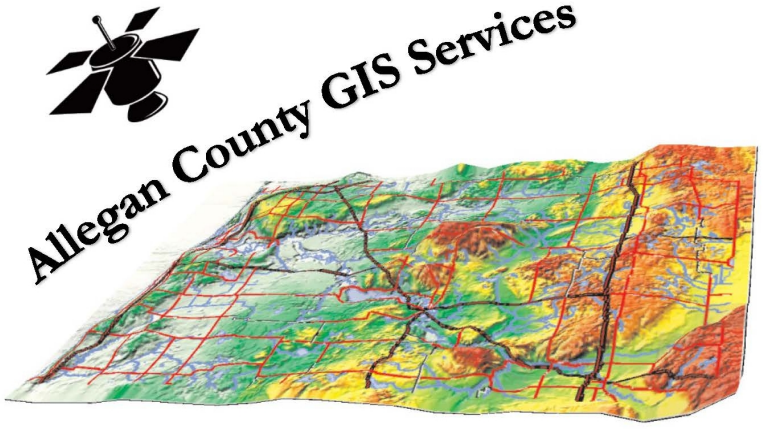

What We Do

Allegan County GIS
www.allegancounty.org/gis

August 3, 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

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

ForfeitureParcels Dat is in figurelive data

ForfeitureParcels Feature Class
Details about the data

Collector Setup Details

Install Collector for ArcGIS from Google Play Store

Hard Copy Record

User Manual

Software

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]{standalone}%Expe
\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.).

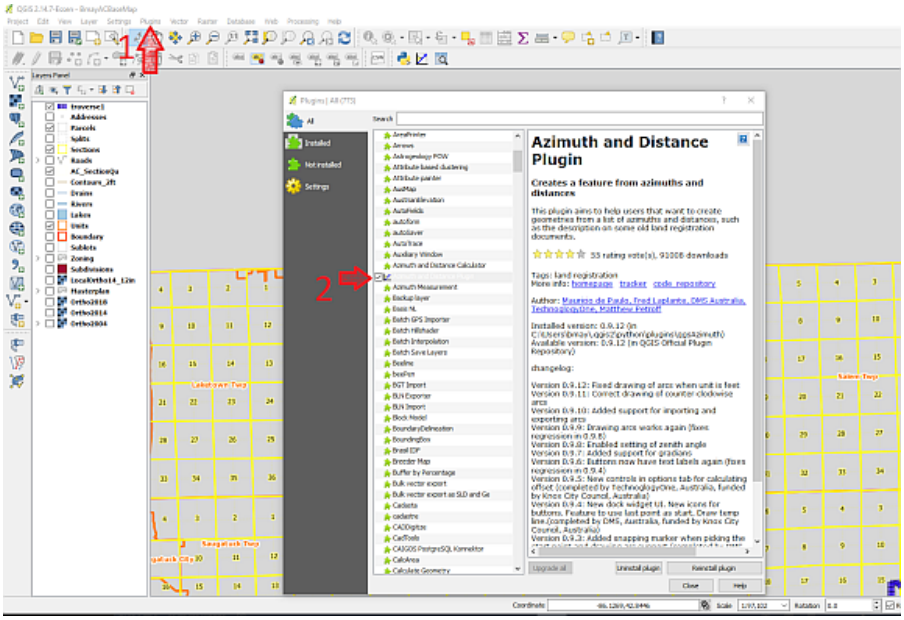

Figure 5.1: launch plugin

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

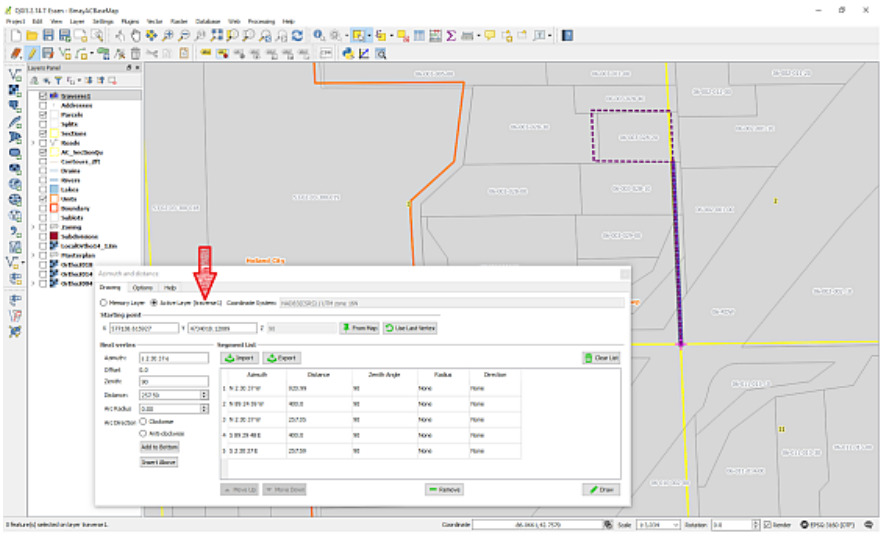

Figure 5.2: check active layer

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

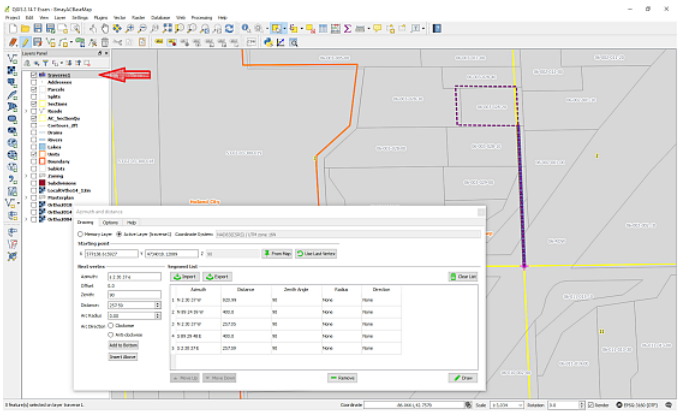

Figure 5.3: activate layer

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

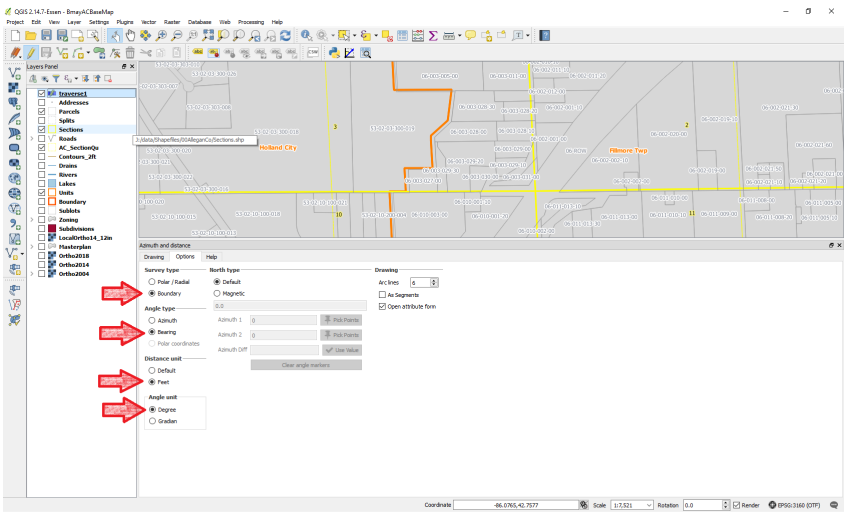

Figure 5.4: Plugin Options

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).

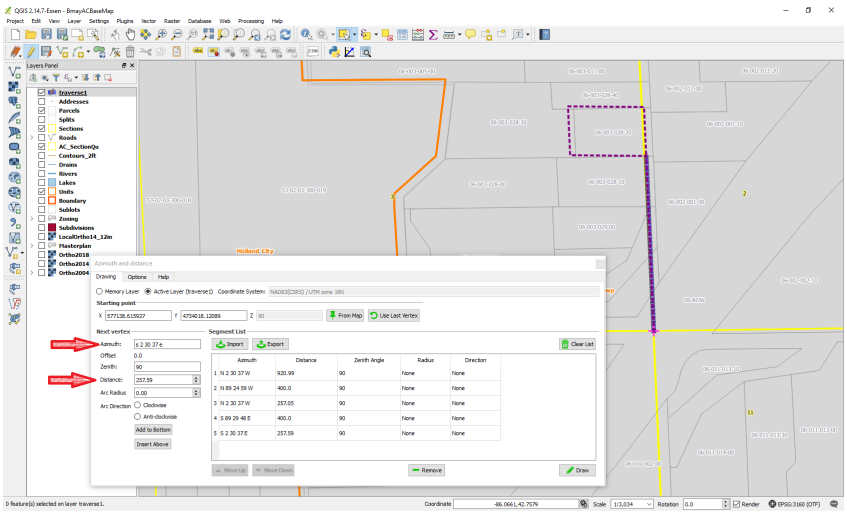

Figure 5.5: Entering Bounds

Configure editing environment

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

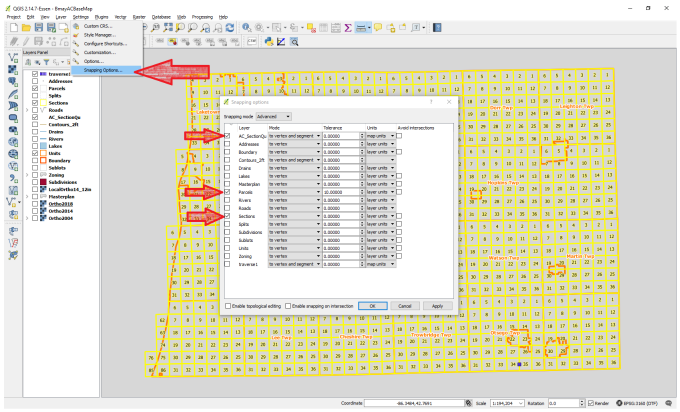

Figure 5.6: Configure editing environment

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.).

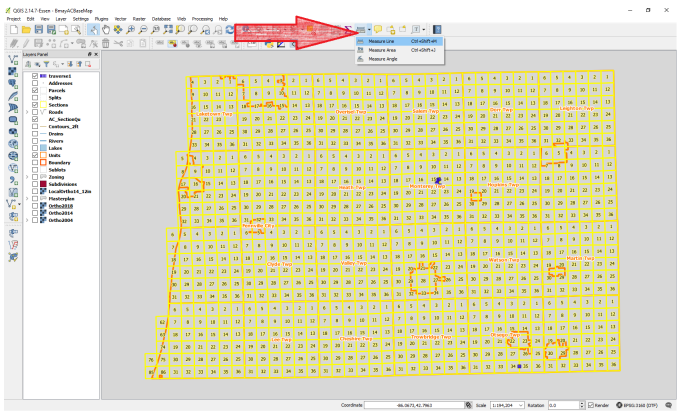

Figure 5.7: Measuring Tool

Search by Parcel Number (Search Layers Plugin.)

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

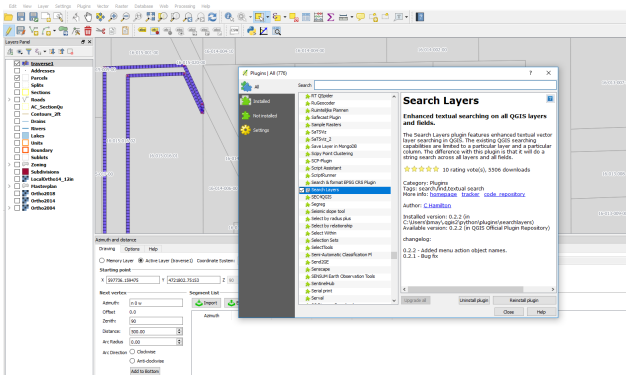

Figure 5.8: Search Layers Plugin

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

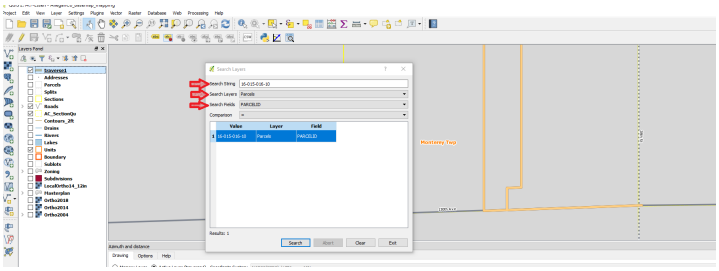

Figure 5.9: Search Layers Setup

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. 33

[2] na, *The hyperref package*, CTAN, na ed., na na. 22

[3] Martin Scharrer, *The standalone package*, CTAN, 1.3a ed., 03 2018. 26

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