



# Networks of Philly (v3)

## Philadelphia's Hidden Network Infrastructure

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- Infrastructure! (Manholes, handholes, antennae, misc.)
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# Who am I?

- Not an expert in anything, but really like networks.
- May have met me at *Philly 2600*. 
- philtel.org – Let's install payphones in Philly
- Editor of the *N-O-D-E* zines.
- Run **networksofphilly.org**

Networks of Philly   [MANHOLE COVERS](#)   [STREET MARKINGS](#)   [WIRELESS ANTENNAS](#)   [KIOSKS](#)   [CAMERAS](#)   [SIGHTSEEING](#)   [TRYING TO KNOW](#)

## Seeing Networks in Philadelphia

Philadelphia's network infrastructure is messy, clumsy, and often unseen by the general public. Wandering the streets, you may get a vague understanding of what's going on—a manhole cover sits unassumingly on the crosswalk, or maybe a mysterious box with an antenna sits high upon a wall in a back alley, humming into the night. Under your feet and above your eye line, data is soaring by through brightly-lit fiber cable and ethereal radio transmission. The city is alive, but few may ever understand to what extent.

What follows below is an ever-changing, work-in-progress project to present information about the network infrastructure as it exists within Philadelphia. Readers are encouraged to reach out by emailing [hello@networksofphilly.org](mailto:hello@networksofphilly.org) to share observations, photos, and information that may be suitable for the site. Contributions can also be made via [GitHub](#). Others may choose to reach out via [@netsofphilly](#).

This website is based off of [seeingnetworks.in](#), which focuses on New York City. Ingrid Burrington, who runs that site, also wrote a [really cool book](#).

Check out similar guides for [NYC](#), [Phoenix](#), and [London](#) (PDF).

Chat with us via Matrix, [#networksofphilly:matrix.org](#) or bridged IRC, [#networksofphilly/Libera](#).



# How did this start?

- Ingrid Burrington's Book, *Networks of New York: An Illustrated Field Guide to Urban Internet Infrastructure* (2016)

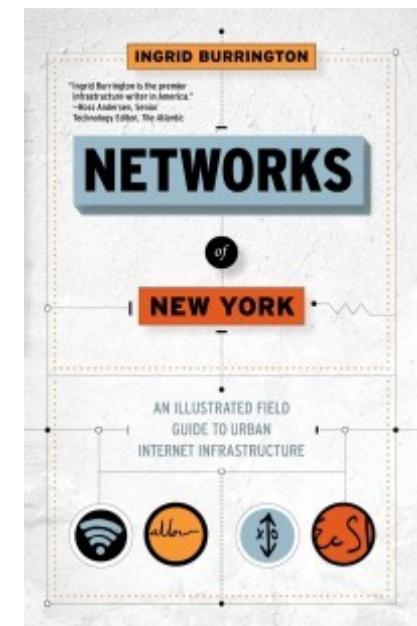
Seeing Networks   MANHOLE COVERS   STREET MARKINGS   VARIOUS ANTENNAS   CAMERAS   SIGHTSEEING   PRINT EDITION

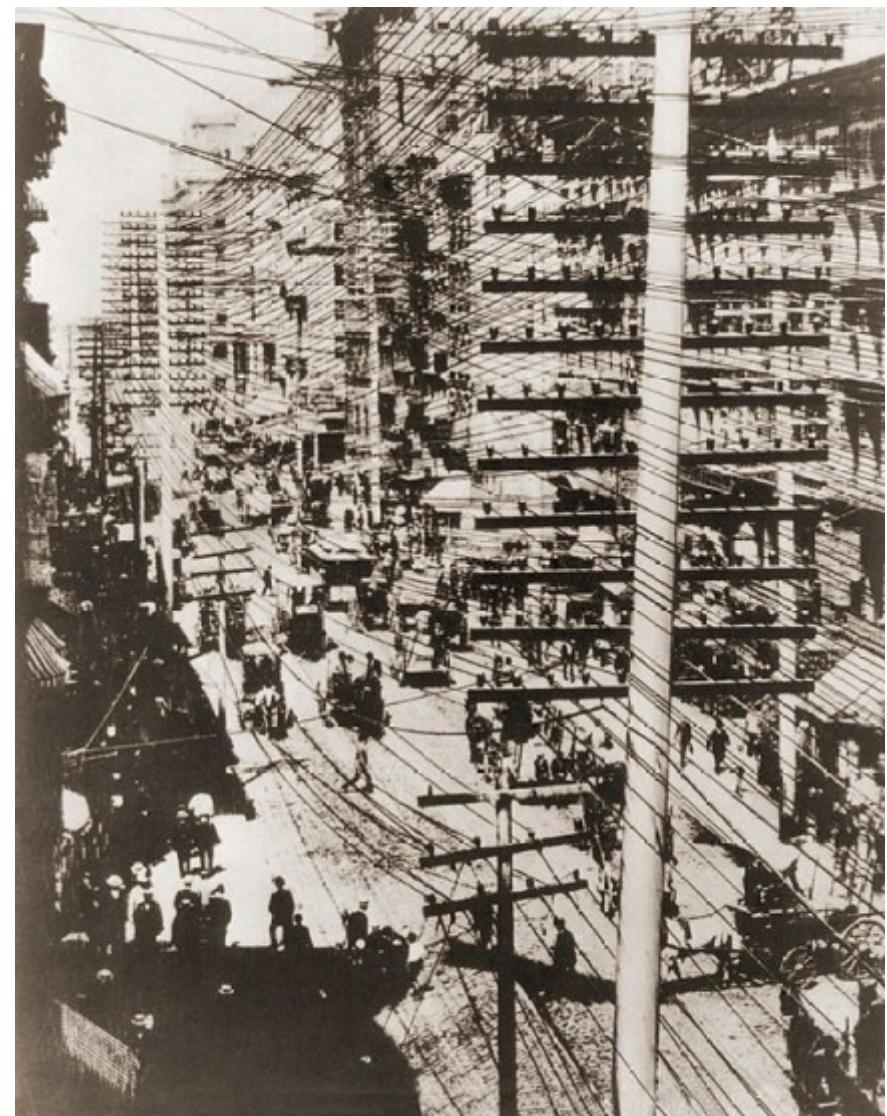
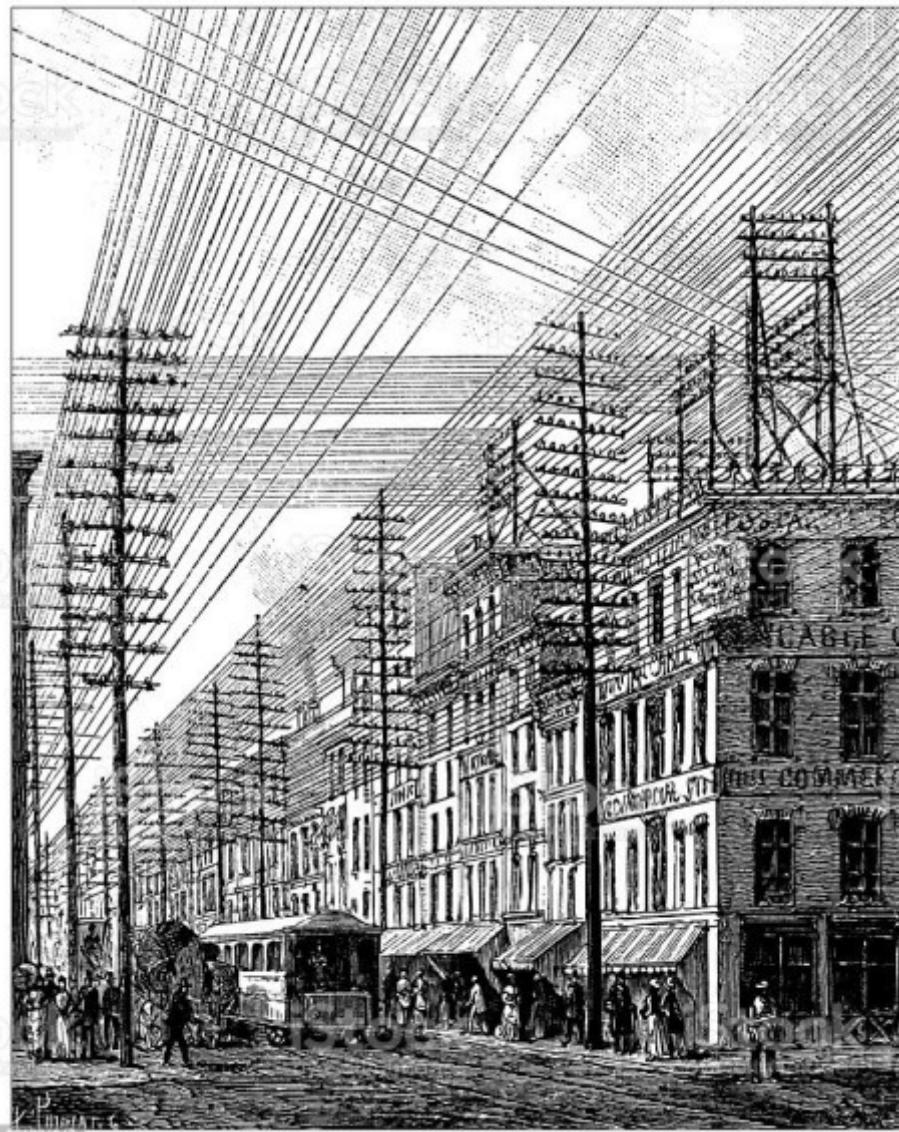
## Seeing Networks in New York City

New York's network infrastructure is a lot like the city itself: messy, sprawling, and at times near-incomprehensible. However, the city's tendency toward flux is a strange blessing for the infrastructure sightseer: markings and remnants of the network are almost everywhere, once you know how to look for them.

What follows below is more or less findings of ongoing research. Readers are encouraged to [get in touch](#) if they would like to contribute other images and observations.

##Oh, and there is [a book](#).





# Look at the ground a lot



**RED**  
Electric Power Lines,  
Cables, Conduit and Lighting  
Cables

**YELLOW**  
Gas, Oil, Steam, Petroleum  
or Gaseous Materials

**ORANGE**  
Communication, Alarm or  
Signal Lines, Cables or  
Conduit

**BLUE**  
Potable Water

**GREEN**  
Sewers and Drain Lines

**PURPLE**  
Reclaimed Water, Irrigation  
and Slurry Lines

**PINK**  
Temporary Survey Marking

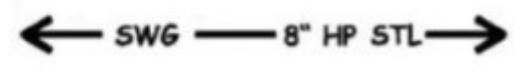
**WHITE**  
Proposed Excavation

Line Markings



Utility identified by termite

Marking Gas Lines – High Pressure

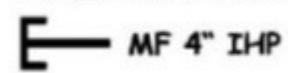


Corridor Markings

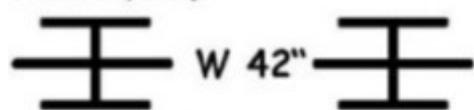


Identifies when number of lines cannot  
be determined.

Marking Termination Point, Dead End, Stub Outs



Oversized Utility Markings



Marking for large diameter structures

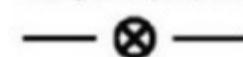
Conduit Markings

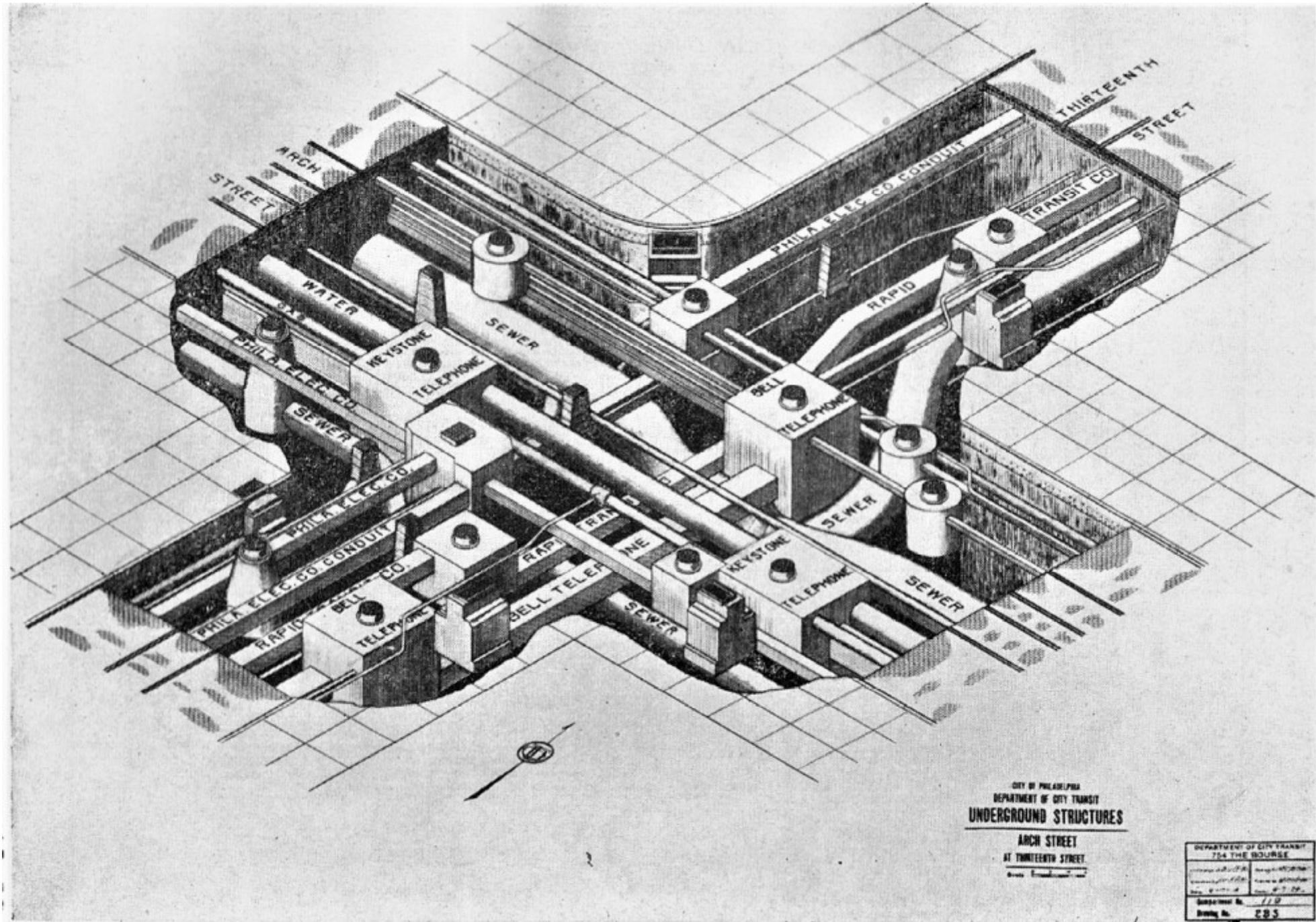


No Conflict (No utilities within the requested area)

**NO/MCI**      **NO/EPG**

Marking Buried Splices, Valves, Manholes

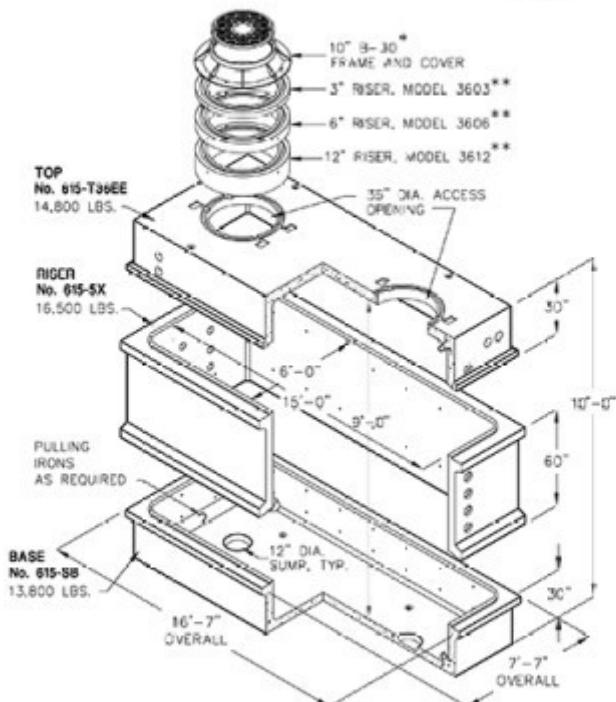




# Manholes

## 615-9 TELEPHONE MANHOLE

6' x 15' x 9' ID.  
MANHOLE



BOX DESIGN LOAD:  
H=20 TRAFFIC  
WITH 1" TO 5" EARTH COVER

FOR COMPLETE DESIGN  
AND PRODUCT INFORMATION,  
CONTACT JENSEN PRECAST.

2/8/05  
6-5\_3dwg  
© 2003 Jensen Precast

\* SEE HARDWARE/APPLIANCE SECTION  
FOR SPECIFICATIONS.  
\*\* RISERS OPTIONAL. SEE COLLAR/RISER  
SECTION FOR SPECIFICATIONS.

**JENSEN**  
PRECAST



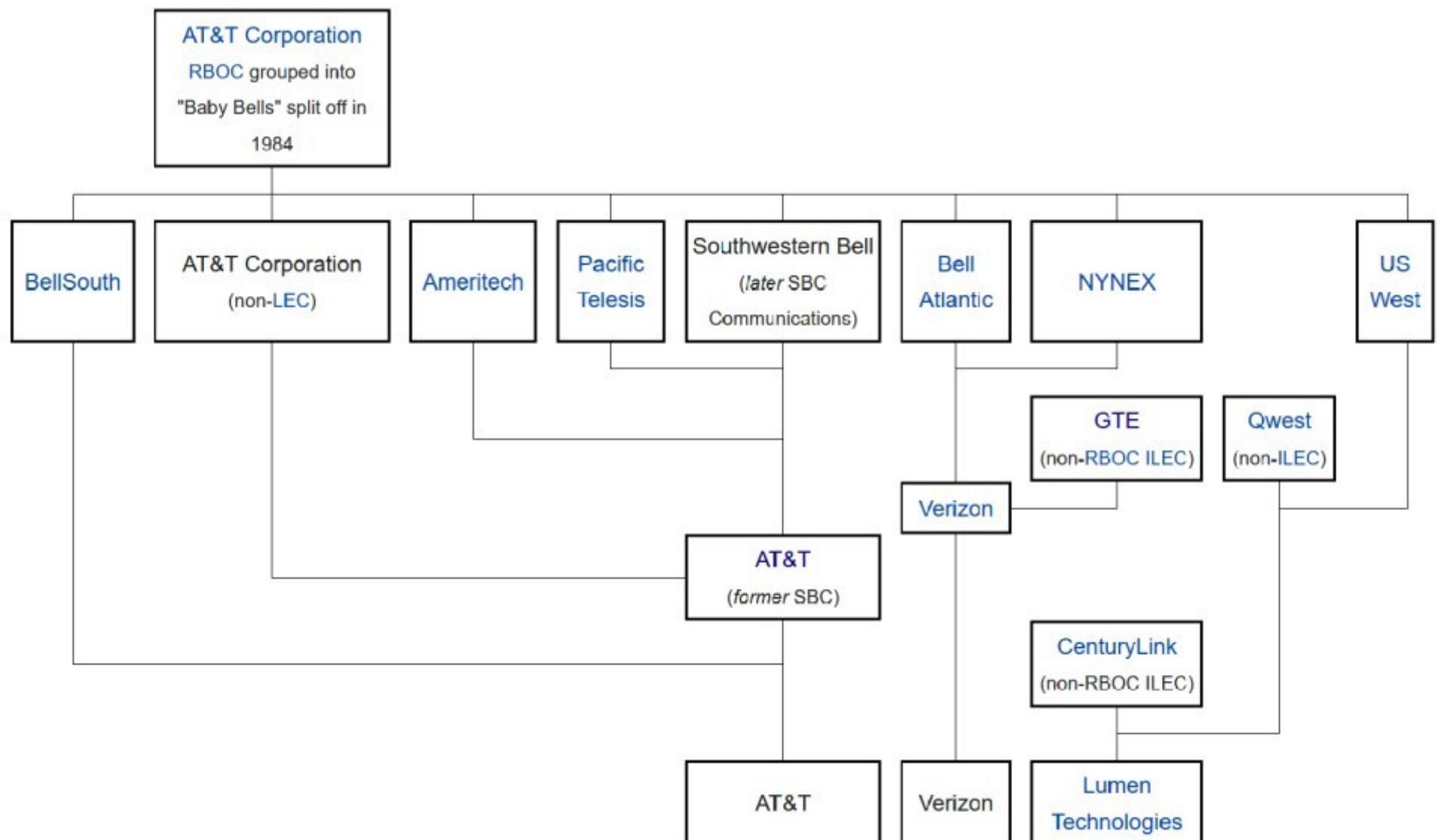
RETHINKTANKDESIGN.COM

# Bell Telephone Company



- **Bell Telephone Company** began as a company in 1879.
- **Bell Telephone Company of Pennsylvania** started the same year.
- Bell was broken up in 1984, Philly's RBOC became **Bell Atlantic**.





# Keystone Telephone Company

- Founded 1900 as a direct competitor to **Bell Telephone Company**, bought by Bell in 1945.
- First telephone company in the world to have completely buried wires.
- Catered to businesses.
- Used for city communications.



# Electrical Bureau

- City department from 1856 – 1951.
- Maintained communications systems (call boxes) for police and fire.
- Now Communications group within the Department of Public Property.



# Western Union Telegraph Co

- Began operation in 1851.
- Telegraphy was spun off to **Western Union International** in 1963.
- Sold telegraphy system to **MCI** in 1983.



# Metromedia Fiber Network

- Launched in 1993 as **National Fiber Network**.
- Dark fiber to communications carriers in the U.S. and EU.
- Bankrupt by 2002, back in 2003 as **Abovenet**, bought by **Zayo** in 2012.



# MCI Metro

- Division of **MCI** that layed fiber in the '90s.
- Bought by **WorldCom** in 1998.
- **MCI** Acquired by **Verizon Communications** in 2006 after bankruptcy.



# Level 3 Communications

- Started building nation-wide fiber in 1998.
- Received \$411 million from the DOD in 2012.
- Bought by **CenturyLink** in 2017, now **Lumen Technologies**.
- Tier 1 Network Operator.

**Level(3)**<sup>®</sup>

 CenturyLink<sup>®</sup>

**LUMEN**

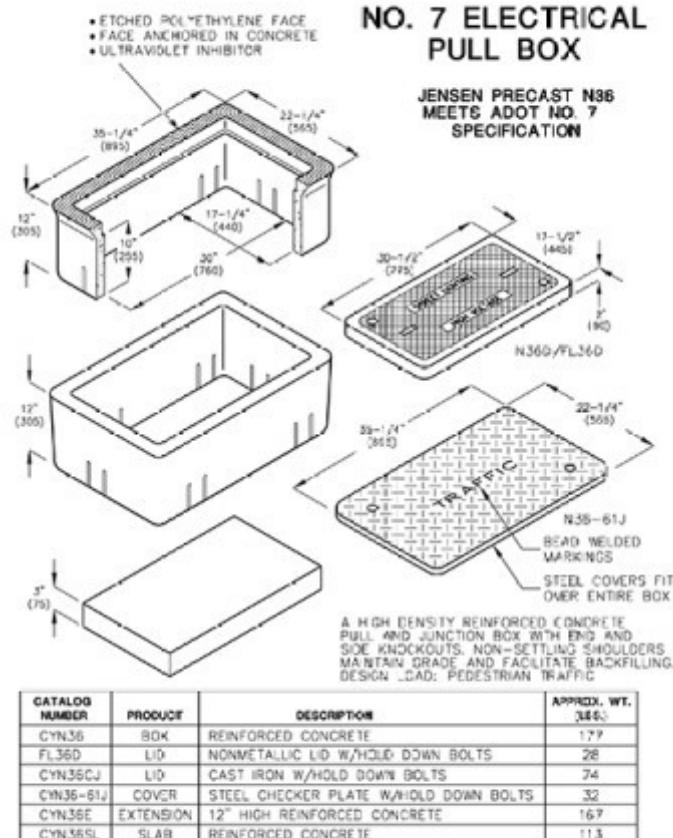


# Telephone & Communication

- “Telephone” is likely a replacement.
- “Communication” is likely for private cables.



# Handholes and Boxes



FOR COMPLETE DESIGN  
AND PRODUCT INFORMATION,  
CONTACT JENSEN PRECAST.

NOTE: METRIC DIMENSIONS  
ROUNDED TO NEAREST 5 MM.

1/7/05  
ADOT7.dwg  
© 2005 Jensen Precast

**JENSEN**  
PRECAST



# CATV

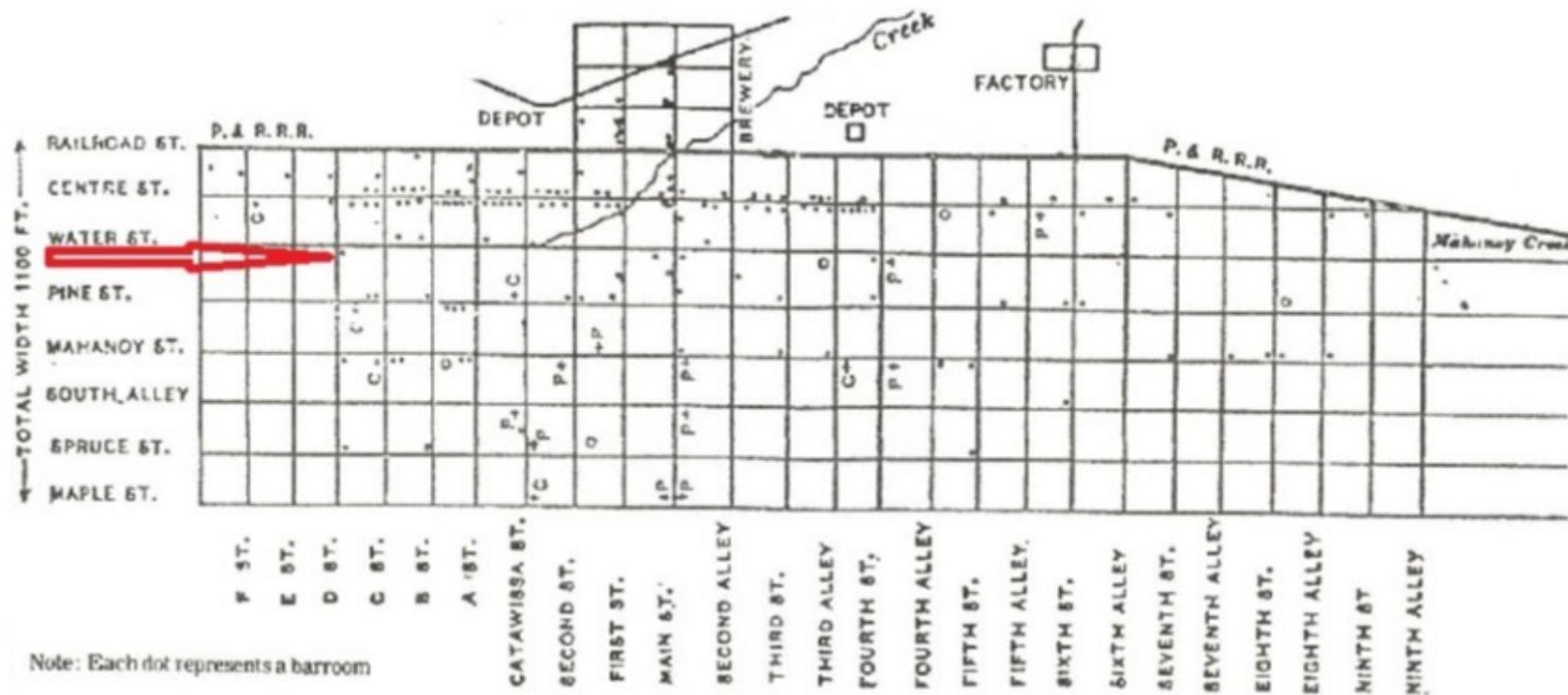
- Cable TV is a Pennsylvania first.
- Handholes provide cable services (coax) to buildings.
- Cable television came to Philadelphia in 1983 under 3 franchises: **Comcast**, **Cablevision Systems of Philadelphia**, and **Philadelphia Inner City Cable** (Wade Cablevision came in 1987).



# The Drinking Capital of America

## Mahanoy City 1903

Population: 13,725 – A total of 143 barrooms,  
or for one for every 98 inhabitants.



# Traffic

- Seen on the sidewalk corners near crosswalks.
- Cabling here connects traffic lights to large metal control (SCADA) boxes nearby.
- Adaptive Traffic Control Systems



# Bell Atlantic

- Operated 1984 – 2000 as one of the 7 RBOCs.
- Was parent of **New Jersey Bell, Bell of Pennsylvania, Diamond State Telephone**, and the **C&P Telephone** companies.
- At its peak, it was the second largest telephone company in the USA with operations in 23 countries and 13 states.



# Verizon



- Carries telephone and Internet services within Philadelphia and is *the* current telephone provider for the city.
- Formed in 2000 after merger between **Bell Atlantic** and **GTE**.



# Zayo

- Founded in 2007, is a fiber network with 130,000 route miles of fiber laid in North America.
- Tier 1 Network Operator.
- Also work installing small cells.



# Antennae & Other Devices



# Small Cell

- Low-powered cellular radio access nodes.
- Range of 10 meters to a few kilometers.
- **Crown Castle** installs Fiber and Small Cells in the North East, bought **Lightower**, a northeastern network provider in 2017.



# Crown Castle (Continued)



# Distributed Antenna Systems

- Expand cell coverage, adding capacity in under-serviced areas.
- Repeater vs Active
- Usually cover different frequencies and different carriers.
- These units are manufactured by **JMA Wireless**.



# LinkPHL

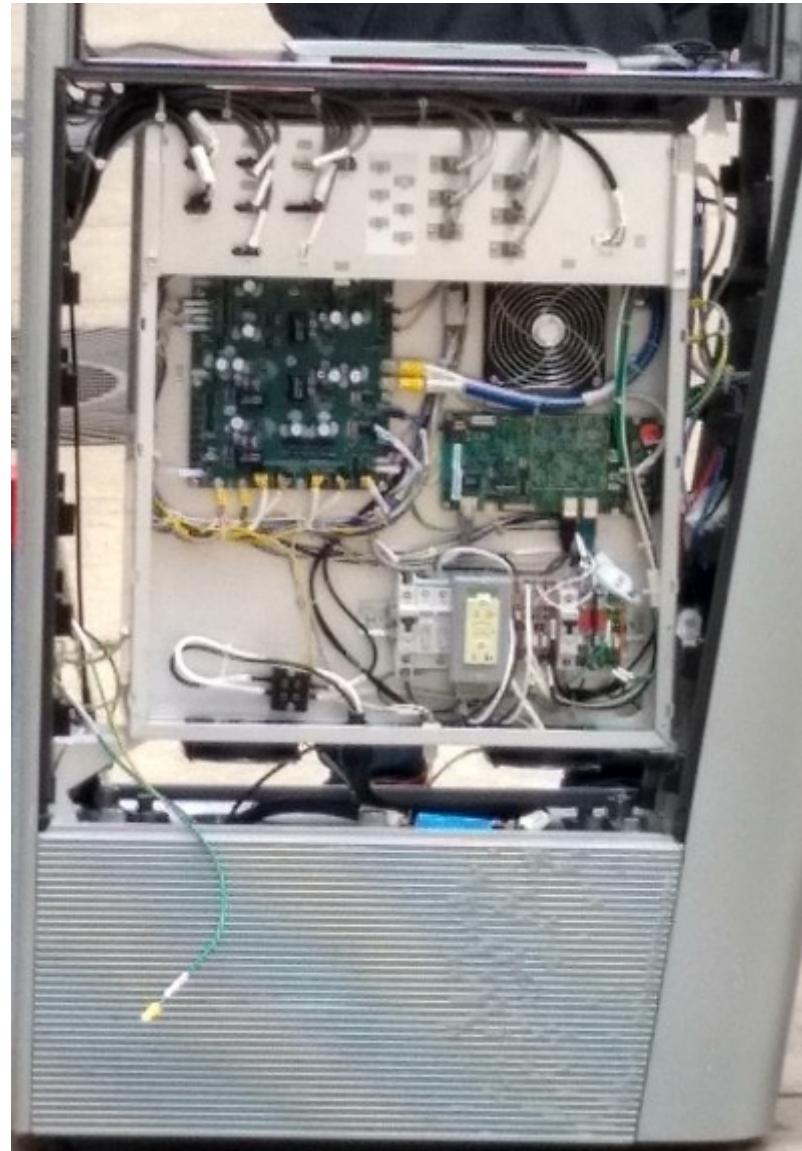
- Provide free WiFi access, mobile device charging, phone calls, access to municipal/emergency services, maps, directions.
- Each LinkPHL kiosk has three cameras, and microphones, among other sensors.
- Created by **Intersection** (formerly **Titan**), with investment from **Alphabet**.



# LinkPHL



2022 Mike Dank @famicoman



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# Police Cameras

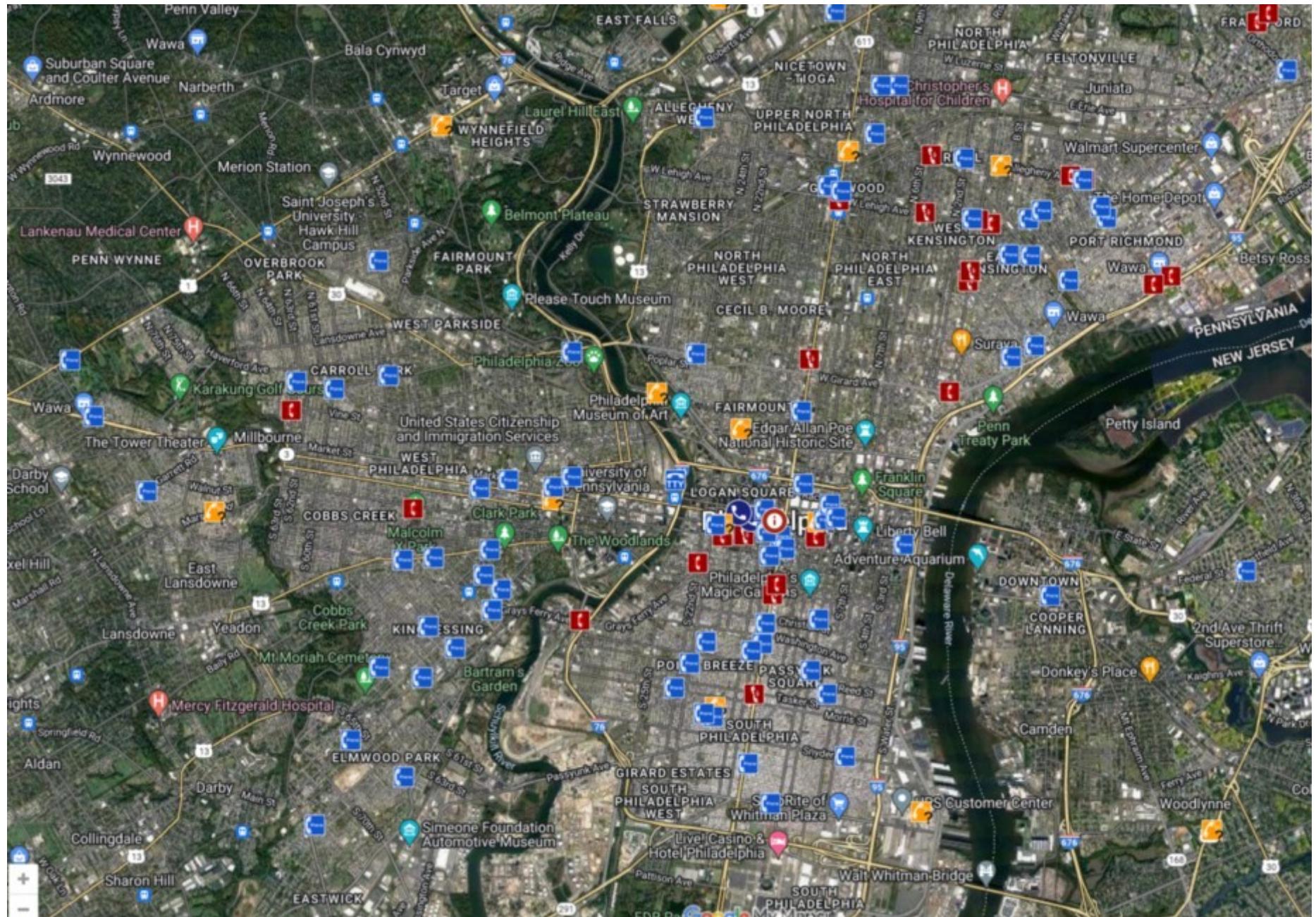
- Have been in the city since 2009, many are thought to be broken and in disrepair.
- Cameras automatically follow movement. Anyone watching?



# Payphones

- Pacific Telemanagement Services (PTS) based out of California.
- NewTel based out of The Bronx, NYC bought remaining Verizon payphones in 2012.
- Please dial the MCI ANAC -> 1-800-444-4444





# Not Yet Covered

- Parking Kiosks
- Transit Kiosks
- Shotspotters/Stingrays
- Ricochet (anything left?)
- Philly Wireless / Earthlink
- More?



# Sight Seeing



# 401 N Broad

- **Terminal Commerce Building**, this 14-story concrete building was built between 1929 and 1931 by the Reading Company.
- Largest carrier hotel within Philadelphia with over 80 carriers as of 2015.



# Three Logan Square

- Formerly the **Bell Atlantic Tower**, this 55-story office building was erected in 1991.
- After Bell split up, the Philadelphia-based Baby Bell **Bell Atlantic** headquartered within the building until 1996 when it purchased New York City-based **NYNEX** and moved operations to New York.
- Still houses **Verizon Communications of Pennsylvania** HQ.



# Comcast Center & CTC

- **Comcast** started as **American Cable Systems** in 1963.
- **Comcast Center** is a 58-story building built between 2005 and 2008, and is **Comcast's HQ**.
- **Comcast Technology Center** is a 60-story building built between 2014 and 2017.



# 500 South 27th

- AT&T building presumably used for continued AT&T service and collocation for other telephone companies.
- Built 1967 by Bell Telephone to replace an older exchange at 17th and the Parkway.
- Situated near railroad lines by the Schuylkill.
- NOT named in The Intercept's article on NSA spy facilities



# Right To Know

- Created **Right To Know** requests that will be submitted to various organizations within the Philadelphia government in an attempt to gain information on surveillance equipment deployed throughout the city.
- inspired by the *Aaron Swartz Day Police Surveillance Project #ASDPSP* and information brought to light via "The Wiretap Room" by Ryan Gallagher and Henrik Moltke in *The Intercept*.
- Requests filed through **MuckRock**,  
<https://www.muckrock.com/project/philadelphia-police-surveillance-project-305/>

**MUCKROCK**

# Right to Know Request List

- GUNSHOT DETECTION MICROPHONES (SHOTSPOTTER/SENTRI)
- IMSI-CATCHER EQUIPMENT
- SOCIAL MEDIA MONITORING SOFTWARE
- PREDICTIVE SOFTWARE
- FEDERAL MOUs
- AUTOMATED LICENSE PLATE READERS
- FLIR THERMAL CAMERAS
- FACIAL RECOGNITION SOFTWARE
- UNMANNED AERIAL VEHICLES (DRONES)
- BODY WORN CAMERAS
- EYE IN THE SKY

# What's Next

- More walking around and looking at things.
- Ask for help to identify things I can't identify,  
<https://github.com/networksofphilly/unidentified-infrastructure-objects>
- Walking tours?



# Questions?

- [networksofphilly.org](http://networksofphilly.org) – this sort of stuff
- [famicoman.com](http://famicoman.com) - my site
- [philtel.org](http://philtel.org) – let's install payphones in Philly
- [philly2600.net](http://philly2600.net) – local hacker meetup
- [phillymesh.net](http://phillymesh.net) – cypherpunk mesh networking group
- [dialup.world](http://dialup.world) – free-to-use dial-up Internet access
- [router.city](http://router.city) – framework for your own BGP test network
- [anarchivism.org](http://anarchivism.org) – preserving hacker zines/docus/etc
- While you're in town, visit Iffy Books – [iffybooks.net](http://iffybooks.net)