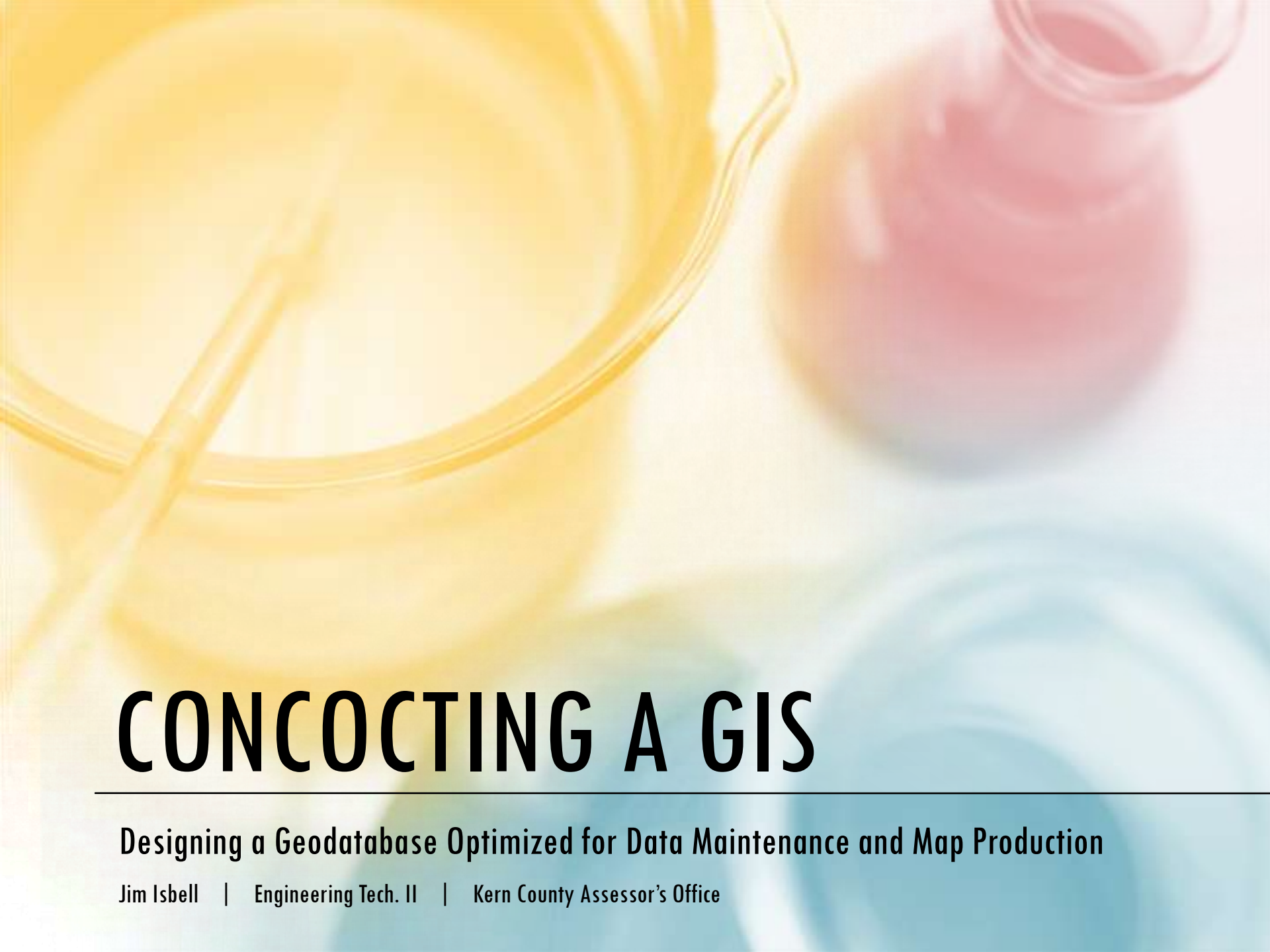


CONCOCTING A GIS

Designing a Geodatabase Optimized for Data Maintenance and Map Production

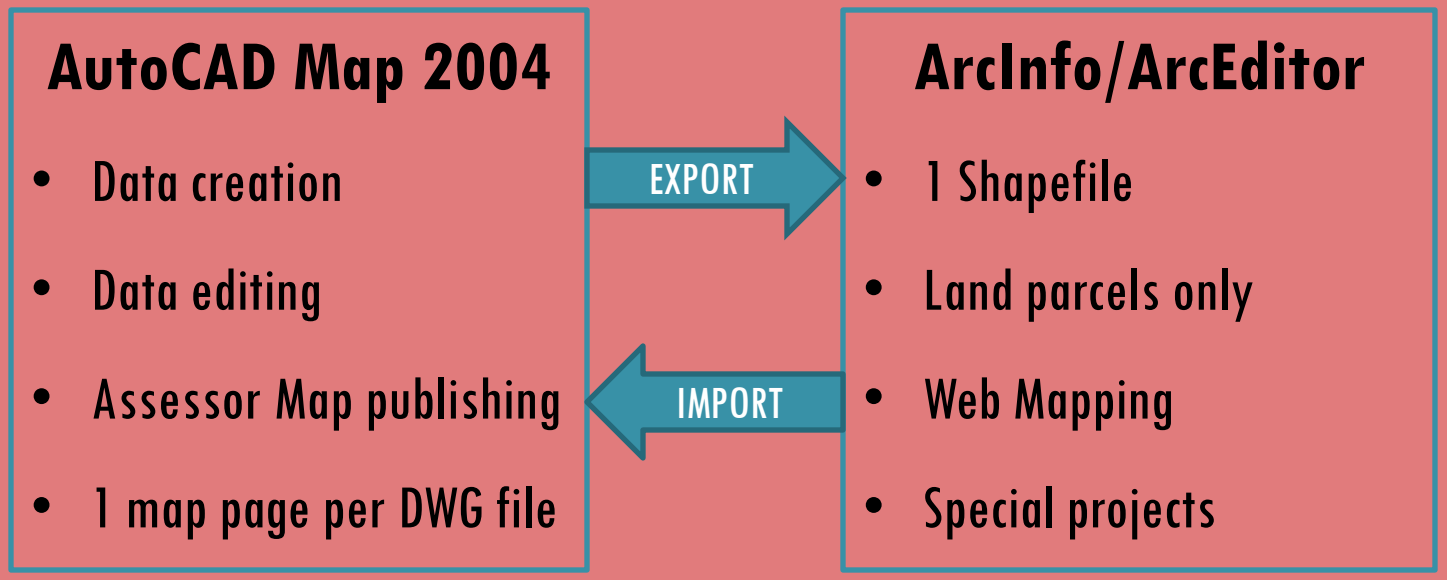
Jim Isbell | Engineering Tech. II | Kern County Assessor's Office

KERN COUNTY STATISTICS

- Size of Kern County
  - 8,162 square miles
  - 5,223,552 acres
  - 753,070 residents (in 2005)
- 11 Incorporated Cities
  - Arvin, Bakersfield, California City, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, Wasco
- 2007-08
  - 383,133 tax bills
  - $968 million

- 389,763 land parcels in GIS
- 16,217 map pages
  - 2,720 AutoCAD-drawn
  - 13,497 hand-drawn
- Projections for 2025
  - Population will double
  - 160,000 new homes
- **5 mappers**

OUR CURRENT MAPPING SYSTEM



PROBLEMS WITH OUR CURRENT MAPPING SYSTEM

- Two datasets - CAD & GIS - don't always match
- CAD data is not georeferenced
- GIS layers don't stay aligned with each other
- Difficult to administer
  - Keeping GIS caught up
  - Keeping track of thousands of CAD files
  - Too difficult to maintain all the GIS layers we want
  - Too difficult to release new editions for web

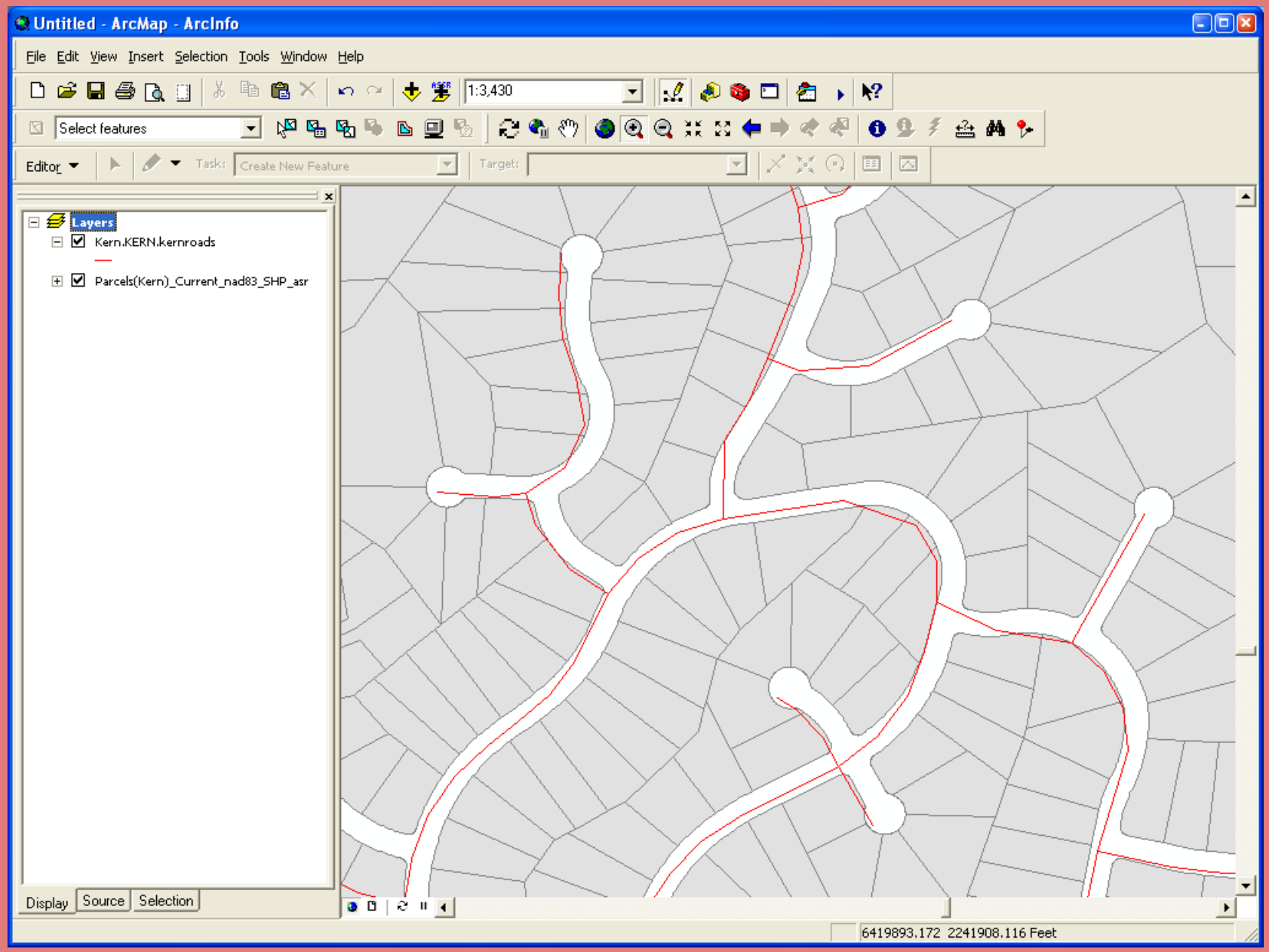
LAYERS NEEDED FOR ASSESSMENT MAPPING

- Parcel boundaries
- Parcel lines (with COGO data)
- Legal Lot boundaries
- Subdivision boundaries
- PLSS Section boundaries
- Street centerlines
- Street Right-of-Way lines
- Railroad centerlines
- Waterway centerlines
- Easement lines
- Address points
- Assessor Page boundaries

LAYERS CREATED IN OTHER DEPTS.

- PLSS SECTIONS (Engineering/GIS Dept.)
  - Pretty good in most areas
- STREET CENTERLINES (Engineering/GIS Dept.)
  - E-911 routing
  - Poor accuracy (not entirely from survey sources)
  - Poorly georeferenced

THE STREETS OF BAKERSFIELD…



EXISTING DATA MODELS

- ESRI Parcel Data Model
- ESRI Cadastral Editor (Survey Analyst)
- Sidwell Parcel Builder
- ACS Parcel Editor

- Too complex
- Too specialized
- Too far-reaching
- Proprietary
- Limited toolsets
- Optimized for analysis rather than data maintenance
- They just don't work the way we want them to

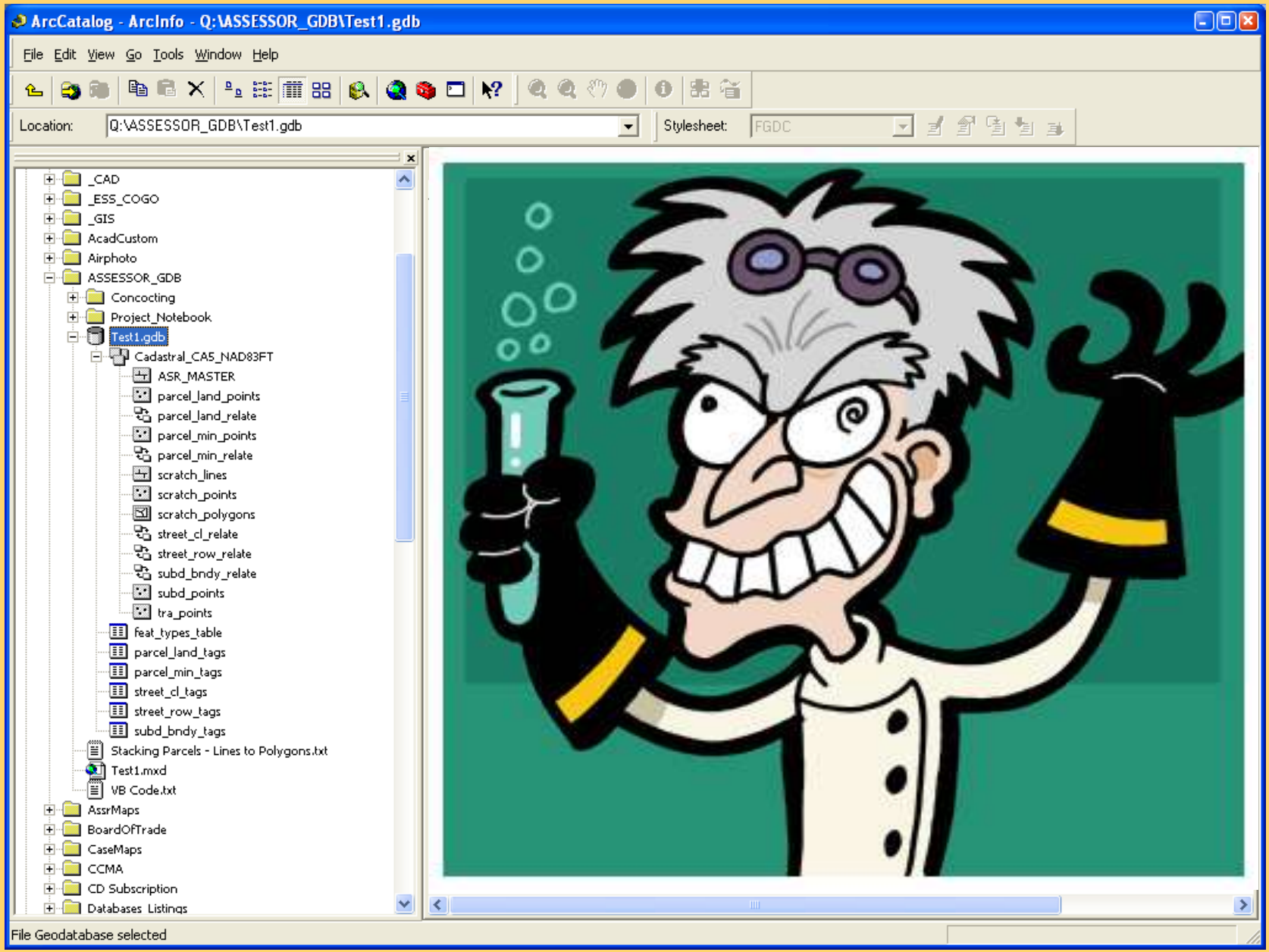
WHAT WE WANT

- Non-proprietary
- Flexible / Generic
- Efficient / Easy to Use
- Automated
- Consistent

ARE WE ASKING
FOR TOO MUCH
???

No, but the price we pay
is
CUSTOM PROGRAMMING.

THE CONCOCTION

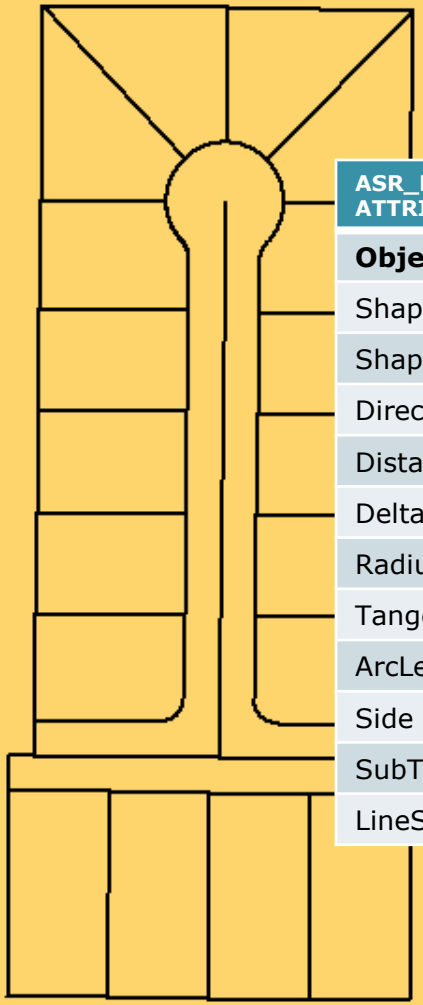


BASIC SYSTEM SPECIFICATIONS

- All features modeled as line segments and arcs
  - One single LINE feature class
  - A line feature is drawn only once, even if several feature types overlap
  - Each line is "tagged" as 1 or more feature types, stored in database tables
  - Topology is used simply to keep linework clean
- Polygon attributes stored in points
- Polygons are generated when needed, from lines and points
- Maps are generated automatically or semi-automatically when needed, using queries, geoprocessing models, and reference tables

BASIC LOGICAL DESIGN

ASR-MASTER (Lines)



ASR_MASTER ATTRIBUTES
ObjectID
Shape
Shape_Length
Direction
Distance
Delta
Radius
Tangent
ArcLength
Side
SubTypeName
LineSymbol

Relationship Classes (1:1)

- PARCEL_LAND_RELATE
- PARCEL_MIN_RELATE
- STREET_CL_RELATE
- STREET_ROW_RELATE
- SUBD_BNDY_RELATE

Tag Tables

PARCEL_LAND_TAGS
ObjectID
FeatureID

PARCEL_MIN_TAGS
ObjectID
FeatureID

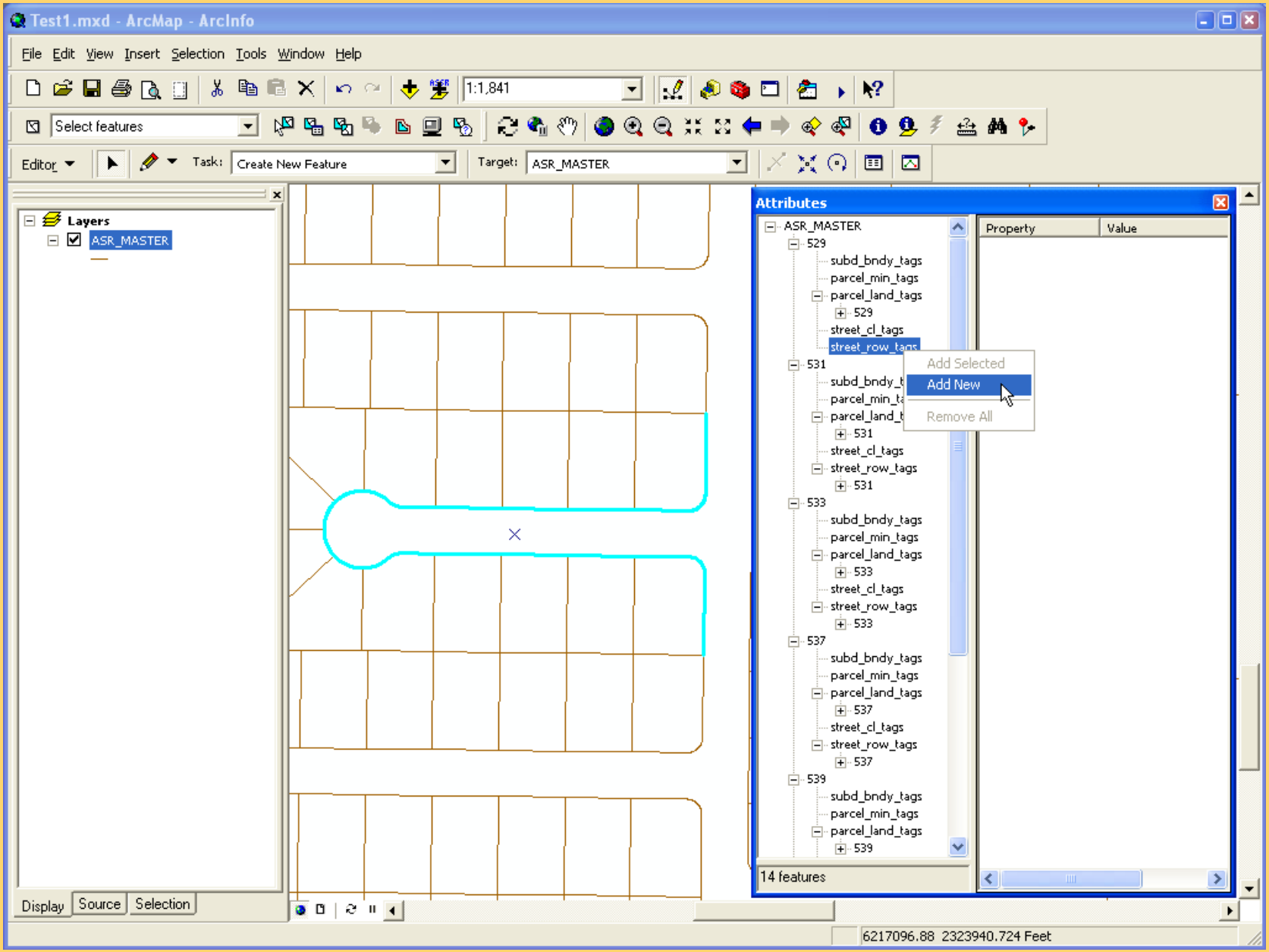
STREET_CL_TAGS
ObjectID
FeatureID

STREET_ROW_TAGS
ObjectID
FeatureID

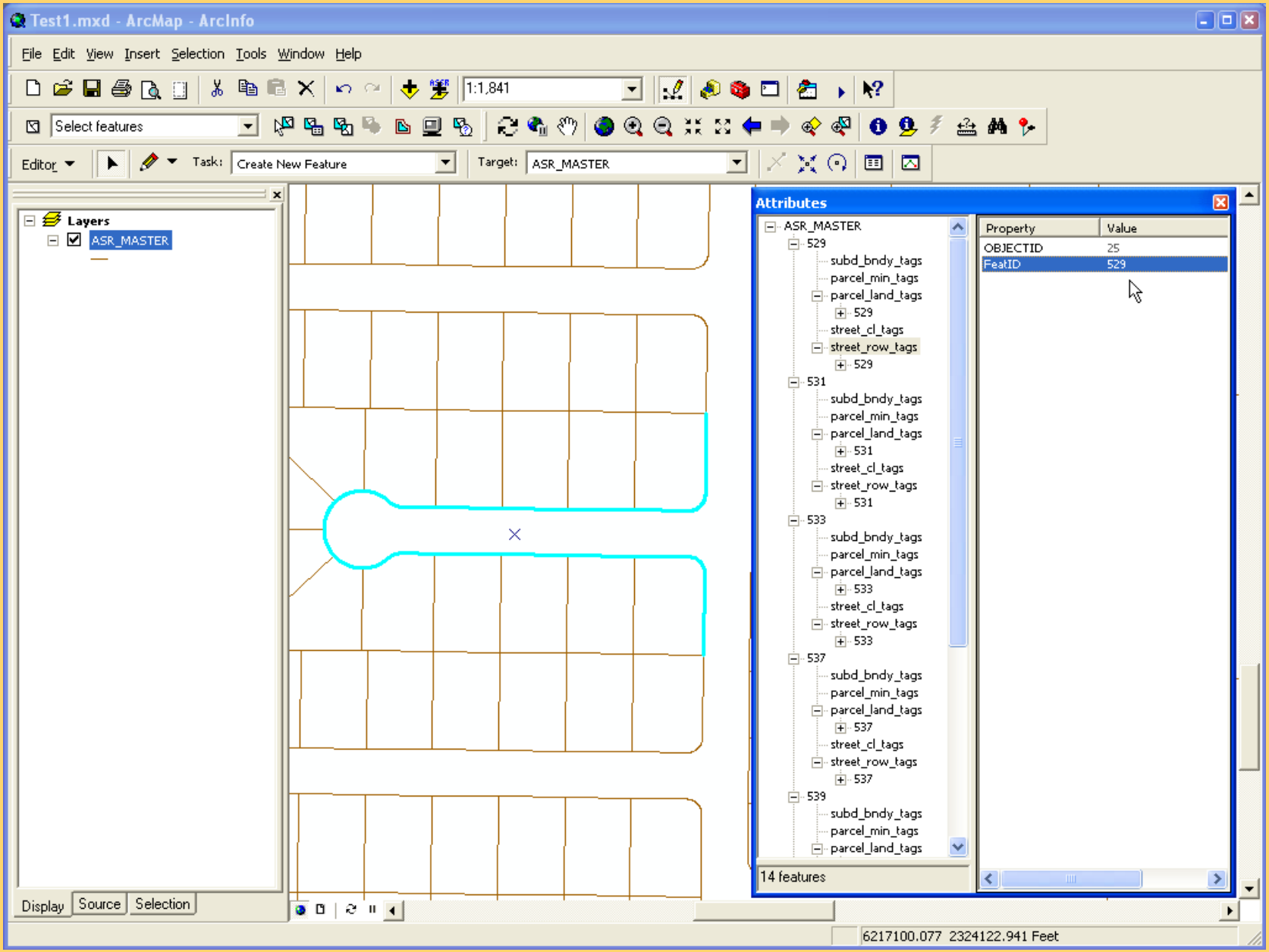
SUBD_BNDY_TAGS
ObjectID
FeatureID

. . .

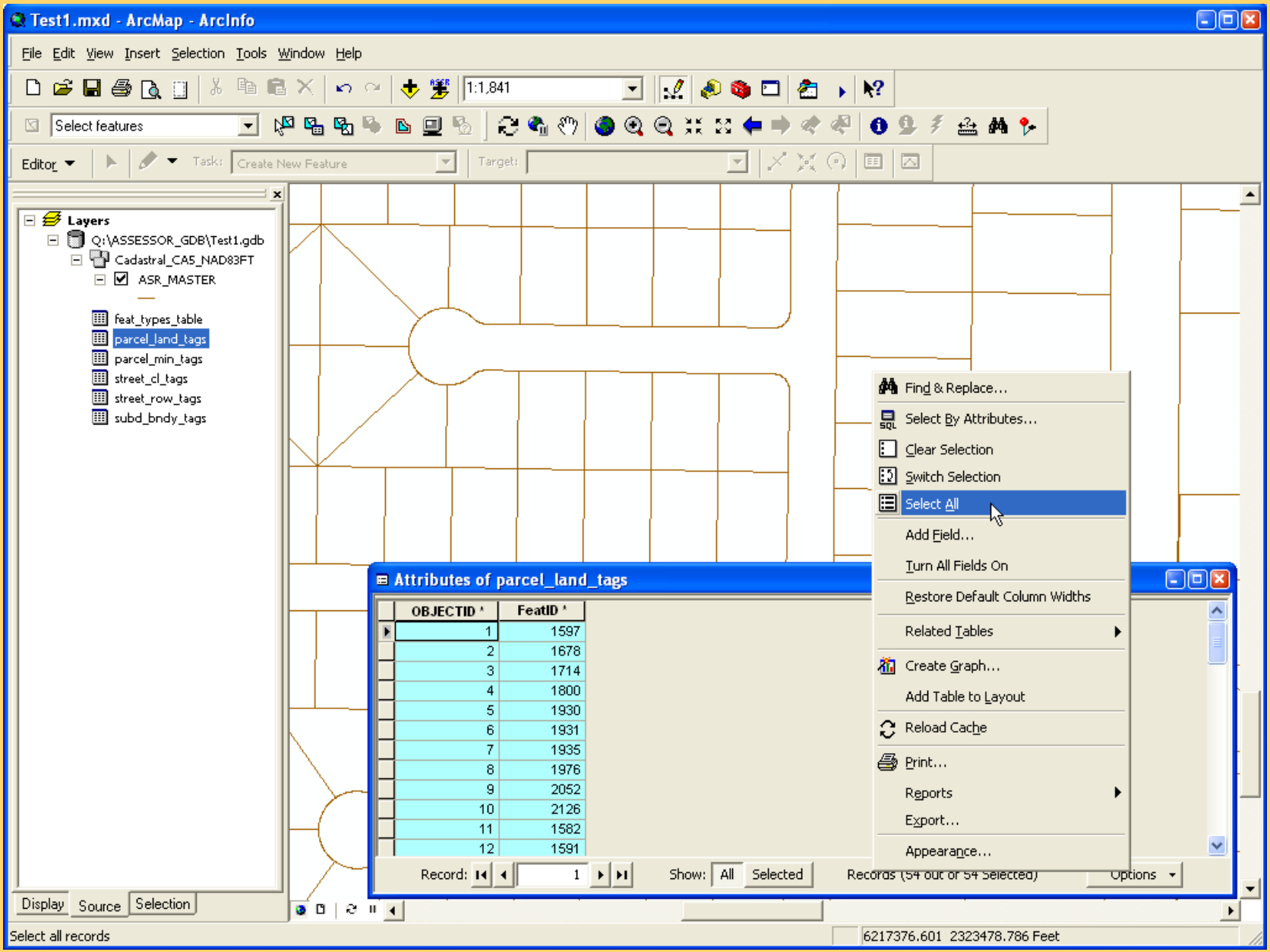
TAGGING FEATURES (THE HARD WAY)



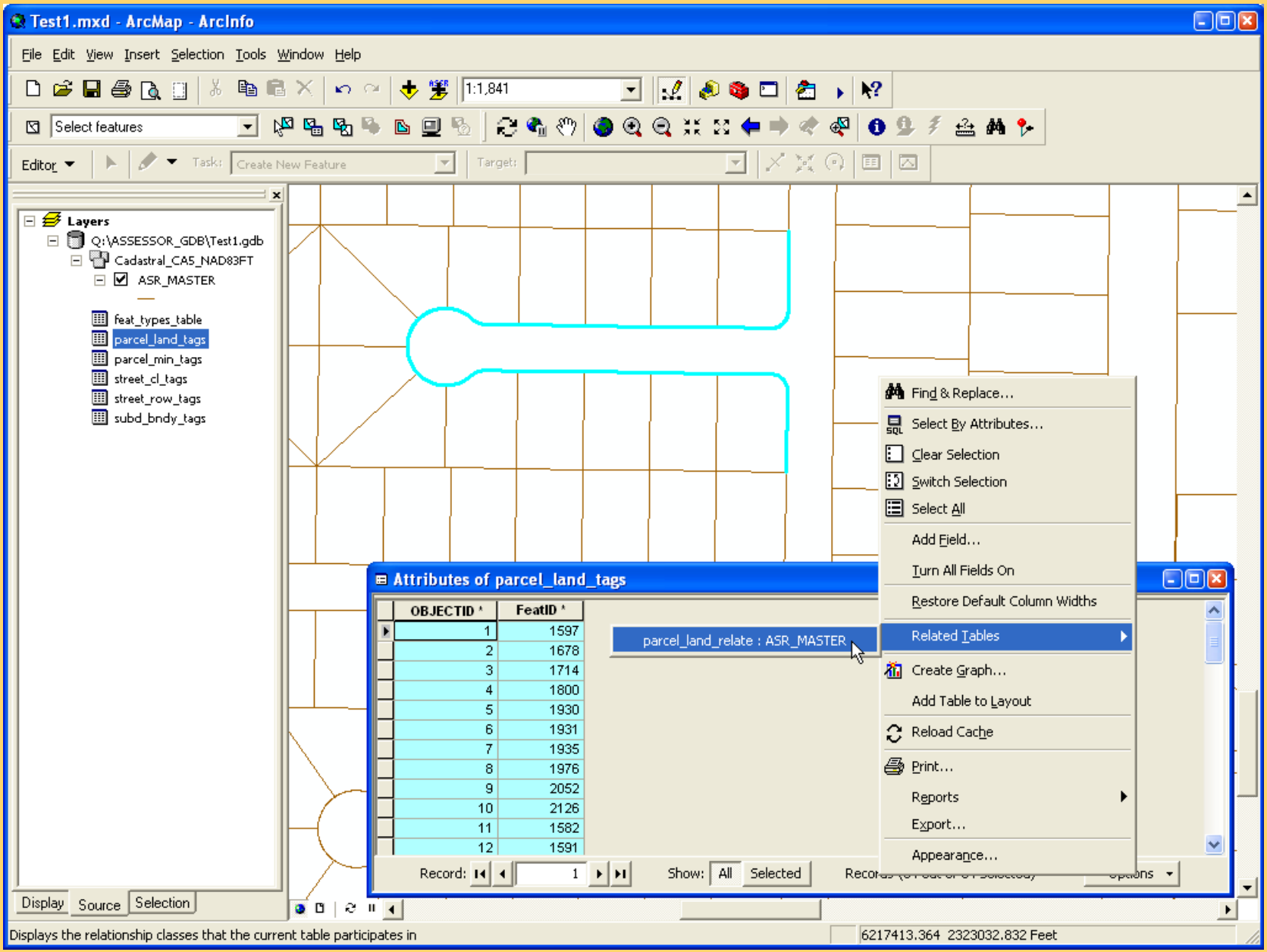
FEATURES TAGGED



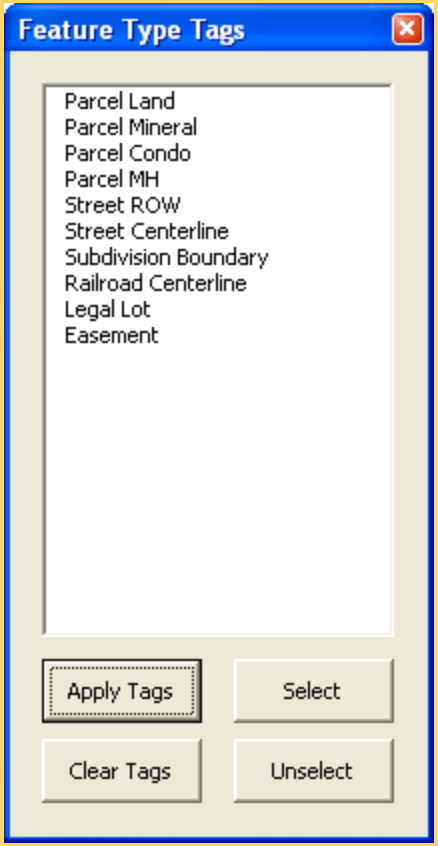
TAGGED FEATURE EXTRACTION (STEP 1)



TAGGED FEATURE EXTRACTION (STEP 2)



TAGGING FEATURES (THE EASY WAY)

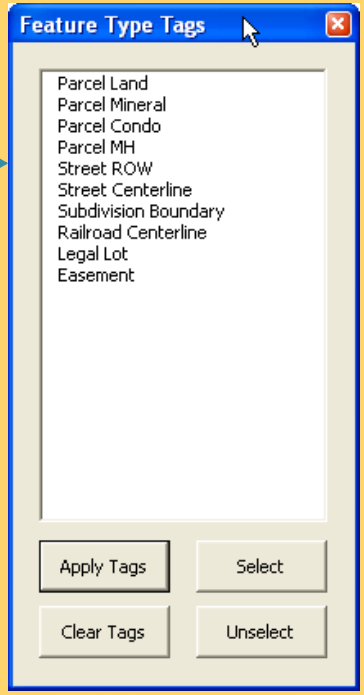


Feature Tagging Tool
(Visual Basic Form)

FEAT_TYPES_TABLE
ObjectID
FeatType
TableName
SubTypeName

Standalone Table That
Defines Each Feature Type

HOW THE TAGGING TOOL WORKS



Friendly Name Shown in User List

Which Tag Table Applies to Selected Feature Type

OID of Selected Features are Copied to Tag Table(s)

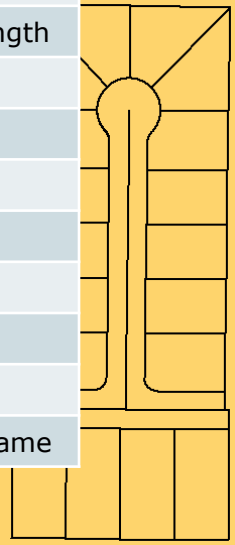
SubType Value is Copied to Attribute Table

FEAT_TYPES_TABLE
ObjectID
FeatType
TableName
SubTypeName

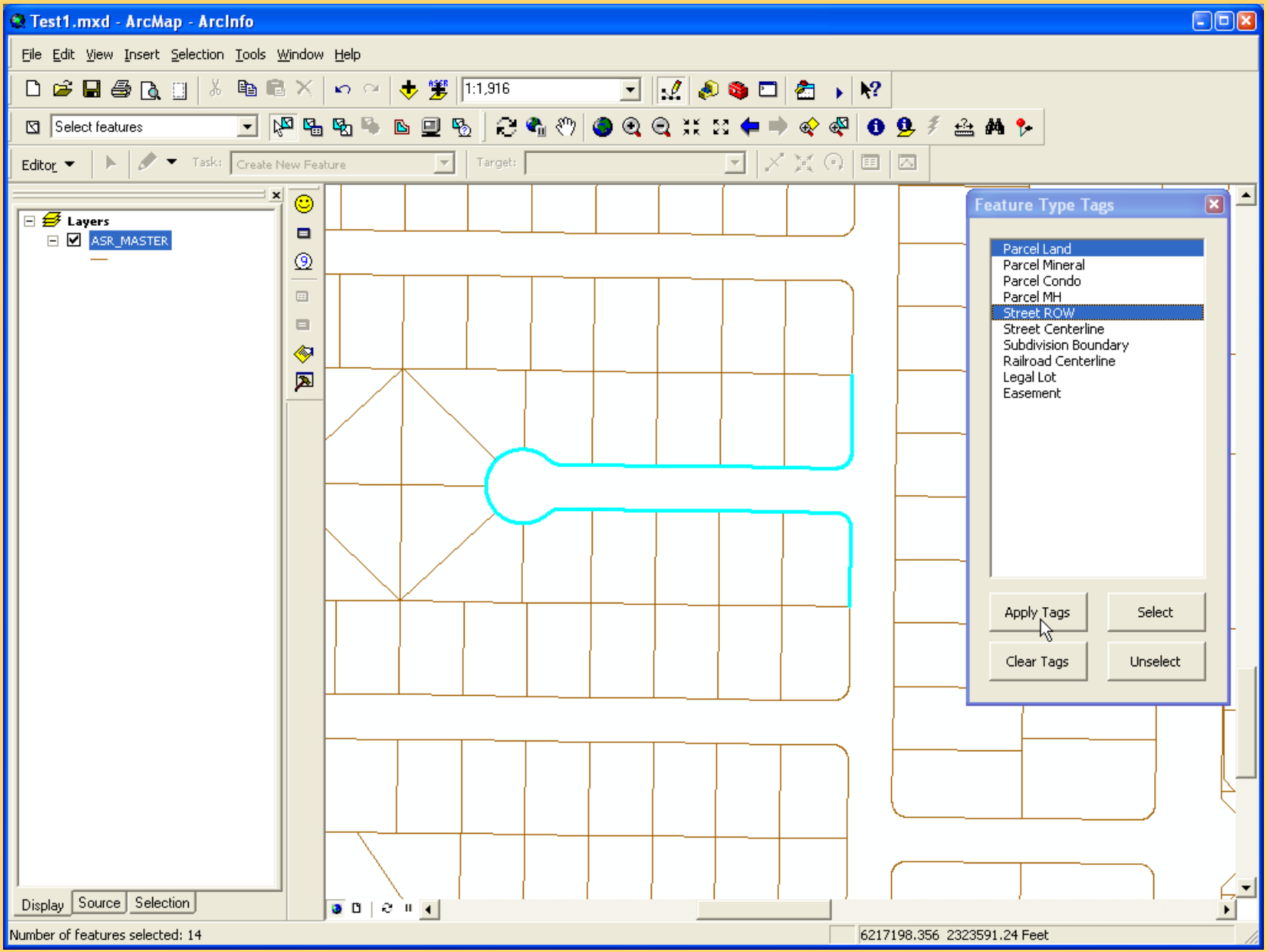
PARCEL_LAND_TAGS
ObjectID
FeatureID

STREET_ROW_TAGS
ObjectID
FeatureID

ASR_MASTER ATTRIBUTES
ObjectID
Shape
Shape_Length
Direction
Distance
Delta
Radius
Tangent
ArcLength
Side
SubTypeName



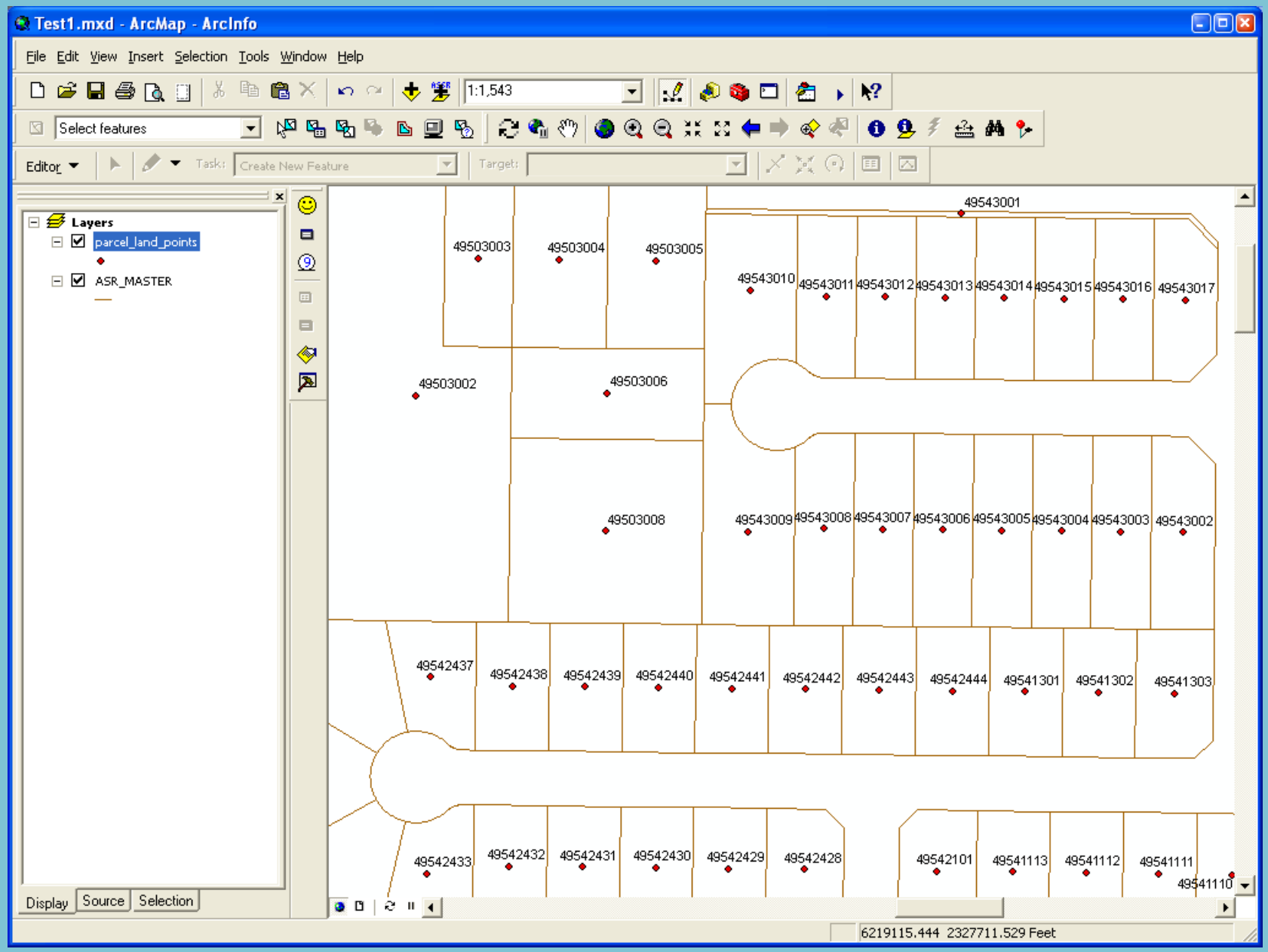
APPLYING TAGS



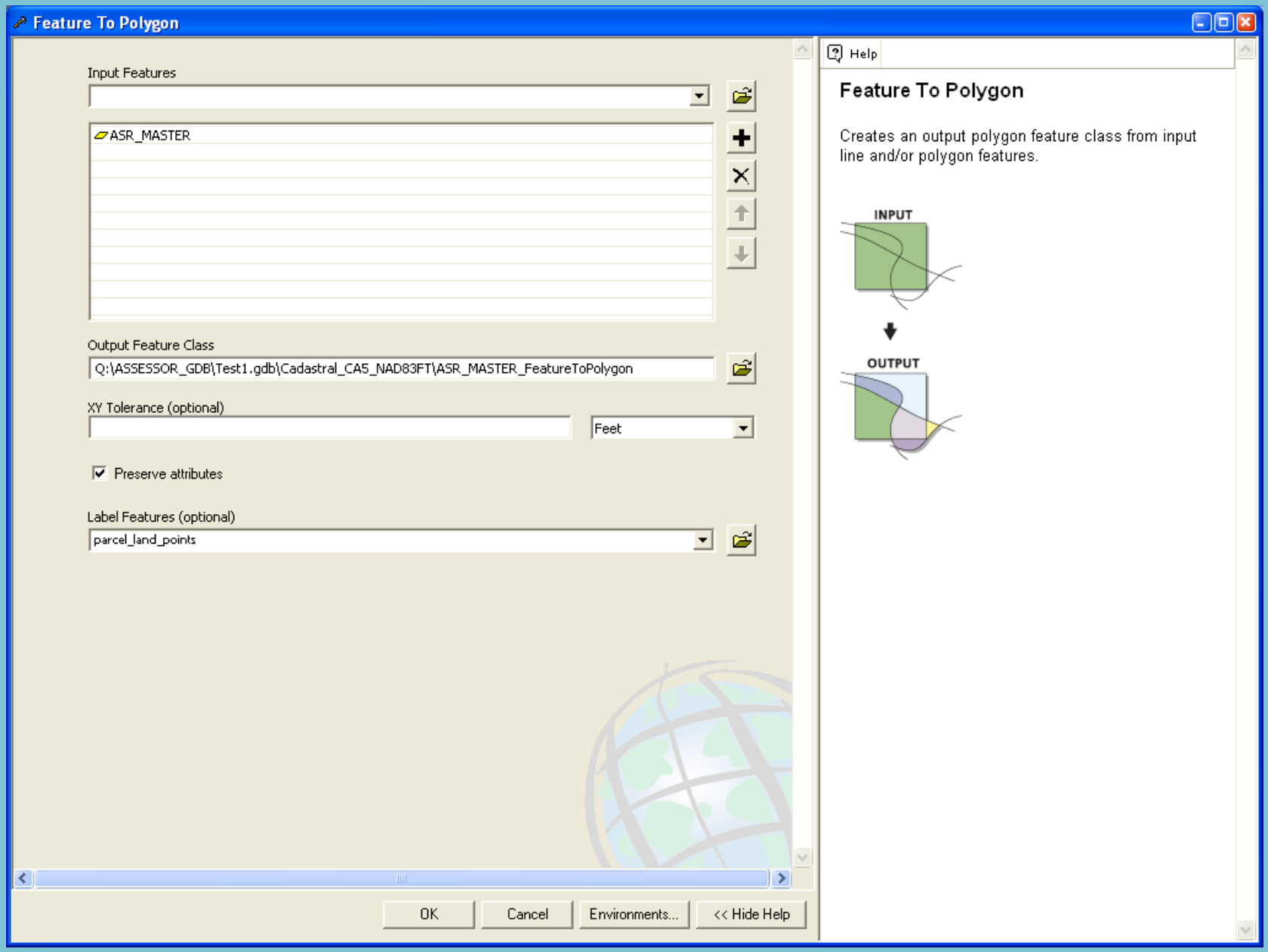
COMMON PROBLEM SOLVED

- Have you ever moved a parcel line and it no longer aligned with the TRA line?
- By modeling line segments that don't overlap, and generating all polygons as needed, all derived layers will ALWAYS be perfectly aligned with each other
- A single line segment can be "tagged" as a parcel line AND a tax rate area line
- Now moving a parcel line also moves the TRA line (because it's the same line segment)

GENERATING POLYGONS



LINES TO POLYGONS (ARCINFO)



GENERATING MAPS

- Maps are generated when needed, using a combination of:
  - Queries / Definition Queries
    - Line Features
    - Annotation Features
  - Geoprocessing models
    - Generate polygons
    - Extract lines for feature types relevant to map
  - Reference tables
    - Feature Symbology
    - Layout elements

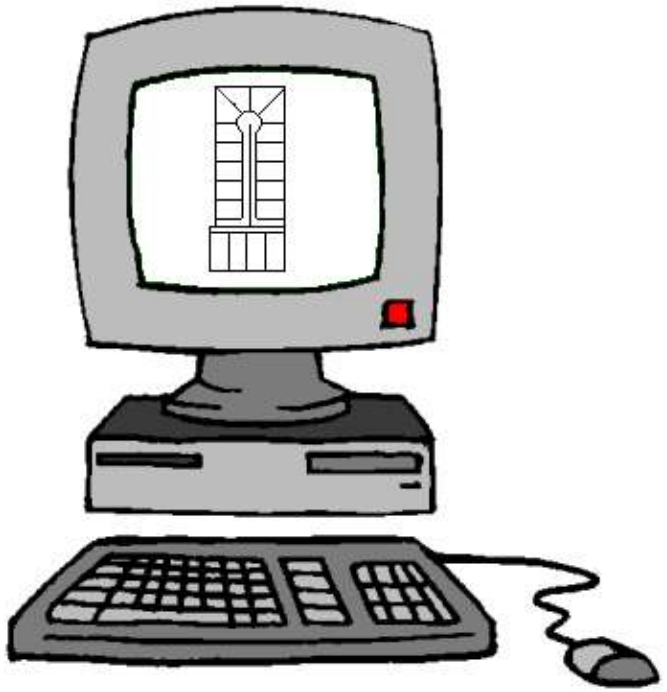
GENERATING MAPS

- Process not designed yet
- Need to nail down a good working prototype first
- Generic data structure should lend itself to any map publishing requirements

WHERE WE ARE NOW

- We have a parcel polygon shapefile aligned with section corners
  - Must be converted to lines
- We have a prototype File GDB with a small amount of data
- We need to add linework for features other than parcels
- We need to program the Tagging Tool (the heart of the system)
- We need to define subtypes and topology rules
- We need to design map generation procedures
- We need more time to experiment

WILL IT WORK?



We hope so.

THAT'S IT, I THINK

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