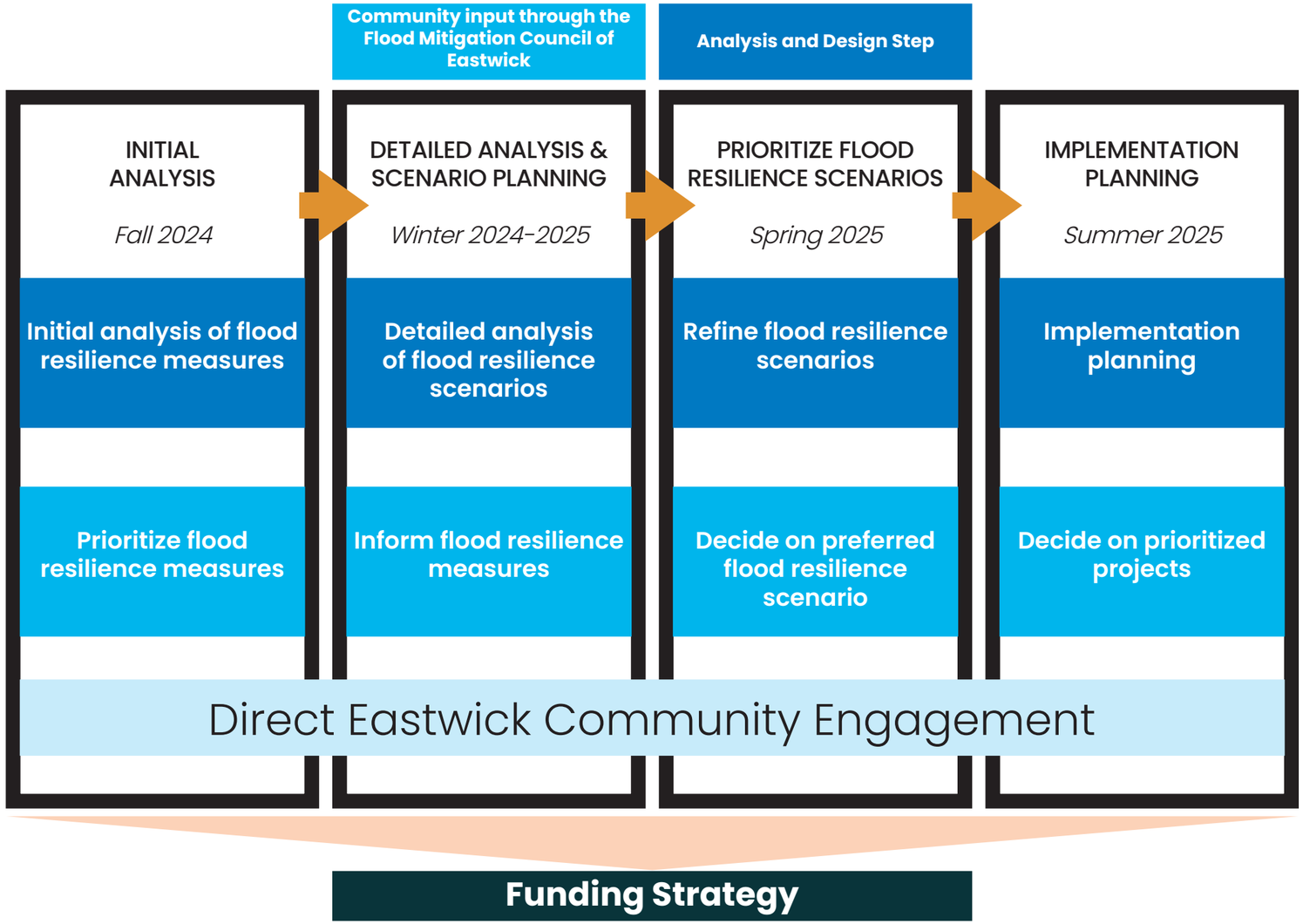
ABOUT THE EASTWICK FLOOD RESILIENCE STRATEGY

INTRODUCTION

The Eastwick Flood Resilience Strategy is a **community-driven** effort to address current and future flooding impacts to the Eastwick community. This strategy will piece together **'flood resilience measures'** across Eastwick to help reduce impacts from river, coastal, and storm sewer flooding.

A **flood resilience measure** is a physical tool to reduce impacts from the three types of flooding. Multiple measures are being explored across the Eastwick community to create different possible flood resilience scenarios.

The strategy is being co-created by the **Flood Mitigation Council of Eastwick** -- a council made up of 11 residents from the Eastwick neighborhood -- and the City of Philadelphia Office of Sustainability. Direct input from community members will guide which measures make up the selected flood resilience strategy. The Council is being supported by the Office of Sustainability, project partners, and a team of technical experts.



PROJECT TEAM

OLIN · Connect the Dots · THE CITY OF PHILADELPHIA OFFICE OF SUSTAINABILITY · ARCADIS · buy in · eDESIGN DYNAMICS · CAPITAL ACCESS

It's time for action. We're pulling together all the flood resilience research and concepts under one umbrella plan so you, the Eastwick community, can provide direct input into the path forward for Eastwick Flood Resilience.

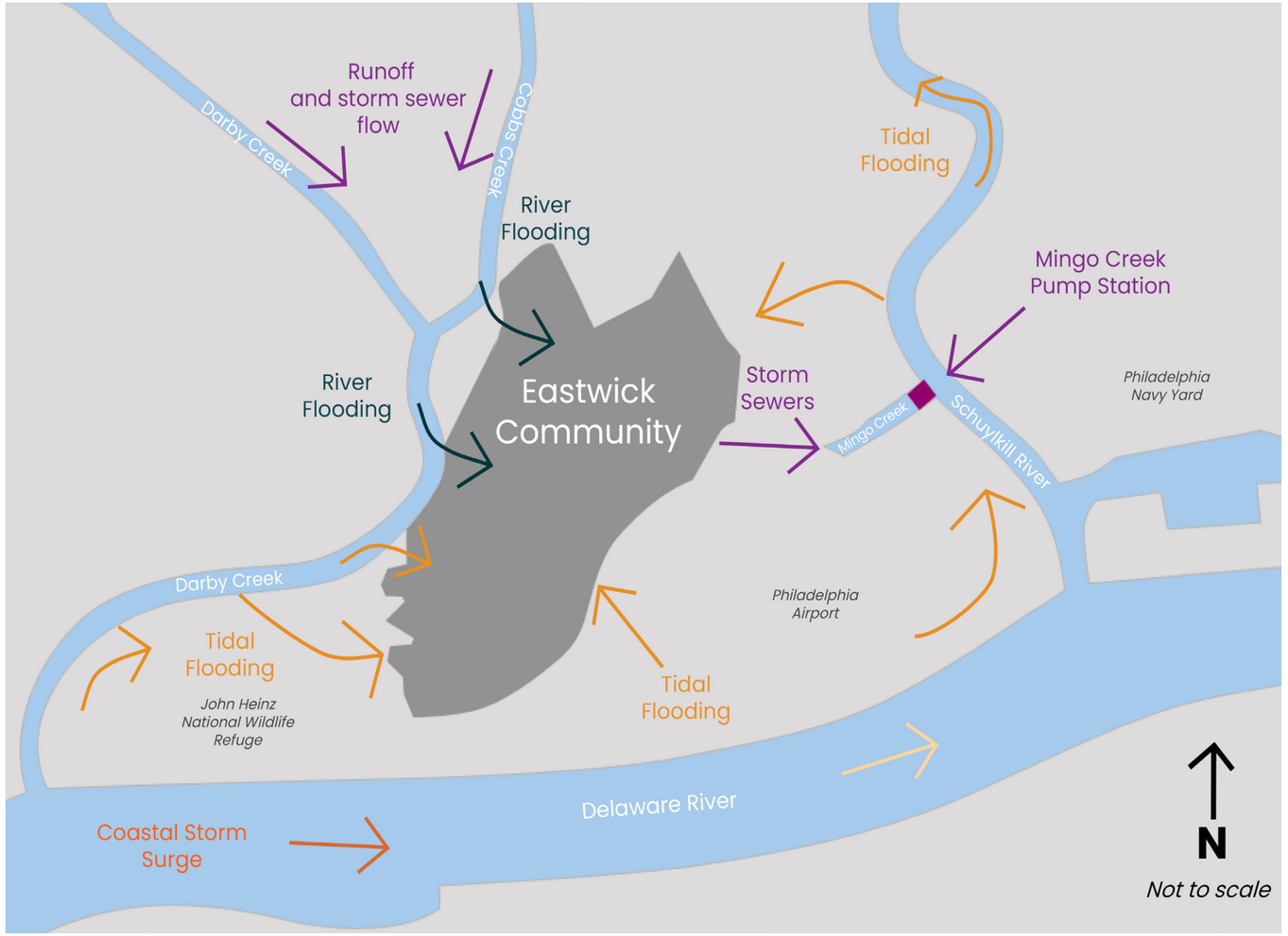
THE MULTIPLE SOURCES OF FLOODING IN EASTWICK

Flooding is the temporary inundation of land that is typically dry. Eastwick is susceptible to a few different types of flooding, all of which are likely to worsen with climate change. When we talk about the ways different measures address flooding in Eastwick, we refer to three primary types of flooding.

FLOOD TYPES IN EASTWICK

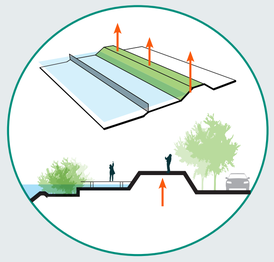
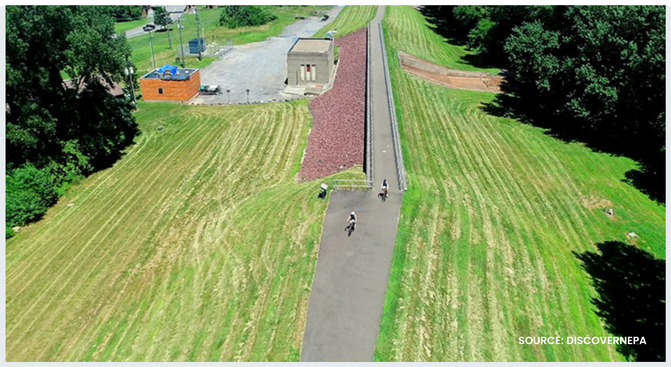
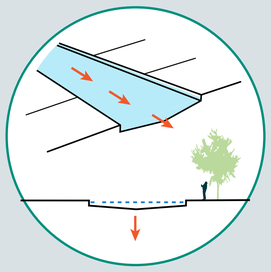
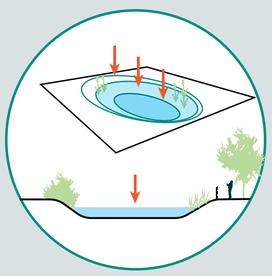
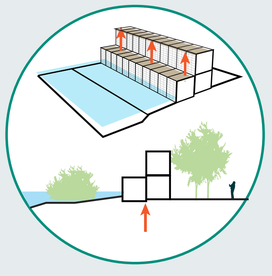
	River Flooding	Coastal Flooding	Storm Sewer Flooding
Flood Hazard	Rainfall upstream of Eastwick results in flood waters overtopping the banks of Cobbs Creek. This type of flooding is the primary and most urgent source of flooding today.	**Tidal:** Low-lying coastal areas flood when water levels rise above ground elevation due to high tides. **Storm Surge:** Coastal storms create flooding due to surge -- a rise in water levels due to storm pressure and waves.	Lower lying areas, both along waterways and inland, can flood due to heavy rain events overwhelming drainage infrastructure. Also called "Urban Flooding". In Eastwick, rainfall flows through storm sewers to Mingo Creek (see map to the right) where a PWD Pump Station is located to pump the collected water to the Schuykill River.
Climate Driver	Increased Precipitation	Sea Level Rise More Severe Storms	Increased Precipitation Sea Level Rise

FLOOD SOURCES IN EASTWICK

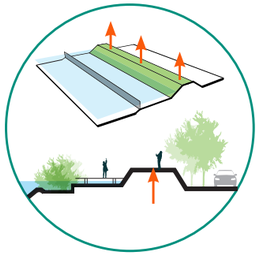


PROPOSED EASTWICK FLOOD MITIGATION MEASURES

These measures are not mutually exclusive; rather it's the combination of these measures in the appropriate places that will have the greatest impact in reducing flood risk.

	EXAMPLE PROJECT	FLOODING TYPES ADDRESSED	TIMEFRAME
LEVEES, BERMS, AND BARRIERS  An earthen and/or concrete structure, designed to contain, control, or divert the flow of water in order to reduce the risk of flooding by stopping the flow of water over land.	 LUZERNE COUNTY LEVEE TRAIL - WYOMING, PA	**RIVER** **COASTAL**	**MID-TERM** (6-10 YRS)
STORM SEWER INFRASTRUCTURE IMPROVEMENTS  Increase and enlarge the storm sewer drainage infrastructure: Build pipes, culverts, channels, tide gates, and pumping stations to help drain water out of Eastwick faster.	 EXAMPLE OF ENLARGED PIPES AND CULVERTS	**RIVER** **STORM SEWER**	**MID-TERM** (6-10 YRS) **TO** **LONG-TERM** (10-20 YRS+)
BUYOUTS, RELOCATION, AND OTHER PROPERTY LEVEL MEASURES  An organization or agency buys homes at their fair market value and returns the land to its natural state. Buyouts can be done at different scales (i.e., individual homes, attached homes, or whole blocks), but buyout strategies vary depending on the type of housing and location.	 RELOCATION PROPOSAL - ISLE DE JEAN CHARLES - LA	**RIVER** **COASTAL** **STORM SEWER**	**MID-TERM** (6-10 YRS)
NATURE BASED SOLUTIONS: WETLANDS STORAGE AND CONVEYANCE  Activities that restore, mimic, and/or enhance nature and natural systems and support flood risk mitigation as well as economic, environmental, and social resilience efforts.	 AFTER: SANYA MANGROVE PARK (2017) - SANYA SHI, HAINAN SHENG, CHINA	**RIVER** **COASTAL** **STORM SEWER**	**SHORT-TERM** (ONGOING-5 YRS) **TO** **LONG-TERM** (10-20 YRS+)
FLOOD RESILIENT RECONSTRUCTION  Reconstructing existing homes in the same location using flood resistant design techniques, such as elevation of the first floor and critical utility systems.	 BUILD IT BACK NYC: ATTACHED, TWO-FAMILY ELEVATED HOMES - QUEENS, NY	**RIVER** **COASTAL** **STORM SEWER**	**MID-TERM** (6-10 YRS)

LEVEES, BERMS, AND BARRIERS



An earthen and/or concrete structure, designed to contain, control, or divert the flow of water in order to reduce the risk of flooding by stopping the flow of water over land.

BENEFITS

- Lowers much of the river and coastal flood risk, allowing most residents to stay in their current homes.

CHALLENGES

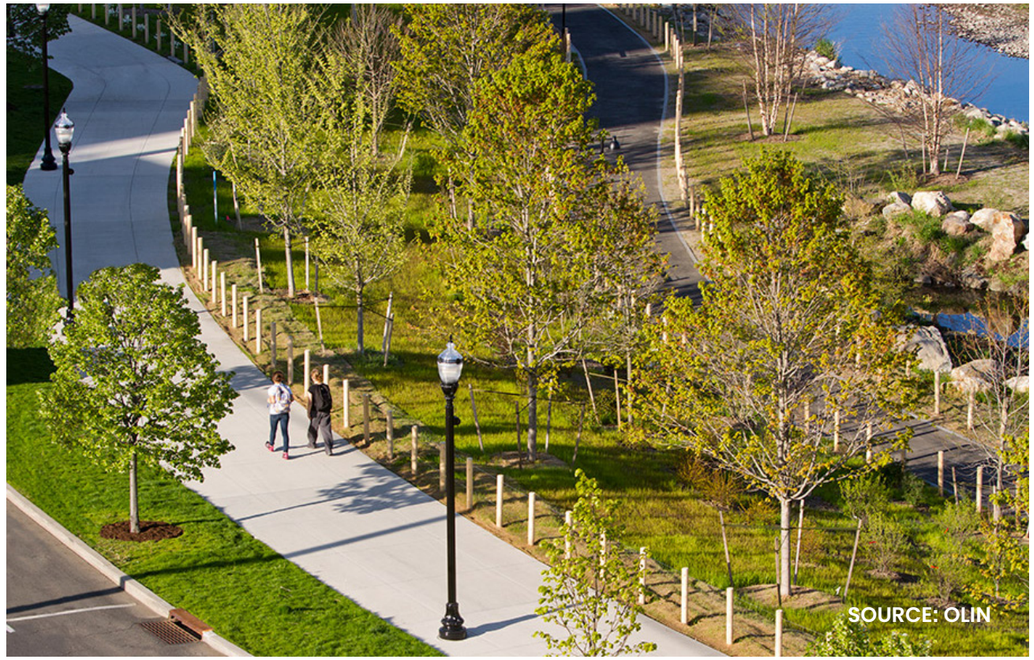
- Requires planning with landowners and Delaware County.
- Can create flooding elsewhere.
- Potential for water to overflow the levee, and erosion of banks.

TIMEFRAME

- Mid-term (6-10 yrs)

FLOOD RISK TYPE MITIGATED

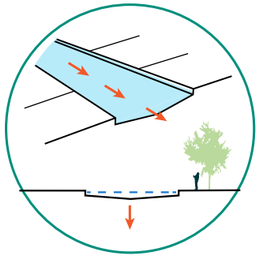
- River, coastal



MILL RIVER PARK, TRAIL ON ENGINEERED EMBANKMENT - STAMFORD, CT

LUZERNE COUNTY LEVEE TRAIL - WYOMING, PA

STORM SEWER INFRASTRUCTURE IMPROVEMENTS



Increase and enlarge the storm sewer drainage infrastructure: Build pipes, culverts, channels, tide gates, and pumping stations to help drain water out of Eastwick faster.

BENEFITS

- Supports other river measures in more quickly moving water out of Eastwick

CHALLENGES

- Coordination with PennDOT and other utilities.
- Potential roadway closures and temporary impacts to evacuation routes.
- There may be some remaining flood risk not fully addressed by this approach.

TIMEFRAME

- Mid-term (6-10 yrs) to long-term (10-20 yrs+)

FLOOD RISK TYPE MITIGATED

- River, storm sewer

EXAMPLE OF ENLARGED PIPES AND CULVERTS

VOLUNTARY BUYOUTS, RELOCATION, AND OTHER PROPERTY LEVEL MEASURES

An organization or agency buys homes at their fair market value and returns the land to its natural state. Buyouts can be done at different scales (i.e., individual homes, attached homes, or whole blocks), but buyout strategies vary depending on the type of housing and location. They can be combined with a land swap strategy - a relocation strategy where a home or a community coordinates a move to a less flood prone location.

BENEFITS

- Removes immediate flooding safety concerns while making land available for restoration.

CHALLENGES

- Requires attached homes to participate together, meaning that collective buy-in amongst neighbors is necessary.
- Landswaps require acquiring and constructing new housing and infrastructure within the community.
- Community ties may be frayed due to partial or whole community displacement.

TIMEFRAME

- Mid-term (6-10 yrs)

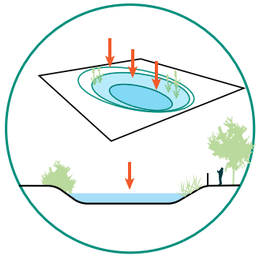
FLOOD RISK TYPE MITIGATED

- River, coastal, storm sewer

ISLE DE JEAN CHARLES - LA

RELOCATION PROPOSAL - ISLE DE JEAN CHARLES - LA

NATURE-BASED SOLUTIONS



Activities that restore, mimic, and/or enhance nature and natural systems and support flood risk mitigation as well as economic, environmental, and social resilience efforts.

BENEFITS

Reduces flooding by restoring habitat and creating space for water to naturally flow away from developed areas during a flood event. Also provides recreational opportunities and community beautification.

CHALLENGES

- Projects will require coordination from multiple municipalities and agencies in both Philadelphia and Delaware County to achieve full benefit.
- If enough flood storage cannot be identified, there may be some remaining flood risk from extreme flood events.
- These projects would need to be part of a holistic solution with infrastructure projects.

TIMEFRAME

- Short-term (ongoing-5 yrs) to long-term (10-20 yrs+)

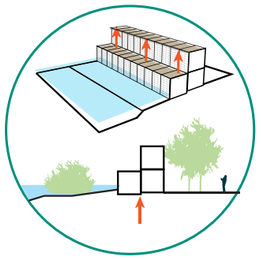
FLOOD RISK TYPE MITIGATED

- River, coastal, storm sewer

BEFORE: SANYA MANGROVE PARK (2015) - SANYA SHI, HAINAN SHENG, CHINA

AFTER: SANYA MANGROVE PARK (2017) - SANYA SHI, HAINAN SHENG, CHINA

FLOOD RESILIENT RECONSTRUCTION



Reconstructing existing homes in the same location using flood resistant design techniques, such as elevation of the first floor and critical utility systems.

BENEFITS

- Reduces flood impacts to private residences and allows residents to remain in their homes

CHALLENGES

- Takes away space in people's homes and can require temporary displacement during construction
- Mitigates flooding impacts, but not actual flooding.
- Does not address flooding on roadways or community infrastructure.
- Not feasible for majority of homes in Eastwick or aging residents.
- Requires moving out of home during reconstruction.

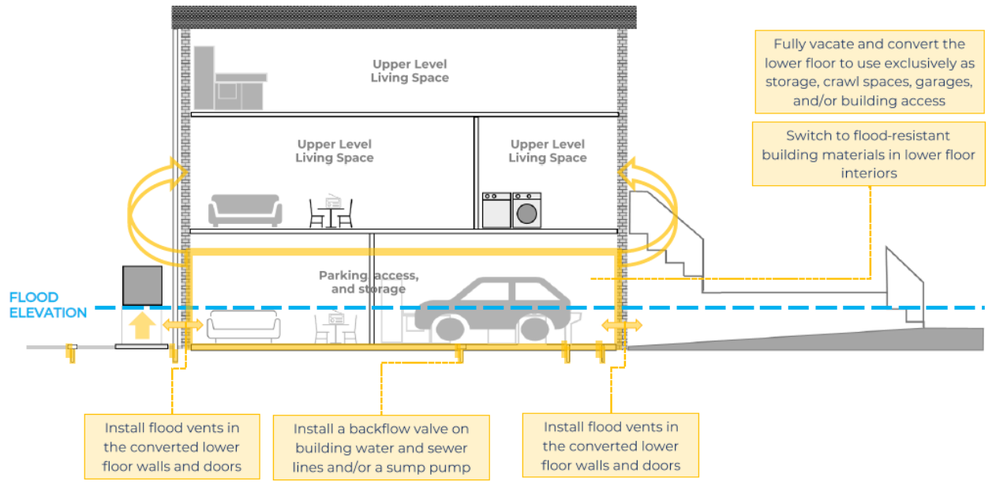
TIMEFRAME

- Mid-term (6-10 yrs)

FLOOD RISK TYPE MITIGATED

- River, coastal, storm sewer

BUILD IT BACK NYC: ATTACHED, TWO-FAMILY ELEVATED HOMES - QUEENS, NY



SOURCE: City of Philadelphia Office of Sustainability

EASTWICK RESIDENT FLOOD READY HOME GUIDE - PHILADELPHIA, PA