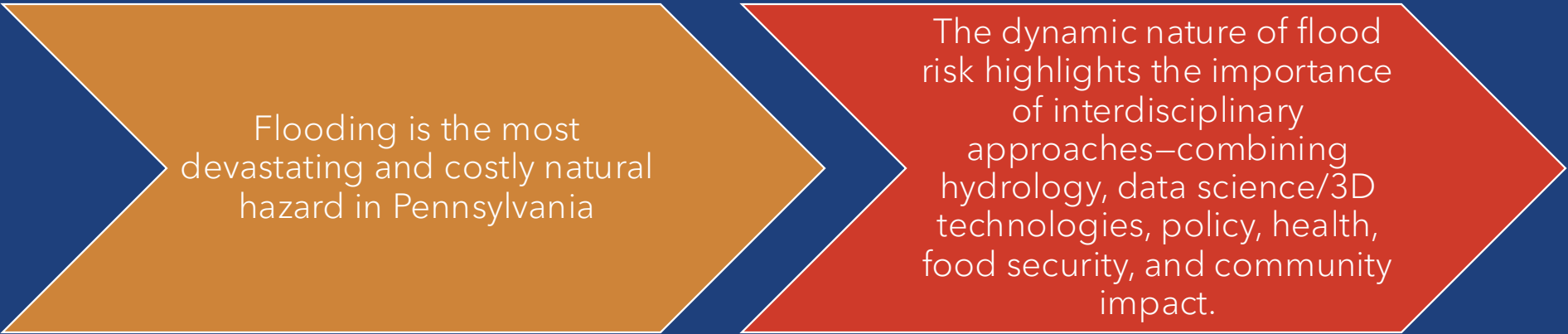




SEEING IS BELIEVING:
VISUALIZING | FLOOD RISK

THE PA FLOOD RISK TOOL & 3D PA FLOOD IMMERSIVE EXPERIENCE



Flooding is the most
devastating and costly natural
hazard in Pennsylvania

The dynamic nature of flood
risk highlights the importance
of interdisciplinary
approaches—combining
hydrology, data science/3D
technologies, policy, health,
food security, and community
impact.



JOHNSTOWN
FLOOD 1889



HURRICANE
AGNES 1972

—

*DOWNTOWN
WILKES-BARRE
PA*

HURRICANE IVAN 2004



MIDDLETOWN, PA

PITTSBURGH, PA





FLOODWATERS OVERWHELM PENNSYLVANIA TOWN

Bucks County 2023

TROPICAL STORM DEBBY 2024



MIDDLETOWN, PA

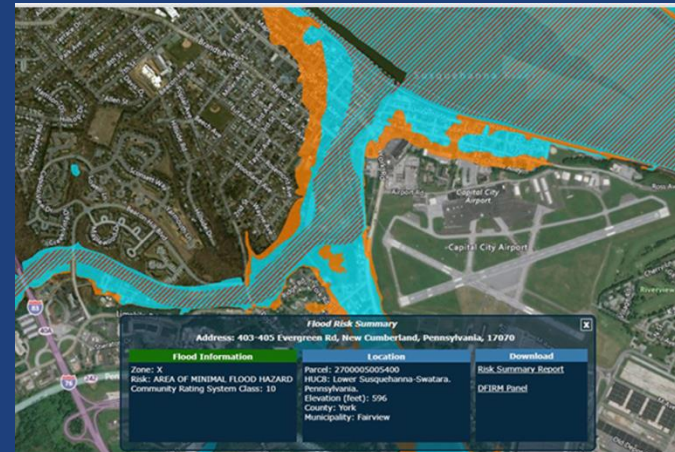


PA FLOOD RISK ASSESSMENT TOOL



How it Works

The Pennsylvania Flood Risk Assessment Tool provides access to the best available flood data from PEMA and other authoritative sources. It includes other data layers including roads, aerial photos, and, where available, parcel data. The PA Flood Risk Tool can be used from a desktop computer and a cell phone.

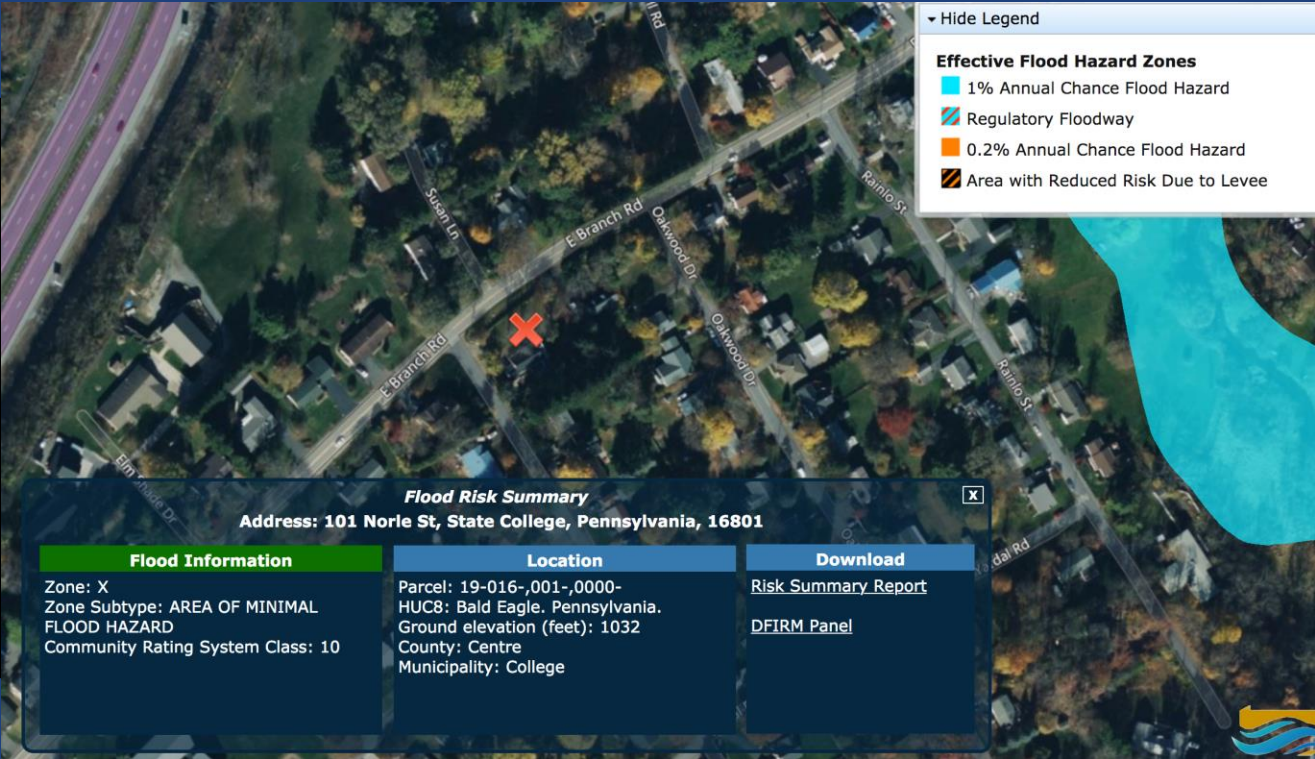


Your Risk Report

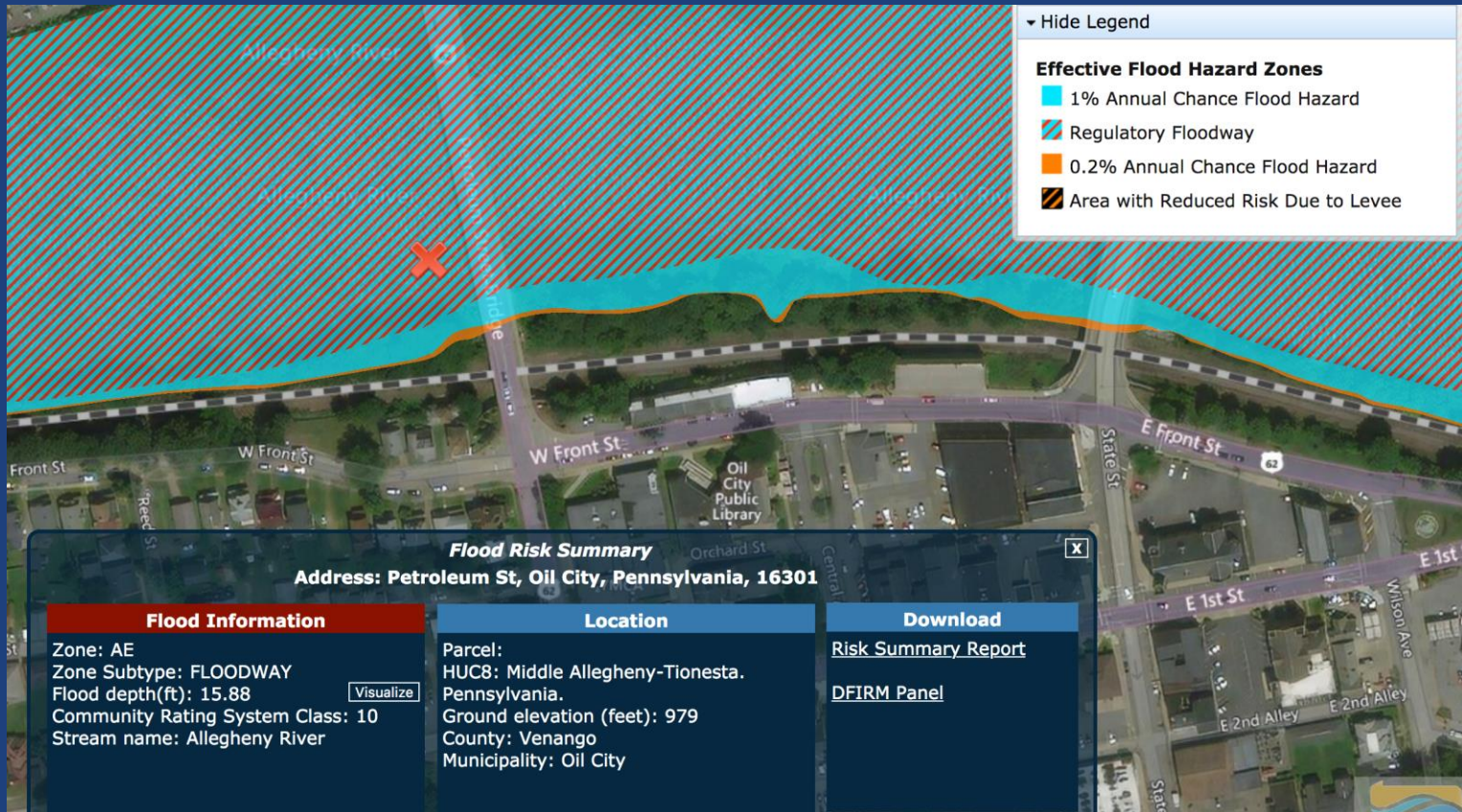
Once you have located your property, you can use the PA Flood Risk Tool to create a report. This report includes a map, information on your flood zone, risk type, address, watershed stream, county, municipality, and parcel (if available).

Remember: if in doubt, it's not out!

DASHBOARD: NO RISK



DASHBOARD: RISK



PA FLOOD RISK TOOL FUNCTIONALITY

Address Search

Zoom to County

Click on a Point
to View
Dashboard

Change
Basemaps

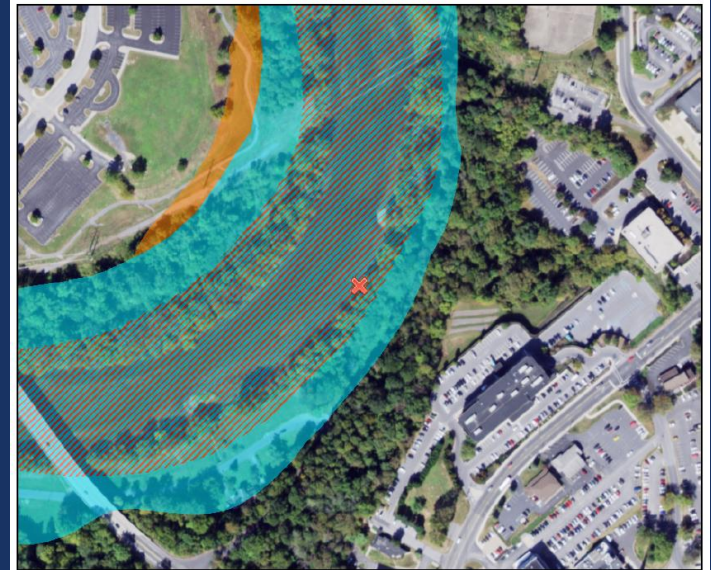
Create reports

View/Download
DFIRM

Links directly to
FEMA Changes
Since Last FIRM
app

Access LOMAs &
LOMRs

RISK SUMMARY REPORT



Flood Zone: AE

Risk Type: FLOODWAY

Address: East Pennsboro Twp, Pennsylvania

Watershed: Lower Susquehanna-Swatara, Pennsylvania.

Stream: Conodoguinet Creek

County: Cumberland

Municipality: East Pennsboro

Parcel ID: not available

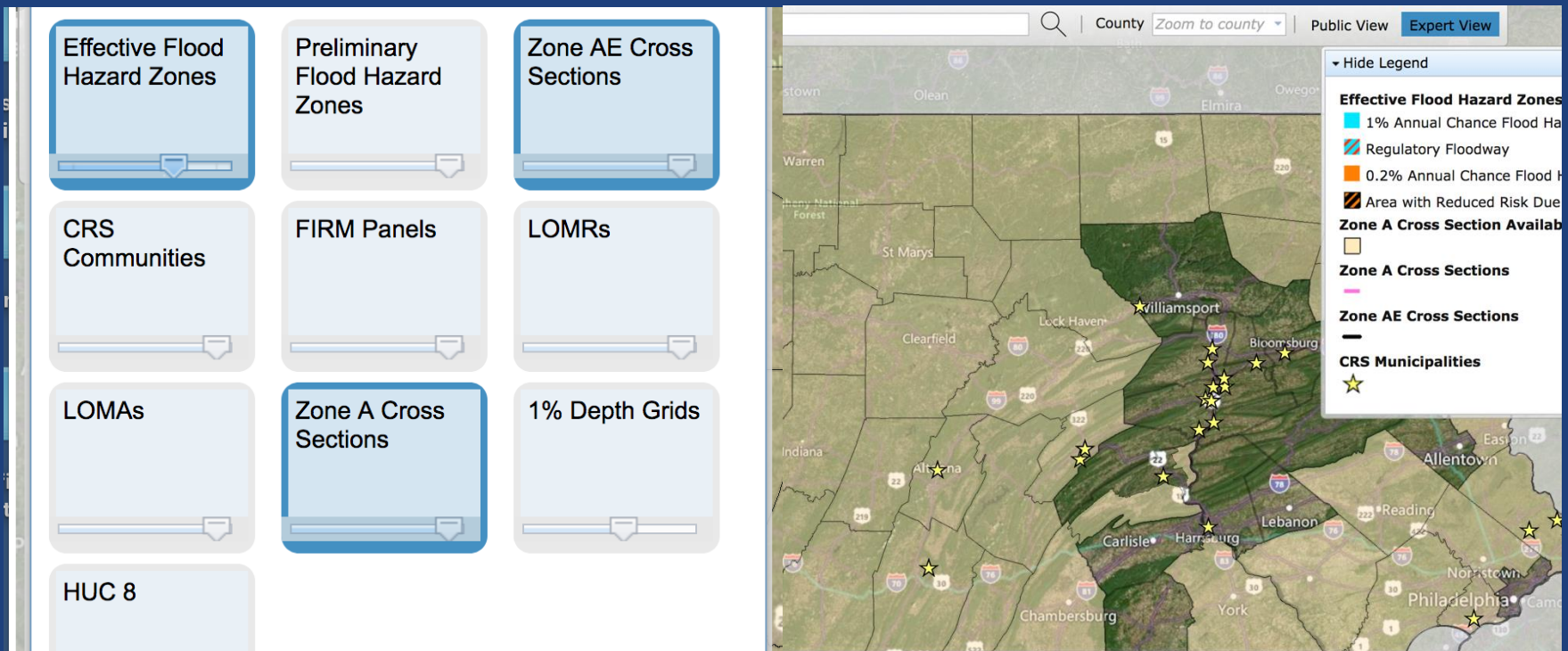
Surface Elevation (ft): 299



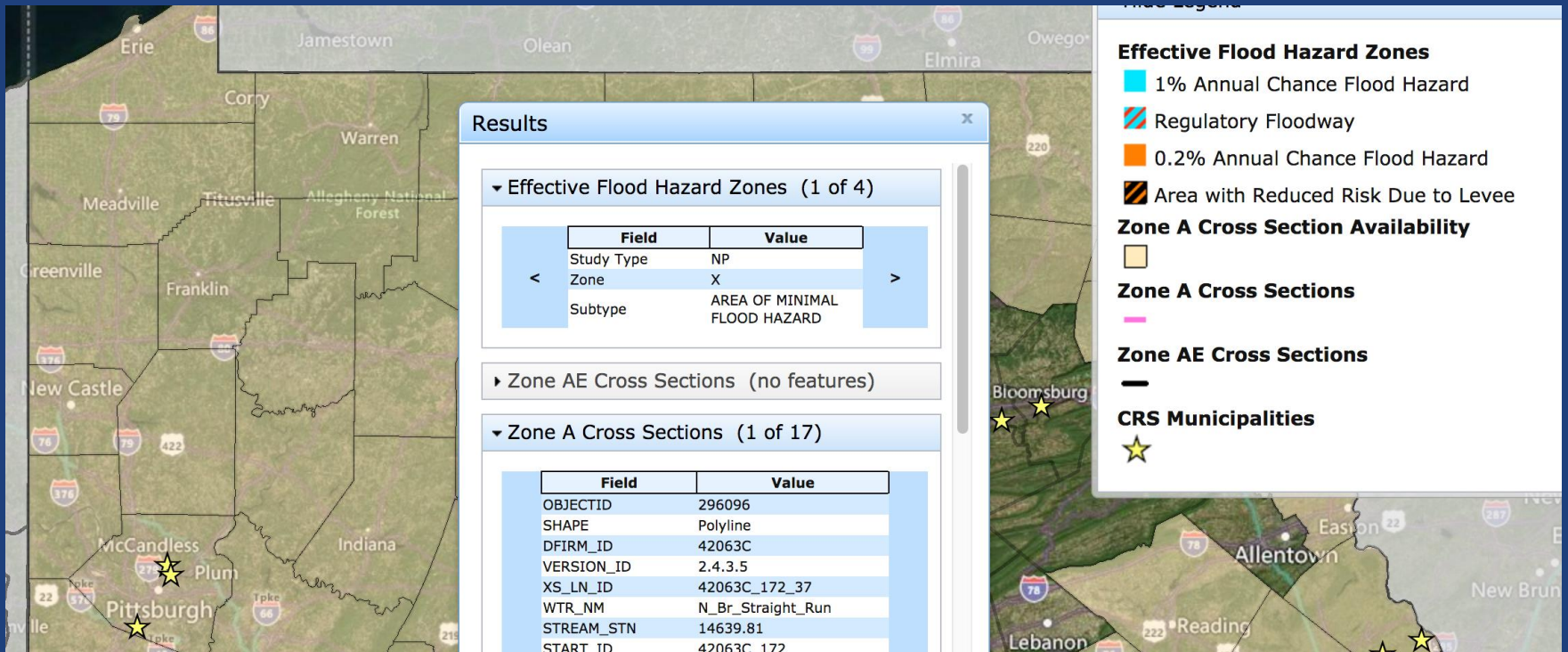
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Regulatory Floodway
- Area with Reduced Risk Due to Levee

Flood report generated at pafloodrisk.psu.edu on 7/4/2020
This summary is provided as-is and is not intended for official use.

PA FLOOD RISK TOOL EXPERT MODE



PA FLOOD RISK TOOL EXPERT MODE



SUSQUEHANNA
FLOOD FORECAST
AND WARNING
SYSTEM



SFWRS

- The SFWRS is an online tool providing flood damage assessment and appropriate response for impacted communities along a 100-mile reach of the Susquehanna River.
- The tool relies on geospatial services to disseminate datasets and supports a defined user group with secure access to the tool. SRBC staff has coordinated development of the tool with the PA Flood Risk Tool.
- Building centroids, flood inundation, flood actions, and flood control structures



Address



County

Public View

Expert View

Flood Inundation Mapping

Select a River Reach (USGS Stream Gage ID)

Select a Flood Stage (Elevation)

Adjust depth grid transparency

*Click on a depth grid to return an estimate of flood depth at that location

Hide Legend

Effective Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee



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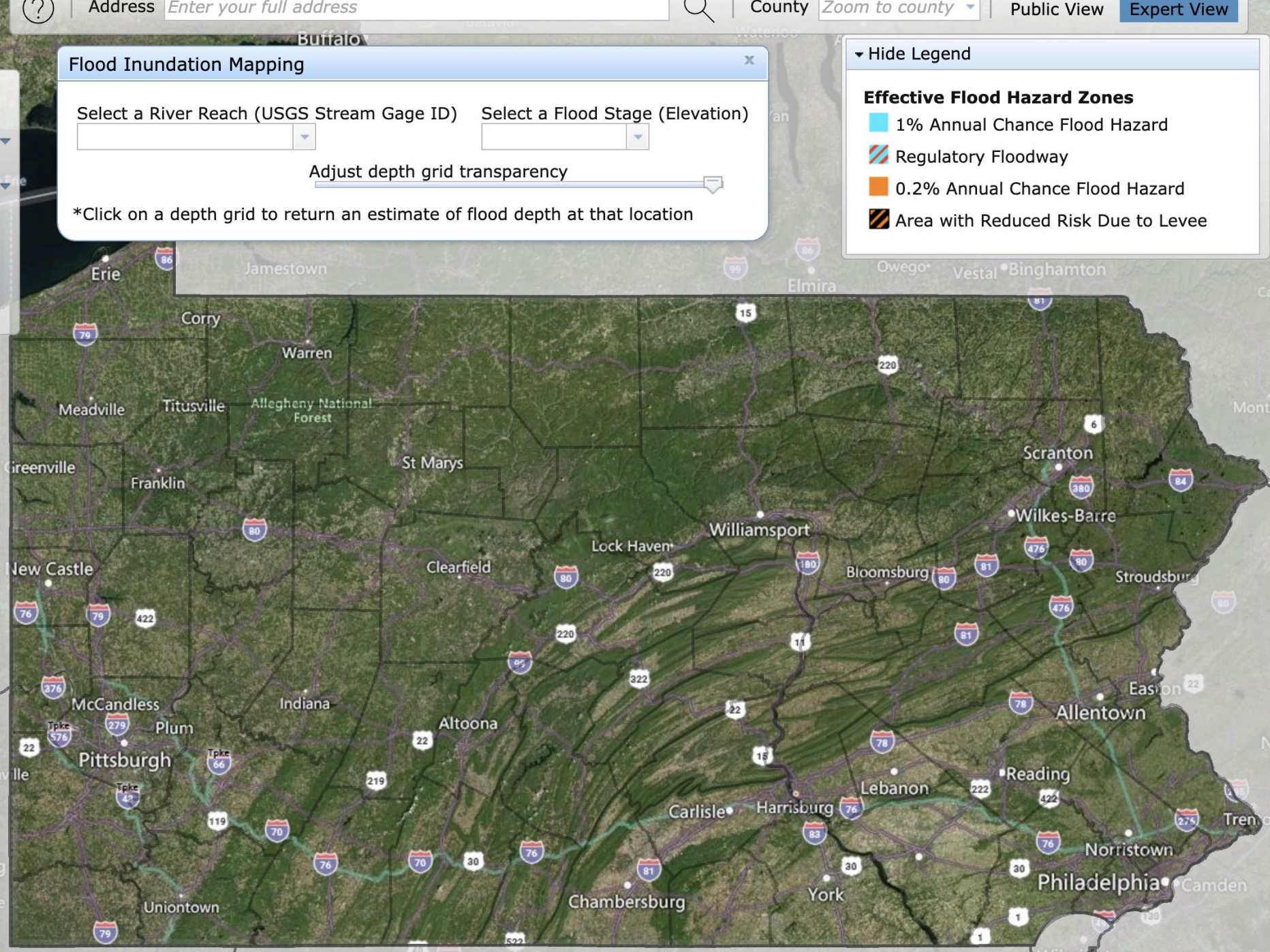
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WHAT ELSE
CAN WE DO TO
HELP PEOPLE
SEE FLOOD
RISK?





Reduced Risk Levee Area - Zone X



Increased Special Flood Hazard Area



No Changes To Special Flood Hazard Area



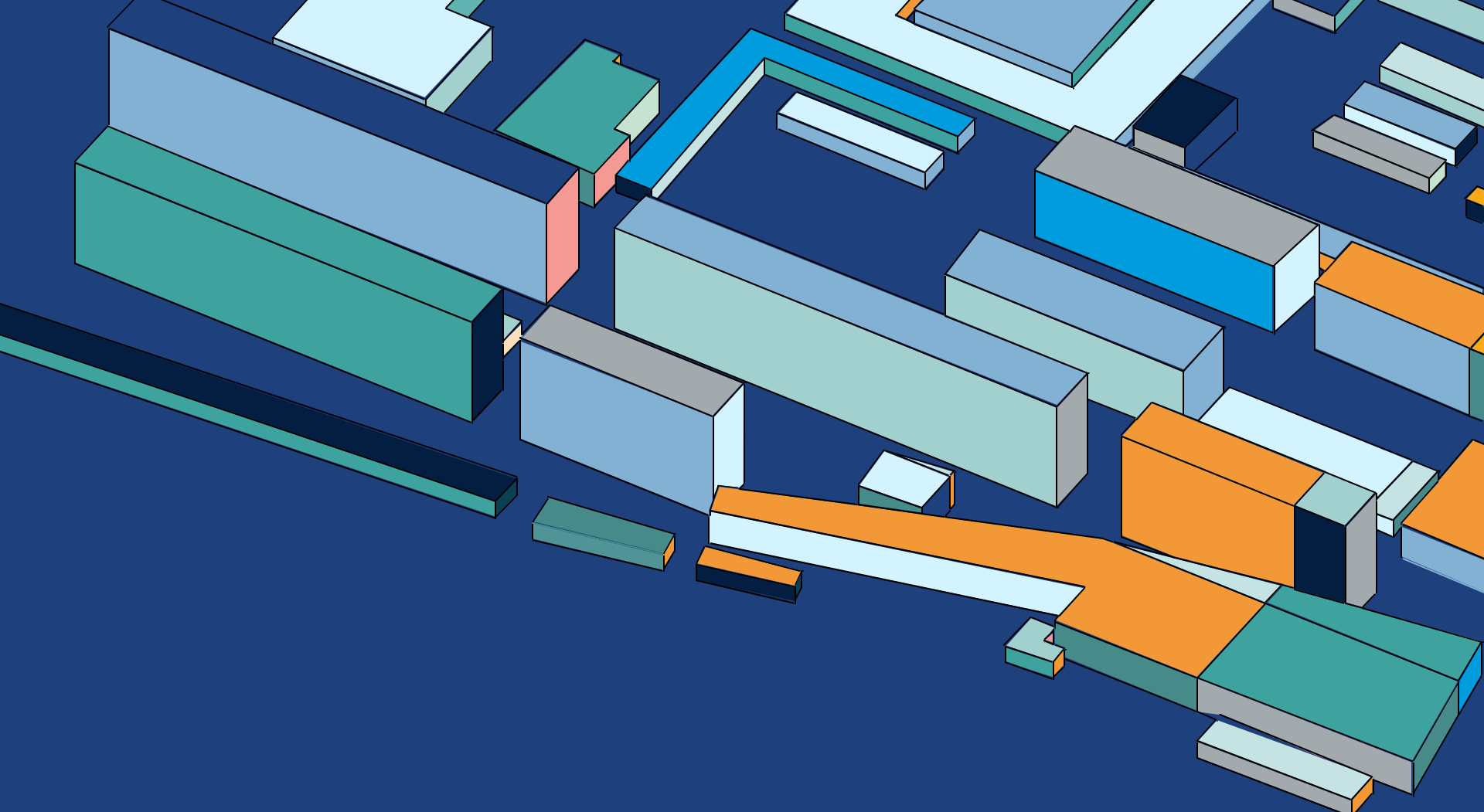
FLOOD EVENT
DATA PACKAGES:
WE NEED YOUR
FLOOD EVENT
DATA!

WHAT TYPE OF DATA?



DATA

- AERIAL PHOTOS
- DRONE IMAGES
- HIGH WATER MARKS
- DAMAGE ASSESSMENTS
- BUILDING FOOTPRINTS
- PARCELS
- BUILDING ELEVATIONS
- PRIVATE CAMPS
- PRIVATE CAMPGROUNDS
- PRIVATE VENUES
- PLACES PEOPLE CONGREGATE FOR RECREATION



3D PA Flood Risk Pilot Project Experience

Immersive Technologies

Virtual Reality

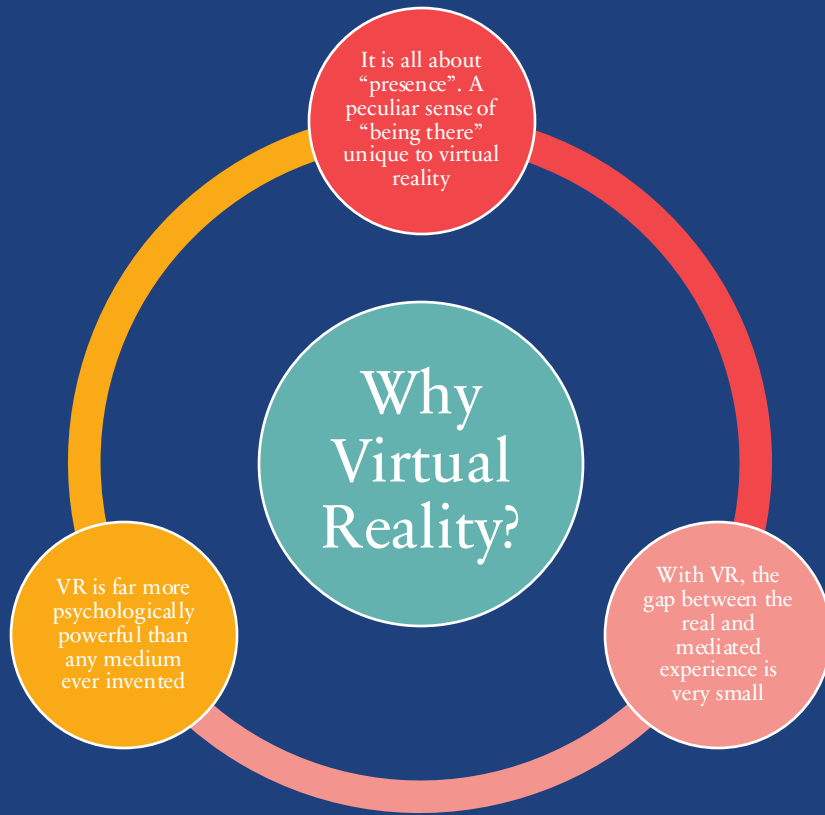


Augmented Reality



Mixed Reality





HOW VR WORKS?

The brain tends to treat VR experiences as real

You can break the rules!

- You can do dangerous tasks
- You can change your body (e.g., 3 arms), age, etc.
- You can distract the brain to not feel pain
- You can go back and forth in time
- You can save tremendous amounts of costs

By breaking the rules, you can teach concepts impossible in other mediums

Why
Virtual
Reality?



KEY AFFORDANCES OF VR



Interactivity



**Spatial
Presence**



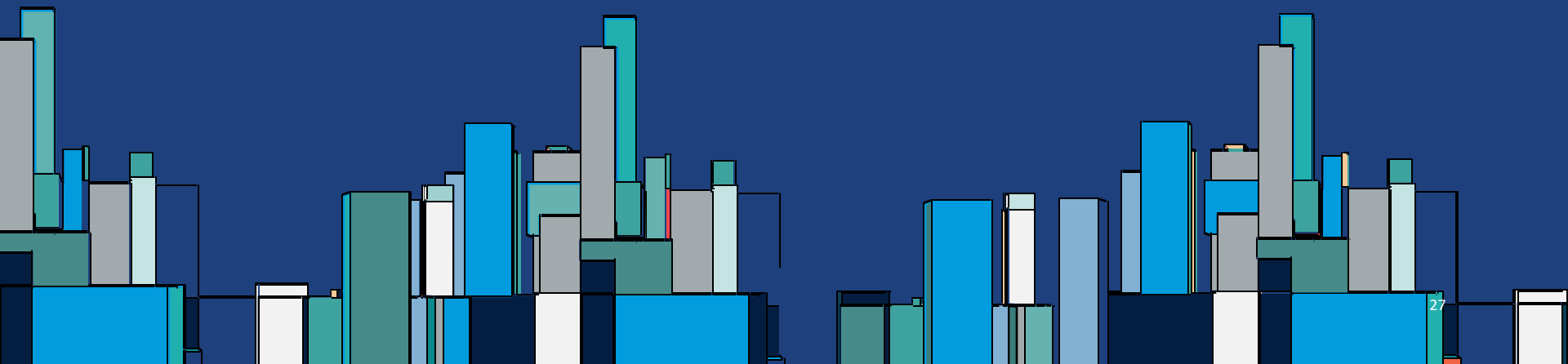
**Social
Presence**



Embodiment

Funding

Funded by FEMA Region 3 through a Cooperative
Technical Partnership Grant



A 3D bar chart with several bars of varying heights and colors. The bars are primarily teal, with some red and grey bars. The chart is set against a dark blue background. The bars are arranged in a cluster, with some taller than others, suggesting a comparison of values.

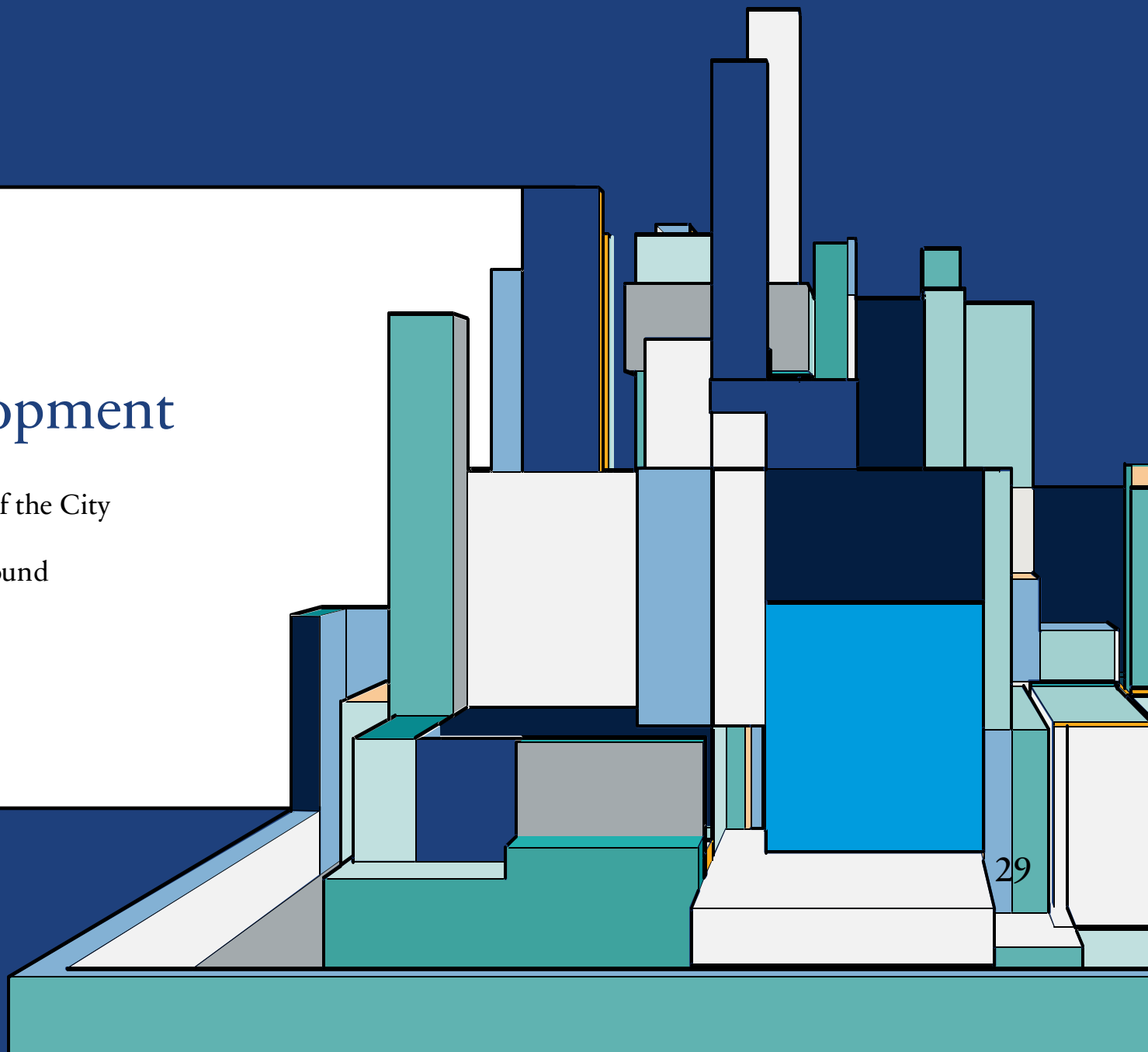
Purpose

To demonstrate to stakeholders the reality of flood risk in a 3D environment and to expand the capabilities of the PA Flood Risk Assessment Tool.

Development

Overview of the City

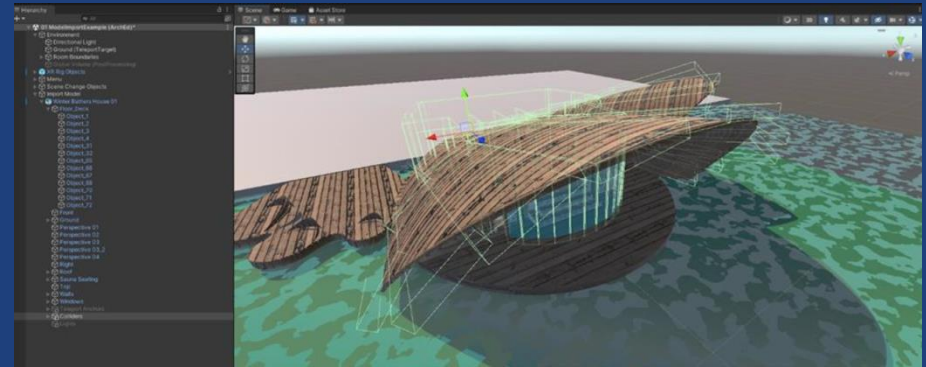
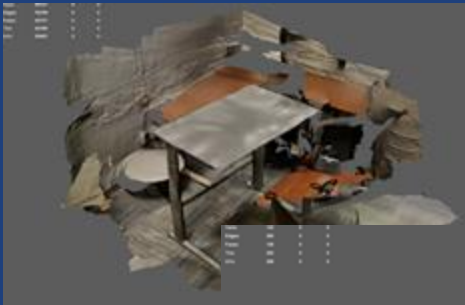
On the Ground



ArcGIS CityEngine



Autodesk Maya -> Unity

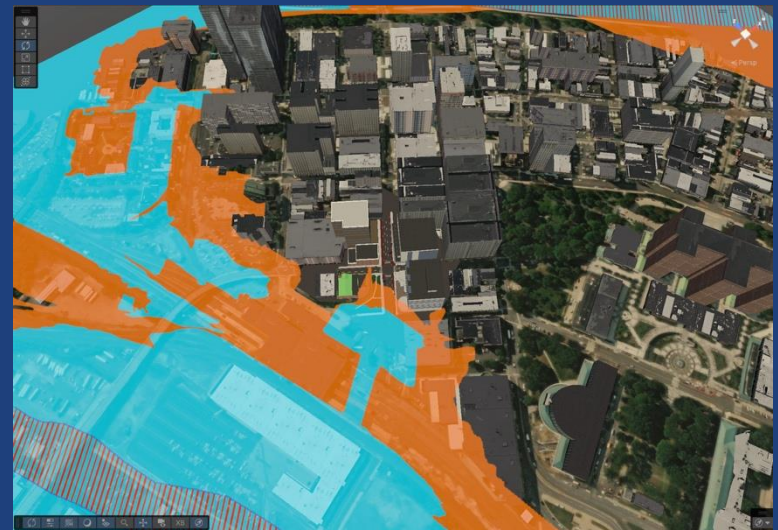


3D FLOOD RISK VISUALIZATION

Flood View



App View



HAZARD MITIGATION





HAZARD MITIGATION HUB

- Working with PEMA to create a PA Hazard Mitigation Hub with information on hazards like flooding, droughts, landslides, tornados, wildfires, earthquakes.
- Will contain information for mitigation, risk assessment, hazard mitigation, and links to resources, data, and apps.

THANK YOU!

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Thanks also to steve kocsis cambria
county

