text.replace('As ammended',
                'As amended')
            print elm.text
    mxd.save()
del mxd
```

## 6.6 LATEX PACKAGES USED BY AGGIS

### 6.6.1 COMMON ERRORS

Source:

<https://www.ocf.berkeley.edu/~latex/files/commonerrors.tex>

If you have every compiled a  $\text{\LaTeX}$  document, chances are high you have received a few error messages. Sometimes they come from something as stupid and as easy to fix as forgetting a parenthesis or forgetting to end an environment. There are also a lot more cases where you have no idea what you have done wrong and it takes you a long time to find or even understand your error.

The purpose of this is to explain some of the common errors that may happen when compiling a  $\text{\LaTeX}$  document and suggestions for what is probably going on and how to debug your document.

### THE FORM OF AN ERROR

There are two forms of errors:  $\text{\LaTeX}$  errors and  $\text{\TeX}$  errors. In both types of errors, the part after the error message will tell you where the error occurred. An example:

1.15 <offending text>

The 1.15 tells you what line the error occurred on and the text will tell you the text that caused the error.

### LATEX ERRORS

The general form of an error in  $\text{\LaTeX}$  is shown below:

! LaTeX error: <error message>

See the  $\text{\LaTeX}$  manual or  $\text{\LaTeX}$  Companion for explanation.

Type H <return> for immediate help.

...

---

The ! lets you know that the error has occurred. The error message will tell you what type of error you have committed. After the ellipses, you will find the line at which the error occurred and the text that caused the error (or at least the text where  $\text{\LaTeX}$  found the error).

## TEX ERRORS

Errors may also have the following form:

```
! <error message>
```

These errors are formatted differently because they are error messages that came from  $\text{\TeX}$  instead of  $\text{\LaTeX}$ . After the error, you will still find the line that the error occurred in and the text of the error.

## WARNINGS

There are some error messages that are just warnings and will not stop or change the compilation of the document. Chances are you have seen them many times.

## UNDERFULL

The following error results when a line does not extend the width of the page, something  $\text{\LaTeX}$  always tries to accomplish:

```
Underfull \hbox (badness 10000) in paragraph at lines  
104--107
```

This error message is just a warning and is not something to worry about. For the most part, when a line does not span the width of the page, it is because you have written something that you want to only cover part of the page.

## OVERFULL

The following error results when a line extends beyond the width of the page:

```
Overfull \hbox (16.04988pt too wide) in paragraph at  
lines 30--31 [] [] \OT1/cmtt/m/n/12 I'm trying to put  
way too much text into a line in my document.
```

---

Usually this error comes from when you are using the `verbatim` package because it will not move to the next line if your text does not go to the next line. The easiest way to fix this is to find the place in your document where this is occurring and change the text so that it fits to the page.

This error will still show up if the text is still on the page but outside of the width of text that  $\text{\TeX}$  has set. In this case, you are welcome to fix things so that the error does not show up or you can leave the text as it is.

## R E F E R E N C E S

The following warnings occur when references are changed when  $\text{\TeX}$  was compiled:

LaTeX Warning: Label(s) may have changed. Rerun to get cross-references right.

LaTeX Warning: There were undefined references.

LaTeX Warning: Reference ‘name’ on page 1 undefined on input line 15.

The way to fix these errors is to recompile the document again to correct the page numbers. Sometimes it is necessary to recompile the document twice to fix this error. You also may have defined a reference wrong, so you should check to make sure your label is correct.

## B E G I N N I N G A N D E N D I N G

### B E G I N E N D E D B Y E N D

This type of error occurs when each environment is not correctly started and ended. When you are missing an `\end` command, the following error will show up:

```
! LaTeX Error: \begin{enumerate} on input line 23
ended by \end{document}.
```

---

To fix this, you need to end the environment mentioned in the error with the appropriate command.

When you are missing a `\begin` command, the following will appear:

```
! LaTeX Error: \begin{document} ended by
\end{itemize}.
```

To fix this, you basically do the same thing as before, correctly beginning the environment mentioned in the error with the appropriate command.

## END OCCURRED INSIDE A GROUP

The following error message will show up at the end of compiling a file if an environment is begun that is not ended:

```
(\end occurred inside a group at level <n>)
```

To fix this error, make sure you end the environment that was begun. The previous error is more helpful in finding the `\begin` statement.

## ENDED BY END OF LINE

The following error will occur when you try to place a command inside a section heading:

```
! LaTeX Error: \verb ended by end of line.
```

See the LaTeX manual or LaTeX Companion for explanation.

Type H <return> for immediate help.

...

There will be many errors of the same type for this mistake. In order to find where you put the command, look in the output file and find the last heading that shows up.

---

## M I S S I N G   B E G I N   D O C U M E N T

This error is self-explanatory:

```
! LaTeX Error: Missing \begin{document}
```

## E R R O R S   U S U A L L Y   C A U S E D   B Y   B A D S P E L L I N G

### U N K N O W N   C O N T R O L   S E Q U E N C E

This error results when you use a command (something that starts with a \) that is not recognized by  $\text{\LaTeX}$ :

```
! Undefined control sequence.
```

Usually this error results from spelling a command incorrectly. Go to the line that is indicated by the error and fix the command.

## E N V I R O N M E N T   U N D E F I N E D

This error results when you begin an environment with a \begin command that is not recognized:

```
! LaTeX Error: Environment verbatim undefined.
```

Usually you have just spelled your environment incorrectly, so you just need to fix it.

## B A D   F I L E   N A M E

This error results when you have mistyped the command `latex` or do not have  $\text{\LaTeX}$  installed on your computer:

```
Bad command or file name
```

To fix this, correctly spell the command to compile your file or make sure that  $\text{\LaTeX}$  is correctly installed on your computer.

---

## C A N N O T F I N D F I L E N A M E

This error occurs when you try to compile a file that the computer cannot find:

```
! I can't find file 'sample'.
<*> sample
```

Please type another input file name:

To fix this error, make sure you have spelled the file name correctly. You also may be in the wrong directory to compile the file, so check to make sure you are in the same directory as your file.

## F A T A L E R R O R S

### R U N A W A Y A R G U M E N T

This error happens when a paragraph ends before a command's argument is done (i.e.,  $\text{\LaTeX}$  thinks that there is a missing  $\}$ ):

Runaway argument?

To fix this, you should use a different command to accomplish what you are trying to do. An example of this is to use  $\bfseries$  instead of  $\bfseries$  to make bold text in more than one paragraph.

This error can also be caused by a missing mandatory argument to a command.

## J U S T A N \*

This error normally occurs when you do not end your document with  $\end{document}$ :

\*

If you are prompted to enter something in, it is best to enter  $\end{document}$

and hope it works. Be sure to end your document with the appropriate command.

---

## E M E R G E N C Y   S T O P

This error happens when  $\text{\LaTeX}$  will stop trying to compile your document due to a serious error:

! Emergency stop.

To fix this error, you will need to figure out what caused it to stop compiling. Chances are you forgot to end your document with `\end{document}`, but there might also be another reason for the emergency stop.

## P L E A S E   T Y P E   A   C O M M A N D   O R   S A Y E N D

This error happens when your file has ended prematurely:

(Please type a command or say ‘`\end`’)

The best way to deal with this type of error is to type

`\end`

or

`\end{document}`

in the case that the absence of that command caused the error. Usually if you have ended your document correctly, the error will result from a missing } or forgetting to end a verbatim environment.

## G R A P H I C S   E R R O R S

### T O O   M A N Y   U N P R O C E S S E D   F L O A T S

This error occurs when figures or tables (i.e., floats) have not been typeset:

! LaTeX Error: Too many unprocessed floats.

$\text{\LaTeX}$  can only have so many floats waiting to be typeset. In order to fix this error, make sure that you are placing your floats where you want them (with a [h] option) and not wanting too many on one page in sequence. Using the command `\clearpage` can be very useful in distributing floats correctly.

## UNKNOWN GRAPHICS EXTENSION

The following error occurs when you try to use a type of graphic that is not supported by the type of file that you are producing:

```
! LaTeX Error: Unknown graphics extension: .gif
```

In order to fix this error, you should change your graphics to the types that are supported by the type of file you are outputting or you will need to include the correct package to deal with that type of graphic. Sometimes you may have named the graphic poorly so that  $\text{\LaTeX}$  will not recognize it as a graphic file.

## DIVISION BY ZERO

The following error occurs when the height of a graphic object is zero:

```
! Package graphics Error: Division by 0.
```

This is usually caused when you rotate an object with zero depth so that its height becomes zero. The best way to fix this is to use the keyword `totalheight` instead of `height`.

## MATH ERRORS

### DISPLAY MATH SHOULD END WITH \$\$

This error occurs when the `displaymath` or `equation` mode is ended incorrectly:

```
! Display math should end with $$
```

To fix this error, make sure that you end the `displaymath` or `equation` mode correctly (ending them with a `$` is not acceptable).

## BAD MATH ENVIRONMENT

### DELIMITER

This error occurs when you do not have your delimiters correct in math mode:

```
! LaTeX Error: Bad math environment delimiter.
```

---

Usually this occurs when you forget to match a right delimiter with every left delimiter. This error may also happen when you forget to end an array.

## M I S S I N G R I G H T

This error occurs when you have a missing right parenthesis:

! Extra \right.

To fix this, you either need to add a \right command or you need to end an array.

## M I S S I N G D E L I M I T E R

This error message occurs when a delimiter is missing:

! Missing delimiter (. inserted).

To fix this error, you need to make sure that you have a right delimiter for every left delimiter. If you do not want a right delimiter matching a left delimiter, you need to use “.” to not have an error message show up.

## M I S S I N G \$ I N S E R T E D

The following error occurs when you try to use a character that can only be used in math mode, like \_ or ^:

! Missing \$ inserted

To fix this error, make sure you change the character to what it should be in text mode.

## T A B U L A R E N V I R O N M E N T E R R O R S

### M I S P L A C E D A L I G N M E N T T A B

#### C H A R A C T E R &

This error occurs when you use & and when you are not in a tabular environment:

---

Misplaced alignment tab character &

To fix this error, you need to use \& to make a &.

## E X T R A   A L I G N M E N T   T A B

This error occurs when you use too many tabs for the number of columns in a table:

```
! Extra alignment tab has been changed to \cr
```

The result of this error is that a new row is formed where the extra tab was. You should go back and fix your table so that the correct number of items in each row would show up.

## A R G U M E N T   H A S   A N   E X T R A   }

These errors happen when an incorrect number of arguments to a tabular environment have been specified:

```
! Argument of \cline has an extra }.
```

```
! Argument of \multicolumn has an extra }.
```

To fix this error, make sure your arguments to the tabular environment are correct.

## E R R O R S   W I T H   L I S T S

### M I S S I N G   I T E M

This error occurs when there is plain text in an environment that takes items:

```
! LaTeX Error: Something's wrong--perhaps a missing
\item.
```

To fix this error, make sure the plain text is changed into an item.

---

## T O O D E E P L Y N E S T E D

This error occurs when there are too many lists for  $\text{\LaTeX}$  to handle:

! LaTeX Error: Too deeply nested

$\text{\LaTeX}$  can only handle four levels of one type of list and six levels of different types of lists. To fix this, you need to use less levels of lists or define your own list environment.

## M I S C E L L A N E O U S E R R O R S

### O N L Y U S E D I N T H E P R E A M B L E

This error occurs when you place a command in the body of a  $\text{\LaTeX}$  document that should be placed in the preamble:

! LaTeX Error: Can be used only in the preamble.

To fix this error, just move the command to the preamble.

### T H E R E I S N O L I N E / P A G E H E R E T O E N D

This error occurs when you incorrectly use the commands that make a new line or a new page:

! LaTeX Error: There's a no line here to end.

You may just leave the command that is making a new line in place or you can take it out. Here,  $\text{\LaTeX}$  is just trying to make sure that everything looks nice.

### C O M M A N D A L R E A D Y D E F I N E D

This error occurs when you try to define a command that already exists:

! LaTeX Error: Command ... already defined.

To fix this, you need to define your command differently.

---

## M I S S I N G   N U M B E R

This error is made when a number is expected as an argument and one is not provided:

```
! Missing number, treated as zero.
```

To fix this error, you need to find where a number is expected so that you can provide the correct one.

## 6 . 6 . 2   F L O A T   P A C K A G E

### U S E P A C K A G E

text

### S I M P L E   U S E

text

### O P T I O N S

text

Add optional arguments to the usepackage line:

Useful options:

➢ **OPTION NAME**

OPTION NOTE

➢ **OPTION NAME**

OPTION NOTE

### U S E   W I T H   O P T I O N S

text

---

## C O M M A N D S

### 6.6.3 G R A P H I C S E X A M P L E S A N D N O T E S

#### C U R L Y F R A M E E X A M P L E

```
\documentclass[landscape]{article}
\usepackage{wallpaper}
\usepackage{niceframe}
\usepackage{xcolor}
\usepackage{ulem}
\usepackage{graphicx}
\usepackage{geometry}
\geometry{tmargin=.75cm,bmargin=.25cm,lmargin=.8cm,rmargin=.2cm}
\usepackage{multicol}

\begin{document}

\curlyframe[.9\columnwidth]{

TEXTTTTTTTTTTTTTTTTTT

}

\end{document}
```

#### R E C T F R A M E E X A M P L E

```
\documentclass[landscape]{article}
\usepackage{wallpaper}
\usepackage{niceframe}
\usepackage{xcolor}
\usepackage{ulem}
\usepackage{graphicx}
\usepackage{geometry}
\geometry{tmargin=.75cm,bmargin=.25cm,lmargin=.8cm,rmargin=.2cm}
```

---

```
\usepackage{multicol}

\begin{document}
\begin{minipage}{.33\textwidth}
\centering
\scalebox{3}{\color{green!30!black!60}
\font\border=umrandb
\generalframe
{\border \char113} % up left
{\border \char109} % up
{\border \char112} % up right
{\border \char108} % left
{\border \char110} % right
{\border \char114} % lower left
{\border \char111} % bottom
{\border \char115} % lower right
\centering
\includegraphics[height=1.25cm]{GIS_Logo_better.jpg}}
\end{minipage}
%\vspace{-8mm}

\end{document}
```

## 6.6.4 GRAPHICX PACKAGE

### U S E P A C K A G E

text

### S I M P L E U S E

text

## O P T I O N S

text

Add optional arguments to the usepackage line:

Useful options:

- **OPTION NAME**

OPTION NOTE

- **OPTION NAME**

OPTION NOTE

## U S E   W I T H   O P T I O N S

text

## C O M M A N D S

### 6 . 6 . 5   H Y P E R R E F   P A C K A G E

#### I N T R O D U C T I O N

Official hyperref package documentation

**Notes:**

- Add the *hyperref package* to the preamble **last** [2]

- To use Tex in a pdf bookmark: use

`\texorpdfstring{\\"}{}`

i.e. `\paragraph{Sample Text\texorpdfstring{\\"}{}}`

Creates a new line without an error.

---

`\usepackage[options]{hyperref}`

## S I M P L E   U S E

Use `\href{URL}{DESCRIPTION}` to add a link with description

`\href{https://www.latex-tutorial.com}{Website with tutorials}`  
produces:

[Website with tutorials](https://www.latex-tutorial.com)

## O P T I O N S

Add optional arguments to the `usepackage` line:

Useful options:

- **pdftex**  
enables other options like breaklines
- **breaklinks**  
allow links to be broken across several lines  
eg. <https://lists.gnu.org/archive/html/emacs-orgmode/2013-06/msg00776.html>
- **colorlinks**  
Colors the text of links and anchors.(default is false)
- **linkcolor**  
Color for normal internal links(default is red).
- **anchorcolor**  
Color for anchor text.
- **citecolor**  
Color for bibliographic citations in text.
- **urlcolor**  
Color for linked URLs

## U S E   W I T H   O P T I O N S

---

```
\usepackage[breaklinks,colorlinks,citecolor=blue,
urlcolor=green]{hyperref}
```

---

## C O M M A N D S

\href{URL}{text} Makes text a link to URL.

To put a file path in text:

eg:

[Official hyperref package documentation](#)

(documentation Pt.4 pg.15)

\href[options]{URL}{text}

Options:

➤ absolute

```
\href{C:/AC/jalapeno/documentation/packageDocs/hyperref2017.pdf}
    {Official hyperref doc}
```

➤ relative **Note: relative path must be from final pdf location**

```
\href{../../../../documentation/packageDocs/hyperref2017.pdf}
    {Official hyperref package doc}
```

This path works from main document

```
\href{../../../documentation/packageDocs/hyperref2017.pdf}
    {Official hyperref package documentation}
```

This path works from subsection document

\hyperref[label]{text}

Makes text a link to where \ref{label} would point.

\hypertarget{name}{text}

Sets an anchor on text with the label name.

\hyperlink{name}{text}

Makes text a link that takes you to the anchor labeled name.

Pair with \hypertarget.

\phantomsection

Used in conjunction with

\addcontentsline  
to make the correct link in the Table of Contents.

## 6.6.6 IMPORT PACKAGE

### U S E P A C K A G E

text

### S I M P L E U S E

text

### O P T I O N S

text

Add optional arguments to the usepackage line:

Useful options:

➢ **OPTION NAME**

OPTION NOTE

➢ **OPTION NAME**

OPTION NOTE

### U S E W I T H O P T I O N S

text

### C O M M A N D S

## 6.6.7 WRAPPING PACKAGE

---

## U S E P A C K A G E

text

## S I M P L E   U S E

text

## O P T I O N S

text

Add optional arguments to the usepackage line:

Useful options:

➢ **OPTION NAME**

OPTION NOTE

➢ **OPTION NAME**

OPTION NOTE

## U S E   W I T H   O P T I O N S

text

## C O M M A N D S

## 6.7 LATEX TEMPLATES

### 6.7.1 LATEX SECTION TEMPLATE

```
\begin{document}
%
\section{SECTION NAME}
%
\subimport{THIS SECTION/}{SOMESubsection.tex}
\subimport{THIS SECTION/}{SOMESubsection.tex}
% etc...
%
\end{document}
```

### 6.7.2 LATEX SUBSECTION TEMPLATE

```
%  
%  
%  
%-----  
%      To Do:  
%  
%  
%  
%-----  
%  
% OPTIONAL PREAMBLE FOR LOCAL COMPILE %  
%  
\def\titlename{SubsectionTemplate}  
\def\authorName{Allegan County GIS Services}  
\def\pdfTitle{SubsectionTemplate}  
\def\pdfSubject{GIS Tools} %  
\def\pdfKeywords{latex,documentation}  
%
```

---



```
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\subparagraph*{SUBPAR HEADING}  
%  
\begin{itemize} %  
%  
\item ITEM 1  
%  
\item ITEM 2  
%  
\end{itemize} %  
%  
\subparagraph*{SUBPAR HEADING}  
%  
\noindent Text  
Text Text Text Text Text Text Text Text Text Text Text Text Text  
%  
\end{adjmulticols}  
%  
\clearpage  
%  
%  
\subsubsection{SUBSUBSECTION HEADING}  
%  
% Single Figure  
%  
%\begin{figure}[h!]  
%\centering  
% \includegraphics[width=1\textwidth]{ProjectDesign}  
%\vspace{-0.2in}
```

---



```
\paragraph{PAR HEADING}
\noindent Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
%
\subparagraph{SUBPAR HEADING}
\noindent Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
%
\subparagraph{SUBPAR HEADING}
\noindent Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
%
\subparagraph{SUBPAR HEADING}
\noindent Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
Text Text Text Text Text Text Text Text Text Text Text Text
%
\end{adjmulticols}
%
% Single Figure
%
%\begin{figure}[H]
%\centering
%    \includegraphics[width=1\textwidth]{IMAGE}
%\vspace{-.2in}
%
%\caption{IMAGE NAME}
%\end{figure}
\clearpage
```

## 6.8 PYTHON SCRIPTS USED BY AGGIS

### 6.8.1 FILE RENAME WITH PYTHON

#### PURPOSE AND SUMMARY

## Purpose

Changing the file names within a directory

## Summary

This script creates a list of all files in a source folder and then iterates through the list editing the file names, in this case, replacing spaces with no spaces.

#### REQUIREMENTS

## Software

- python 2.7 and a Python IDE
- A text editor

## Python(2.7)

This script was developed in python 2.7

## The Python Script

```
#-----
# Name:      RenameFiles.py
#
# Purpose:   Renames any number of files within a directory
#
# Notes:     This script creates a list of all files in a source folder and
#            then iterates through the list editing the file names,
#            in this case, replacing spaces with no spaces.
#
# Author:    BMay
#
# Created:   20190620
```

---

```
# Updated: 20190621
#-----
#####
# Imports and Relative path folder setup
#####
import os, sys
project = os.path.dirname(os.path.dirname(__file__))
processing = os.path.join(project, 'processing')
build = os.path.join(project, 'build')

#####
# vars
#####
renameSrc = os.path.join(processing, 'RenameSource')

#####
# Main
#####
if __name__ == "__main__":
    os.chdir(renameSrc)
    for i in os.listdir(renameSrc):
        print i
        newName = i.replace(' ', '')
        print newName
        os.rename(i, newName)
```

## 6.8.2 PDF OPTIMIZER

### PURPOSE AND SUMMARY

#### Purpose

Optimization of any number of pdf documents

---

## Summary

A Python script creates a list of .pdf docs in a folder. The list is used to write a .txt document in which every line is a DOS command to optimize each of the .pdf documents and save them to another location. The .txt must be saved as a .bat. When executed the batch process calls ghost script for the optimization.

## R E Q U I R E M E N T S

## Software

- ghostscript
- python 2.7 and a Python IDE
- A text editor

## About ghostscript

ghostscript is used for the optimization. ghostscript is an interpreter for the PostScript language and for PDF [1].

## Licensing

ghostscript is available opensource under AGPL conditions. more information can be found [here](#).

## Download

ghostscript can be downloladed [here](#).

## Add Ghostscript to the system path Variable

---

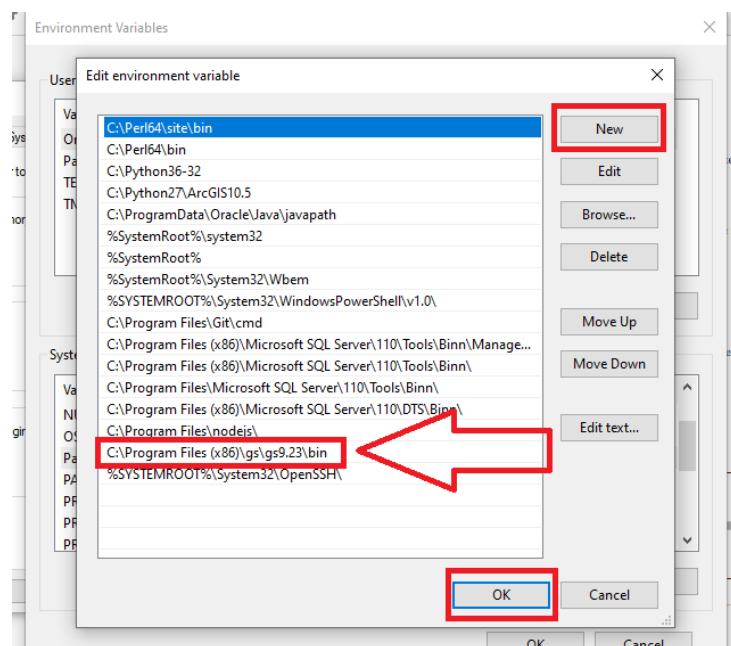


Figure 6.70: Add GS to Path

*note:*

The output of this script is bdoc.txt, Save as a .bat to execute the optimize.

## Python(2.7)

This script was developed in python 2.7

### The Python Script

The output is a batch file

```
#-----
# Name:          OptimizePDF.py
#
# Purpose:       Batch optimize pdfs
#
# Notes:         This script creates a list of pdf files in a source folder and
#                 then creates a .txt that can be used as a .bat file to optimize
#                 all of the pdfs in the source folder to a new location.
#
# Author:        BMay
#
# Created:      06/20/2019
#-----
#####
# Imports and Relative path folder setup
#####
import os, sys
project = os.path.dirname(os.path.dirname(__file__))
processing = os.path.join(project, 'processing')
build = os.path.join(project, 'build')

#####
# String vars for each line of the .bat file
#####
inString1 = "gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4 -dPDFSETTINGS=/ebook#
-dNOPAUSE -dQUIET -dBATCH -sOutputFile=H:\\2019ParcelAtlas\\optimized\\"
inString2 = " H:\\2019ParcelAtlas\\20190619\\"
usString = '_' # Underscore string to add to file names

#####
# Source pdfs path
#####
sourcepdf = os.path.join(project, '20190619x') # folder with pdfs to be optimized
```

---

```
#####
# new .txt
#####
batchdoc = os.path.join(processing,"bDoc.txt") # new .txt that can be used as a .bat

#####
# Main
#####
if __name__ == "__main__":
    list1 = os.listdir(sourcepdf) # assemble list of all files in sourcepdf
    l = open(batchdoc,'w') # open .txt doc to write lines
    for i in list1: # iterate list of files
        #newi = i[0:] # allows slicing on file name if chars need to be removed
        #print newi
        #t = inString1 + usString + newi + inString2 + i + "\n"
        t = inString1 + usString + i + inString2 + i + "\n" # assemble each string
        print t
        l.write(t) # write each string
    l.close()
```

## W I N D O W S B A T C H F I L E

A line from the batch file looks like:

```
gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4 -dPDFSETTINGS=/ebook -dNOPAUSE
-dQUIET -dBATCH -sOutputFile=J:\Project\2018ParcelAtlas\build\optimized 02-
001-001-00.pdf J:\Projects\2018ParcelAtlas\build\2018071 \_02-001-00-00.pdf
```

To execute the batch file: change the extension of the scripts output from .txt to .bat. Double click the .bat to execute.

## 6.9 QGIS TOOLS

### 6.9.1 QGIS AZIMUTH AND DISTANCE PLUGIN

#### TOOL SUMMARY

The Azimuth and Distance Plugin can be added to QGIS to provide COGO functionality.

#### Background

QGIS is an open-source GIS that provides additional tools through Plugin architecture.

#### Who the Tool is For

A user with QGIS installed locally and the ability to make a basic map.

#### Why the Tool is Needed

QGIS does not have a COGO toolset built in.

#### Takeaways

The Azimuth and Distance Plugin provides the COGO functionality in QGIS.

The Plugin can be installed following these steps.

## AZIMUTH AND DISTANCE PLUGIN INSTALLATION

### Install the Plugin

Plugins (1) ⇒ Topography Group

Select the Azimuth and Distance Plugin (2)

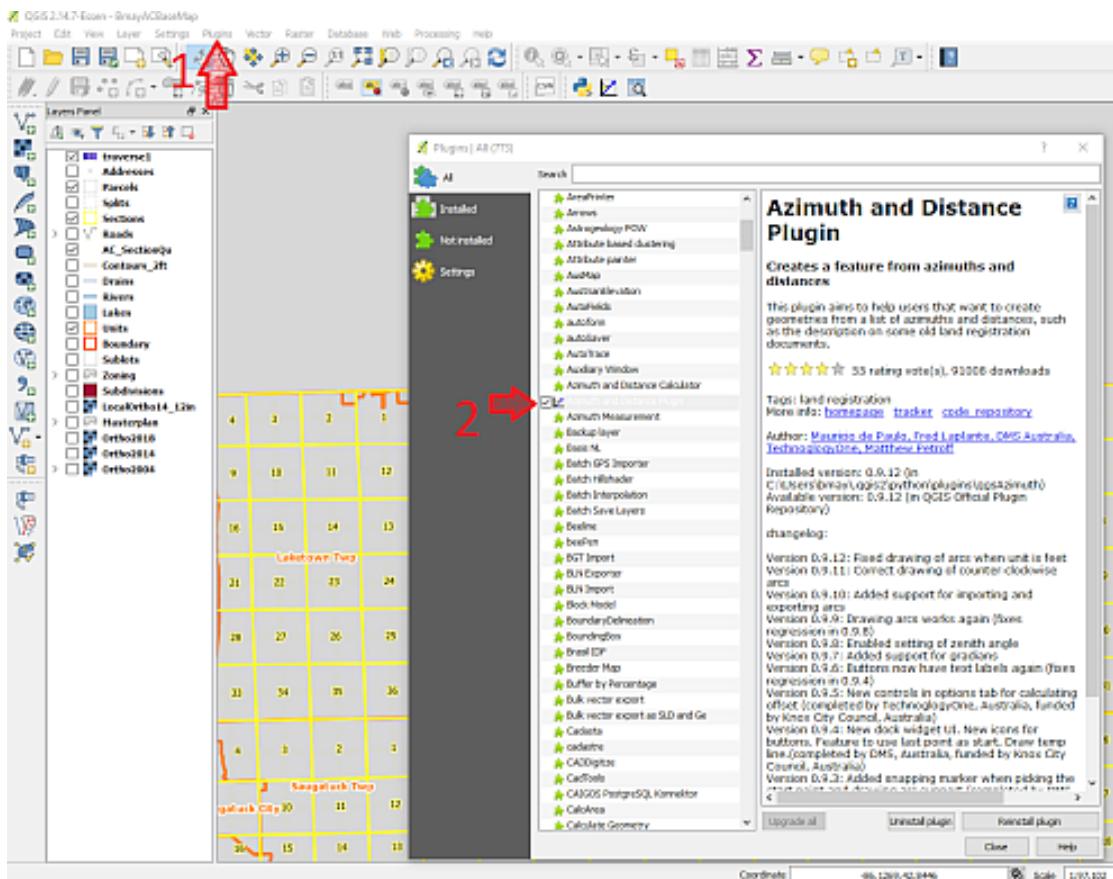


Figure 6.71: Launch Plugin

### Azimuth and Distance Plugin Tool is Added to Toolbar



Figure 6.72: COGO Icon

## 6.9.2 COGO TOOLS IN QGIS

### TOOL SUMMARY

Transfers of real property typically involve a Metes and Bounds description:

Commencing at Southeast corner of Section 1, Town 2 North, Range 11 West, Martin Township, Allegan County, Michigan; thence North 88 degrees 32 minutes 05 seconds West 1338.44 feet along the south line of said section to the point of beginning; thence North 01 degrees 27 minutes 55 seconds East 388 feet; thence South 88 degrees 32 minutes 05 seconds East 584 feet, more or less, to the centerline of the Gun River; thence southerly along said centerline to the south section line; thence West along said section line to the point of beginning.

Figure 6.73: Description From Deed

## Background

In GIS, *Coordinate Geometry* or **COGO** tools convert written descriptions of real property into digital map features.

Users in several county departments use COGO tools in their regular workflow.

## Why the Tool is Needed

A tool is needed to convert between written descriptions of real property and digital map data.

The COGO tools in ArcGIS require an advanced license.

## Who the Tool is For

A user with QGIS installed locally and the ability to make a basic map.

## Takeaways

QGIS is an open source GIS without a built in COGO toolset.

The Azimuth and Distance Plugin provides the COGO functionality in QGIS.

Following are instructions for using QGIS for COGO

To use COGO tools in QGIS, follow these steps

## Step 1:

### Launch and Configure the Azimuth and Distance Plugin

\*Plugin installation is covered in a separate document.



Figure 6.74: COGO Icon

\*This tool draws in a temporary layer or in an active map layer.

Select **traverse1** as active layer in the tool.

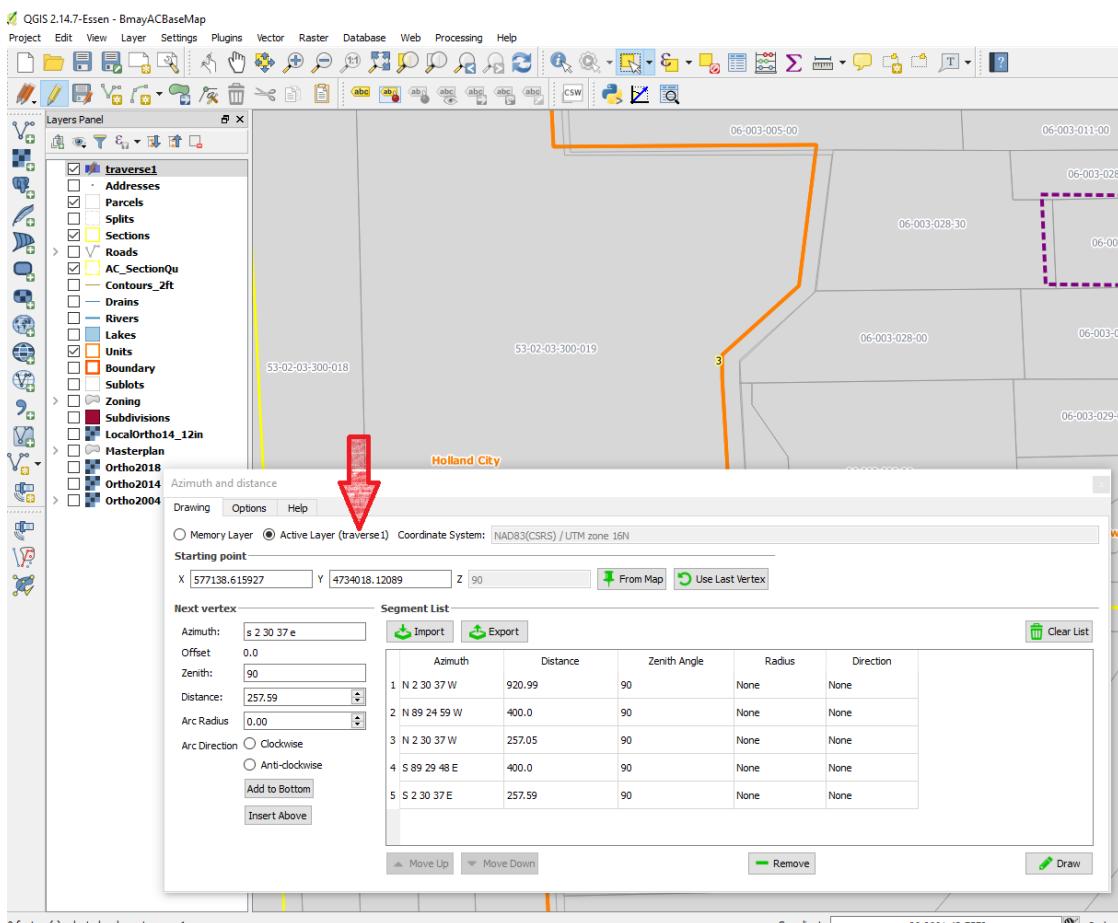


Figure 6.75: Check Active Layer

## Configure Options in Plugin

On the **Options** Tab: Select these radio buttons;

- **Boundary**
- **Bearing**
- **Feet**
- **Degree**

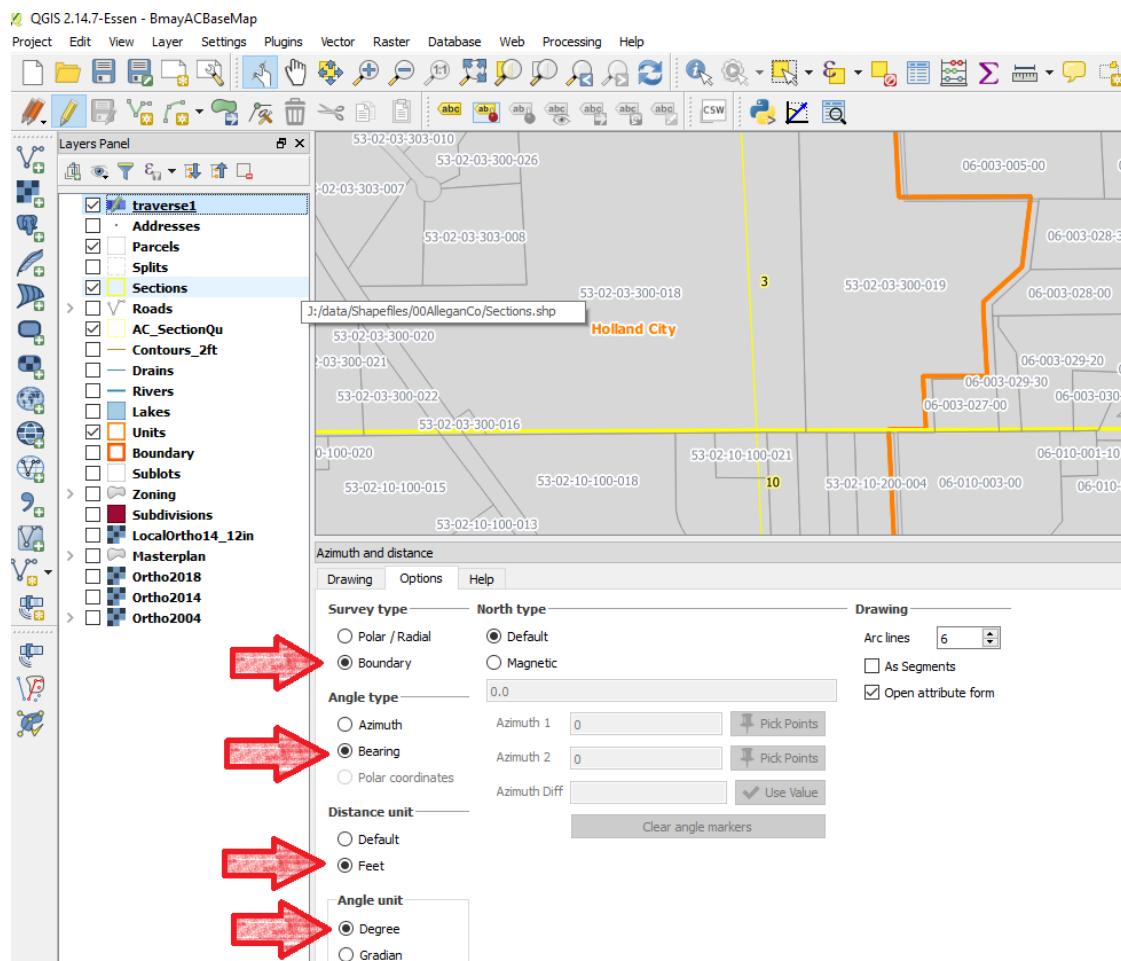


Figure 6.76: Plugin Options

## Step 2: Activate traverse layer in map

\*For a map layer to be editable, it must be activated in the Layers Panel.

(If necessary) left click the layer **traverse1** in Layer Panel to activate it.

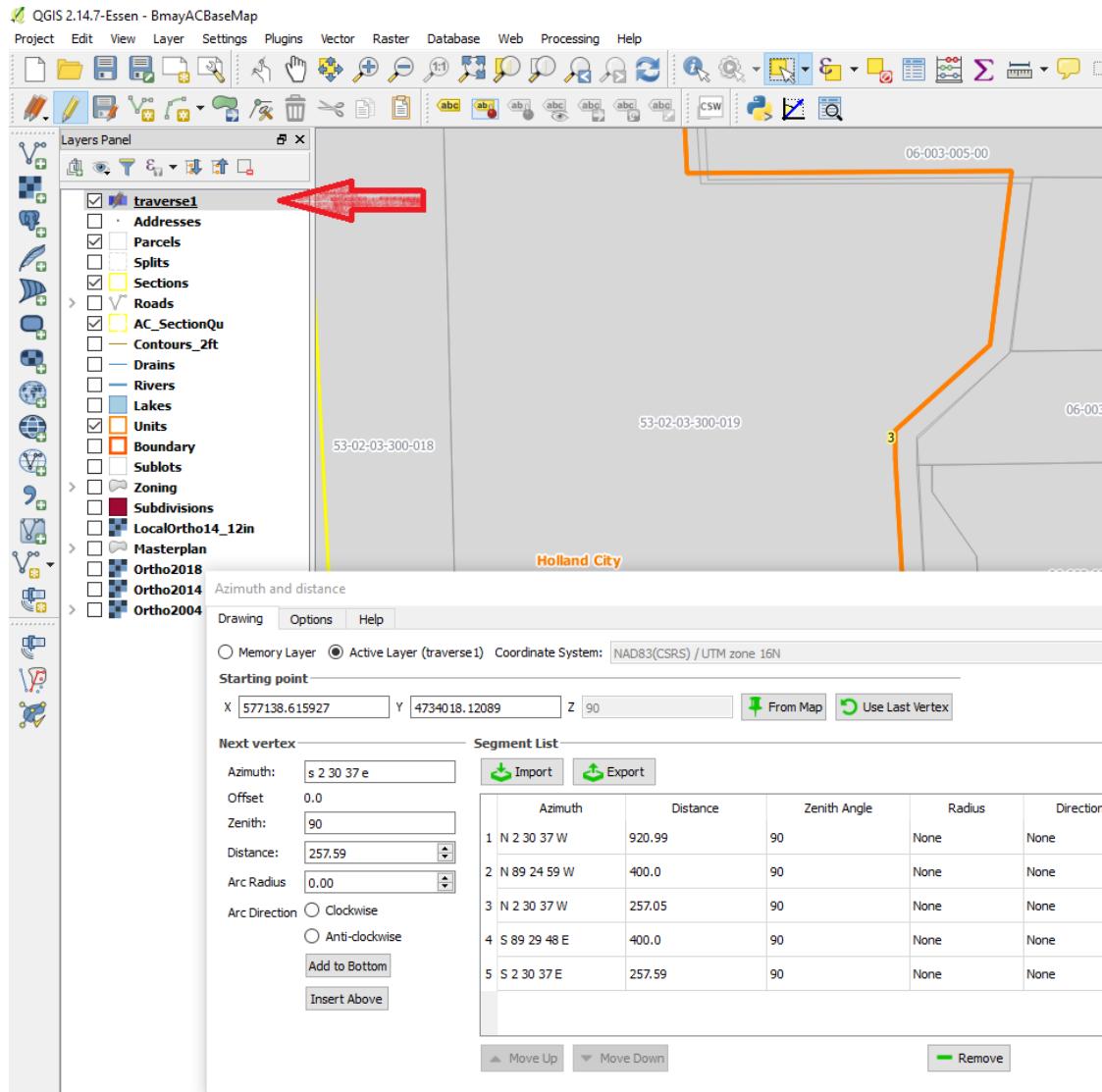


Figure 6.77: activate layer

## Step 3: Locate the Point of Commencement

To get to the Point of Commencement,

Use **any combination** of the following methods:

- Use Reference Layers such as Units, Sections, Quarter Sections, and Parcels.

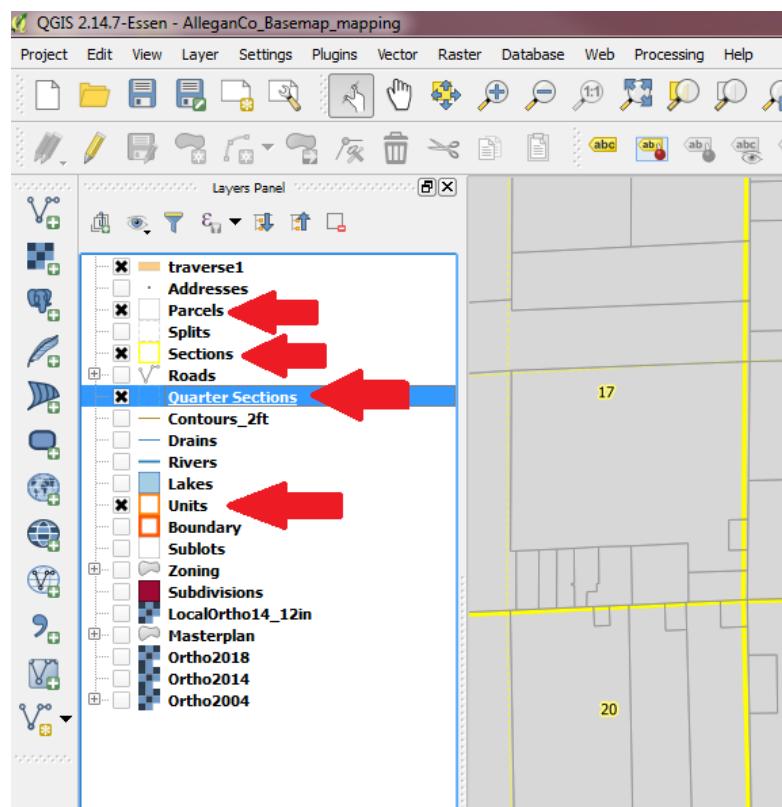


Figure 6.78: Select Reference Layers

➤ Use the Measuring Tool

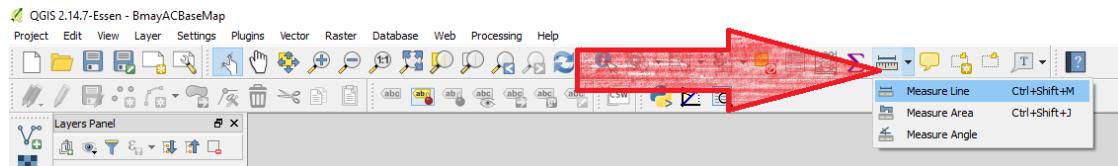


Figure 6.79: Measuring Tool

➤ Search by Parcel Number (Search Layers Plugin)



Figure 6.80: Search Layer Icon

➤ Draw COGO lines (Step 4)

## Step 4: Draw a Line With Azimuth and Distance

Commencing at Southeast corner of Section 1, Town 2 North, Range 11 West, Martin Township, Allegan County, Michigan; thence North 88 degrees 32 minutes 05 seconds West 1338.44 feet along the south line of said section to the point of beginning; thence North 01 degrees 27 minutes 55 seconds East 388 feet; thence South 88 degrees 32 minutes 05 seconds East 584 feet, more or less, to the centerline of the Gun River; thence southerly along said centerline to the south section line; thence West along said section line to the point of beginning.

Figure 6.81: Description From Deed

### On the Drawing Tab:

- Azimuth (bearing): Enter Bearing in format: *N 88 32 05 W*
- Offset: Set to *0*
- Zenith: Set to *90*
- Distance: Enter Feet Distance in numbers only *1338.44*

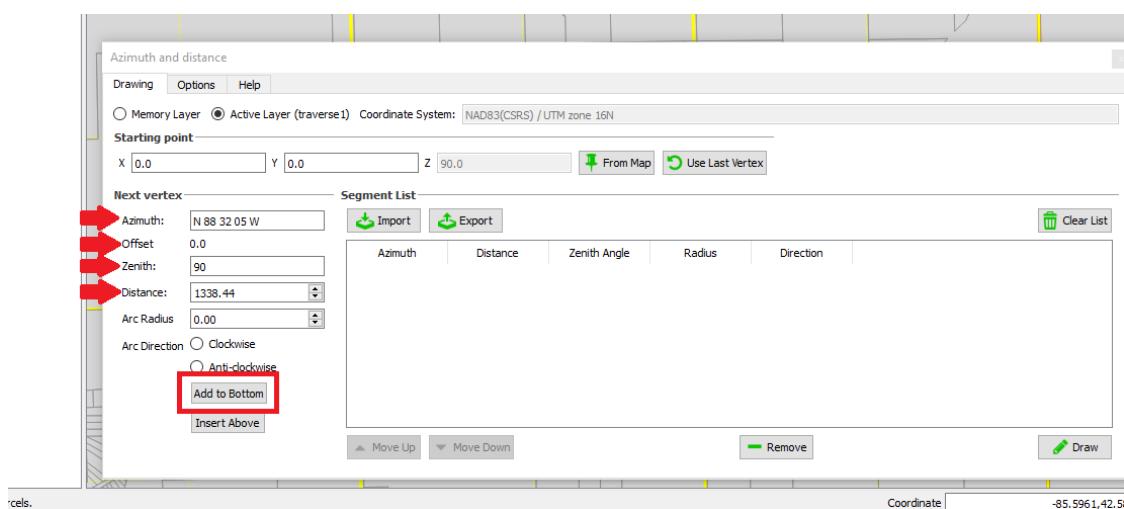


Figure 6.82: Entering Bounds

Push **Add to Bottom**

## Line is added to the list

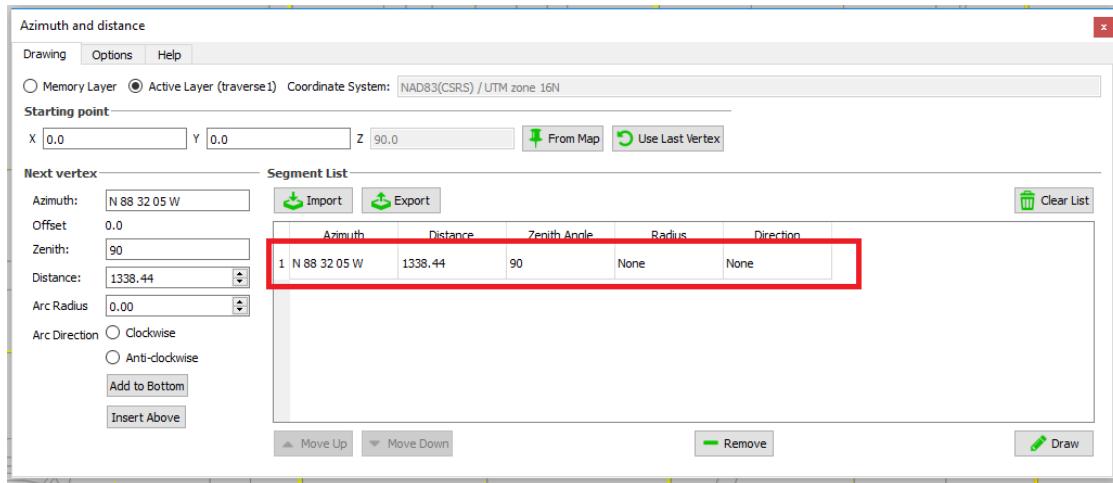


Figure 6.83: Line Added

Add as many bounds as you can from the description

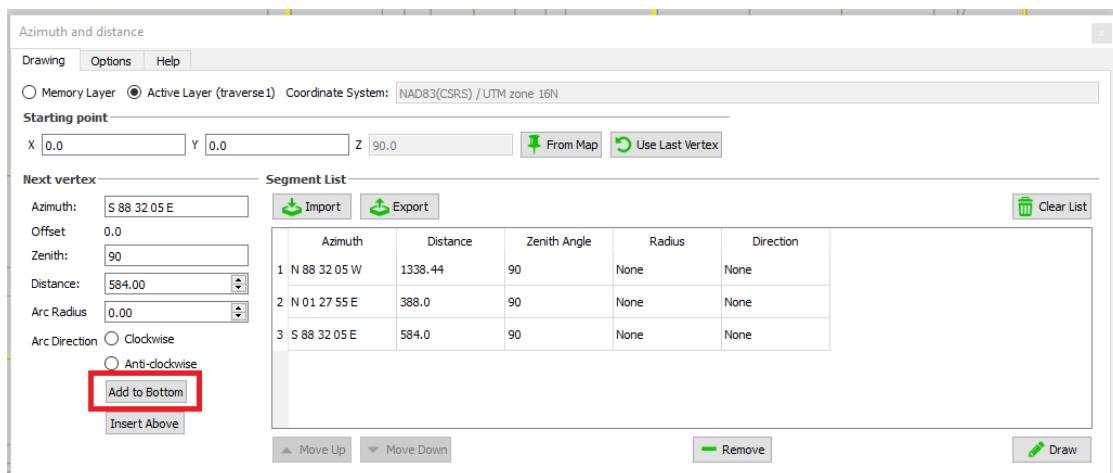


Figure 6.84: Three Lines Added

## Choose A Point to Start Drawing From

Push the **From Map** button.

\*Decide which layer to reference for a starting point.

Align cursor with desired starting point and click.

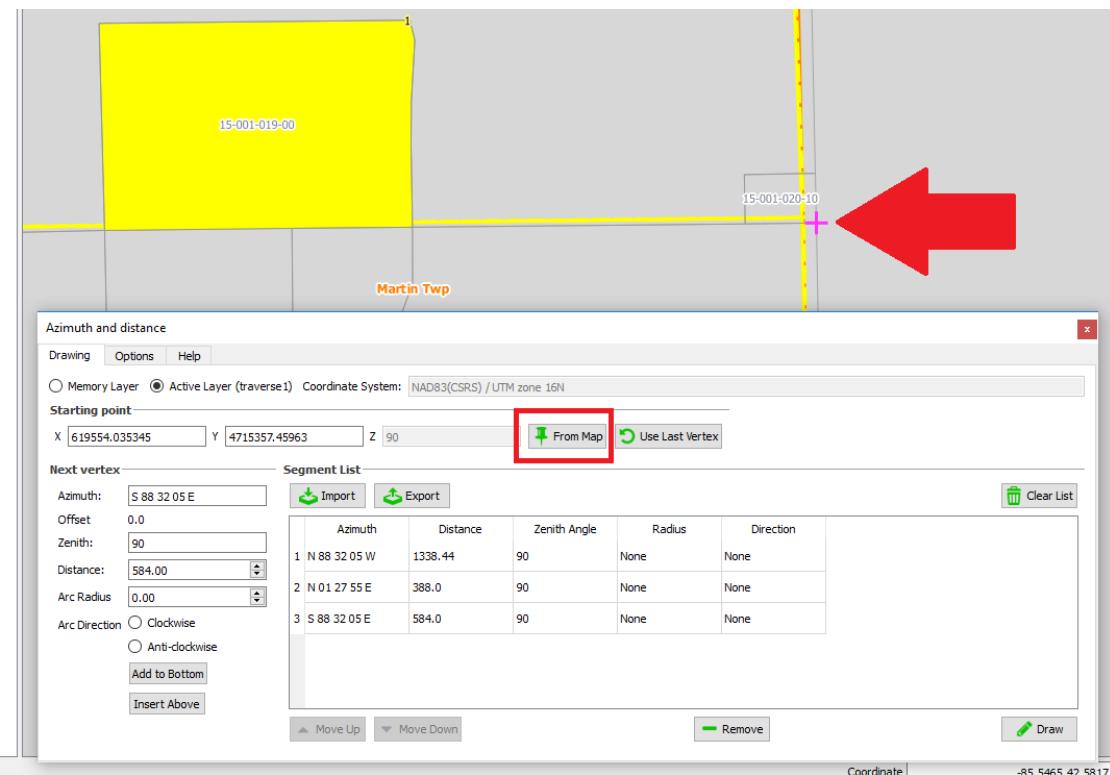


Figure 6.85: From Map

## Draw the Segments So Far

- Push **Draw**
- Enter Attributes for the polyline to be created
- Press **OK**

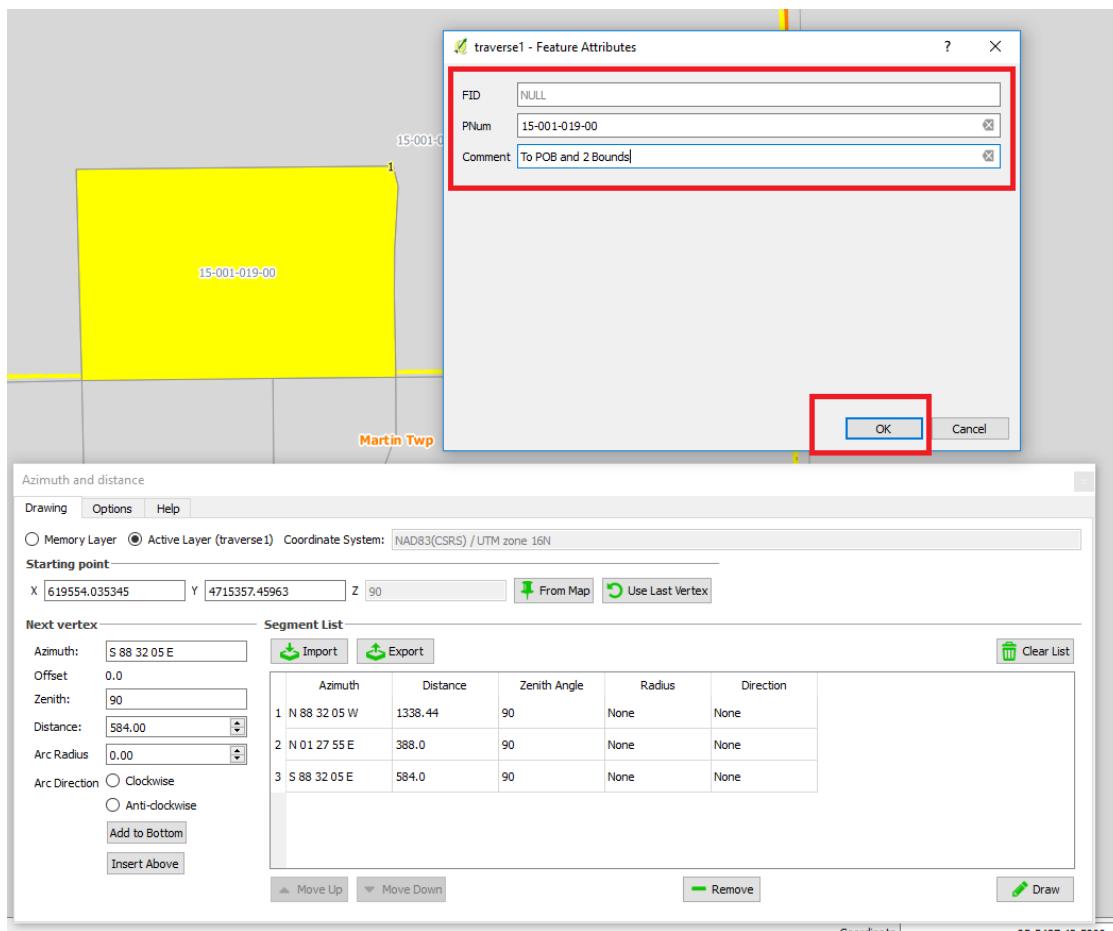


Figure 6.86: Enter Attributes

## Use the sketch to identify the parcel

In this case, turn on ortho photo to verify the remaining bounds.

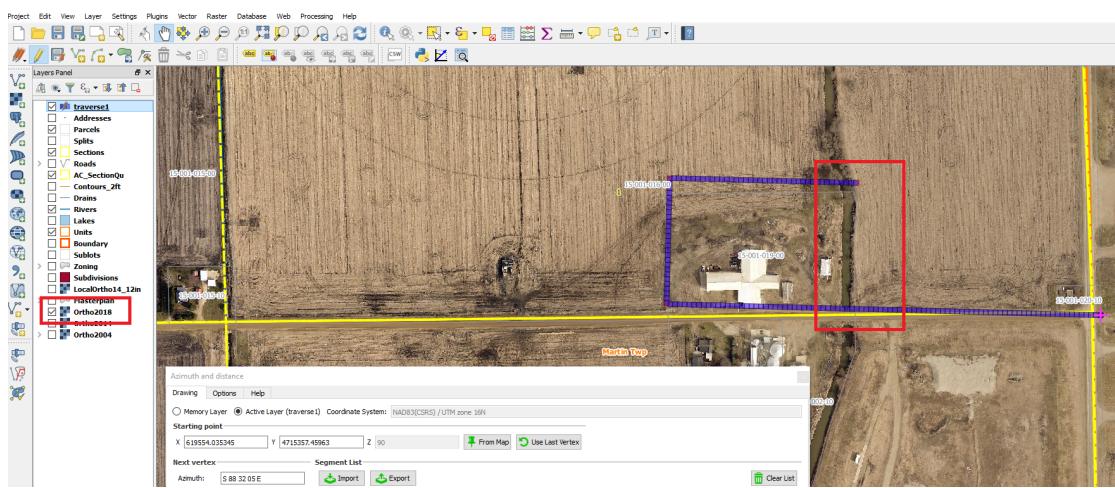


Figure 6.87: Verify Remaining Bounds

## (optionally) Save Input for Later Use

If you want to save the segments for later use, press **Export**.

Name it and select a **save** location.

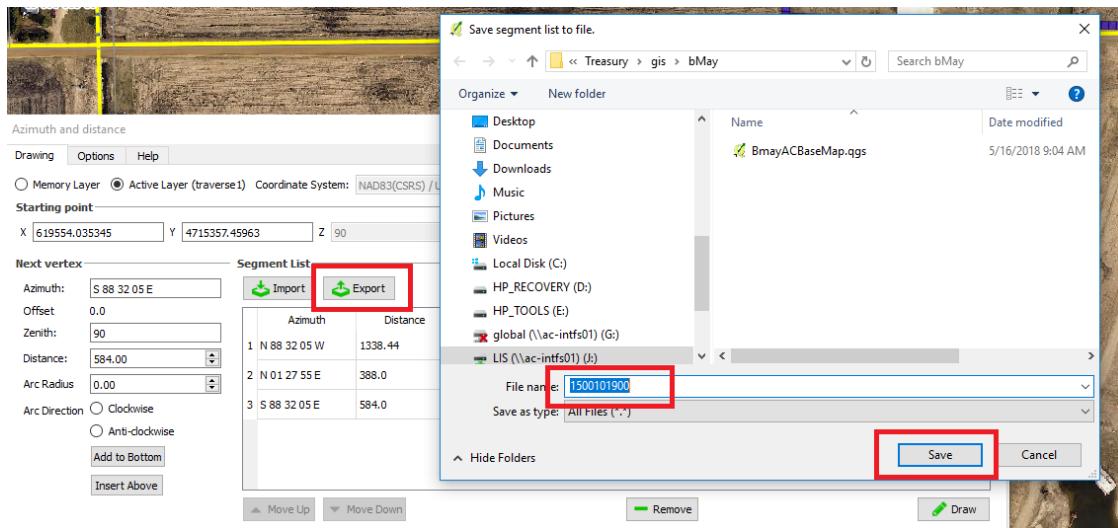


Figure 6.88: Save Segment List

## Verify Attributes

Right click on **Traverse1** in the Layers Panel

and select **open attribute table**.

The attributes you entered should be in the table.

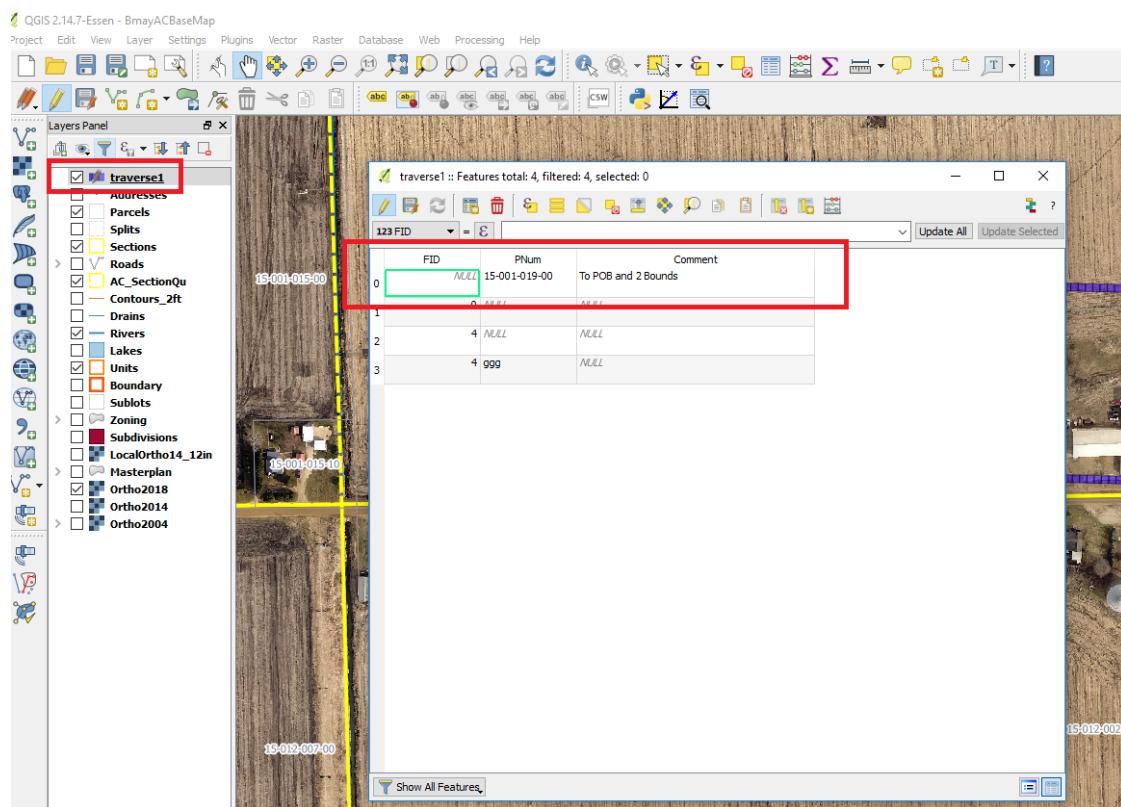


Figure 6.89: Segments In Table

### 6.9.3 SEARCH LAYERS PLUGIN

#### TOOL SUMMARY

QGIS has some tools built in and others can be added via the Plugin architecture.

#### Background

QGIS is an open source GIS and search by feature attributes is needed.

#### Who the Tool is For

QGIS users that require a search by attributes tool.

#### Why the Tool is Needed

QGIS users need a tool to search for features by attribute.

#### Takeaway

The Search Layers Plugin can be added to any installation of QGIS.

## P L U G I N S E T U P

### Install Search Layers Plugin

- To install: Plugins ⇒ **Search Layers** Plugin ⇒ Install

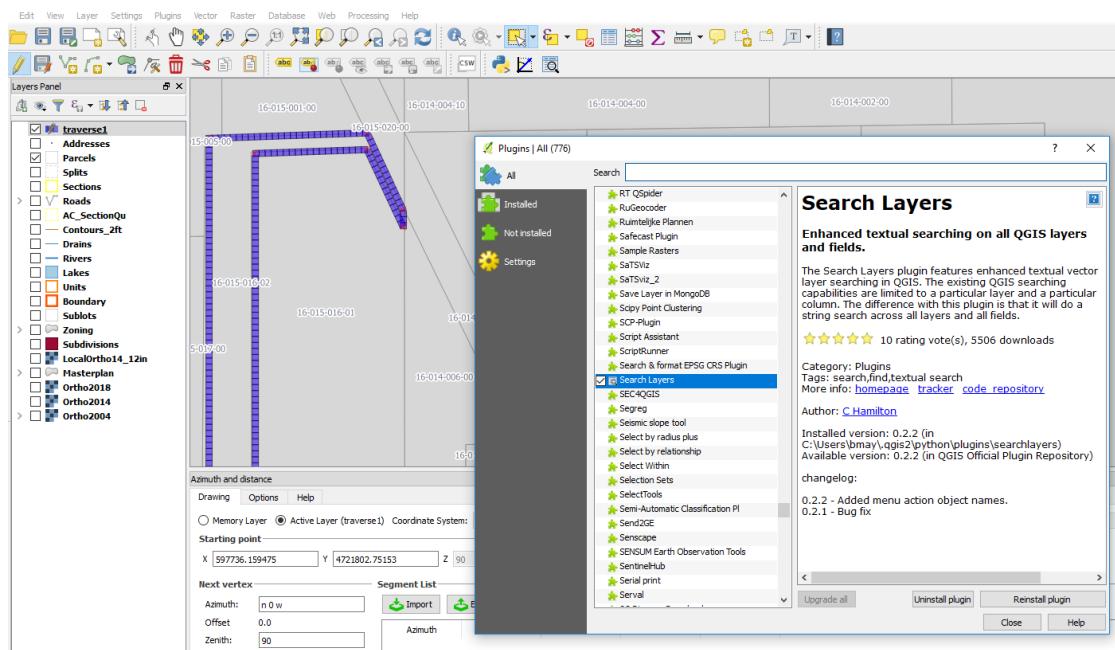


Figure 6.90: Search Layers Plugin

### Search Layers Plugin Tool is Added to the Toolbar



Figure 6.91: Search Layer Icon

## U S I N G T H E P L U G I N

### Enter Parcel Search Data

#### In The Search Layers Plugin:

- Enter **parcel number** (with dashes) into *Search String*
- Select **Parcels** in *Search Layers*
- Select **PARCELID** in *Search Fields*
- Select **=** in *Comparison*

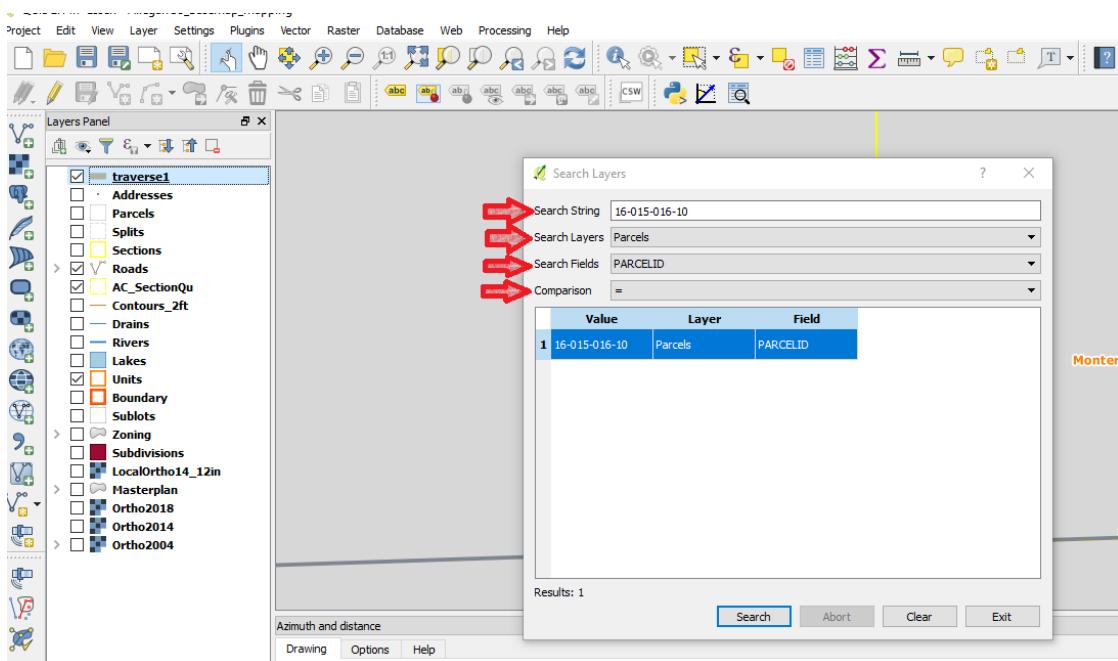


Figure 6.92: Search Layers Setup

- click on result in table

## Screen zooms into the selection

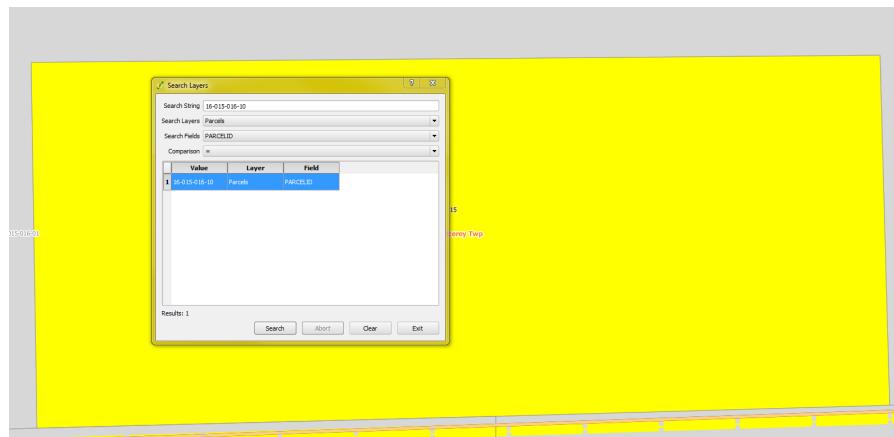


Figure 6.93: Search Results

Zoom out far enough to find a reference point



Figure 6.94: Search Results Zoomed Out



# Part IV

# Resources



---

## Reading Room

---

ESRI PRODUCT DOCUMENTATION  
ARCGIS ENTERPRISE

### arcgis 10.5 Enterprise Functionality Matrix

Document Link

## G E O G R A P H Y 1 0 1

### T E R M S A N D A B B R E V I A T I O N S

#### BLM Glossary of Terms

[Document Link](#)

### C O O R D I N A T E S Y S T E M S

#### A Primer on Coordinate Systems Commonly Used in Michigan

[Document Link](#)

### P L S S R E S O U R C E S

#### PLSS Development Notes

[Document Link](#)

#### Theoretical Township Map

[Document Link](#)

#### US Public Land Survey System

[Document Link](#)

## PRINTING RESOURCES

### PAGE SIZES

#### ANSI Size Illustration

[Document Link](#)

#### Standard Paper Size Guide

[Document Link](#)

S T A T E   R E S O U R C E S

S T A T E   T A X   C O M M I S S I O N

## State Tax Commission Course on Legal Description

Document Link

V E R S I O N   C O N T R O L   R E S O U R C E S

G I T   R E S O U R C E S

## git Branching Model

Document Link



---

## Task Summaries

---

### S U R V E Y P L A N S

### U S I N G C O O R D I N A T E S F R O M S U R V E Y P L A N S

### H O W T O U S E N O R T H I N G A N D E A S T I N G C O O R D I N A T E S T A B L E

**Using a spreadsheet to convert the dimensions** To use Northing and Easting from survey plans: In a spreadsheet, adjust the data to be relative to the 1st point

So if a survey gives you:

| Pt  | Northing  | Easting   |
|-----|-----------|-----------|
| 1   | 995.9952  | 9766.6    |
| 2   | 994.3049  | 9112      |
| 3   | 989.234   | 7150      |
| 4   | 1194.3099 | 9114      |
| 5   | 1193.266  | 8710.2059 |
| 6   | 1193.0954 | 8644.2016 |
| ... | ...       | ...       |
| 32  | 1617.7856 | 8827.4296 |

Table 1: Survey Plan Northing and Easting

Calculate Relative North and Relative Easting of the points to Point 1 by subtracting the point 1 values from each of the other points.

Use formulas:

|     | A   | B         | C         | D           | E           |
|-----|-----|-----------|-----------|-------------|-------------|
| 1   | Pt  | Northing  | Easting   | Relative NS | Relative EW |
| 2   | 1   | 995.9952  | 9766.6    | 0           | 0           |
| 3   | 2   | 994.3049  | 9112      | =B3-B\$2    | =C3-C\$2    |
| 4   | 3   | 989.234   | 7150      | =B4-B\$2    | =C4-C\$2    |
| ... | ... | ...       | ...       | ...         | ...         |
| 6   | 32  | 1617.7856 | 8827.4296 | =B9-B\$2    | =C9-C\$2    |

Table 2: Survey Plan Northing and Easting

Giving you:

|     | A   | B         | C         | D           | E           |
|-----|-----|-----------|-----------|-------------|-------------|
| 1   | Pt  | Northing  | Easting   | Relative NS | Relative EW |
| 2   | 1   | 995.9952  | 9766.6    | 0           | 0           |
| 3   | 2   | 994.3049  | 9112      | -1.6903     | -654.6      |
| 4   | 3   | 989.234   | 7150      | -6.7612     | -2616.6     |
| ... | ... | ...       | ...       | ...         | ...         |
| 6   | 32  | 1617.7856 | 8827.4296 | 621.7904    | -939.1704   |

Table 3: Relative Northing and Easting

So to place pt 32:

From pt 1:

Use distances 621.7904' N and 939.1704'W

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## References

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- [1] Artiflex, *ghostscript.com*, 2018. 209
- [2] na, *The hyperref package*, CTAN, na ed., na na. 197



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## Glossary

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**git** An open source version control system. 15



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