TxDOT Maritime Division
Maritime Funding Update

Travis Milner
Maritime Division
Planning & Development Section Director

Texas Department of Transportation

May 24, 2024

Maritime Funding Project Progress

Maritime Infrastructure

Seaport Connectivity

Contracts executed/in development	12	10
Projects in procurement phase	4	1
Projects under construction	1	0
Estimated letting volume/total cost		
FY 24	12/$200,000,000	5/$16,892,250
FY 25	0/$0	14/$23,107,750

Ship Channel Improvement Revolving Fund (SCIRF)

LOAN TERMS

YEAR 0-3

No interest accrual or payments due during the initial loan term, either until project completion or for up to three years, whichever comes first

Interest will begin to accrue at the AAA bond rate minus 1%

YEAR 5+

Interest will accrue at market rate

APPLICATION STATUS

- MRD received 1 application for the full $400M available
- Application currently under review
- Next step, if approved: Commission presentation

Looking Ahead

Considerations

- MRD is working to create a legislative brochure ahead of the 89th session.
- MRD plans to create a video to visually showcase MIP project progress
  - Photographs or drone footage will be helpful

Looking Ahead

Legislative Charges

Texas Senate

Transportation Funding: Assess the implementation of funding appropriated by the 88th Legislature for aviation, maritime ports, international points of entry, existing rail line operations, and public transportation from non-dedicated state funds and federal funds and make recommendations to ensure these sectors meet current demands and are prepared for future growth.

Texas House

Port Infrastructure and Maritime Industry: Study long-term needs of the maritime industry in Texas. Evaluate the implementation status of the Maritime Port Mission Plan and make recommendations to improve port planning, safety measures, and project delivery. Examine status of TxDOT seaport projects that received funding during the 88th Legislature.

Questions?

Travis Milner
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Planning & Development Section Director
(512) 486-5600
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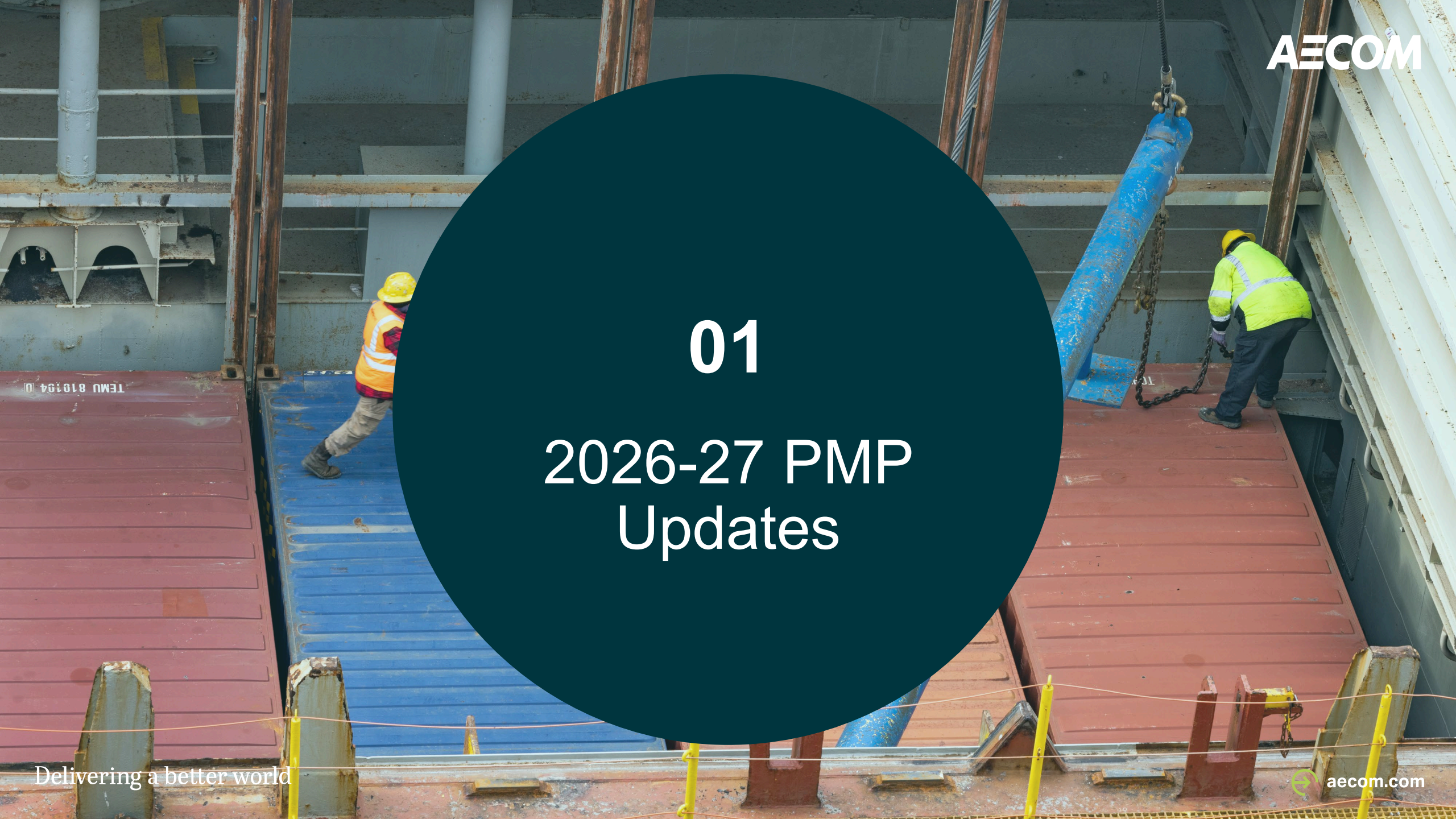
Texas Department of Transportation

May 24, 2024

2026-27 Port Mission Plan

PAAC Meeting | May 14, 2024

Erika Kunkel, Project Manager - TxDOT Maritime Division
Taylor Squires, PE - AECOM



01

2026-27 PMP Updates

Thank you for completing Project Questionnaires!

MARITIME INFRASTRUCTURE PROJECT INFORMATION SHEET

Project
Port:
Project Name:

Project Support
Project has the support of the sponsor's governing board/commission: ☐ Yes ☐ No
Describe the support for this project from government agencies, industry, regional planning organization, stakeholders, and the public.
Has the project been included in previous plans and/or studies? Please provide links & page numbers.

Project Summary
Project Summary including improvements to be made (with approximate details regarding lengths/size/area/extents of improvements)
Describe the existing and/or anticipated conditions that highlight the need for the project (include any relevant historical data)
Describe how this project will alleviate current and/or anticipated problems or constraints the Port is experiencing.
Describe which industries this project would benefit or any new Port capabilities that would result from this project.

Consequences of Inaction (What limitations or negative impacts will result from not implementing this project?)

SEAPORT CONNECTIVITY PROJECT INFORMATION SHEET

Project
Port / Submitting Entity:
Project Name:
Project Contact (name, title, email):
Does the project include any of the following? If so, the project is ineligible for SCP funding:
☐ Restricted public access
☐ Routine maintenance, operations, and administrative expenses
☐ Planning Studies
☐ Channel improvements, security projects, equipment purchases, and terminal improvements
☐ Rail projects
☐ Right of way acquisition

Project Basics

Project Summary
Project Location. *(Include roadway, limits)*
Project Summary including improvements to be made. *(With approximate details regarding limits/size/area of improvements).*
Describe the existing or projected future conditions that highlight the need for the project. *(Include any relevant historical or forecast data).*
Is the project included in any planning documents? If so, which? *Include link & pg # (e.g. Maritime PMP, Regional LRTP, etc.)*

Project Funding (Note: the PAAC expects a minimum local match of 25%)

Total Project Cost:	$
Amount of SCP Funds Requested:	$
Other Funding (amount and source):	$

Pg. 1

SHIP CHANNEL PROJECT INFORMATION SHEET

Project
Port or Navigation District:
Project Name:
Is this a Federal or Non-Federal Project?* ☐ Federal ☐ Non-Federal
*Note: Federal projects are those that are Congressionally Authorized (i.e. Water Resources Development Act [WRDA]). Non-federal projects are port-supported projects that do not undergo Congressional Authorization.

Federal Projects – NOT REQUIRED FOR NON-FEDERAL PROJECTS
Project is authorized under WRDA
Year authorized under WRDA (if applicable)
Type of project
What is the status of Federal review?
Provide a link to the Chief's Report, if available
Provide a link to the project website or webpage, if available
*Note: Currently, only new work projects are eligible for funding under the Ship Channel Improvement Revolving Fund (SCIRF); however, TxDOT is working to capture all of the ports' needs and gathering this information helps inform the current and future Port Mission Plan.

Non-Federal Projects – NOT REQUIRED FOR FEDERAL PROJECTS
Type of project
Please provide the project's approximate latitude and longitude

Funding (continued on next page)
Project Cost:
Non-Federal Cost:
Maintenance Cost:
Maintenance Cycle (years):
Share (%):
Sponsor Cost Share* (%):
Appropriated to Date ($):
Allocated to Date ($):

All Projects
Federal Projects

Pg. 1

aecom.com

PMP Project Summary

110 total
projects submitted

No questionnaires from:
- Cedar Port
- Port of Bay City
- Port Isabel
- Port of West Calhoun

Maritime Infrastructure

65 projects submitted

$1.9B total cost

$508M funding identified

$1.4B funding required

57 projects lettable next biennium

Seaport Connectivity

25 projects submitted

$510M total cost

$141M funding identified

$369M funding required

22 projects lettable next biennium

Ship Channel

20 projects submitted

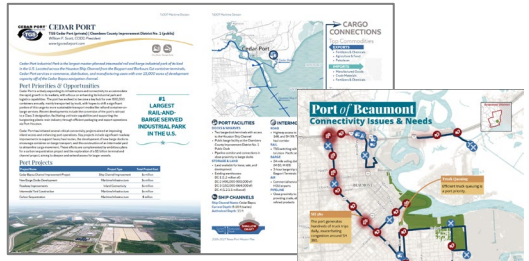
$4.5B total cost

$2.9B funding identified

$1.6B funding required

17 projects lettable next biennium

Project timeline



We are here

Sept-Dec 2023
1st round port interviews
☑ **completed**

May-Jun 2024
Ports review draft materials by June 9

Sept 2024
PAAC to review and approve final PMP

Jan-Feb 2024
Ports fill out project questionnaires
☑ **completed**

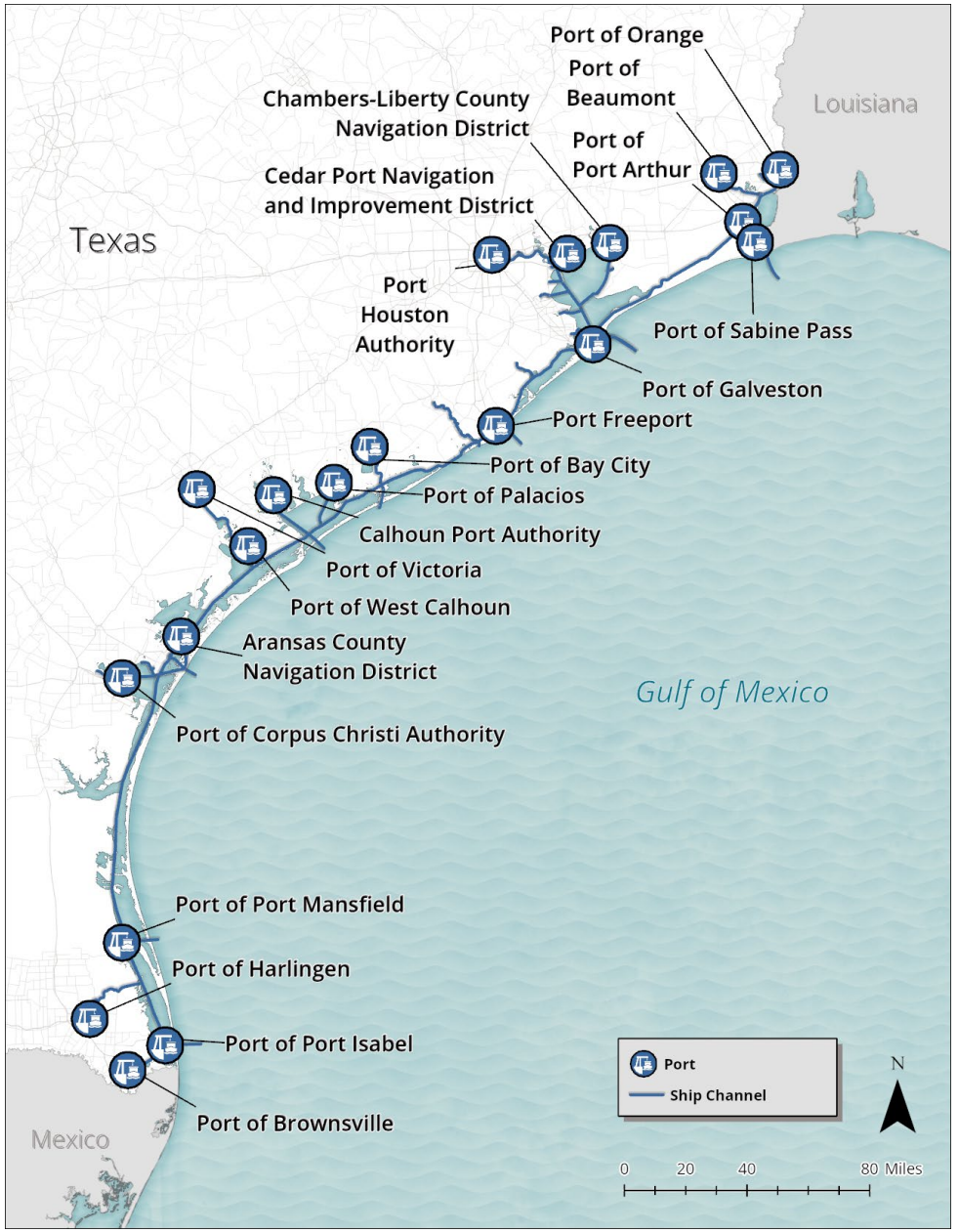
Jun-Jul 2024
2nd round interviews to finalize port materials

02

Port Materials

Draft Port Materials

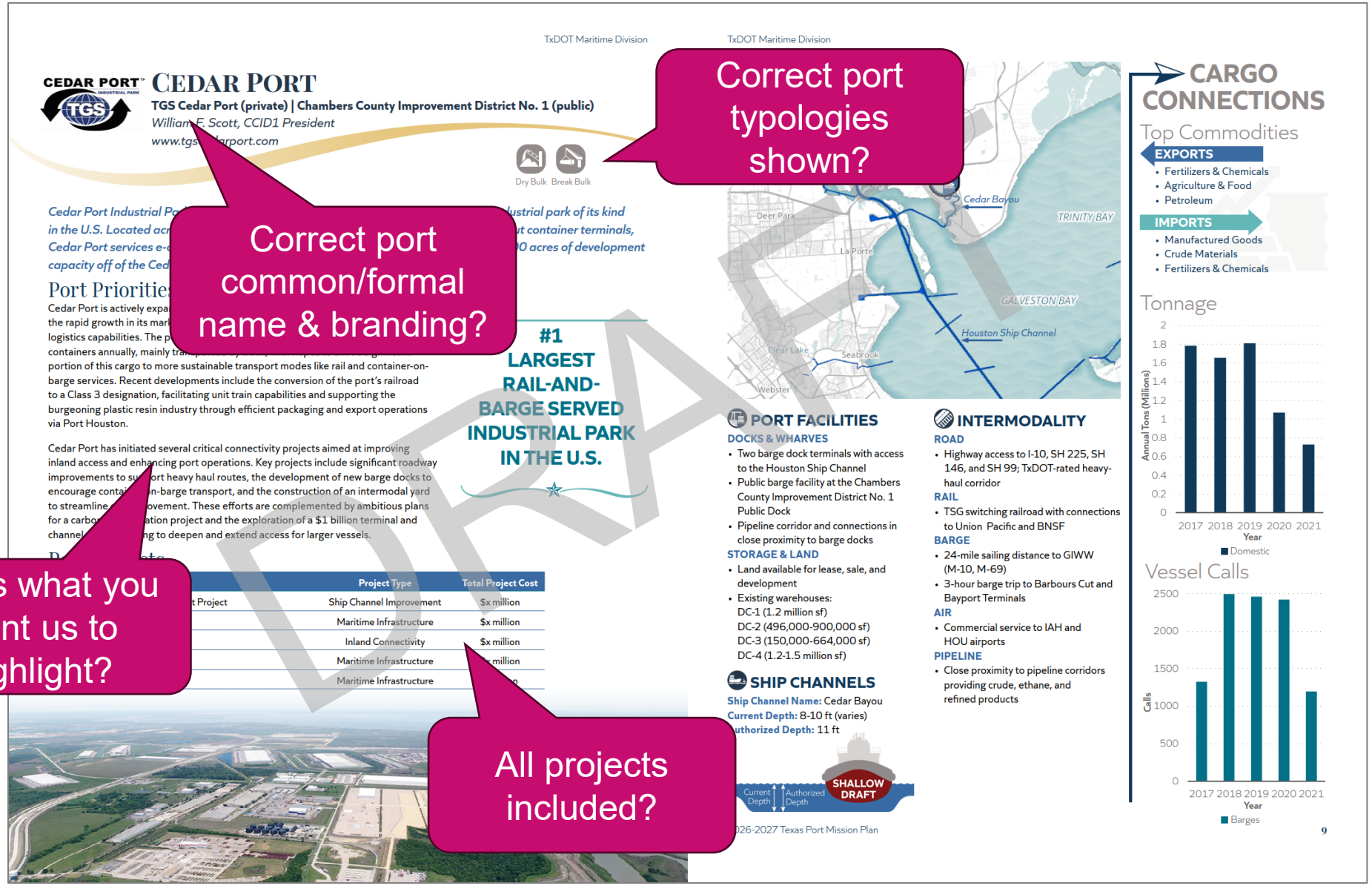
- Each port will receive an emailed PDF package for review
- Will include:
  - 1x Port profile
  - 1x Connectivity issues and needs map
  - Project profiles
- **Request each port review and send edits**



1x Port Profile

Typologies

- Container
- Breakbulk
- Bulk
- Cruise
- Energy
- RoRo
- Commercial Fishing
- Other



TxDOT Maritime Division

CEDAR PORT

TGS Cedar Port (private) | Chambers County Improvement District No. 1 (public)

William F. Scott, CCID1 President

www.tgs[illegible]rport.com

Dry Bulk Break Bulk

Cedar Port Industrial Po[illegible] industrial park of its kind in the U.S. Located ac[illegible] t container terminals, Cedar Port services e-[illegible]0 acres of development capacity off of the Ced[illegible]

Port Priorities

Cedar Port is actively expa[illegible] the rapid growth in its mari[illegible] logistics capabilities. The p[illegible] containers annually, mainly tra[illegible] portion of this cargo to more sustainable transport modes like rail and container-on-barge services. Recent developments include the conversion of the port's railroad to a Class 3 designation, facilitating unit train capabilities and supporting the burgeoning plastic resin industry through efficient packaging and export operations via Port Houston.

Cedar Port has initiated several critical connectivity projects aimed at improving inland access and enhancing port operations. Key projects include significant roadway improvements to su[illegible]ort heavy haul routes, the development of new barge docks to encourage conta[illegible]n-barge transport, and the construction of an intermodal yard to streamline [illegible]ovement. These efforts are complemented by ambitious plans for a carbo[illegible]ation project and the exploration of a $1 billion terminal and channel [illegible]g to deepen and extend access for larger vessels.

	Project Type	Total Project Cost
[illegible] Project	Ship Channel Improvement	$x million
	Maritime Infrastructure	$x million
	Inland Connectivity	$x million
	Maritime Infrastructure	[illegible] million
	Maritime Infrastructure	

#1 LARGEST RAIL-AND-BARGE SERVED INDUSTRIAL PARK IN THE U.S.

TxDOT Maritime Division

PORT FACILITIES

DOCKS & WHARVES
- Two barge dock terminals with access to the Houston Ship Channel
- Public barge facility at the Chambers County Improvement District No. 1 Public Dock
- Pipeline corridor and connections in close proximity to barge docks

STORAGE & LAND
- Land available for lease, sale, and development
- Existing warehouses:
  DC-1 (1.2 million sf)
  DC-2 (496,000-900,000 sf)
  DC-3 (150,000-664,000 sf)
  DC-4 (1.2-1.5 million sf)

SHIP CHANNELS

Ship Channel Name: Cedar Bayou
Current Depth: 8-10 ft (varies)
[illegible]uthorized Depth: 11 ft

INTERMODALITY

ROAD
- Highway access to I-10, SH 225, SH 146, and SH 99; TxDOT-rated heavy-haul corridor

RAIL
- TSG switching railroad with connections to Union Pacific and BNSF

BARGE
- 24-mile sailing distance to GIWW (M-10, M-69)
- 3-hour barge trip to Barbours Cut and Bayport Terminals

AIR
- Commercial service to IAH and HOU airports

PIPELINE
- Close proximity to pipeline corridors providing crude, ethane, and refined products

CARGO CONNECTIONS

Top Commodities

EXPORTS
- Fertilizers & Chemicals
- Agriculture & Food
- Petroleum

IMPORTS
- Manufactured Goods
- Crude Materials
- Fertilizers & Chemicals

Tonnage

Vessel Calls

[illegible]026-2027 Texas Port Mission Plan

9

DRAFT

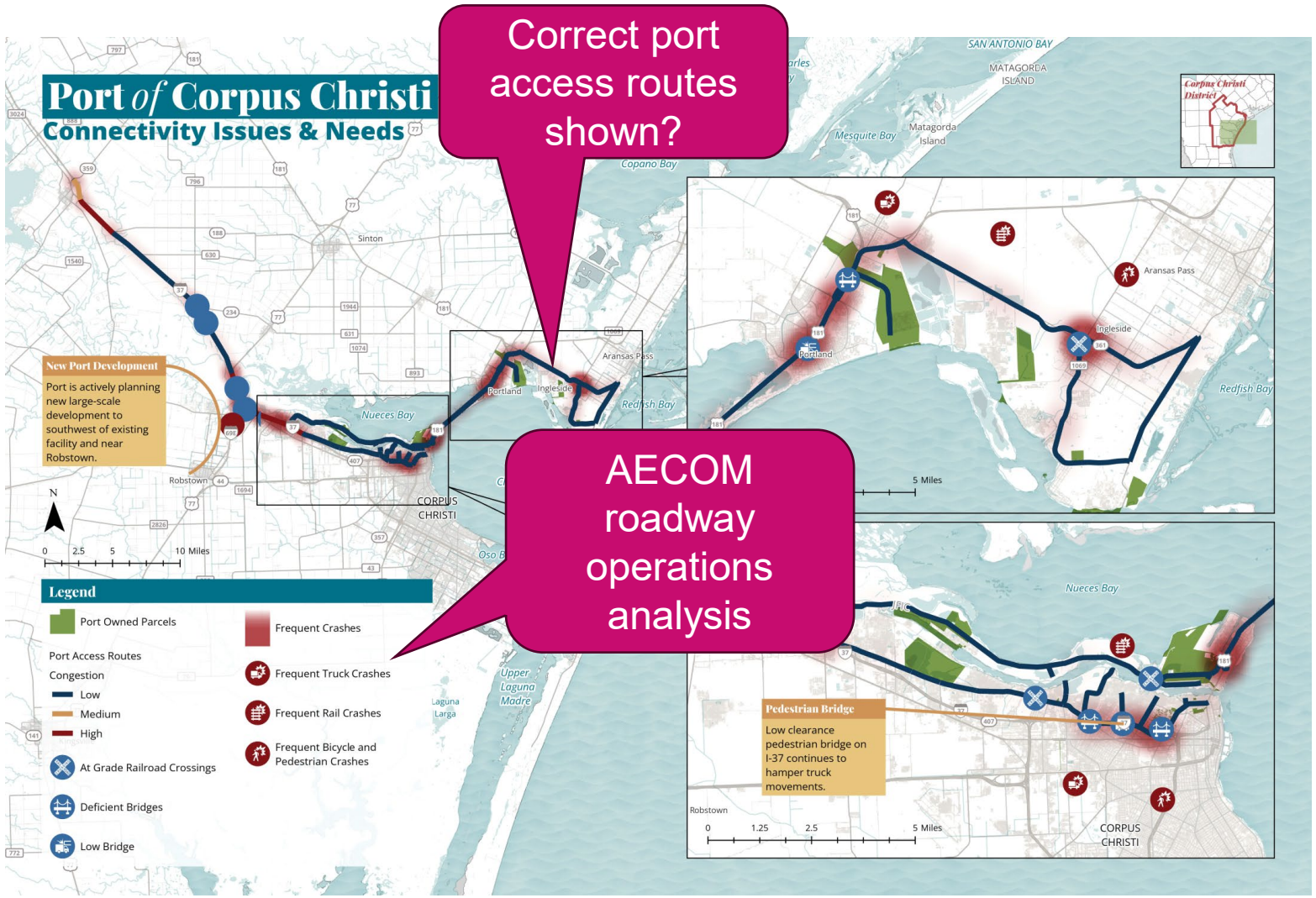
Correct port typologies shown?

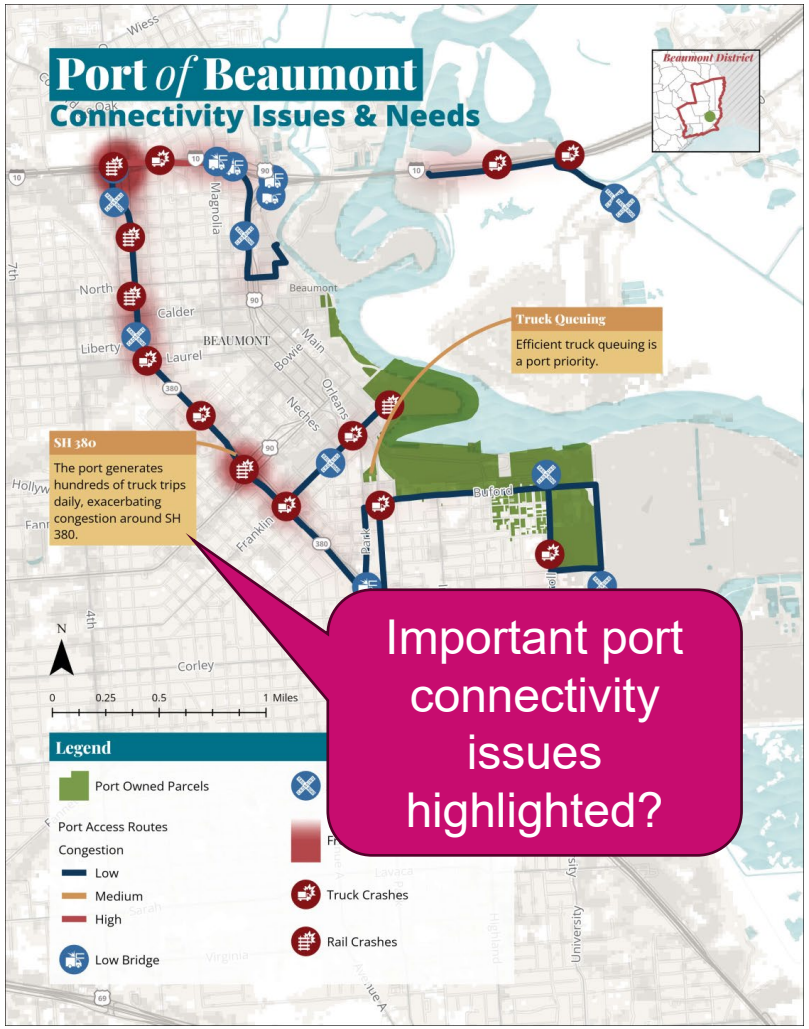
Correct port common/formal name & branding?

Is this what you want us to highlight?

All projects included?

1x Connectivity Issues and Needs Map





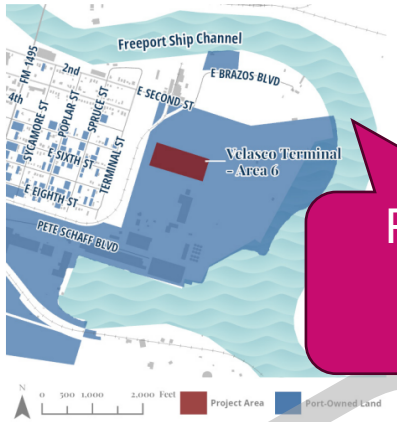
Project Profile – Maritime Infrastructure

PORT FREEPORT

VELASCO TERMINAL AREA 6 IMPROVEMENT PROJECT

Port Freeport

Project Category: | **County:** Brazoria | **Project Status:** Scoping and Planning | **Total Project Cost:** $10,000,000



Project map created by AECOM

Project Description

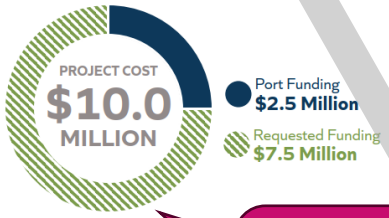
Area 6 within the Velasco Terminal is a semicircle-shaped storage yard bordered by Port Road, Turning Basin Road, and a rail spur that serves the rice mill at Port Freeport. The existing storage yard is limestone aggregate on top of stabilized base, which limits the types of cargo the Port can store in the area. Additionally, there is an approximately eight-foot difference in elevation between Area 6 and the adjacent Area 3, negatively impacting port operations. Currently, the existing rail spur [illegible] delivered [illegible] roads [illegible] port [illegible] to optimize [illegible].

[illegible] to [illegible] Area 6 [illegible] surface for [illegible] the rail spur would also be relocated to eliminate crossings with Port roads. High mast lighting would be installed in the area to improve safety and visibility for all port users.

Improvements to Area 6 will create valuable storage space for diverse types of cargo, such as containers and finished vehicles, which cannot currently be accommodated due to the existing aggregate surface. Port Freeport's burgeoning container and roll-on/roll-off cargo segments would benefit greatly. Additionally, relocating the rail spur will eliminate the two road crossings, allowing for more effective and efficient traffic movements throughout the port.

Failing to construct the necessary improvements in Area 6 will continue to present safety concerns and delay growth for the port by limiting the available cargo that can be stored in the area. Operational efficiency within Area 6 is currently hindered by differences in grade elevation within the area as well as by [illegible]s at the nearby rice mill. [illegible] Area 6 and enables [illegible]owth in profitable

Funding Status



Confirm correct costs

Project Status

The project is a priority project for the Port and is listed in Port Freeport's FY2024 Capital Plan. The project was listed in 2023's Capital Budget, which was approved by the Port Commission.

Scoping and planning for the project are approximately 60[illegible] complete, with design also being approximately 60% complete. Completion of these tasks is dependent on securing funding and Port Commission approvals of AFA with TxDOT. The project would be lettable within the 2026-2027 biennium and constructible by the end of the 2030 fiscal year.

The project has received a USACE 404 permit as well as a USACE 408 authorization. Environmental review and permitting for the project are also complete.

Provide text updates as needed

Photo / rendering provided by port

Operations

- Fixes elevation issues along with relocation of the rail spur
- Improved efficiency due to removal of rail/roadway intersections
- Opens a smooth, seamless area for container handling, terminal handling with direct access to Gate 12

Connectivity

- Area 6 will have access through Gate 12 which will handle containers or roll-on/roll-off cargo
- Proximity to new roads and Hwy 36 or 332/288 corridor will increase connectivity and feed Velasco Terminal and expansion areas

Safety

- Project will improve safety by reducing congestion, as cargo currently stored in this area must be moved through the port, starting in Brazos harbor, going through multiple four-way stops, railroad crossings, and navigating around other terminal traffic. [illegible]dditional surfacing created [illegible]hrough the project will [illegible]gnificantly reduce travel [illegible]istance for unloaded cars. [illegible]mproved rail spur safety by [illegible]emoving intersections. [illegible]igh mast lighting will improve [illegible]afety and security for all port users.
- Fire hydrant installation will

Project Profile – Seaport Connectivity & Ship Channel

Harborside Drive Port Sidewalks

Port of Galveston

Project Category: | **County:** Galveston | **Project Status:** Study Authorized | **Total Project Cost:** $400,000

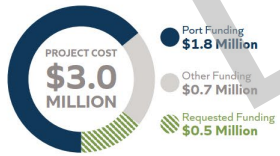
Connectivity Issue

The Port of Galveston is the Gulf's premier cruise ship port. Thousands of cruise passengers annually debark from the terminal at 25th Street. Many of these passengers park in surface lots along Harborside Drive and walk to the terminal along a busy roadway segment that lacks pedestrian facilities.

Solution

The US Congress has authorized the deepening of a significant reach of the BIH Ship Channel from its previous authorized depth of 42 feet to its current authorized depth of 52 feet, including deepening of the entrance channel and jetties to 54 feet and deeper as appropriate. To expand on the benefits of this current channel deepening, the Port has expressed interest in taking advantage of the proposed deeper channel draft by also proposing to modify six docks within the footprint of the channel deepening. The proposed project for this iteration of the PCIR would be a feasibility study to determine the extent of the benefit that would result from deepening the six docks. The feasibility study would result in a Feasibility Report quantifying the benefits using a cost to benefit ratio.

Funding Status



- Port Funding **$1.8 Million**
- Other Funding **$0.7 Million**
- Requested Funding **$0.5 Million**

PROJECT BENEFITS

Safety
- Bullet point with text bullet point with text bullet point with text
- Bullet point with text bullet point with text bullet point with text
- Bullet point with text bullet point with text bullet point with text

Economics
- Enhances trading of major commodities (petroleum products, dry bulk, wind turbine components)
- Fuels trade between Texas and Mexico.
- Increases revenue and creates jobs for the port and for its customers.

Operations
- Improves cargo movement and reduces transit times
- Provides direct access for large, fully loaded vessels
- Removes the need for barges and vessels to light load

Other
- Bullet point with text bullet point with text bullet point with text
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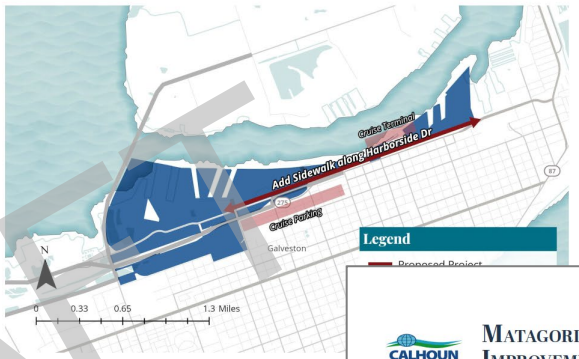
- Bullet point with text bullet point with text bullet point with text

TxDOT Maritime Division



Matagorda Ship Channel Improvement Project

Calhoun Port Authority

Project Category: | **County:** Matagorda | **Project Status:** Preliminary Design | **Total Project Cost:** $600,000,000

Project Description

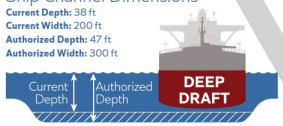
The Matagorda Ship Channel (MSC) is a 26-mile federally authorized and maintained deep-draft waterway located in Calhoun and Matagorda counties. The channel provides access from the Gulf of Mexico to the Calhoun Port Authority (CPA) and accommodates shallow-draft vessels from Port Lavaca and the Port of Palacios. Most deep-draft users are located in the vicinity of the CPA facilities, which are located at the upstream terminus of the federal channel.

The USACE Chief's Report proposes adding a new 1,200-foot turning basin in the Lavaca Bay reach to accommodate the larger vessels; extending the entrance channel 13,000 feet into the Gulf of Mexico to allow for deepening to 49 feet; dredging a 1,600-foot-long sediment trap in the area of the offshore bar; widening the Entrance Channel from 300 to 550 feet and the Main Channel from 200 to 300 feet; deepening the Entrance Channel to 49 feet and the Main Channel to 47 feet.

The existing channel was designed for vessels with loaded drafts of less than 38 feet and accommodates 25,000 to 30,000 deadweight ton (DWT) vessels. Under current market conditions, vessels up to 80,000 DWT access the channel and are required to light-load before entering the port. Once the improvements are completed, it is expected that the port will begin to see mid-size Aframax tankers, which will provide nearly double the tonnage capacity of the existing lightered Panamax vessels for transporting crude oil and petroleum products. Deepening and widening the channel will reduce lightering, reduce navigation costs, increase port efficiencies, and produce large amounts of sediments for beneficial use.

Ship Channel Dimensions

Current Depth: 38 ft
Current Width: 200 ft
Authorized Depth: 47 ft
Authorized Width: 300 ft

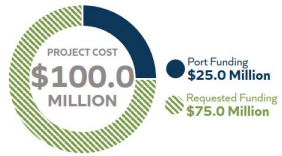


Project Status

The Feasibility Report and Environmental Impact Statement were completed in August 2019 and the USACE Chief's Report was signed in December 2019. The project was ultimately authorized by WRDA 2020. The project is currently in the engineering and design phase, having been awarded $1,809,000 in the USACE FY21 Work Plan.

Construction of the project will require dredging an estimated 20 million cubic yards of new work material that will be used to create islands, widen beaches, and more. Bidding and initiation of dredging is anticipated to begin in 2026.

Funding Status



- Port Funding **$25.0 Million**
- Requested Funding **$75.0 Million**

PROJECT BENEFITS

Economics
- Enhances trading of major commodities, such as petroleum products and crude oil
- Doubles the tonnage capacity of existing lightered Panamax vessels by accomodating mid-size Aframax tankers

Macro-Economics
- $12.3 billion of economic activity
- $125.2 million in state and local taxes generated
- Supports 48,000 port-related jobs
- $2.6 billion created in overall personal income

Environmental Stewardship
- Project includes creation of up to 300 acres of beach/dune habitat and creation of oyster reefs

Project Development
- Project is needed to complete additional capital investments such as dock and wharf modifications ancillary to the federal project

Project Funding
- In 2021, CPA entered a public-private partnership with Max Midstream to invest $360 million into the channel and other capital improvements. In June 2021, the CPA approved issuance of $120 million dollars in bonds to begin channel upgrades

How should my team provide edits?

There is (almost) no wrong answer.

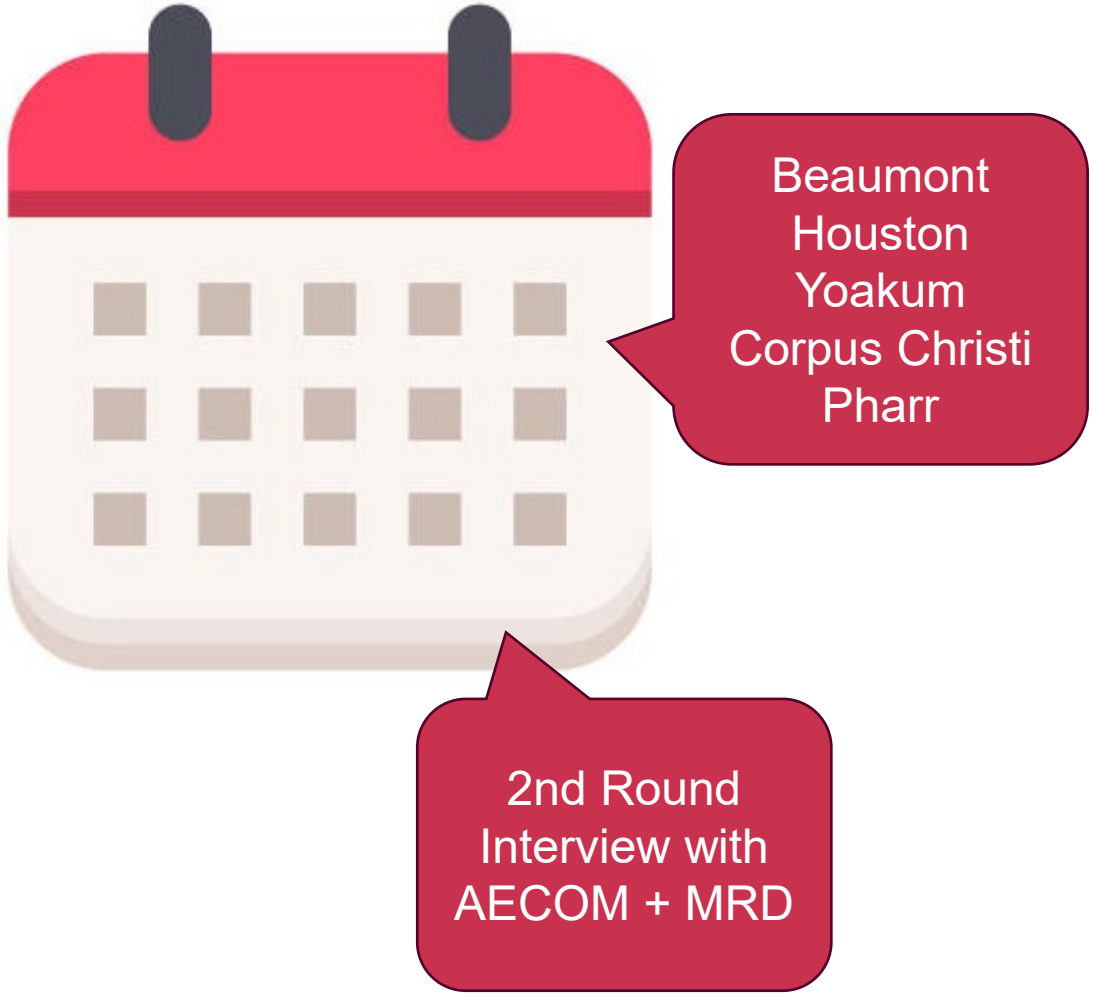
- By email
- Directly on the PDF
- Over the phone
- During 2nd round interview

03

Next Steps

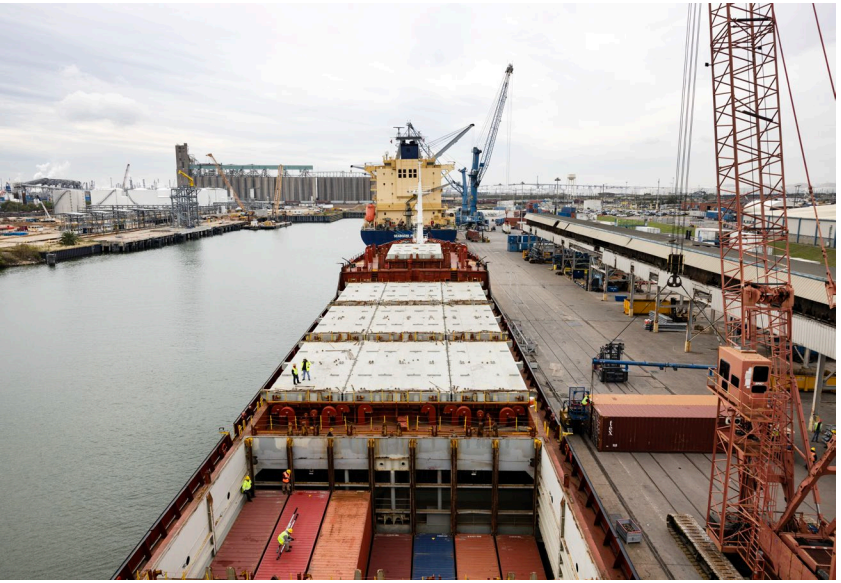
Two Upcoming Meeting Opportunities

- **District Meetings**
  - With each of the 5 coastal Districts
  - Summarize projects by district
  - Highlight regional connectivity issues
  - Ports are encouraged to attend
- **2nd Round Port Interviews**
  - Finalize port materials
  - Add, delete, revise project



Next steps for ports

- **Review your port materials <u>by June 7, 2024</u>**
- **Reply to emails** from Amiah Williams at Hollaway to schedule your 2nd round interview
- **Attend District calls**—your feedback is important
- **Please send us port photos!**



Questions?

Thank you for your continued support of the 2026-27 Port Mission Plan.

Texas Truck Parking Action Plans

Port Authority Advisory Committee

Agenda

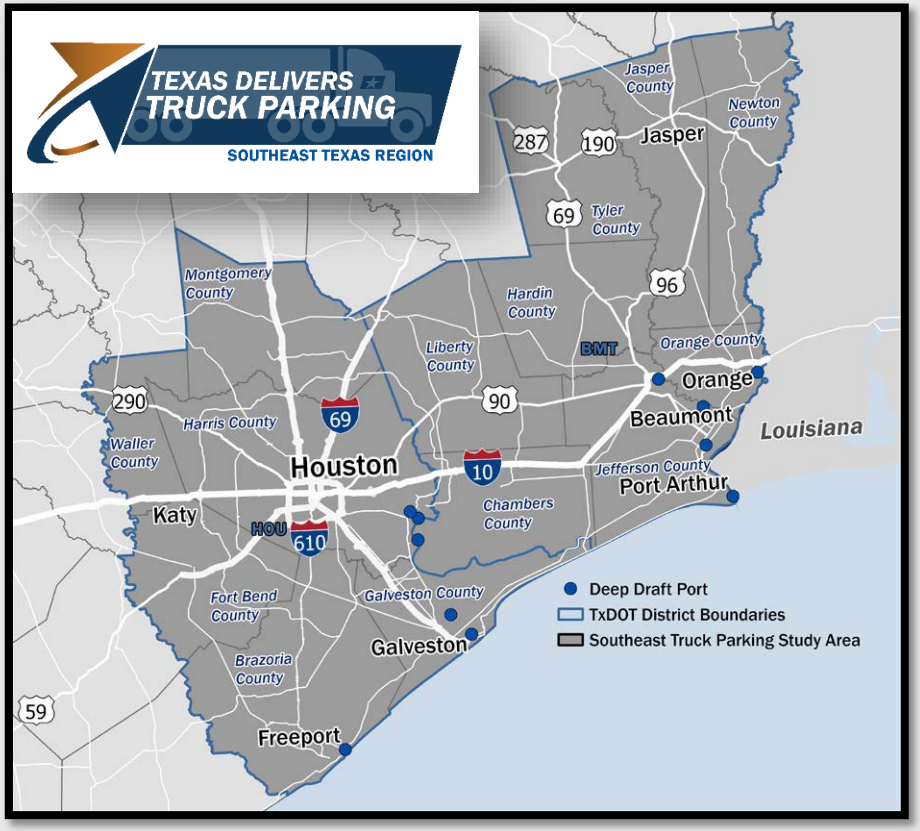
1. Overview of Truck Parking Action Plan
2. What we have heard to date
3. Potential projects, policies, and programs
4. Schedule and next steps

Overview of Truck Parking Action Plan

Southeast Texas Truck Parking Action Plan

- TxDOT Transportation Planning and Programming Division
  - Recommendation from the *2020 Statewide Truck Parking Study (TPS).*
  - TxDOT-led and supported local action plans.
  - Study Area: TxDOT Houston and Beaumont Districts, H-GAC, Southeast Texas Regional Planning Commission, and ports.
  - Stakeholder engagement.
  - Outcomes: conceptual action plans, preliminary cost estimates, short, mid, and long-term phasing concepts.

Summer 2024 – Final Action Plan



Why do truck drivers need to park?

Federal Hours of Service (HOS) regulations include strict provisions on driving limits and rest breaks, enforced by in-cab electronic logging devices.

Local community regulations/ordinances restrict parking locations and duration.

Types of Truck Parking

10-hour Rest

Challenge:

- Drivers on roads for days and weeks for cross-country trips.

30-Minute Break

Challenge:

- Off-duty drivers cannot move the truck for any reason.

Time Off

Challenge:

- Off-duty independent drivers need a place to park their truck.

2+ Hour Staging

Challenge:

- Drivers pick up and deliver freight at manufacturing plants, warehouses, and distribution centers.

Emergency

Challenge:

- Incidents that close or congest the roadway result in drivers needing a place to park.

Intermodal (Ports)

Challenge:

- Truck staging/parking needs near ports.

Stakeholder Engagement

What We've Heard

What We Have Heard to Date

- There is a need to incentivize private development.
- Must think creatively about land use.

- Ports are supportive of truck parking near facilities and near interstates.
- Ports are actively planning for truck parking projects.

- In the Southeast, hurricanes and flooding are significant hazards to consider.
- Truck staging for hurricane evacuation/emergencies should avoid storm surge.

Potential projects, policies, and programs

Potential Projects, Policies, Programs, and Technologies

TxDOT - Led

- New parking capacity
- Technology (TPAS, ConnectSmart, data)
- Truck parking guidance
- Education campaign
- Integrate truck parking into project development process

TxDOT - Supported

- New parking capacity
- Innovative funding partnerships
- Industry-provided truck parking

I-10 Corridor Coalition Truck Parking Availability System (TPAS)

California	243 Miles	6 Sites
Arizona	392 Miles	8 Sites
New Mexico	164 Miles	5 Sites
Texas	881 Miles	18 Sites
Total	1,680 Miles	37 Sites

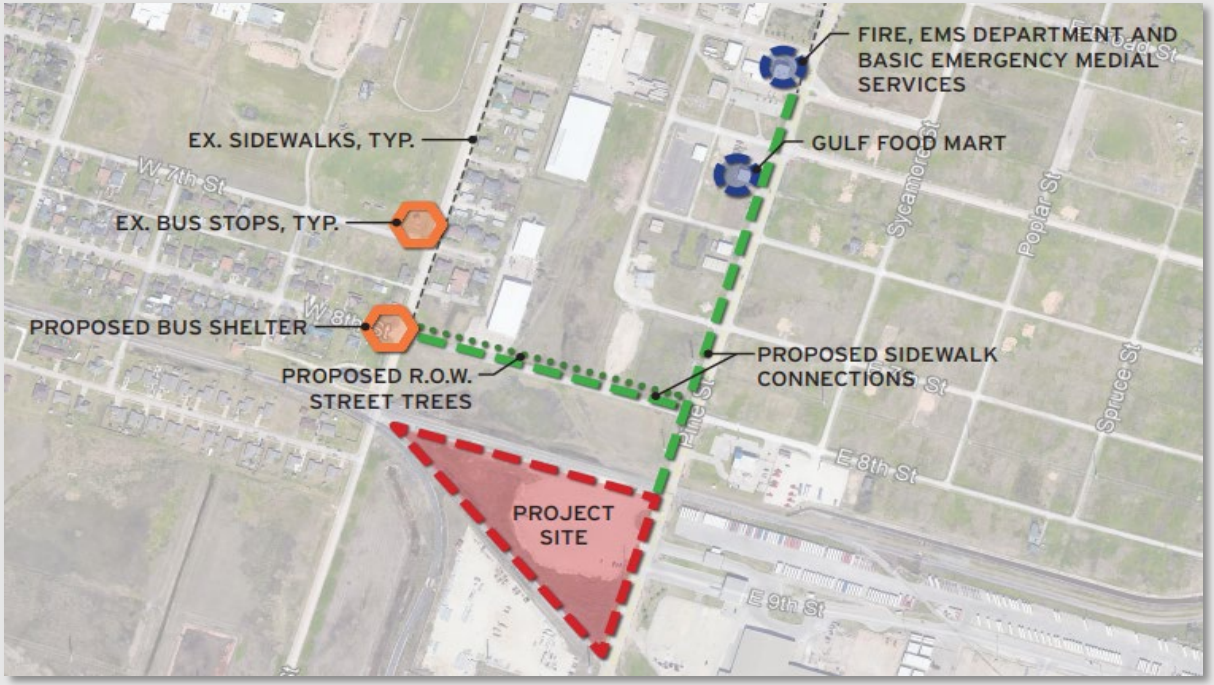
NM DMS sign on I-10 west of Las Cruces
(Source: NMDOT)

Port Freeport Site

- Innovative partnership between TxDOT and Port Freeport to fund and build truck parking infrastructure. TxDOT led the design and grant submittal. Port Freeport will operate and maintain the facility.
- Provides staging area truck parking spaces with an office building for Port Freeport operations staff.
- Provides EV charging stations for trucks and passenger vehicles and aligns with TxDOT's NEVI Plan.
- Houston District has submitted the project for a RAISE and MPDG Rural grant.
- Project to be included in the 2026-2027 Port Mission Plan.

Grant Support - Freeport Site

- Provides ADA-compliant sidewalks to community resources.
- Increases affordable mode choices, such as transit.
- Improves public health through the addition of trees and active transportation facilities.



Schedule & Next Steps

Project Milestones and Schedule

2022	2023				2024		
Fall	*Winter*	*Spring*	*Summer*	*Fall*	*Winter*	*Spring*	*Summer*

Kickoff/Develop Plan, Vision, Goals and Objectives

Identify Truck Parking Needs

Identify Improvement Strategies

WE ARE HERE

Conceptual Design for Truck Parking Sites

Develop Action Plans

Legend

- Agency Presentations
- Freight Industry Engagement
- External Government & Partner Agency Meetings

Timeline subject to change

STAKEHOLDER ENGAGEMENT

Thank you!

- TxDOT Project Manager

  Kale Driemeier
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- HNTB Consultant Project Manager

  Brian Comer, AICP
  Bcomer@HNTB.com

Any questions?

Thank you for participating. Your input helps TxDOT deliver truck parking to the southeast Texas region!

Automatic Identification System Platform - Gulf Intracoastal Waterway

Maryam Hamidi, PhD
Associate professor,
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May 2024

AUTOMATIC IDENTIFICATION SYSTEM APPLICATION - GULF INTRACOASTAL WATERWAY

Atefe Sedaghat

Doctoral Candidate

Masood Jafari Kang

Post Doctorate Student

Homayoon Arbabkhah

Doctoral Student

Maryam Hamidi

Associate Professor

Goal and Challenges

- Developing a publicly available platform that dynamically obtain and process AIS data to visualize and analyze vessel movements and identify trajectories.
- AIS data contains static and dynamic information
- volume of generated data is difficult to process and time consuming
- contains noise and false data

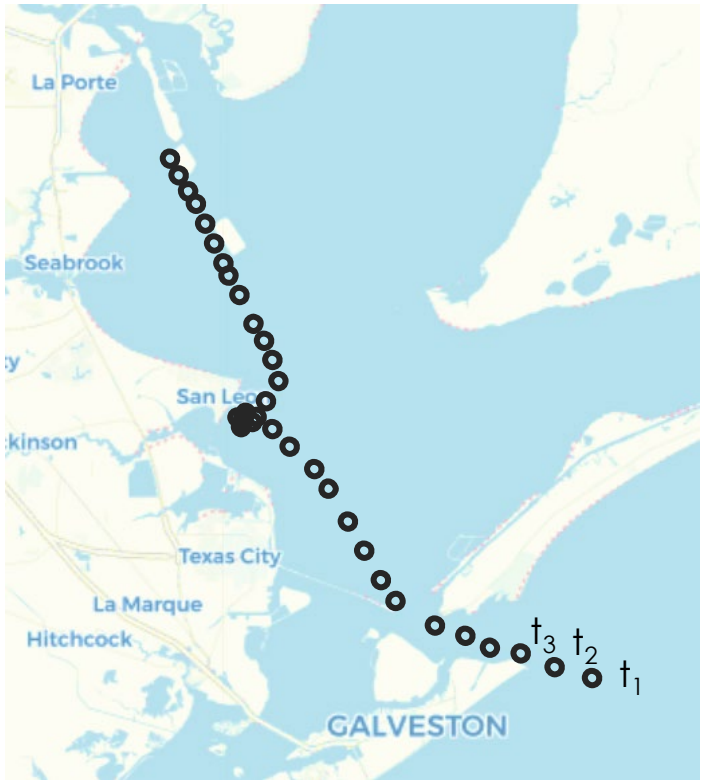
MMSI	Timestamp (UTC)	Longitude (°)	Latitude (°)	SOG (Kt)	COG (°)	True Heading (°)
412XXX410	1539561613	121.9508	30.4141	4.6	59.0	70
412XXX410	1539585463	121.9511	30.4142	4.6	59.5	71
412XXX410	1539585473	121.9513	30.4143	4.6	60.0	70
412XXX410	1539585492	121.9517	30.4145	4.6	59.9	68
412XXX410	1539585503	121.9519	30.4146	4.6	59.1	68
412XXX410	1539585533	121.9526	30.4150	4.6	58.0	71
412XXX410	1539585533	121.9530	30.4152	4.6	59.0	72

Extracting the Data

- Data is filtered based on Area of Interest (AoI).
- Data-cleaning process by removing any incomplete or null values.

Applying Sample Rate

Fast processing

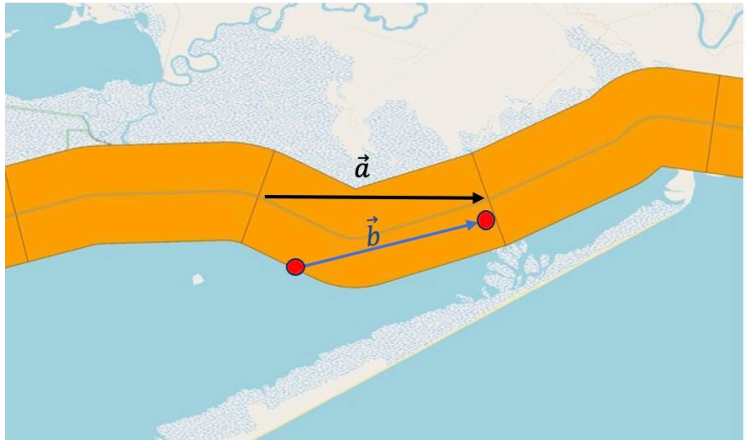


	Time
t1	8/1/2018 7:15:45
t2	8/1/2018 7:17:15
t3	8/1/2018 7:18:47
t4	8/1/2018 7:19:54
t5	8/1/2018 7:24:37

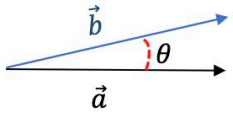
Finding Segments

Vessel Direction

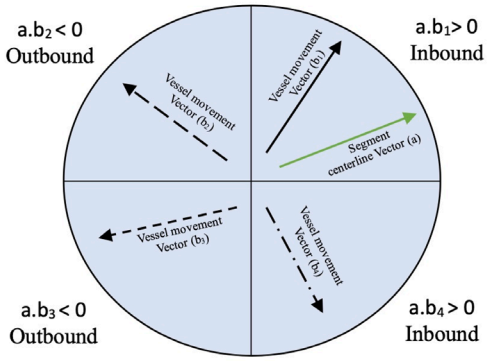
Inbound, Outbound, Stop



a: segment centerline vector
b: vessel movement vector



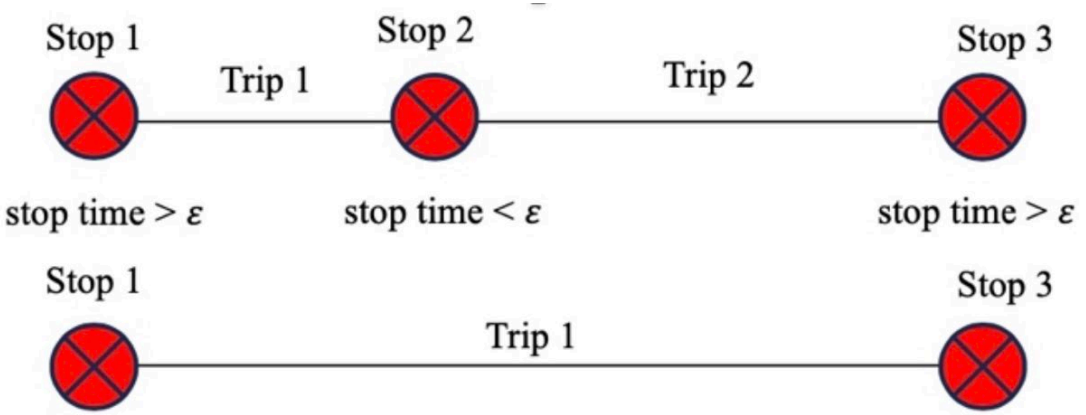
$$a.b = |a|\ |b| \cos(\theta)$$



$$\begin{cases} 0 < \theta \leq 90 & if \quad a.b > 0 \\ 270 < \theta \leq 360 & if \quad a.b > 0 \\ 90 < \theta \leq 270 & if \quad a.b < 0 \end{cases}$$

Trip Separation and ID

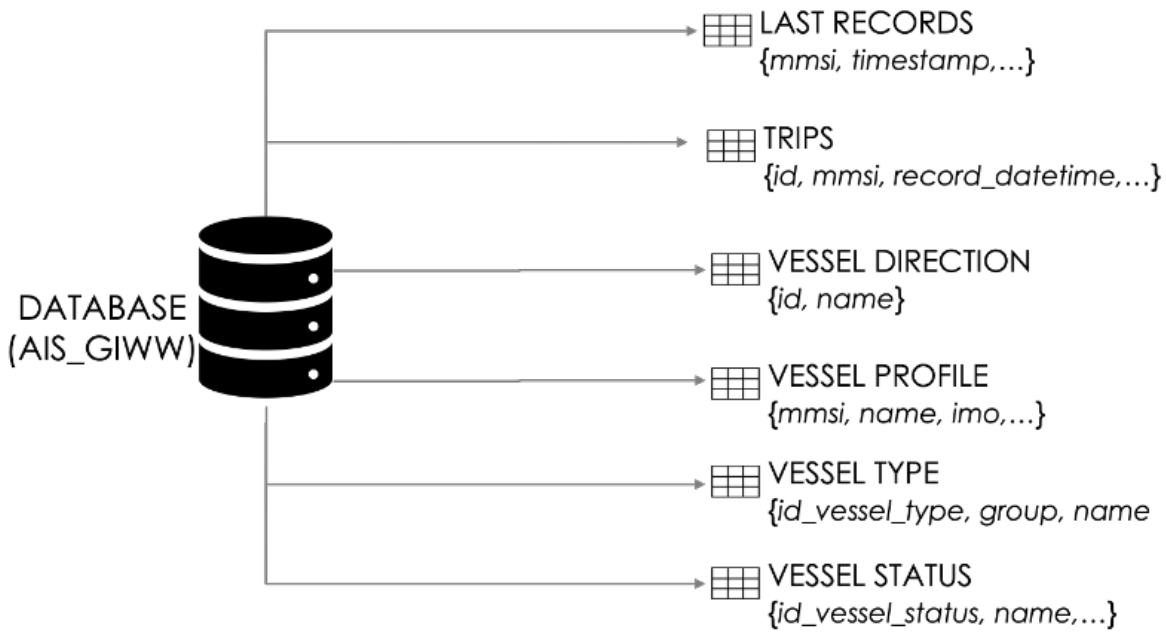
Chemical Tankers have several trips in one visit
Several visits in short period



Database Design

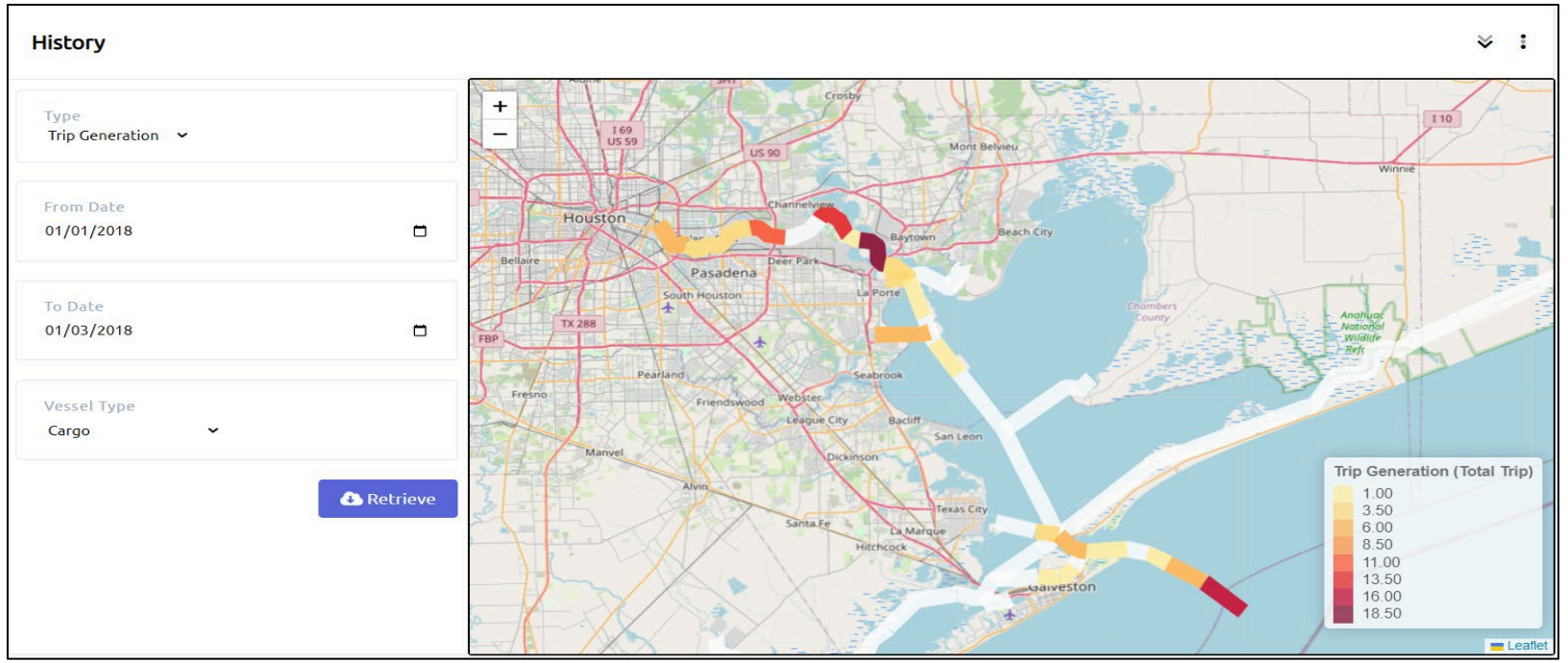
Compresses vessel data while retaining useful information, also adding features such as trip ID, trip origin/destination, traffic density, and traffic flow

```
08:57:23: loading data from API 2018-01-02T00:00:00 to 2018-01-02T00:05:00 ...
08:57:24: 26935 records are loaded from API.
08:57:24: getting data in AoI...
08:57:24: 3522 records are located in AoI.
08:57:24: cleaning data...
08:57:24: 3390 records are filtered as cleaned data.
08:57:24: transforming data...
08:57:32: 583 records are processed.
08:57:32: Inserting new vessel data...
08:57:32: 0 vessels were added to the database successfully.
08:57:32: Inserting new trip data...
08:57:33: 583 records were added to the database successfully.
08:57:33: Inserting last records...
08:57:34: 1166 records were added to the database successfully.
08:58:34: loading data from API 2018-01-02T00:05:00 to 2018-01-02T00:10:00 ...
08:58:34: 23892 records are loaded from API.
08:58:34: getting data in AoI...
08:58:34: 3212 records are located in AoI.
08:58:34: cleaning data...
08:58:34: 3093 records are filtered as cleaned data.
08:58:34: transforming data...
08:58:43: 543 records are processed.
08:58:43: Inserting new vessel data...
08:58:43: 0 vessels were added to the database successfully.
08:58:43: Inserting new trip data...
08:58:44: 543 records added to the database successfully.
08:58:44: Inserting last records...
08:58:44: 1086 records added to the database successfully.
```



UI Development

- https://aisapp.lamarhamidi.com/



Contribution

- Publicly available platform for AIS analysis
- ETL pipeline is highly efficient, processing ten million records takes ten seconds
- VTS does not monitor the whole waterway
- Data base is needed for implementing ML predictive algorithms such as next location for avoiding vessel collision, demand prediction, and efficiency metrics

Thank you

Texas Beneficial Use of Dredged Material Master Plan

Ray Newby, P.G.
Waterways Program Coordinator
TxDOT Maritime Division

May 24, 2024

The Dredge Material Disposal Issue

- USACE contracts over 30 million cubic yards of dredging annually
- Private entities and Ports have additional dredging needs
- Existing placement areas provide few environmental benefits and are nearing capacity
- Texas is losing coastal marshes, beaches, and other resources due to erosion and relative sea level rise
- Beneficial Use of Dredged Material (BU) can help to reverse habitat loss

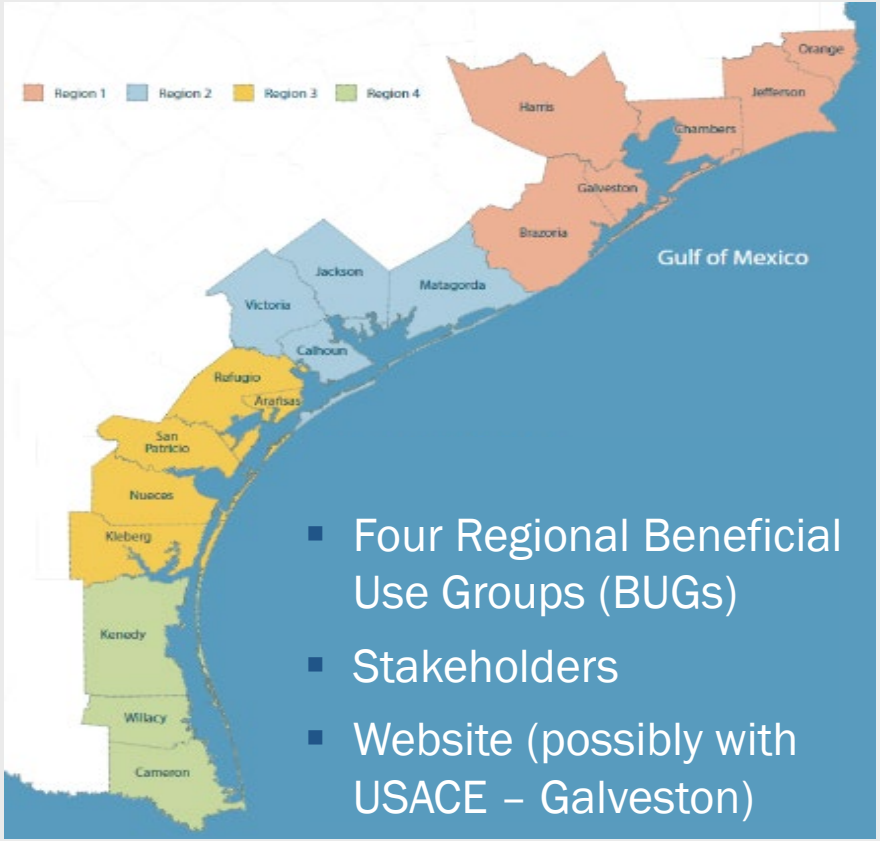
Beneficial Use Challenges

- Successful BU projects require:
  - A source of sediment
  - A degrading resource and opportunity for enhancement
  - Schedule coordination
  - Logistics planning
  - Environmental permits
  - Funding
  - Land use authorization
  - Collaboration among entities

A Solution: The Texas BU Master Plan

- Master Plan focused on BU
  - Coordinate efforts to identify opportunities and efficiencies
  - Build consensus to identify and prioritize sites
  - Produce plans and guidelines to reduce costs and accelerate projects
- Types of projects
  - USACE/TxDOT
  - Ports, private entities, etc.
- Plan will be non-regulatory and non-binding
- Funded by Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act) through TCEQ

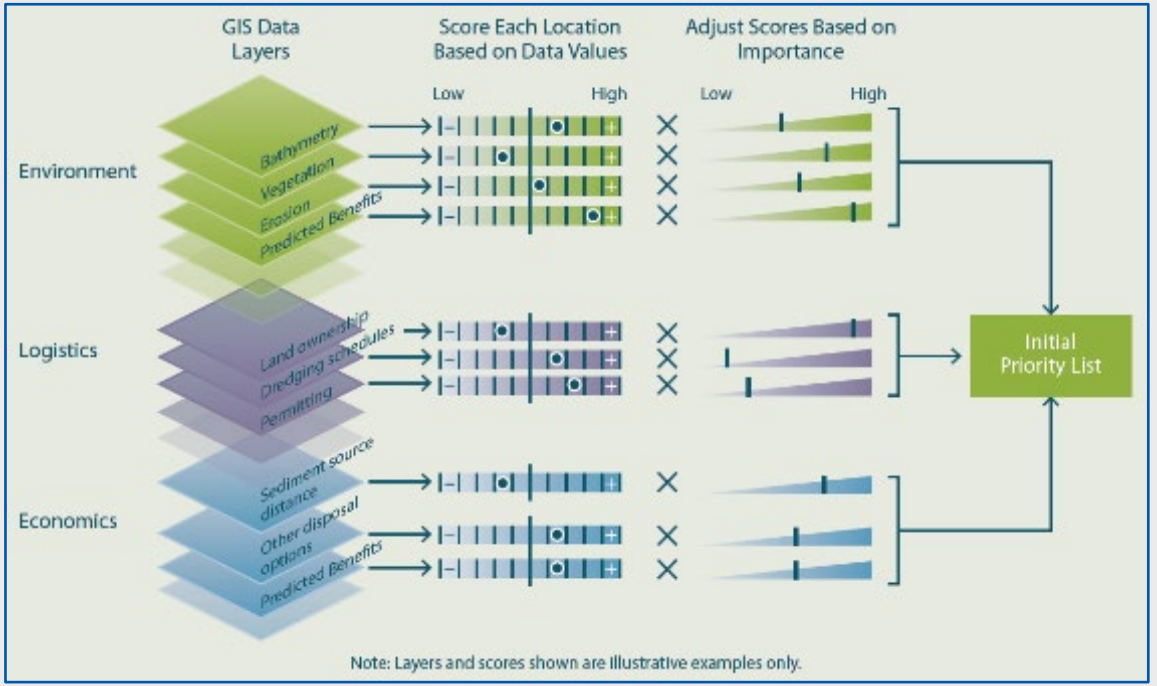
Coordination and Outreach



- Four Regional Beneficial Use Groups (BUGs)
- Stakeholders
- Website (possibly with USACE – Galveston)

Decision Support Tool

- Custom GIS tool to combine BUG/stakeholder input with data to establish initial priority list



Conceptual Level Design and Cost Estimates

- 10% design and cost estimates for 20 to 28 sites
  - Containment concept
  - Sediment amount and type
  - Distance from sediment sources
  - Dredging schedules
  - Intended benefits
    - Economic benefits
    - Ecosystem services

Master Plan and Implementation Guides

- Master Plan
  - Document data, methods, and conclusions
  - Guide for programmatic implementation
- Implementation Guides
  - One per region
  - A practical resource for project proponents
  - Maps of BU sites, priorities, and considerations
  - Guidance on permitting and coordination
  - Discussion of funding sources

BU Master Plan Summary

- Designed to reflect the will of BUGs and stakeholders
  - All BU project types will be considered
  - Regional priorities will be established by regional BUGs and stakeholders
- Complements other efforts
  - Texas GLO Texas Coastal Resiliency Master Plan
    - BU sites from TxBUMP will be considered
  - USACE Galveston BUDM GIS Hub
    - Potential host of TxBUMP web site
    - USACE goal of 70% BU by 2030

Questions/Discussion?

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Texas Department of Transportation

May 24, 2024