

# Assessing Storm Water Runoff Fees in Westminster, Colorado

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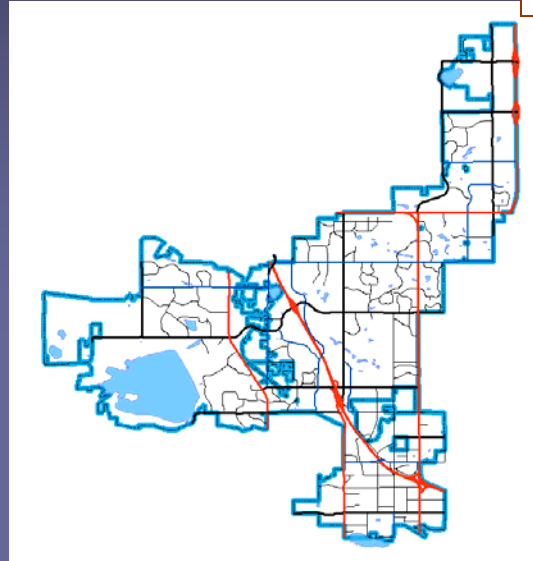
# WESTMINSTER, COLORADO

33.5 Square Miles  
Population: 109,838  
Avg. HH Income: \$74,690

City Manager–Council Gov't  
1,000+ City Employees

½ hour east of the foothills  
of the Rocky Mountains

About 10 miles NW of Denver



# Westminster GIS

- GIS Staff of 4
- 2 part-time IT staff dedicated to GIS functions
- Serving 9 Departments
- 100+ Users
- Licenses: 8 ArcInfo, 17 ArcView – About 25 daily users
- Enterprise ArcSDE, SQL Server
- Integrated with: 8 Internal IMS Services, Accela Maintenance Management, Utility Billing, Building Permits, Police/Fire Dispatch, Infrastructure Master Plan, Storm Water Billing Program, Pavement Management

# Storm Water Utility (SWU) History

- Dec. 2000: City adopts storm water regulations, Federal mandate for NPDES, Phase II
- 2001-2002: City develops programs to collect fees for infrastructure development, maintenance, etc.
- Original program used table-based data and some GIS
- Previously, there were no water meters locations; impervious surface data was inconsistent
- AML scripts ran the GIS tools – hard to troubleshoot
- 2005: Decision to upgrade the procedure and the necessary GIS data



# Current Storm Water Utility (SWU) Framework

**PROJECTED 2008 REVENUE = \$2,000,000**

- SWU fees are calculated monthly, in association with the water bill cycle
- Runs as a vector-based procedure
  - No imagery
- Program runs from set of models
  - Created in Model Builder 9.1 (updated in 9.2)
  - All input to the models is GIS data
- Models pull data directly from SDE feature classes
- Results are archived each month in GIS formats

# SWU Procedure

## STEP 1 – Data Input

- Impervious Surface Datasets:
  - Primarily from developers' AutoCAD files, which we require as part of the development process
  - Added to GIS during development
  - Constant maintenance – 90+ projects in progress in the City.....

### CHARGEABLE SURFACES

Parking Lots

Road Areas

paved drives

Impervious Surfaces

tennis/basketball courts

patios/walkways

asphalt play areas

Building Footprints

Pools



- Parcels

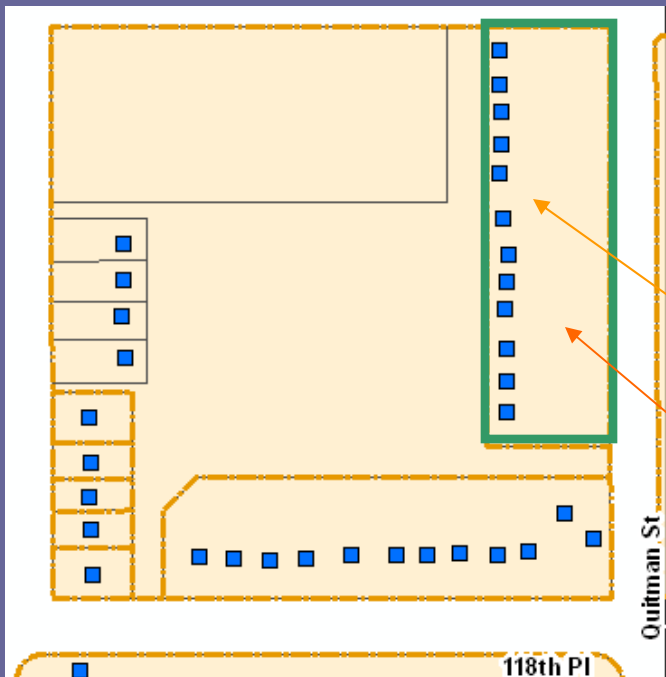
Certificates of occupancy determine that billing will begin  
Parcel boundaries are added from plat/survey data

- Water Meters

Approx. 32,000 meters

Location is GPS'd or placed (estimated) into appropriate parcel

11 types of meters (i.e. commercial, irrigation, apartments, etc....)



Linked by unique identifier field  
Not always a 1-to-1 relationship



All Meters in parcel 23455 have  
PARUNIQ = 23455

Parcel has PARUNIQ = 23455

# ■ SWU Billing Polygons

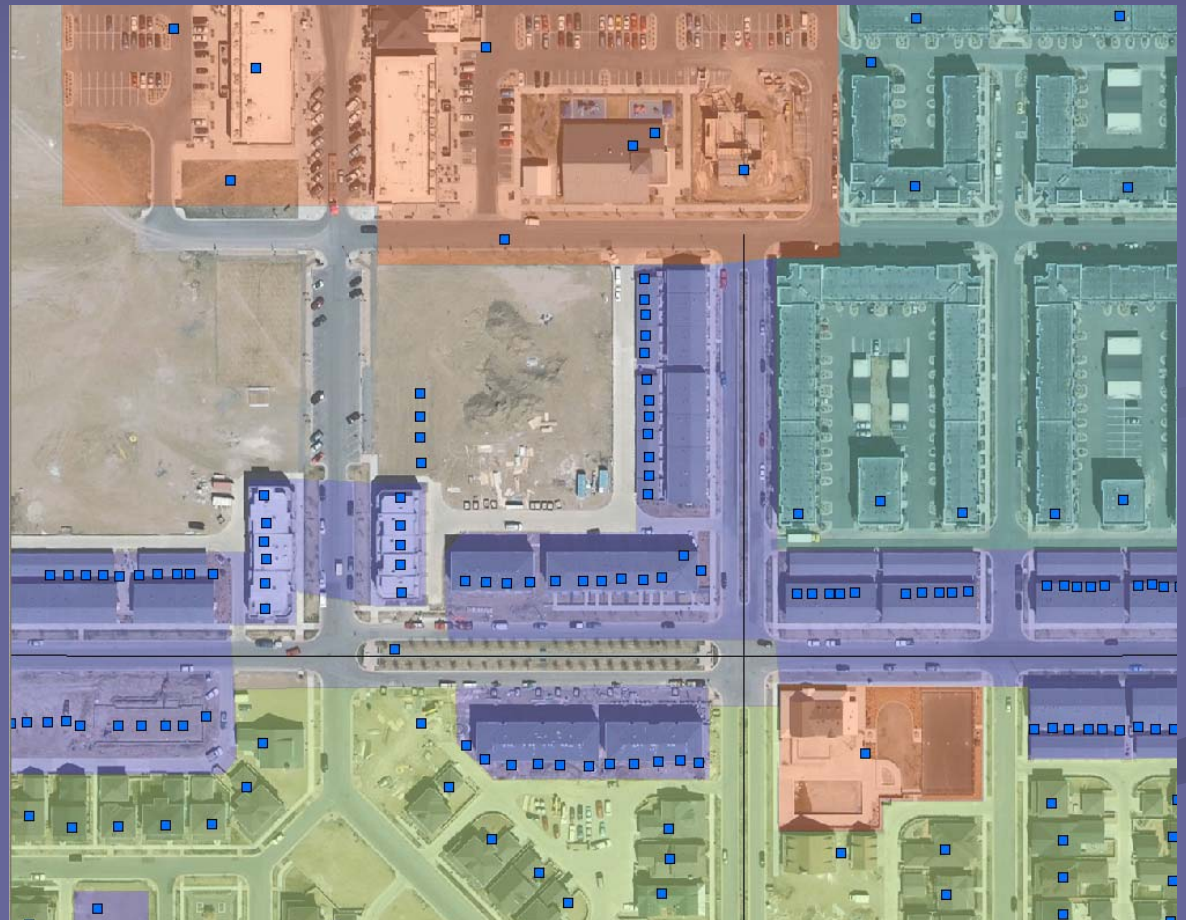
Contain meters of the same type or for specific area

Include meters and parcels belonging to a certain development area

Contain the info that tells billing program which formula to use

## 5 Types of Polygons

Single Family Detached  
Apartments  
Townhomes  
Parks  
Commercial





# SWU Procedure

## STEP 2 – Data Updates

- Monthly report of new meters & account numbers from Utility Billing Dept. – *These are added to the GIS*
- Monthly report of new Certificates of Occupancy – *Attributes updated in GIS parcels*
- GPS meter location edits made by Public Works staff
- Parcel-Meter Links verified in GIS
  - Important for assigning impervious to correct meter



Approx. 1 Full Day of Work

*(the impervious surface updates are continuous)*

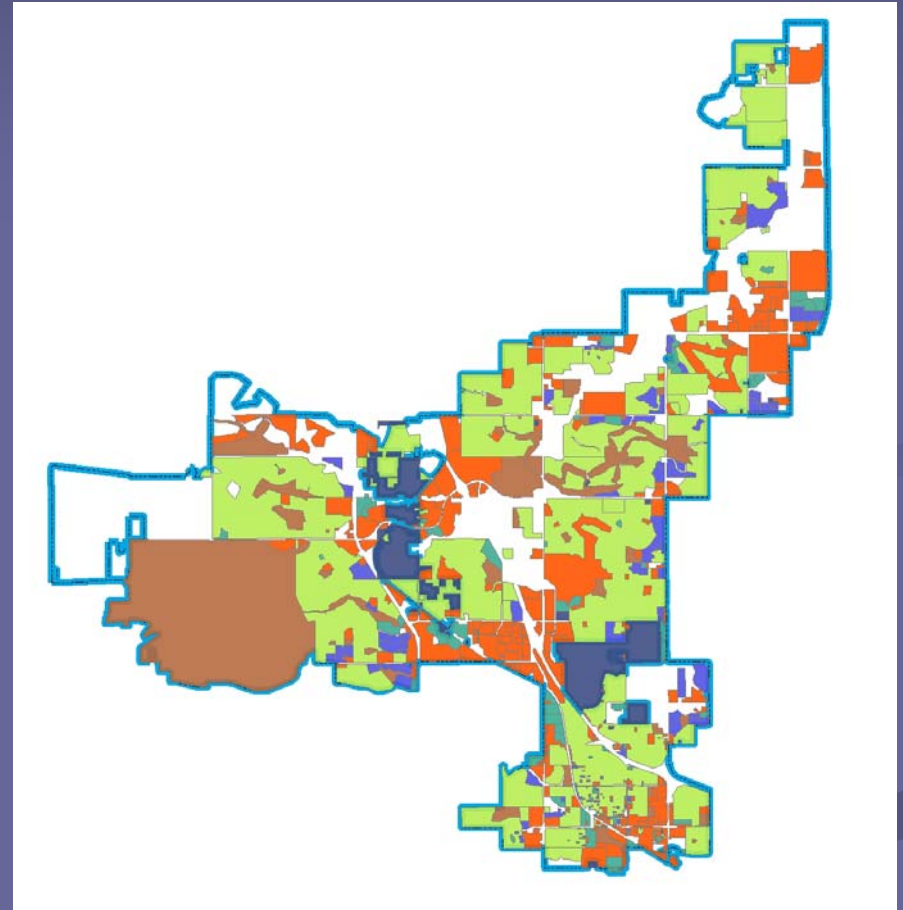
# SWU Procedure

## STEP 3 – The Formulas

- 697 Storm Billing Polygon Areas
- Single Family Detached properties billed flat fee of \$3.00
- 3,100 square feet is the SFD estimate for impervious surface
- All other formulas are based on a factor of 3,100

### EXAMPLE

- Billing polygon has 9,300 sq. ft. of impervious surface
- Fee factor is 3
- $3 \times \$3.00 = \$9.00$  total fee for the polygon



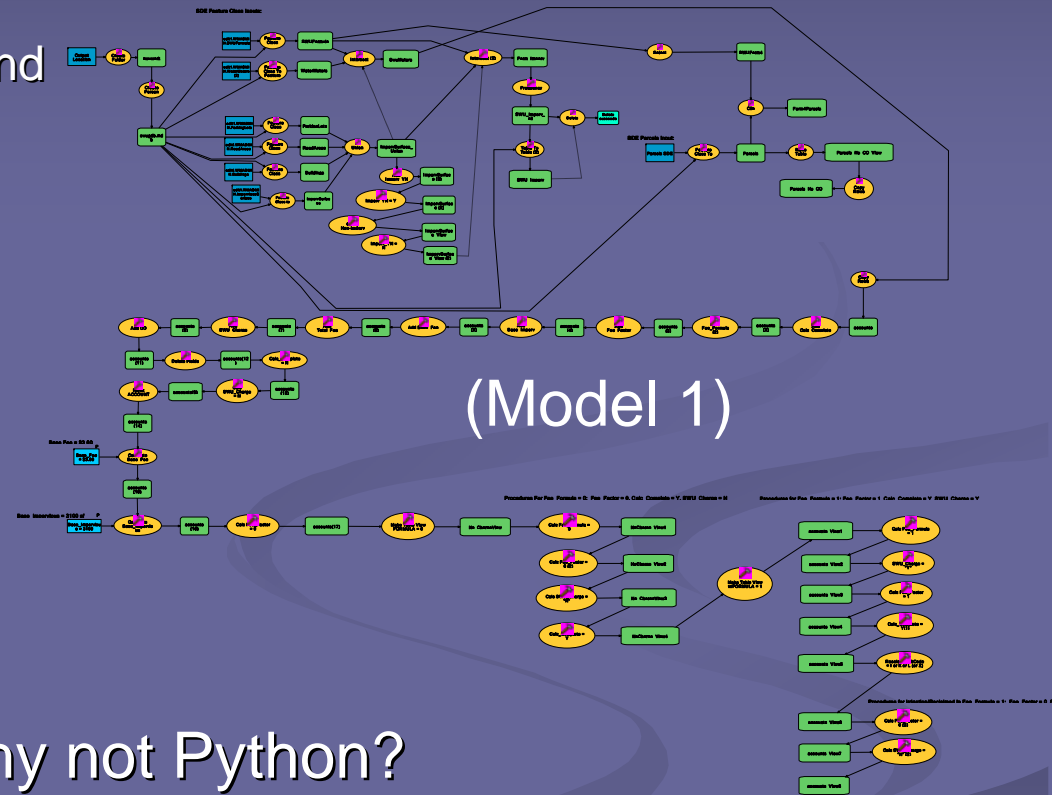
## Five Formula Types

- **Single Family Detached** – Flat fee of \$3.00 per account
- **Townhomes** – totals the impervious in the development and divides it proportionally to the meters, depending on how many units the meter serves
- **Apartments** – Totals the impervious in the development and divides it equally among the meters
- **Commercial** – Totals the impervious within each parcel in the development, then apportions it to the meters in the respective parcel
- **Parks** – Same as the Apartments formula

# SWU Procedure

## STEP 4 – The Models & The Results

- Union all the impervious
- Select out non-billable meters and polygons
- Calculate impervious square footage
- Assign fees to meters based on their respective formulas in the SWU polygons



- SWU\_Tools\_92
  - SWU Model 1
  - SWU Model 2
  - SWU Model 3
  - SWU Model 4
  - SWU Model 5
  - SWU Model Finish
  - SWU Model Stats
  - SWU Model Stats 2 (optional)
  - SWU Model Tracking Archive

### Why not Python?

SDE issues

If you aren't a code writer, it's hard to maintain knowledge  
Models break it up the program for easier troubleshooting  
& updates

- Models create results tables and archive snapshots of feature classes – contained in a personal GDB

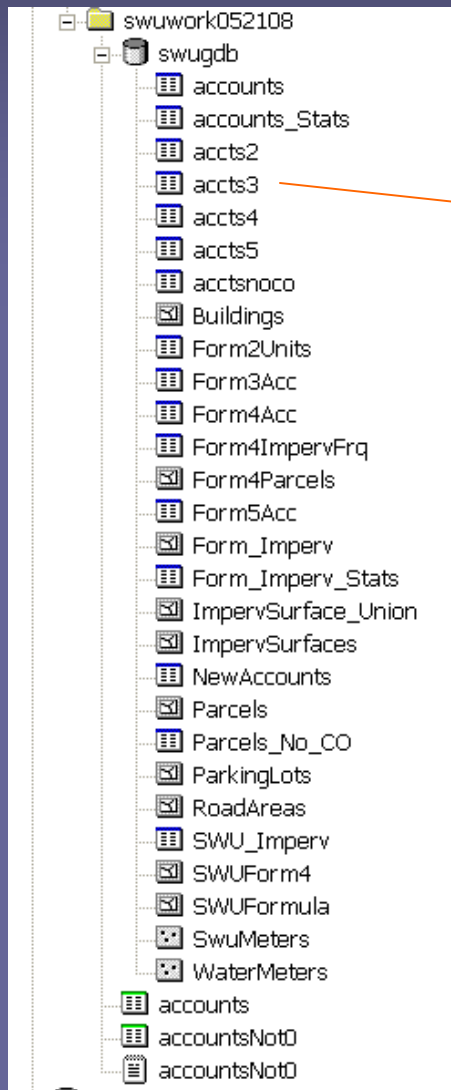
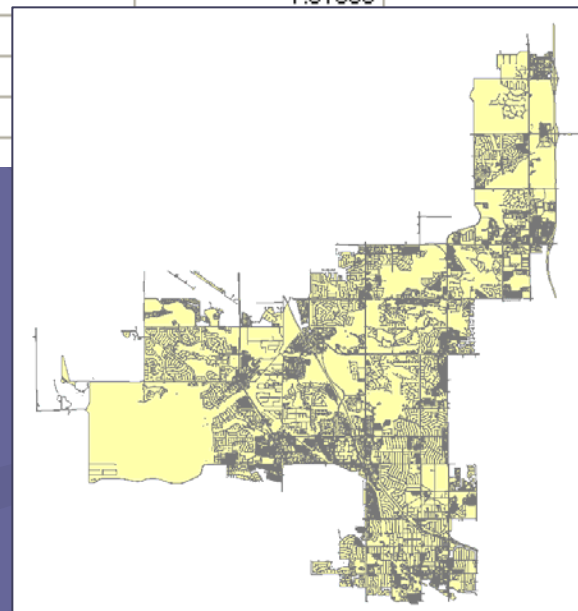


Table with fees in \$\$ for each account

	C_ACCOUNT ^	fee_factor	Total Fee
9	00361738	1.35163	4.05488991737
4	00361733	1.35163	4.05488991737
1	00118006	1.33919	4.01757001877
9	00134396	1.33448	4.00344014168
4	00100544	1.32246	3.96738016605
4	00115019	1.31638	3.94914007187
3	00115011	1.31638	3.94914007187
3	00115010	1.31638	3.94914007187
2	00115017		3.94914007187
3	00115015		3.94914007187
5	00115013		3.94914007187
1	00300760		3.92961001396

Union of all impervious Feature classes

Copy of input Feature classes



# What advantages does a GIS method have?

- Instead of flat fees, all non-SFD properties' fees are based on square footage to be "fair". Bob's flower shop shouldn't pay the same as Wal-Mart, even if they are in the same development.
- Already input the impervious features for each project, why not use them?
- Can implement topology to avoid double charges, and find missing impervious areas
- VISUAL of what's going on, and archives for each month
- Actual (not estimated) square footage can be charged, and fees will change when impervious surface changes

# Lessons Learned & Future Plans

- Contracting the creation of the Model Builder tools was great, but we made sure to own them after they were completed
- Archiving data is important to figure out billing discrepancies and to answer questions from customers
- Individual polygons for all non-SFDs – currently, some developments are sharing billable areas
- Possibly using new imagery/LIDAR to determine impervious surface for single family homes

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