Climate Resilience Roadmap

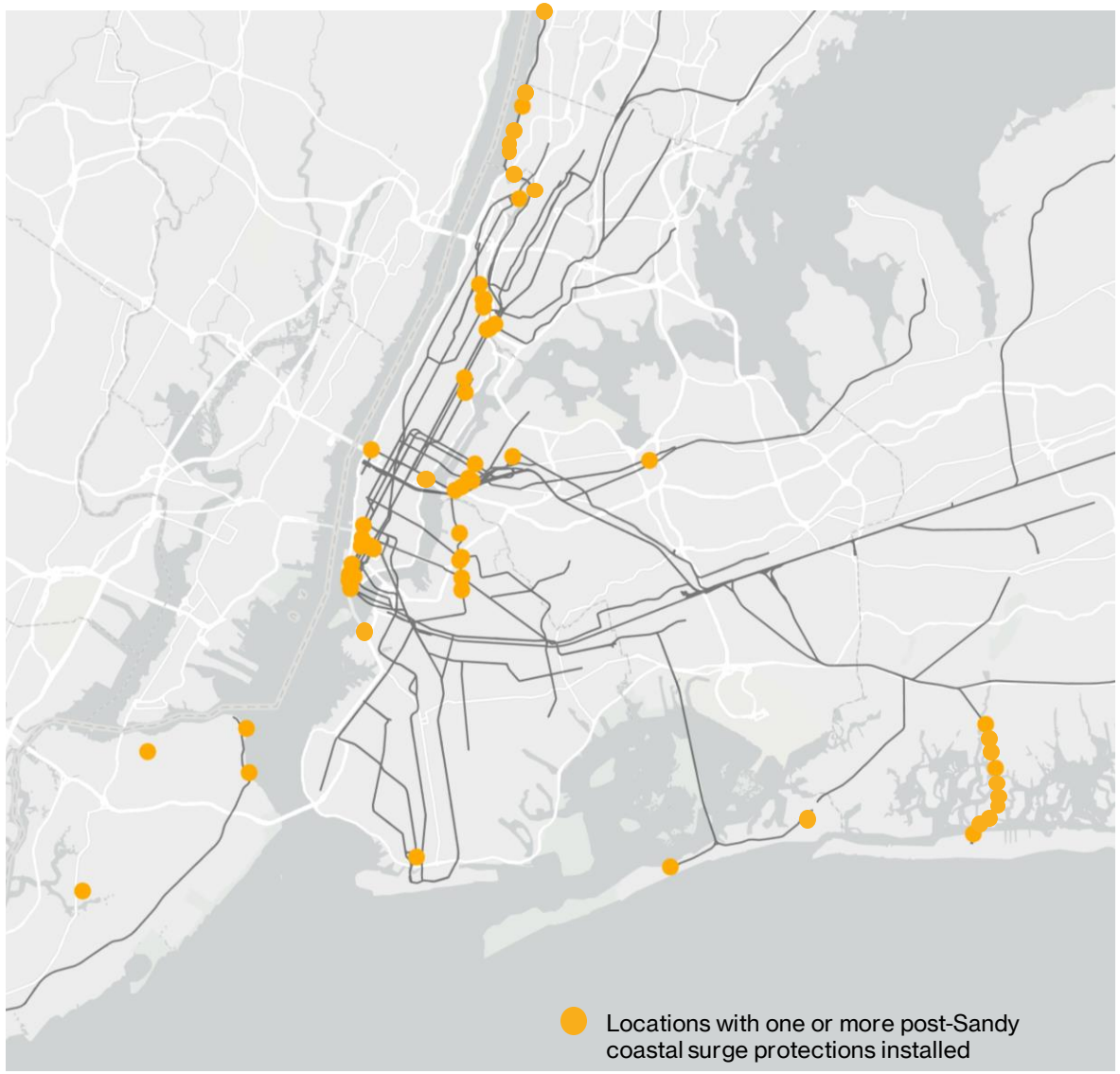
Progress Update

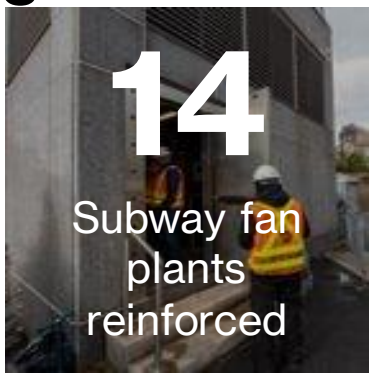
145th St & Broadway, Sep 2021
Photo: Kerry Burke/New York Daily News

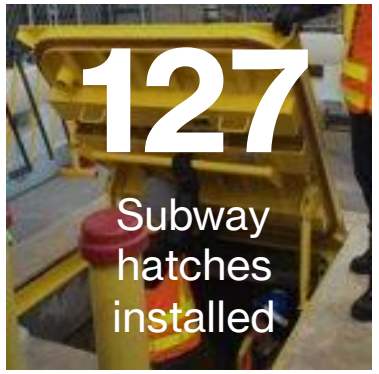
MTA Board Briefing

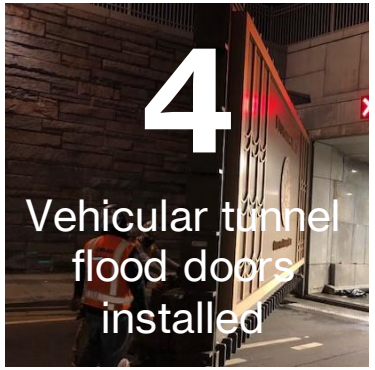
Jan 31, 2024

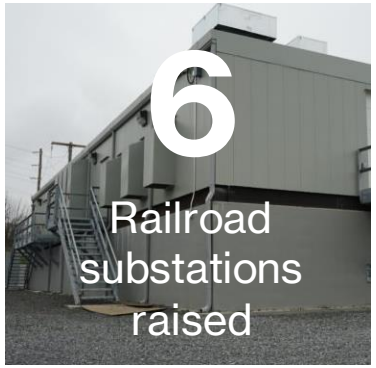
Preparing the system for climate change: coastal flood resilience







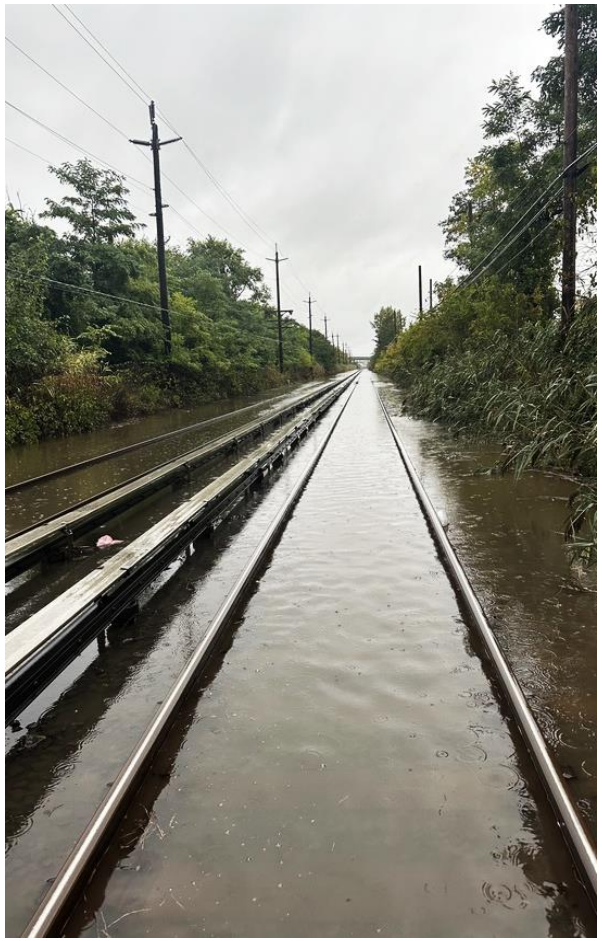




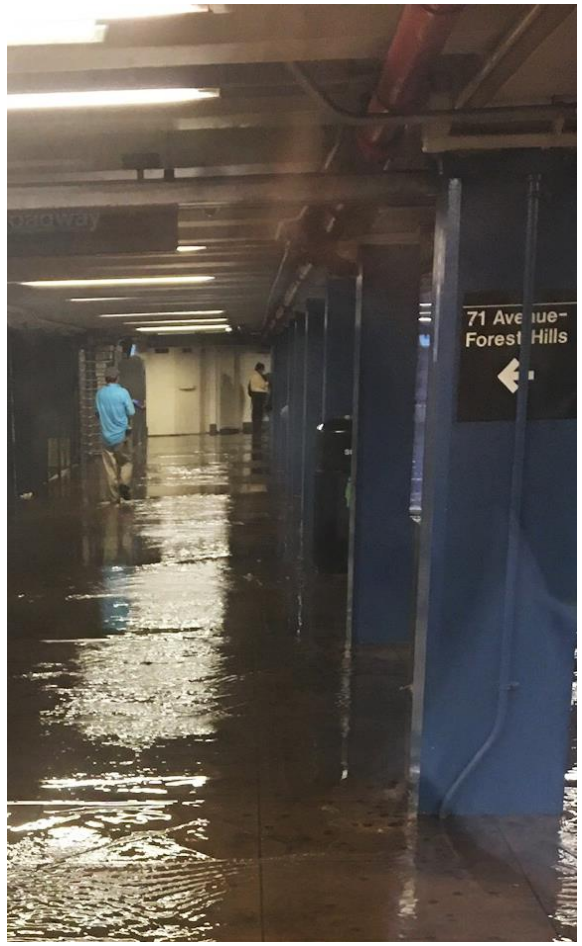
New York's climate is changing...

Coastal surge

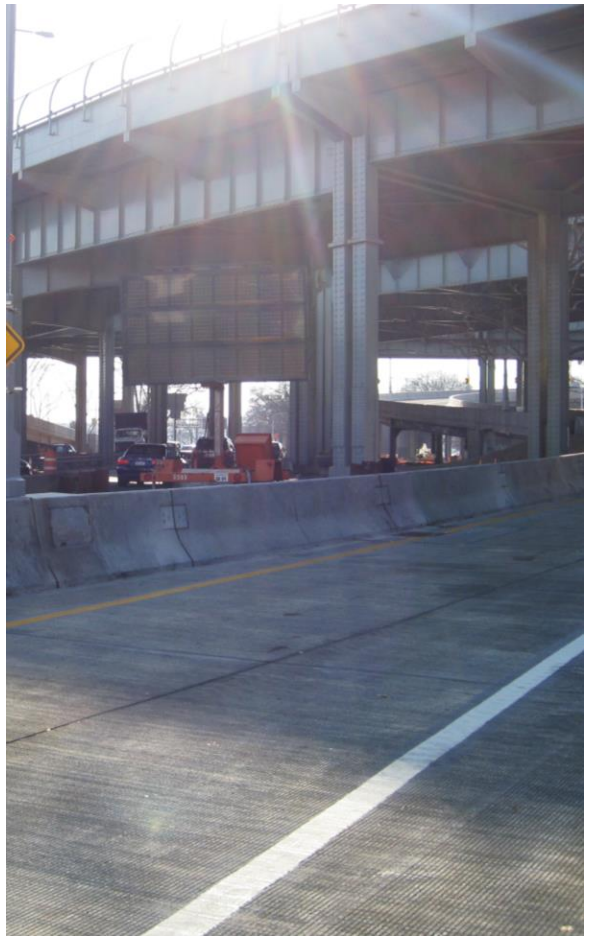
Sea level rise



Torrential rain

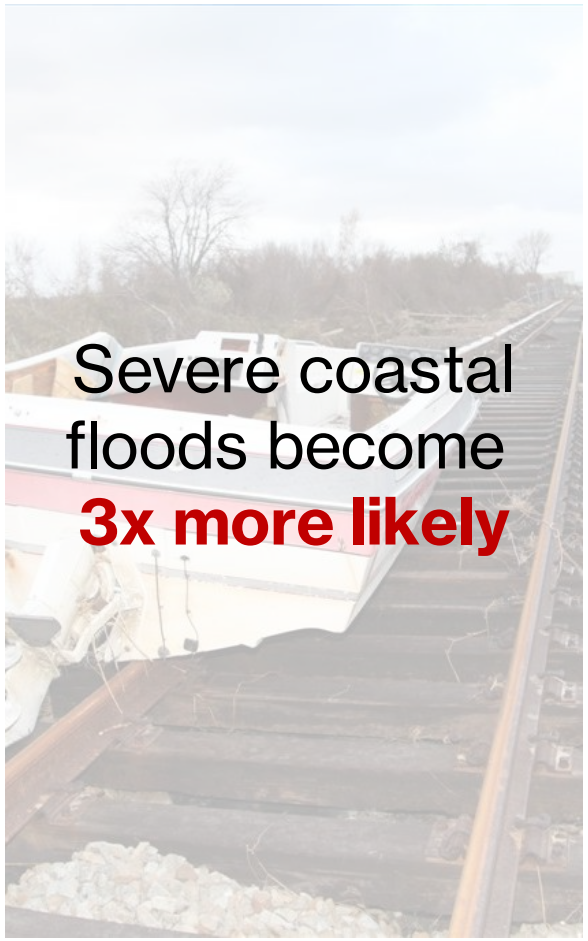


Extreme heat



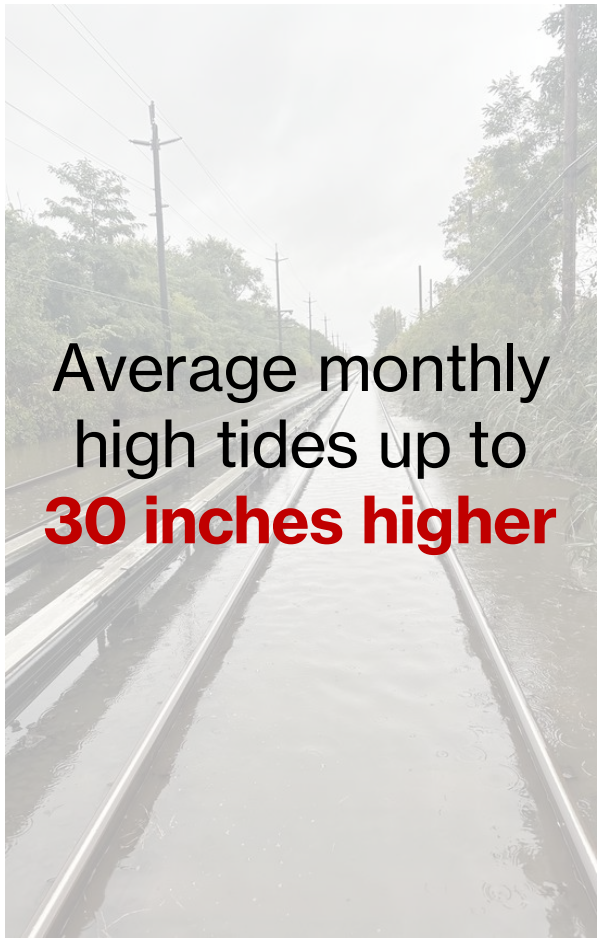
...between now and the 2050s...

Coastal surge



Severe coastal floods become **3x more likely**

Sea level rise



Average monthly high tides up to **30 inches higher**

Torrential rain

Number of torrential rainfall events **doubles**

Extreme heat

Number of high heat days >90° **triples**

Source: New York City Panel on Climate Change, 2019

What is the Climate Resilience Roadmap?

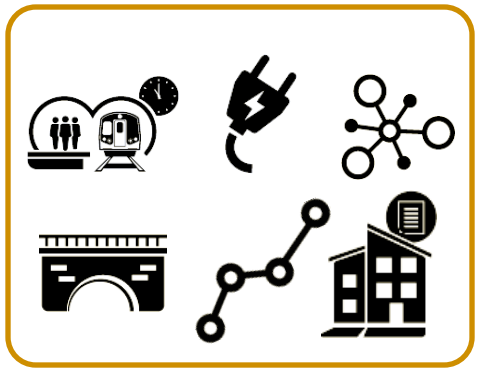
- **Assessment** of current and future climate vulnerabilities
- **10 climate resilience strategies**
- **Implementation framework, including:**
  - Capital projects
  - Design practices
  - Operating actions
  - Interagency actions

Hudson Line shoreline repair

MTA Climate Vulnerability Assessment

1. Climate hazard projections
(2020s, 2050s, 2080s)

+



2. MTA system and assets

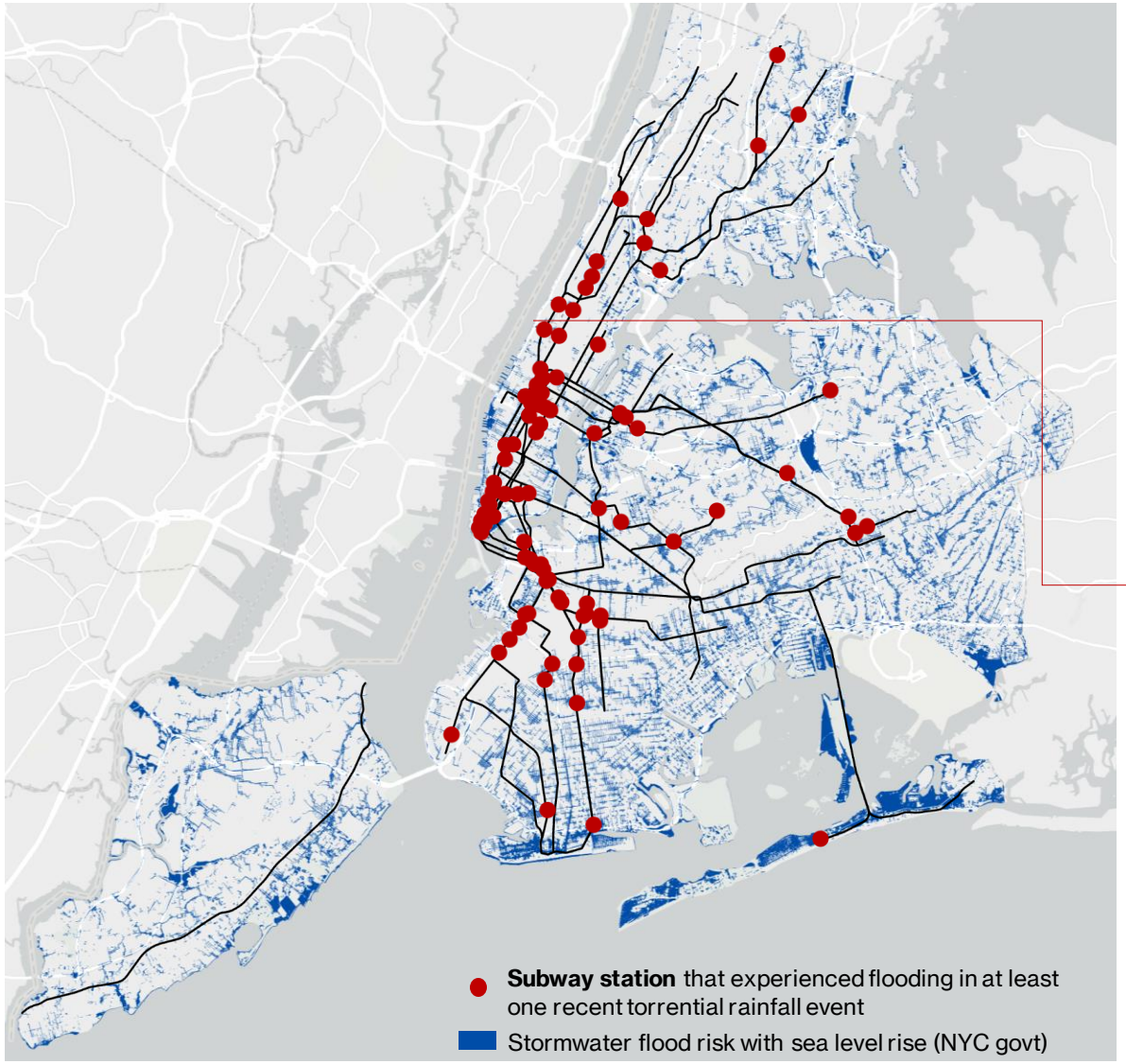
−

3. Completed protections

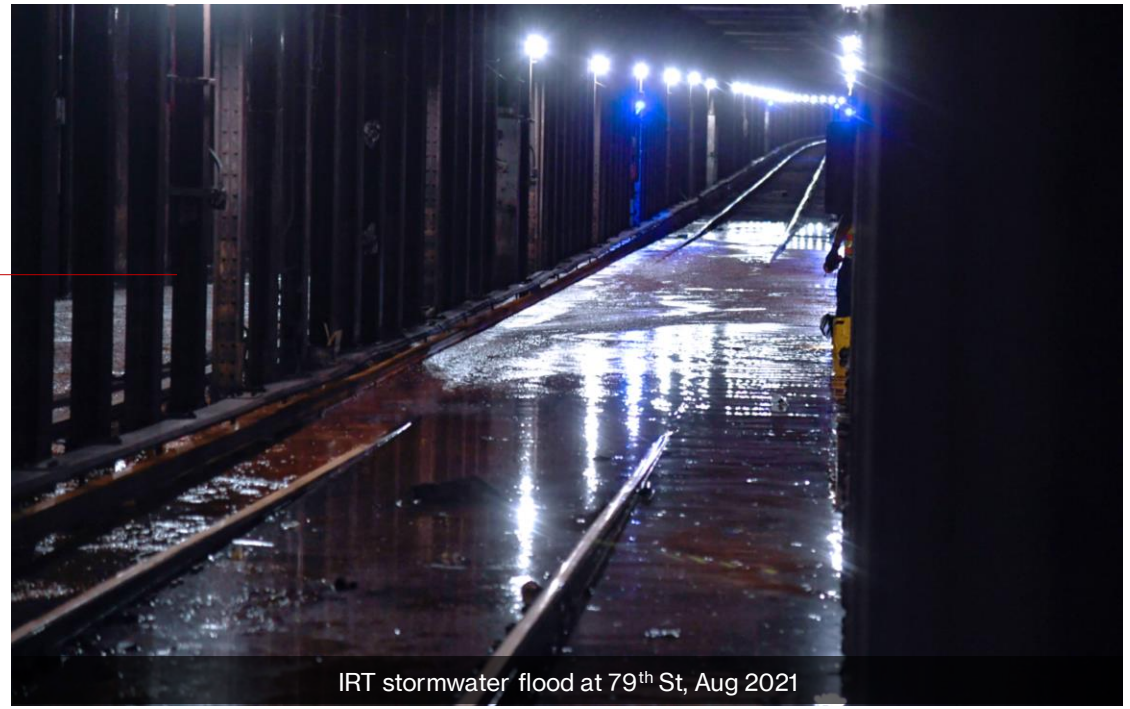
=

Climate vulnerability

Underground subway infrastructure

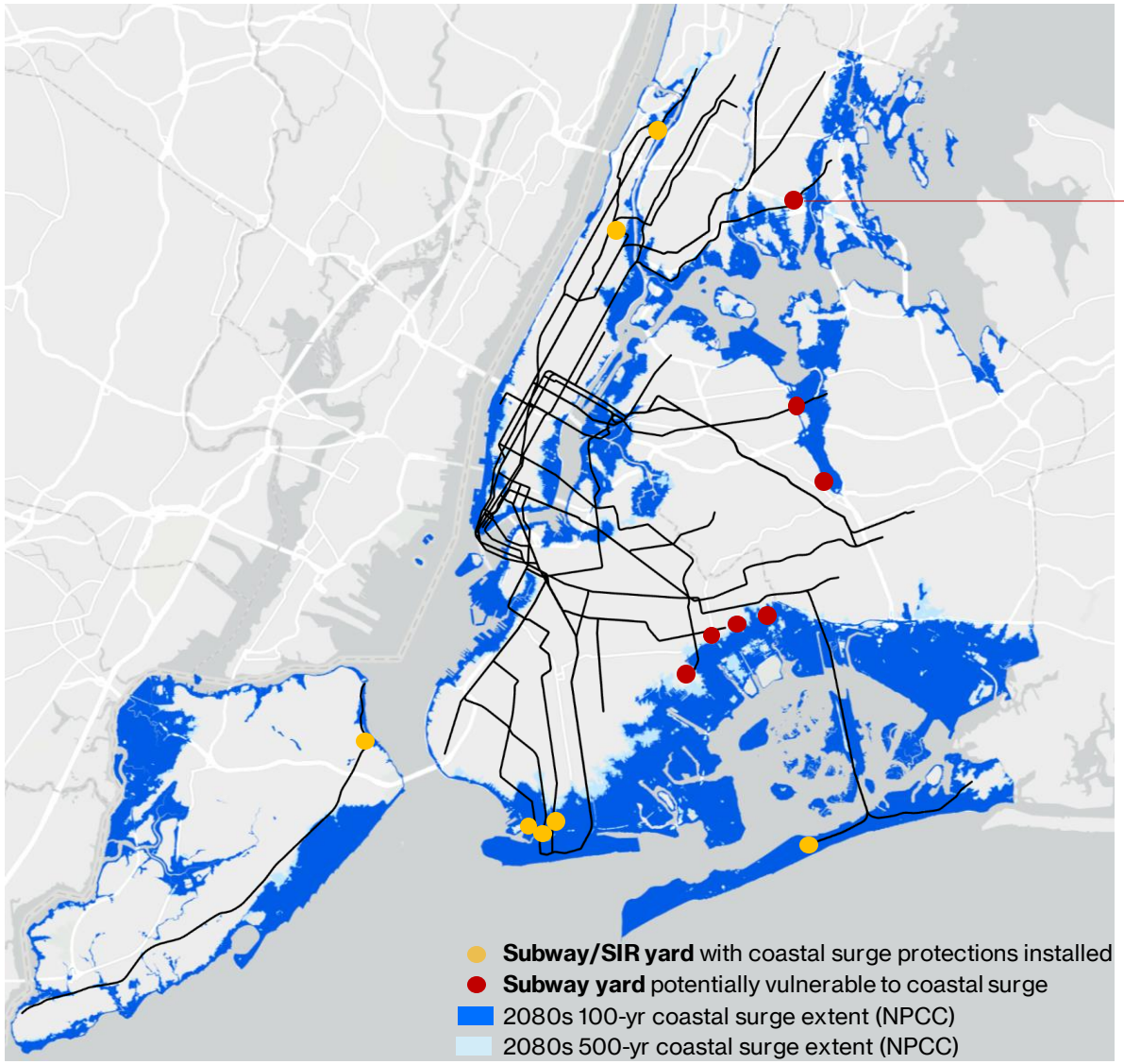


63% of subway system is underground and vulnerable to **torrential rain** at intensities >1.75 in/hour (=NYC sewer capacity)



IRT stormwater flood at 79th St, Aug 2021

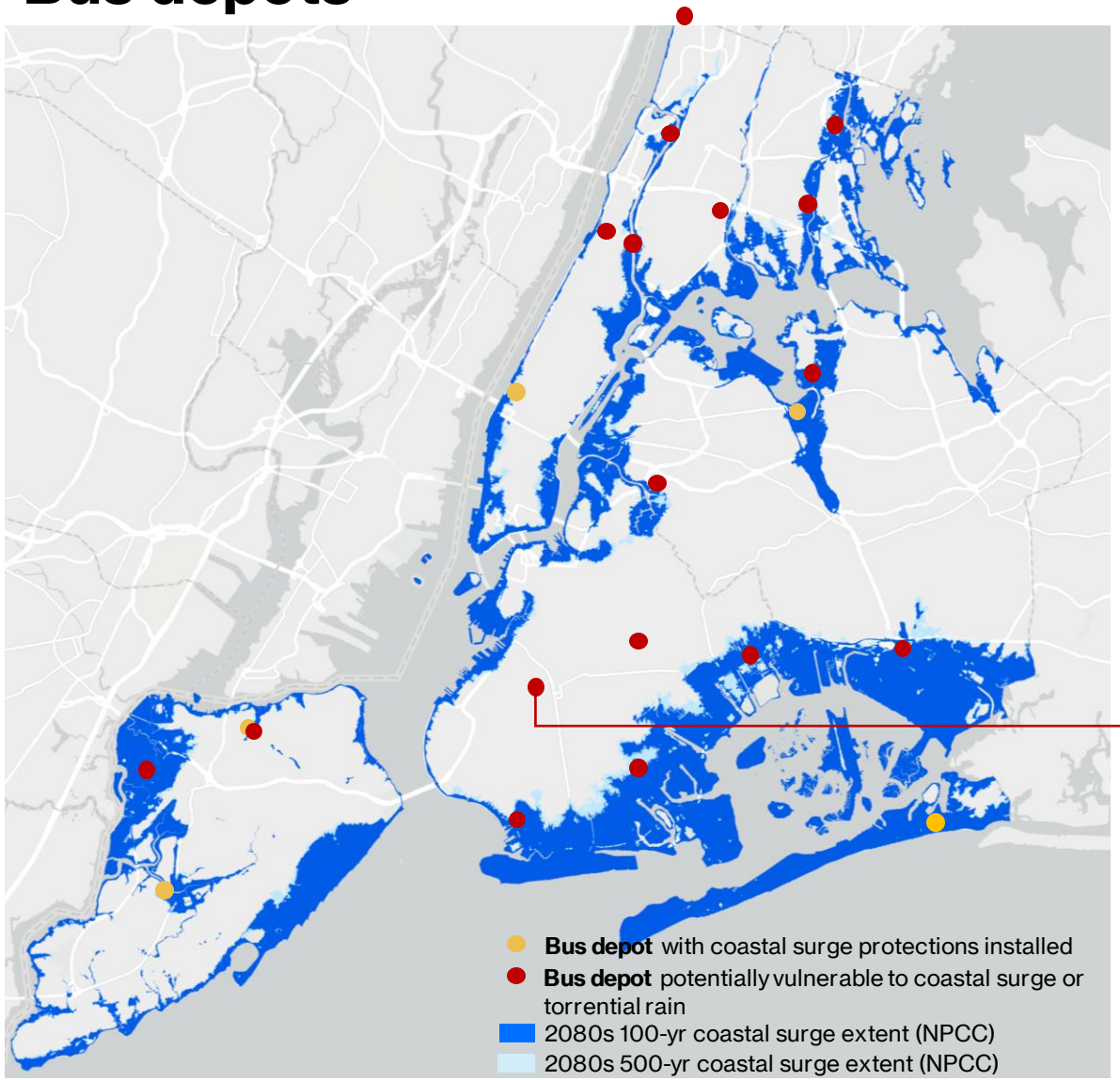
Subway yards



7 subway yards are currently vulnerable to **coastal surge** and stormwater floods during **torrential rain**. Exposure grows over time with **sea level rise**.

Westchester Yard, Sep 2023

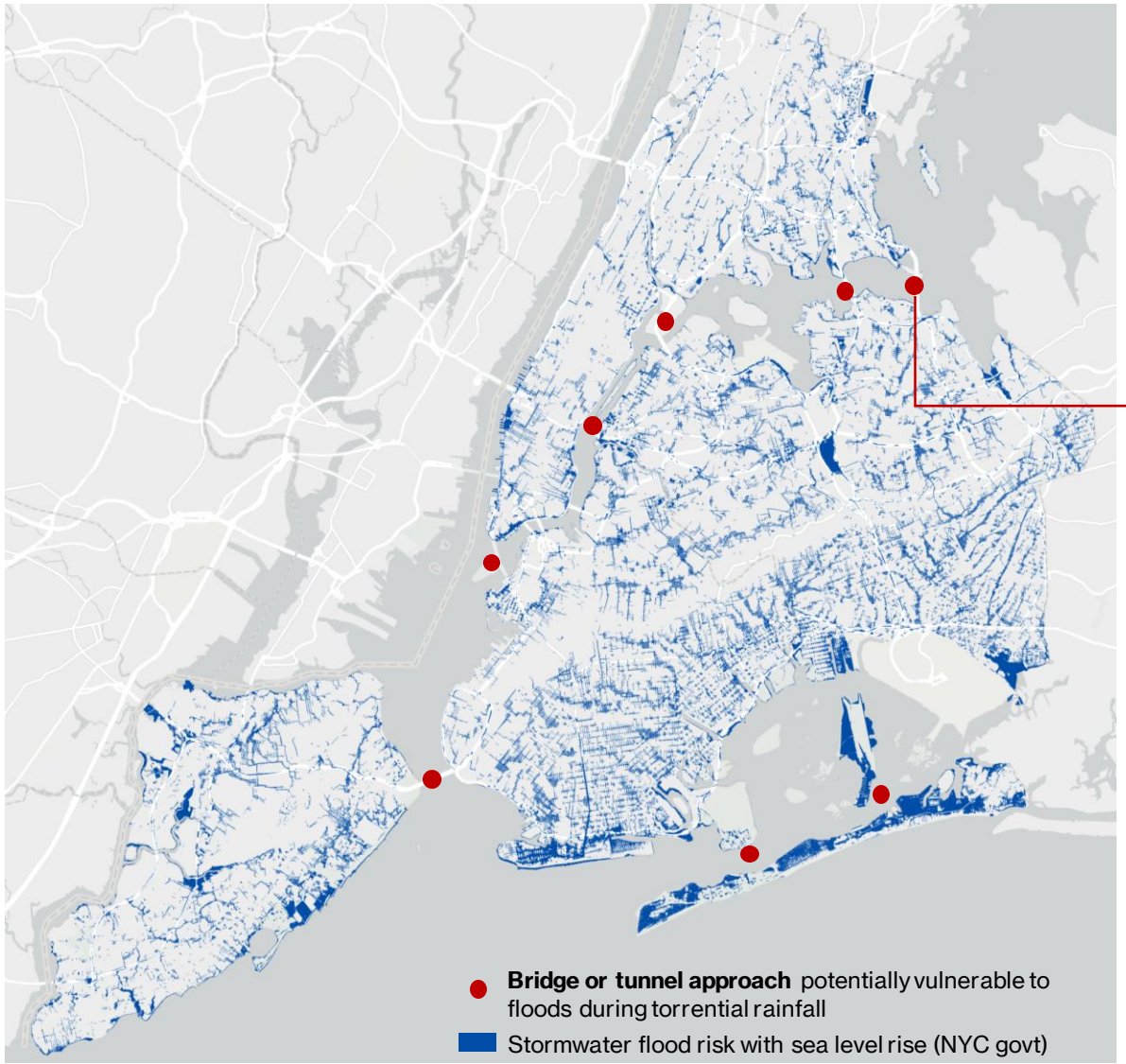
Bus depots



- 14 bus depots have existing unmitigated **coastal surge** exposure
- Up to 11 bus depots are currently impacted by **torrential rain**

Jackie Gleason Depot, Sep 2021

City streets



- All tunnel and most bridge approaches are vulnerable to floods during **torrential rain**
- 95% of bus routes traverse at least one street exposed to stormwater floods during **torrential rain**


Cross Island Parkway ramp to the Throgs Neck Bridge, Apr 2023


Bus passenger video Sep 2021
Photo: Joe English

Heat in underground and outdoor locations

Underground locations

Station platforms and sensitive equipment are vulnerable to prolonged **extreme heat**

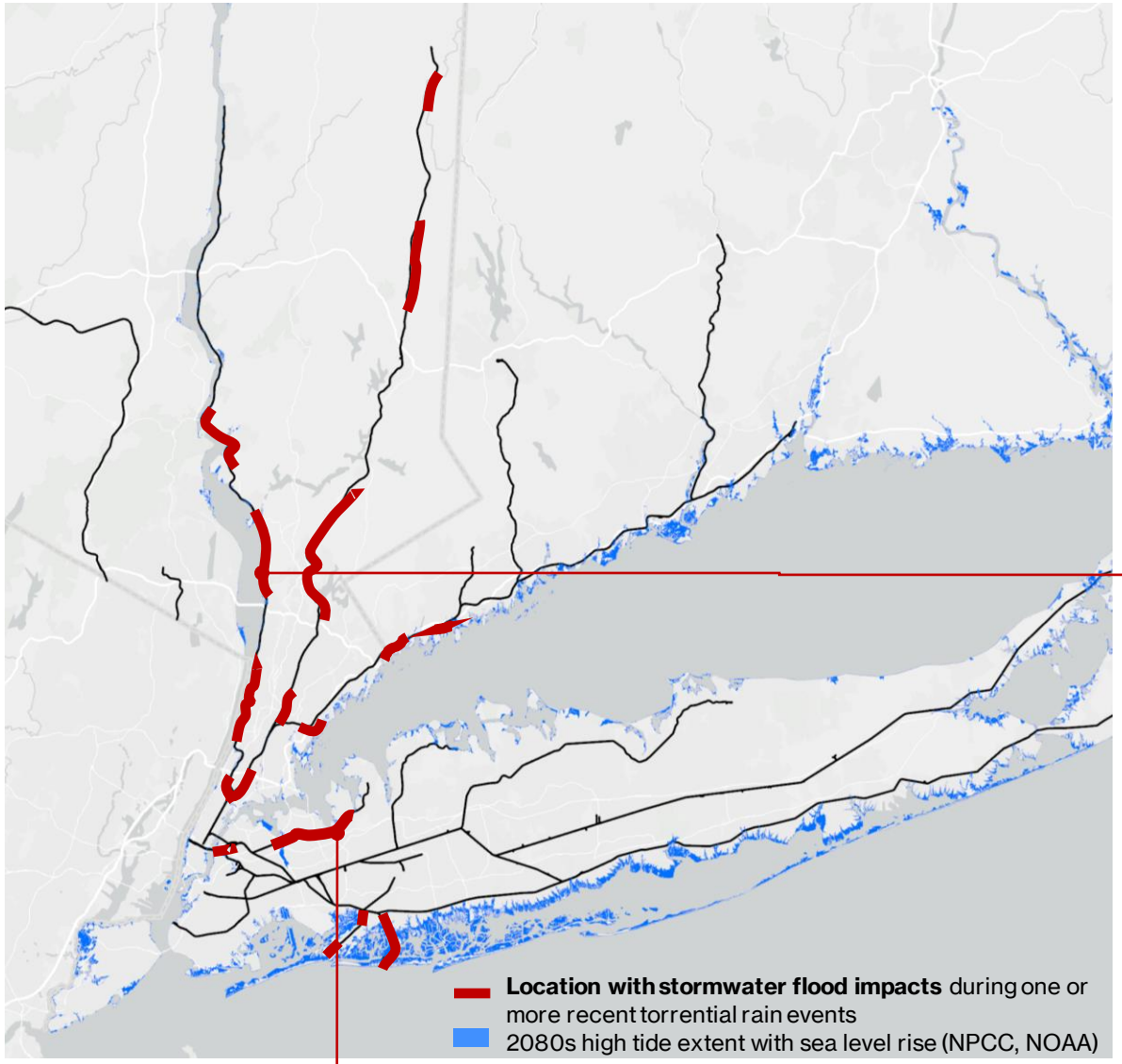
Communications equipment at Wall St Station

Outdoor locations

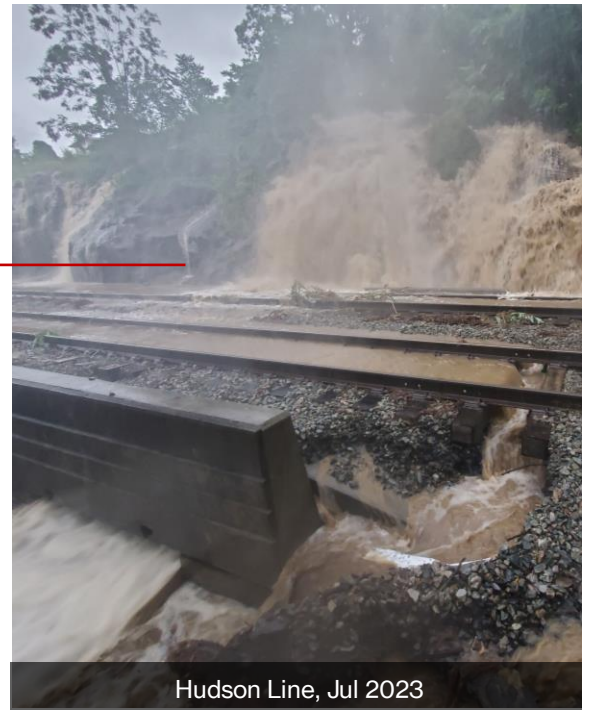
Track and equipment vulnerable to expansion, compromised performance and reduced useful life during prolonged **extreme heat**

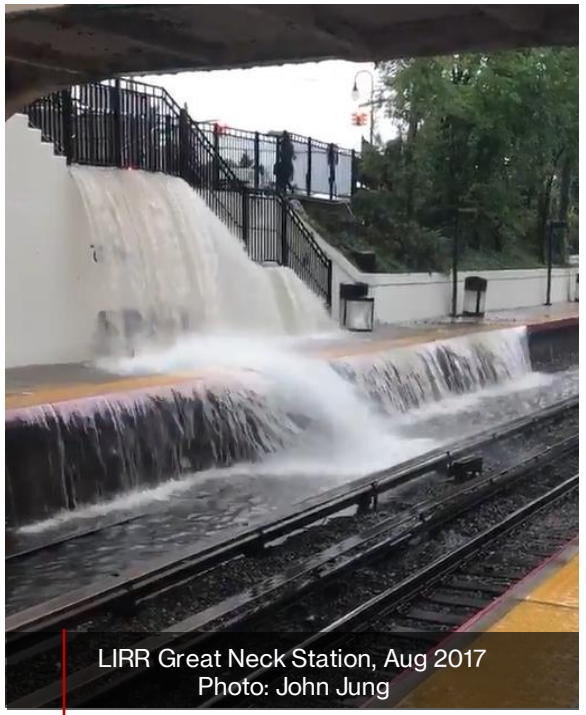
Kinked rail, Rye, May 2017

Regional railroad tracks and yards

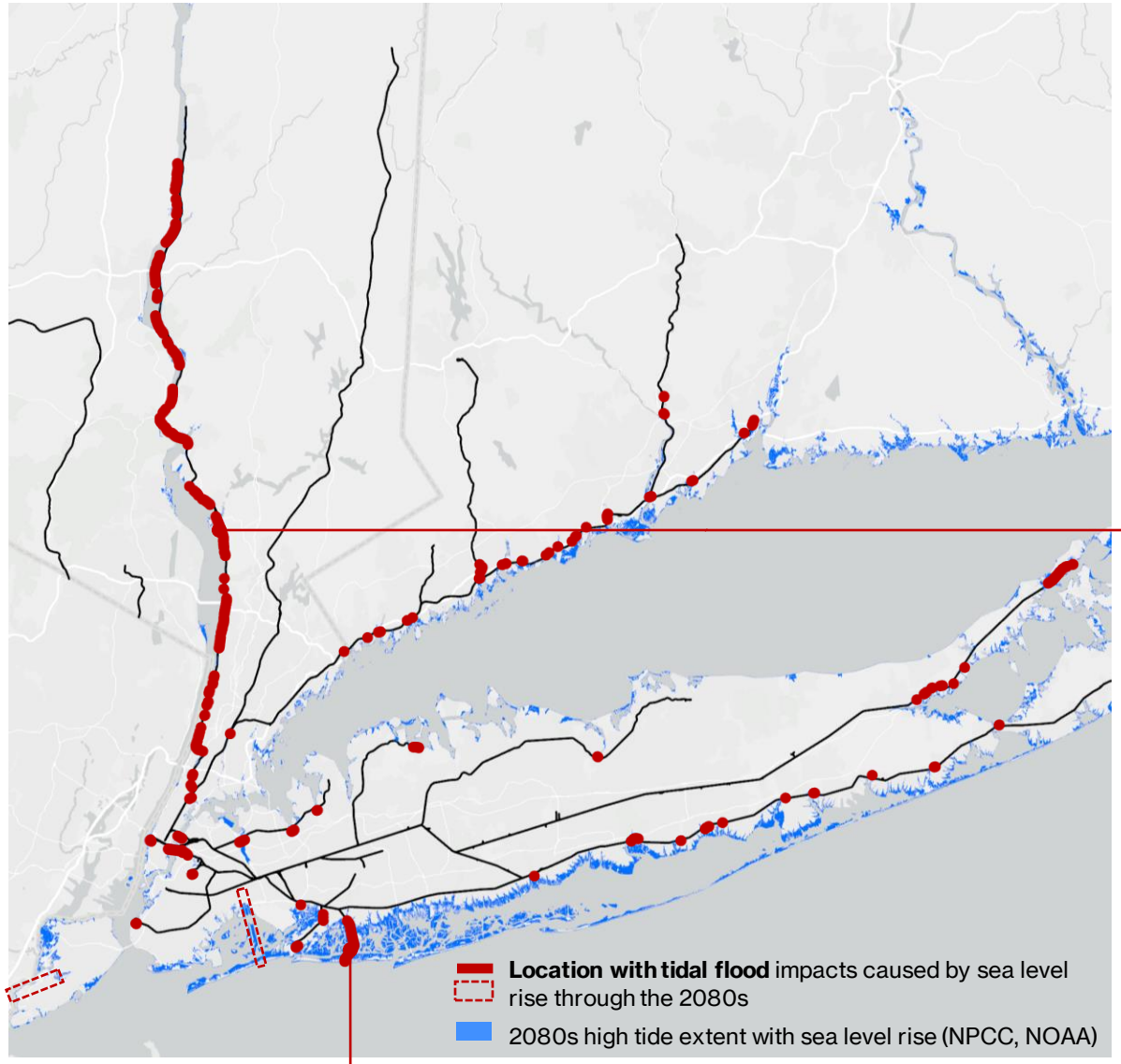


- **Torrential rain** impacts tracks and yards, causing damage and service delays
- About 41% of MNR track and 19% of LIRR track is adjacent to **steep slopes** or **embankments,** exacerbating **torrential rain** vulnerability


Hudson Line, Jul 2023


LIRR Great Neck Station, Aug 2017
Photo: John Jung

Coastal tracks



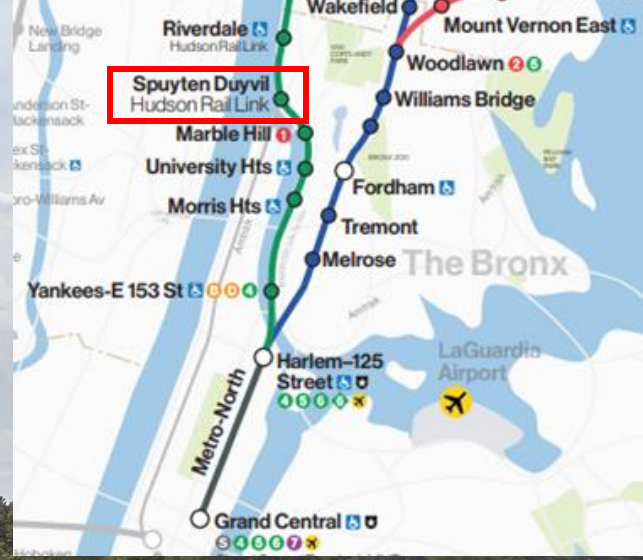
- **Sea level rise** will expose 64 miles of regional railroad track to monthly tidal floods by the 2050s, increasing to 175 miles by the 2080s
- About 5 miles of at-grade subway tracks are exposed to monthly tidal floods by the 2080s


Hudson Line, Jul 2023


Long Beach Branch, Sep 2023

2030s sunny day monthly tidal flood

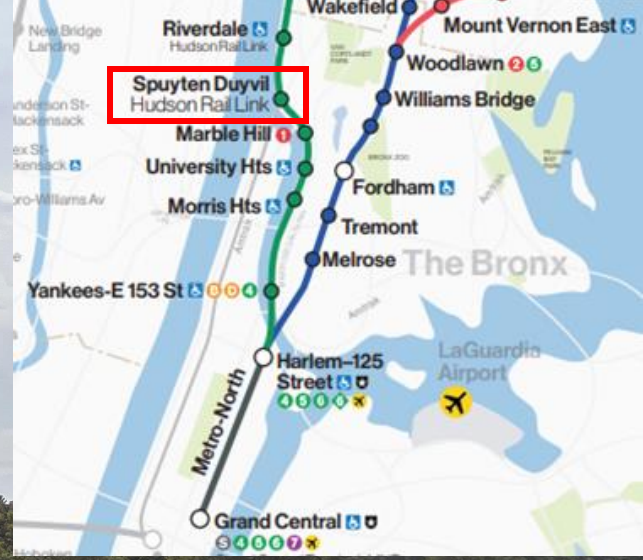
12” sea level rise from current level



ILLUSTRATIVE PURPOSES ONLY

2050s sunny day monthly tidal flood

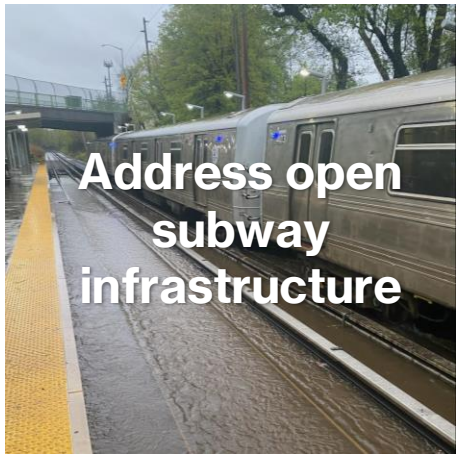
30” sea level rise from current level

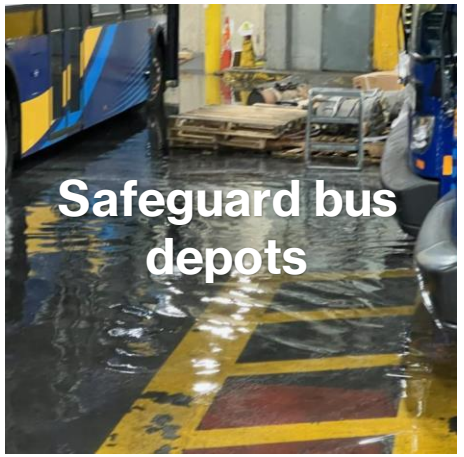


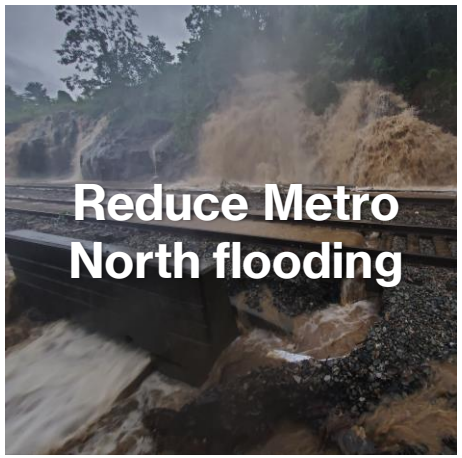
ILLUSTRATIVE PURPOSES ONLY

10 strategies to boost climate resilience

With funding and partnerships, the MTA will prepare for the impacts of climate change



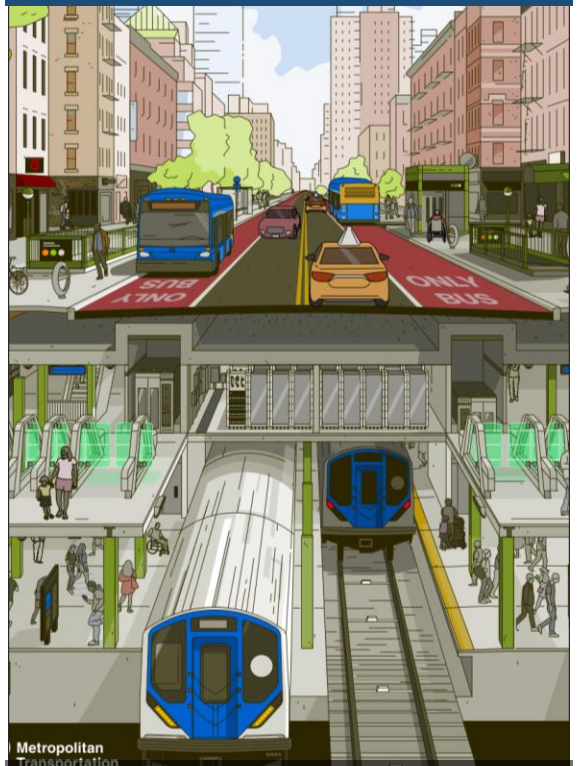




Implementation framework

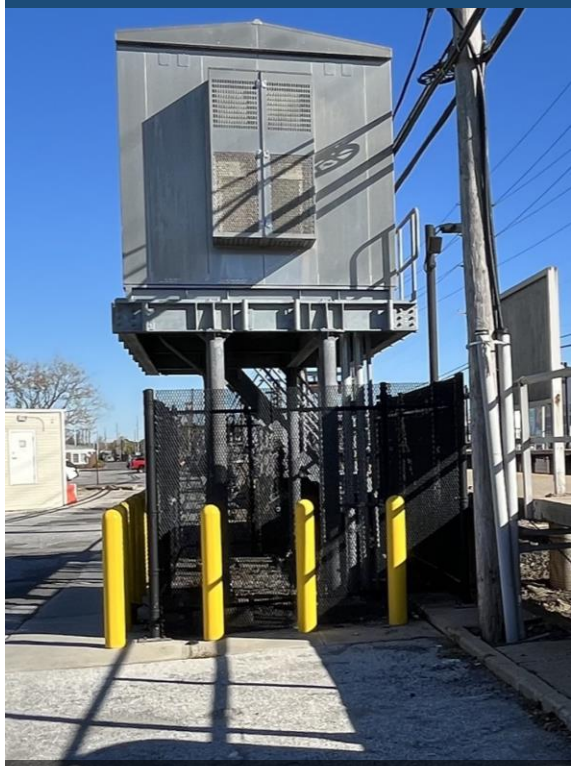
Climate resilience strategies will be implemented through multiple means, including:

Capital projects



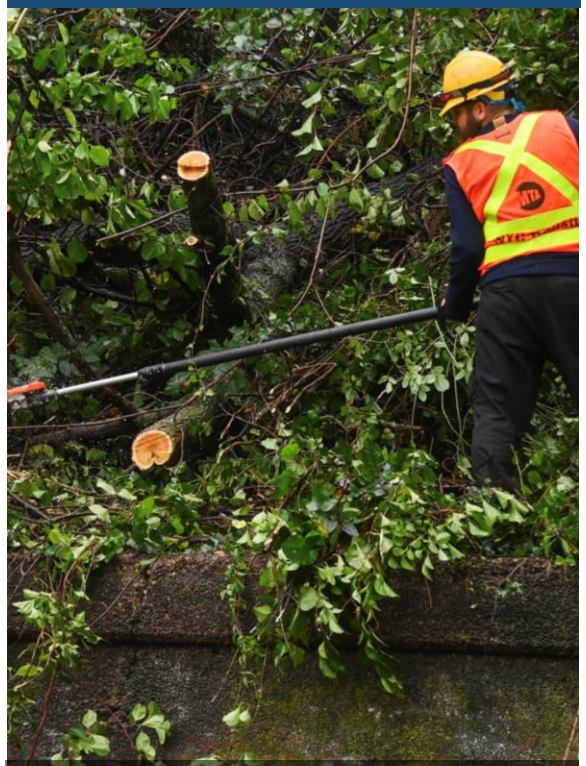
MTA 20-Year Needs Assessment, Oct 2023

Design practices



LIRR Long Beach Branch

Operating actions



NYCT tree trimming adjacent to open tracks

Interagency actions

DEP sewer and siphon inspection and cleaning

Case study | Strategy 1: Shield subway stations and tunnels

Keep stormwater out and remove stormwater that enters

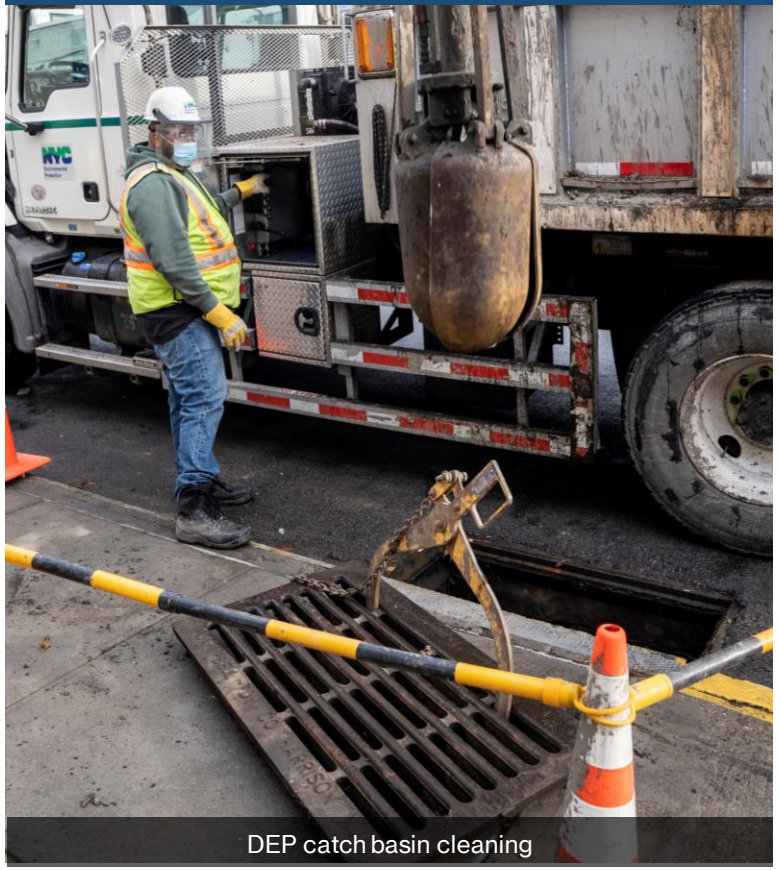
Capital projects

Top step in chronic stormwater flood area

Operating actions

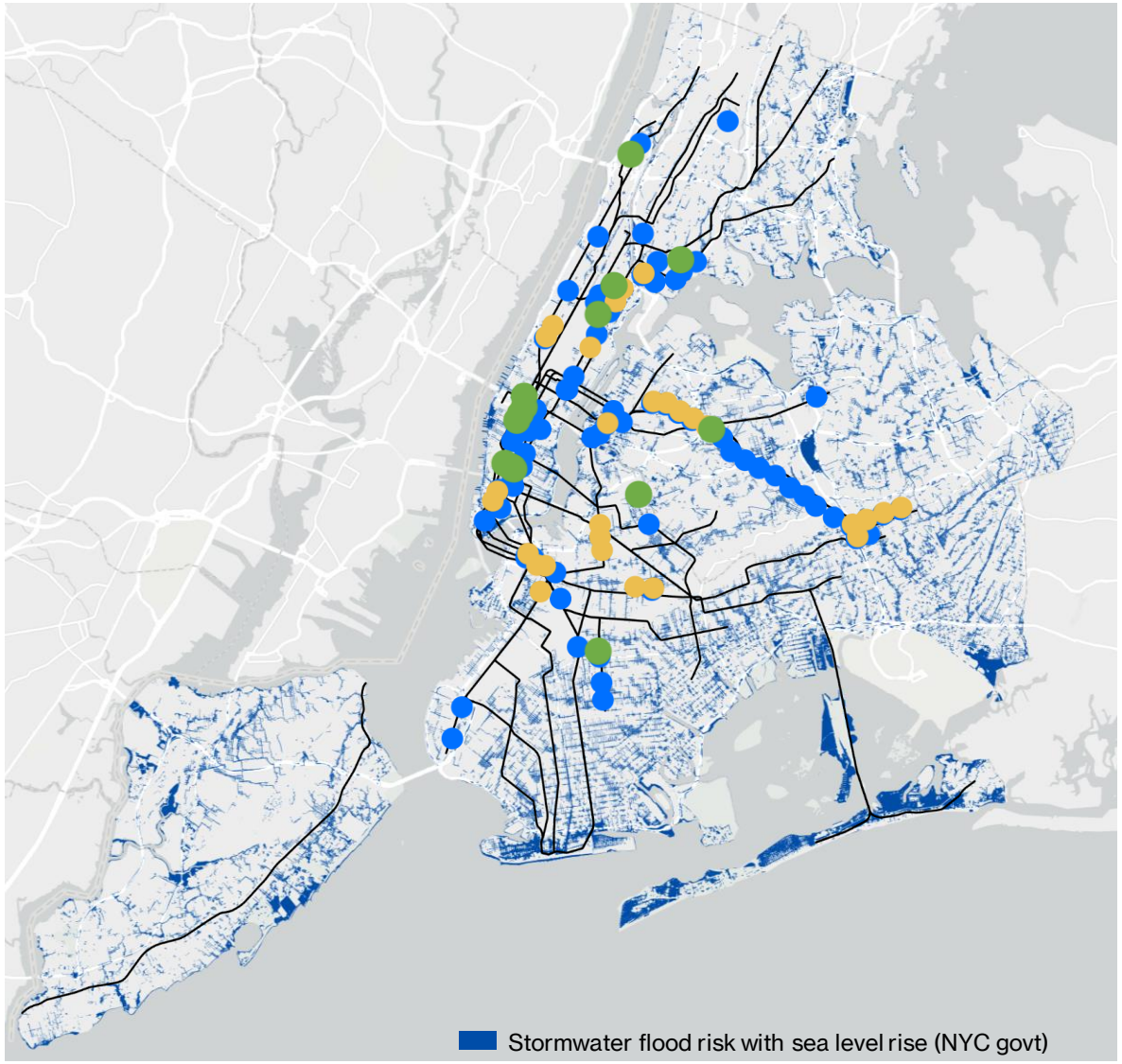
Track drain cleaning

Interagency actions



DEP catch basin cleaning

Case study | Strategy 1: Shield subway stations and tunnels



MTA capital projects

- **Installed | 28 stations**
  Vent, stair protections installed after 2007 torrential rain

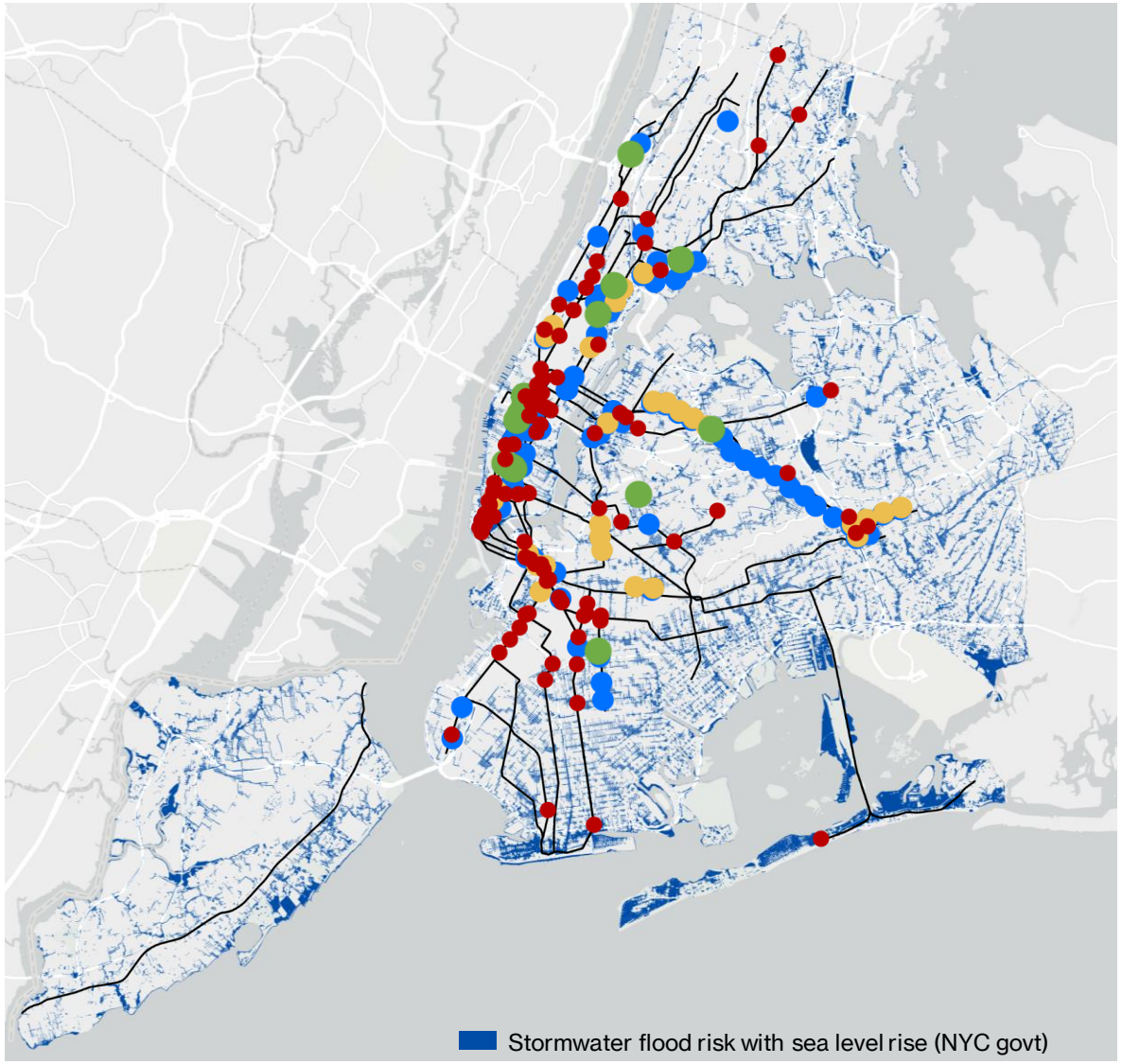
- **Underway | 74 stations**
  Vent, stair, and drainage infrastructure protections

Interagency actions (NYC DEP)

- **16 catch basins** cleaned before **every** torrential rain

- 9 siphons and 13,500 linear ft of sewers adjacent to subways cleaned in 2022/23
- Continued coordination on capital planning in under-sewered neighborhoods with vulnerable subway infrastructure

Case study | Strategy 1: Shield subway stations and tunnels

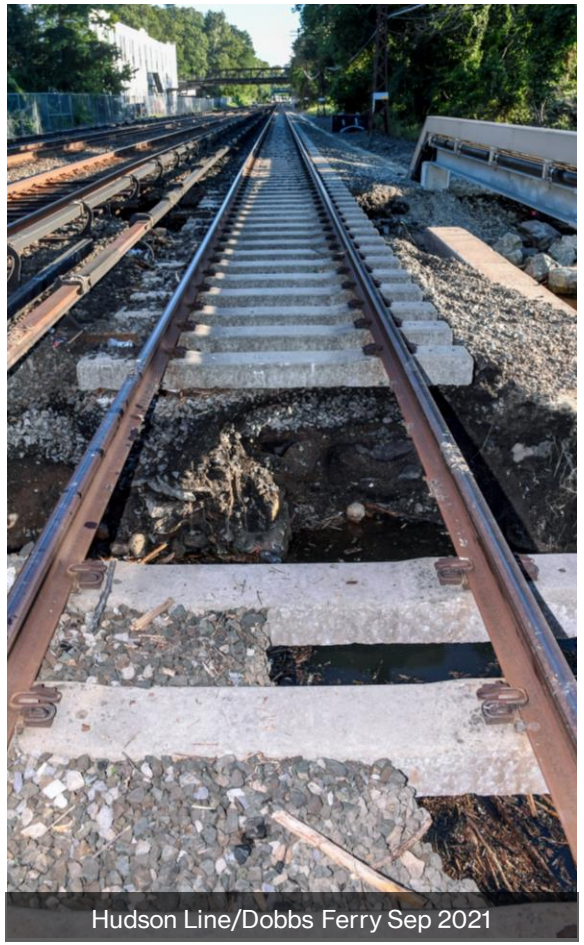


- **88 stations** experienced floods in one or more torrential rain event in 2023

  For these, MTA is advancing on multiple fronts, including:
  - New capital projects
  - Proactive operating actions, and
  - Ongoing interagency actions

Case study | Strategy 7: Reduce Metro-North flooding

Hudson Line, Mott Haven Yard, Melrose/Tremont Corridor, and Harlem Line



Hudson Line/Dobbs Ferry Sep 2021

Hudson Line/Dobbs Ferry, Mar 2022

Mott Haven Yard, Sep 2023

Next steps

The Climate Resilience Roadmap will outline **proactive adaptation actions** in anticipation of the 5-Year Capital Plan and beyond