Capturing the Geographic Value of Living in 3-D
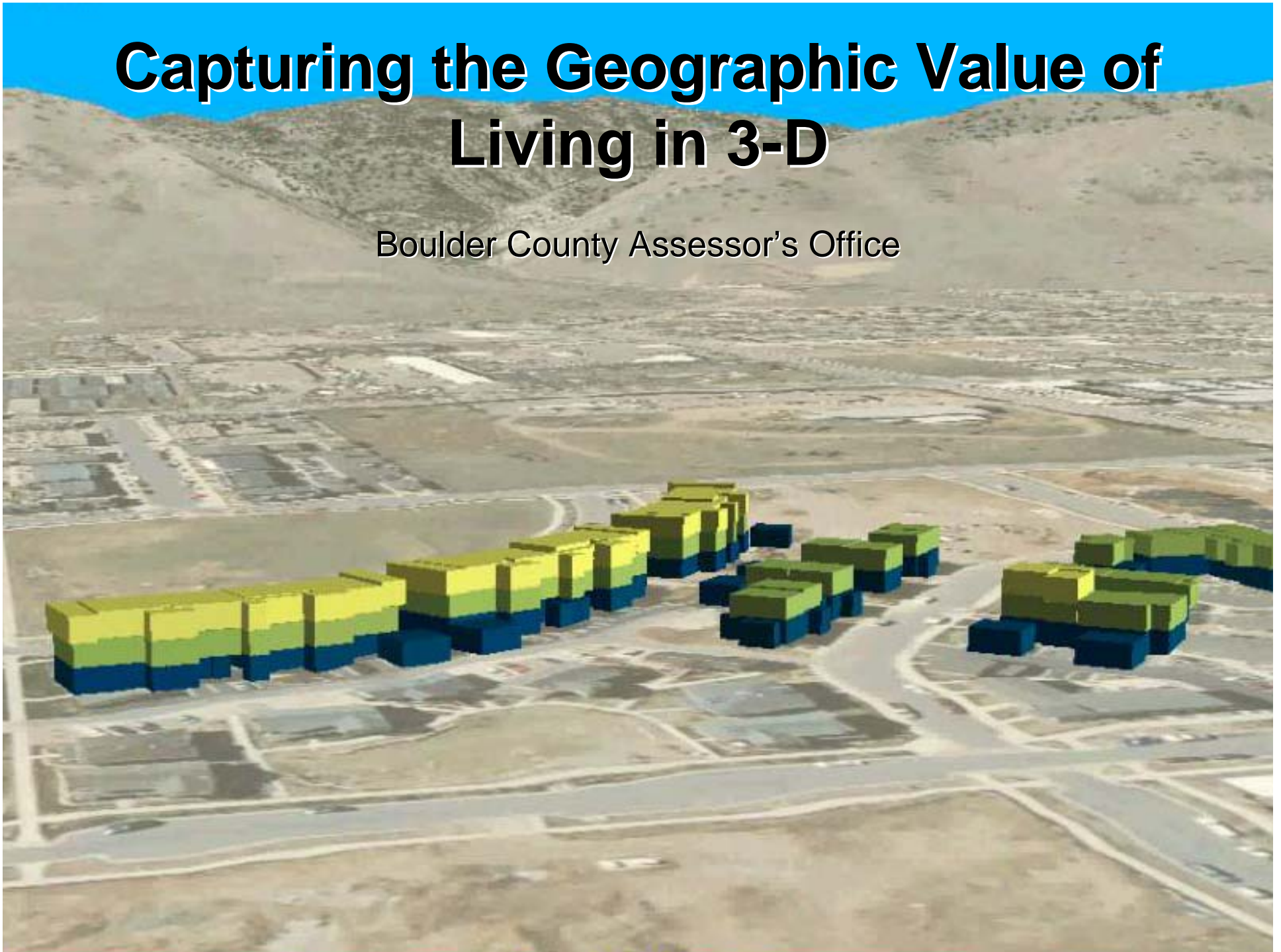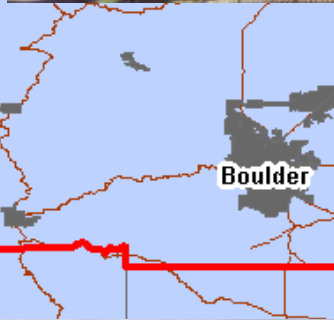
Boulder County Assessor's Office
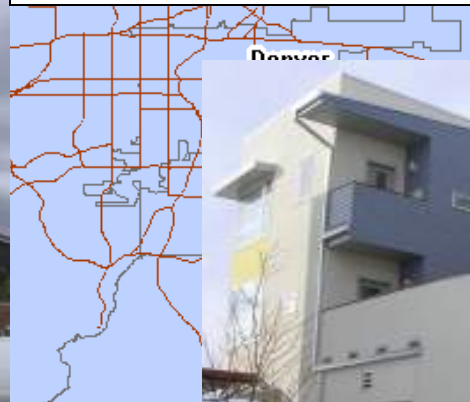
In the city of Boulder, 25 of 37 plats in 2007 were for condos

Condominiums are popping up all over Boulder County
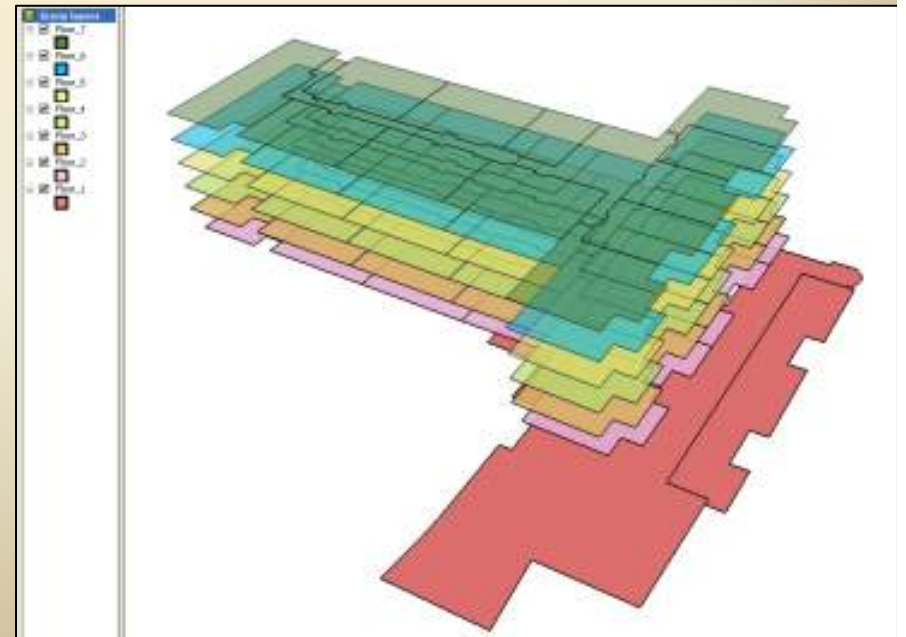
Introduction

Topics to be covered:

- Define condos and why it's difficult to represent them spatially

- History of mapping condos in Boulder County

- Current representation of condos (containers)

- Development/description of current data model
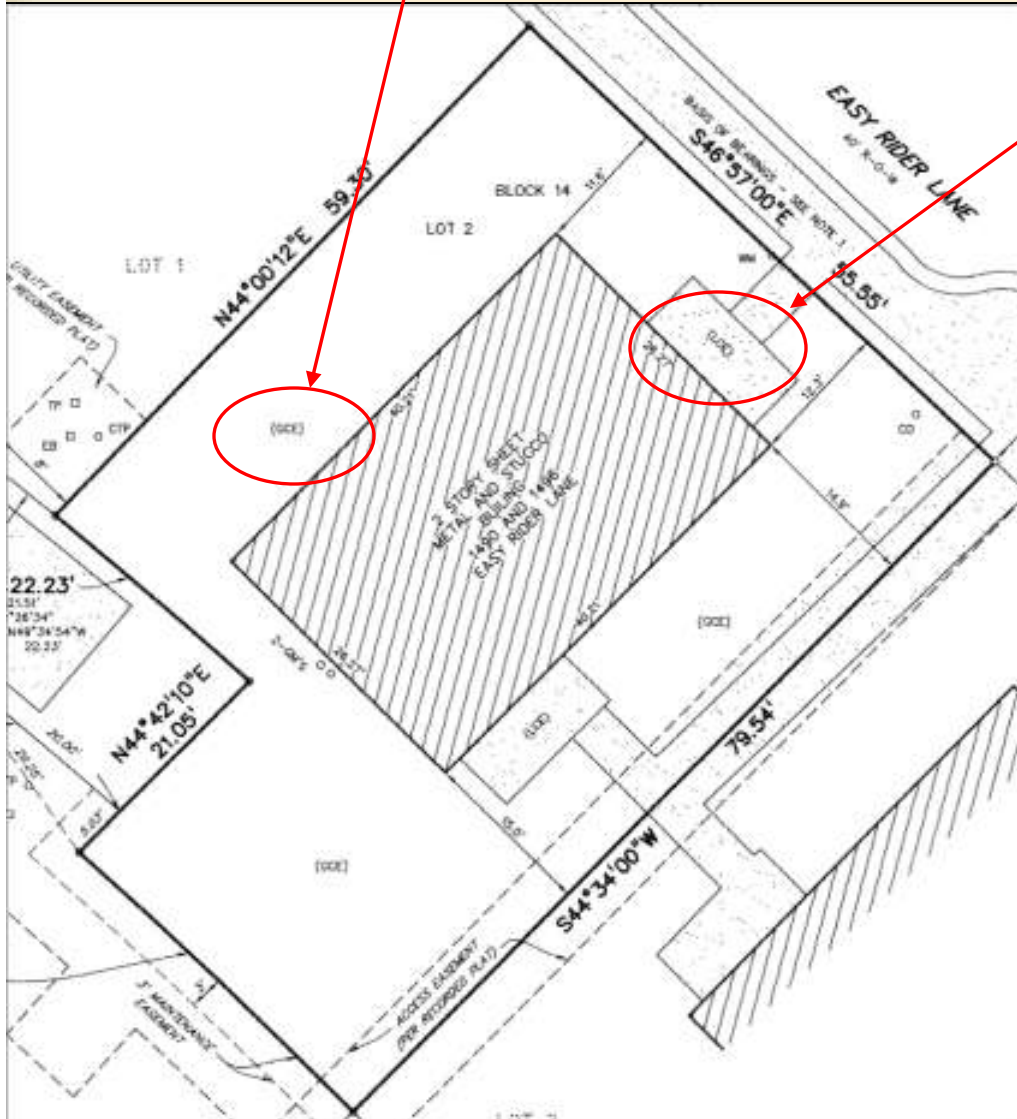
- Where are we going – future uses

What is a condo?

- In Colorado, a condominium is a type of "common interest community" set up under the Common Interest Ownership Act. (C.R.S. 38-33.3)

- Unit owners own 'walls-in', but usually also an undivided interest in the common areas, including the land beneath their unit

What is a condo?

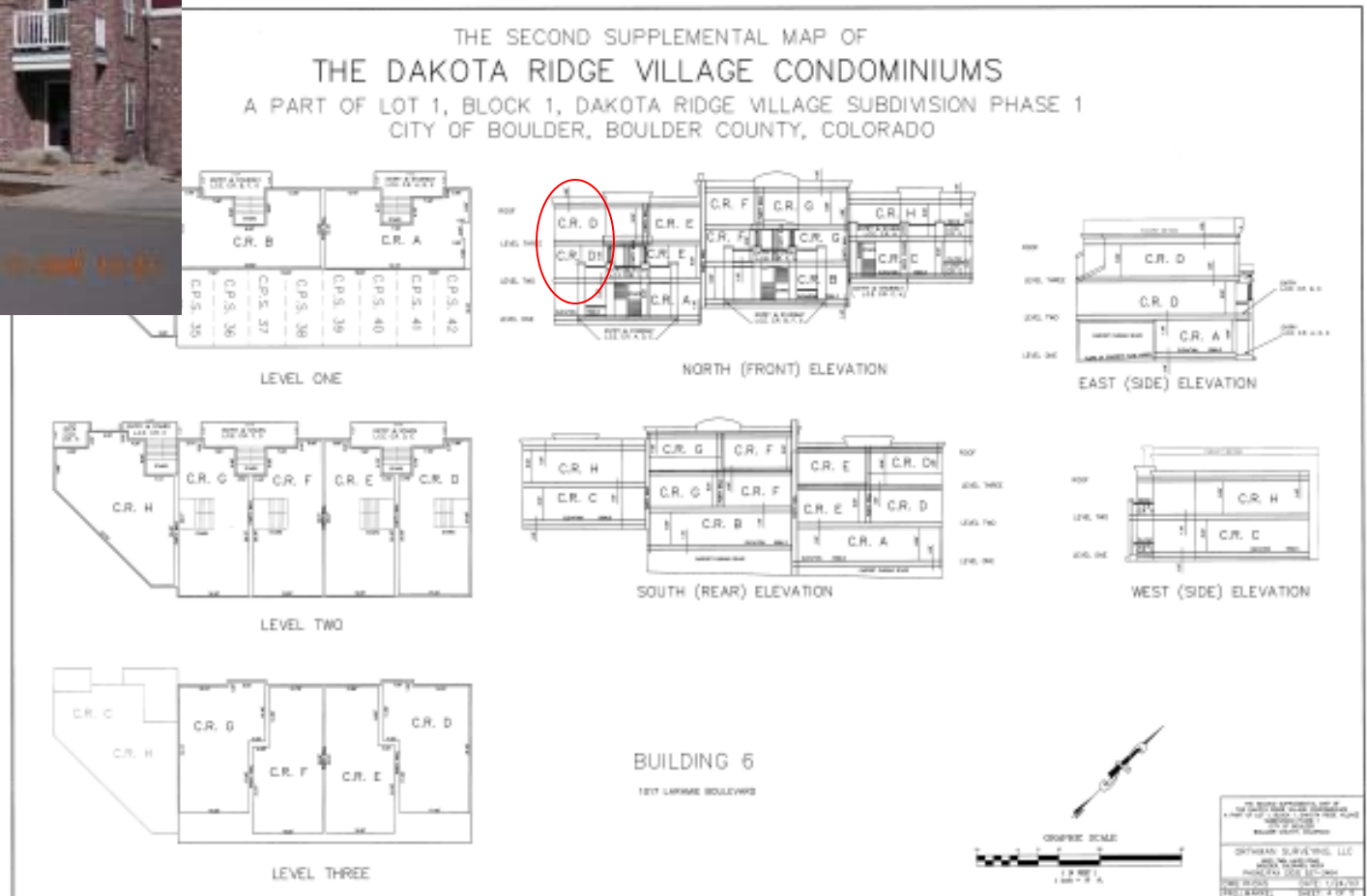## General Common Elements and Limited Common Elements

What is a condo?

Condos are different from townhouses, where the owner actually owns the land under their unit

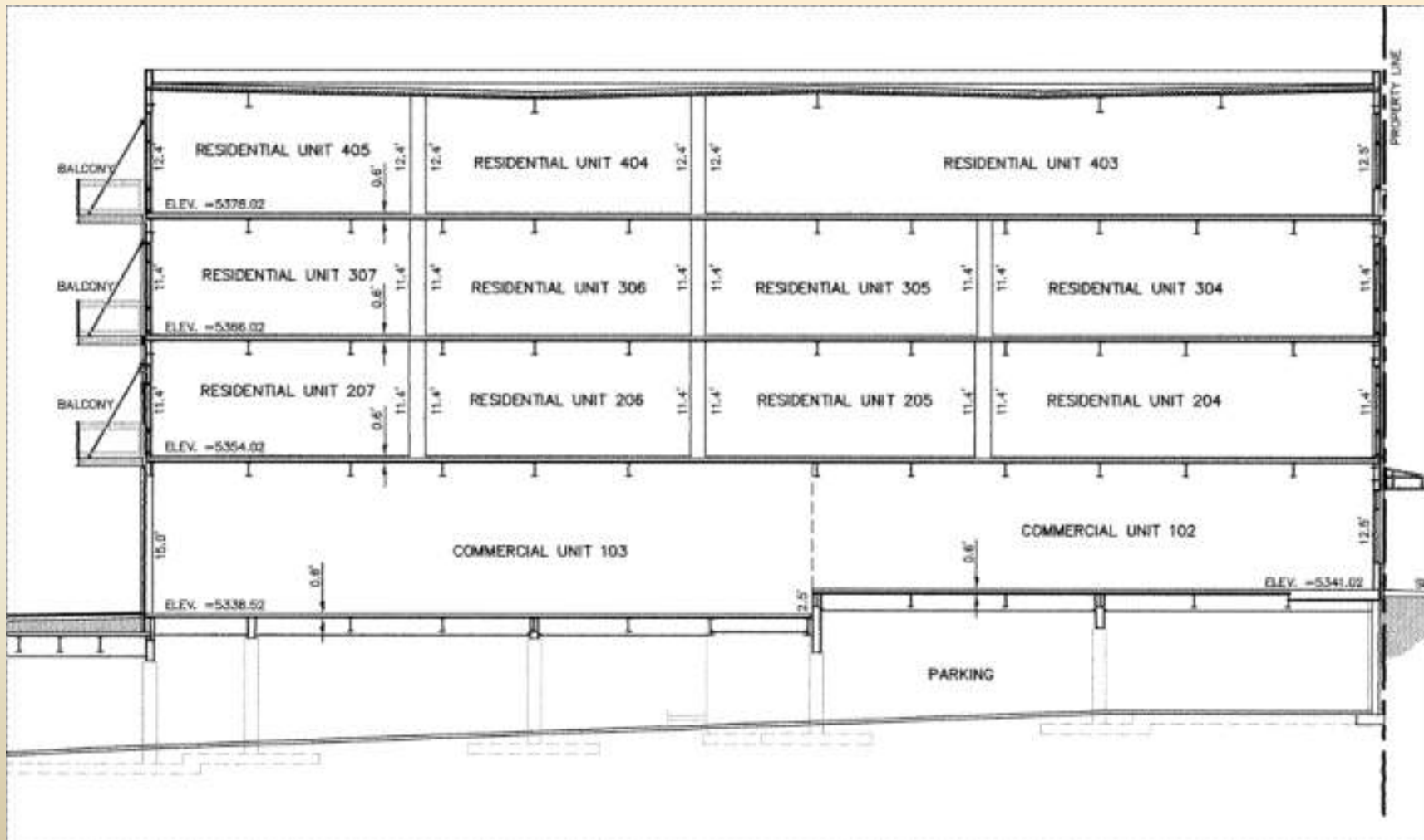# Condo Challenges

Condos can be multi-level = one unit has 2 floors
(townhouse-style)

Condo Challenges

Or…condos can be stacked

Condo Challenges

Difficult to represent accurately in 2-D

Real World

GIS

How we previously mapped condominiums

- In ArcInfo Workstation coverages, each unique condominium parcel number was represented by its own unique polygon

- Result: "Condo Boxes" were normally 5 foot by 5 foot polygons that 'housed' each unique parcel number/condo unit

- In each condo phase, one condo unit's parcel number 'housed' the remainder geography

Poplar Grove Townhome Condos
Longmont, Colorado
Phases 8 through 12
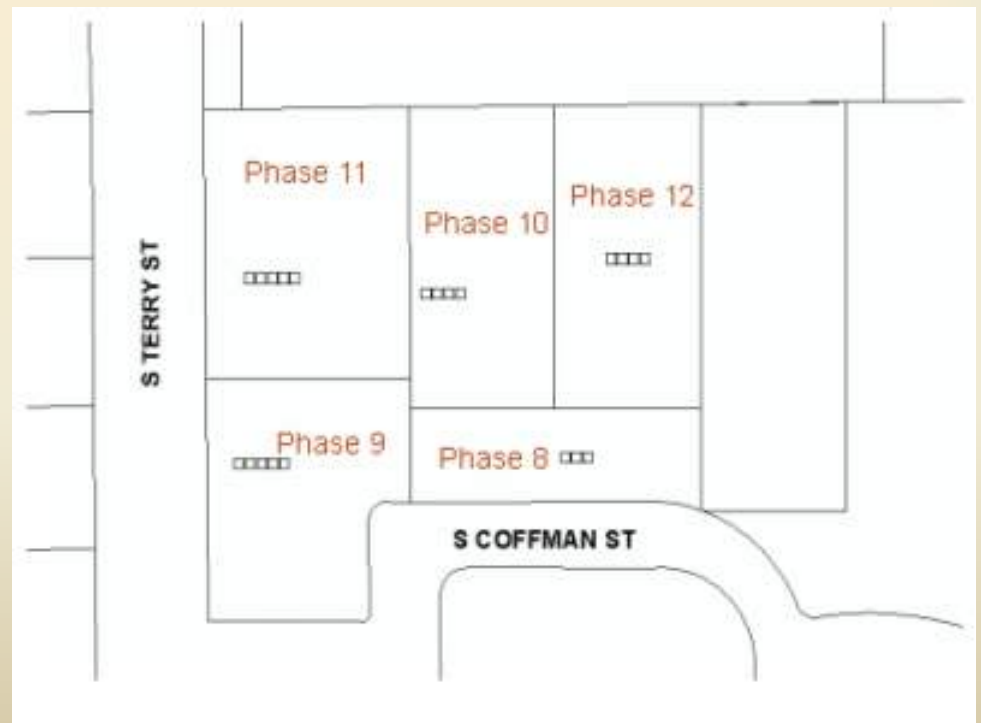
Condo Boxes: A Closer Look

Poplar Grove Townhome Condos
Longmont, Colorado
Phases 8 through 12

- **5 of the 6 units in Phase 11 are represented by condo boxes**
- **1 of the 6 units is the 'remainder' geography within Phase 11's general common elements**
- **Poor representation of condo units' relative location to each other**

Condos in the Real World

Photographs

Poplar Grove Townhome Condos
Longmont, Colorado
Phases 8 through 12

- **Condo boxes are spatially inaccurate**

- **Derived x-y coordinates for modeling are arbitrary**

- **Limited ability to value condo units by location**
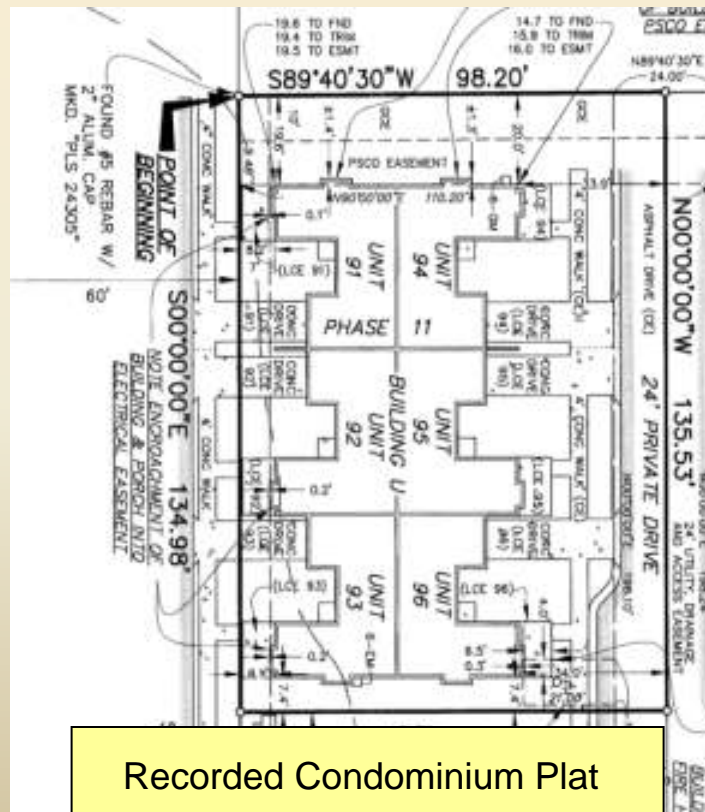
Recorded Condominium Plat
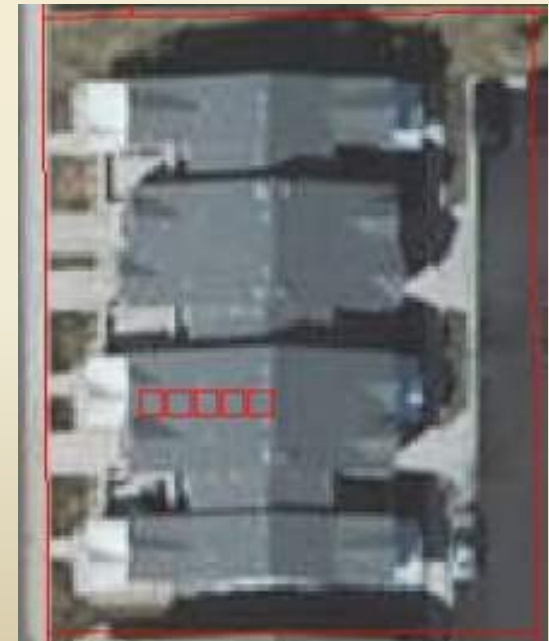
Aerial Photography

How we map condos now… with "Containers"
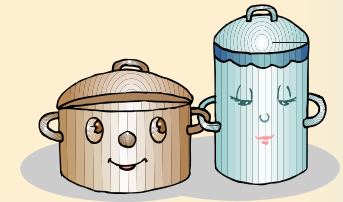
- A container illustrates an entire condo phase in the parcel layer
- Each unit owns a partial interest in the GCE
- This is a better representation than the condo box

Centennial Pavilion Loft Condos

CENTURY DR

CENTURY CIR

S MCCASLIN BLVD

How containers work

- Containers are created in ArcMap using a custom vendor editing extension
  - Records for each unit are copied to a separate table
  - The table records are linked to the polygon via a common "feature key"
  - One-to-many relationship

- <u>Brand new</u> condo containers can be created

- <u>Existing condo boxes</u> can be converted to containers

Use of Containers

- **An overnight SDE script builds stacked polygons from the non-mapped parcel table**

- **By using the identify tool in the parcel layer, all condo unit parcel numbers are revealed**
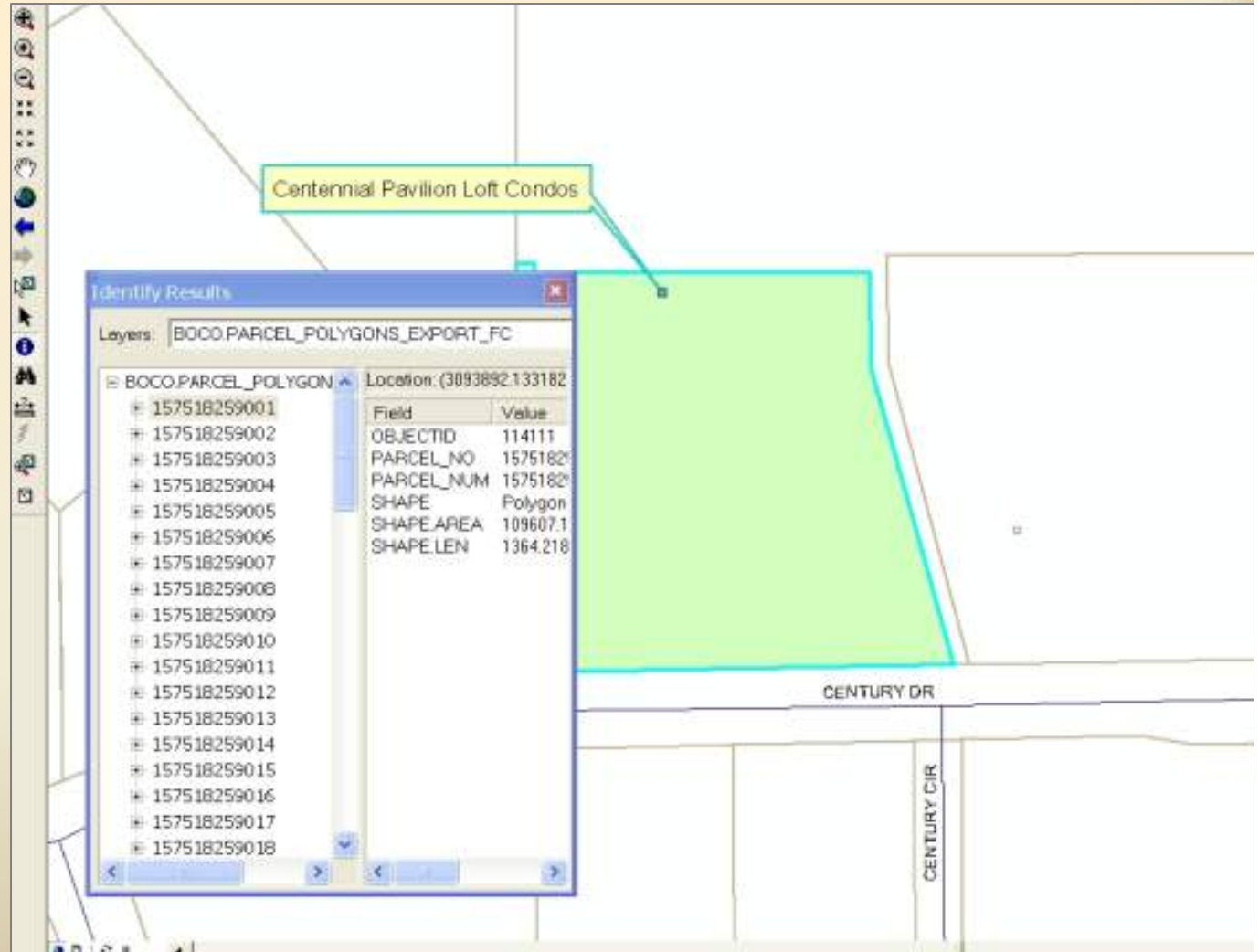
Use of Containers
Pros and Cons
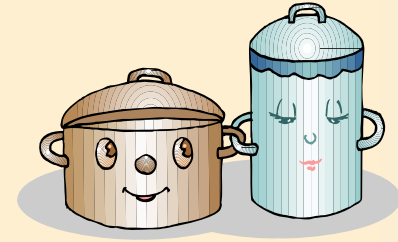
- Pros
  - Spatially a better representation than condo boxes
  - Less confusing to the public when viewing parcel layer
  - Much easier identifying units using a table

- Cons
  - Does not accurately illustrate location of unit; x-y coordinates are generalized to container
  - No help to the appraiser in valuation

How to make our condo data more useful and spatially accurate

Editor

Parcel Number

Elevation

- Digitize condo building footprints to a separate database
- Attribute individual features
  - Units, LCE, GCE
- Use a model that ensures uniformity
- Capture elevation for 3D modeling

Unit #

X Y Coordinates

GCE

LCE

Original Condo Footprint Model

All levels contained in same shapefile:

- Difficult to distinguish between floors
- This made for tough editing

Original Condo Footprint Model

Different floors were intentionally offset horizontally:

- Made editing between floors easier
- But…introduced greater spatial inaccuracy
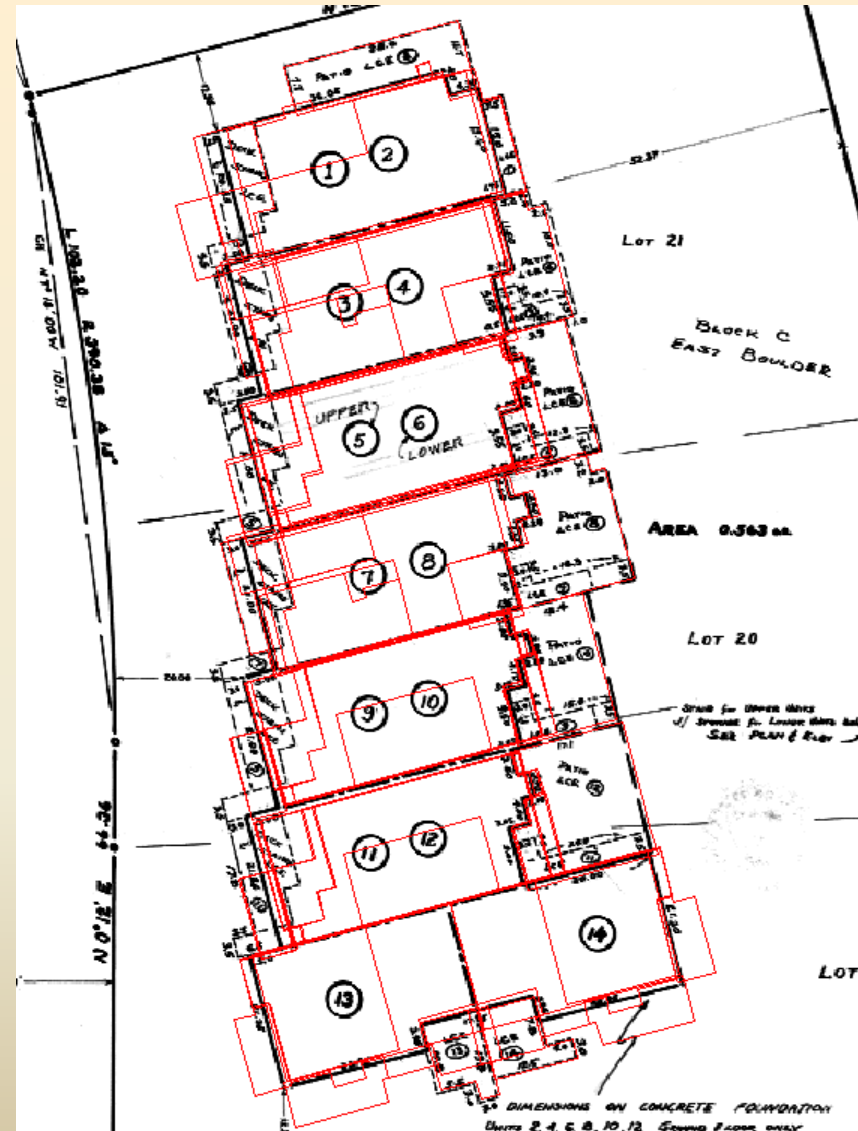
Original Condo Footprint Model

Offsets cause problems when the features are 3-D
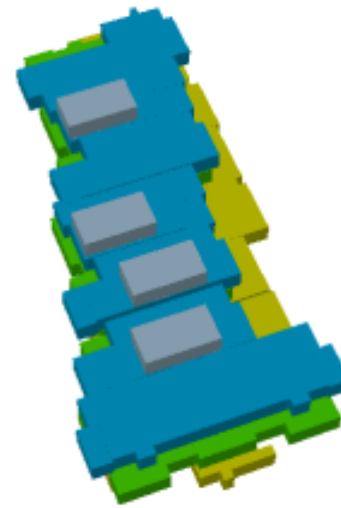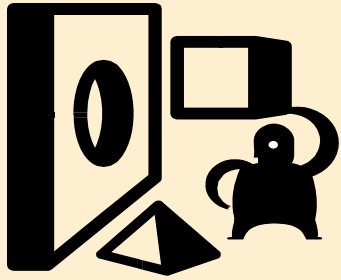
Original Condo Footprint Model

Attributes weren't standardized:

- Same kind of features were assigned different attributes
- Fields weren't required, leading to inconsistencies/data gaps

Consolidating shapefiles from various editors' work:

- Difficult!
- Good information lost because attributes had to be generalized
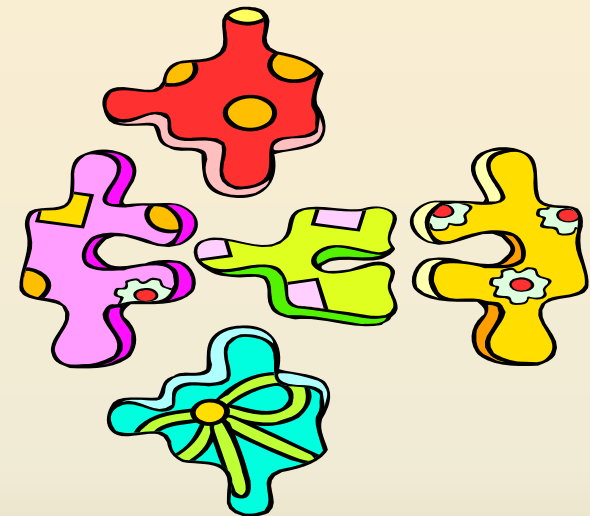
Re-designing the Condo Parcel Data Model

What needs to be captured…

For each Condo Unit, LCE and GCEs within the building:

- The _footprints_ of each feature as polygons
- The attributes that allow 3-D display and analysis
  - Level/floor and elevation
- Other important attributes of each feature
  - Parcel number: links the GIS feature to the record in the Assessor's database
  - Condo unit number
  - Detailed classification of LCE or GCE
  - Primary polygon for each condo unit (X-Y)

Re-designing the Condo Parcel Data Model

In the Data Structure…

Fields and attributes should have:

- Rules for required fields
- Rules for types of data that can be entered
- Domains/pick-lists to eliminate arbitrary values

Digitizing and editing should be:

- Easier to work with and see
  - Levels/stories are discrete layers
- More efficient and less repetitive
  - Features and attributes can be copied from polygon to polygon and level to level
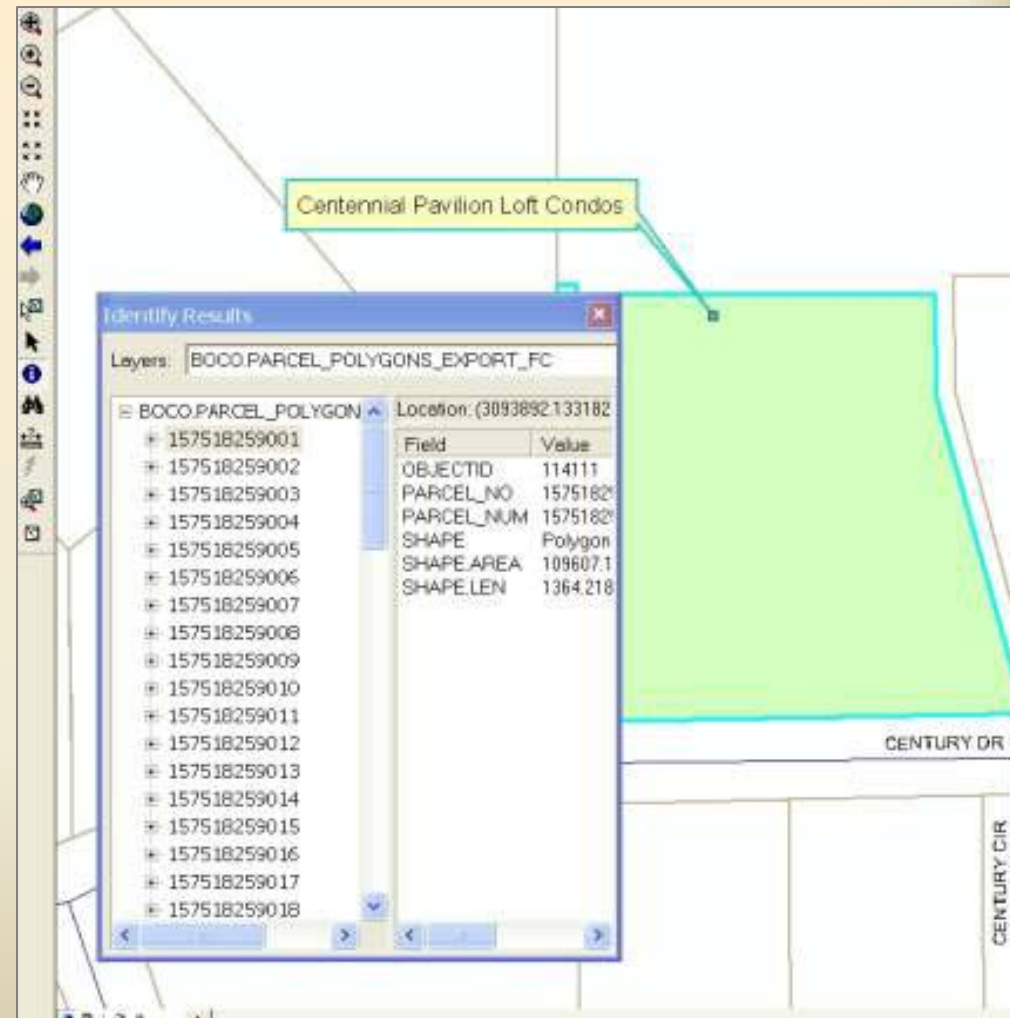
Re-designing the Condo Parcel Data Model

Data Consistency

- Makes consolidation easier
- Improves accuracy of final product

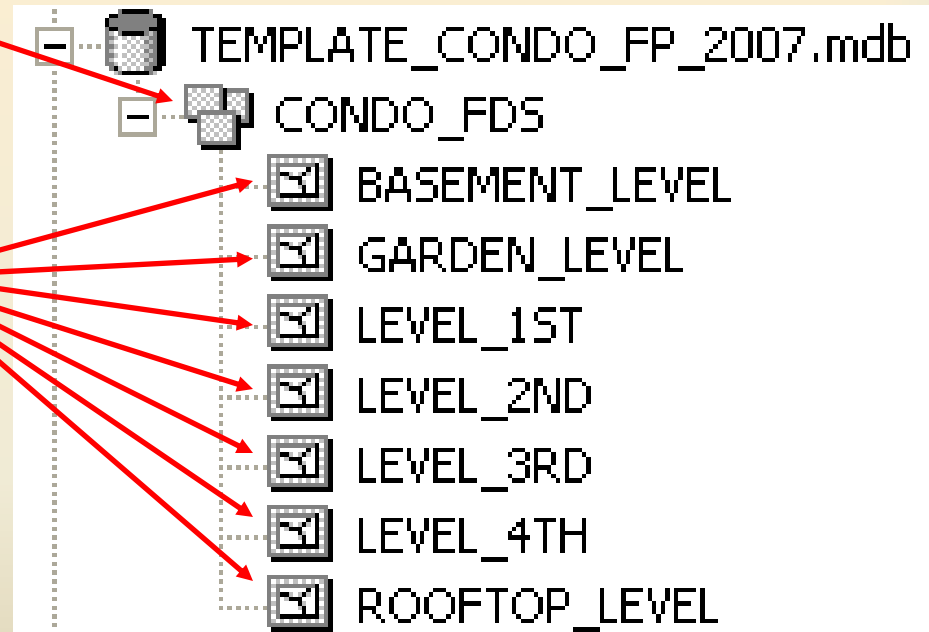## What we *didn't* need in this model:

- The boundary of each condominium complex
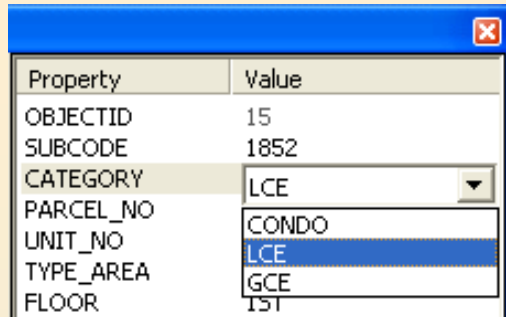- We already have container polygons in our parcel layer

Current Condo Parcel Data Model

The Personal GeoDatabase (PGDB)
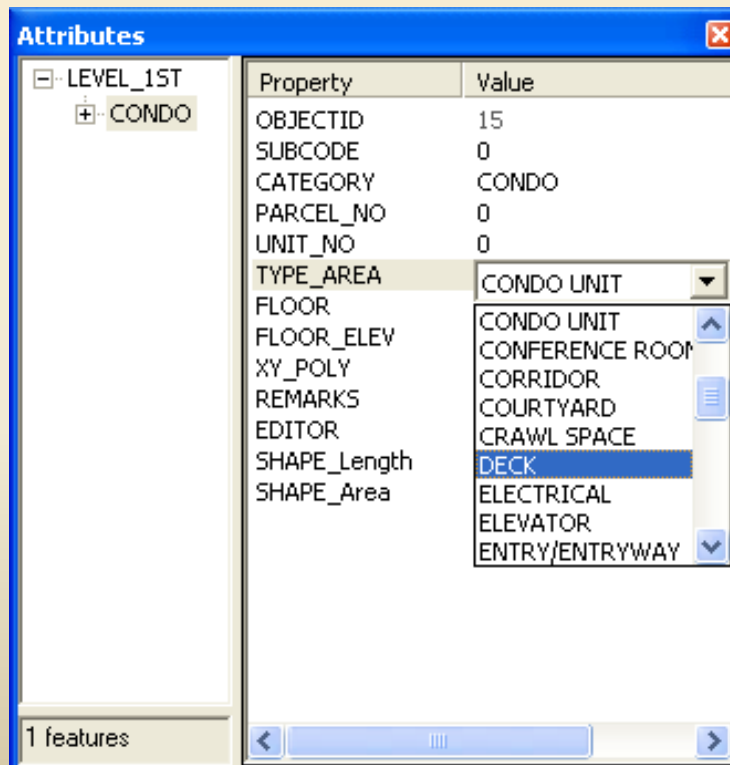contains a *Feature Data Set* (FDS)

FDS contains seven
Feature Classes for
levels Basement
through 4th Floor, and
Rooftop

TEMPLATE_CONDO_FP_2007.mdb
CONDO_FDS
BASEMENT_LEVEL
GARDEN_LEVEL
LEVEL_1ST
LEVEL_2ND
LEVEL_3RD
LEVEL_4TH
ROOFTOP_LEVEL

Current Condo Parcel Data Model

Each Feature Class:

- represents a level/story
- contains the same fields, domains and rules

Additional feature classes can be added to the PGDB for higher stories – 5th floor and above

Fields & Attributes

Required Fields:
- ✓ Subdivision Code
- ✓ Category
- ✓ Type of Area
- ✓ Floor Level
- ✓ Floor Elevation
- ✓ Editor

Conditional Fields:
- ☐ Parcel Number
- ☐ Unit Number
- ☐ Remarks

Exclusive: X-Y Polygon

Data Model – Fields & Attributes

- **Unit Number:**
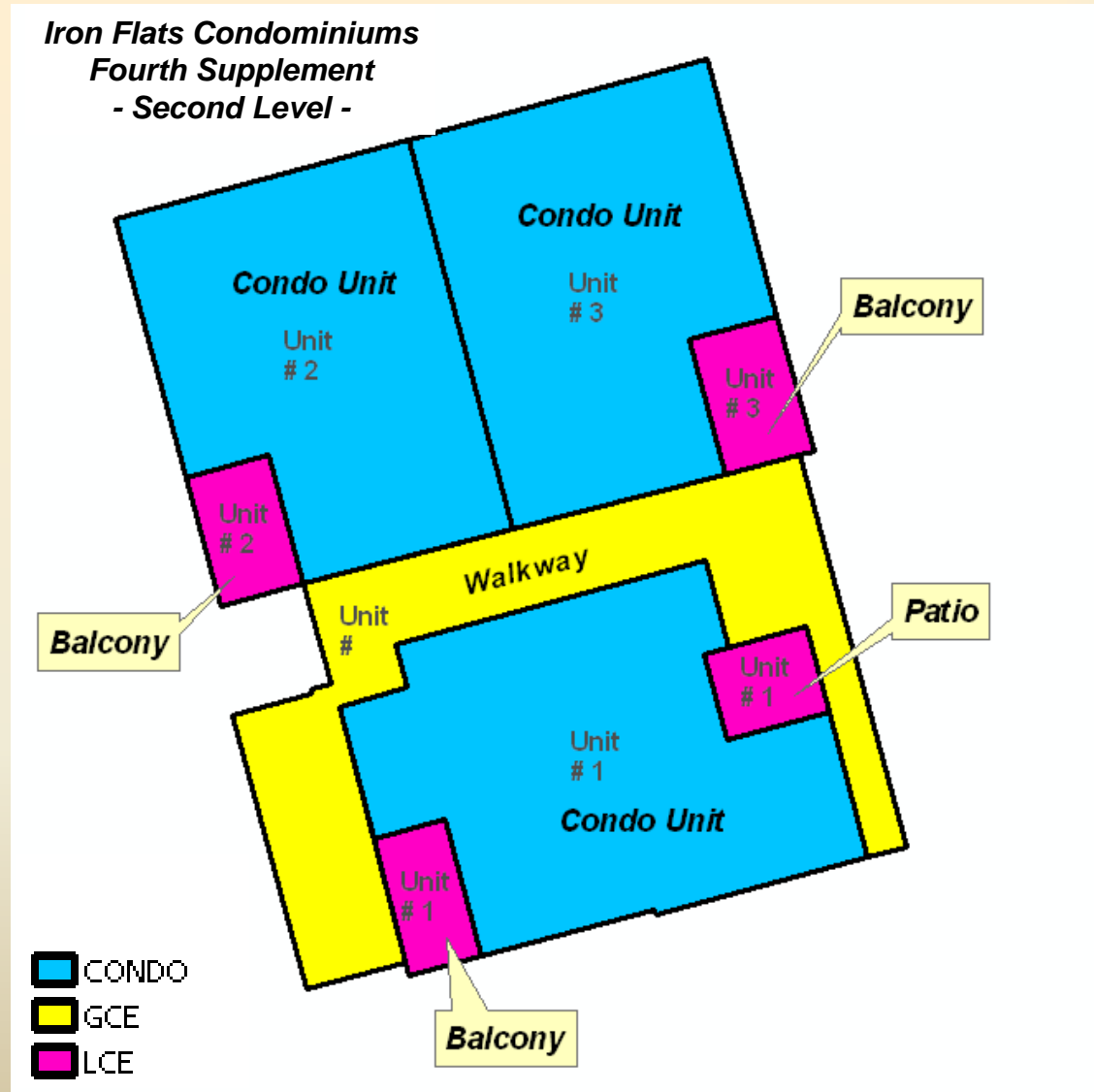 1, 2, and 3

- **Category:**
  CONDO
  LCE
  GCE

- **Type Area:**
  Condo Unit
  Balcony
  Patio
  Walkway

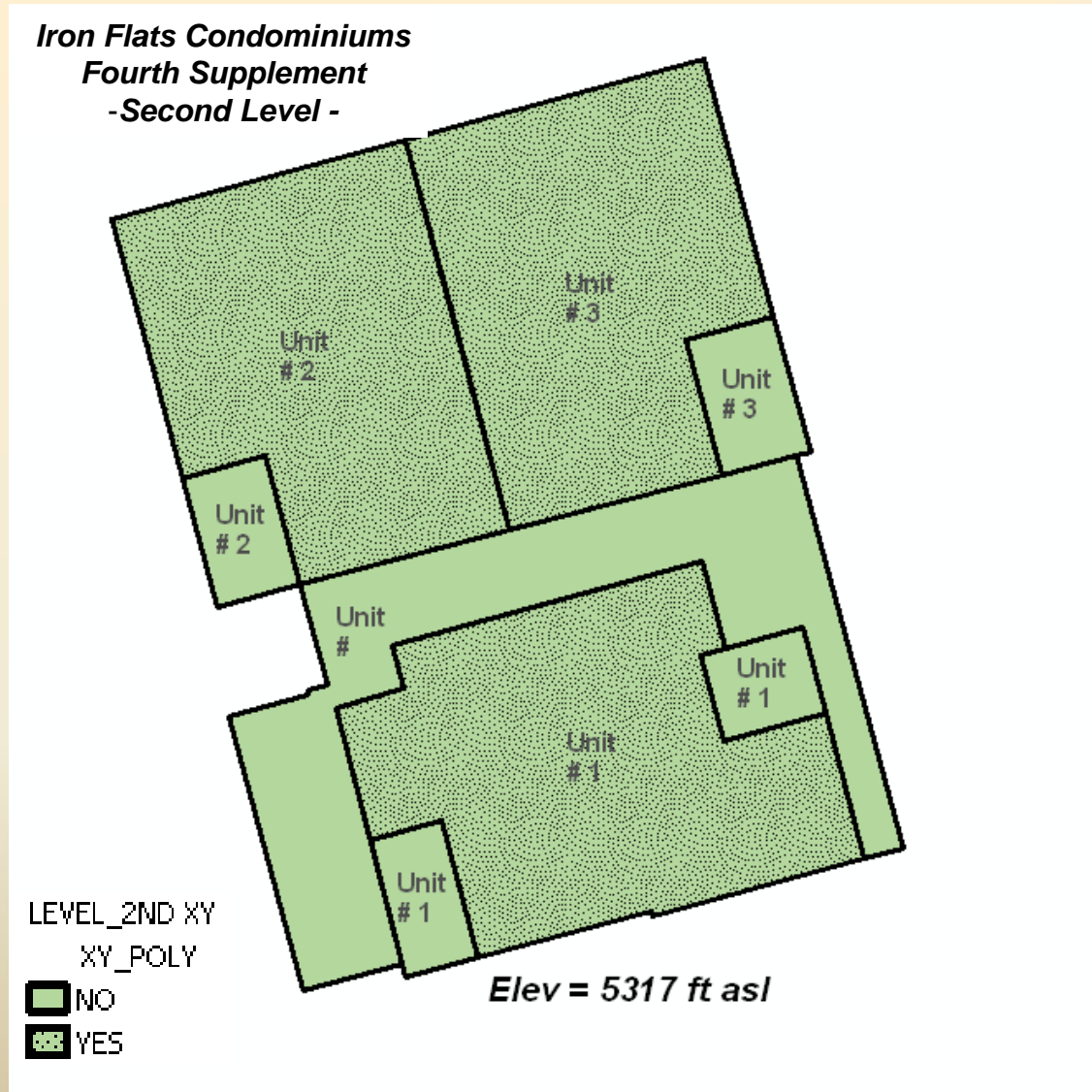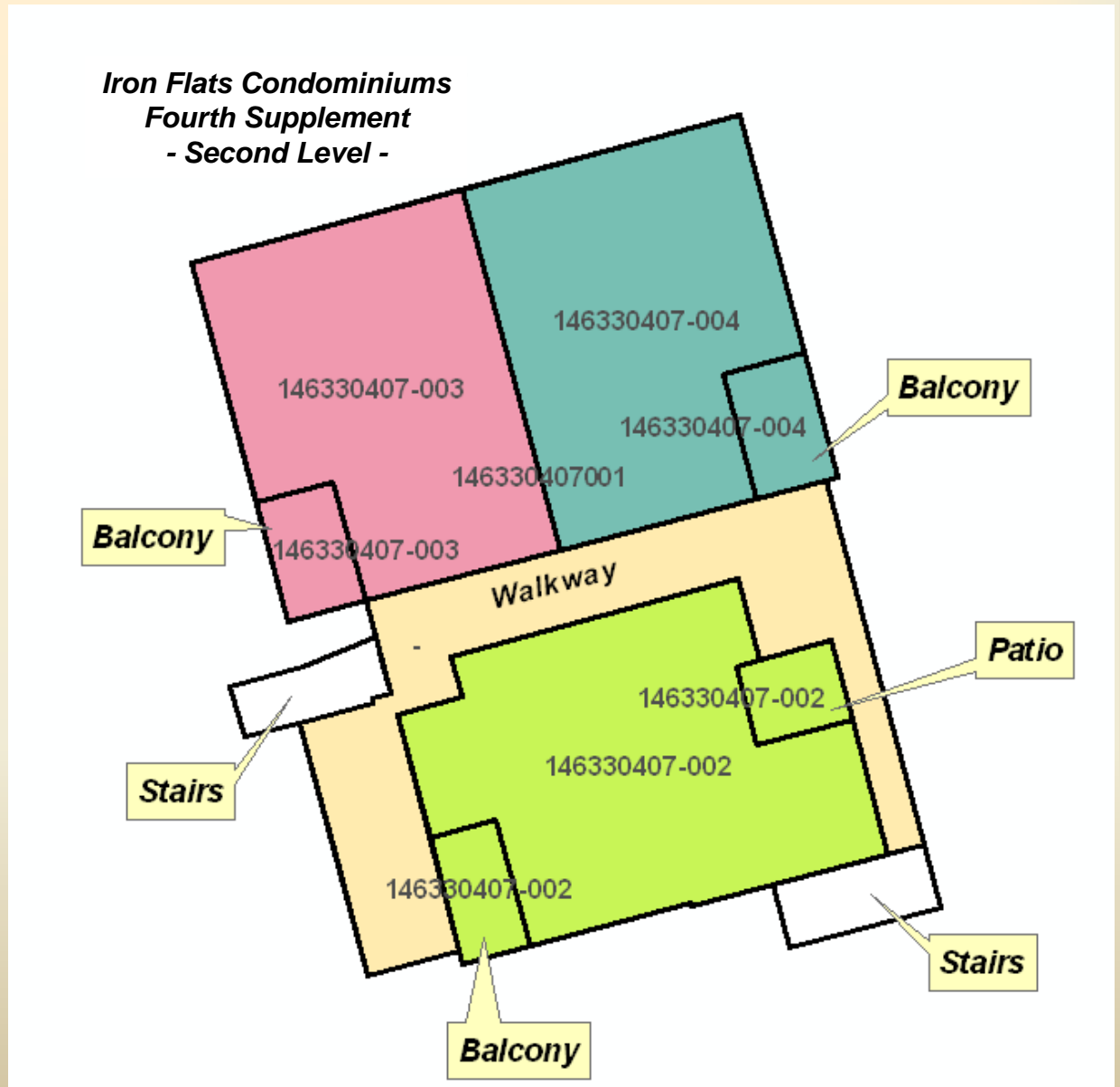*Iron Flats Condominiums*
Fourth Supplement
- Second Level -

Data Model – Fields & Attributes

- **Floor:**
  2nd

- **Elevation:**
  5317 ft asl

- **X-Y Poly:**
  NO
  YES

Iron Flats Condominiums
Fourth Supplement
-Second Level -

Data Model – Fields & Attributes

- **Parcel Number** (PIN):
  Usually unique for condo units

- **PIN** also may apply to LCEs:
  When the LCE feature is associated with only one account

- **Remarks**:
  - Provides more specific details about a feature
  - Lists multiple unit numbers

Iron Flats Condominiums
Fourth Supplement
- Second Level -

146330407-004

146330407-003

Balcony

146330407-004

146330407001

Balcony

146330407-003

Walkway

Patio

146330407-002

Stairs

146330407-002

146330407-002

Stairs

Balcony

Data Model –
Fields & Attributes

- ## Subcodes:
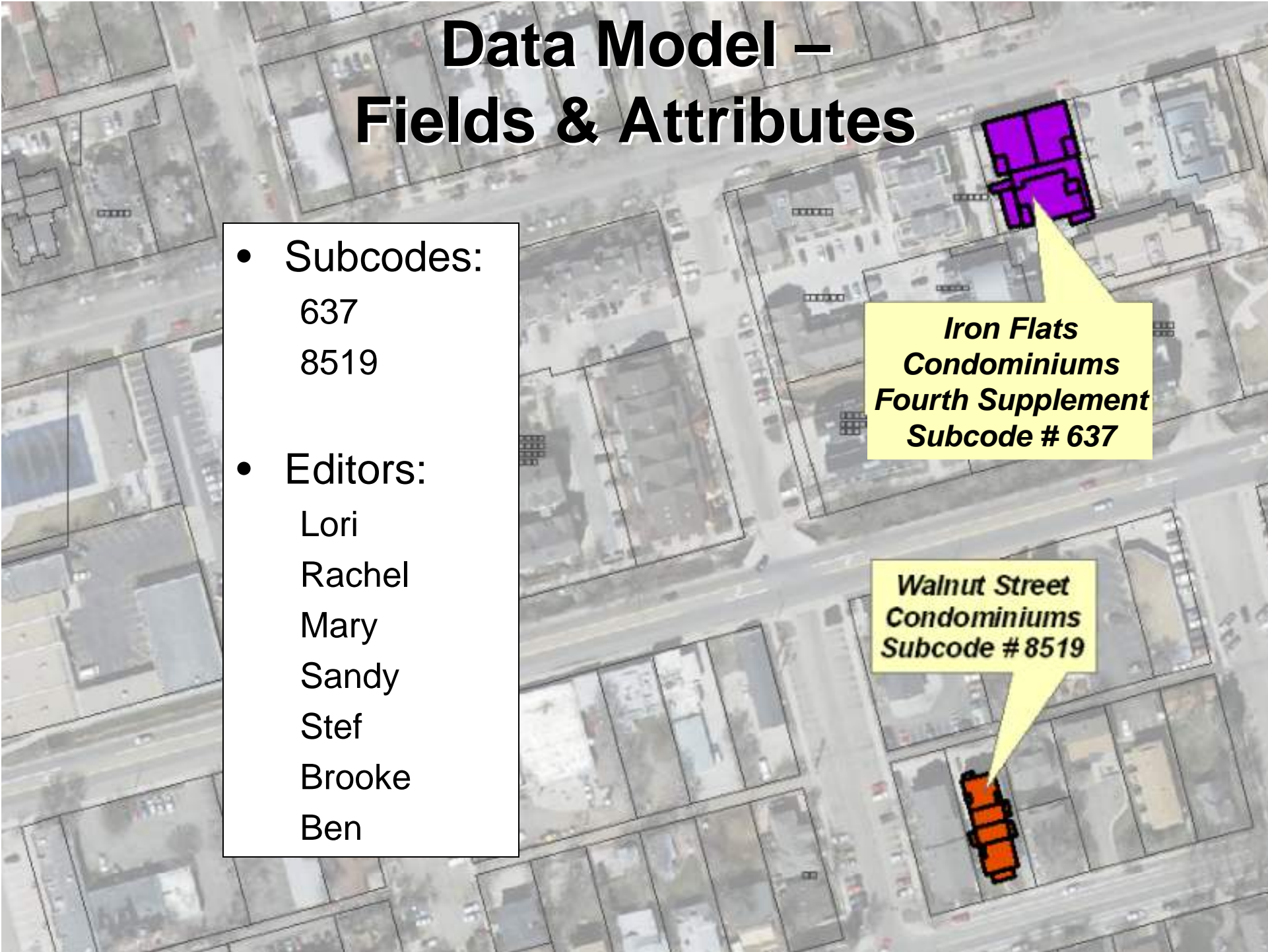 637

  8519

- ## Editors:
  Lori

  Rachel

  Mary

  Sandy
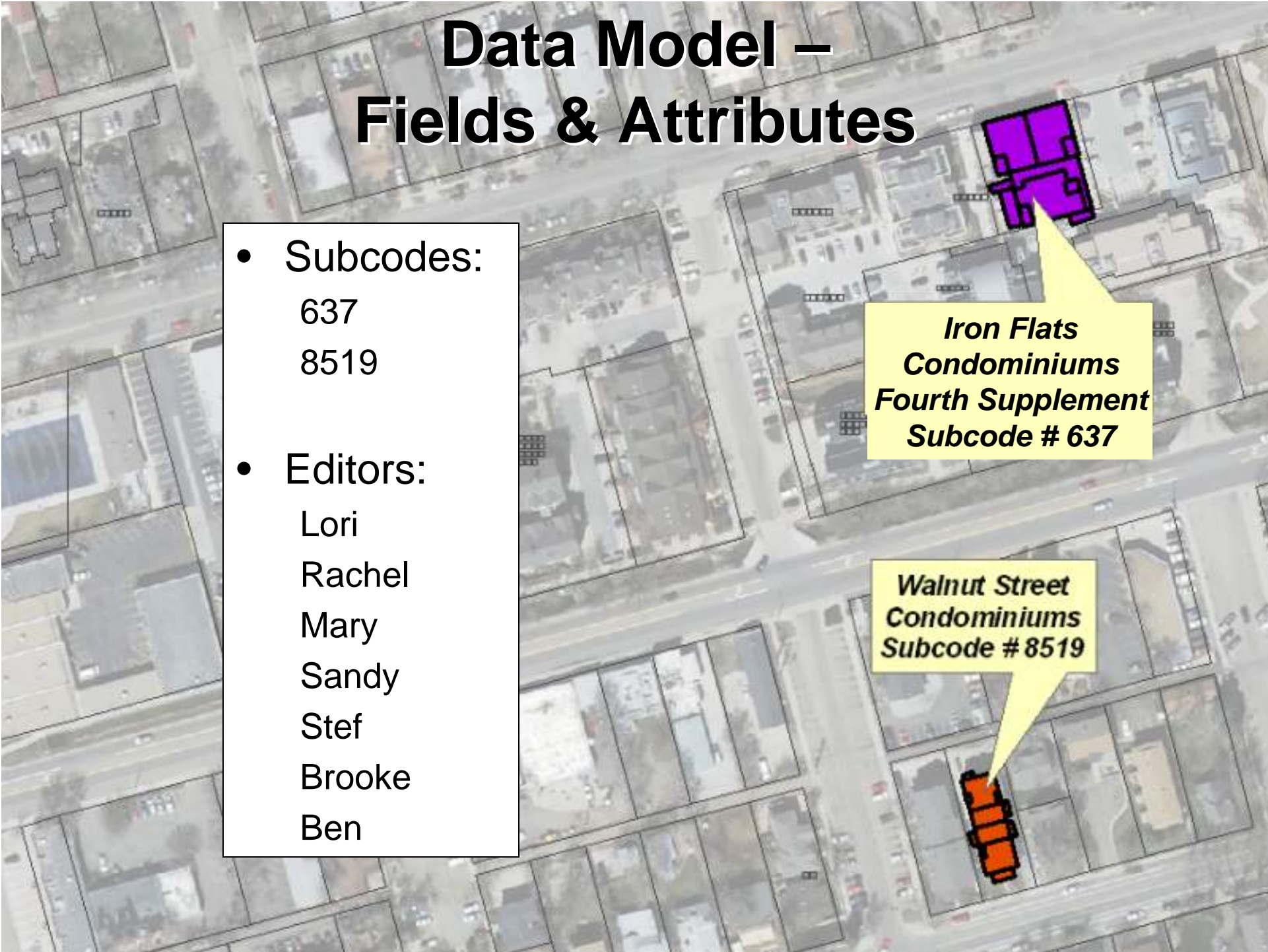
  Stef

  Brooke

  Ben
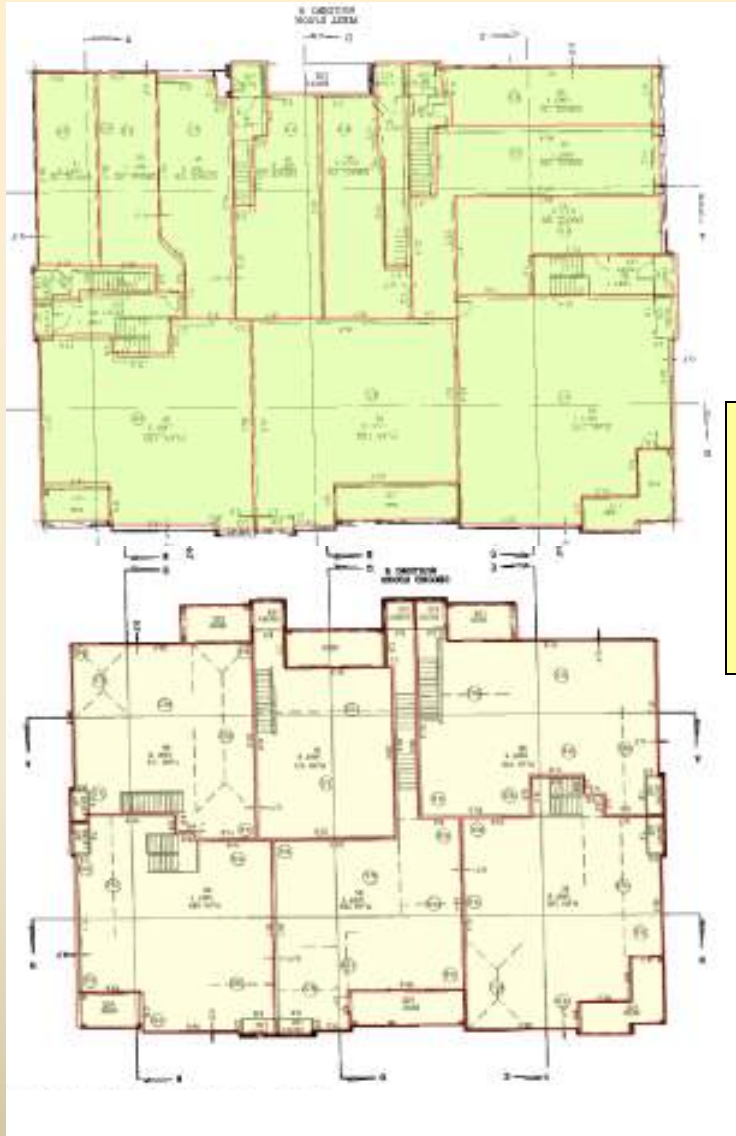
Iron Flats Condominiums Fourth Supplement Subcode # 637

Walnut Street Condominiums Subcode # 8519

Georeferencing Plat Image and Other Tricks

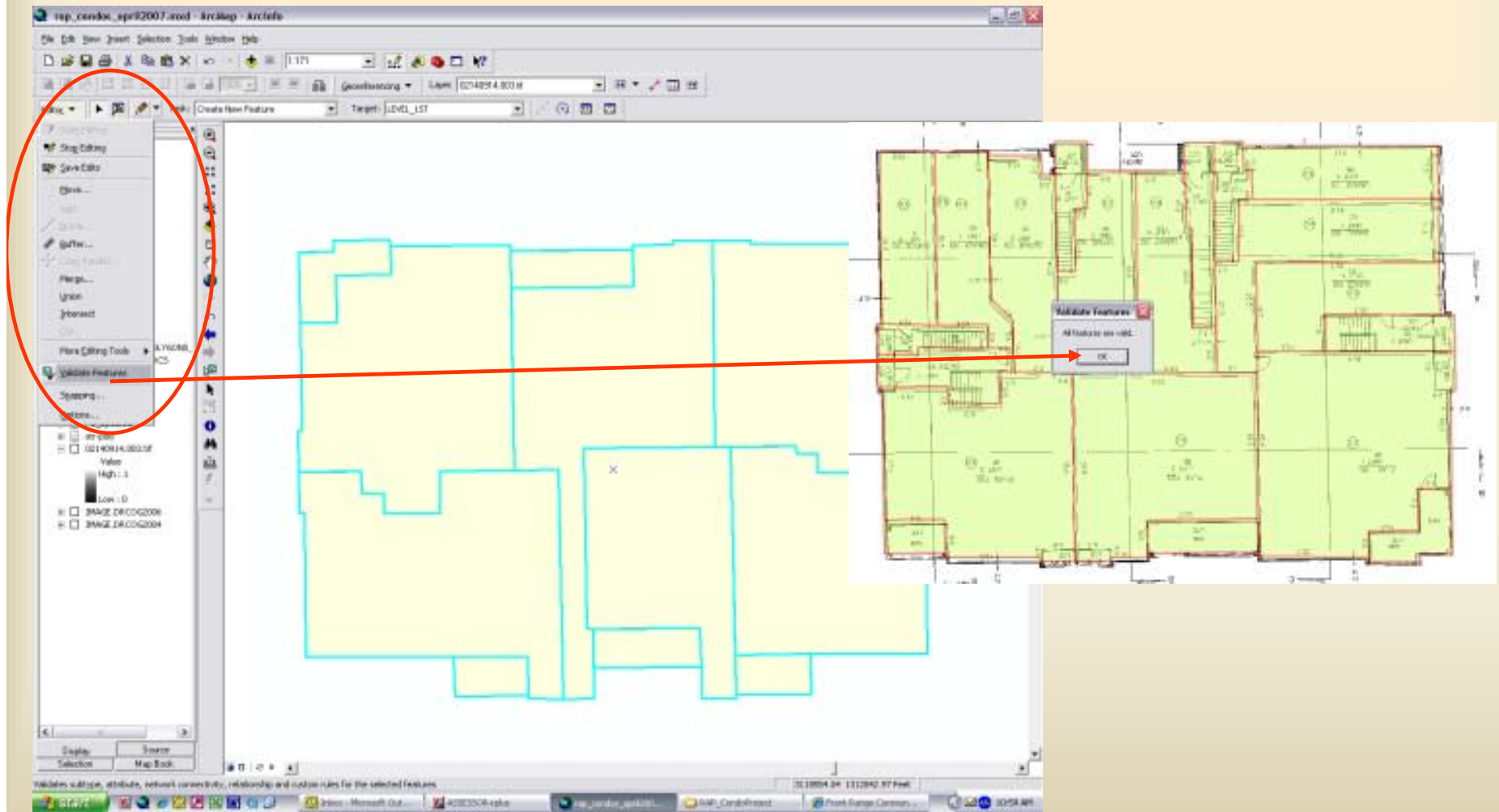
Villas at Ute Creek
Longmont, Colorado
Original filing & phases
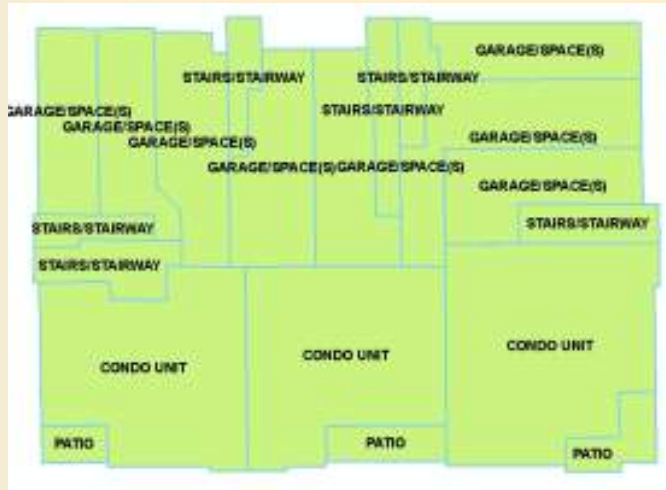1 through 5
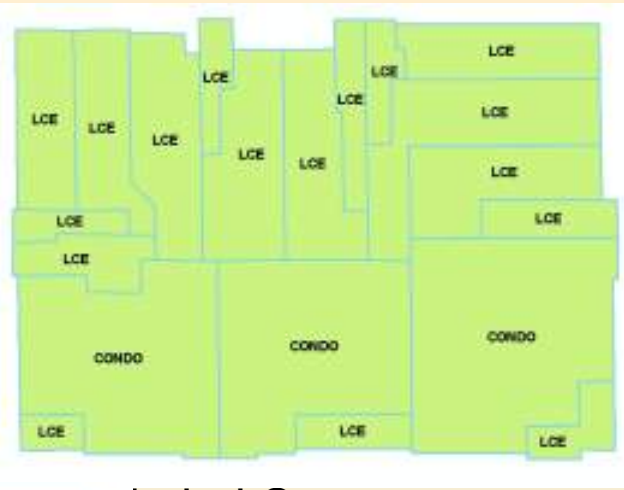
Attribute Condo Units

Quality Control and Edit Checks: Validate Features
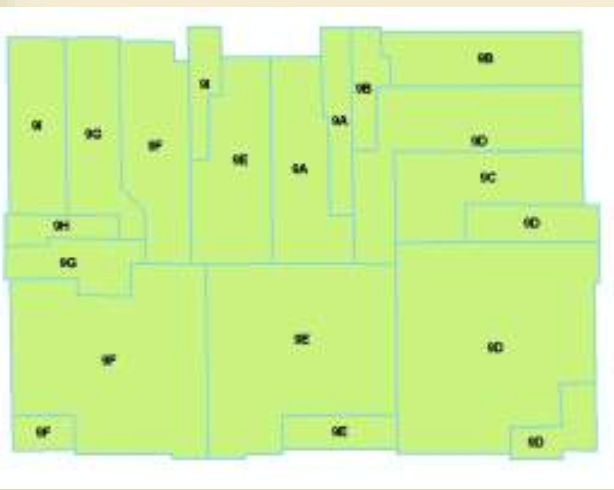
Quality Control and Edit Checks:
Labeling Attributes

Area Type

Label Category

X Y Polygon?

Unit Number
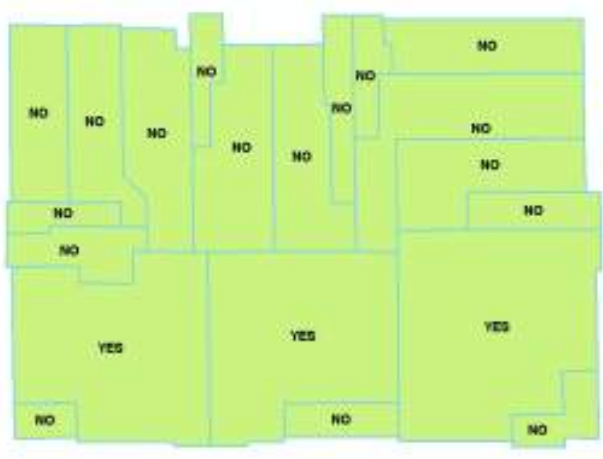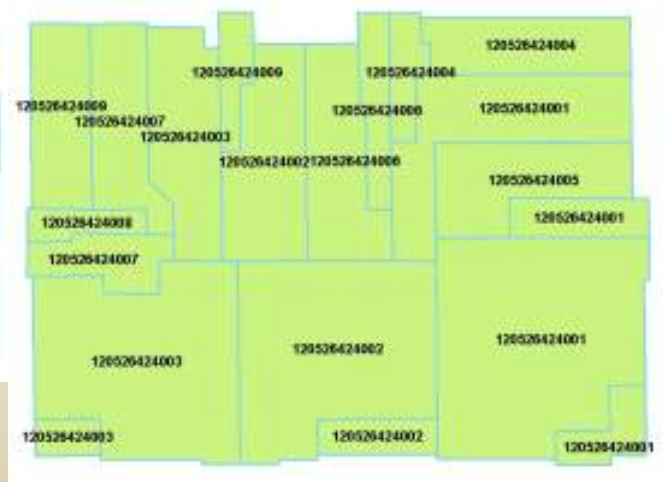
Parcel Number

The new condo model highlights

- Spatially accurate - but not survey quality
- Data structure promotes uniformity
- Consistency of GIS editing and data entry allows easier consolidation of multiple editors' work
- Provides more detail for each unit and its relative position within the condo complex, in both 2-D and 3-D views

Editor

Parcel Number

Elevation

Unit #

X Y Coordinates

GCE

LCE

Ultimate Products / Future Uses

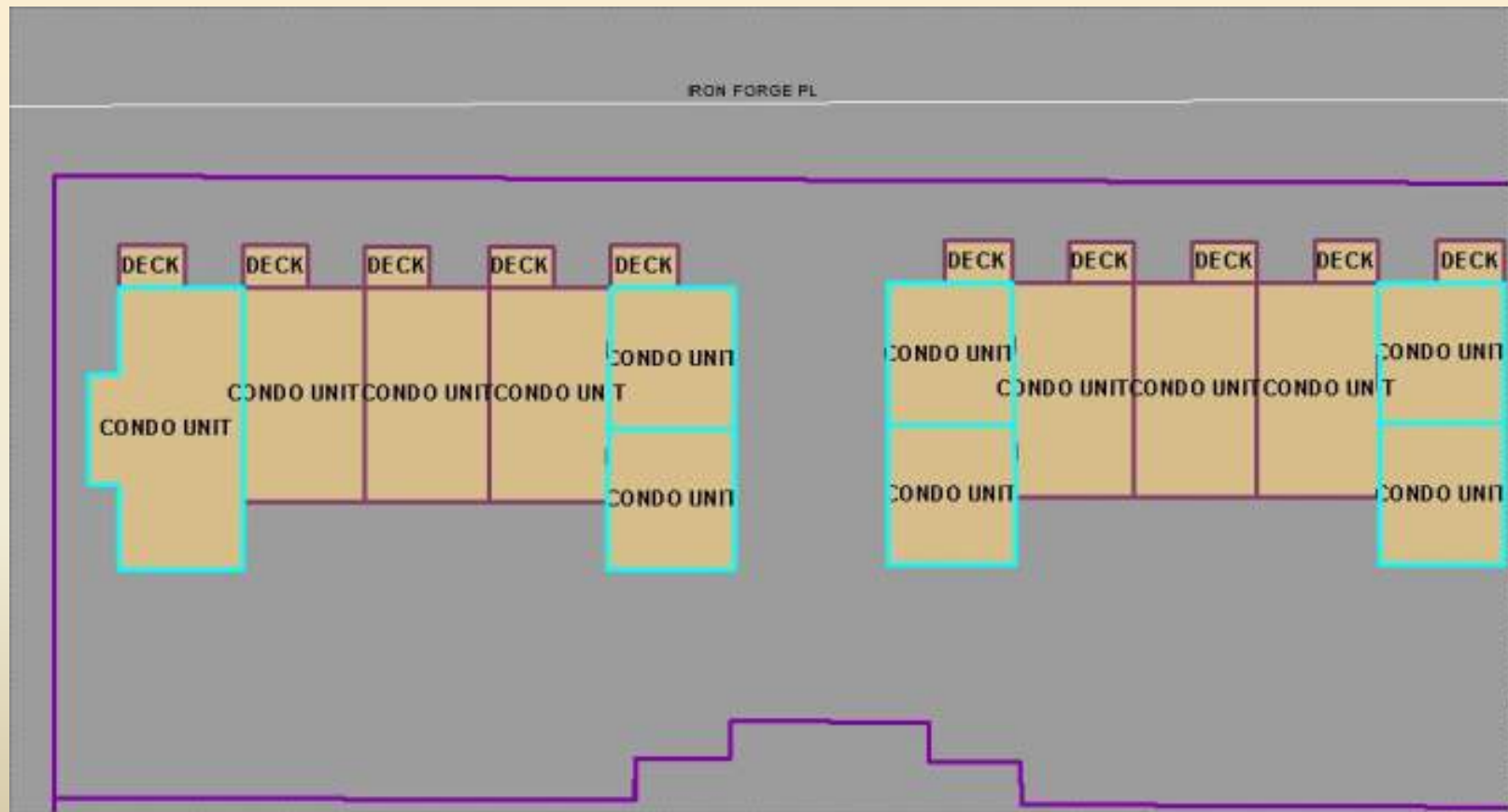Publish condo footprints in online mapping application

– Depicts the individual unit boundaries while retaining the boundary of the underlying land parcel of the condo complex

Ultimate Products / Future Uses

Capturing additional attributes for detailed property valuation:

- – End units, west-facing units, 4th floor vs. 1st floor, etc

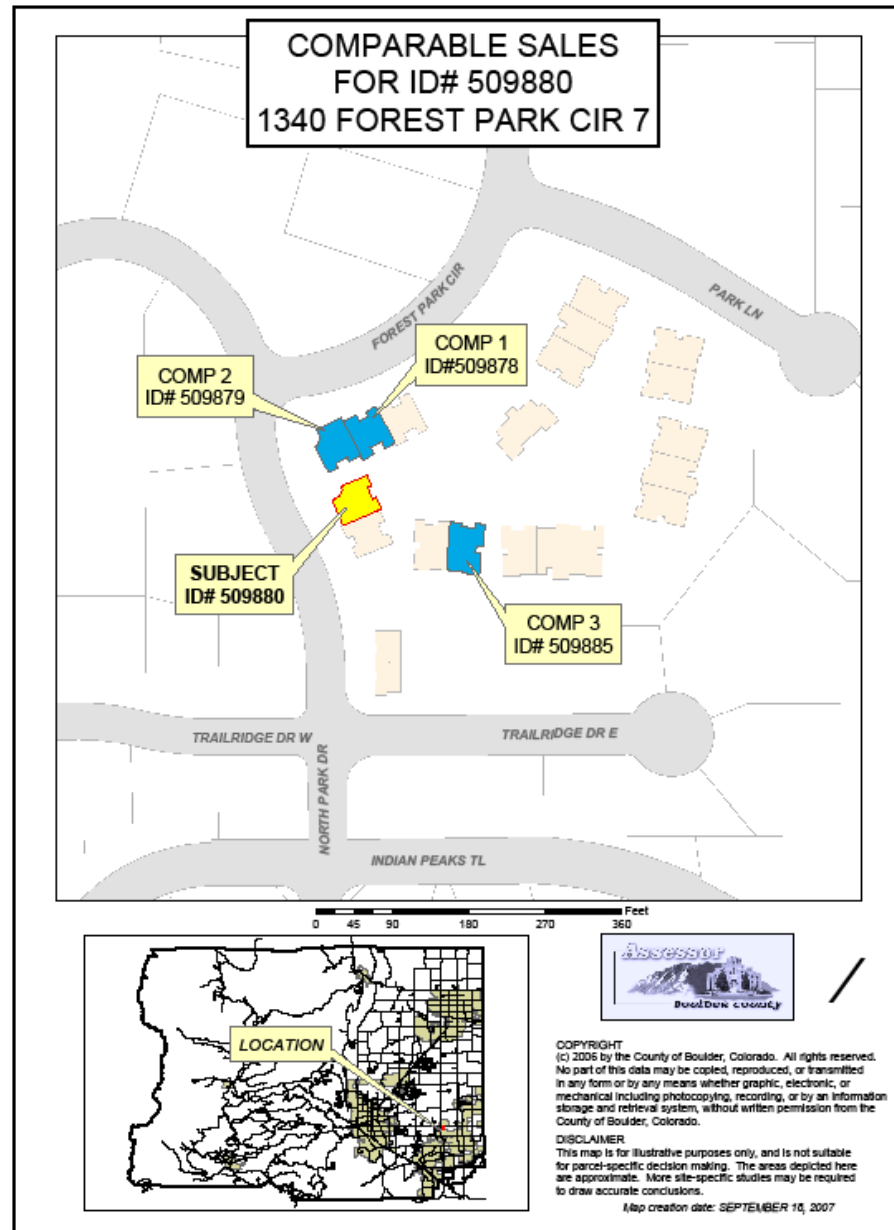# Ultimate Products / Future Uses

Appraisers can analyze properties in 3-D to assign attributes and determine which attributes affect value that we may not have realized before

- Floor level and view
- Relative location, traffic, and privacy
- Visual tool to help explain values to taxpayers

Comparable maps

- **Traffic**
- **Golf Course**

- **Views**
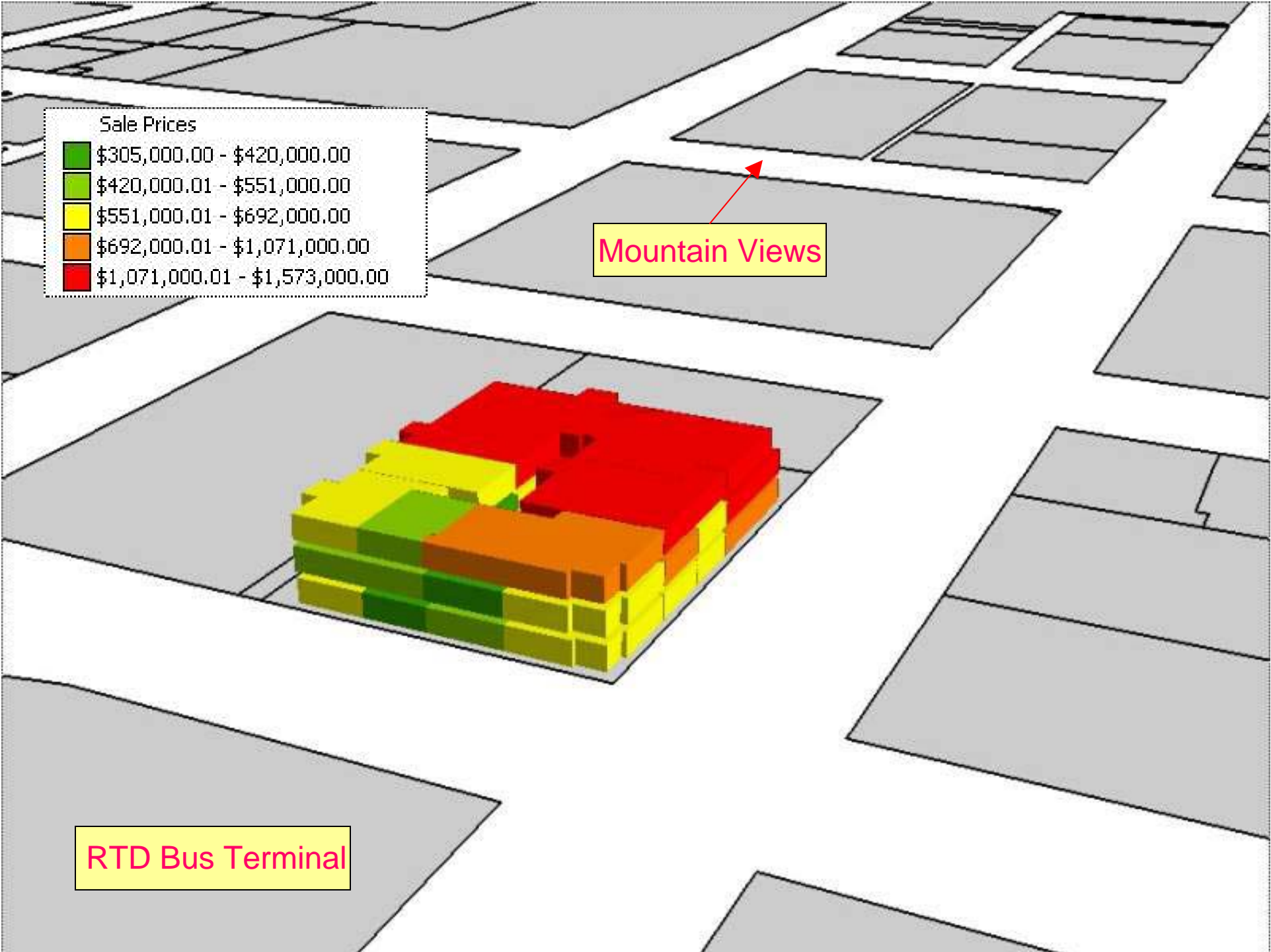- **Proximity to Open Space**

• **Golf Course**

Sale Prices
- $305,000.00 - $420,000.00
- $420,000.01 - $551,000.00
- $551,000.01 - $692,000.00
- $692,000.01 - $1,071,000.00
- $1,071,000.01 - $1,573,000.00

Mountain Views

RTD Bus Terminal

Contact Information

Presenter

Rachel Parrinello

rparrinello@bouldercounty.org

Contributing Editors

Brooke Cholvin
bcholvin@bouldercounty.org

Lori Krager
lkrager@bouldercounty.org

Mary Sampson
msampson@bouldercounty.org

Sandy Ingalls
singalls@bouldercounty.org

Stefanie Schroeder
sschroeder@bouldercounty.org

www.BoulderAssessor.org

Cindy Braddock, *GIS Deputy*
cbraddock@bouldercounty.org