Design of a storm surge protection for the Port of Galveston

TU Delft research presentation: Anne Grooten

4-3-2025

About me

Context and Background

- Coastal ports are vulnerable to flooding
- Port of Galveston is the 4th biggest cruise port in the US
- Study flood risk reduction for the Port of Galveston

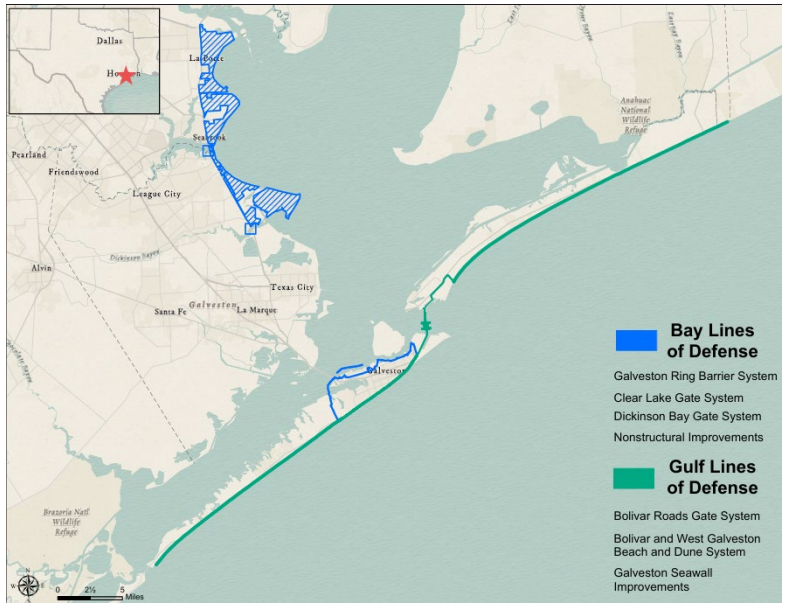
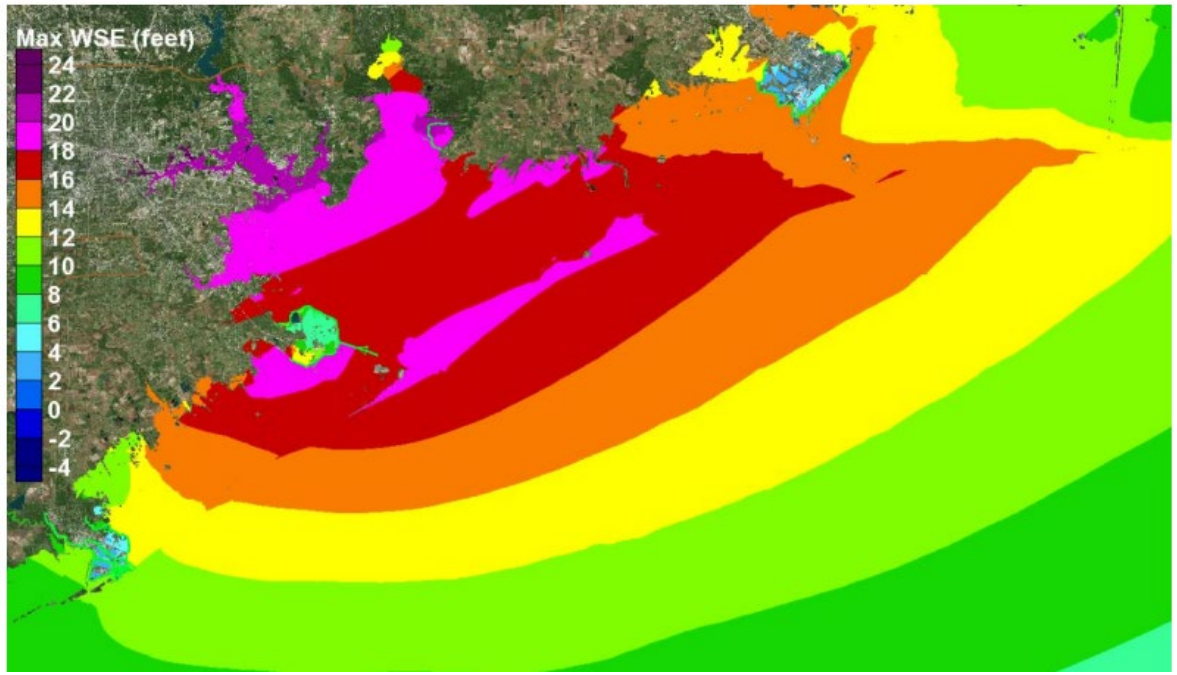
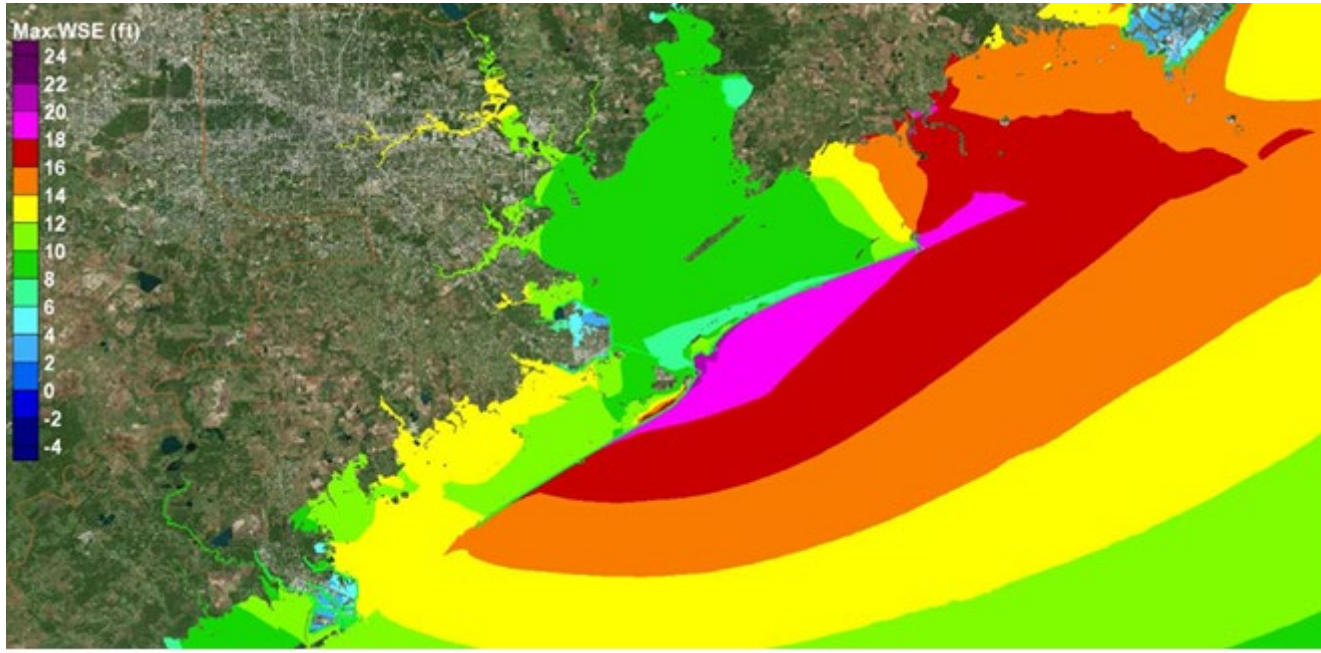


Figure: Bay Defenses (Coastal Texas Study, 2021)

Figure: oil spills in Louisiana after Hurricane Ida (NOLA, 2021)

Water levels without and with a barrier at Bolivar Roads





Figures: water levels at Galveston Bay for 100-year storm with mean sea level at +3.31 ft NAVD88 (Ebersole et al, 2018)

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Back Surge due to hurricanes

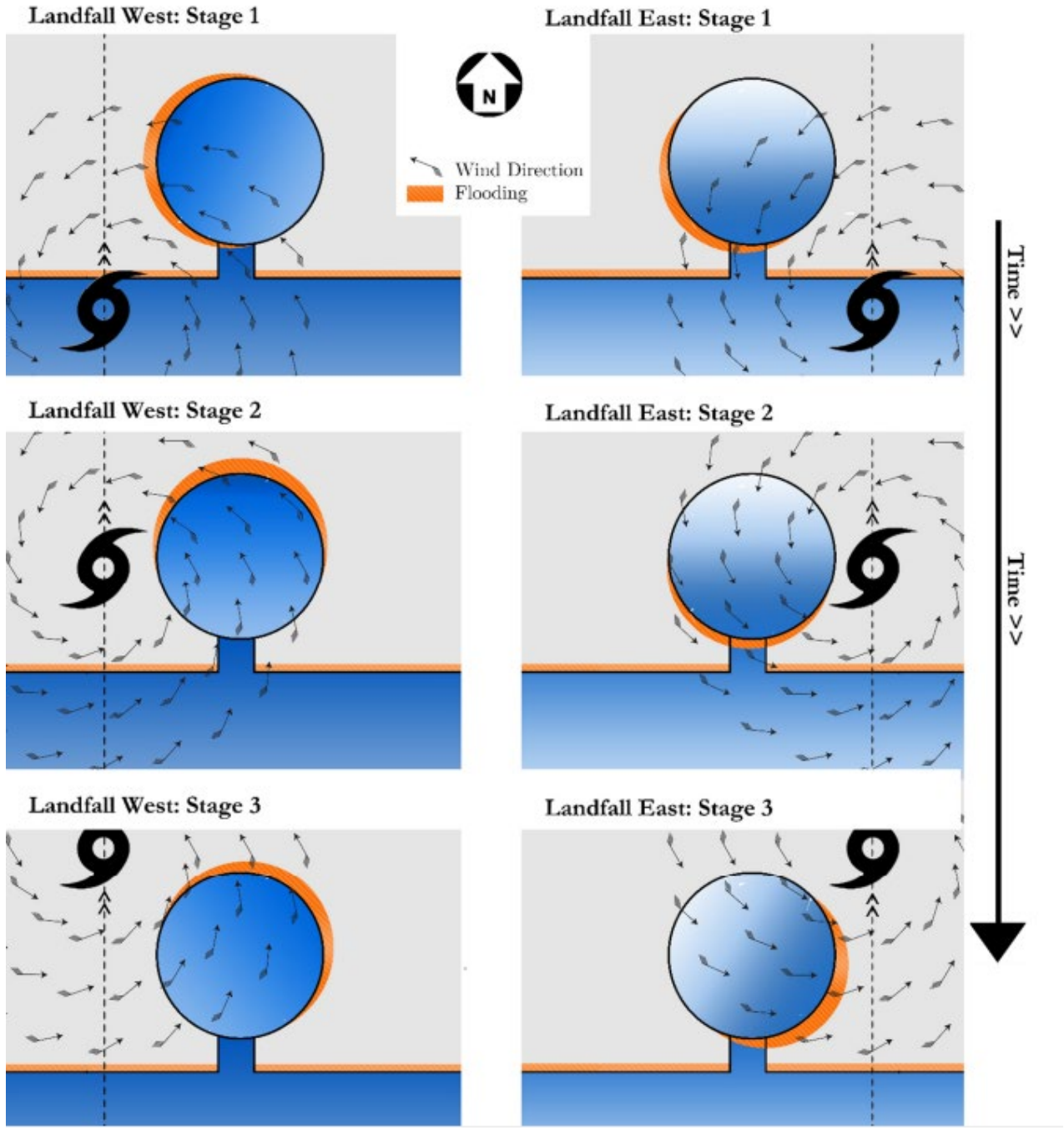

Image credits: Kasper Stoeten, 2013

Map: Defacto Urbanism, based on Texas Coastal Study

Gates and floodwall

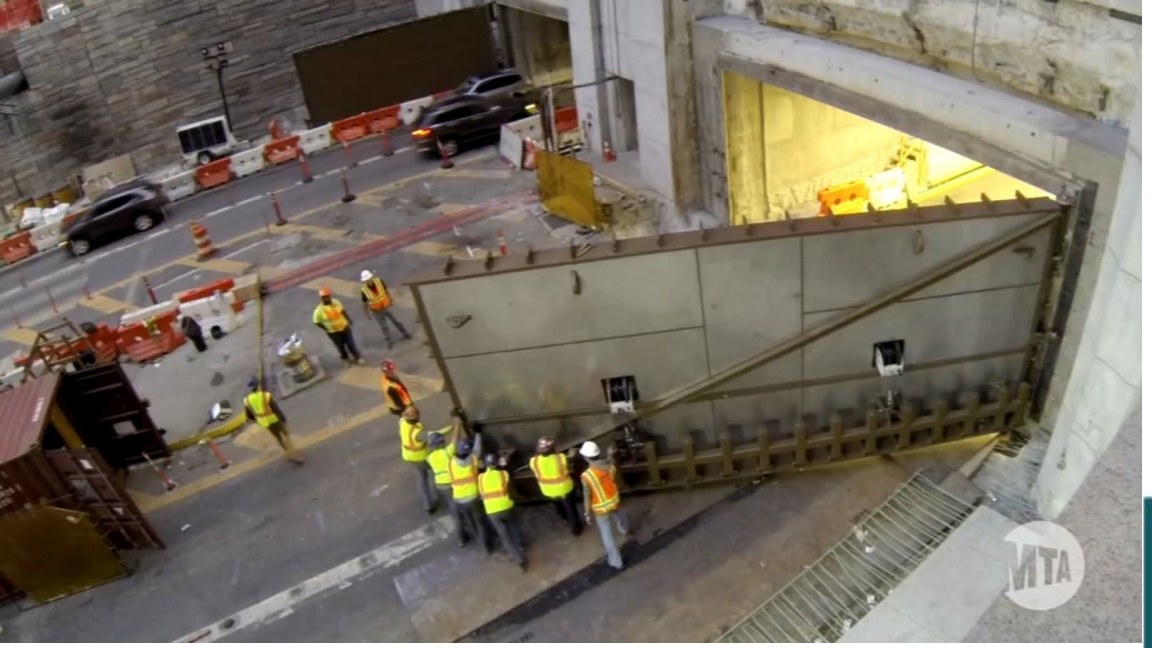

Figure: Hugh L. Carey tunnel flood door test, MTA

Figure: Spatial assessment collage of USACE ring barrier near historical city centre (Defacto Urbanism)

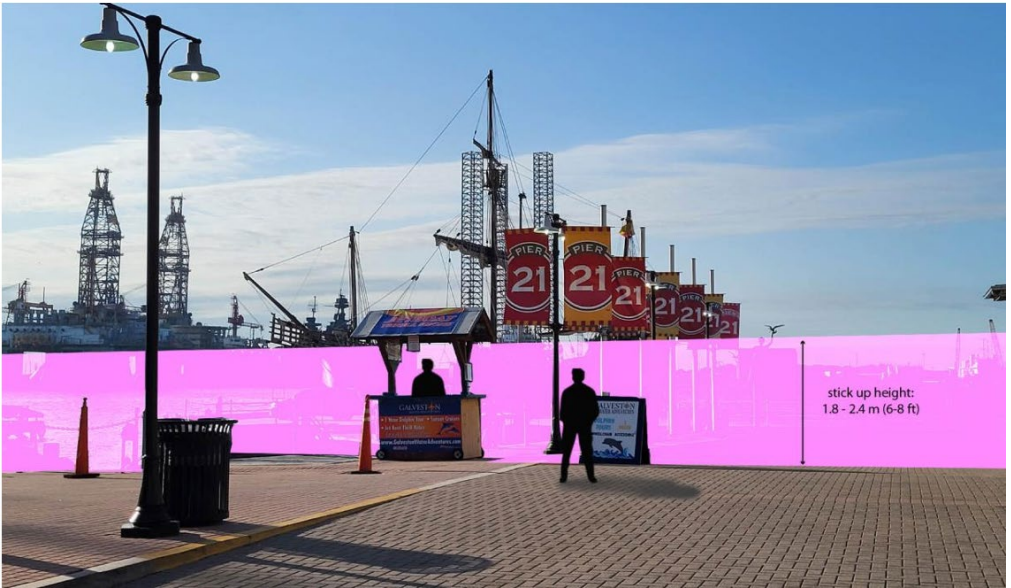

Figure: Texas Coastal Study, 2021

Looking ahead at possible measures


"Harborside Drive Levee"
Seawall
Pump
Raised roadway / dike

Alternatives for Harborside Drive Levee

- Maasboulevard, Rotterdam

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"Pelican Island Levee"
Seawall
Environmental/navigati
Levee/floodwall
Levee
Pump


"Seawolf Parkway Levee"
Seawall
Environmental/navigati
Levee/floodwall
Levee
Pump

Navigation Gates

Figure: IHNC Barge gate (USACE NOLA)

- Fit a cruise ship of 300+ m (1000+ ft) length and 50 m (165 ft) beam

Figure: Maeslantkering (Rijkswaterstaat)

Environmental Gates

Figure: Oosterscheldekering (Rijkswaterstaat)

Thank you

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