



Disaster Response and Preparedness:

Lessons Learned after Hurricane María

AEROSTAR
AIRPORT HOLDINGS LLC

Guest Speaker:
Erick Gracia – Emergency Manager

Overview

- Overall Introduction
- Puerto Rico - SJU Airport – Aerostar
- Resiliency Components
- Managing the Unpredictable
- Resiliency Examples
- Lessons Learned
- Open Discussion



WHO WE ARE

AEROSTAR AIRPORT HOLDINGS, LLC acquired the Operation Certificate of the Luis Muñoz Marín Int'l Airport on February 27, 2013, becoming the **FIRST** medium hub commercial service airport to be privatized in the USA.

Currently owned by Grupo Aeroportuario del Sureste (ASUR) and PSP Investments/AviAlliance, Aerostar has a **FORTY-YEAR LEASE** to manage the airport and make capital improvements.

AEROSTAR'S EMERGENCY MANAGER ABOUT SJU

-  **Busiest airport in the Caribbean with a total traffic of 9,700,000+ PAX and an approx. of 390 daily operations**
-  **Served by around forty (40) airlines total PAX and Cargo**
-  **With flights to over fifty (50) destinations**

AIRPORT HOLDINGS LLC

AEROSTAR

AIRPORT HOLDINGS LLC

Erick.gracia@aerostarairports.com

Puerto Rico

- Located in Caribbean Region.
- Commonwealth of the United States.
- 3.5 million American Citizens (61% live in coastal communities).
- Everything comes in or goes out by air or water.
- SJU is the only airport with the resources, technology and personnel to manage a large scale disaster in the Island.

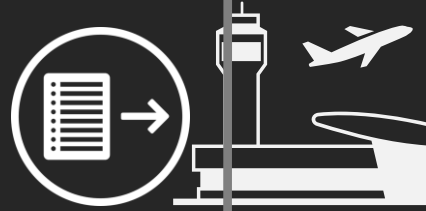


SJU RESILIENCY COMPONENTS

02

BUSINESS CONTINUITY

- Ensure consistency, simplicity, actionability, and readiness for impacting events.
- Coordinated response with a proactive incident management system.



01

INTEGRATED PREPAREDNESS PLAN

- Train and educate.
- Hazard Identification, Risk Assessment & Consequence Analysis.
- Multi-Year Exercise & Evaluation Program.
- Community outreach program
- Thorough preventive and predictive maintenance program.

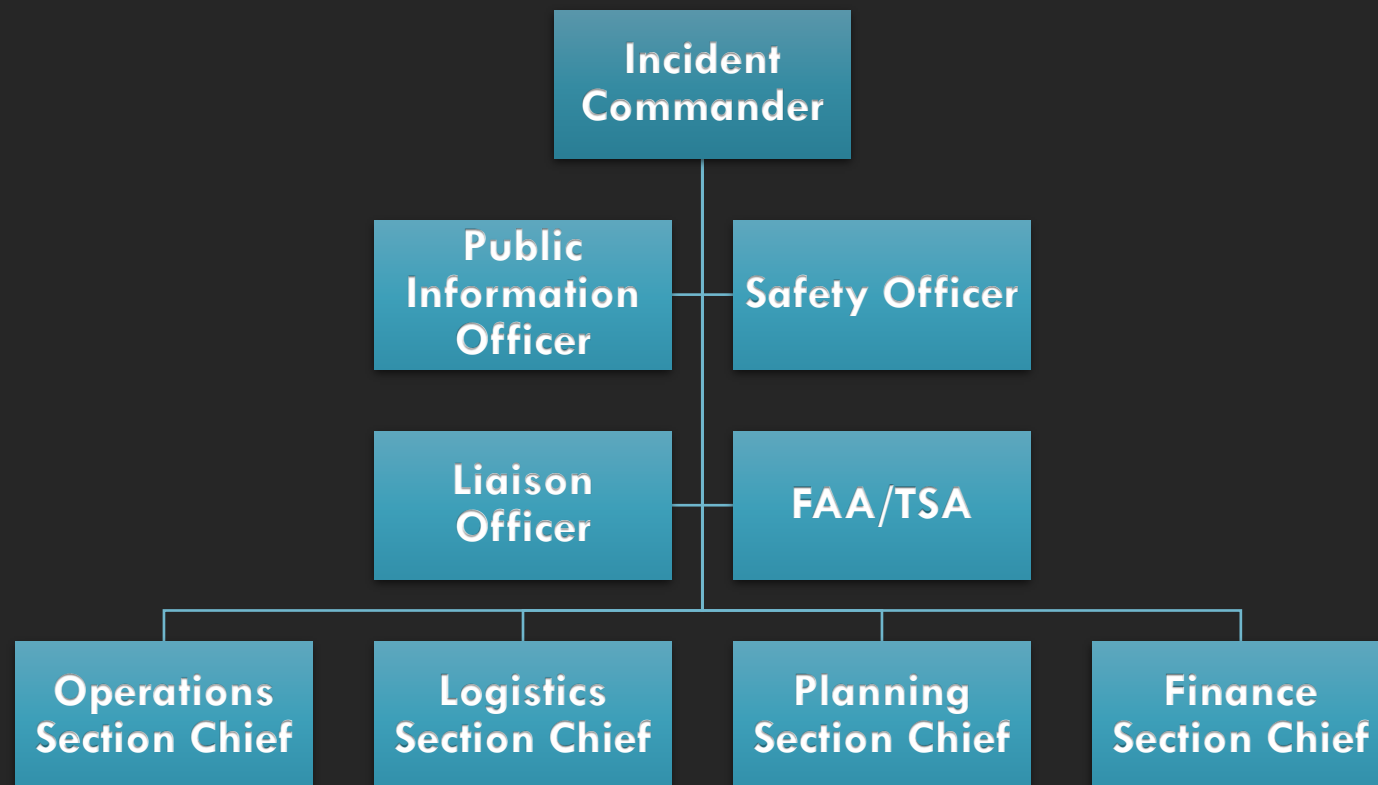


01

INTEGRATED PREPAREDNESS PLAN

PRACTICE, ACTIONS, AND LEADERSHIP:

- Tabletop Exercises
- Quarterly Drills
- Tri-Annual Live Event
- Monthly Stakeholder Meetings
- Routine Maintenance of Critical Equipment
- Understanding of Critical Infrastructure
- Committed and Organized Team





BUSINESS CONTINUITY & SOCIAL MEDIA

One of the most reliable means of communication before, during, and after the event; along with newspaper, radio and TV.



Aeropuerto Internacional Luis Muñoz Marín - Puerto Rico
September 19, 2017 · 🌐

#MariaPR

Para conocer el estatus de su vuelo, favor de verificar el siguiente enlace. /
To know the status of your flight, please check the follow link:
<http://aeropuertosju.com/pasajeros/aerolineas/>

AEROSTAR
PUERTO RICO

AVISO

El último vuelo de salida programado para el día de hoy es a las 8:40pm, el último de llegada es a las 8:00pm, después de eso el aeropuerto cesará operaciones. La reapertura será después de realizar las inspecciones adecuadas y certificar que el aeropuerto es apto para las operaciones aéreas.

NOTICE

The last departure flight scheduled for today is at 8:40 pm, the last arrival is at 8:00pm, after that the airport will cease operations. The reopening will be after proper inspections and certify that the airport is suitable for air operations.

Det
Cre
77 Likes 24 Comments 155 Shares

septiembre y jueves, 7 de septiembre de 2017.
Favor de llamar al 787-791-1900 para la reasignación de

Due to Hurricane Irma's passing thru the area, the Airport training for Wednesday, September 6 and Thursday, Sep cancelled.
Please call 787-791-1900 to reschedule the training.

10 Likes 11 Shares

Rico
lico's

Aeropuerto Internacional Luis Muñoz Marín - Puerto Rico
September 5, 2017 · 🌐

Algunas líneas aéreas han cancelado Irma. Para más información relaciona línea aérea. En el siguiente enlace av

Aeropuerto Internacional Luis Muñoz Marín - Puerto Rico
November 10, 2017 · 🌐

Buenos días! En estos momentos estamos operando con normalidad, contamos con aire acondicionado y sin necesidad de generadores de emergencia. Si desea conocer el estatus de su vuelo contacte a su línea aérea.



Aerolíneas | Aeropuerto Luis Muñoz Marín Puerto Rico - Sitio Oficial

En el Aeropuerto Internacional Luis Muñoz Marín de Puerto Rico operan decenas de aerolíneas. Para su comodidad, le prov...

AEROPUERTOSJU.COM

197 Likes 8 Comments 51 Shares

4471	SS	Florida, FL
4571	SS	Florida, FL
2811	VQ	San Juan, PR
1041	PR	Philadelphia, PA
481	AC	Orlando, FL
2803	AC	Orlando, FL
670	SA	Tampa, FL
3804	ST	St. Croix, Virgin Islands
3512	ST	St. Thomas, Virgin Islands
2891	VQ	San Juan, PR
2111	ST	St. Croix, Virgin Islands
4431	SS	Florida, FL

49 Likes 22 Comments 166 Shares

Aeropuerto Internacional Luis Muñoz Marín - Puerto Rico
shared Federal Aviation Administration's post.
September 26, 2017 · 🌐

El día de hoy la Administración Federal de Aviación (FAA por sus siglas en inglés) autorizó 12 vuelos comerciales por día, vuelos internacionales aún no están autorizados.

idando a no venir al aeropuerto si no cuenta con una elo por parte de la aerolínea.

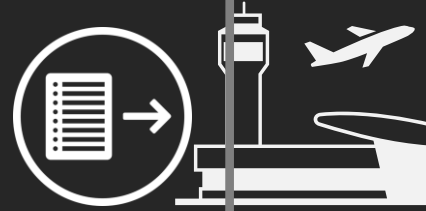


Administration

The FAA is now supporting more than a dozen commercial airline flights per day at Aeropuerto Internacional Luis Muñoz Marín - Puerto Rico in San Juan, Puerto Rico. bit.ly/2yCSr8Q

227 Likes 99 Comments

SJU RESILIENCY COMPONENTS



01

INTEGRATED PREPAREDNESS PLAN

- Train and educate.
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- Multi-Year Exercise & Evaluation Program.
- Community outreach program
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02



BUSINESS CONTINUITY

- Ensure consistency, simplicity, actionability, and readiness for impacting events.
- Coordinated response with a proactive incident management system.



03

MITIGATION

Aerostar's Resources & Equipment

Supporting Contractors

Airport Community / Mutual Aid Agreements

Make informed decisions with real-time data.

04

INSURANCES

Aviation General Liability

Natural, Man-Made, Technological Hazards





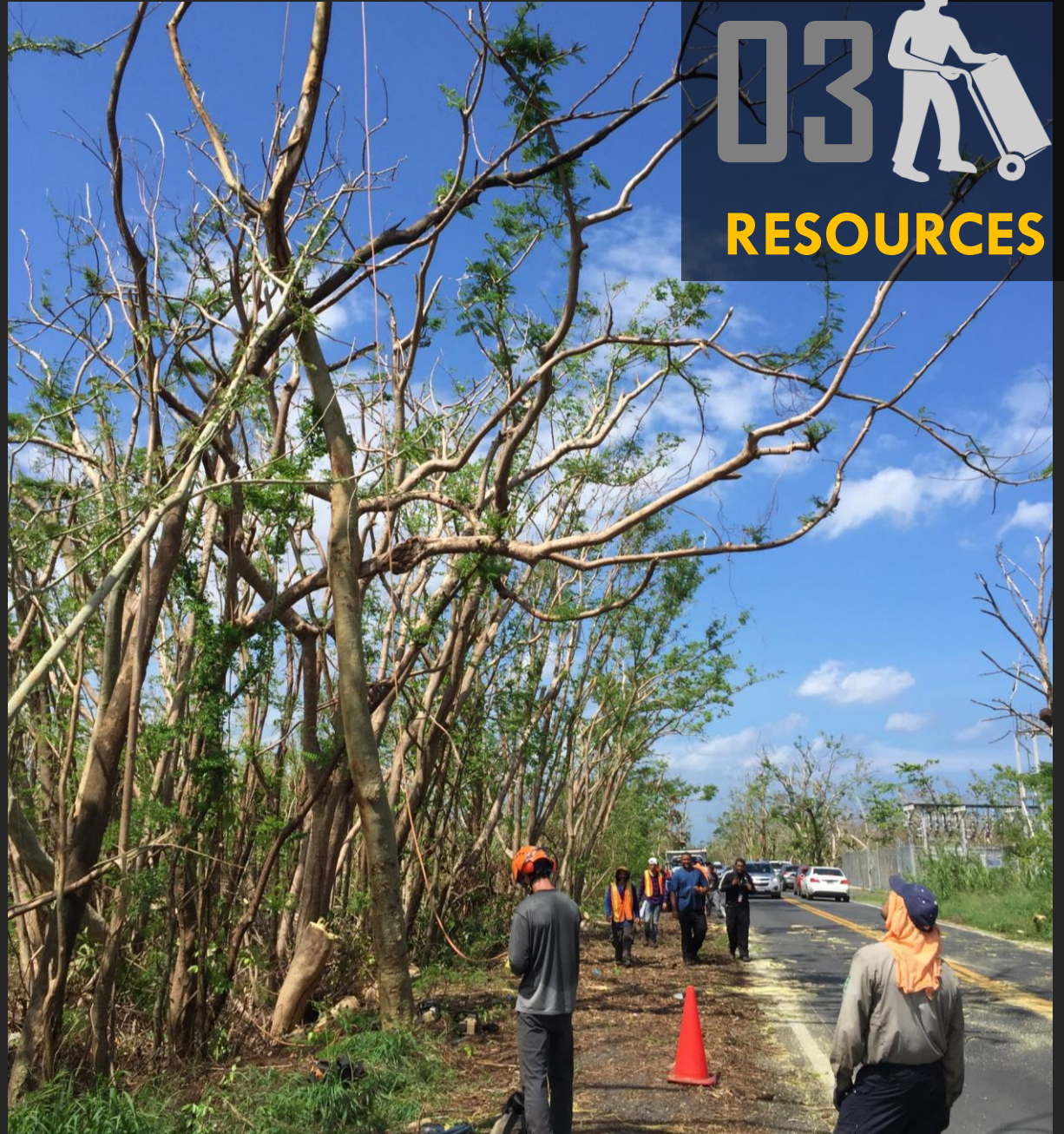
03

PERSONNEL



03

RESOURCES





03

MITIGATION

Aerostar's Resources & Equipment

Supporting Contractors

Airport Community / Mutual Aid Agreements

Make informed decisions with real-time data.



04

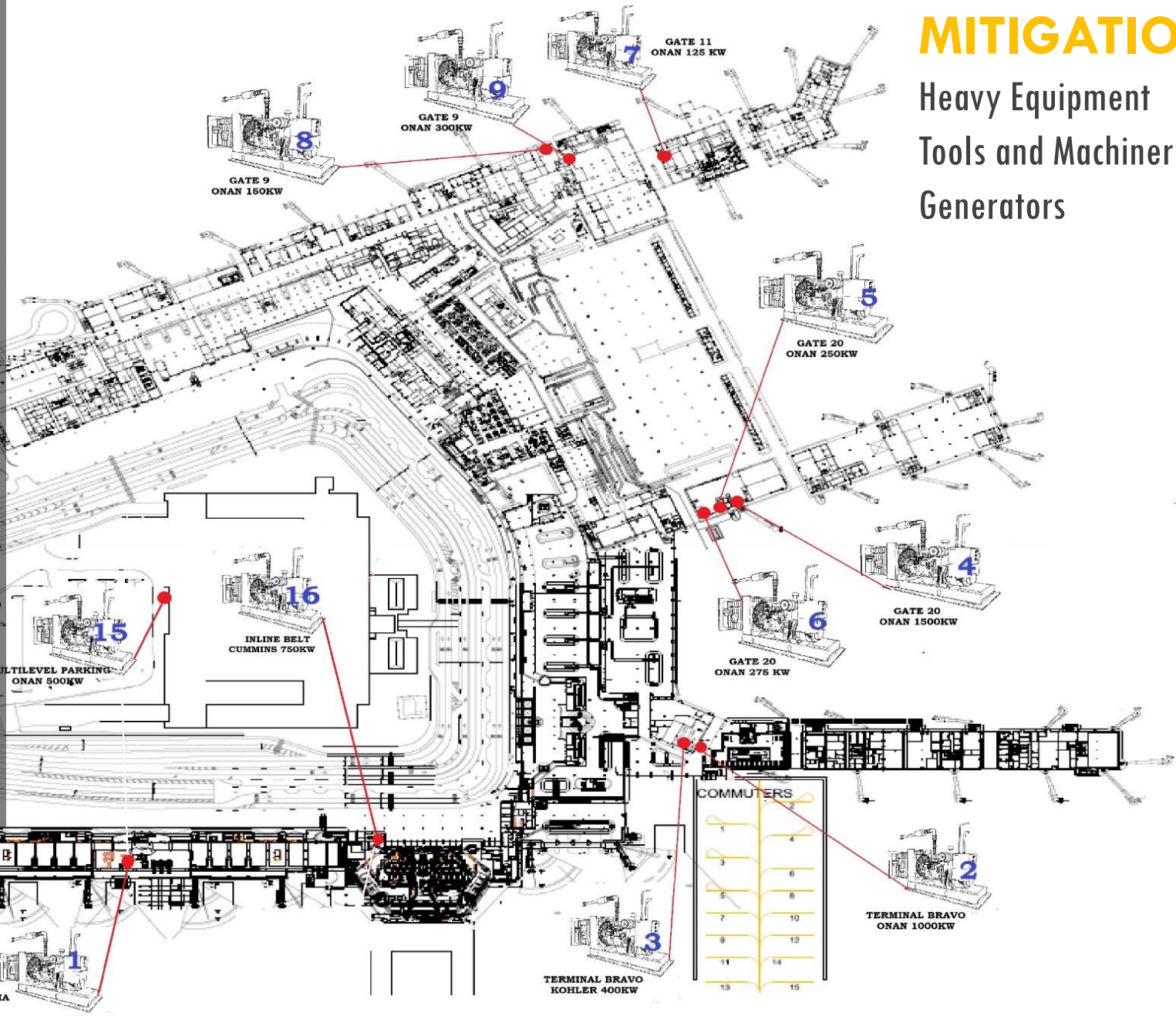
INSURANCES

Aviation General Liability

Natural, Man-Made, Technological Hazards

Emergency Generator Power Distribution:

- Limited interior lighting
- Air conditioning Main Terminal
- Runways AOA
- Water Pumping Stations
- Secure Doors SIDA
- Automatic Doors
- Escalators
- Elevators
- Airline Counters
- BHS System
- Computer and Data Rooms
- Critical Operational Areas—EOC/AOCC
- PBB's
- Baggage Claim Areas
- Food & Beverage across the airport



MITIGATION

- Heavy Equipment
- Tools and Machinery
- Generators



03

RESPONSE EFFORTS

“Hope for the best but prepare for the worst.”

AEROSTAR
AIRPORT HOLDINGS LLC





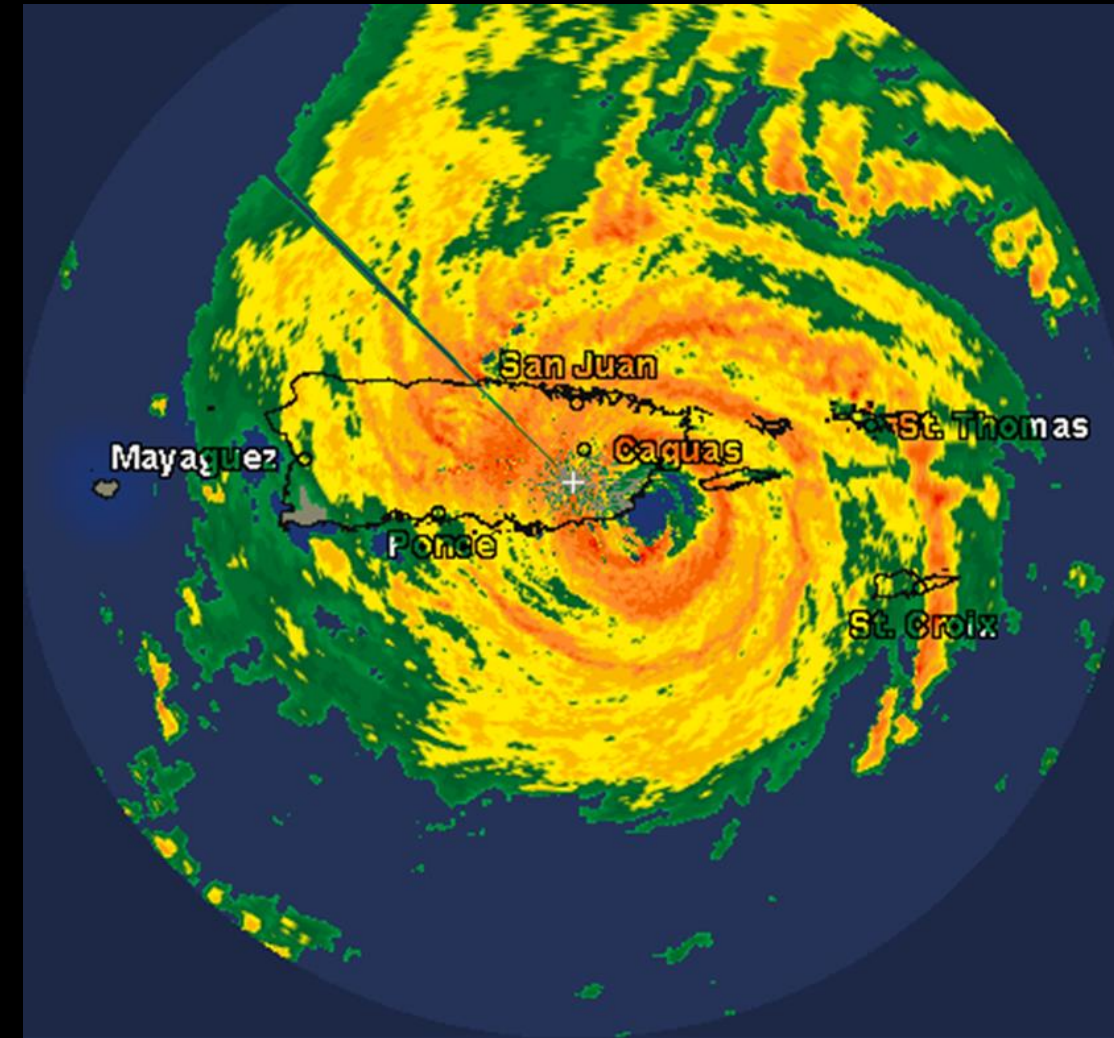
HURRICANE MARIA

HURRICANE MARIA

2017 Cat 4-5

Category 5 Hurricane Maria made land fall over the southeastern portion of the island of Puerto Rico the morning of **September 20, 2017** (maximum sustained winds of 150+ mph). The slow northwest movement of this system resulted in devastating consequences to a substantial portion of our infrastructure.

Immediately after the cyclonical system was securely outside of our area, **Aerostar Airport Holdings** personnel mobilized to inspect all areas of the SJU Airport to mitigate the damages and establish an immediate restoration plan for the available facilities. SJU reopened in 24 hrs.





Operational Layout

 Commercial

 Military

 Relief/Cargo



Response Operational Layout

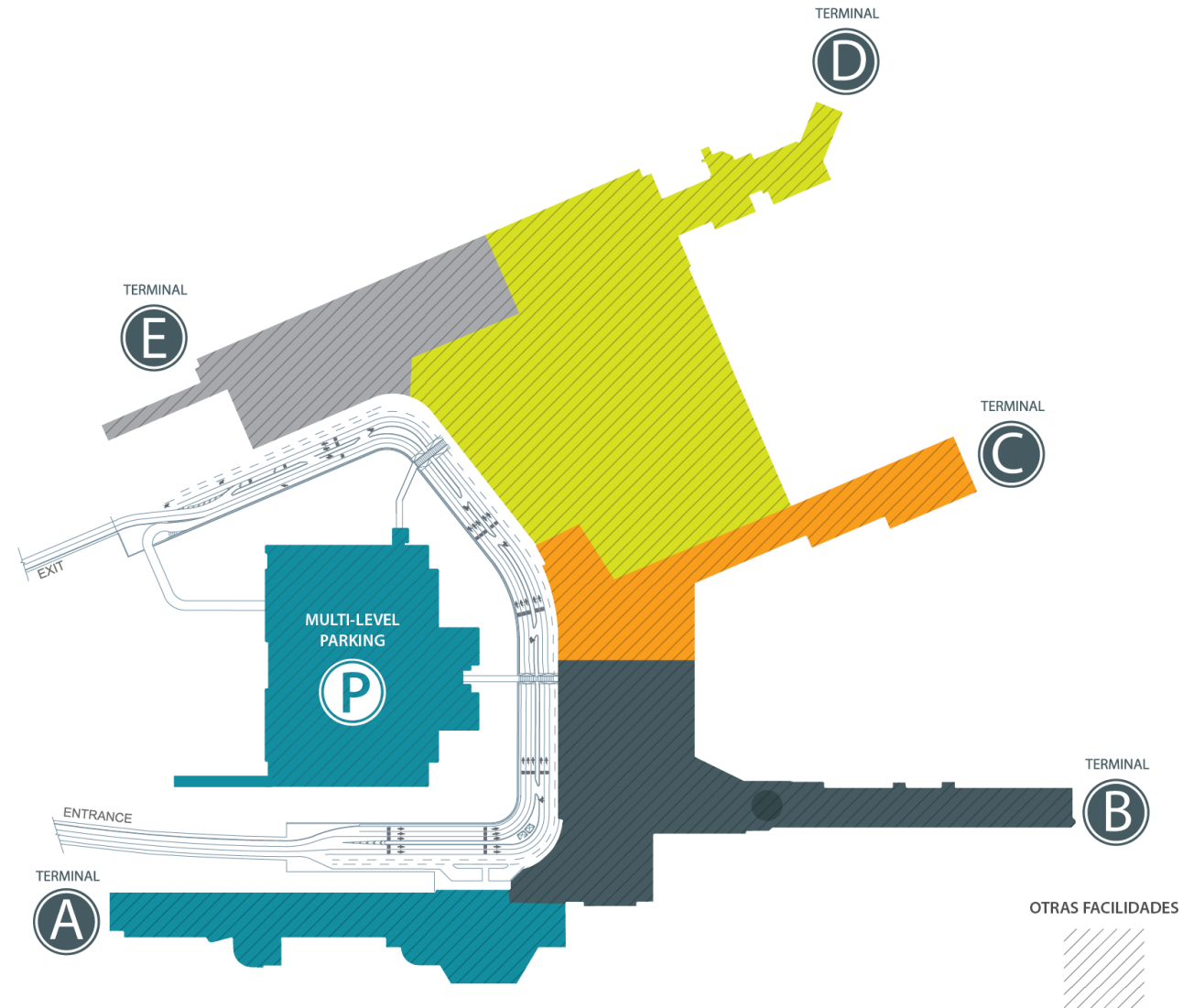
 Commercial

 Military

 Relief/Cargo

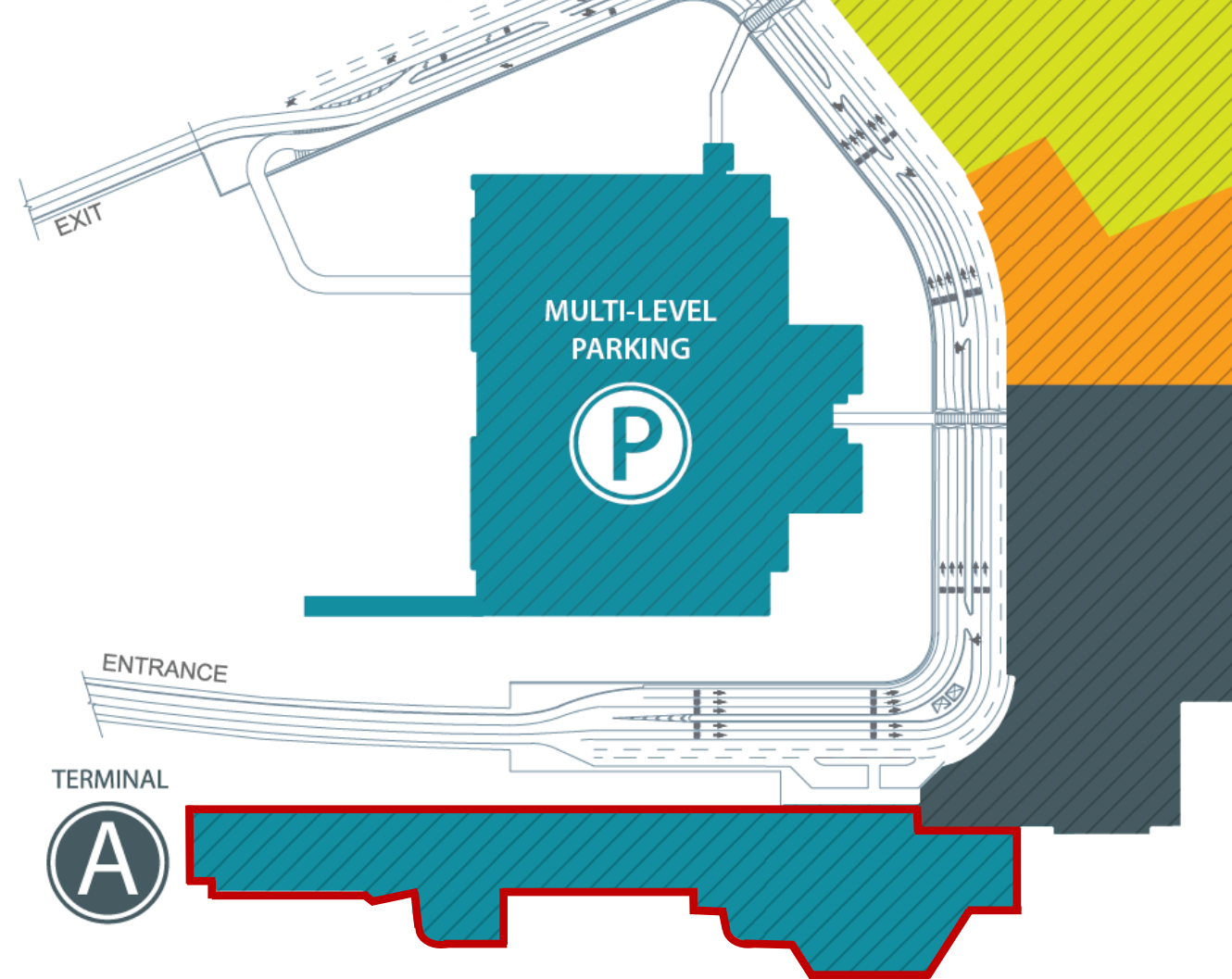
AIRPORT CONDITION ASSESSMENT

SJU was constantly monitored by the response and standby personnel for condition awareness at all times, during and after the event.

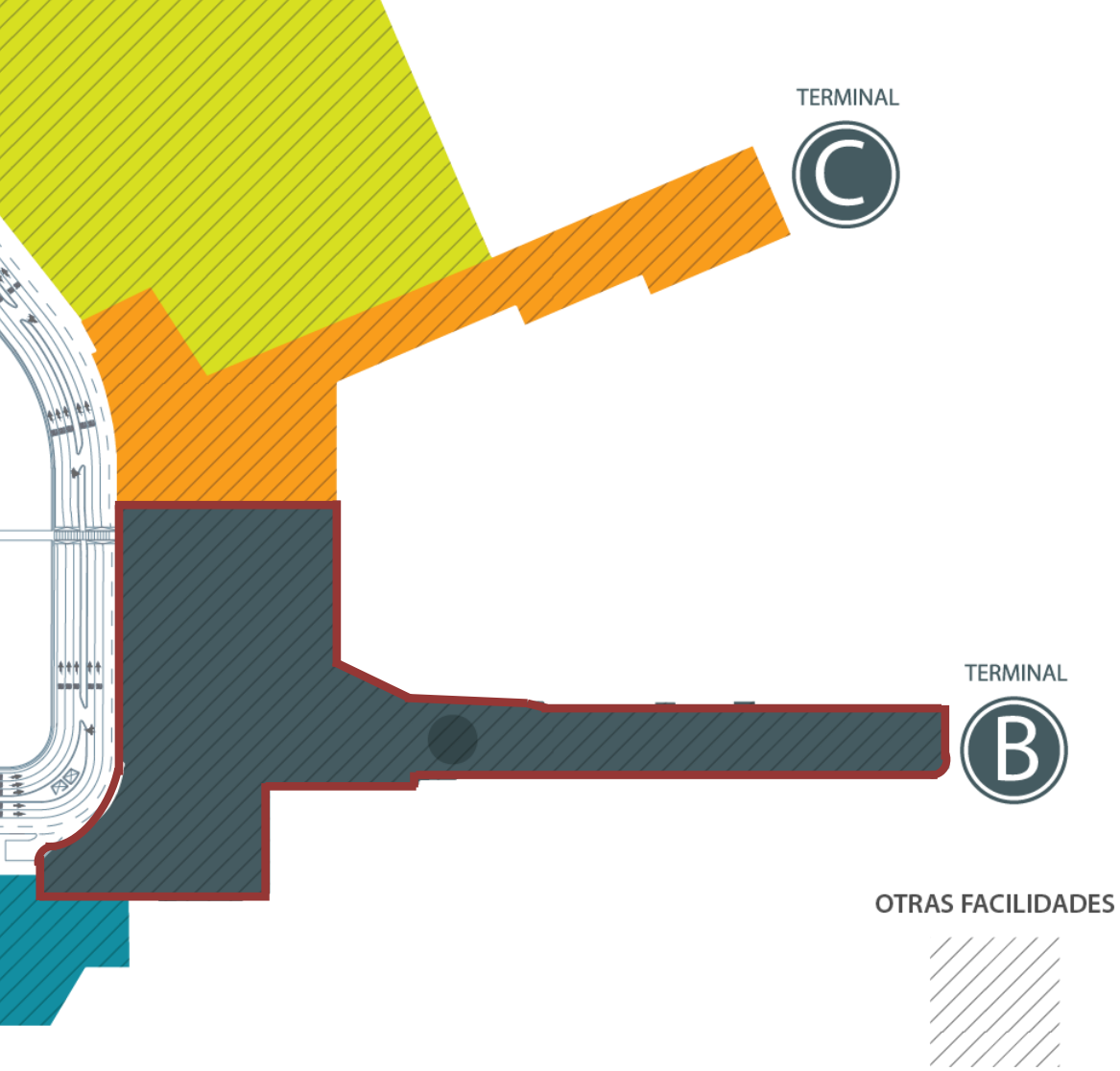


TERMINAL A

Various areas subject to water damage.
Supported Terminal B ground operations until
repairs were complete.







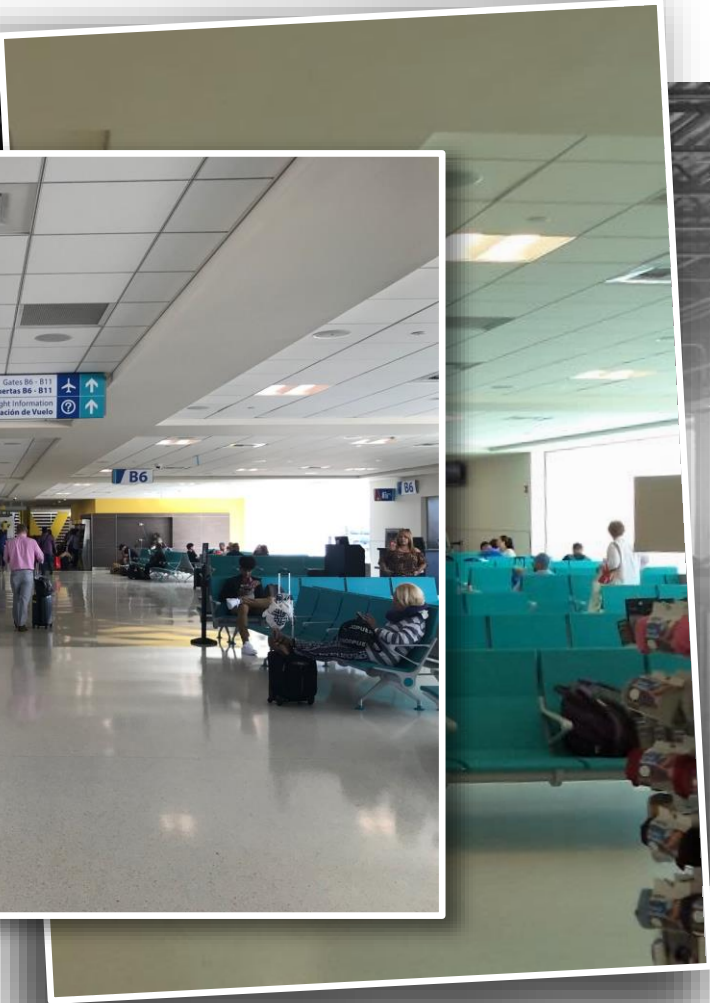
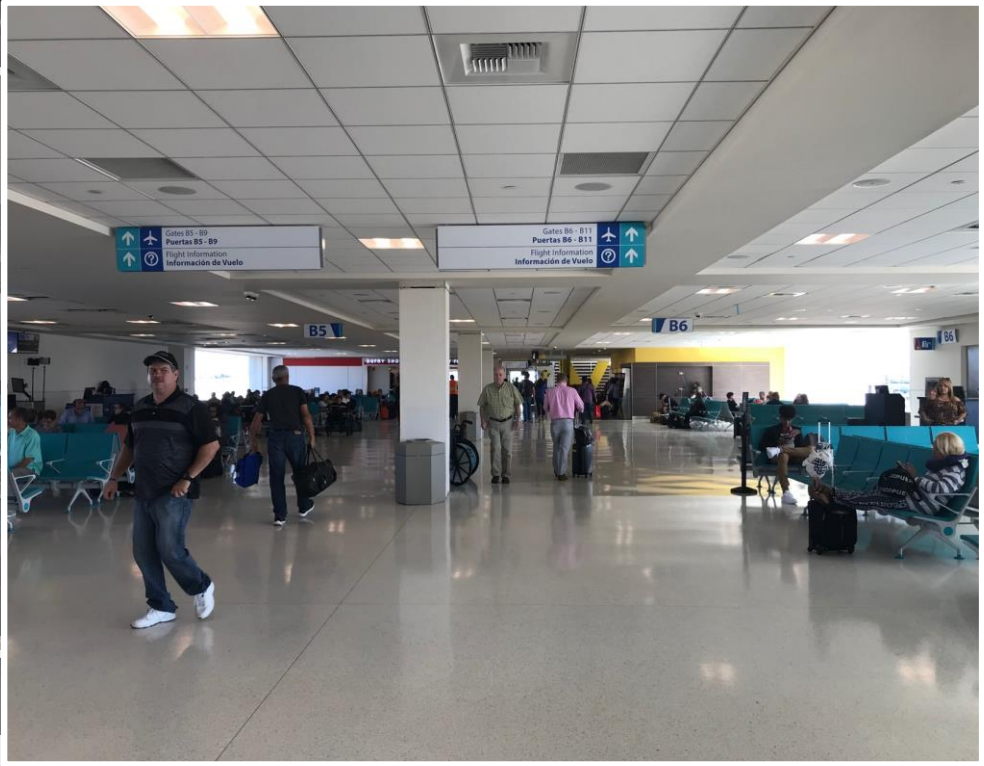
TERMINAL B

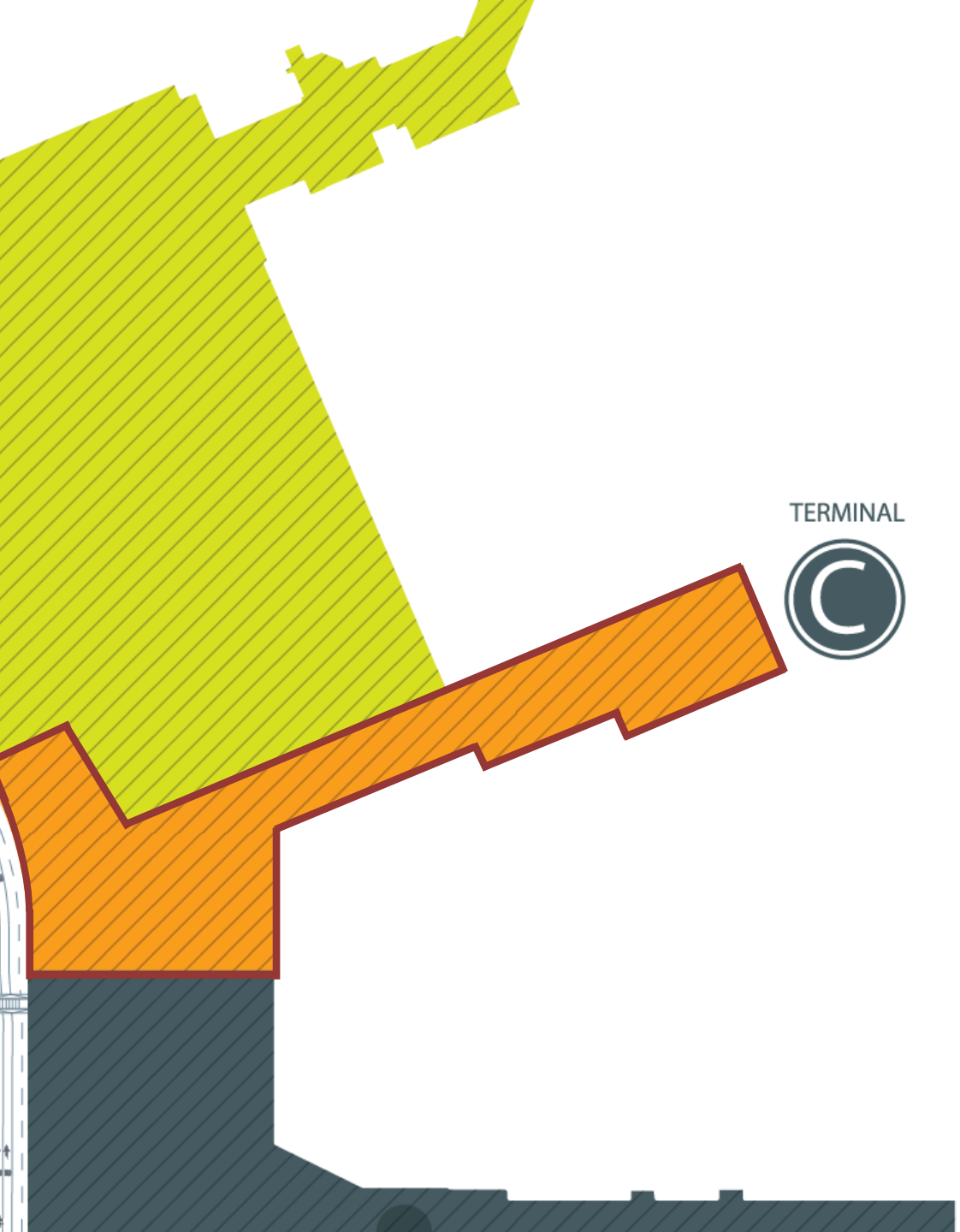
Roof covering was torn off with ensuing water damage inside.
Temporary repairs completed on November 25, 2017.





Terminal B roof was temporarily repaired, and the terminal was brought back to operation two months after the event. Permanent roof repaired were finished by August 2018.





TERMINAL C

Roof covering damaged.
Used to handle ground operations until
Terminal B temporary repairs were
completed.



TERMINAL



TERMINAL D

Roof covering damaged with ensuing damage
inside.

Limited operations.

TERMINAL



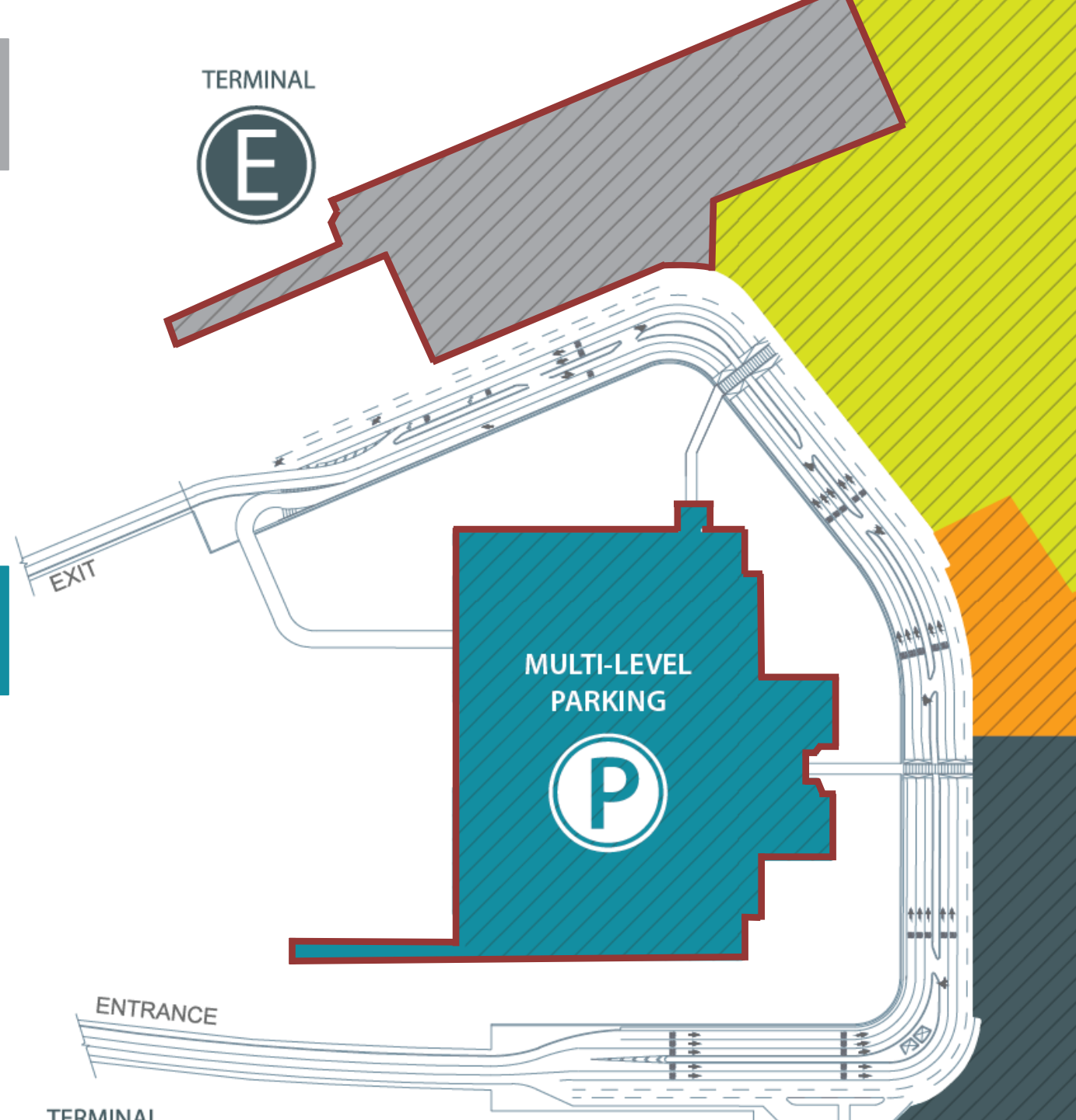


TERMINAL E

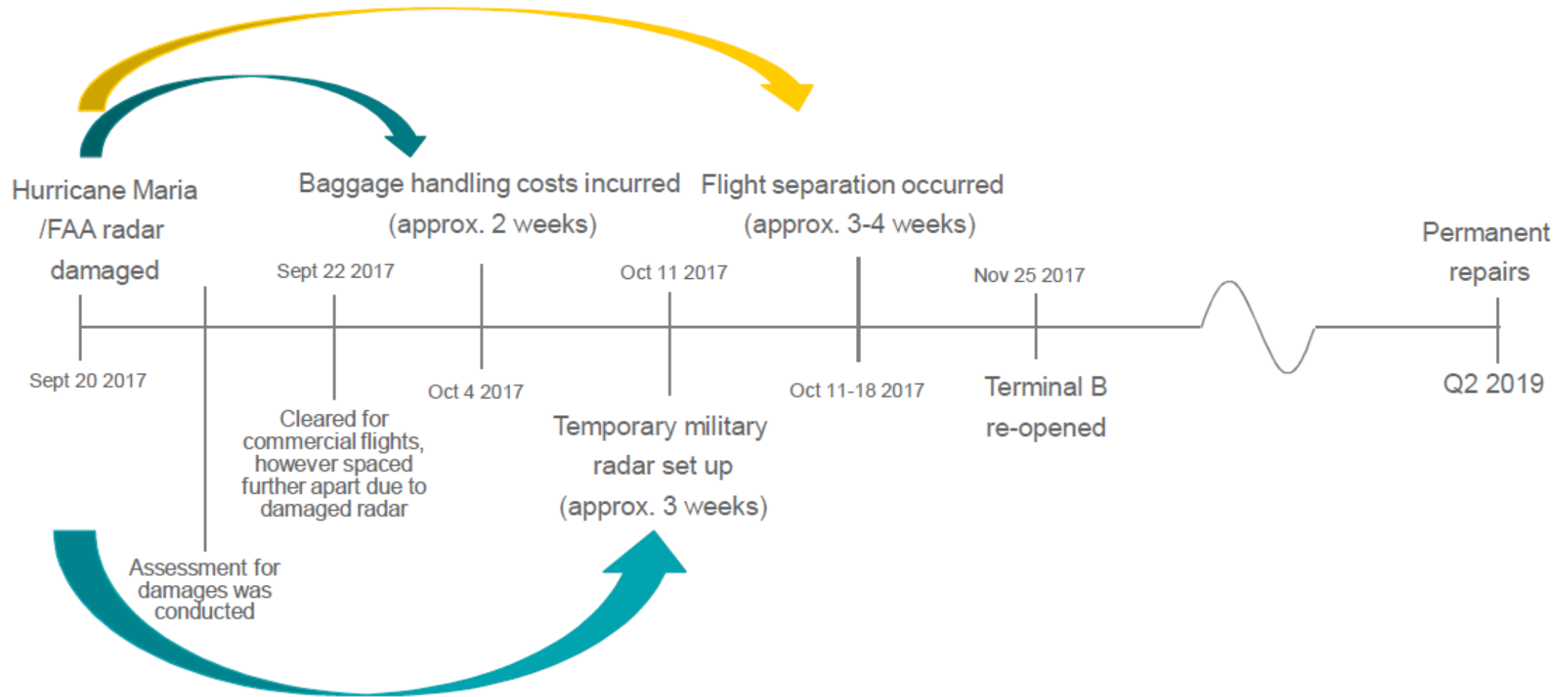
Damaged in areas but was not in operation at the time of the hurricane

MULTI-LEVEL PARKING

Flooded in some areas



RESPONSE TIMELINE & Recovery Efforts





**As result of prompt recovery efforts at SJU, resources were
flown in regularly for federal and local aid agencies to
distribute.**

TERMINAL B ROOF REPAIRS

Notice to Proceed
April 25, 2018

Schedule Project
Substantial Completion
August 31, 2018



INCIDENT STABILIZATION MODEL

FOOD & BEVERAGE

- Food, Water, Shelter
- Distribution Programs/Supply Chain
- Storage & Commercial Distribution

HAZMAT

- Fuel Farm Facilities
- Contaminants

SAFETY & SECURITY

- Law Enforcement/Security
- Fire Service
- Traffic Management
- Government Services
- Community Safety



COMMUNICATIONS

- Most important of all.
- Satellite voice, data, TV communication
- Banking Services
- Know the 5W & 1H questions

TRANSPORTATION

- Management of water, air, ground transportation system & infrastructures.
- Support Emergency Responders.

ENERGY

- Power Grid : Generation, Transmission, & Distribution systems
- Fuel: Storage, pipelines, distribution
- Cascading effect on the whole community, jurisdiction and critical sectors.

HEALTH & SAFETY

- Minimize/prevent public health issues
- Provide medical care & human services
- Patient movement, care, pharmaceutical
- Distribution, delivery, supply chain.

SJU AIRPORT LESSONS LEARNED

SIGNIFICANT ISSUE	ADVERSE EFFECT	ACTION
Last strong hurricane to hit PR was in 1998 — (Hurricane Georges)	- Complacency in the community - Limited preparedness efforts in our community & youths.	- Community Outreach Program - Trainings & Exercises
Power outage (entire Island).	- No HVAC (significant heat) - Limited illumination in areas - TSA Checkpoint failure - Condensation in floor	- Redundancy — emergency generators - Staff assisted passengers - Safe corridors - Co-gen Plant — Self-Sufficient
Communications failure (FAA radar, radios, cell phones).	- Limited and cancelled commercial flights	- Meetings, meetings, meetings - Continued orientation to passengers - Satellite Communications
Debris, flooding, and water damage in multiple locations.	- Limited operational areas - Mold	- Designate priority areas (triage type exercise)
Downed trees and perimeter fence	- Security and compliance - Blocked access	- Interagency agreements - Reinforced fences
Waste management	- Accumulated waste in sterile areas and in main dumpster zone	- Adaptive management (alternate routes, storage areas, heavy machinery, and collaboration)

SJU AIRPORT LESSONS LEARNED

SIGNIFICANT ISSUE	ADVERSE EFFECT	ACTION
Emergency Medical Response	- Not enough resources to manage potential threats - Communication limitations - Heat strokes	- Set fixed EMS stations - Law enforcement support - Generators — Comfort to Pax.
SJU was perceived as a shelter (food and water)	- Potential for vandalism - Affected operations	- Proactive & Active communication process - Limited water and food provided
Personal matters, emotional health, and physical fatigue	- Employee depression and desperation - Potential mistakes / risk - Affected operations	- Teamwork approach and delegation - Aerostar headquarters adopted a “home” environment - Family support (water, gasoline, special assistance, daycare)
Back to “normal” operations	- Lack of reliable / stable electricity - Emergency situations all over again (2-5 times per week) - Waste management, TSA, access, checkpoint, condensation, etc.	- Development of “standard” alternative plans

Airport Sustainability Plan Main Goals

To provide a framework that integrates sustainable and resilience focused practices into planning, design, construction, and maintenance activities at SJU.



Climate Adaptation and Resilience

- Sea Level Rise
- Increase in Storms
- Temperature Changes
- Extreme Weather Events



Air Quality/Greenhouse Gas Emissions

- Convert Vehicle Fleet to Electric
- Ground Support Equipment (GSE) to alternative fuel or electric Incentive
- Electric Airport Shuttle Program



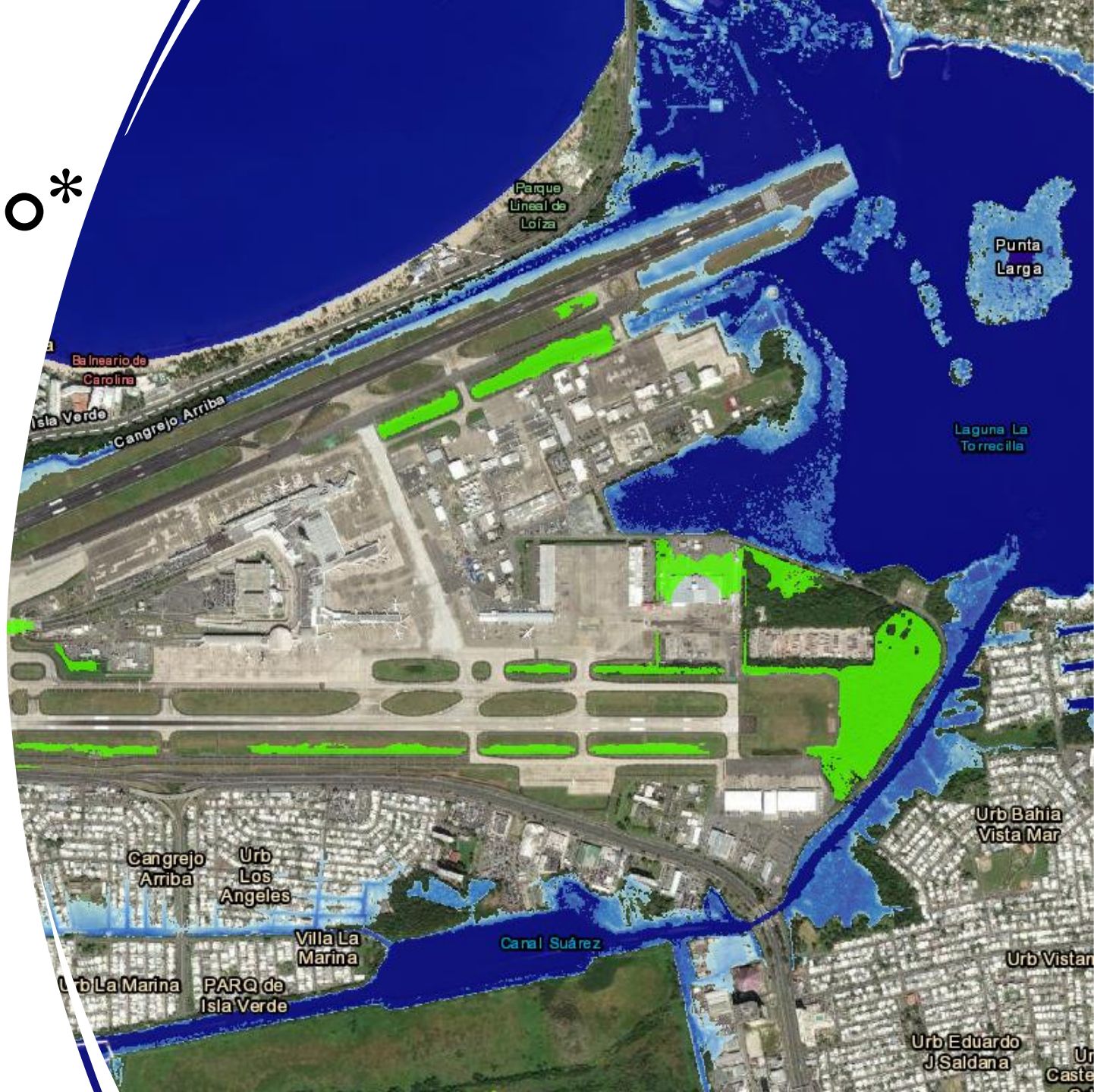
Water Quality, Conservation and Storage

- Stormwater Management
- Water Use And Conservation Goals
- Water Storage Improvement
- Water Quality

SLR 2100: Intermediate Scenario*

- Potential adverse impacts to:
 - RW 8-26 RSA (East)
 - Drainage system
- Adaptation and mitigation efforts to consider phased development.
- Opportunity for beneficial use of dredged materials (levee).
- ROFA project to address an important section.

* Based on NOAA SLR Viewer



Lessons Learned: Summary

- Preparedness is year-round.
- Everything comes in or goes out by air or water.
- Self-sufficient as possible.
- SJU is the only airport with the resources, technology and personnel to manage a large-scale disaster in the Island.
- Supply chain was dependent on how fast we were able to recover.
- Piers, water transportation, and regional airports were restored weeks after landfall.
- Government & private sector integration.



HURRICANE MARÍA

SEPTEMBER 20, 2017

THANK YOU

AEROSTAR

AIRPORT HOLDINGS LLC

