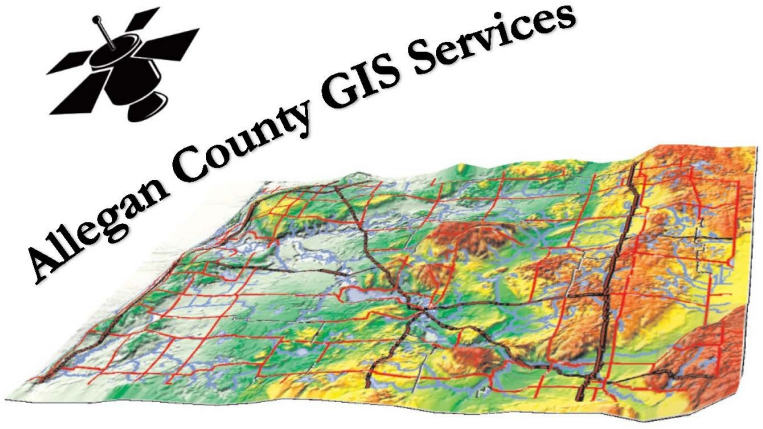

What We Do

Allegan County GIS
www.allegancounty.org/gis

August 14, 2018

Contents

Part I

Brand

Chapter 1

Awards

1.1 The GIS Champion Award

1.1.1 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}
\usepackage{multicol}
\setlength{\columnseprule}{0.4pt}
\columnwidth=0.3\textwidth

\begin{document}

%\TileWallPaper{4cm}{2cm}{CoLogo133x200.png}

\centering
\scalebox{3}{\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=1.25cm]{GIS_Logo_better.jpg}
%\end{minipage}
\vspace{-8mm}

\curlyframe[.9\columnwidth]{

\textcolor{red!10!black!90}
{\small Allegan County GIS Services}\\
\textcolor{green!10!black!90}{
\tiny recognizes}

\\
\uline{\textcolor{black}
{Ian Hanes}}
\\
\smallskip
\tiny Chief Equalization Technician
\smallskip

\textcolor{green!10!black!90}
{
\tiny as a
}
\smallskip
\tiny
\\
\textcolor{black}{\large \textsc{GIS Champion}}
\\
\vspace{1mm}
\textcolor{green!10!black!90}
{
\tiny for outstanding dedication and service to the community
\\while using GIS technology on this day
\itshape June 29, 2018
}
\vspace{3mm}

{\color{blue!40!black}
\scalebox{.6}{

\begin{tabular}{ccc}
```

```
\cline{1-1}
%\cline{2-2}
\cline{3-3}
%\cline{4-4}
%\cline{5-5}
\\
Neil Besteman  & &  Bryan May \\
GIS Manager & & GIS Analyst \\
\end{tabular}
}}}}
\end{minipage}

}
\end{document}
```

Part II

Methods

Chapter 2

Documentation

2.1 About Documentation

2.1.1 How Jalapeño Works

General 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
documentation	resources used in Jalapeño
processing	.tex douments and build folders
source	common image files

...\jalapeno\documentation\..

folder or file	description
moduleTemplates	.tex templates
packageDocs	LaTeX documentation
references	reference and appendix resources
unsorted	catch all for unsorted documentation
BookStructureMM.mm	A mindmap of jalapeno

...\jalapeno\processing\..

folder or file	description
...Part	folders of book *part*s
build	LaTeX workspace and location of .pdf output and referenceEntries.bib*
commonTitle.tex	code for all title pages
fullCompile.sh	shell script to compile GISDocumentation.tex
GISDocumentation.tex	master document code
glossaryEntries.tex	entries that appear in glossary
indexEntries.tex	entries that appear in the index
preamble.tex	preamble code for all documents

***Note about referenceEntries.bib** Any reference entries built here can be cited in any .tex document in the project.

Using the glossary

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 LaTeX 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:** 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. For example:
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.

Using the bibliography(References)

Bibliography requirements: Compiling the bibliography requires running bibtex either in a 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.

For example, the command:...\bibliography{referenceEntries}
...places the bibliography called referenceEntries.bib which must be in 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:** 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:

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

To add the bibliography to the subdocument:

- Similar to adding to the master document but not documented here.

Using the Index

Index requirements: Compiling the index requires running the makeindex command either in a 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:** 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

Using index terms in 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.

Using the Appendices

2.2 Document Storage Concepts

2.2.1 GIS File Standard

Folders inside the project folder

Lets talk about map projection

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

Chapter 3

Team Concept

3.1 Team Structure

3.1.1 Paired Programming

A paragraph about pp from Joy Inc.

Part III

Service

Chapter 4

Applications

4.1 Applications for Treasurer Dept.

4.1.1 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 Current Tax Forfeiture workflow is built on MapInfo software which has been replaced by ESRI software. The Forfeiture data collection application must be recreated in the ESRI framework.

Analysis Tax Forfeiture Application will facilitate:

- Mobile data collection on handheld device via Collector for ArcGIS configured with Allegan County GIS Portal (**device app**)
  - Device app will:
    - Synchronize with data in the office (online)
    - Navigate to forfeiture sites (offline)
    - Collect data and photos of forfeiture sites (offline)
    - Synchronize the collected data with data in the office (online)
- Daily form production and printing for each site visited with required data and images.

Design

Overview The Forfeiture Data Collection Application uses BSA, ArcGIS Desktop, ArcGIS Collector for Android, and ArcGIS Portal web maps and apps to enable forfeiture data collection. A daily routine is supported that maintains forfeiture parcel data through the notification period.

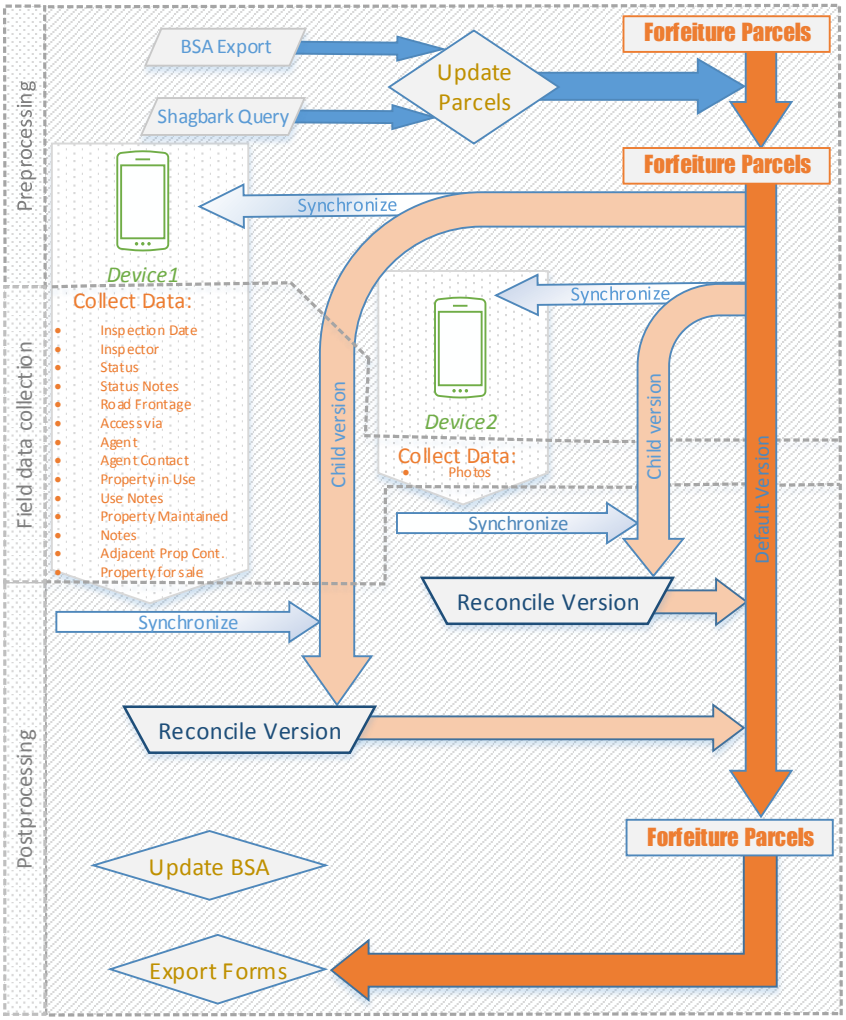

Figure 4.1: Project Design

The workflow is designed in three stages: Preprocessing, Field Collection, and Postprocessing. The key dataset, Forfeiture Parcels, is a map feature class that is exposed through the internal network or externally via an internet map

service. In preprocessing, the data is updated to match the Treasures data in BSAforfeiture.net and synchronized to two android mobile devices. In field data collection, the two mobile devices are used to collect info required.In postprocessing, the mobile devices are syncronized back to the network data and a form is exported for each site visited that day.

BSA data export Details of parcels in the forfeiture process are managed in BSA Delinquent Tax.net. The Treasurer office has a BSA export the parcels that need a site visit. Export of the updated list is the beginning of the daily routine in this workflow.

ArcGIS Desktop tasks Tools are designed to preprocess and postprocess 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 syncronizes 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 configured to work offline(without an internet or cellular connection) by syncronizing before and after fieldwork.

ArcGIS Portal Webmaps and Apps Live data from a publishing (replica of ACPro) enterprise geodatabase (ACPub) running on SQL Server database server (acintsql01) is provided through a feature service (REST service) named TaxReversionParcels. A webmap called Forfeiture Field Map consumes the TaxReversionParcels feature service exposing the forfeiture parcels, for editing. The Forfeiture Field Map is configured to work in the ArcGIS Collector App. The app downloads the webmap, allowing the user to collect the necessary information on each forfeiture parcel in the field disconnected and uploads the changes when reconnected.

Forfeiture Data Collection Three parts of the daily routine:

1. Pre-processing (in the office):
    - Export current forfeiture list from BSA
    - Update webmap layers with results from BSA export
    - Synchronize from webmap layers to field collection device **(device app)**
2. Field data collection with device app:
    - Support navigation to forfeiture sites
    - Provide a checklist of data points about the site

- Attach photos to the site
- Save results for synchronization in post-processing

3. Post-processing (in the office)
   - Synchronize data and images collected in device app to webmap layers

Backend data details

Location of production data

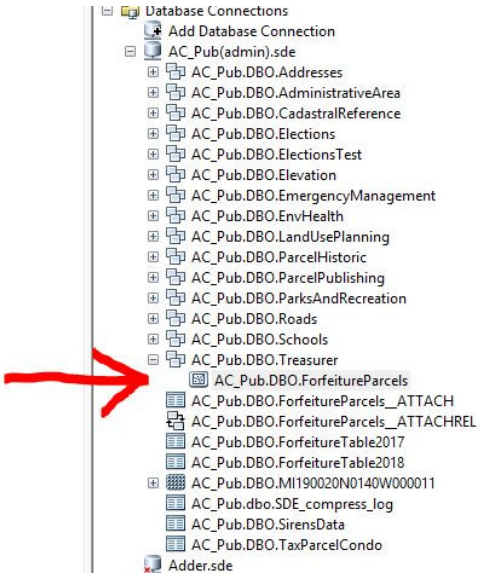

Figure 4.2: live data

ForfeitureParcels feature class

Collector for ArcGIS

Webmap details

Hard Copy Record

User Manual

Admin Tasks

Setup Users in ArcGIS Users that will run Pre and Post processing scripts must be created and given priviliges on ACPub Treasurer Feature Data Set.

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.

Collector Setup Details

Install Collector for ArcGIS

- Available from the Google Play Store

Configure Collector

- Connect to Allegan County GIS
  - Choose or add the connection:

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

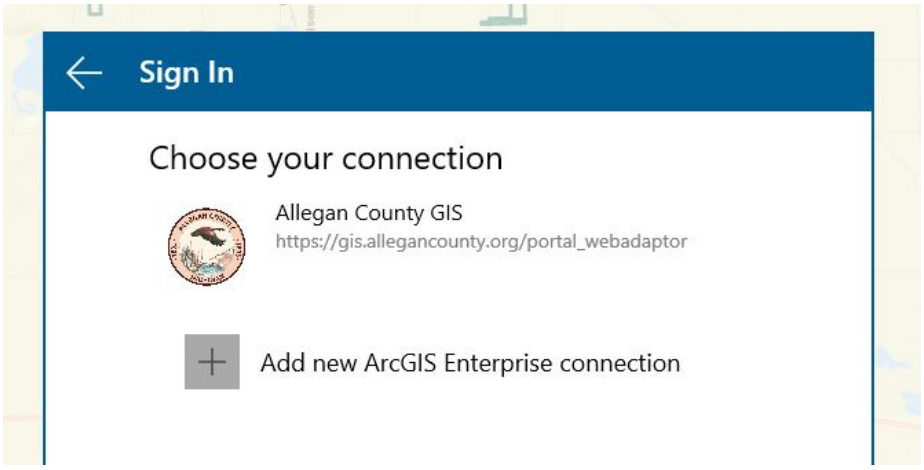

Figure 4.3: Collector Connection

  - Username is JMorris or CAndress

  - Password: (enter password)

- Find the map Forfeiture Field Map under Treasury Services
- Download the field map
- Select area needed and detail needed and download the webmap

Daily Preprocessing Routine

Execute Preprocessing Script A tool in ArcGIS that:

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

Synchronize Webmap In Collector for ArcGIS, push the sync button on the Forfeiture Field Map

Forfeiture Data Collection

Navigation Either device can be used to search for parcels and navigate to them.

Device 1 Field Operation In the Forfeiture Field Map, for each site visited, select the desired parcel, push the edit button and collect the following attributes. Save at the end of each parcel collection:

Device 2 Field Operation In the Forfeiture Field Map, for each site visited, select the desired parcel, push the edit button and then the add attachment button. Select photo, and take a photo.

Daily Postprocessing Routine Back at the office

Sync Edits Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Field Name	Entry Type	Note
Property Number	Prefilled	NA
Inspection Date	Autofill or Dropdown	NA
Inspector	Dropdown	NA
Class	Prefilled	Missing!
Acres	Prefilled	Missing!
Address	Prefilled	NA
Status	Dropdown	NA
Status Notes	Open entry	254 Character limit
Road Frontage	Dropdown	Yes or No
Access via	Open entry	30 Character Limit
Agent	Open entry	30 Character Limit
Agent Contact	Open entry	30 Character Limit
Property in use	Dropdown	Yes or No Missing!
Use Notes	Open entry	254 Character limit
Property Maintained	Dropdown	Yes or No Missing!
Notes	Dropdown	254 Character Limit(maintNotes!)
Property Contaminated	Dropdown	Yes or No Missing!
Notes	Open entry	254 Character limit Missing!
Adjacent Property Contaminated	Dropdown	Missing!
Notes	Open entry	254 Character limit Missing!
Property for sale	Dropdown	Yes or No
Posted	Prefilled	Handled in Pre and Postprocessing
InList	Prefilled	Handled in Preprocessing
PostedInList	Prefilled	Handled in Preprocessing
Print Today	Dropdown	Yes or No

reconcile Versions Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Print forms for site visits Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper

in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Update BSA Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Etiam lobortis facilisis sem. Nullam nec mi et neque pharetra sollicitudin. Praesent imperdiet mi nec ante. Donec ullamcorper, felis non sodales commodo, lectus velit ultrices augue, a dignissim nibh lectus placerat pede. Vivamus nunc nunc, molestie ut, ultricies vel, semper in, velit. Ut porttitor. Praesent in sapien. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Duis fringilla tristique neque. Sed interdum libero ut metus. Pellentesque placerat. Nam rutrum augue a leo. Morbi sed elit sit amet ante lobortis sollicitudin. Praesent blandit blandit mauris. Praesent lectus tellus, aliquet aliquam, luctus a, egestas a, turpis. Mauris lacinia lorem sit amet ipsum. Nunc quis urna dictum turpis accumsan semper.

Software

ESRI Licensed Products

ArcDesktop

Enterprise ArcGIS Deployment

Collector for ArcGIS Developed and tested on Android(7.0)

Chapter 5

Tools

5.1 ESRI Tools

5.1.1 COGO Tools in ArcGIS

TEXT

5.2 LaTeX Packages used by AC GIS

5.2.1 float Package

usepackage

```
text
```

Simple Use

```
text
```

Options

```
text
```

Add optional arguments to the usepackage line:
Useful options:

- **OPTION NAME**
  OPTION NOTE
- **OPTION NAME**
  OPTION NOTE

Use with options

```
text
```

Commands

5.2.2 graphicx Package

usepackage

```
text
```

Simple Use

```
text
```

Options

```
text
```

Add optional arguments to the usepackage line:
Useful options:

- **OPTION NAME**
  OPTION NOTE
- **OPTION NAME**
  OPTION NOTE

Use with options

```
text
```

Commands

5.2.3 hyperref Package

Introduction

Official hyperref package documentation

Note: Add the *hyperref package* to the preamble **last** [2].

```
\usepackage[options]{hyperref}
```

Simple Use

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

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

Website with tutorials

Options

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

Use with options

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

Commands

`\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.
```

5.2.4 import Package

usepackage

```
text
```

Simple Use

```
text
```

Options

```
text
```

Add optional arguments to the usepackage line:
Useful options:

- **OPTION NAME**
  OPTION NOTE
- **OPTION NAME**
  OPTION NOTE

Use with options

```
text
```

Commands

5.2.5 standalone Package

Introduction

Link to official standalone documentation

standalone provides a **package** and a **class**

- The *standalone* **package** is used for:
  - Main documents that will input or import sub documents.
  - For example:

    ```
    \usepackage[subpreambles=false]{standalone}
    ```

    * Ignores preambles of imported sub documents [3, pg.4]
- the *standalone* **class**:
  - Is a document class
  - Provides standalone / subdocument switches and options
  - For example:

    ```
    \documentclass[class=article]{standalone}
    ```

    * behaves as an article when standalone
    * makes document available for import into a master document

Simple Use

- The *standalone* **package**
  - In the main document:

    ```
    \documentclass[openany]{book}

    \preamble...

    \usepackage{standalone}
    ```
- the *standalone* **class**:
  - In any subdocument:

    ```
    \documentclass[class=article]{standalone}

    \preamble...
    ```

Options

- The *standalone* **package**
  - **subpreamble**
    - default value of subpreambles is *false*
- the *standalone* **class**:
  - **crop**
  - **titlepage**
  - **twoside**
    - Makes pagination style match book
    - default value is *false*
  - **multi**
    - `multi=true|false`
    - `multi={<environment name>, ...>}`
  - **float**

Use with options

- the *standalone* **package**:
  - `\usepackage[subpreambles=false]{standalone}`
- the *standalone* **class**:
  - ```
    \documentclass[class=article , crop=false,
        titlepage, twoside,
        multi={itemize, figure, verbatim},
        float=false]{standalone}
    ```

Commands
    ```

5.2.6 wrapfig Package

usepackage

```
text
```

Simple Use

```
text
```

Options

```
text
```

Add optional arguments to the usepackage line:
Useful options:

- **OPTION NAME**
  OPTION NOTE
- **OPTION NAME**
  OPTION NOTE

Use with options

```
text
```

Commands

5.3 LaTeX Templates

5.3.1 LaTeX Section Template

```
%\documentclass[class=report , crop=false, multi={itemize, figure}, float=false]{standa
\documentclass[class=book , crop=false]{standalone}

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

\def\titlename{Section Template}

\title{\input{../../../commonTitle}}  % closing brace for title

\begin{document}% Document Begins

\input{../../../commonFront} % provides standalone options

\section{SECTION NAME HERE}

\subimport{RELATIVE PATH TO NEW Section/}{NEW SUBSECTION Subsection.tex}

%eg.
%\subimport{latexTemplatesSection/}{subsectionTemplateSubsection.tex}
% etc...

\end{document}
```

5.3.2 LaTeX Subsection Template

```
\documentclass[class=book , crop=false]{standalone}

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

\def\titlename{Subsection Template}

\title{\input{../../../commonTitle}}  % closing brace for title

\begin{document}% Document Begins

\input{../../../commonFront} % provides standalone options

% NEW INFO GOs HERE.
\subsection{Subsection Template}
```

```
\medskip
```

5.4 PDF Tools used by AC GIS

5.4.1 Introduction

Pupose and Summary **Workflow Purpose:** Optimization of a large number of pdf docs.
Workflow Summary: Uses Python to create a list of .pdf docs in a folder and creates a batch file to optimize the pdfs in the list to another location. The batch process calls ghost script for the optimization.

requirements Opensource software:

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

5.4.2 Python(2.7)

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

Script that creates a batch file

```
import os, sys

project = os.path.dirname(os.path.dirname(__file__))
processing = os.path.join(project, 'processing')
#source = os.path.join(project,'source')
build = os.path.join(project,'build')
sourcepdf = os.path.join(build, '20180716')

inString1 = "gswin32 -sDEVICE=pdfwrite -dCompatibilityLevel=1.4
-dPDFSETTINGS=/ebook -dNOPAUSE -dQUIET -dBATCH
-sOutputFile=J:\\Projects\\2018ParcelAtlas\\build\\optimized\\"

inString2 = " J:\\Projects\\2018ParcelAtlas\\build\\20180716\\"

batchdoc = os.path.join(processing,"bDoc.txt")

#   Main
################################################################################

if __name__ == "__main__":

    list1 = os.listdir(sourcepdf)
    l = open(batchdoc,'w')
    for i in list1:
```

```
        newi = i[1:]
        print newi
        t = inString1 + newi + inString2 + i + "\n"
        print t
        l.write(t)

    l.close()
```

5.4.3 ghostscript

About 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 downloloaded here.

5.4.4 Windows batch files

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\20180716
 \_02-001-001-00.pdf
```

5.5 QGIS Tools

5.5.1 Using COGO Tools in QGIS

Set up the Azimuth and Distance Plugin (Azd Plugin).

In the Plugins drop down(1), under the topography group select the **Azd Plugin(2)**(see fig.).

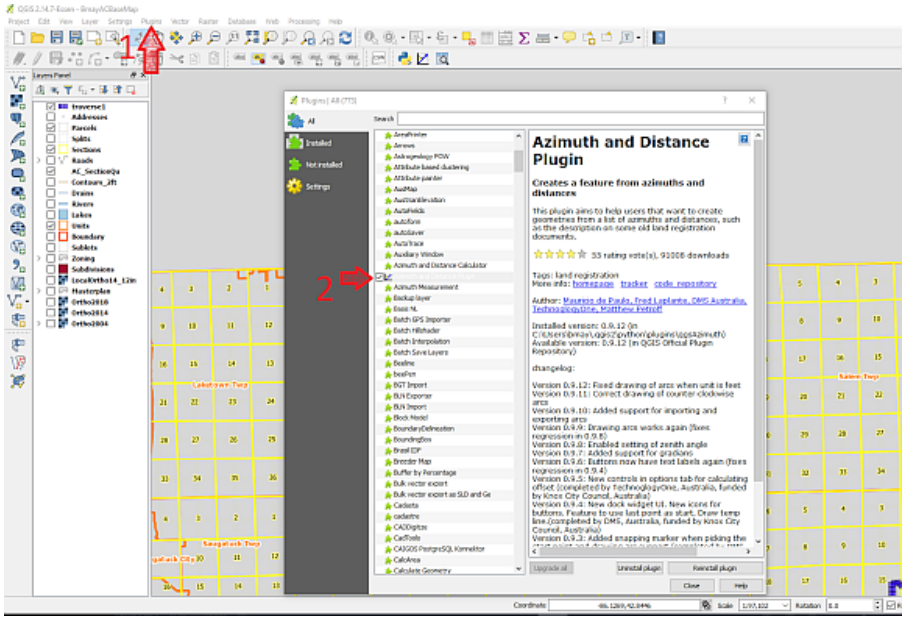

Figure 5.1: launch plugin

Note here which layer is active (see fig.).

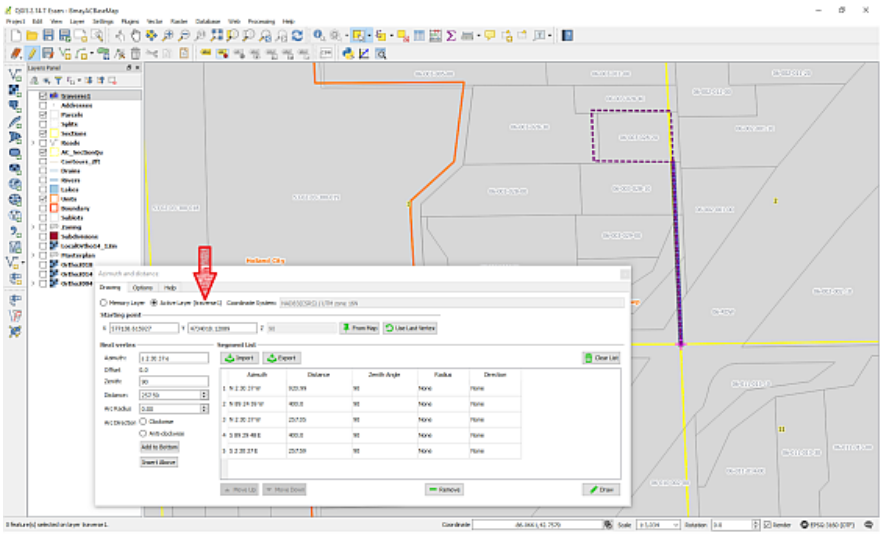

Figure 5.2: check active layer

If necessary, left click the layer ***traverse 1*** in Layer Panel to activate it(see fig.).

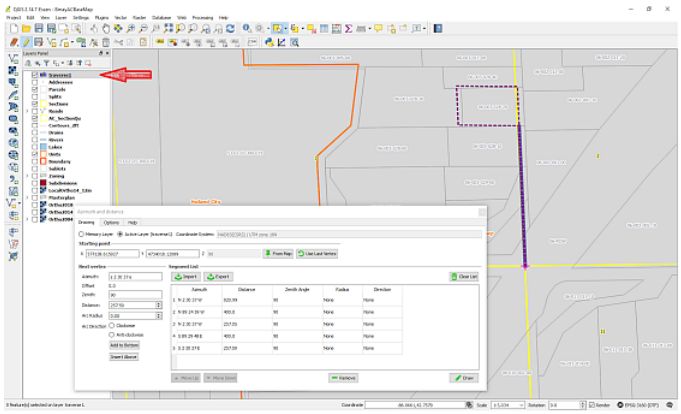

Figure 5.3: activate layer

Configure Options On Options Tab: Select Boundary, Bearing, Feet, and Degree radio buttons.

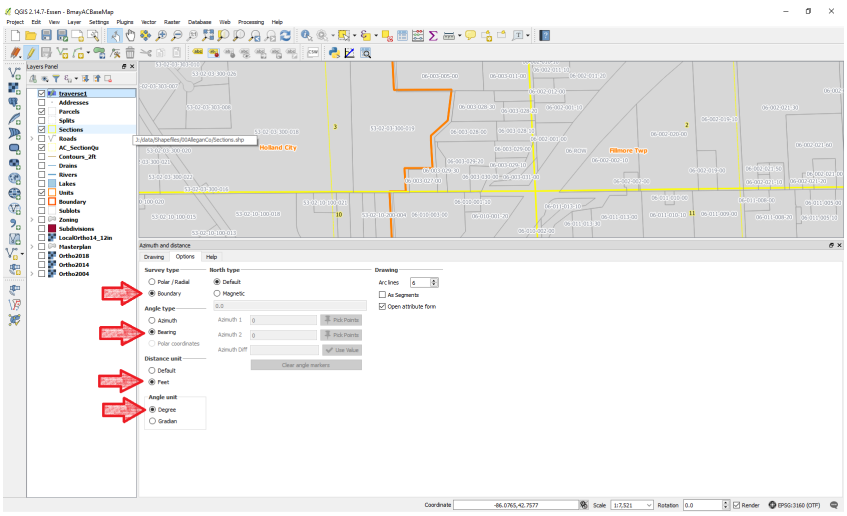

Figure 5.4: Plugin Options

Using the tool Boundary descriptions are entered into the Drawing Tab. Azimuth (bearing) and Distance are the important boxes (Set Offset = 0 and Zenith = 90 and ignore)(see below).

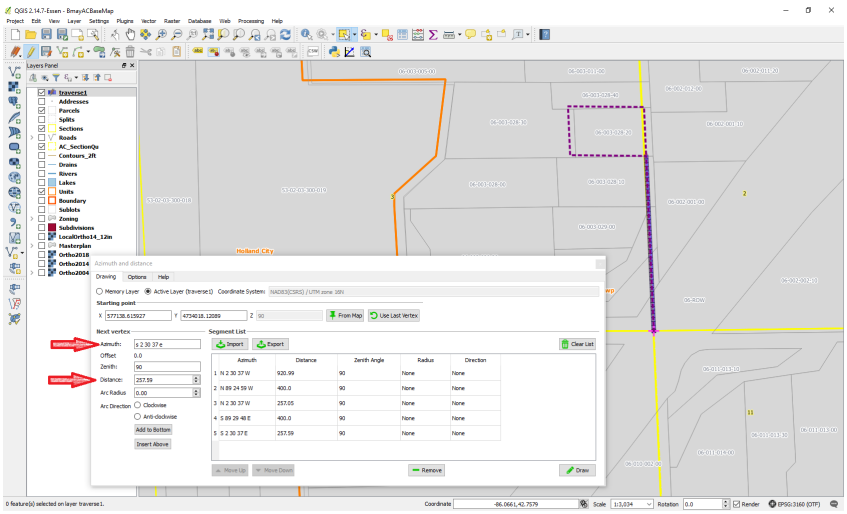

Figure 5.5: Entering Bounds

Configure editing environment

Use Settings Dropdown and Snapping Options to enable snapping to Sections, Quarter Sections, and or Parcels if desired (see fig.).

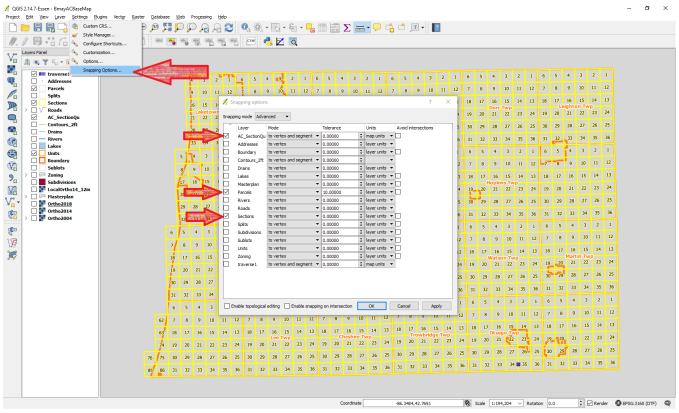

Figure 5.6: Configure editing environment

Locate Point of Commencement

To get to the Point of Commencement,

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

- Using Reference Layer
- Using Measuring Tool
- Search by Parcel Number (Search Layers Plugin)
- Draw COGO lines (Azd Plugin)(as described earlier)

Using Reference Layer Use reference layers; Units, AC_SectionsQu, Sections, and Parcels. Toggle layers on and off in Layers Panel and zoom in and out with mouse wheel.

Using Measuring Tool Use the measuring tool, make sure to set units to feet. To exit current measurement right click (see fig.).

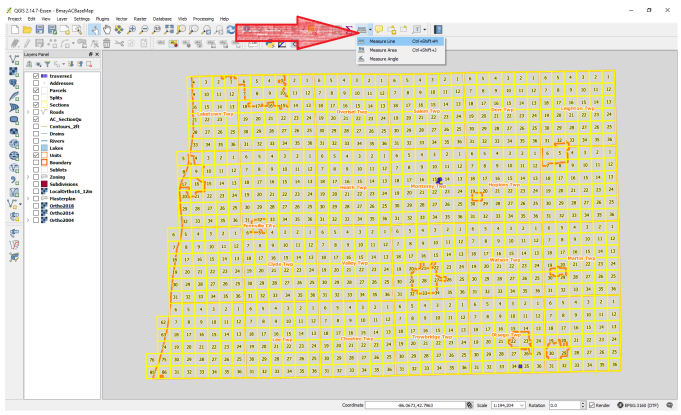

Figure 5.7: Measuring Tool

Search by Parcel Number (Search Layers Plugin.)

To Launch Search Layers Plugin:
In Plugins dropdown:
Enable the **Search Layers** Plugin. (see fig.)

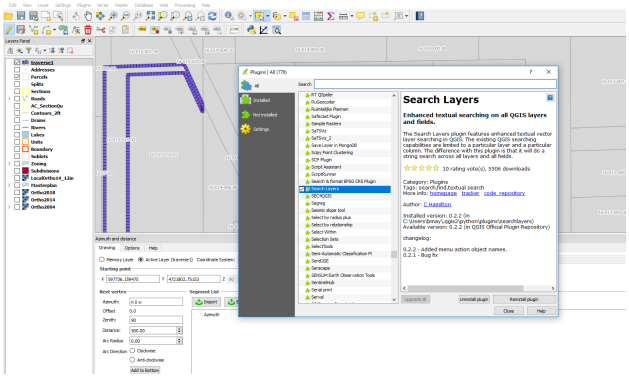

Figure 5.8: Search Layers Plugin

Enter parcel number (with dashes), Set layers, and set search field.(see fig.)

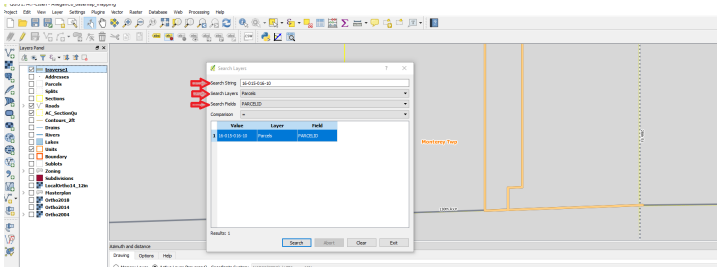

Figure 5.9: Search Layers Setup

Part IV

Resources

Appendices

A.1 Geography 101

Foundations of geography

A.1.1 A Primer on Coordinate Systems Commonly Used in Michigan

A Primer on Coordinate Systems Commonly Used in Michigan

References

[1] Artiflex, *ghostscript.com*, 2018. 38

[2] na, *The hyperref package*, CTAN, na ed., na na. 27

[3] Martin Scharrer, *The standalone package*, CTAN, 1.3a ed., 03 2018. 31

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