

# They're All Just Events: Reframing our thinking around analytics

## Why Are We Here?

GOAL:

Collect, refine, and summarize user behavior data in easily-understood formats, build reusable reporting tools available to any city individual or agency creating or managing front line digital content and services for citizens or internal resources for staff.

Put simply:

we shouldn't be leaving anyone guessing about how their content is being used.

Sometimes this means extra details are needed in the data we're collecting...

so we start working on something called

**measurement strategy**

To make sense of all this data, we need **3** things:

- our implementation is reliable (the **way** our tracking is installed)
- decide **what** we care about
- choose **how** we will count things

## Basic tracking

There are many terms thrown around when we talk about analytics, but for our purposes we distinguish between 3 primary dimensions:

**users**

**sessions**

&

**pageviews**

In Google Analytics, everything centers around a **pageview**.

The first time you visit a website and a page loads, you —

the **user**

send a **pageview**

which begins a **session**.

The single most important thing nonspecialists should understand is the difference **&** relationships between these 3 things.

**Pageviews** will always be the highest

because one **user** usually visits many pages

during a single **session**.

Never, never, never never never never never look at **pageviews** alone. Please.

## Why?

A single user may have many sessions associated with them over time.

Multiple users might use the same computer.

# Device Overlap

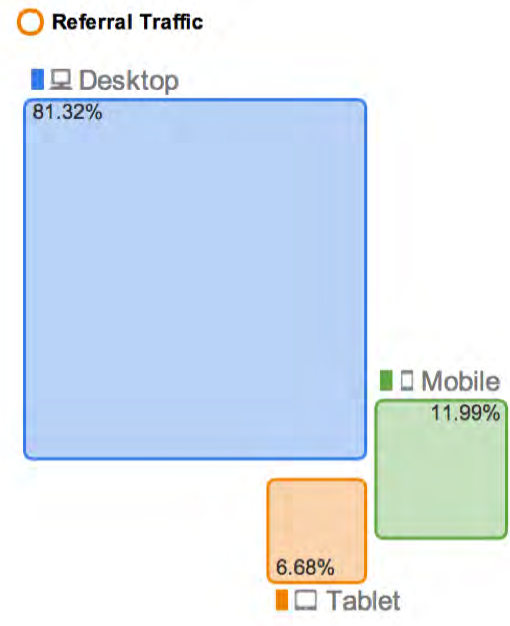
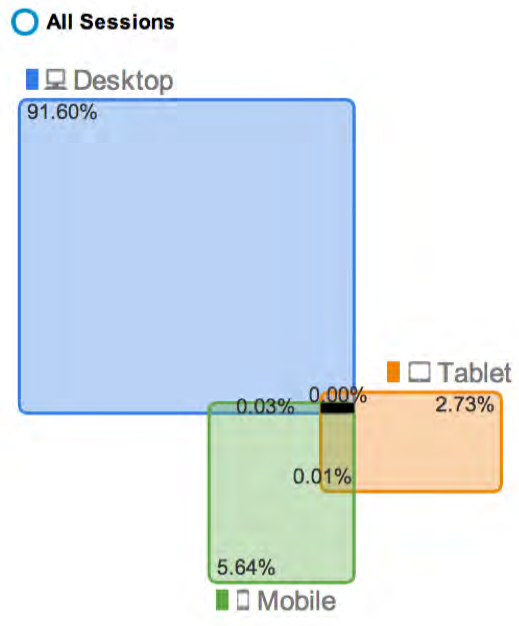
Email Export Shortcut



## Sequencer

Users

- Desktop
- Mobile
- Tablet



\* The overlap areas of the squares above are approximations.

Primary Dimension: Device Category

The same user might visit your content across many devices (which is still a major challenge yet to be solved with analytics).

This is because of cookies.





No, not that kind.

Unless you have opted out of tracking (most browsers include this as an option), websites can store information about you in a tiny file your browser loads when you visit the site. They are sticky. They follow you everywhere.





This is how Zappos knows you were looking for those shelltops last night when you were lost in a YouTube-fueled 90's flashback and shows you ads for the next year on Philly.com.

But I digress.

These cookies have lots of preservatives....

in the case of Google Analytics, they can follow you for up to **2 years**.

## Everything you do can be tracked.

It may not always be explicitly associated with your identity,  
but 'you' as a user create a digital footprint that may be used for everything from  
serving you ads across many disparate sites,  
to remembering what you ordered on Grubhub the last time.

If you like data, analytics haz it. All of it.

- clicks
- scroll
- pan
- highlight
- typing/form input/search
- uploads
- screenshots
- and (with permission) even your location (think all the skeezy local news websites that ask for your location even though they don't need it - they just want more data about you)

In this case, I mean JavaScript events, but IRL they're more like 'actions':

- **arrived** from a search engine, another website, or social media, or a link in an email
- **searched** for specific content on phila.gov
- **downloaded** a PDF document or < sigh > form (we can't get analytics to make forms better from PDFs)
- **called** a phone number via mobile touch

and on and on

From a practical standpoint, this can become unwieldy to organize & maintain

everyone's inherited some janky code before...how to we counteract this?

Luckily, the future's here:

[Google Tag Manager](#)

and

[autotrack.js](#)

## Google Tag Manager

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A "tag" is just a piece of JavaScript, and tag manager gives us a UI to decide which tags to fire, when to fire them, and where (on our site).

This is a big deal because if you've ever tried to implement customized web analytics, you know that you're either stuck creating your own sea of JS events as scripts that need to be tailored per page, or you deploy a bunch of junk everywhere that doesn't need to be loading.



# Tag Manager is just one snippet, deployed everywhere, once.

## Install Google Tag Manager

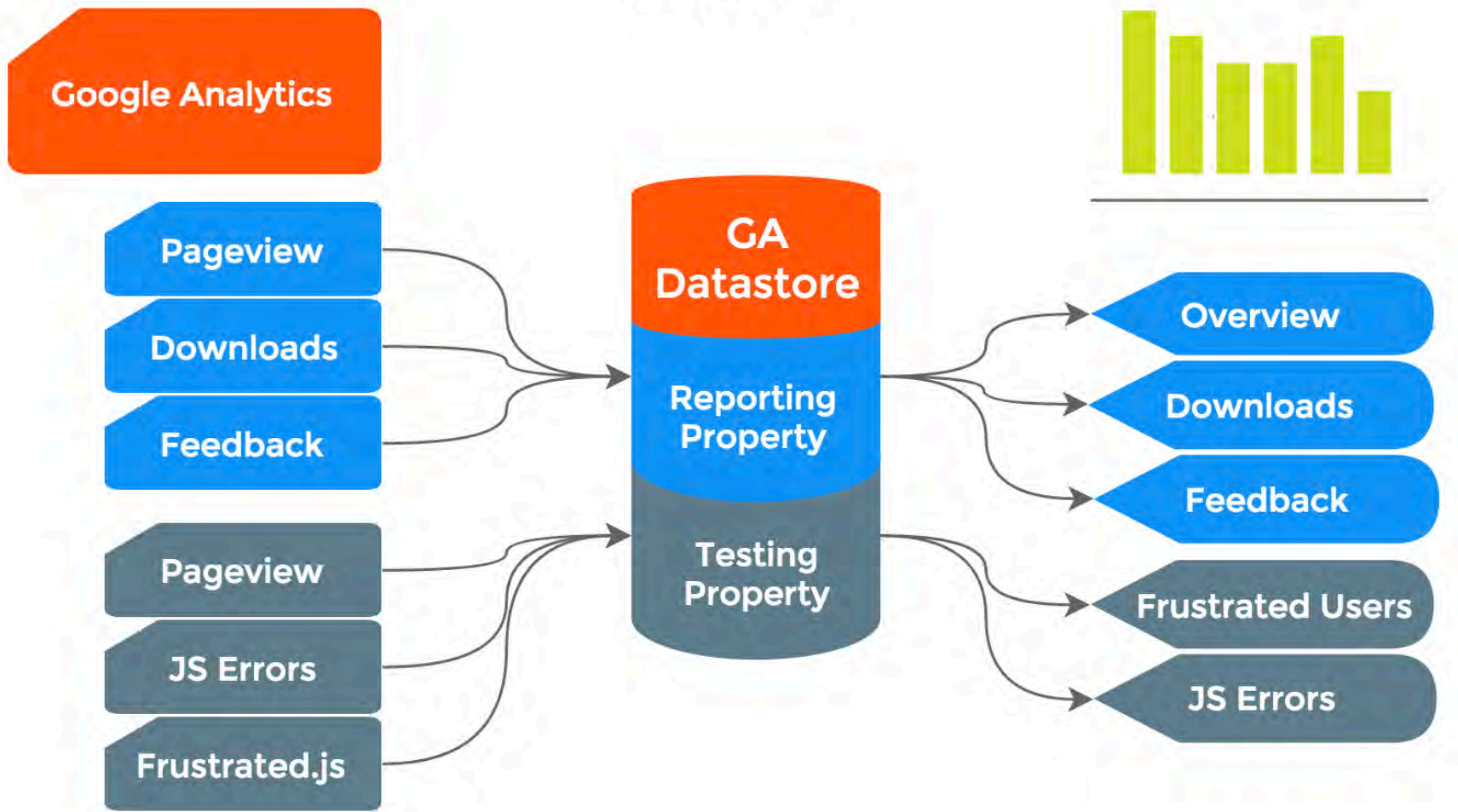
Copy the code below and paste it onto every page of your website. Place it immediately after the opening <body> tag.

```
<!-- Google Tag Manager -->  
<noscript><iframe src="//www.googletagmanager.com/ns.html?id=GTM-W776HR"  
height="0" width="0" style="display:none;visibility:hidden"></iframe></noscript>  
<script>(function(w,d,s,l,i){w[l]=w[l]||[];w[l].push({'gtm.start':  
new Date().getTime(),event:'gtm.js'});var f=d.getElementsByTagName(s)[0],  
j=d.createElement(s),dl=l!='dataLayer'?'&l='+l:'';j.async=true;j.src=  
'//www.googletagmanager.com/gtm.js?id='+i+dl;f.parentNode.insertBefore(j,f);  
})(window,document,'script','dataLayer','GTM-W776HR');</script>  
<!-- End Google Tag Manager -->
```

For more information about installing the Google Tag Manager snippet, visit our [Quick Start Guide](#).

OK

# Google Tag Manager "Container"



Rough outline of City's configuration

The best part:

the full configuration can be exported and shared as a single JSON file.

We're [open-sourcing this configuration](#),  
tailored for government use

To flesh out the information we start knitting this data together:

- Monitoring for loss of traffic
- Malware/hacked sites (ex. [City Commissioners](#))
- Feedback clicks
- Department content tracking
- [Telephone calls](#)
- Network provider access (Comcast, Verizon, etc)
- [Error Logging](#)
- [PDF Downloads](#)
- Frustrated Users

## You put the data in

We add extra dimensions to almost everything we send to GA:

CUSTOM DIMENSIONS (20)					
Index	Scope	Name	Expected Va	Notes	Status
1	hit	Full URL	URI	used for gut-checking anomalies	active
2	user	Client ID	string	pulled from GA cookie	active
3	session	User Agent	string	from request headers	active
4	session	Session ID	string	Randomly-generated	active
5	hit	Hit Timestamp	dateTime	time of hit w/local offset set by IP	active
6	hit	Last Updated	dateTime	id="content-modified-datetime"	active
7	hit	Department	string	id="content-modified-department"	active

To give it structure for later analysis, we built a schema:

Category	Action	Label
Form Submit	Paid Water Bill	{{ page URL }}
Document Download	{{ anchor text }}	{{ parent page }}
Frustrated User	{{ click element ID }}	{{ page URL }}
JavaScript Error	{{ script URL }} - {{ error line # }}	{{page URL}}
User Behavior	Clicked Phone Number (from mobile)	{{ number }}
User Behavior	Submitted Feedback Form	{{ page }}
User Behavior	Clicked Department Search Result	{{ department name }} {{ keyword }}

then you have to get the data out

(with custom reporting)

So about those maps - all that JavaScript in your Leaflet maps is emitting events.

example:





Category	Action	Label
Geocoder Search	{{ address }}	{{ coordinates }}
Geolocate User	{{ layers present }}	{{ hundred block }}
Layer Change	{{ add}} or {{ remove }}	{{ layer name }}

Then we can have some real conversation about parking supply and demand in Philadelphia.

## IN CONCLUSION

Analytics aren't just about website data.

They're a tool to help you tell the story of  
how visitors are using your content...

and how they wish they could.

### Other kinds of data we collect

- [Session recordings](#) | [Hotjar](#)
- Search keywords & rankings from SERP
- Internal site search keywords

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### Appendices:

#### Useful terminology:

- HIT: outdated, useless measurement parameter from logfile-analysis times; counts every single element downloaded from a webserver to display a given page (i.e. every image, script, stylesheet,...) don't use it
- CLICK: no common definition; usually used in conjunction with media elements like banners or ads; counts clicks on these elements; often called click-throughs

- VISIT: a given user enters the website, uses it for some time without pausing for more than (depending on tool vendor) 30 minutes. Often a visit is also ended after 12 hours or at midnight
- VISITOR: any uniquely identified user; where uniquely identified usually means tagged with a persistent cookie, or – if that fails – identified by a combination of IP address and user agent
- PAGEVIEW: a single page viewed

## Autotrack.js

dev-friendly plugins, markup-as-you-go

Plugin	Description
<code>eventTracker</code>	Declarative event tracking
<code>mediaQueryTracker</code>	Media query and breakpoint tracking
<code>outboundFormTracker</code>	Automatic outbound form tracking
<code>outboundLinkTracker</code>	Automatic outbound link tracking
<code>socialTracker</code>	Automatic and enhanced declarative social tracking
<code>urlChangeTracker</code>	Automatic URL change tracking for single page applications

### Example

The following element would send an event hit to Google Analytics with the category "video" and the action "play":

```
<button data-event-category="video" data-event-action="play">Play</button>
```



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## Workflows to Support Geodesign: *ArcGIS Interoperability for Site Design, Engineering and 3D Visualization*

- Generate Design Content (including proposed terrains)
- Convert to GIS
- Model in CityEngine
- Share via Web



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Architecture (M.S.)



Architecture (M.Arch.)



Construction Management (M.S.)



Interior Architecture (M.S.)



Sustainable Design (M.S.)



Landscape Architecture (BLA)



Geodesign (M.S.)

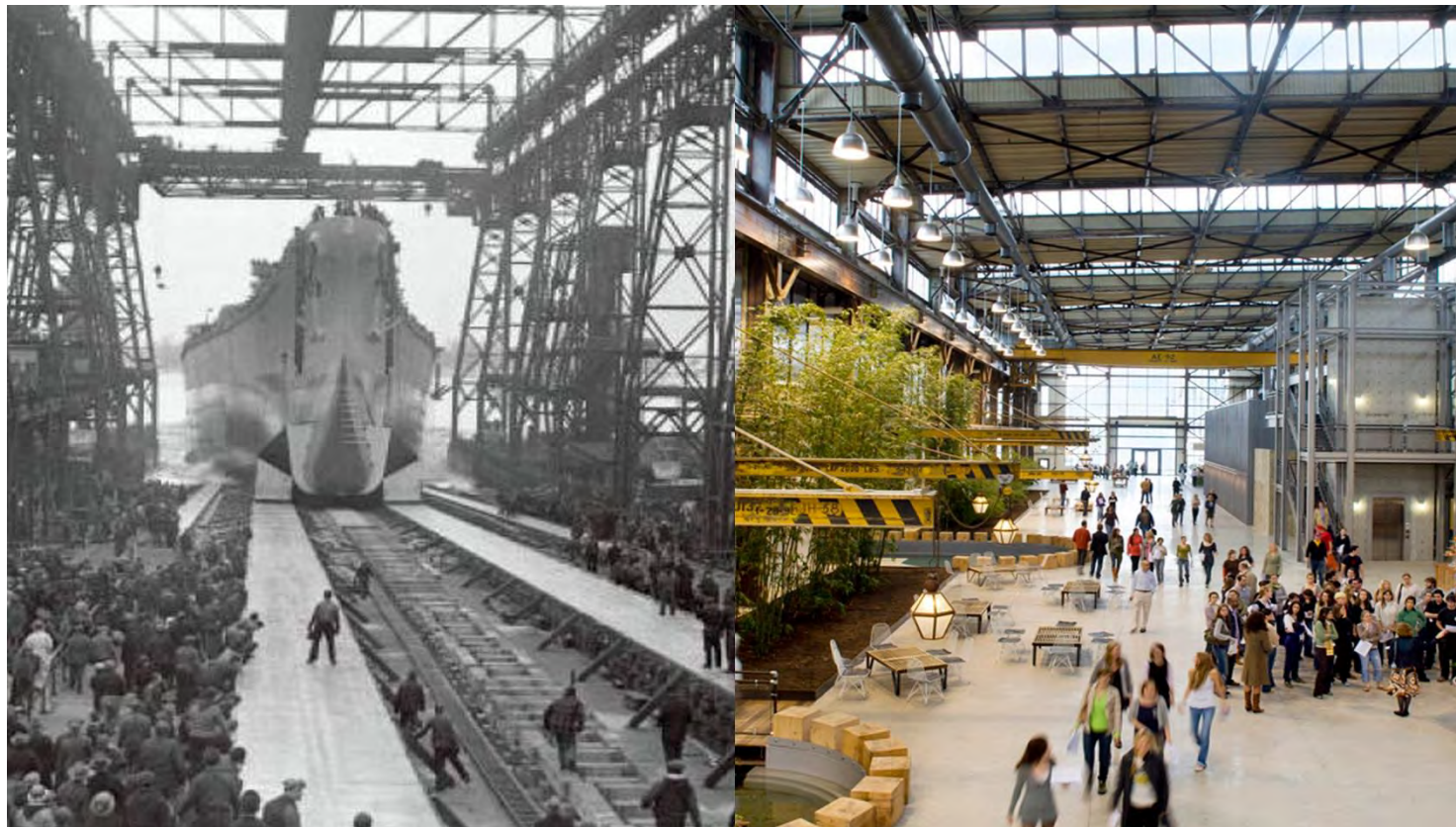
<u>Courses</u>	<u>36 Credits</u>
• Intro GIS for Geodesign - Optional Summer	3
• Geodesign Tech 1 (Fall)	3
• Advanced GIS 1 for Geodesign (Fall)	3
• Environmental Policy (Fall)	3
• Sustainable Design Methodologies (Fall)	3
• Geodesign Collaborative Studio I (Spring)	6
• Advanced GIS 2 for Geodesign (Spring)	3
• Geodesign Tech 2 (Spring)	3
• Applied Research Studio (Summer)	6
• Geodesign Explorations (Summer I)	3
• Adaptive Design or Elective (Summer II)	3



## Client Based Design Studios







POWERED TO DO WHAT'S NOW, POWERED TO DO WHAT'S NEXT.



Mustin Park District



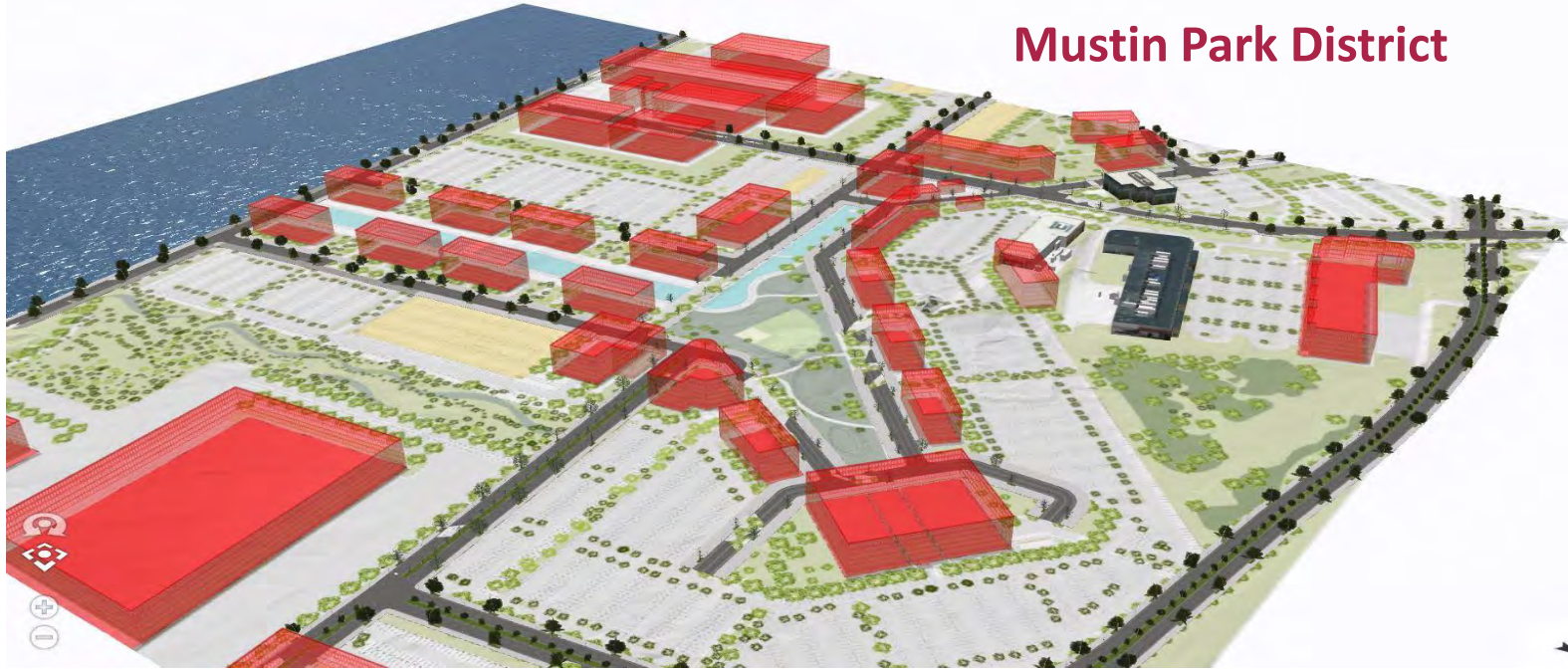
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## Challenge:

- **Develop rich site design content (including terrains)**
- **Use ArcGIS to integrate and share design content with stakeholders**



## Mustin Park District







Layers

- water
- Underground
- Master\_Plan\_\_Scenario\_B
  - ScenarioB\_Buildings+Mesh
  - Master\_Plan Import
- Streets
- Existing\_Buildings
- Comments

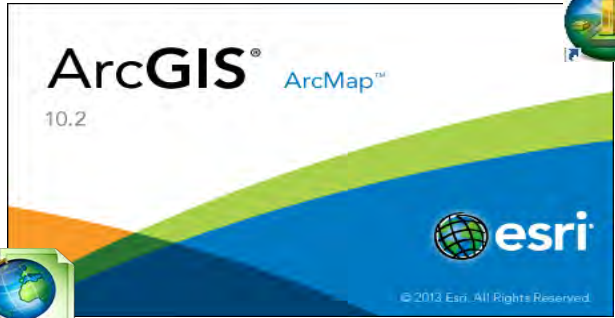
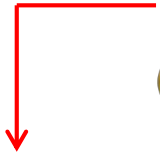
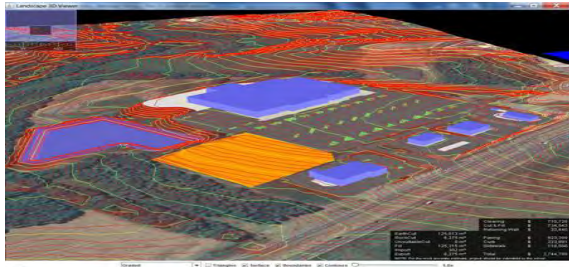


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## **Geodesign Workflow Collaborators:**

- **Patrick Gahagan:** Esri and Philadelphia University
- **Steve Lewis and Mike Kissinger:** Pennoni Associates





ArcGIS Online



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Design Content  
Generation

Conversion to GIS

3D Modeling

Web Collaboration

## SiteOps

- SAAS solution uses existing GIS data and imagery
- Site design
  - Circulation
  - Parking lots (islands, spaces, drives, etc.)
  - Other landscape features (e.g., plazas, parks, etc.)
- Site engineering
  - Proposed contours and spot elevations
  - Proposed terrain
  - Stormwater management infrastructure
- Export to ArcGIS via DWG and LandXML

Layout Solver Grading Solver Utility Solver

Solvers

Save Revision Revision

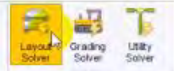
Base Property Boundary



SPC Zone: 3702  
 Revision: 15 - JIM VIDEO  
 Number of spaces: 382  
 Parcels: 0 (0.00 a/c) 19.0 ac (0.00%)  
 Total surface: 2414834.83 sf (56.44 ac)  
 Impervious surface (16%): 389870.2 sf (8.95 ac)  
 Building surface (5%): 123142.38 sf (2.83 ac)

SNAP E: 2693826.83 N: 214573.49 Z: 6.046 preferences applied

Properties  
 Layers  
 Spatial Templates  
 Blocks



SPC Zone:  
Revision:  
Number of spaces:  
Parcels:  
Total surface:  
Impervious surface (50%): 1118411.55 sf (25.68 ac.)  
Building surface (9%): 193851.18 sf (4.45 ac.)



## ArcGIS Desktop

Design Content  
Generation

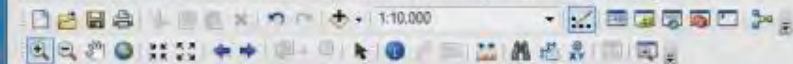
Conversion to GIS

3D Modeling

Web Collaboration

- Create geodatabase
- Import site design content into the geodatabase
- Add attributes and projection
- Import proposed terrain content
- Prep for CityEngine





Snapping

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- NavyYard Real World Schema
  - Basemap
- Siteops Simple Schema
  - SiteOpsSampleDWG.dwg Group Layer
    - SiteOpsSampleDWG.dwg Annotation
    - SiteOpsSampleDWG.dwg Point
    - SiteOpsSampleDWG.dwg Polyline
    - SiteOpsSampleDWG.dwg Polygon
    - SiteOpsSampleDWG.dwg MultiPatch

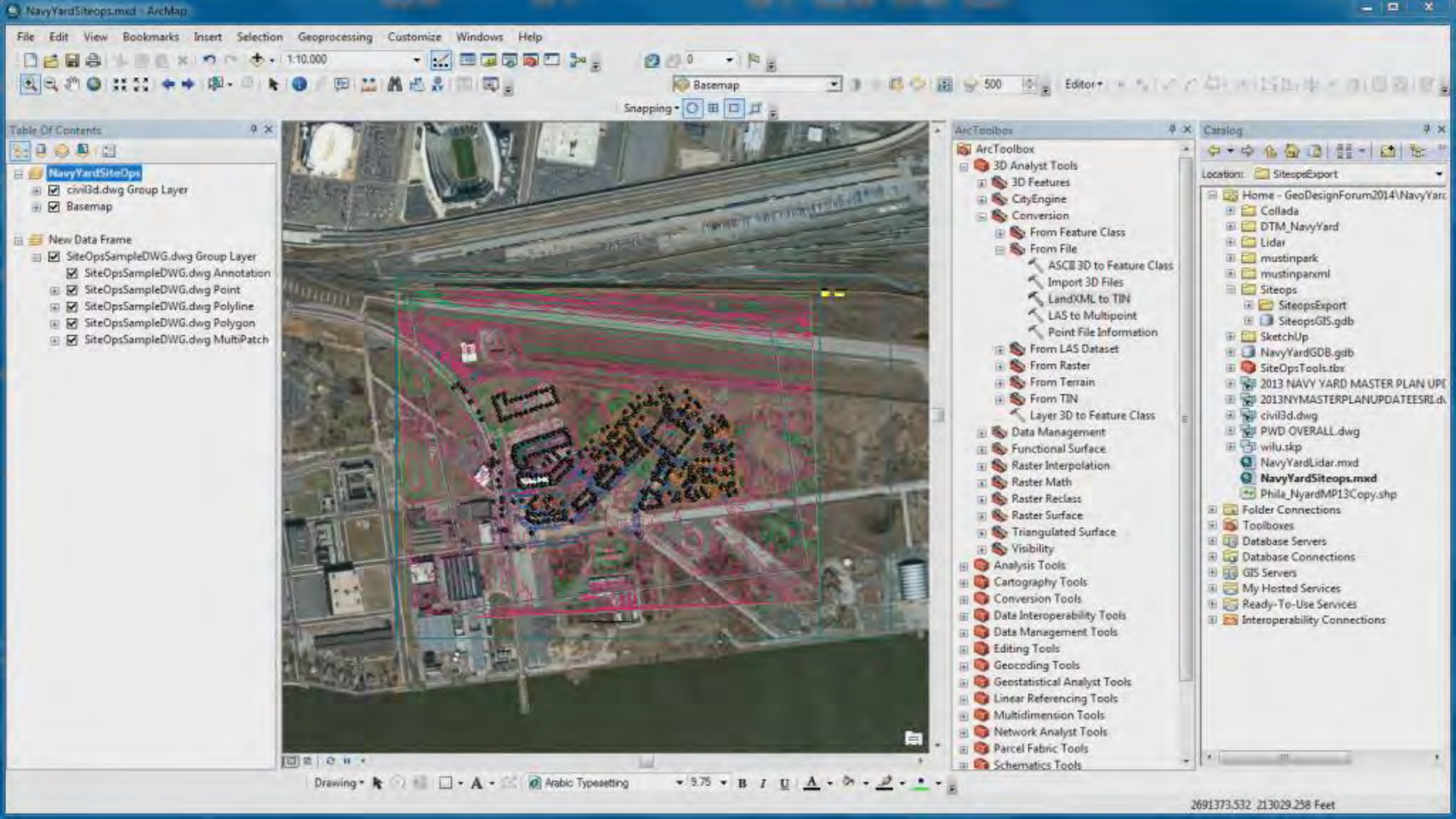


ArcToolbox

- ArcToolbox
  - 3D Analyst Tools
    - 3D Features
    - CityEngine
    - Conversion
      - From Feature Class
      - From File
        - ASCC 3D to Feature Class
        - Import 3D Files
        - LandXML to TIN
        - LAS to Multipoint
        - Point File Information
      - From LAS Dataset
      - From Raster
      - From Terrain
      - From TIN
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    - Data Management
    - Functional Surface
    - Raster Interpolation
    - Raster Math
    - Raster Reclass
    - Raster Surface
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    - Visibility
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  - Cartography Tools
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  - Geocoding Tools
  - Geostatistical Analyst Tools
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  - Multidimension Tools
  - Network Analyst Tools
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  - Schematics Tools

Catalog

- Location: SitesopsExport
- Home - GeoDesignForum2014\NavyYard
    - Collada
    - DTM\_NavyYard
    - Lidar
    - mustinpark
    - mustinparxml
    - Siteops
      - SitesopsExport
      - SketchUp
      - NavyYardGDB.gdb
        - SiteOpsTools.tbx
          - Siteops Geodatabase Creation
          - Siteops Load Line Features
          - Siteops Load Polygon Features
          - Siteops Terrain Import
      - 2013 NAVY YARD MASTER PLAN UPD/
      - 2013NYMASTERPLANUPDATEESRL.dwg
      - civil3d.dwg
      - PWD OVERALL.dwg
      - wilu.skp
      - NavyYardLidar.mxd
      - NavyYardSiteops.mxd
      - Phila\_NyardMP13Copy.shp
    - Folder Connections
    - Toolboxes
    - Database Servers
    - Database Connections
    - GIS Servers
    - My Hosted Services
    - Ready-To-Use Services
    - Interoperability Connections





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## CityEngine

Design Content  
Generation  
Import to GIS  
**3D Modeling**  
Web Collaboration

- **Intuitive and realistic** 3D visualization of designs
- **Clear** representation of design goals
- **Report generation** to support design goals  
(e.g., sustainable design measures)

Navigator

- models
  - rules
    - Buildings
      - ColorBuildings.cga
      - DrivewayandParking.cga
      - ParkingLotRules.cga
      - Subdivision.cga
    - scenes
      - NavyYard.cej

No preview available

No preview available

Building | Scene

search expression

- Scene Light
- Panorama
- Cybercity Buildings (1 Object)
- SITEOPS\_3dModels (1 Object)
- Parking Lines (20433 Objects)
- ParkingLots\_Finished (28 Objects)
- Roadways (4 Objects)
- Greenspace (40 Objects)
- Car Driveways (8 Objects)
- Landscaping Areas (3 Objects)
- Building Footprints (11 Objects)
- Parking Islands (84 Objects)
- Sidewalks (7 Objects)
- Terrain NYRD\_Proposed
- Texture 10kAerial

Viewport | Perspective View | 76 Objects | 26267 Polygons



Inspector





Perspective View | 19980 Objects | 363722 Polygons



Grid Size 100ft | NAD 1983 StatePlane Pennsylvania South FIPS 3702 (US Feet)

Perspective View | 19980 Objects | 363722 Polygons



Grid Size 100ft | NAD 1983 StatePlane Pennsylvania South FIPS 3702 (US Feet)

## → CityEngine Web Scene

Design Content  
Generation  
Import to GIS  
3D Modeling

**Web Collaboration**

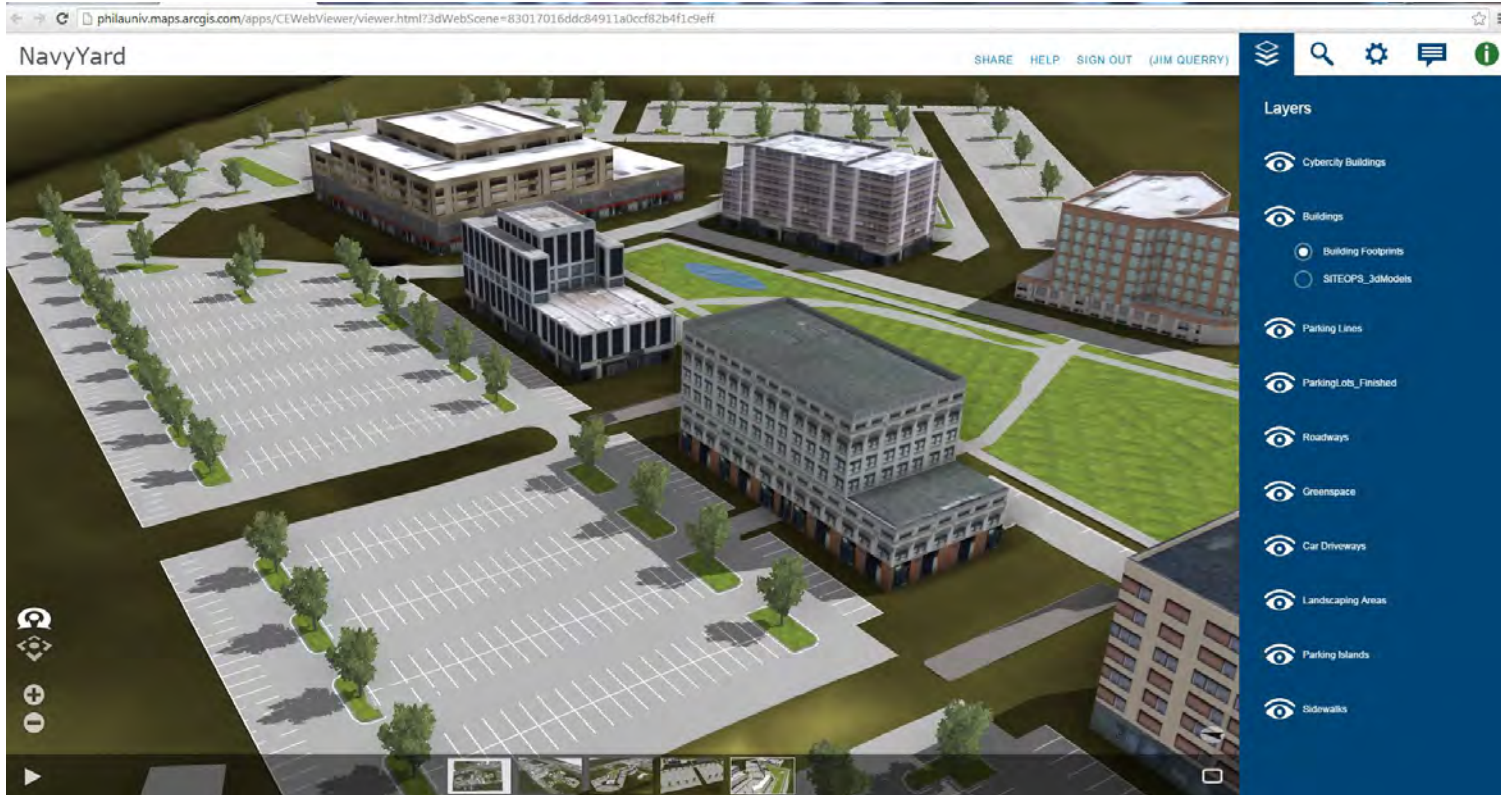
- Upload to CityEngine model to ArcGIS Online and share with stakeholders



Layers

- Cybercity Buildings
- Buildings
  - Building Footprints
  - SITEOPS\_3dModels
- Parking Lines
- ParkingLob\_Finished
- Roadways
- Greenspace
- Car Driveways
- Landscaping Areas
- Parking Islands
- Sidewalks







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