Sidewalk Classification in an Urban Environment

Geog 342 Final Project 5/13/2010

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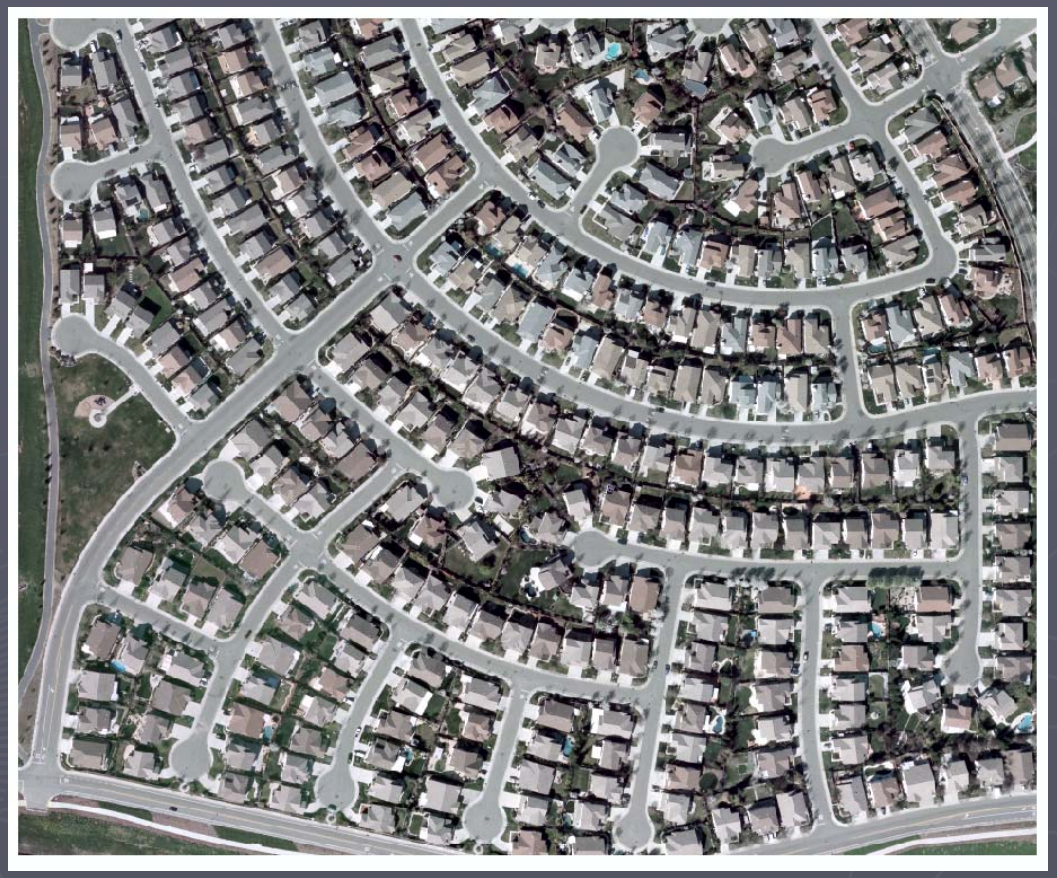
Purpose

- The purpose of the project was to investigate if Feature Analyst could be used to create a sidewalk layer in a typical urban environment.

Image Processing Tasks

- The first task was to clip the sample areas from the larger.SID image files.
- Using the clip tool, we defined the sample areas, approximately a 3 x 3 block area.

Natomas Area



Downtown Area

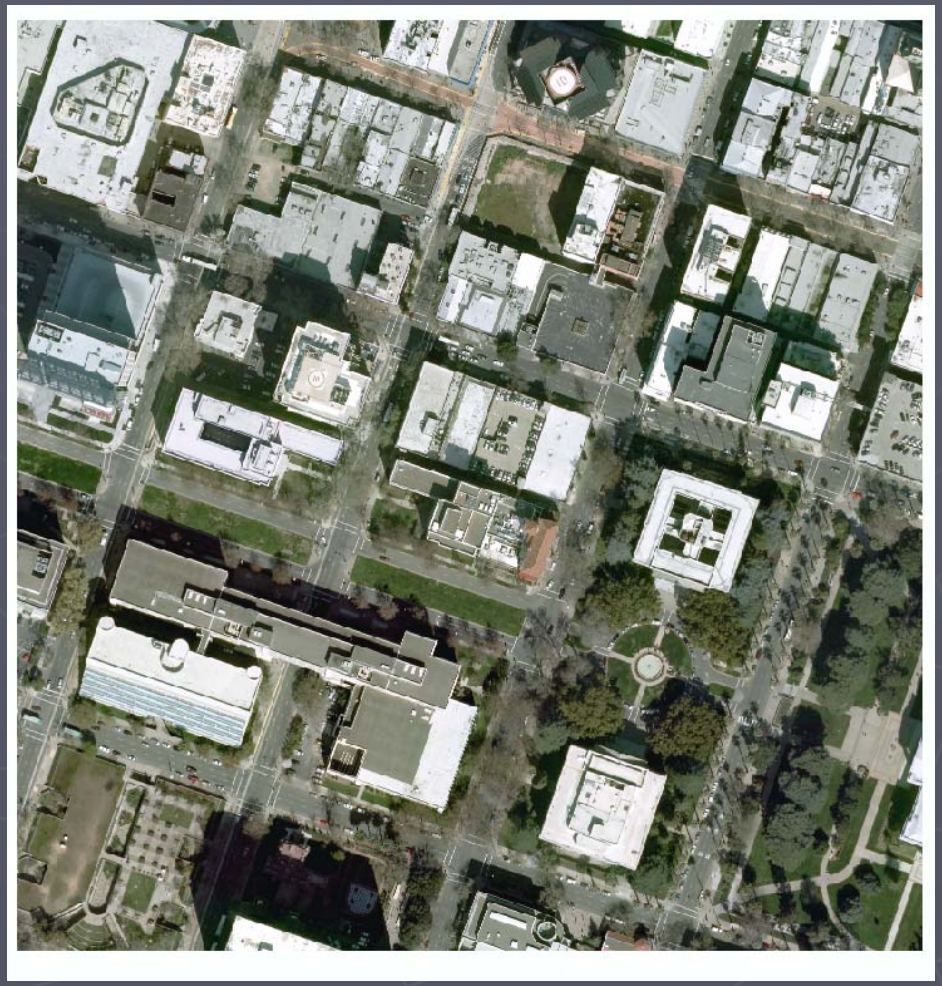


Image Processing Tasks

- The next task was to run an unsupervised classification on the image.
- We chose 6 classes and to aggregate pixel areas less than 6 pixels, but left all other selections as default values.

Unsupervised Classification

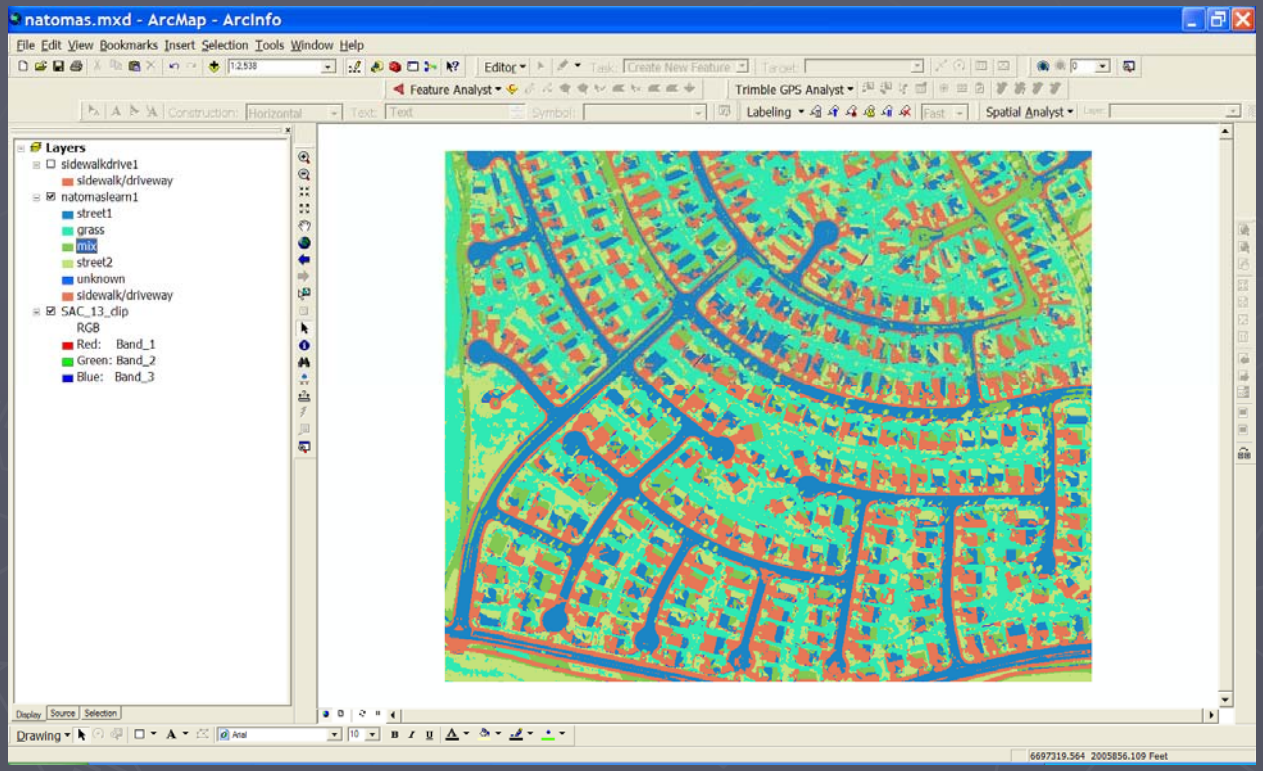


Image Processing Tasks

- The next task was to split the class of interest.
- We only split off the sidewalk/driveway layer

Split Off Classes

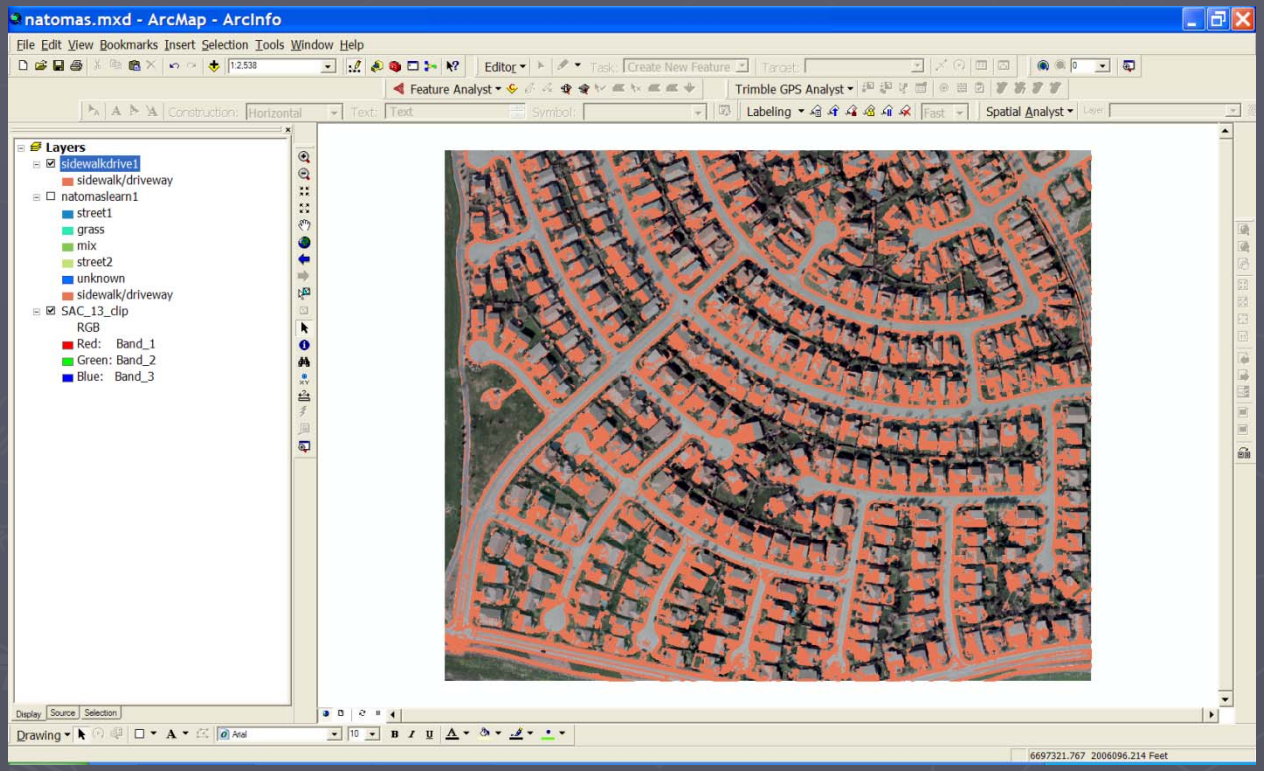


Image Processing Tasks

- The next step was to begin removing clutter.
- We created a training layer and created “correct” and “incorrect” training areas using the Feature Analyst tools.

Training Layer

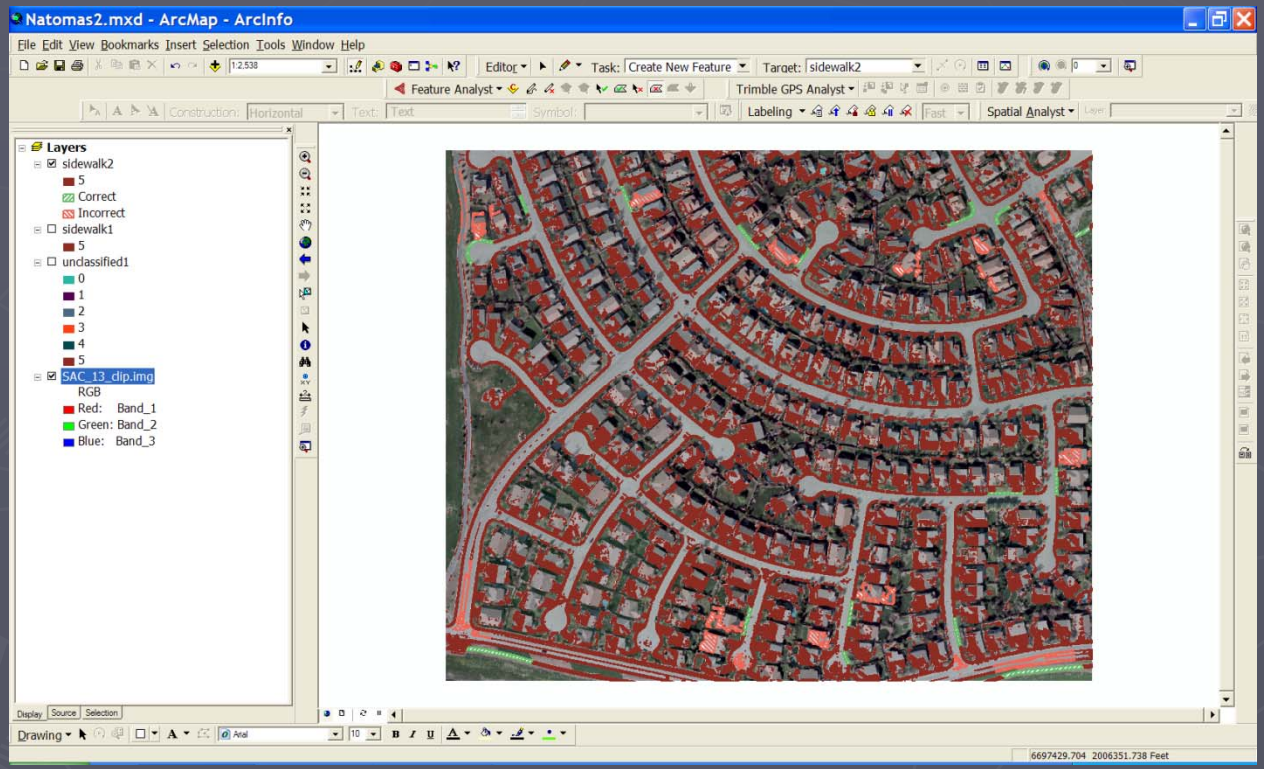


Image Processing Tasks

- Next we ran a learning run using One Button Learning

Clutter Removal

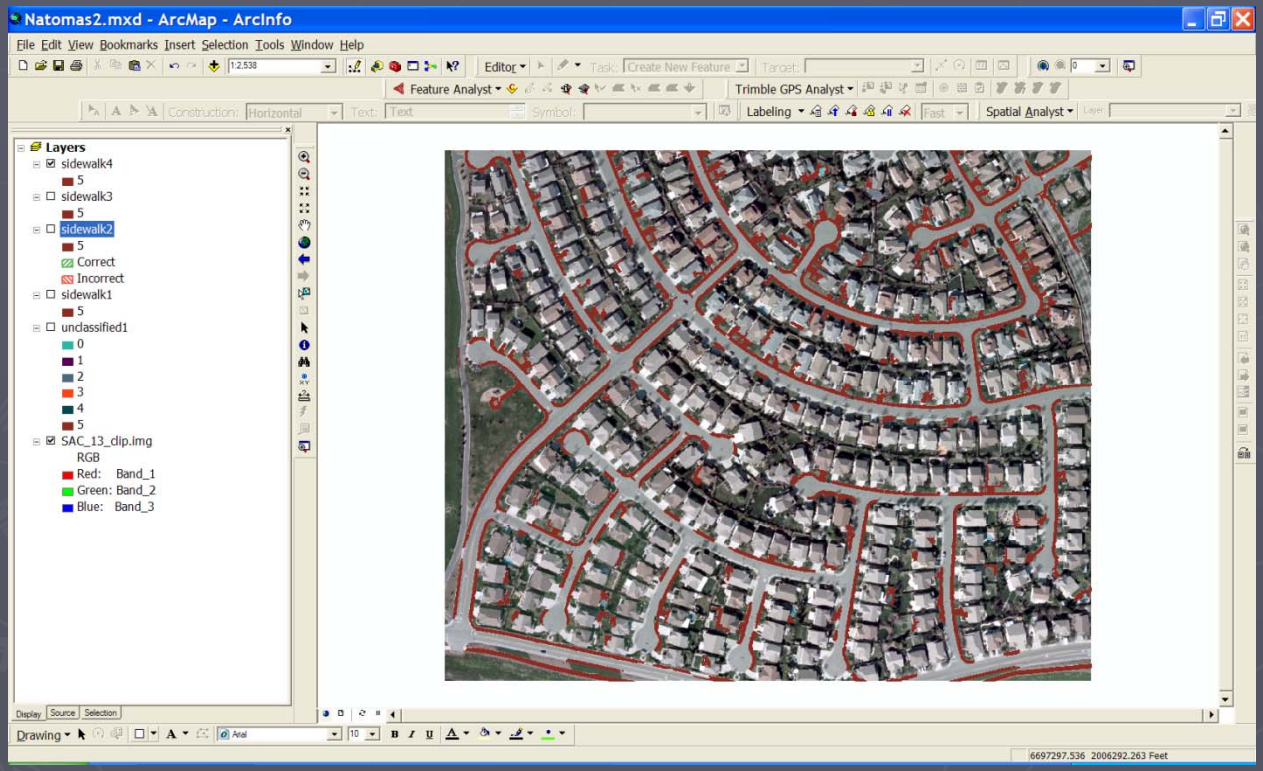
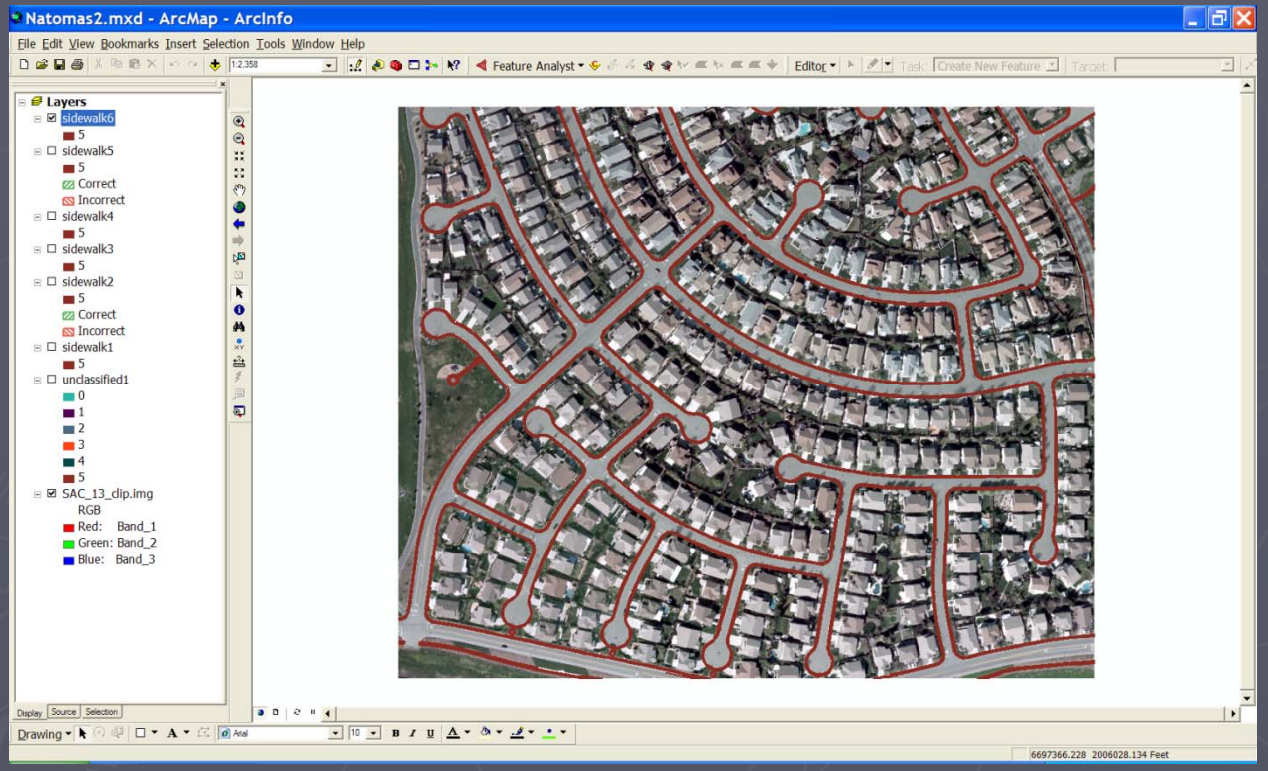


Image Processing Tasks

- At this point we did manual editing to separate the driveway areas from the sidewalks using the Cut Polygon Feature tool in an Edit Session.
- Finally we added back in the missing areas by Adding New Features in an Edit Session.

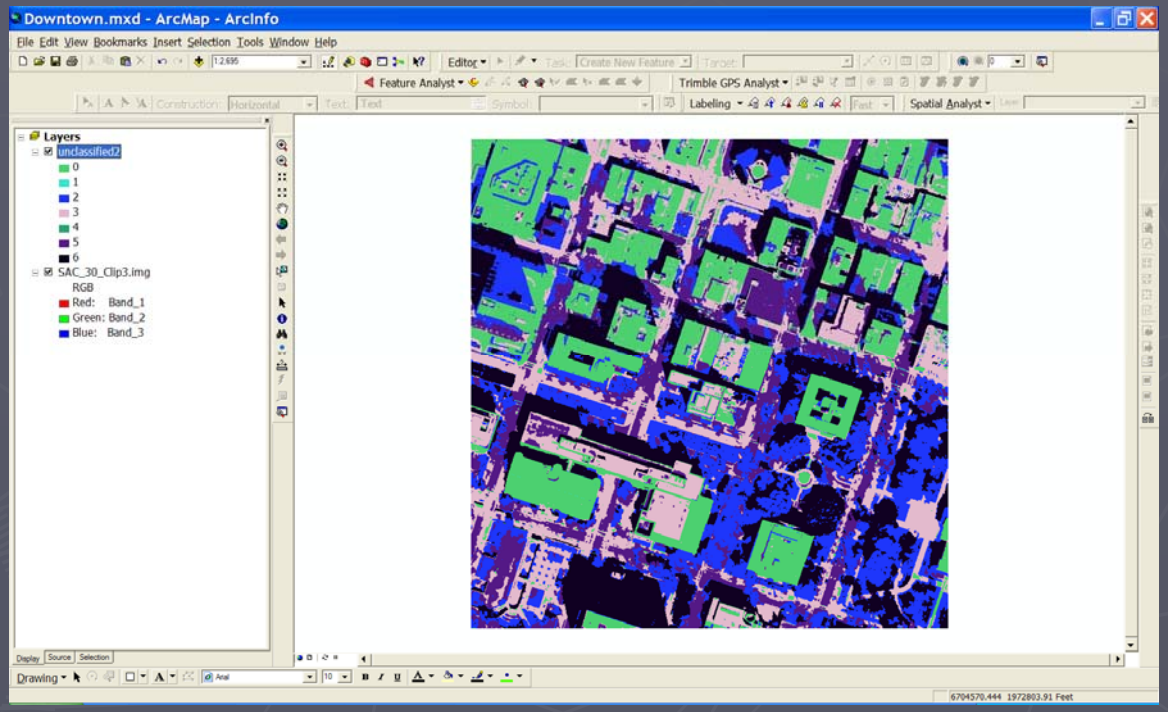
Final Sidewalk Layer



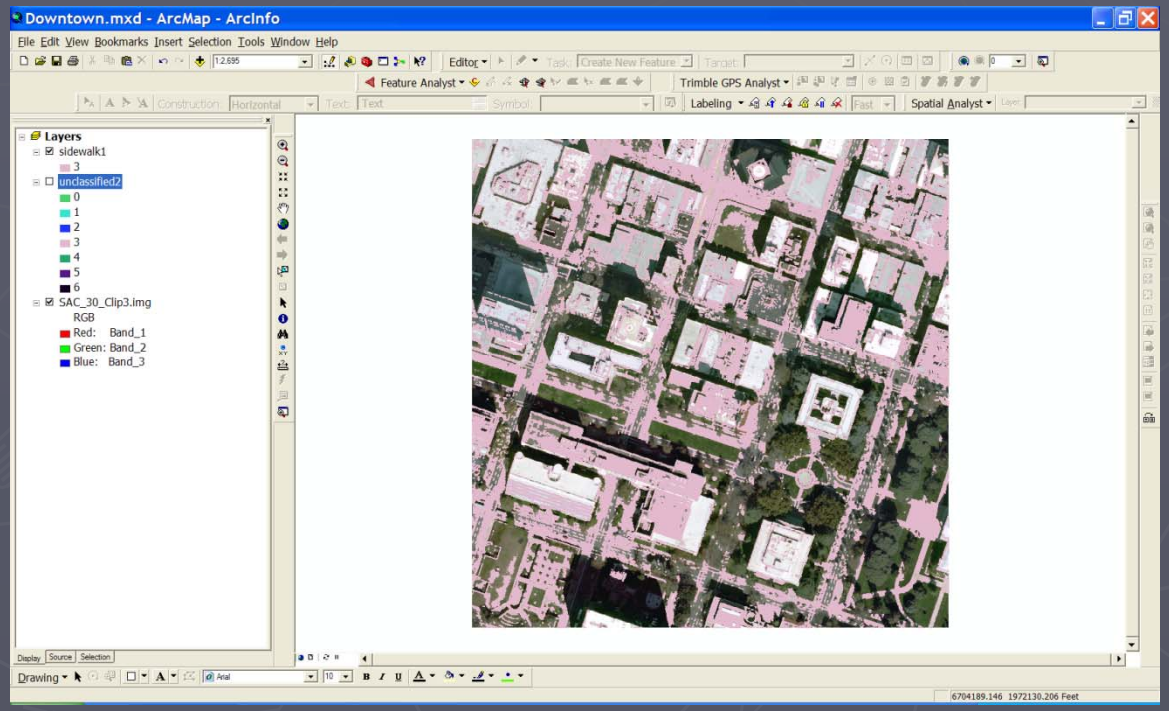
Compare with Downtown Area

- We tried the same process with the Downtown area, but the results were not as good.

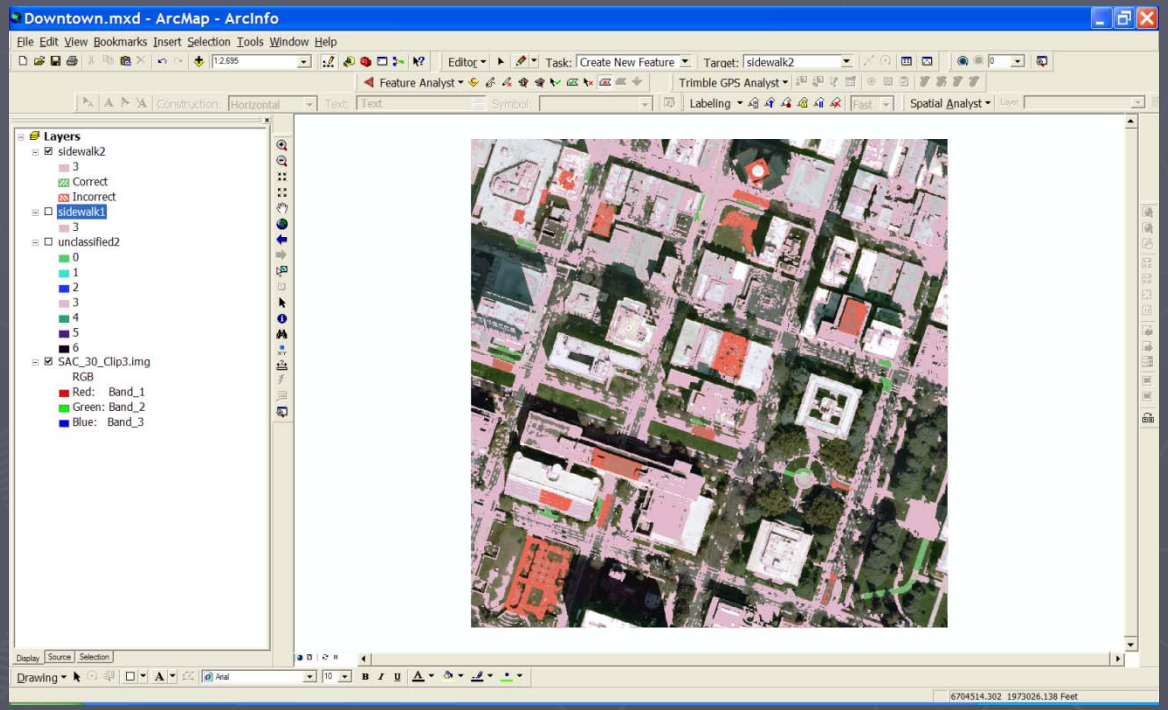
Unsupervised Classification



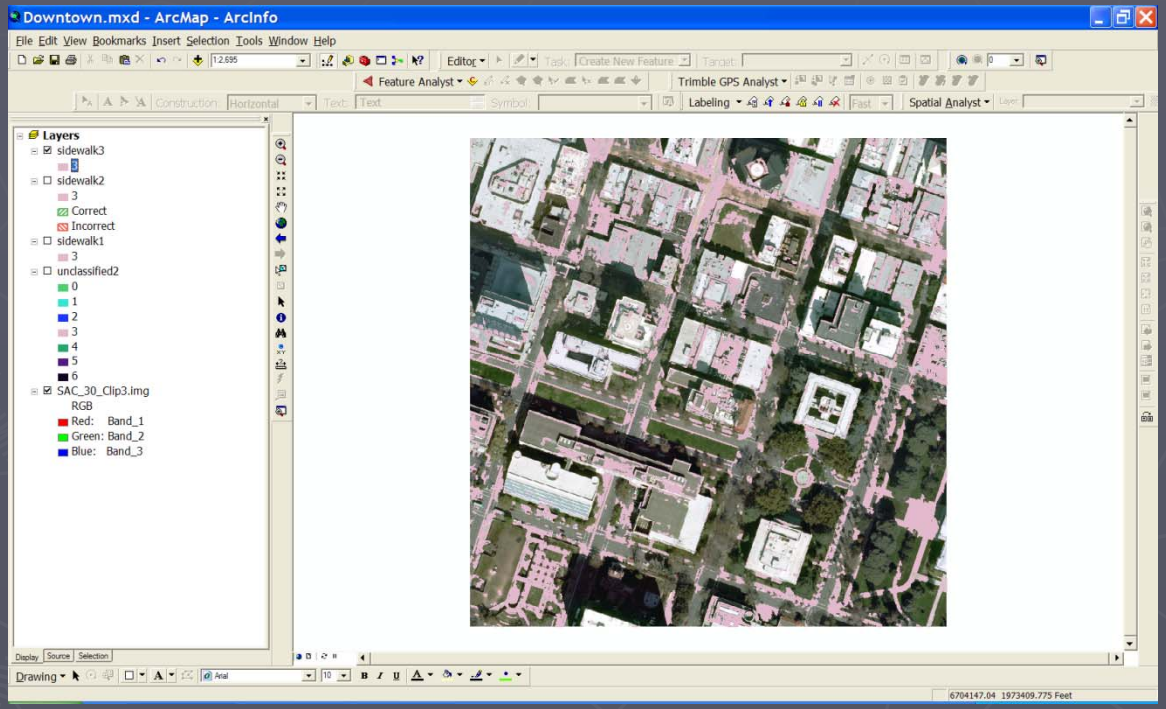
Split Out Classes



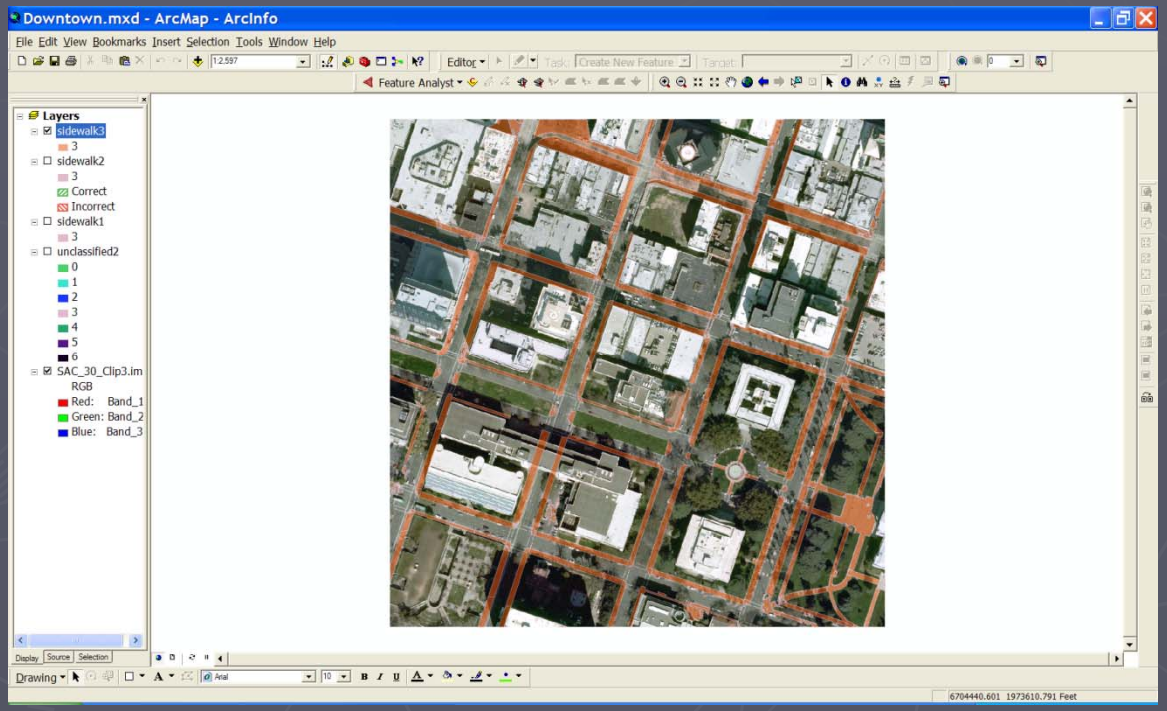
Training Layer



Clutter Removal



Final Sidewalk Layer



Conclusions

- It was possible to create a pretty good sidewalk layer for the Natomas area. Manual editing was required, but was straightforward and pretty simple to do.
- It wasn't possible to create a good layer for the Downtown area. Trees, shadows and lack of resolution prevented accurate manual editing because the sidewalk edges were not visible in the image.

Conclusions

- Unsupervised classification saved time compared to training individual classes.
- Removing too much clutter is actually counterproductive because it makes the manual editing steps more time consuming.
- Adding Missing Features did not work well at all and was not used because it added clutter back into the image.