# Connecting to WMS Services with MicroStation and Civil 3D

## Contents
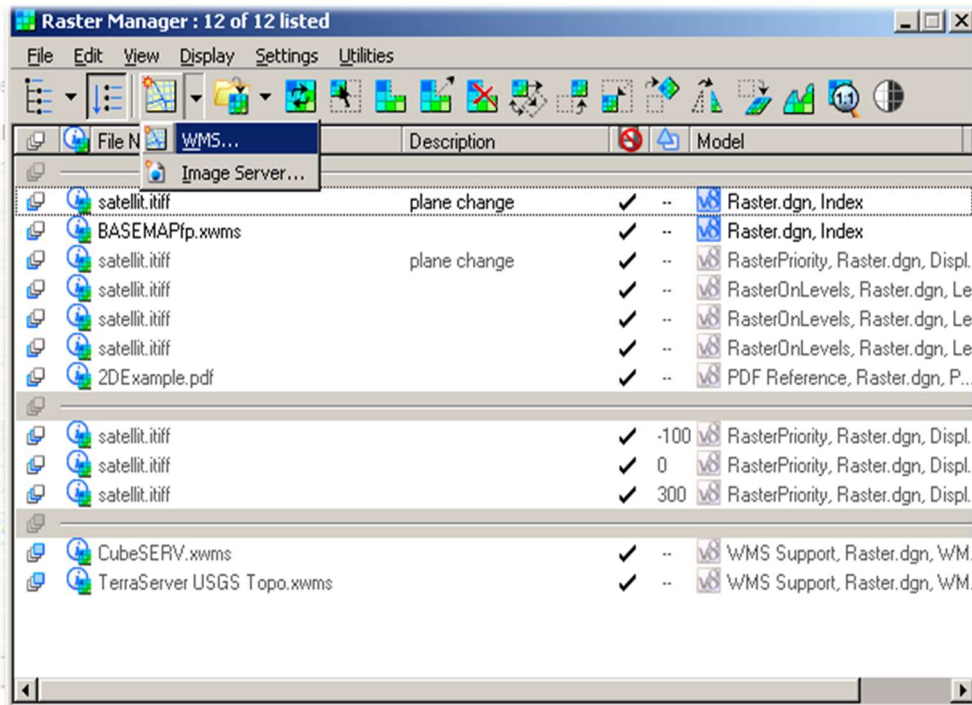
# Adding WMS layers in MicroStation

1. Check and/or Set your DWG's units and coordinate system. Pay attention to the Min/Max Lat/Long of the Coordinate system (this effects the bounding box of the map you'll pull into your DWG) and the units so you can select the correct Coordinate System for the WMS later
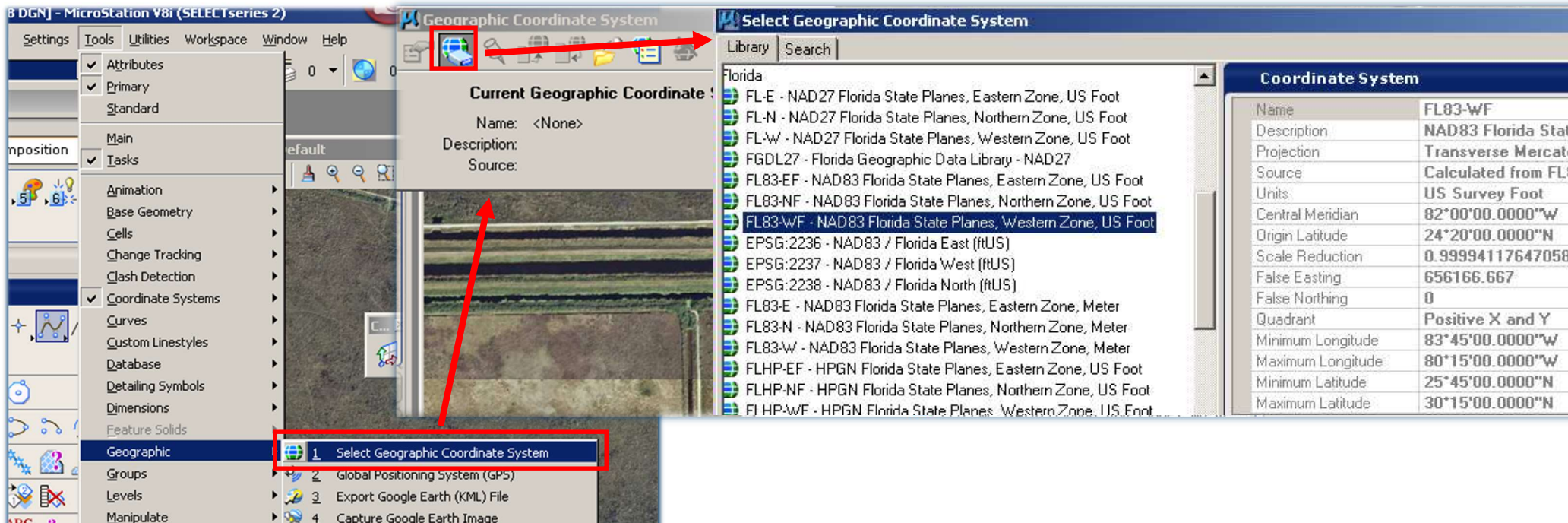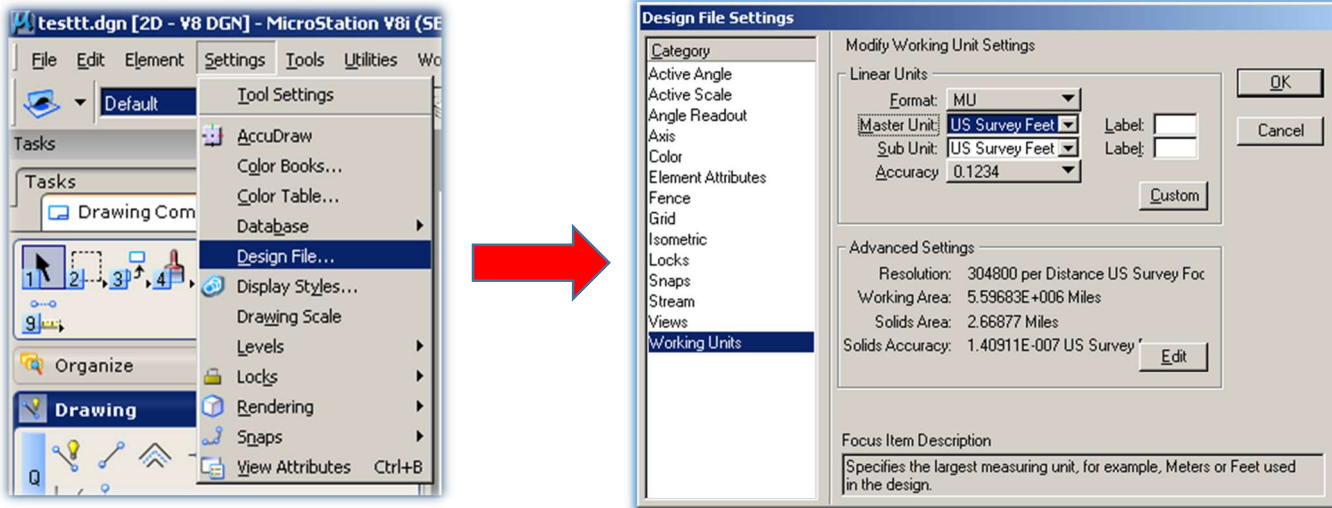
2. Open Raster Manger > open the WMS dialog

3. Connect to the WMS Server using its WMS URL

Click on ' Servers…' to open the dialog for entering the URL:
http://gisintra.dot.state.fl.us/ArcGIS/services/FL_DOT_Ortho_Imagery_ImageServer/MapServer/WMSServer

Once connected, the 'Available Layers' will be populated. Select the layer you want and click 'Add to map'

4. With the 'WMS Map Editor' dialog still open: Set the WMS Server connection's Settings

You'll typically want to specify the Coordinate System you want the WMS served in and the areal extent of the requested basemap . You may also want to choose a specific image format to receive the service in, such as JPEG of TIFF

*Setting the CS for the WMS*

## Setting the Extent of the requested WMS by manually entering Min/Max
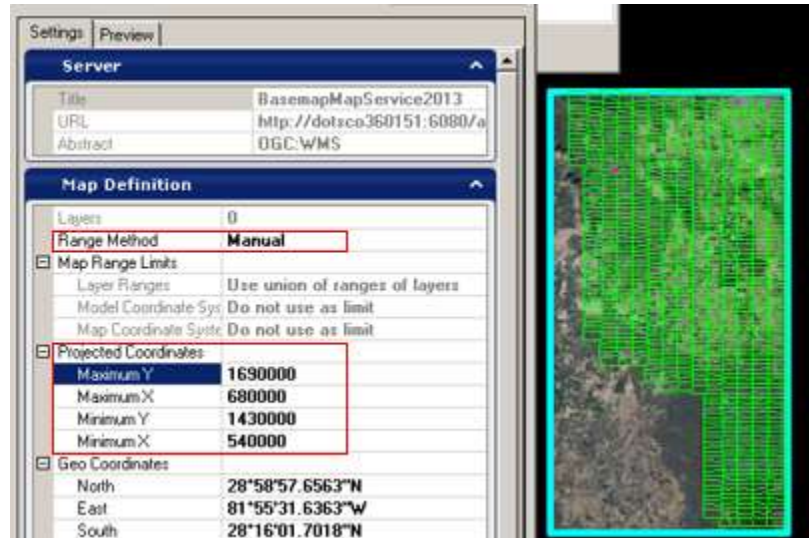


**Range Method= Use Range Limits**

Allows you to specify the requested map extent based on the Coordinate System range limits (their min/max lat/long)

**Range Method** = Manual

Then: Enter the bounding Min/Max in the Projected Coordinates fields for your AOI

5.  Click Save and Attach

This will save a .xwms file of this connection along with WMS Map Definition setting,
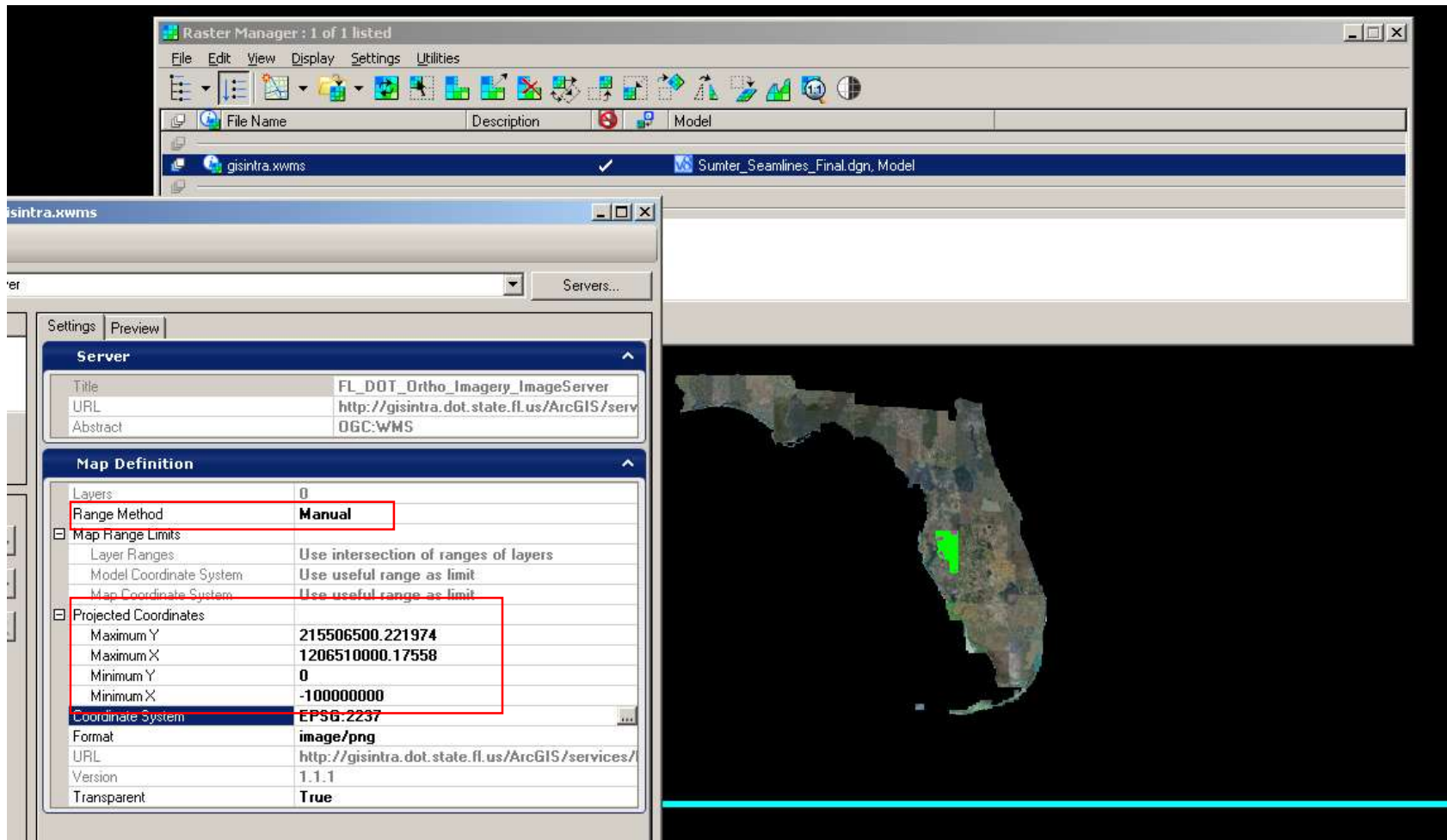
This .xwms file lets you simply attach the WMS to a DWG in the future, as you would with a typical raster. The .xwms file is essentially an XML file that stores the connection information and the Map Definitions settings you specified for the WMS.

The WMS layer should now be visible in your drawing. If not, double check your DWG/WMS connection's coordinate system & units

## Controlling the Map Extent of your WMS Layer

The default setting for a WMS' Map Definition Settings is **Range Method**: *Use Range Limits*. This will limit the basemap's extent according the range limits of the coordinate systems involved (i.e. their areas of use). In ~every case when doing design work you'll want to limit the basemap according to these settings and ensure you are connecting to WMS with the right coordinate system for you project's area (i.e. the coordinate systems of the DGN and the WMS connection's settings  have the same datum, units and state plane zone). The spatial alignment will degrade outside of the area of use. The basemap is served to you in the coordinate system you select, and in general, should be viewed in the corresponding state plane zone.

If this need for accuracy isn't necessary for your purposes for whatever reason, you can set the Range Method = Manual and then modify the Min/Max values of the Latitude and Longitude. E.g. below I've manually adjusted these values to show the entire statewide basemap… but again, for design purposes, you'll want to stick to the zone limits for accuracy.

6. Optional: further refine the extent of the WMS layer by using the Raster Manager's Clip tool

    Activate the Clip tool in Raster Manger > draw you bounding box in your DWG > *accept* the Clip to redefine the base map's extent
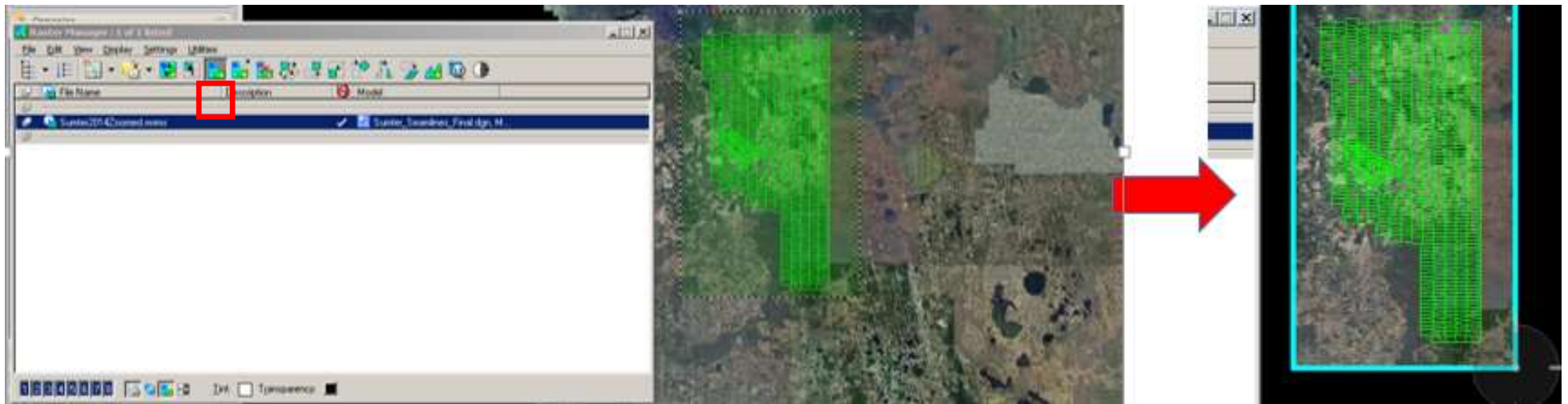


    There's also a Modify Clip tool on the toolbar which lets you interactively redefine the extent, as well as a Remove Clip tool to undo the clip.

*Note: for Clip to be functional you may need to first modify the properties in the .xwms by setting the Geometry to "Inherit GeoCS from Model". Double Click on the xwms file in Raster Manager to open the Element Information window > navigate to the Geometry tab and set Inherit GeoCS from Model = Inherited.
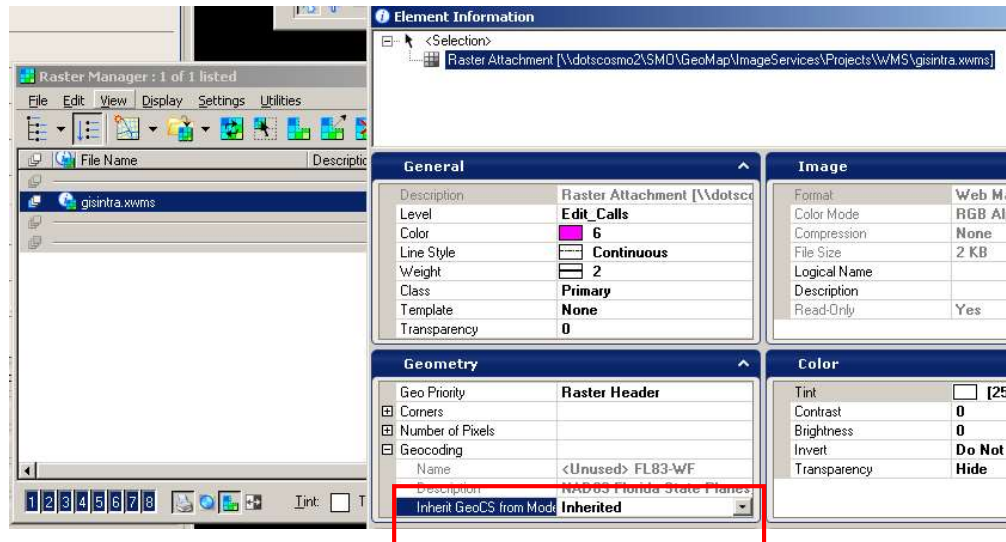
# Adding a WMS layer in Civil 3D using a WMS Server Connection

1. **Set and/or check your coordinate system**.

    Ensure you've selected the coordinate system on the appropriate datum, in the correct state plane zone and uses the correct units.

    Note the chosen coordinate system's EPSG Code for future reference

## Command line:
## ADESETCRDSYS

## 2. Establish a WMS Server connection

Open the Task Pane/Display Manger Tab > click the Data icon > 'Connect to Data…'  > 'Add WMS Connection'

With the Add New Connection Dialog open, enter the URL of the WMS Server, provide a name for the connection and select the version of the WMS that the service is (If unsure, you can check the WMS version via a GetCapabilities URL request. Example shown below)

http://gisintra.dot.state.fl.us/ArcGIS/services/FL_DOT_Ortho_Imagery_ImageServer/MapServer/WMSServer

Note: secured services may prompt you for a login. Our services are hosted via our DOT intranet, so you can leave them blank

*Workflow for connecting to a WMS*



Command line: MAPWSPACE

Leave the UN and PW blank

*Checking the WMS version of a Service: example of a GetCapabilities request via a Browser/URL*

**3. Use the WMS Connection to add WMS layers to your drawing**

Select from the list of available WMS layers, Select the Coordinate System you want for the WMS, adjust other options as desired

**Note**: You may select the Image Format for the WMS. PNG supports transparency for 'no data' areas, but also seems to read whites as 'no data'

Once the setting are selected > 'Add to Map'

Check the box for the Layer you want

Select the CS you want it in

> 'Add to Map'
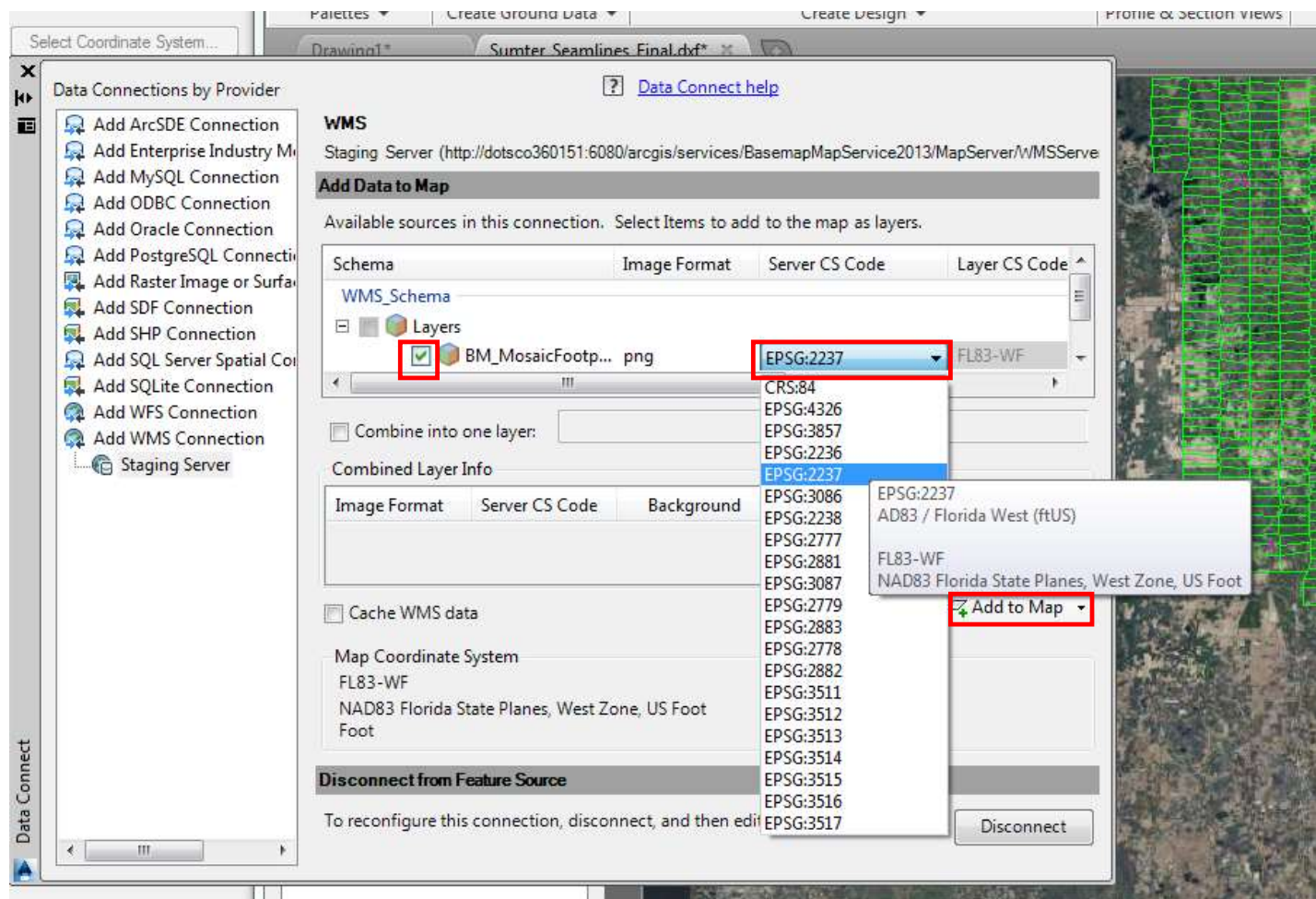
4. Adjust the display extent of the WMS if necessary

    By default, Civil 3D limits the WMS request to the approximate area of use for the coordinate system specified in the connection settings

    You can refine the display extent of the WMS by zooming to your AOI, then right-clicking on the WMS layer in the Pane > then using 'Resample Raster':

# WMS extents are limited by the approx. area of use for the selected CS
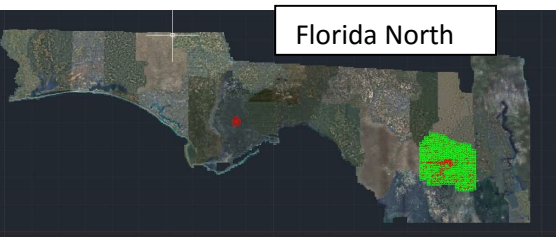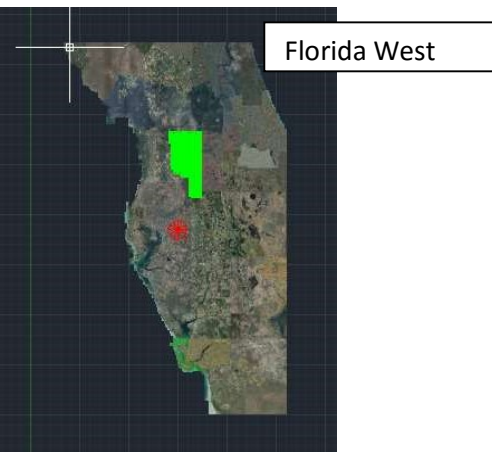
## 'Resample Raster' will set the WMS extent to the current view



Florida West



Florida North



WMS extent after resampling
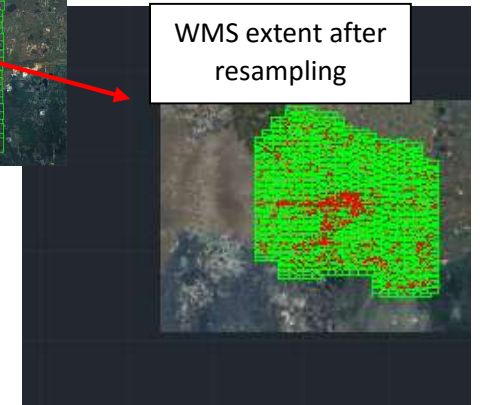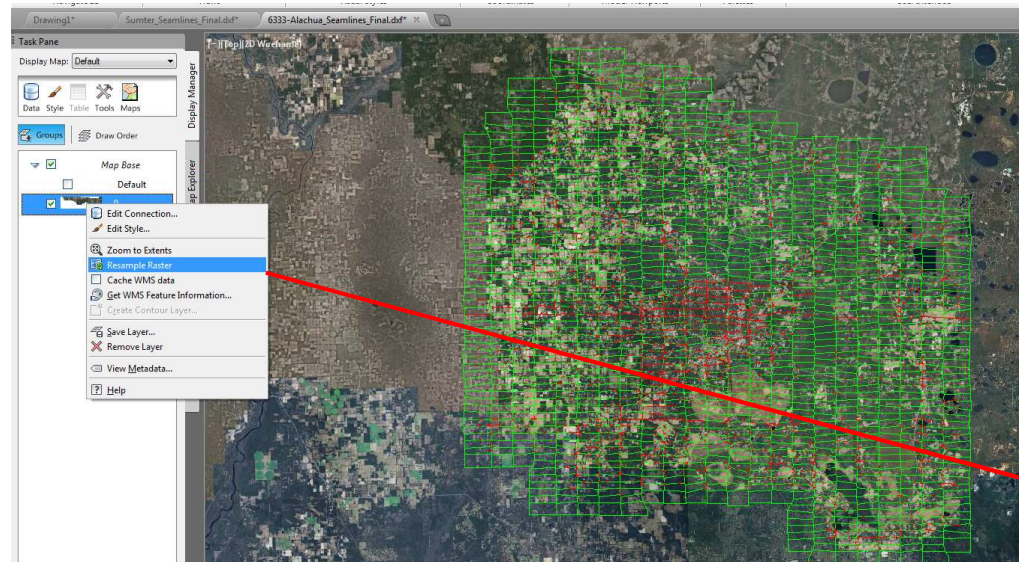
# Connecting to Services in Civil 3D using the ArcGIS for AutoCAD plugin

1. Download and install the plug-in: http://www.esri.com/software/arcgis/arcgis-for-autocad

   Once installed, you'll have an ArcGIS menu added to your Civil 3D ribbon

2. Use the ArcGIS ribbon menu to connect to a server via 'Add Service'. If there's no assigned coordinate system, you'll get a prompt (shown below)
   Follow the prompts to connect to and add the service
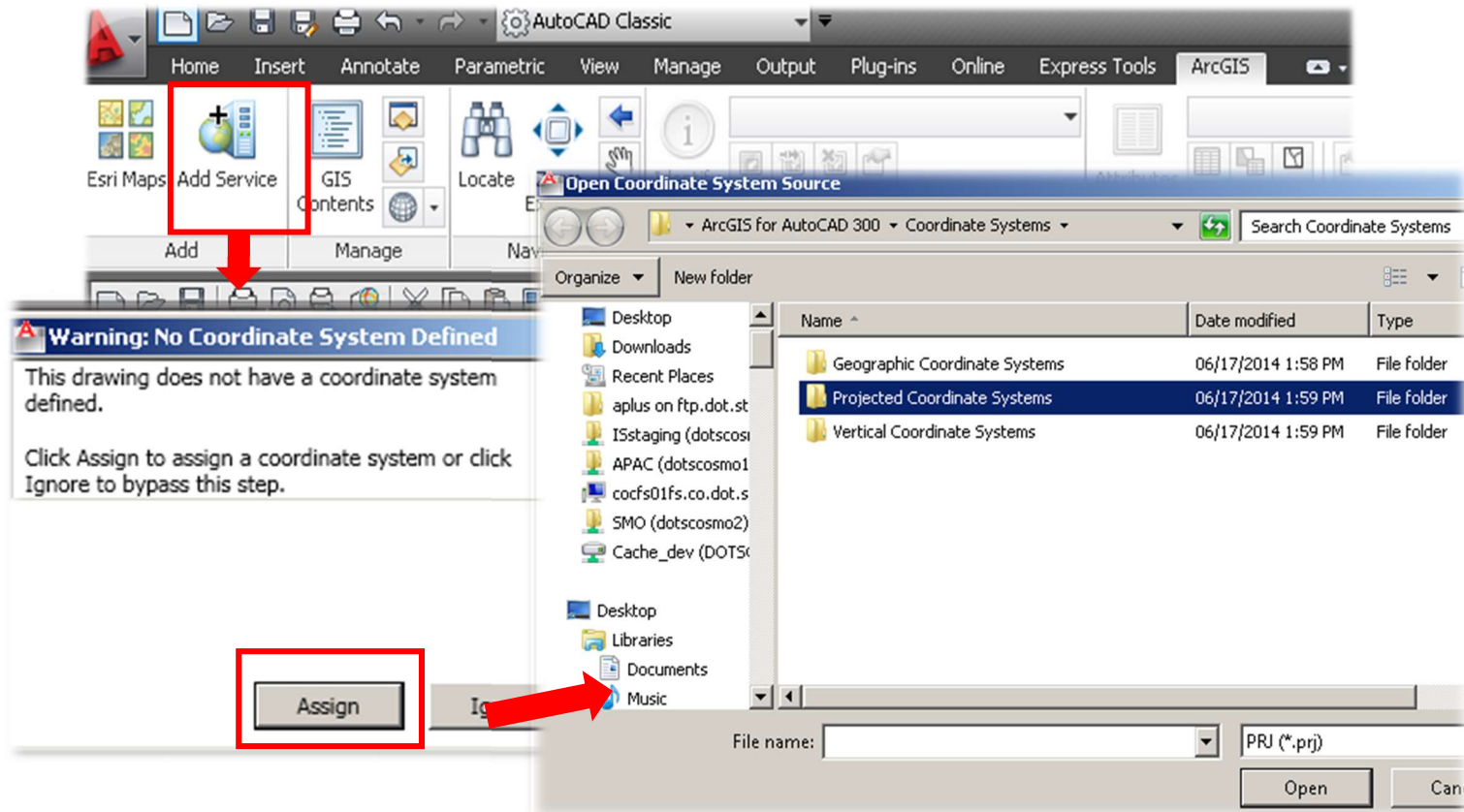
3. Connect to the Server using its root URL for the hosted services. E.g. http://gisintra.dot.state.fl.us/ArcGIS/rest/services/

You'll then have access to the various types of GIS services provided, as well as more advanced settings for the service requests and limited GIS functionality (e.g. access to the attributes/database behind the service, this will vary depending on the service).

Add layers as desired
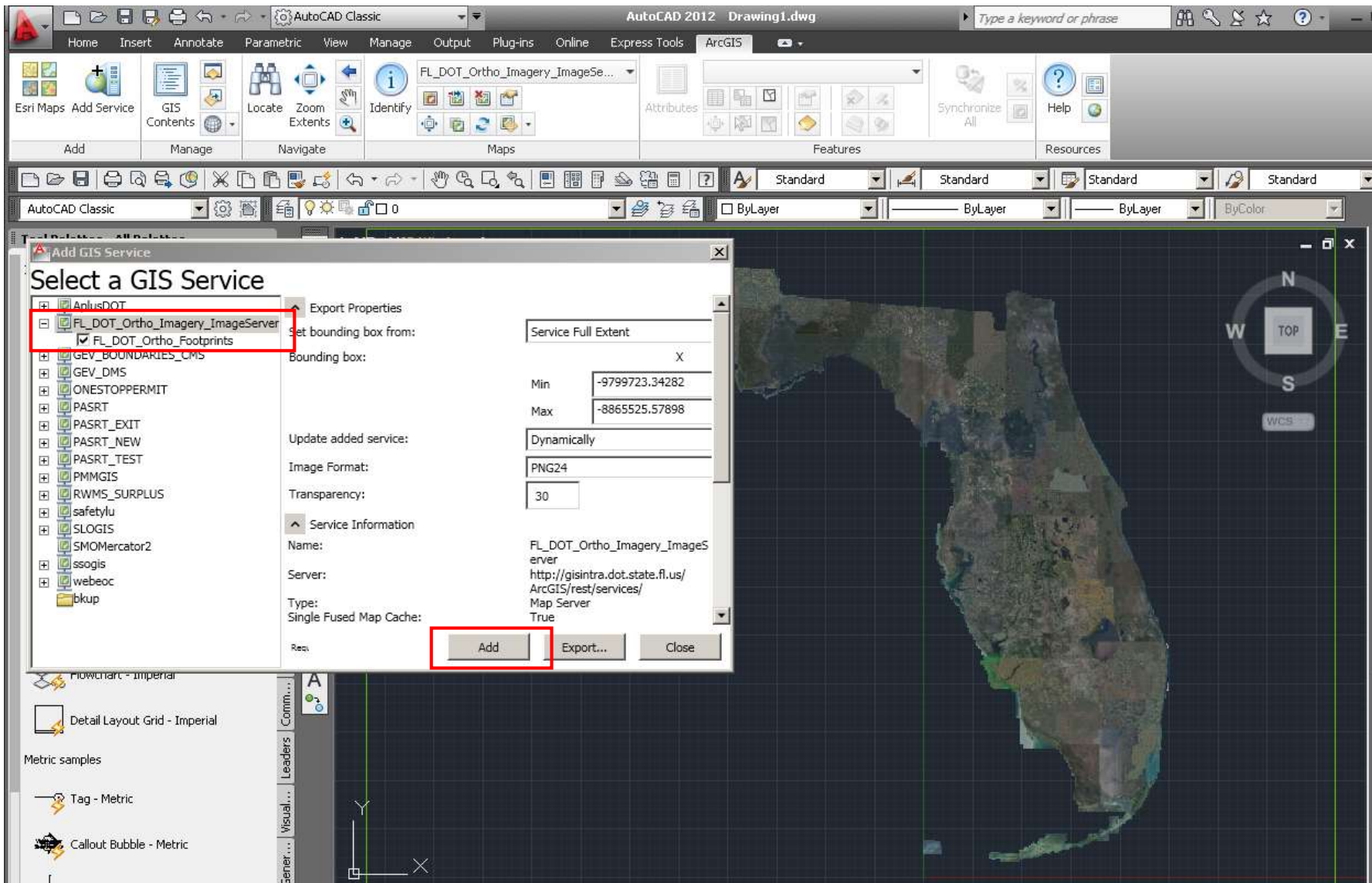
## Tracking Down a Service's Properties and WMS URLs

- Services produced with ESRI software will often have their service directories accessible via an internet browser. E.g. Our services' directory can be reached via http://gisintra.dot.state.fl.us/ArcGIS/rest/services/ . You can browse the service links to see their properties.
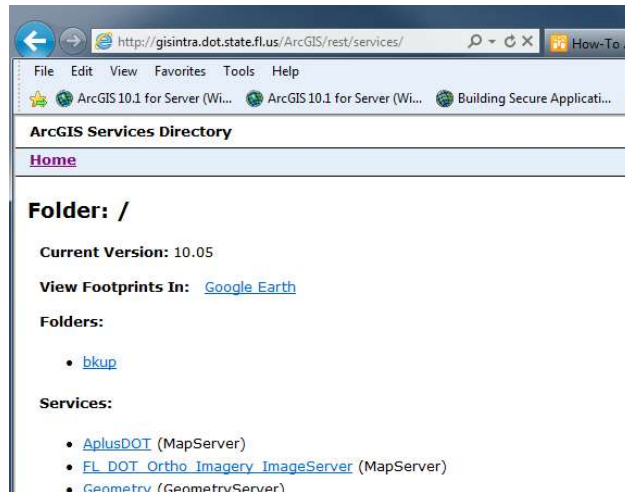


- Services that have an accompanying WMS version of the service will have a WMS link in their service properties directory that will open a new window containing information specific to the WMS service, including the URL needed to connect to it:
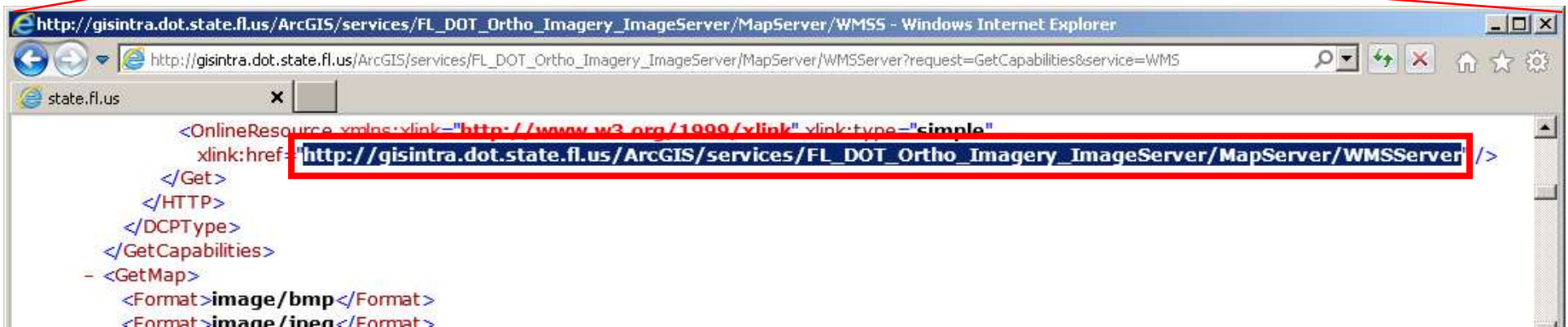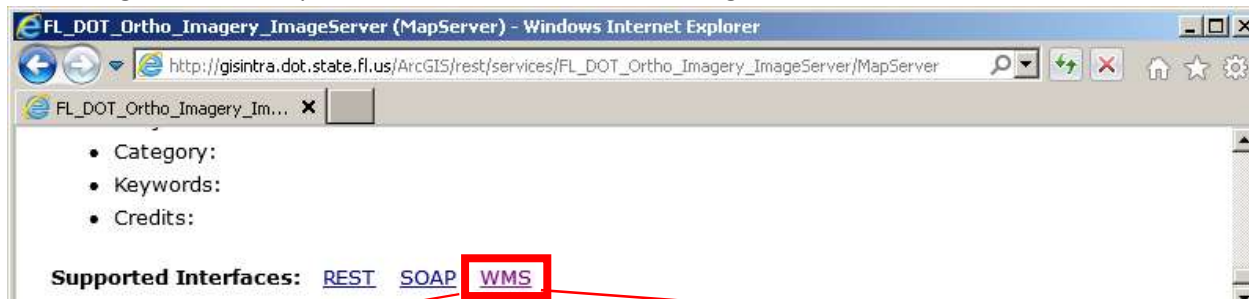
# SMO's Services

- Our Main Production Server (Shared with other offices):

  http://gisintra.dot.state.fl.us/ArcGIS/rest/services/

  Access point for numerous types of services

- Our basemap/aerial orthophoto map service

  http://gisintra.dot.state.fl.us/ArcGIS/rest/services/FL_DOT_Ortho_Imagery_ImageServer/MapServer

- **WMS URL** for SMO's orthophoto basemap:
  http://gisintra.dot.state.fl.us/ArcGIS/services/FL_DOT_Ortho_Imagery_ImageServer/MapServer/WMSServer


Metadata about our basemap map service

- The basemap is created from an image mosaic that places our most recent imagery on top (there's overlap between datasets and each county is flown ~ every 3 years)
- The source imagery are the county datasets in our Aerial Photo Archive Collection
  http://www.dot.state.fl.us/surveyingandmapping/documentsandpubs/aerial_years.pdf
- Scales available of our map service:
  o When we have recent 6 inch GSD (ground sampling distance) imagery available for an area,  we will create the basemap down to a scale of 1:564
  o Otherwise, urban areas/areas around highways will have the basemap created down to a scale of 1:1128
  o Rural areas, not in close proximity to a major road, have their basemap created down to 1:4513


# Please direct questions/comments to…

/discovered errors/requests for service modifications, updates, improvements and future imagery-based services to:

Michael Nesius (current basemap administrator): Michael.nesius@dot.state.fl.us 850-414-4669 or

SMO's Image Services section: imageservices@dot.state.fl.us  850-414-4111

## Appendix: Background/Ancillary Information

A **Web Mapping Service (WMS)** is a standard protocol for serving georeferenced maps. It is a widely used means of achieving interoperability between GIS and CAD software. This interoperability is achieved by making a map service accessible via URL requests that include information about the extent of the map requested, the coordinate system for the map, image format and a few other parameters. A WMS is essentially a bunch of snapshots/views of the underlying GIS map data. As such, a WMS loses the database related functionality that the map has in the native GIS, but it's great if you just need the visual of the basemap. One other important note, is that a WMS can only be reprojected to a coordinated system that has been added to the WMS' service properties (these supported coordinate systems show up in the drop down lists available when adding a WMS layer to your drawing). If you don't see the coordinate system you need on the list, let us know.

**Available Scale Levels for the WMS**: Because of limited resources, the basemap wasn't created for all scales in all areas. The default behavior of Civil 3D and MicroStation doesn't resample the WMS image when zooming in passed the available scale level (so the basemap will disappear when zoomed in too far).