Web Maps, Open Data, and more!

How DVRPC visualizes geospatial data across different planning tools and platforms

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@CRVanPollard
The Greater Philadelphia Region
2 States
9 Counties
353 Municipalities
5.7 Million People
3 Million Jobs
Office of Geographic Information Systems (GIS)

Provide GIS and mapping support for 13 different DVRPC planning departments

- Long-Range Planning and Economic Coordination
- Executive Office
- Travel Monitoring
- Transportation Operations Management
- Modeling and Analysis
- Transit, Bicycle, and Pedestrian Planning
- Capital Program
- Freight and Aviation Planning
- Project Implementation
- Transportation and Corridor Studies
- Public Relations
- Energy and Climate Change Initiatives
- Environmental Planning
- Transportation Safety and Congestion Management

as well as...

MEMBER GOVERNMENTS
TRANSPORTATION AGENCIES
PRIVATE CONSULTANTS
PUBLIC
GIS and Mapping Tools

Industry standard Esri products (ArcGIS, ArcGIS Pro, ArcSDE, ArcGIS for Server, AGO, and ArcGIS Open Data)
Maps, maps, and more maps

A lot of our GIS work comes from our work program projects
We do more than just make static maps...
Cartography is NOT a skill, it’s the combination of many skills.
We care about accurate and reliable geospatial data to help foster regional data-driven decision making.

Good data leads to effective and trustworthy communication.

- Public Engagement - County Planning Effort (i.e. Master Plans)
- Policy-Making – Project Implementation
Data Management (GIS Enterprise Infrastructure)

- Desktop GIS
- ArcGIS Online
- Open Data Portal
- Web Apps
- Mobile Data Collection

~250 Datasets
DVRPC GIS Portal - Our GIS Data lives here
(https://www.dvrpc.org/Mapping/Data/)

Close to 70 DVRPC and other agency datasets
- Traffic Counts
- Bicycle and Pedestrian Counts
- 2045 Long Range Plan Data Sets
- PA and NJ TIP
- Indicators of Potential Disadvantage
- 2015 DVRPC Land Use
- Impervious Surface
- Protected Open Space
- Building Footprints
- Passenger Rail
- Freight Rail
Where else can you find us

Open Data Philly

PASDA

18 Datasets (Imagery)

18 Datasets
(Planning and Transportation)

Coming soon...
UMMM YEAH...

IF YOU COULD ENTER THAT METADATA,
THAT’D BE GREEEAAT
**Web Mapping Tools**

ArcView GIS & ArcIMS & Esri Leaflet & Mapbox & CARTO & Leaflet & AGO Web Maps & ArcGIS API for JS & Story Maps & Highcharts & D3 & GitHub are simply awesome.
Interactive Maps  (https://www.dvrpc.org/Mapping/Webmaps/)
Interactive Maps (Tech Focus)

Travel Monitoring

Philly Freight Finder
Tech Focus on Travel Monitoring

DVRPC Travel Monitoring: Counting a Region in Motion
• tools of the trade

- Bluetooth
- Video
- Bicycle Counter
- Pedestrian Counter
- Equipment Van
- Vehicle Counters, Pneumatic Tube, etc.
- Permanent Bicycle/Pedestrian Counting Station
- Microwave Radar
Why Count?

“What gets measured, gets managed”

Funding, performance
May be necessary for funding applications and tracking of performance measures

Project justification
Analysis of before and after conditions

Trend analysis
Historic data allows for the development of trends

Measuring safety
Useful in calculation of exposure and risk

How do we get all this great data to potential users?

the result:
a database with over 100,000 traffic counts
Data Management Tools
Travel Monitoring (Esri Leaflet)

Esri Leaflet is a project from the Esri PDX R&D Center and the Esri Community
Tech Focus on PhillyFreightFinder

The Delaware Valley is a premier freight transportation gateway. The performance of its extraordinary network helps promote and support a thriving economy.

*PhillyFreightFinder* is a resource for exploring and tracking this Philadelphia-Camden-Trenton regional freight network.
Background

AN ONLINE, INTERACTIVE PLATFORM FOR SHARING FREIGHT NETWORK DATA TO ENHANCE THE UNDERSTANDING OF PERFORMANCE AND VALUE OF FREIGHT IN THE REGIONAL ECONOMY

LAUNCHED 2013
With support from the DVRPC Freight Advisory Committee, the initial product was made public in 2013. The FAC assisted with identification of data and included a mix of public and private-sector members.

DVRPC FREIGHT
*PhillyFreightFinder* was built internally through the DVRPC freight office, building on a foundation of technical work that was conducted over 20+ years. The project remains an integral part of the annual work of the DVRPC Office of Freight.
Why build PhillyFreightFinder

- Expand reach of freight planning efforts
- Improve visibility + availability of freight data
- Educate regional planners and the public
- Develop better data sharing with public- and private-sectors

Twenty Years of Technical Studies

PhillyFreightFinder offered a new platform for putting data in the hands of those who needed it; beyond the countless printed reports sitting on shelves.
Components of PFF

FRONTEND APPLICATION
- Built 100% in-house
- Flexible, lightweight
- Open Source code
- Independent of Esri stack

BACKEND DATA WAREHOUSE
- ArcGIS Server + PostgreSQL
- Python for data intake
- Automation of data updates built-in to workflow

Data + Maps + Code
WE PRIORITIZE DATA

• essential to understanding the **intermodal supply** for freight movements;

• that explains freight demand and **supply-chain logic**; and

• that measures **system performance**.
WHAT WE LEARNED

• **recency/frequency** is a key consideration
• **consistency and reliability** impact the utility of data for planning and tracking purposes
• telling the story of freight with data requires an **ongoing commitment**

HAVE A PLAN

be clear in your practical uses of all the data you collect as it makes it easier to adapt to availability and budgetary restrictions
Value to our partners

- County planners have expanded freight planning capacity
- Engaged new partners (public + private)
- Centralized, accessible data resource for region
- Foundation for additional performance measure tracking

ADDED VALUE TO OUR WORK

being a resource improves visibility of all our products and improves the quality and level of input we get in our process
Freight Data Portal for the Delaware Valley

The Delaware Valley is a premier freight transportation gateway. It possesses one of the world's busiest freshwater ports; rail freight service from two large Class I railroads and 12 smaller short lines; an airport with expanding international cargo services; an excellent highway and connector network; and numerous rail and port intermodal terminals.

The performance of this extraordinary network helps promote and support a thriving economy. PhillyFreightFinder is a resource for exploring and tracking this regional freight network.

New Tool  Freight Centers of Greater Philadelphia
Explore the freight economy and its impact on regional development and employment patterns

County Freight Profiles
The DVRPC region is comprised of nine counties, each with a unique freight profile of facilities, employment, and trade patterns. The County Profile Tool provides insights on these unique aspects.

Performance Indicators
A key to understanding freight in the Delaware Valley is evaluating the performance of the facilities that support freight in the region.

Explore Our Network
The region's extensive network includes hundreds of individual facilities that function together to drive the economy. Our map tool allows you to explore key details and facts about each of these facilities.

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The Delaware Valley region consists of nine counties: Bucks, Chester, Delaware, Montgomery and Philadelphia in Pennsylvania, and Burlington, Camden, Gloucester and Mercer in New Jersey.

The DVRPC region contains an impressive freight transportation network consisting of highways, rail lines, ports, airports, and pipelines. These key linkages unite an expansive list of facilities including warehouses, manufacturing sites, rail yards, and truck stops.

Strategically positioned in the middle of the densest population center in the United States; over 100 million people live within a 500-mile radius of Philadelphia, representing a vast consumer base and making the region ideally situated as a manufacturing and distribution hub.

Explore freight facilities and activity by county
(select a county of interest)
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Like powerful internet networking tools, Philadelphia, Pennsylvania's freight system affords rapid, productive, and global connections. Once known as the *Workshop of the World*, Philadelphia now serves as the calling card of the Delaware Valley region's impressive freight assets. For even the casual observer, the city's prominence in international commerce is abundantly evident: mammoth container cranes, multi-cultural company logos, and non-stop daily pick-up and delivery patterns dot the landscape.

**Freight Network Statistics**

- **Highway Statistics**
  - 39 miles Interstate Routes
  - 91 miles National Highway
  - 4 NHS Connectors
  - 26 Interstate Highway Interchanges
  - 0 Truck Stops and Rest Areas

- **Freight Rail Statistics**
  - 105 miles Freight Trackage
  - 11 yards and Intermodal Terminals

- **Maritime Statistics**
  - 10 Port Terminals
  - 734 Annual Ship Calls

- **Additional**
  - 8 Unique Freight
  - 37.3k Employment

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A Ship being unloaded at Packer Avenue Marine Terminal

**Source**: 2015 DVRPC PhillyFreightFinder Database

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- **Maritime Statistics**
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  - 734 ANNUAL SHIP CALLS

- **Other Statistics**
  - 8 UNIQUE FREIGHT
  - 37.3k EMPLOYMENT

*A Ship being unloaded at Packer Avenue Marine Terminal*

Source: 2015 DVRPC PhillyFreightFinder Database

[www.dvrpc.org/webmaps/phillyfreightfinder](http://www.dvrpc.org/webmaps/phillyfreightfinder)
Philadelphia County | Domestic Trade Patterns

Top Trading Partners

- Chicago, IL: 664.3 ktons
- Harrisburg, PA: 456.2 ktons
- New Orleans, LA: 85.8 ktons
- St. Louis, MO: 73.4 ktons
- Toledo-Fremont, OH: 62.7 ktons
- Los Angeles-Long Beach, CA: 58.9 ktons
- Minneapolis, MN: 51.0 ktons
- Buffalo, NY: 50.7 ktons
- Indianapolis, IN: 40.7 ktons
- Cincinnati, OH: 39.0 ktons

Top Inbound - Commodities by Volume -

1. Misc. industrial organic chemicals
2. Broken stone or riprap
3. Freight all kinds shipments
4. Plastic matter or synthetic fibers
5. Flour or other grain mill products
6. Primary iron or steel products
7. Misc. industrial organic chemicals
8. Paper
9. Potassium or sodium compound
10. Fiber, paper or pulpboard

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www.dvrpc.org/webmaps/phillyfreightfinder
Freight Centers of Greater Philadelphia

- Update to regional centers identification
- Better data driven process
- Regional analysis framework
- Intended as a tool for planners

Freight Quotient Analysis

*indication of potential freight activity*
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Introduction to DVRPC Freight Centers

The production and distribution of goods is an integral part of the region's economy, requiring dedicated expanses of land in order to meet the needs of businesses and consumers. This land is an essential resource for a prosperous economy and an important part and source of tax revenues for many communities. The goal of the DVRPC Freight Centers inventory is to identify and categorize these key locations to enhance planning necessary to concentrate growth, invest in appropriate transportation infrastructure, and minimize conflict with host communities.

1. Defining Freight Employment

Greater Philadelphia is home to over 430,000 business establishments employing over 3.1 million individuals. The story of freight centers starts with these employers. The role that each business plays in the regional economy influences the movement of goods and services and informs the patterns of freight-related development.
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We can understand the role of businesses when they are grouped into industry subsectors based on the type of economic activity. **To illustrate this we can portray each of the region’s 97 industry subsectors as circles, scaled by it’s regional employment.**

Circles sized by number of employees:
- 300,000
- 100,000
- 500

**What is freight employment?**
Not all of these industries rely on freight to an equal degree. The goal is to identify industries that are freight-intensive, meaning that the industry in question generates or attracts large amounts of freight trips or movements.

Industry Classifications

Extraction

These industries are involved in the extraction of raw materials from the earth and/or the raising of animals and crops. These industries represent a small but important part of the regional economy.

The region has approximately 12,600 employees working in extraction industries grouped in the following subsectors:

1. Crop Production
2. Support Activities for Agriculture and Forestry
3. Animal Production and Aquaculture
4. Mining (except Oil and Gas)
5. Support Activities for Mining
6. Oil and Gas Extraction
7. Forestry and Logging
8. Fishing, Hunting and Trapping

When charted by average annual wage we see that many freight-intensive industries have a higher average annual wage. Additionally, these freight subsectors are often "family sustaining," having a higher average annual wage than the region's living wage for a family of three.
**Average Wage by Subsector**

When charted by average annual wage we see that many freight-intensive industries have a higher average annual wage. Additionally, these freight subsectors are often “family sustaining,” having an average annual wage greater than the region’s living wage for a family of three.

Source: 2013 NETS, 2016 BLS, and MIT Living Wage Project

Classification of industry subsector:
- Extraction
- Distribution
- Production
- Consumption

Circles sized by number of employees:
- 300,000
- 100,000
- 500
Analysis Criteria

Freight-intensive Establishments
The distribution of freight establishments in the region provides a starting point for cluster analysis. These highlight the locations where there are many establishments located in proximity to each other.

The distribution of freight employment using establishments can give unnecessary weight to a location with many small businesses that have relatively little freight activity associated with them.

Source: DVRPC Analysis of 2013 NETS Data
DVRPC Freight Centers

The final result of the FQ analysis and evaluation of the potential freight centers identified the final set of Freight Centers in the region.

These geographies are the foundation of the final step in the identification process, the classification of centers.
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Source: DVRPC PhillyFreightFinder, 2018
Typologies Overview

An analysis of each of the freight centers, grouping them by economic, transportation, and development activity resulted in classification into five typologies:

- **International Gateway**
- **Heavy Industrial**
- **Distribution & Logistics**
- **High Tech Manufacturing**
- **Local Manufacturing & Distribution**
**Heavy Industrial**

A Heavy Manufacturing Freight Center is a node focused around heavy industrial land uses involved in the manufacturing of goods. These centers are served by freight rail access and often have additional access to a port terminal allowing for the movement of bulk or break-bulk source materials.

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**Employment and Development**

focused around manufacturing and production sectors

**Building Size and Distribution**

highly dependent on manufacturing processes but often includes dedicated power plants, old industrial buildings, and tank farms

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View Highway Performance
View Maritime Indicators

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Start Exploring

www.dvrpc.org/webmaps/phillyfreightfinder
PFF Online Data Visualizations

- Know your audience
- Tools can have many uses
  - Storytelling
  - Interactive infographics and dashboards
  - Analysis tools and explorers
- Use open source resources

Front-end technologies:
- Mapbox
- HTML, CSS, JS

Back-end technologies:
- DECK.GL
- Python
- Django
- PostgreSQL
- DigitalOcean
Thank You

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