

# — STORM RESILIENCE — AT NAPLES AIRPORT

PRESENTED BY





# INTRODUCTION

**Resilience<sup>1</sup>:** the ability to anticipate, prepare for, and adapt to changing conditions or withstand, respond to and recover rapidly from disruptions, including the ability to resist hazards or withstand impacts from weather events



Importance of resilience



Lessons are learned from every storm



Ability to predict, manage and mitigate storm events



Storm surge during Hurricane Ian  
September 2022

————— NAA has taken numerous multi-faceted steps —————  
to improve resiliency of facilities and infrastructure

*1: Resiliency as defined by the US Department of Transportation*



# HURRICANE IAN – STORM SURGE IMPACTS





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## STORM SURGE



- Estimated level of storm surge on airfield (6-7' AMSL)
- Airfield lighting/NAVAID equipment inundated
- Pavement flooding
- Limited infiltration of lower elevation buildings

Elevations Table		
Minimum Elevation	Maximum Elevation	Color
0.0'	1.0'	Lightest Blue
1.0'	2.0'	Light Blue
2.0'	3.0'	Medium Blue
3.0'	4.0'	Dark Blue
4.0'	5.0'	Very Dark Blue
5.0'	6.0'	Darkest Blue
6.0'	7.0'	Black



# HURRICANE IAN -DAMAGE ASSESSMENT

## AIRFIELD LIGHTING

- Airfield Lighting inundated with saltwater
- Lighting fixtures on majority of airfield not working
- Over **370** Taxiway edge lights damaged
- **2** Precision approach path indicators damaged
- **3** Runway light operators damaged
- Precision Approach Path Indicators (PAPIs) and Runway End Identifier Lights (REILs) out of service





# AIRFIELD & FACILITIES



Standby generators at all critical facilities  
(Terminals, ATCT, Fuel Farm, Airfield  
Lighting, Facilities Maintenance)



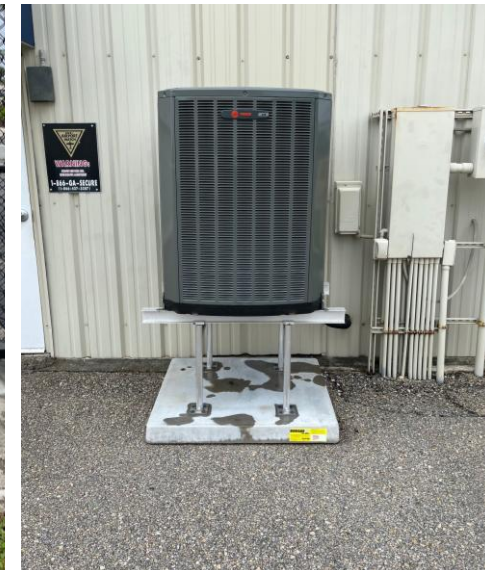
Elevating gate operators and mechanical  
equipment to mitigate surge impacts



New, elevated and wind-rated ARFF  
Facility (2021)



Hurricane shutters on North Road  
Terminal (NRT)





# STORMWATER & DRAINAGE IMPROVEMENTS



- Master Drainage Plan (2012)
- Taxiway A North Pond (2012-2015)
- Runway 14-32 Drainage (2014)
- Pond 212 Improvements (2016)
- Runway 5-23 Drainage (2021-2024)



Pond 212 – Under Construction (2016)

**Phase 3** (Before Completion)

**Phase 2** (Completed)



Runway 5-23 Drainage Improvements – Image taken after Hurricane Ian, September 29, 2022



# INFORMATION SYSTEMS



Immediate UPS on critical network equipment



Redundant secondary fiber back up and tertiary Starlink internet service backup



Transition from local NAA servers to secure, redundant cloud-based systems



Government priority service on all NAA cell phones; satellite phones for key staff



Everbridge employee and tenant text alerts



# OPERATIONAL CONSIDERATIONS



Park vehicles on higher ground



Maintain extra stock of critical airfield lights/supplies



Contracts in place for landscape/debris removal and emergency repairs



Mutual aid partnerships and EOC coordination



Contractors assisting NAA with airfield debris cleanup following Hurricane Milton.

# CURRENT & FUTURE IMPROVEMENTS

## NRT



Impact Resistant Windows and Doors



## FUEL FARM



Elevated pumps and electrical equipment



## SOLAR



Facilities Maintenance and Possible GAT Parking Lot



## FLOOD-PROOFING



Evaluating Tiger-Dam systems for critical facilities





# FUTURE IMPROVEMENTS – AIRFIELD LIGHTING VAULT



Existing Airfield Lighting Vault



Future Airfield Lighting Vault (*Design Rendering*)



Existing vault below Base Flood Elevation (BFE)



All concrete construction, stand-by generator, redundant HVAC



New Vault at BFE + 3' = 13.2'

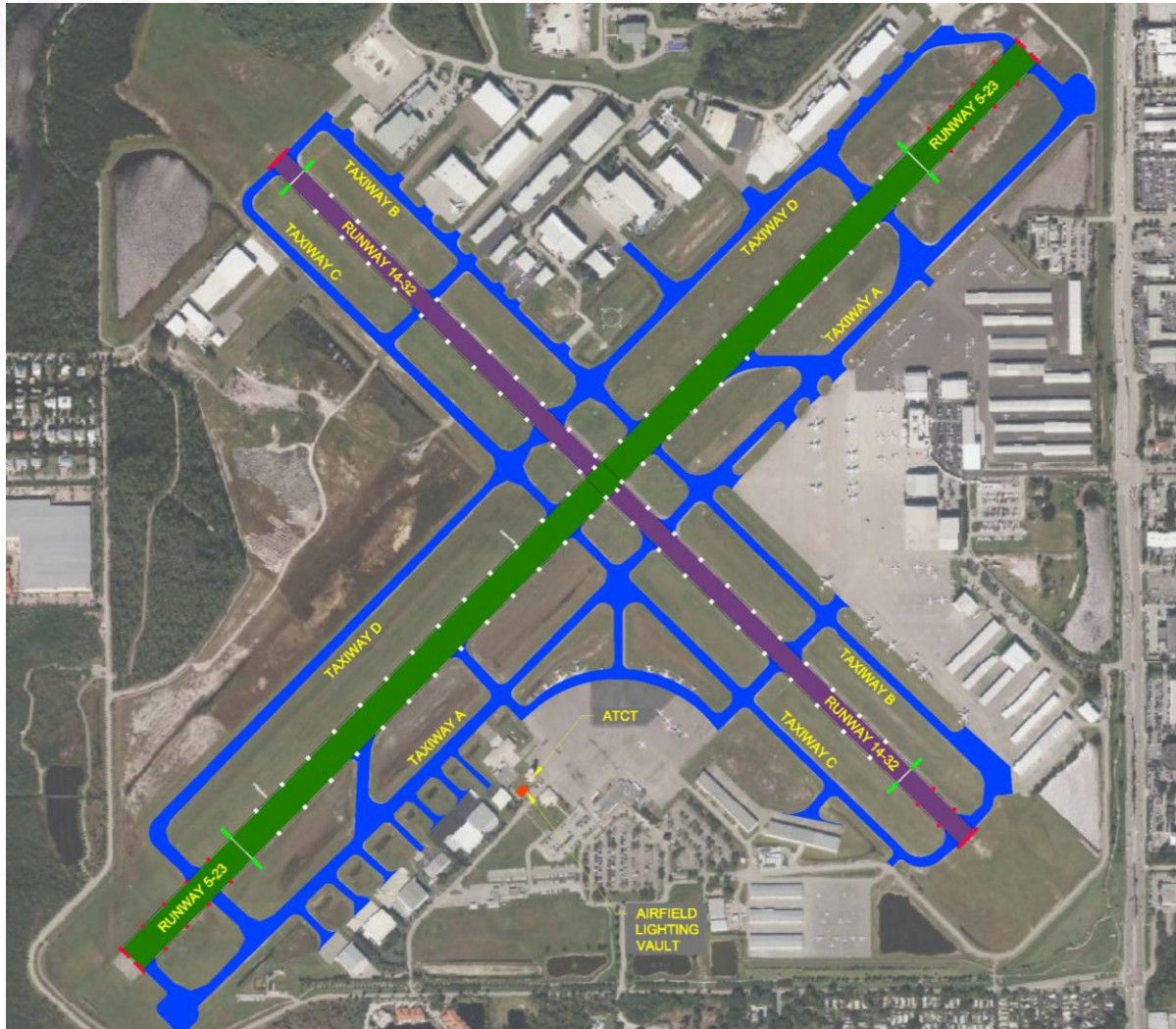





Bid Result of \$5.5M with possible Resilient Florida Grant of \$2.7M\*  
*\*subject to state legislative appropriation*





# FUTURE IMPROVEMENTS – AIRFIELD LIGHTING



 Runway 5-23    Runway 14-32    Taxiways A,B,C, D and Connectors

## Replacement of Lighting and Infrastructure



Improved construction methods  
(lighting connections)



Conduit/base can drains and sumps



Water-resistant fixtures

Bidding: January - March 2025

Bid Cost: \$22 million *(inclusive of lighting vault)*

Construction Duration: 18 months



# LONG TERM RESILIENCY CONSIDERATIONS



Possible to raise airfield pavements 1-2'



Raise airfield lighting



Minimal impact beyond runways/taxiways (tie-ins)





# RAISE RUNWAY AND TAXIWAY PAVEMENT



## Runway and Taxiway Pavement could be raised approx. 2'

- Place limerock base and asphalt
- Airfield lighting can be adjusted
- Will meet standard RSA grades
- Estimated cost \$50-70M+



## Limitations

- Grades to Apron/Hangars



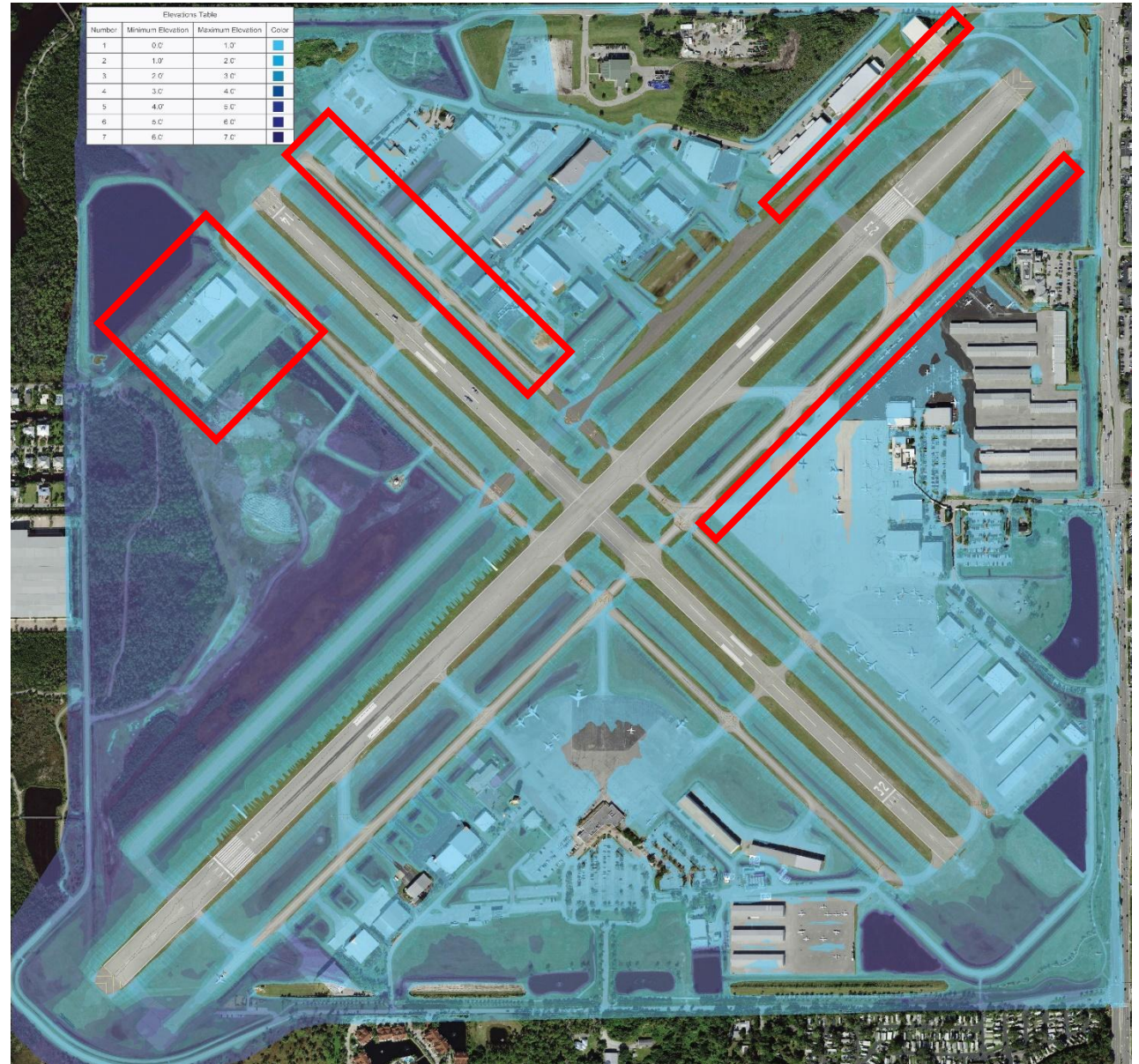
## Additional Benefits

- Supports raising future development to meet flood requirements



## Limited AIP eligibility

- Airport resilience and runway safety (\$200M)





# FUNDING AND INSURANCE CONSIDERATIONS

- Without the adequate knowledge and due diligence, operations like ours face potentially enormous infrastructure repair/mitigation costs.
- The Naples Airport has been traditionally protected through private insurance programs.
- FEMA Public Assistance vs. FEMA Mitigation Program  
–FEMA Consultant
- Resilient Florida Program (FDEP)
- Limited FDOT and AIP Funding



**FEMA**



# QUESTIONS?

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