

Brattleboro Case Study: Improving Private Well Locations

Background

In the effort of mapping Vermont's groundwater resources, Geology requested improving the relative accuracy of 30% of the private water wells through computer techniques. The Brattleboro Case Study investigates a process to accomplish this using *Parcel Data* and *E911 Sites* GIS layers.

GIS parcel data is available for many towns in Vermont. The polygon GIS layer usually includes a separate table that can be joined providing street addresses and parcel owner information. *E911 Sites* is a point, GIS layer and includes street addresses and a description of each point. The two datasets were chosen because they represent accurate sources for house locations, street addresses, and parcel owner information. The parcel's owner information is current to each towns parcel mapping; Brattleboro was done in 2007. On the contrary the owner information from *Private Wells* is only current when it was entered into the Water Supply Data Composite (Wellmain table). Those dates range from 1965 to present.

In order to potentially snap well locations to an E911 site, considered an accuracy improvement over a screen digitized private well, a connection between *Private Wells* and *E911 Sites* needs to be established. This is because the Wellmain table does not have street address information, only owner information. To establish this connection, the parcel attribution needs to attach to *E911 Sites*. Without parcel owner information matching a private well to an E911 site could only be done spatially. While the correlation between private well locations and residential houses are positive. It cannot be used as factor alone to reliably move a point.

Data Sources

- a. *E911 Emergency Sites* (Database Connections\GDB_VCGI User.sde\GDB_VCGI.VCGI_ADMIN.EmergencyE911_ESITE\GDB_VCGI.VCGI_ADMIN.EmergencyE911_ESITE_point)
- b. *Private Wells* (Database Connections\GDB_ANR_GEN ADMIN.sde\GDB_ANR_GEN ADMIN.WaterWells_ALLPVTWELLS_point)
- c. *Brattleboro Parcel Data* (T:\Shapefiles\Parcels\BrattlParcel07\BRATTLBR.shp and grandlst_07_join.dbf)

Analysis Steps

- a. **Selected from *E911 Sites*, those points that are Residential (R*) and create a layer for analysis.** The *E911 Sites* layer includes point data related to emergency management like telephones and fire hydrants.

- b. **Spatially join *Parcel Data* to *E911 Sites (Residential)*.** Basically create an *E911 Sites (Residential)* layer with *Parcel Data*'s attribution attached. We are particularly interested in the parcel's owner and street addresses.
- c. **Execute the Near tool using the *Private Wells* as the input and step b's product as the near feature.** This will add two attributes to the *Private Wells* layer; NEAR_DIST, the distance to the nearest residential E911 site and two; NEAR_ID the nearest residential E911 site's features id. We will use the feature id to join step b's product to *Private Wells*.
- d. **Join step b's table using OBJECTID to the step c's *Private Wells* using NEAR_ID.** We have now created a *Private Wells* layer with a distance field (in projected units) to the nearest E911 site, that E911 site's street address, parcel street addresses and owner information.
 - **Suggested action:** Go to the layers properties>fields tab and 'turn off' all unnecessary fields, so you can focus on just what's important to this process.
 1. **Private Wells first name**
 2. **Private Wells last name**
 3. **E911 Sites address**
 4. **Parcel owner 1**
 5. **Parcel owner 2**
 6. **Parcel address number**
 7. **Parcel street name**
 8. **NEAR_FID**
 9. **OBJECTID**

Results

- a. **6.5% (38 of 588) of the Brattleboro private wells match the last name of the *Parcel Data*.** The only tabular connection with *Private Wells* and the available datasets is the parcel owner's name. Because parcel ownership can change frequently and the Water Supply Data Composite's owner information is current to when it was entered, there are potentially many 'good' matches that are not known. The problem is the Wellmain table has no other known attribution that could be used determine better. The only remaining factor is distance to an E911 site.
- b. **34 of the 38 parcel owner's last name matches were exact address matches.** That is *E911 Site*'s points fall within a parcel with the same address. The four records not matching had the same street names.
- c. **The 38 last name matches range from 17 meters to 227 meters, to the nearest E911 site. Average distance is 78 meters.**
- d. **7% (41 of 588) of the private wells in Brattleboro are within 25 meters of an E911 residential site.**

- e. **23% (134 of 588) of the private wells in Brattleboro are within 50 meters of an E911 residential site.**
- f. **54% (303 of 588) of the private wells in Brattleboro are within 100 meters of an E911 residential site.**

Conclusions

It is difficult to reliably match a private well to an E911 site because *Private Wells*'s only factors for matching are owner's name and the individual wells location. Another factor is the *Private Well*'s owner name is static while *Parcel Data* is current to when the mapping is completed. In the case of Brattleboro, we could only reliably match 6.5% of wells in the town. Not much gain for the estimated half days work for each Vermont town. And this would have to be a town-by-town effort, because parcel data is distributed in that fashion.