DistrictBuilder

Open Source, Public Redistricting Software
Who we are

advanced geospatial analysis on the web
USING BUSINESS AS A FORCE FOR GOOD

MEET THE B CORPS
Apply geospatial technology for civic, social and environmental impact
Triple Bottom Line
- Civic/Social impact
- Donate share of profits
- Summer of Maps

Research-driven
- 10% Research Program
- Academic Collaborations
- Open Source
- Open Data
1. UX Design
2. Geography & Place
3. Open Source
3. Open Source
Your source for open data in the Philadelphia region

OpenDataPhilly is a catalog of open data in the Philadelphia region. In addition to being the official open data repository for the City, it includes data sets from many organizations in the region.
A few examples
Machine Learning
Data Management
Research Grants
Number of Satellites
(1-50 kg)

Count

Year

Source: SpaceWorks
Web-based
Combine Multiple Sources
Chained Analysis Functions
The Raster Foundry web application. [https://www.rasterfoundry.com](https://www.rasterfoundry.com)

- [geotrellis](#)  [raster](#)  [earth-observation](#)  [geospatial](#)  [geospatial-processing](#)  Manage topics

<table>
<thead>
<tr>
<th>Branch</th>
<th>Commit Message</th>
<th>Latest commit</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>develop</td>
<td>Update color corrections on field blur, make debounce longer</td>
<td>b7f3a87</td>
<td>3 days ago</td>
</tr>
<tr>
<td>bintray</td>
<td>Remove bintray warning (#1238)</td>
<td></td>
<td>2 months ago</td>
</tr>
<tr>
<td>github</td>
<td>Add &quot;loses&quot; in PR template</td>
<td></td>
<td>2 months ago</td>
</tr>
<tr>
<td>app-backend</td>
<td>Update histogram component with clipping and add to color correct</td>
<td></td>
<td>4 days ago</td>
</tr>
<tr>
<td>app-frontend</td>
<td>Update color corrections on field blur, make debounce longer</td>
<td></td>
<td>11 hours ago</td>
</tr>
<tr>
<td>app-tasks</td>
<td>Use gdal_translate to resample in footprint generation</td>
<td></td>
<td>4 days ago</td>
</tr>
<tr>
<td>deployment</td>
<td>Force deletion of images that have multiple tags</td>
<td></td>
<td>6 days ago</td>
</tr>
<tr>
<td>docs</td>
<td>Spelling corrections for spec.yml</td>
<td></td>
<td>4 days ago</td>
</tr>
<tr>
<td>nginx</td>
<td>Use per-user feature flags on the frontend</td>
<td></td>
<td>a month ago</td>
</tr>
<tr>
<td>prototype</td>
<td>Remove foul language from project source code</td>
<td></td>
<td>2 months ago</td>
</tr>
<tr>
<td>scripts</td>
<td>Remove remaining references to app-clients</td>
<td></td>
<td>18 days ago</td>
</tr>
<tr>
<td>worker-tasks</td>
<td>Minimize Airflow container rebuilds: upgrade Spark container images</td>
<td>a month ago</td>
<td></td>
</tr>
<tr>
<td>.env.template</td>
<td>Add Rollbar integration to front-end (#1331)</td>
<td></td>
<td>2 months ago</td>
</tr>
<tr>
<td>.gitignore</td>
<td>Add alt reclassification types</td>
<td></td>
<td>6 days ago</td>
</tr>
<tr>
<td>mention-bot</td>
<td>Add Facebook mention-bot configuration</td>
<td></td>
<td>2 months ago</td>
</tr>
<tr>
<td>CHANEGLOG.md</td>
<td>0.7.0</td>
<td></td>
<td>4 days ago</td>
</tr>
<tr>
<td>jenkinsfile</td>
<td>Minimize Airflow container rebuilds: upgrade Spark container images</td>
<td>a month ago</td>
<td></td>
</tr>
<tr>
<td>LICENSE</td>
<td>Update license copyright</td>
<td></td>
<td>7 days ago</td>
</tr>
<tr>
<td>README.md</td>
<td>Clarify instructions for adding new migrations</td>
<td></td>
<td>1 month ago</td>
</tr>
<tr>
<td>Vagrantfile</td>
<td>Remove extra swagger files, keep spec</td>
<td></td>
<td>27 days ago</td>
</tr>
<tr>
<td>docker-compose.airflow.yml</td>
<td>Add batch job to airflow</td>
<td></td>
<td>1 month ago</td>
</tr>
</tbody>
</table>
Radiant
Earth Imagery for Impact

Radiant.earth
Road network data from OpenStreetMap

Open Data
Visualize Transit Network
<table>
<thead>
<tr>
<th>公交站点之间的距离</th>
<th>0.35 km</th>
<th>0.59 km</th>
<th>0.64 km</th>
<th>0.59 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>每周服务小时数</td>
<td>135.32 hrs</td>
<td>166.25 hrs</td>
<td>No Data Available</td>
<td>166.25 hrs</td>
</tr>
</tbody>
</table>

**Performance & Access Stats**
**Confirm Times**

We've estimated the arrival times for each stop.

<table>
<thead>
<tr>
<th>Stop</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15:17</td>
</tr>
<tr>
<td>2</td>
<td>15:20</td>
</tr>
<tr>
<td>3</td>
<td>15:23</td>
</tr>
<tr>
<td>4</td>
<td>15:26</td>
</tr>
</tbody>
</table>

Finish / Back

---

**Test Scenarios**
Water Vulnerability Analysis

Cartographer: Annaka Scheeres
Data Source: American Red Cross
Road Connectivity Analysis

Road Connectivity Scores

- > each category's threshold (> 1.5 miles from low-accessibility road OR greater than 2.5 miles from moderate-accessibility road OR greater than 3 from high-accessibility road)
- > 0.5 - 1.5 miles from a low accessibility road
- 1.0 – 2.5 miles from a moderate-accessibility road AND 0-0.5 miles from a low-accessibility road
- 0 - 1.0 miles from a moderate-accessibility road
- > 1.5 - 3.0 miles from a high-accessibility road
- > 0.5 - 1.5 miles from a high-accessibility road
- < 0.5 miles from a high-accessibility road
- < 0.5 miles from a high-accessibility road and within 1 mile of a node

Cartographer: Annaka Scheeres
Data Source: American Red Cross

Esri, HERE, DeLorme, Mapbox, iStock, OpenStreetMap contributors, and the GIS user community.
Overall Vulnerability Analysis

Cartographer: Annaka Scheeres
Data Source: American Red Cross

Legend:
- Medium
- High
- Very High
- Highest

Scale: 0 5 10 20 30 40 Miles

Cartography: HERE, Deformed, Mappymindia. © OpenStreetMap contributors, and the GIS user community.
Address-based District Matching and Elected Official Lookups
Data Totals

- 25,680 Elected Officials
- 1,490 Elected Assemblies
- 9,910 Election Events
- 27,792 Legislative District Boundaries
- 760,794 Non-Legislative District Boundaries
- 9 Countries with elected official data

Cicero Data Totals as of 11:07AM Jan 28, 2016

Upcoming Elections

31 January 2016
Central African Republic President and Parliament Runoff

1 February 2016
Iowa Caucus
Both Republican and Democrat precinct caucuses. Since 1972, the Iowa caucuses have been the first major electoral event of the nominating process for President of the United States.

2 February 2016
British Columbia Legislative Assembly By-Election
Coquitlam-Burke Mountain and Vancouver-Mount Pleasant Electoral Districts

2 February 2016
Massachusetts House Special Primary Election
12th Essex, 9th Plymouth, and 3rd Worcester districts.

2 February 2016
Connecticut House Special Election
26th District Representative instead of Representative was up for election.

Data Coverage
Data: Redistricting
10% Time
We live in Philadelphia
Gerrymandering Index

Using Cicero data to determine the most gerrymandered districts in the US
Least Compact Districts

- Raleigh B
  - C = 1.2

- Miami 2
  - C = 2.5

- Houston B
  - C = 2.5

- Houston E
  - C = 3.1

- Fort Worth 7
  - C = 3.1

- California 23
  - C = 2.5

- Alaska 99
  - C = 2.5

- Florida 18
  - C = 2.6

- Florida 22
  - C = 2.7

- Georgia 13
  - C = 2.7
Redraw the map on redistricting.

Legislators have long used redistricting as an opportunity to select their constituents, rather than empowering voters to elect their representatives. The redistricting following the 2010 Census is an opportunity to change how the process is conducted. Armed with knowledge and the right tools, the public can redraw the map on redistricting.
Michael McDonald
Micah Altman
Better Automated ReDistricting
- Web-based
- Open source
- Designed for general public
- Integrate with data
- Generate valid (legal) plans
- Non-partisan
- Transparent

Objectives
Sloan Foundation
- Create and edit district plans
- Use template plans to get started faster
- Import and merge plans from other systems
- Display demographics, election and other data
- Integrate with GoogleMaps, Esri ArcGIS Online, OpenStreetMap or Bing maps

Features (1)
- Show additional reference map layers (school districts and administrative boundaries)
- Automatically calculate contiguity, compactness and population statistics as you create your plan
- Customize demographic, geographic and election data statistics on-the-fly
- Find unassigned areas

Features (2)
- Draw communities of interest and evaluate a plan against them
- Evaluate if proposed plan matches legal requirements
- Save and share plans
- Support public competitions, scoring and leaderboards
- Support multiple languages
- Support multiple, nested jurisdictions
- Django
- PostgreSQL/PostGIS
- GeoServer
- jQuery
- OpenLayers
- Celery
Cloud or Local Infrastructure

-or-

Your Servers

Cloud or Local Infrastructure
DistrictBuilder
DistrictBuilder is web-based, open source software for collaborative redistricting.

Customizable open source software built by experts

DistrictBuilder was developed by leading redistricting experts at the Public Mapping Project. Whether you work for a state or local government agency, an advocacy group or you are a legislator, DistrictBuilder has been designed to provide you with affordable, easy-to-use, customizable redistricting tools that make the redistricting process more open and collaborative across agencies and with the public.

Main Features
- Create and edit district plans
- Use template plans to get started faster

Acknowledgements
Principal Investigators: Michael P. McDonald and Dr. Micah Altman, as part of the Public Mapping Project

Software Development: Azavea

Funded in part by:

The Joyce Foundation
Overview

The Virginia Redistricting Competition was created in 2011 to engage students in the process of redistricting. The competition was led by Judy Ford Wason, Associate Professor at Christopher Newport University.

Student teams were tasked with drawing districts for Congress, State Senate, and State House of Delegates using 2010 census data. There were two divisions. The first division followed criteria originally articulated for the competition. A second division was later created to encourage students to draw maps that were consistent with criteria articulated in Governor McDonnell's executive order establishing an advisory redistricting commission. The students drew their plans using free and open-source software developed by the Public Mapping Project. See the details regarding the competition’s rules and procedures for more information.

In total, 55 valid plans were submitted to the two judging divisions. A plan was deemed valid if the team submitted a unique plan with an accompanying narrative for a particular division. Some submissions were later disqualified from one division because the same plan was submitted for two divisions. In these cases, the plans were judged.

The volunteer judges for the competition were Thomas Mann, Senior Fellow at the Brookings Institution and Norman Ornstein, Resident Scholar at the American Enterprise Institute. They were assisted by Raffaela Wakeman, research assistant to Tom Mann, and Jennifer Marsico, assistant to Norman Ornstein.

Winners

First place and second place awards were given to Congressional, State Senate, and State House plans for the two divisions, for a total of twelve winning submissions. A total of $13,500 in cash prizes were awarded using the following schedule.

<table>
<thead>
<tr>
<th>Legislative Body</th>
<th>First Place Prize</th>
<th>Second Place Prize</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congress</td>
<td>$1,000</td>
<td>$500</td>
</tr>
<tr>
<td>State Senate</td>
<td>$1,500</td>
<td>$750</td>
</tr>
<tr>
<td>State House of Delegates</td>
<td>$2,000</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

Congressional Maps

The winning plans are as follows. Links are provided to images of the plans with some plan summary statistics and to the submitted plan narratives.

Competition Division

1st  University of Virginia Team 1
2nd  University of Virginia Team 2

Governor/Commission Division

1st  College of William & Mary Law School
2nd  University of Virginia Team 1

State Senate Maps

Competition Division

1st  University of Virginia Team 2
2nd  College of William & Mary Law School

Governor/Commission Division

1st  College of William & Mary Undergraduate Team
2nd  University of Virginia Team 1
- William and Mary team
- Drew 3 minority opportunity districts
- Basis for legal challenge

VA Redistricting
• Commission created by ballot initiative in 2010
• 11 members - bought one license for desktop Maptitude
• DistrictBuilder - simpler and all commission members can use plus public engagement
• Two community groups - Latino and Somali - drew districts for their communities
▪ Commissioners adopted those districts into their map
▪ In 2012 election, first Latino and first Somali representatives - outcome was better representation
- City Council promised public hearings, then backed out
- Journalists
- Competition
- Small prizes
- 3 categories: compactness, pop., ward splits
- Public forum
- 4 weeks
1,200 PLANS. 31 CONTEST SUBMISSIONS. 7 WINNERS.
ENGAGED POPULATION FOR A FAIRER REDISTRIBUTING PROCESS.

NEWS
Thanks to all who participated in the FixPhillyDistricts competition. The competition is now over but we welcome you to sign up for an account and experiment with drawing district plans. Winners have been announced! Are you one of them? Check it out.

START DRAWING YOUR DISTRICTS

TO DRAW YOUR OWN...
SIGN UP
rcheatham

TO VIEW OTHER USERS’ PLANS...
Enter as a guest

Terms of Use

Forgot your password?

Interested in receiving future contact news? Submit your email address below:

Email Address

Subscribe

Redraw the Map on Redistricting. FixPhillyDistricts.com is designed to educate the public about redistricting and encourage civic engagement in the legislative redistricting effort. We also aim to demonstrate that a non-partisan and open, public process based upon objective criteria can produce fair council districts in Philadelphia.
Overall Winner
- 31 submissions (1,000+ plans)
- City Council held public hearings
- Invited winners to present plans
- Less embarrassing district map

Philadelphia Outcomes
fixphillydistricts.com
Video
Challenges

- Scalability
- User experience design
- Collaboration costs
- Timeframe
- Sustainability
Ok, ok, what’s next?
DistrictBuilder 2.0
- Expensive
  - Complicated to setup
  - Time
  - Data loading
  - Infrastructure

- Sustainability
Census Data APIs
Re-architect for shared infrastructure

(configure vs. install)
Re-design
User Experience

Improvement #4
Support Other Types of Districts
80 hours  →  80 minutes
More Amanda Holts
DistrictBuilder

Open Source, Public Redistricting Software

azavea