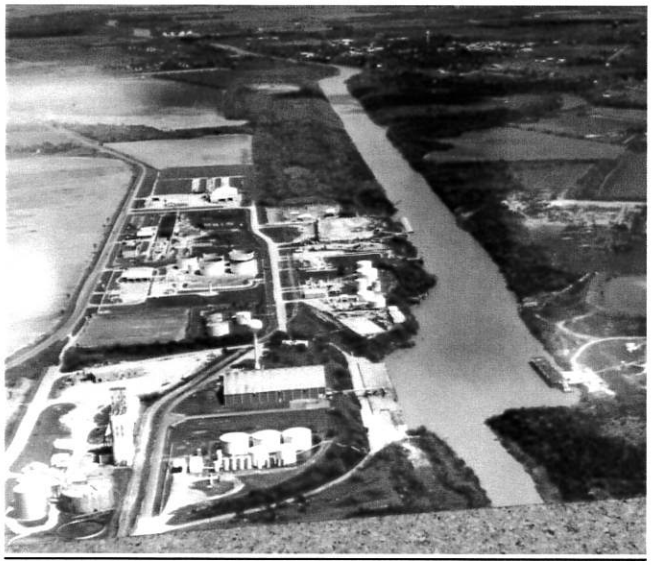


Port of Harlingen Master Plan

Prepared for:
The Port of Harlingen Authority

Prepared by:
HDR Engineering, Inc.

July 8, 2019



Background

Port of Harlingen is located in the southernmost tip of Texas on the Arroyo Colorado River. The Port is located 25 miles inland of the Gulf Intracoastal Waterway, which stretches from the Mexican border (Brownsville) along the entire coast of the Gulf of Mexico, and northward along most of the U.S. Eastern Seaboard for approximately 1,050 miles. The Harlingen channel is maintained to a width of 125 feet and a depth of 12 feet with a turning basin that is approximately 400 feet wide and 14 feet deep[1].

With the expansion of the Panama Canal Locks in 2016, there has been an increase in international vessel movement of commodities to the Gulf coast region. The Port facilitates trade of bulk and liquid cargo in Texas, Louisiana and Mexico. The Port has operated over 80 years since 1926 and is strategically located to provide an important hub to the South West Texas region, Rio Grande Valley and the Mexican border. It provides an efficient and economical transportation link along the Texas gulf for shallow draft barge movement. With over 15 ports along the Texas coast, the Port of Harlingen has access to several major markets via this International Waterway, which provides over 1,300 miles of protected waterway and connects to several navigable rivers through which shipping traffic travels to inland ports. The Port handles mostly agricultural products and fertilizer; however, diesel fuel has also become a very good opportunity for the Port.

The Port of Harlingen provides efficient and economical transportation to markets as close as Corpus Christi and as far away as the Great Lakes approximately 1,600+ miles away and into the central eastern regions of Canada. The Port is the second largest in Cameron County, with an overall cargo tonnage of 1 million annually. It sits on over 2,000 acres of land with 650 linear feet of dry cargo wharf, 100 linear feet of dry bulk wharf and 5 docks; and continues to serve as a strategic link in the comprehensive transportation network of South Texas.

The Port's strategic location offers a comprehensive transportation network with easy access to rail, air, international highways, and ports of entry:

- Port has direct connections to US-77, US-83 and Interstate I-69. The Port handles an estimated 25,000 to 30,000 trucks per year.
- Terminal rail is served by Union Pacific with interline connections to Burlington Northern Santa Fe and Kansas City Southern de Mexico. There are an estimated 150 to 175 rail moves per year at the Port.
- Air service through the International Air Cargo facilities at Valley International Airport.
- Foreign Trade Zone Number 62, one of the largest in Texas, covering the Harlingen Industrial Park and Airpark.
- Port is pipeline served with connections to terminal areas in the Port.
- General Statistics1
    - 1.42 million tons of commodities handled in 2018
    - $169.9 million in total wages and salaries

[1] Texas Department of Transportation, Martine Associates Economic Study, Port of Harlingen

- $96.47 million in business revenue
- $19.3 million in economic impact
- 525 direct and indirect jobs

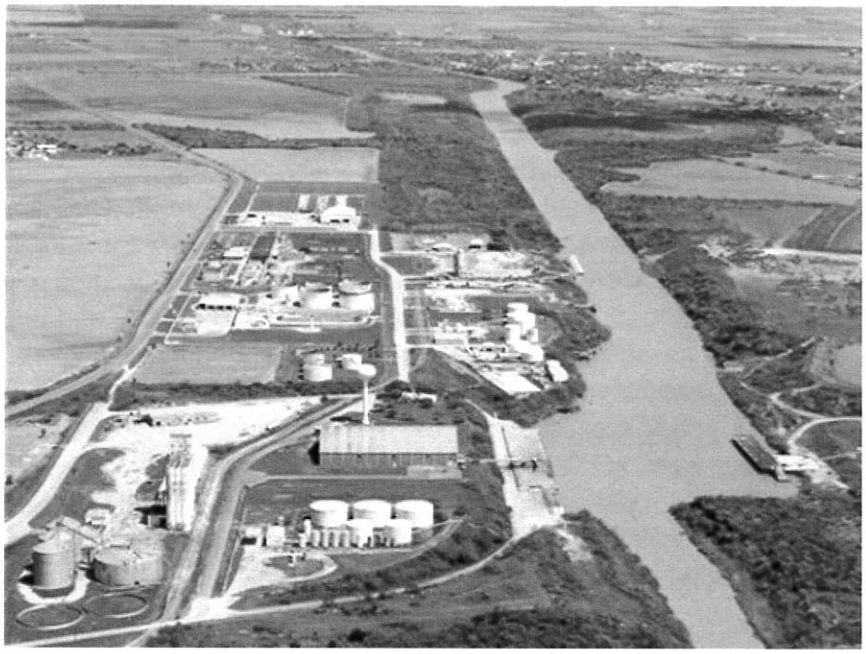


Figure 1 Port of Harlingen (Source: Port)

The Port of Harlingen is similar to other inland river and "brown" water ports in size and scope of operation, as well as assets. The Port consists of an industrial park, which serves as a transportation center, and an intermodal facility. Revenue is generated by tonnage and usage fees, and the Port is also supported with public tax dollars. The Port relies on infrastructure grants from the State of Texas Department of Transportation, and the other O&M maintenance funding from the federal government (i.e. US Army Corps of Engineers), for waterway improvements and maintenance dredging. The Port is classified by the Texas Department of Transportation as a shallow draft, commercial niche port.

The Port of Harlingen Authority, enabled in 1926, is governed by a three person Board of Port Commissioners. The Port is managed by a small staff of four employees, including the current Port Director, Walker Smith, and his support staff consisting of an Administrative Assistant/Bookkeeper, Secretary, and a Maintenance Supervisor. The Port also utilizes a contract engineering firm, Ferris and Flinn Engineering, for required repairs and structural services[2].

1.1 Scope and Purpose

There are a number of potential opportunities within the geographic region of the Port as well as the ability to expand the Port's existing business and revenue base. The Port wants to be in a position to plan and optimize its current assets while developing

[2] Port Staff Interview, February 2019.

new and diversified income streams and business development including increased and expanded cargo volumes. Port and terminal planning is the key to developing a specific roadmap to growth. The Port's Master Plan should be methodical, and easy to understand; particularly for participants and those who are going to work with the plan, The Master Plan should also be justified with accurate data, anticipate impacts on all stakeholders, be based on good information, and have measurable economic advantages. The planning process to develop the plan document should be done in a manner that provides for regulatory and public scrutiny, and review.

For ports, the planning process incorporates four different types of planning which include Strategic Planning, Master Planning, Logistics Planning and Cargo Planning. *Strategic Planning* sets goals for the Port based on the port's assets, capabilities, business opportunities, resources and potential improvements. *Master Planning* looks at the Port's assets and provides design alternatives based on the condition of the facilities, needed improvements and potential business opportunities as developed in the Strategic planning process. *Logistics Planning* looks at the tactical move of commodities including the origin and destination flow of cargo. Finally, *Cargo Planning* looks at preserving the intrinsic value of the commodity to the benefit of the shipper. All of these are critical to successful port development and operations. As a landlord port, the first three are the most critical in planning the Port's development and business growth.

Under this project, the Scope of Work included the following:

Task 1 - Project Initiation & Controls.

This work will involve general project management duties of the project. This included a Quality Management Plan and other documents needed for project execution.

Task 2 - Initial Meeting and Site Survey.

In the initial step, HDR's port professional team met with the Port's management personnel to discuss what data is available, do a general assessment of the existing facilities and look to quantify the Port's vision. From this initial interview and site visit, HDR developed Strategic Objectives as part of a technical memorandum for the Port management team to review.

Task 3 - Business Opportunities.

HDR looked at the current and past business of the Port. As part of our site visit we toured key facilities as well as met with personnel handling cargo at the Port. Key to this task was a discussion with the company handling the diesel fuel, which represents a significant commodity to the Port. Their expansion plans were also discussed, and sites reviewed to look at current and proposed activities. In addition we reviewed general information that is readily available from previous studies as well as any studies that have been done for the Port, the region and the State including our own research and database on industry information. We also accessed public data that was available from appropriate government sources such as the Texas DOT and US Department of Commerce to identify tends and quantify the visionary concepts. HDR used this information to develop business targets, ranked by potential, and provide general information on the Port's ability to attract those businesses.

Task 4 – Infrastructure.

HDR looked at the Port's existing infrastructure and developed conceptual plans and recommendations for improvements and modifications; including preliminary estimated costs. This included the property, road, rail docks, waterway shorelines, dredge disposal areas, tenant facilities and barge, rail, road and dock operations. This is the basis for the conceptual Master Plan for the Port, which is included in this report.

Task 5 - Strategic Action Plan Development and Conceptual Level Design.

Once all of the data was gathered and analyzed, HDR presented the Port's management staff and Commissioners with the draft Strategic Action Plan based on findings. The plan is designed as an action document, small short term steps toward achieving a larger long term goal and is built on a timeline with goals and objectives that can be used as a management tool and a measure of progress.

1.2 Approach

Strategic Plan Development is based on a carefully determined step by step approach to setting goals and objectives based on data, research and findings. HDR uses a specific process that has been utilized in our numerous strategic planning efforts. The process is based on a wide range of experience in ports throughout North America and is taught and recognized in the port management educational program we support through the International Association of Maritime and Port Executives (IAMPE).

The plan process involves the following:

1. Develop initial vision and strategic concepts
2. Conduct a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis
3. Develop a conditional survey of facilities and a functionality assessment
4. Review historic trends for the port/region based on available or researched data
5. Compare historic trends potential and perspective business based on data
6. Develop infrastructure plan concepts, estimated phasing and costs
7. Identify funding sources
8. Prepare a strategic action plan for approval and implement

Step 1: Initial Meetings and Site Survey

In the initial step, HDR's port professional team met with the port's management personnel to discuss what data is available, do a general inspection of the facilities and look to quantify the Port's vision. We asked a number of questions in the initial visit:

1. Is there a vision for the Port?
2. What does the SWOT analysis tell us?
3. What do we have to work with?

4. How are assets utilized & how do they function?
5. What is the growth capability and expandability?
6. What data do we need to quantify objectives?
7. What industries might be appropriate?
8. Are there potential/probable business opportunities?
9. Who are the stakeholders and how would they be included?
10. What are the political winds?
11. What financial resources are available?
12. What financial resources are needed?
13. What is the availability of staff?
14. What will be the Port's first steps?

From this initial interview and site visit, we developed a series of visionary Strategic Objectives for the Port management team to review and using research, quantified real opportunities, goals and objectives.

Step 2: Business Opportunities

Step 1 allowed HDR to understand what assets the Port has to work with and what services can be provided. A refined SWOT analysis looked at:

- Flexibility, adaptability and limitations
- Internal and external impacts
- Potential costs
- What we have, what we need, what is helping/hurting
- Realistic potential opportunities
- Business stakeholders and their potential interest
- Historic and current business trends
- Staff expertise
- Identifying and /analyzing threats-what must we overcome.

After a review of all of the available information HDR used that data to identify potential business opportunities and business sector ideas. HDR also met with various tenants to view their operations and discuss current and future plans. This included a review of historical data and tends to quantify the visionary concepts which was analyzed according to practicality and potential.

Step 3: Infrastructure

Step 3 looked at the infrastructure and how the site functions. From this recommended improvements and modifications including estimated costs could be suggested. Understanding how public agencies work, HDR prioritized recommended improvements and phases and included a future cost of money given the often long

process of getting financial allocations or applying for grants. This was the basis for a future Master Plan for the Port which addresses infrastructure. HDR developed several high level concept drawings for review.

Step 4: Strategic Action Plan

Once all of the data was gathered and analyzed, HDR prepared the Strategic Action Plan based on draft recommendations. This took into account the availability of the Port's human resources. The plan is designed to function as an action document, with small short term steps I.

The Strategic Action Plan should be used as a dynamic management tool, and is designed to provide a long term vision, that is broken down into a series of short term steps which focus on achieving that larger, long term goal. It is particularly well suited to smaller ports where staffing is limited. It also allows the Port to measure its annual progress and, as necessary, make changes as conditions warrant.

1.3 Site Visits and Meetings

An initial teleconference call was conducted with the Port of Harlingen Authority (POH) in January of 2019 to do a final overview of the scope and tasking prior to the planned site visit in February. POH personnel on the call included Walker Smith, Alan Johnson (Commissioner Chairman), Bryan Duffy (Commissioner Secretary), Neil Haman (Commissioner). Attendees for HDR included Capt. Jeff Monroe, Brent Moore, Doug Wilson, and Jason Foltyn. The following were discussed on the call:

1.3.1 Goals of the Study

1. The Port has never had a Strategic Plan nor a Master Plan, and recognizes a need for them.
2. There is growth in the region, and the Port wants to be in a position to plan for and respond to opportunities.
3. The Port recognizes a potential opportunity to expand its fuel business with customers in Mexico.
4. The Port feels that it is too reactionary, resulting in missed opportunities to develop business. The Port would like to be better able to forecast opportunities for business development.

1.3.2 Key Areas to Be Addressed

- Past Master Plan Study – it appeared that minimal effort was put into the previous report, and that it was inadequate for the Port's current needs.
- The Port wants us to help better define and understand the operational layout of its infrastructure assets. Are there better solutions to improve operational efficiencies or to better organize and define its land usage?
- The Port wants to have foresight in planning for future expansion possibilities. What land does it need to acquire?

- The Port has a small fleeting area within the waterway, and would like to better know if it can be expanded, or if it can better coordinate usage of the area by vessels and barges.
- The Port moves 6 to 9 barges per week.
- The Port needs help to identify and outline additional sources of funds including bonds, state and federal grants, or Maintenance and Operational taxes.
- The Port needs to reevaluate its maintenance dredging needs, and the capacity of its Dredged Material Placement Area (DMPA).
- Although the Port has rail infrastructure nearby, it is underutilized. The Port does have an existing relationship with Union Pacific, who requires rail improvements be made before they use more of the trackage and handle more railcars on site.
- The Port's existing business is primarily agricultural. The Port would like to diversify its business, and look for additional opportunities in domestic and international fuels, and in bulk sugar. Martin Associates did an economic study in 2015.

1.3.3 Study Interests

1. Market and Demand Analysis
2. DMPA capacity
3. Recommended Infrastructure Upgrades and Cost Estimates
4. Return on Investment Analysis
5. Grant Possibilities (e.g. TIGER, INFRA, and BUILD)
6. Other potential funding streams

1.3.4 Additional Areas:

1. Develop preliminary layout plans for Port properties
2. Discuss Dredged Material Placement Area (DMPA) capacity with USACE Corps of Engineers.
3. Discuss existing rail infrastructure and opportunities.
4. Understand barge traffic flow. The port is located 25 miles from the Intracoastal Waterway. The existing channel to the port is 125 feet wide by 12 feet deep. The Port currently moves 6 to 9 barges per week. Is this volume adequate, or can the Port handle more?
5. Understand truck traffic flow.
6. Turning Basin expansion – 400 feet wide by 14 feet deep.

1.4 Visions

HDR met with each of the Commissioners on an individual basis, and the following questions were asked, or topics discussed in conversation. Some of these questions were referred to the Port Director:

1. What is your personal vision for the port?
2. What do you think are the Port's greatest strengths?
3. What, in your opinion, are the greatest challenges for the Port?
4. What, in your opinion, are the greatest challenges for the Port of Harlingen Authority?
5. What support do you feel the Port Director needs from the Commissioners?
6. Do you have a current marketing strategy or list of potential tenants you are targeting for business opportunities?
    a. Energy
    b. Heavy Bulk
    c. Agriculture
    d. Is there another market the Port would like to enter?
    e. Is there a market the Port would like to exit?
7. Do you know if your tenants have any immediate capital improvement or expansion plans?
    a. Would any tenants be willing to relocate to different property within the Port, to allow for growth (optimizing the Port and usage)?
    b. List of tenants that require water-front access?
    c. What new tenant/market would the Port like to attract to Harlingen?
8. Financials
    a. Is there any existing Port debt burden that would restrict expansion growth?
    b. What amount/percentage of the Port's budgetary income is available for expansion? Short term and long term planning? Is there an amount currently available for immediate expansion/growth?
    c. Is there any long term lease agreements by the tenants that would inhibit expansion? What is the typical duration of lease agreements at the Port?
    d. Who is the Port's major revenue income tenant?
    e. Do you now if your tenants have immediate capital improvement or expansion plans?
    f. Has the port ever applied for and received any grants from federal or state agencies (such as the EPA, TxDOT, DOT, TIGER, and PAAC)? If so, when

and how much? What were they used for? If not, were you declined and why?

9. If funding was not an issue, what would be your investment priorities?
10. If given $15 Million dollars today, how would the port spend the money?
11. Priorities: Please rank in order how the port would like to expand?
    a. Land expansion?
    b. Tenant expansion?
    c. Infrastructure (buildings and utilities) expansion?
    d. Waterway / Dock expansion?
    e. Rail expansion?
    f. Roadway / Truck Traffic expansion?
12. What do you hope the Strategic Plan will provide you with?
13. What information do you feel you will need as a Commissioner to make decisions regarding addressing the ports challenges and opportunities?
14. What opportunities do you feel should be addressed or pursued?
15. What is your expectation of us as your consultants? (Be specific).
16. Would you like to know our initial impressions regarding the port? Would you like a briefing on the industry, trends or other similar projects?
17. Can you describe the rail operations?
    a. Where is the drop off location for Class I rail?
    b. Does the Port have a Third Party Switcher?
    c. What are the major concerns or issues with existing rail operations?
18. Are there any major constraints that we should be aware of in planning new rail terminals (such as noise, frequency, hazardous materials, schools, crossings, etc.)?
19. What is your opinion of the existing infrastructure of the port?
    a. Age, conditions, size of docks?
    b. Age, conditions, size of roadways?
    c. Age, conditions, size of dry bulk warehouse/buildings?
    d. Age, condition, size of rail operations?
    e. Age, conditions of utilities (sewage, gas, electricity, water)?
20. Are there any current restrictions that we need to consider which would limit expansion, such as tenant leases/contracts, land usage, politics/community issues, labor personnel resources, capital funding streams, other constraints?

1.5 Commissioner Meetings

HDR conducted its first site visit on February 13-14, 2019, led by HDR's Project Manager, Jason Foltyn, and Capt. Jeffrey Monroe. The HDR team met with the Port Director, his maintenance supervisor, and the Port's Commissioners. In addition, the team toured the facility and took representative photographs of the Port's property, waterway, docks, roadways, trackage and tenant sites.

HDR personnel met separately with the three Port Commissioners (Bryan Duffy, Alan Johnson, and Neil Haman) on Feb 13, 2019. In general, all three Commissioners noted the same goals and objectives for the Port. In summary, Port business has been relatively consistent, mostly handling agricultural products and fertilizer. The diesel fuel business has been a very good opportunity for the Port. They have recently reinstated the assessment of a port-specific tax which they had been authorized to collect for a number of years, but had not collected. Some public concerns and opposition about the tax have been expressed. The Commissioners recognized that the Port is a key economic engine for the Valley, and Harlingen is a center of finance for the region. They also recognized that most of the public probably does not understand what the Port does or its impacts on the local economy; and better public information is necessary.

As mentioned, the Port is managed by a small staff of four reporting to the Port Director. The Commissioners have confidence in the staff and recognize that future staff expansion will be necessary to accomplish what they hope to see happen in the Port. The Strategic and Master Planning effort now underway is looked to provide a specific roadmap to provide the professional guidance and help set priorities for setting goals and objectives and meeting those efforts. Grant funding is also critical for a number of projects that are recognized and sources and means to do grant writing is critical.

Overall, the Commissioners saw the same general requirements for moving forward with Port development. Infrastructure is a recognized challenge, as is the funding to address. The waterway needs significant improvement including dredging, dredge spoils disposal and a needed turning basin for barges. Usable waterfront footage is a necessity. Roadway and rail improvements were also recognized. (One Commissioner expressed rail investment is valuable to the Port, while another Commissioner expressed rail as being high maintenance with lack of use). The current rail service provider has been challenging at times to work with. (Other than the current provider, other railroads have trackage rights and some area ports have third party port railroad operators). (The potential for a third party operator for the Port rail as well as investment in equipment through federal grants was discussed by HDR). The rail has had multiple derailments on curves within the Port.

The Commissioners were sent a questionnaire form in advance of the workshop. Each Commissioner was asked, separately, how they would prioritize the ranking of the following items during our interview (1 being highest, 6 lowest).

Table 1 Commissioner Priorities

Topics	Commissioner 1	Commissioner 2	Commissioner 3
Land Expansion	5	5	1
Tenant Expansion	2	4	3
Infrastructure Expansion	3	1	6
Waterway / Dock Expansion	1	2	2
Rail Expansion	6	3	4
Roadway-Truck Traffic Expansion	4	6	5

Ranking: 1 being highest and 6 lowest.

Uniformly, the Commissioners agreed that the need for waterway/dock expansion and tenant expansion were the primary topics to be addressed. The efficient utilization of upland property is also recognized as a high priority. Property expansion for new business development is key, as is the optimization of existing property. HDR estimated that the Port has approximately 1,500 acres under its control, based on current tax maps.

The Commissioners' perception of potential new cargo opportunities included wind turbines, other agricultural cargoes, chemicals, ethanol, container on barge for agricultural products (cotton, corn, DDG's, lentils and legumes), neo-bulk cargoes such as steel, liquefied gases such as LPG or LHG, aggregate, minerals, construction equipment and project cargo. The need for cargo handling equipment, including ground equipment and a dock crane (mobile harbor crane) was noted. There is a general lack of understanding regarding the export destinations of cargo such as cotton and grain, that leaves the Port by truck (domestic and international), which needs to be identified.

The Commissioners also expressed ideas about property utilization off the Port proper. Selling property that may not have direct use for Port activities and acquisition of new land that would benefit Port expansion and business development. One consideration, for example, was selling Goat Island to Texas Parks and Wildlife, since it is already a refuge and would be difficult to develop into a cargo handling facility due to the ox-bow. They could use these funds to purchase land adjacent to the main port area (Industrial Park area) which would be better suited for the Port's needs.

The need for additional dredge material placement areas (DMPA) were also discussed. The existing DPMA near the turning basin was reaching capacity. Adjacent farm land would be idea should it become available for sale.

Port governance was also discussed. The need for a Policy Manual, Public Relations Plan, grant writing methodologies, expanded staff with job descriptions, future employee search methodologies, tariff and Port Rules/Regulations review, designation

of the port area as a Designated Port Zone (by Port's attorney consistent with Texas State Law), safety and security plans, business development, operations and other key areas that may be needed with growth. The Commissioners were supportive of these areas being addressed.

The expectations of the Port Commissioners were consistent regarding the HDR study. They, along with the Port Director, are looking for a "how to" path of Strategic Goals and Objectives including a Master Plan for property and infrastructure development and optimization which includes the land, waterway and intermodal connectivity. A careful look at the Port's strengths, weaknesses, opportunities and threats (SWOT Analysis) is critical and is included in the scope of the project. Public information, staffing and clear data usable to the Commission and staff is considered to be of the highest value.

Notes with Commissioner 1:

- Ports greatest strengths: no competition, close to the people of the Valley, unique niche in sand, gravel, agricultural products, sugar, and fuel
- Port's greatest challenges: need to maintain or update the infrastructure, need offload capabilities, need dock expansion, need to expand the turning basin or better accommodate barge traffic flow. Does not care for rail, as it has high liability risks, maintenance costs, and low utilization.

Notes with Commissioner 2:

- Ports greatest strengths: hidden gem, but not getting on the radar.
- Ports greatest challenges: funding, unable to offload containers, need offload capabilities, need dock expansion and dock space, need to expand the turning basis or better accommodate barge traffic flow.

Notes with Commissioner 3:

- Ports greatest strengths: unique niche in commodities, small port
- Ports greatest challenges: additional staffing needed, better public perceptions, need of a Master Plan, need of Public Outreach, need of funding, need of offloading capabilities.

1.6 Summary Findings

There was a strong consensus regarding the future direction of the Port and what needed to be accomplished. The Commissioners were all well versed in the details of the Port's business and expressed strong support for the Port Director and his staff. All of the Commissioners were supportive of this Strategic Planning and Master Plan study and were looking to use the study as a roadmap for future growth and management.

Port Conditions-Functionality Analysis

1.7 Property and Site Constraints

Overall, the condition of the existing property and its general organization suits the Port with the exception of the main cargo pier. The main cargo pier has drainage issues that are noted by the Port Director, and will be addressed with future plans for additional road and drainage improvements. The following section looks at overall property utilization including tenants and public infrastructure.

1.7.1 Property Utilization, Commodity and Mode of Transportation

Table 2 Commodities, Mode of Transportation and Handler

Commodity Type	Transportation	Company Name
Sand	Barge	• CEMEX • Central Ready Mix/CCM
Cement	Barge	• CEMEX
Liquid Fertilizer	Barge	• Helena • Nutrien • Sanders
	Rail/Truck	• Wilbur Ellis
Liquid Bulk (Gas / Diesel)	Barge / Truck	• NuStar Energy • Titan Marine Fuels • Key Petrol
Cotton	Truck / Rail	• RGV Gin • Harlingen Gin
Grain	Truck / Rail	• Gavilon
Composted Materials	Truck	• Earthwise Organics

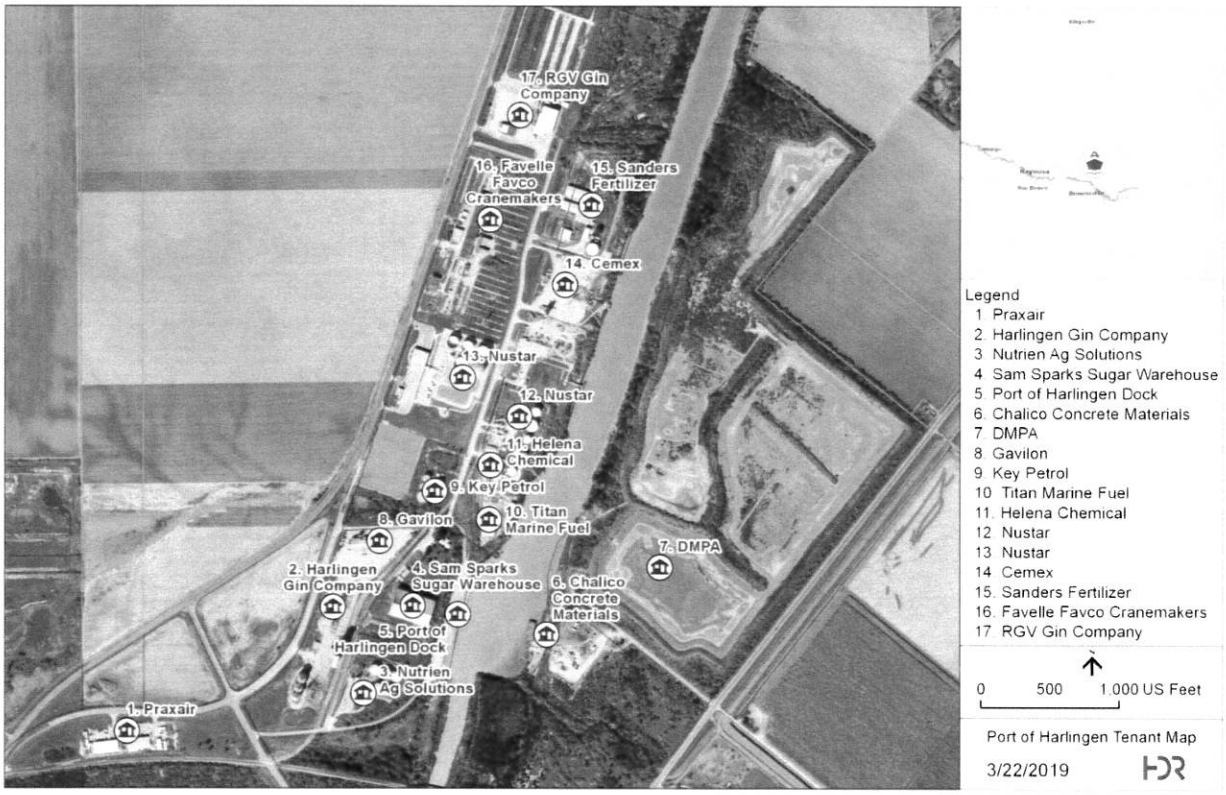


Figure 2 Port of Harlingen Tenant Map

Table 3 Port of Harlingen Owned Land Summary

Port Owned Lands	Description	Size (Acres)	Priority	Ready Infrastructure	Water Frontage	Rail Access	Road Access	DMPA	Future Development Possibilities	Comments
Owned 1	Primary	55.5	H	X	X	X	X			Primary site with infrastructure and docks
Owned 2	Secondary Primary	119.7	H	X	X	X	X		X	Future Development / Water / Rail Frontage - Small DMPA area to be realigned
Owned 3	DMPA / Commercial	65.3	H				X	X	X	Future Commercial / Truck Access - DMPA Frontage - No Water Frontage
Owned 4	DMPA / Commercial	353.3	H				X	X	X	Future Commercial / Truck Access - DMPA Frontage - No Water Frontage
Owned 5	Future Development	42	M				X			Future Development - Limited Road
Owned 6	Existing DMPA	52.8	L		X		X	X		Existing DMPA - Limited Use
Owned 7	Future Development	151.2	H				X		X	Future Commercial / Truck Access - Potential Rail Access. No Water
Owned 8	Cement Area	68.3	H		X	X	X		X	Existing Dock, Near Rail, Near Turning Basin, Limited Infrastructure
Owned 9	Existing DMPA	133.8	L		X		X	X		Existing DMPA - Limited Use
Owned 10	Upper Bend Area	5.8	L		X					Limited Use Area - Possible future DMPA site, but small.
Owned 11	Small Ox Bow DMPA	22	L		X					Limited Use Area - Possible future DMPA site - Mitigation Site possibility.
Owned 12	Large Ox Bow DMPA	143.7	M		X					Limited Use Area - Possible future DMPA site - Mitigation site possibility. Possible site for mid-stream fleeing area.
Circle X Subdivision	Residential Subdivision		L	X	X		X			Alternate Revenue Source. High visibility area
Refuge Area TPWD	Mitigation Area		L		X					Alternate Revenue Source / Alternate Mitigation Site / Possible land swap or sale potential
SMASH Model Airfield	Recreational Site	83.4	M		X			X		Alternate Revenue Source / Community Use Area / Rio Hondo city lease opportunity
Port Owned Subtotal Acres		**1296.8**	*(DOES NOT INCLUDE CIRCLE X AND TPWD LEASES)*							

Priority
H= High
M = Moderate
L = Long Term

1.7.2 Public Infrastructure-Main Cargo Dock

The main cargo dock is highly congested and is a major barrier to future business development. The 650 foot long by approximately 90 foot wide concrete dock is elevated and was used at one time to support barge/rail cross-docking. The rail has been removed and the former right of way used for fuel truck loading. The dock also supports sugar barge loading and diesel barge unloading. This accounts for nearly full occupancy and schedule overlaps between vessels and barges using the facility have impacted operations. Port staff coordinates the barge scheduling. The sugar facility and the liquid fertilizer facility both have fixed assets on the pier. There are vehicle ramps up to the dock on both ends, as well as mooring winches. The maximum static landing weight capacity on the dock apron is estimated (but not confirmed) at approximately 700 to 750 pounds per square foot. The general surface condition of the dock is visually good. There is good road access to the dock from the higher elevation of the Port proper. No recent inspections of the dock were available. A dock inspection / assessment is critical to determine the future utilization opportunities that may be available for using this dock.

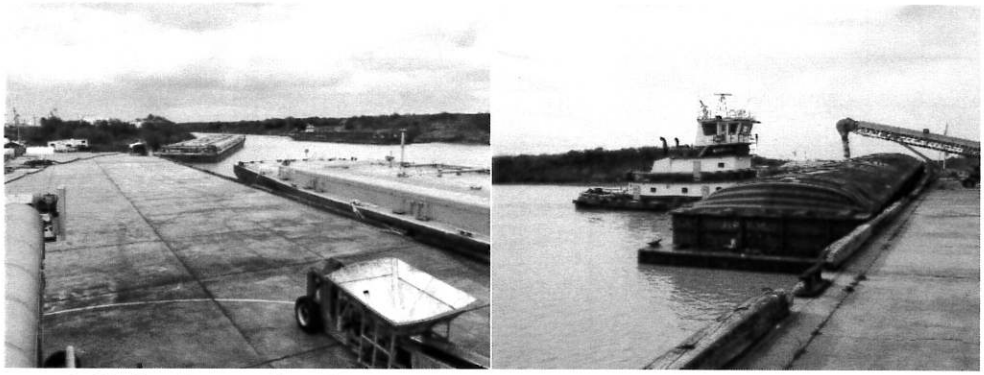


Figure 3 Main Cargo Dock

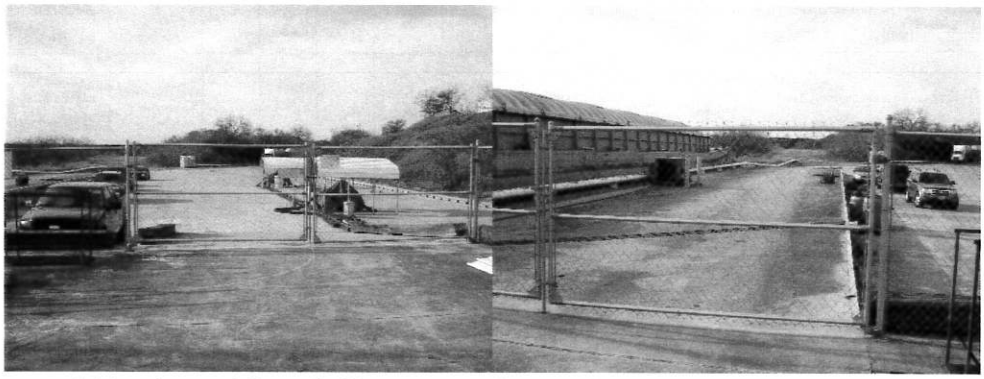


Figure 4 North and South Ramps to Cargo Dock



Figure 5 Liquid Fertilizer Loading Arm and Barge Mooring Winch

1.7.3 Rail

The rail line beyond the Class 1 Rail right-of-way is owned by Union Pacific (UP) and lies within the confines of the Port's property. It is the responsibility of the Port to maintain the track and roadbed, however. A sub-contractor is used to maintain and repair the rail line and right-of-way on the Port's property. There is limited storage for rail cars, and no run-around track for locomotive movement on site.

UP told the Port that two cars per switching is the maximum they will handle without yard storage on site. The trackage ends approximately midway through the port property, though there is additional space for future development. The rail needs track repair and tie replacements, however, maintenance of the underutilized tracks has been expensive for the Port. Reported derailments have occurred even at slow speeds when UP locomotives pick up and drop off freight rail cars.

Key deficiencies in the Port's rail system include poor and inconsistent ballasting, as well as poor drainage on the rail bed which leads to increased need for tie replacement,. The track needs to be leveled and elevated above the ballast when new ballast stone is added. As noted, there are numerous deteriorated and loose ties, different rail weights, and low radius turns designed for older and shorter railcars. Immediate fixes could include expanded ditching along the rail bed, and the possible use of guard or check rails on curves and the leveling of the rail bed.



Figure 6 Existing Track Conditions

1.7.4 Roadways

Most of the roadways at the Port consist of concrete or macadam, and are in good condition. Drainage is a problem, and roadway markings such as speed limit signs and other general signage is needed. Speed limits are recommended within the Port, as well as the regular wearing of safety vests for drivers and staff in open areas. Trash disposal receptacles for drivers in queue areas might also reduce the workload of Port staff, who must clean up litter on the roadway shoulders on a regular basis.

Truck queuing on site is not well organized, and could be improved with designated truck lanes, passing areas, expanded roadway width and queue space, truck control methods, and some limited driver services. Informational handouts to truckers would assist the Port in site control.



Figure 7 Truck Queuing on Pier Road and Upper Portion of Site

1.7.5 Waterway

Waterway issues at the Port are very obvious, but these problems are not dissimilar to those of other river ports. The Harlingen Channel, also referred herein as the waterway, is maintained to a width of 125 feet and a depth of 12 feet, with a turning basin that is 400 feet wide and 14 feet deep. The waterway is very narrow, permitting one-way movement only, and no passing in many cases. Berth encroachment in the waterway, insufficient water depths and dredge material disposal were also noted as issues. The waterway has steep banks, and topography is very restrictive along the channel. Steep grades and slopes make it difficult for piping, truck access, and dock expansion. Grades can range up to 1:2 in areas.



Figure 8 Waterway Bank Topography

It was noted that additional berthing areas and partial relocation of the fuel barges further north in order to eliminate nesting the barges was also needed. This would require the installation of new mooring/breasting dolphins. The addition of fleeting mooring points for staging barges away from the cargo pier until needed for operations is also critical for future growth. Reconstruction of an old pier located just north of the existing pier should be undertaken as part of a general waterfront rehabilitation.

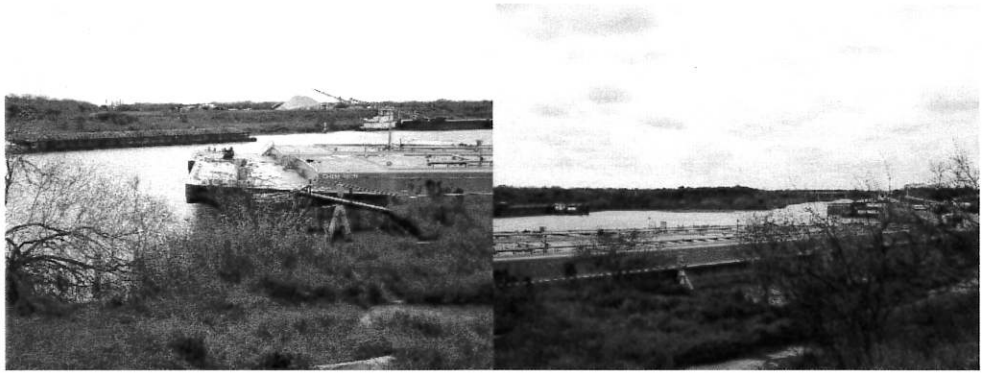
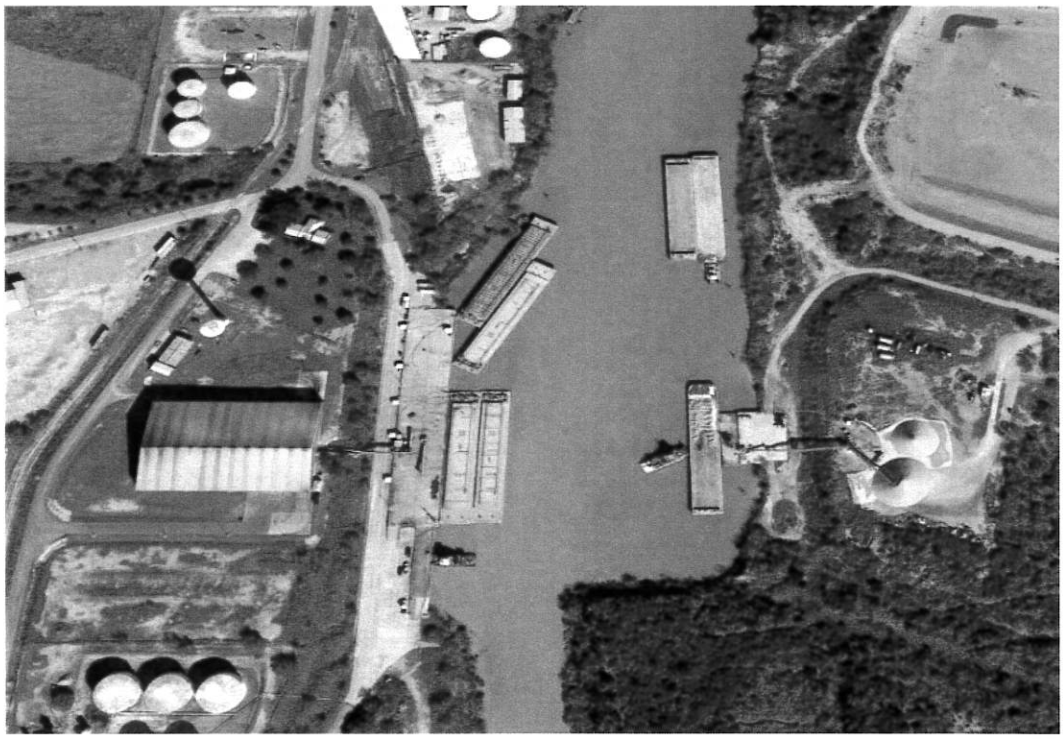


Figure 9 Existing Pier North of Main Port Pier

An expansion of the barge turning basin, as well as providing additional berthing space was evident. The most likely location for a new turning basin was the south end of the Port, where the waterway narrows, and up to a location near the existing UP Railroad Bridge. The west bank is also the most probable location for an expanded pier for additional cargo opportunities.



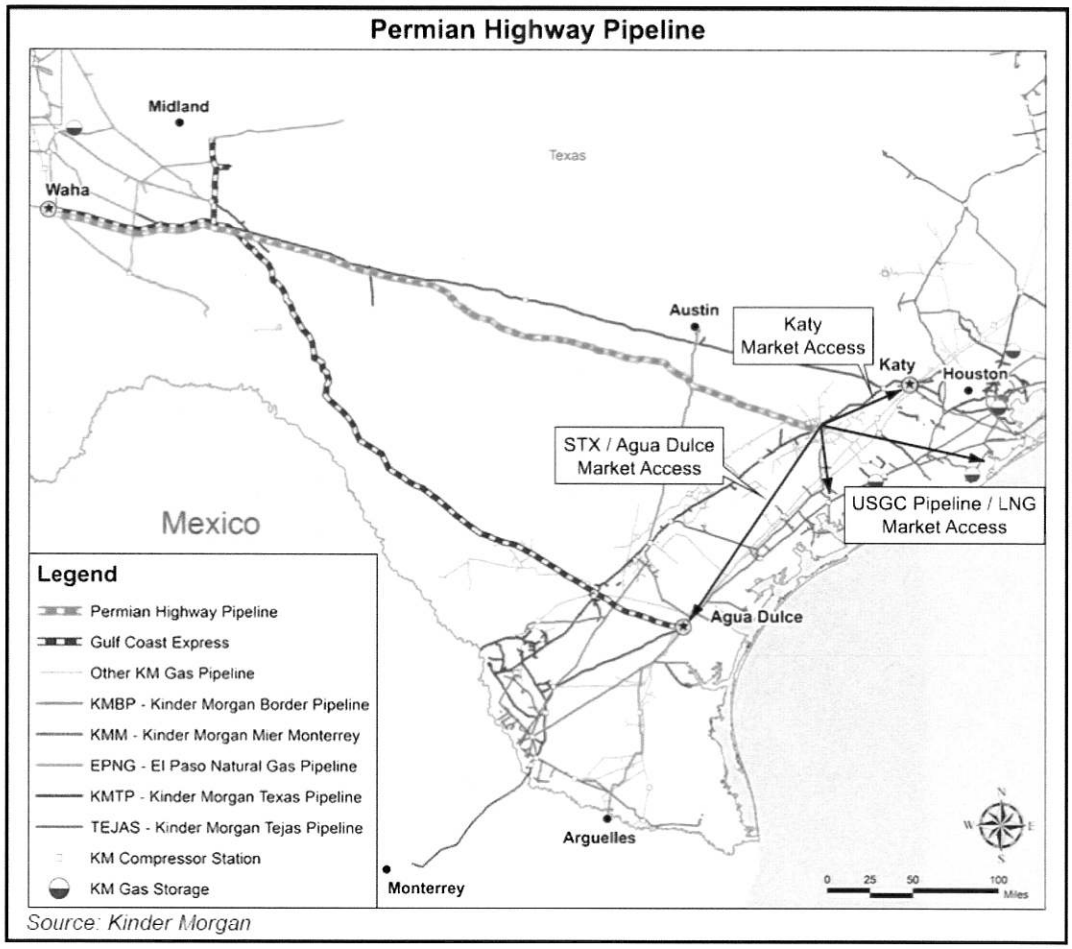
(Source: Google Earth)

Figure 10 Port Proper

A critical factor in maintaining the viability of the Port is regular maintenance dredging by the US Army Corps of Engineers which should include future improvement dredging. The Harlingen Channel depth is limited by the maintained depth of the Gulf Intracoastal Waterway (GIWW) which also needs to be deepened. Currently barges operating in the GIWW and the Harlingen Channel can only be loaded to 75% to 80% of their full capacities, which increases operating costs, traffic and pier congestion.

1.7.6 Pipelines

There is a pipeline in place between the Port and Helena, Texas. There is also an eight-inch pipeline that runs from the Texas/Mexico border to Valero L.P.'s products terminal in Edinburg, Texas. This includes approximately 68 miles of 10-inch pipeline that runs from Edinburg to Valero L.P.'s Harlingen, Texas, terminal and then on to a terminal in Brownsville. The U.S. pipeline segment, operated by Valero L.P., also connects Valero L.P.'s existing Valley products pipeline system, which originates in Corpus Christi, Texas, to terminals in Brownsville. This opens up a possibility of liquefied propane by barge from Harlingen.



Source: Kinder Morgan

Figure 11 Texas Pipelines

Passing through Harlingen is a 168-mile natural gas pipeline project that connects from Agua Dulce to Brownsville. It is designed to eventually travel underwater to

connect with Mexico's Sur de Texas-Tuxpan pipeline. The pipeline is built south to the Valley and generally follows the course of I-69E/U.S. 77. When operational, the 42-inch pipe will be able to push 2.6 billion cubic feet of natural gas through the line daily. It has been built to provide natural gas to Mexican utilities but may provide a near Port opportunity for LNG export by barge.

1.7.7 Environmental

An Initial Environmental Assessment was completed on February 19, 2018 for the Turning Basin Expansion Area only and is attached hereto as Appendix G. No other environmental assessments or surveys (cultural, environmental, historical, etc…) of the Port property were performed under this study. This will need to be done per specific project respectively.

1.8 Port Activity and Existing Commodity Data

The Port has several key tenants who regularly conduct intermodal activity on the Port's property. This includes handling of commodities by rail, road and waterway. Not all of the commodities pass over the Port's docks but the Port services as a critical transportation hub and industrial park. Port commodities include liquid fertilizer, sand, aggregates, gasoline, diesel, ethanol, raw sugar, cotton, sorghum and corn[3]. Tenants include:

- CEMEX-Sand, Cement and Fly Ash
- Chalico Concrete
- Crop Production Services-Agricultural Supplies and Chemicals
- Harlingen Gin-Cotton
- Helena-Chemicals
- Nustar-Fuel and Petroleum
- RGV Sugar, RGV Cotton Gin
- Sanders Chemicals
- Wilbur-Ellis-Agricultural Materials
- Titan Marine-Diesel Fuel
- Gavilon-Corn and Maize

1.8.1 Sugar

Sugar is the only export commodity for the Port, with an average of 30 shipments per year totaling approximately 150,000 tons. The raw sugar moves from Santa Rosa, Texas to Louisiana for refining by Dominos. Sugar arrives by truck and is stored in a purpose built warehouse above the dry cargo dock. Most of the sugar is moved during the harvest season in early spring, and ends in April or May. The sugar typically has two loading periods per month. Generally speaking, there are no sugar barges handled during the months of August, September, and October. The facility and dock handle

[3] Texas Department of Transportation, Overview of Texas Ports, Texas Senate, May 2016.

approximately 108 barges over 9 months. This may increase to 12 barges per month for 12 months, depending on demand from the refiner.

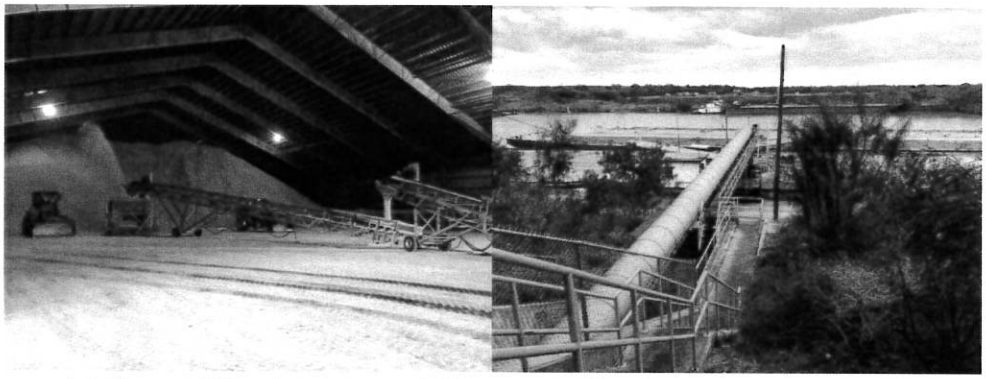


Figure 12 Sugar Warehouse and Conveyor System



Figure 13 Fixed Conveyor Transfer Unit on Pier, Barge Loading Conveyor

The dock handles 6 barges per barge lash-up (a/k/a barge train), 2 lash-ups or trains per month. Each barge takes 4 to 5 hours to load, or approximately 48 hours per train. The sugar is dumped and piled in the warehouse and then moved by front end loader to a fixed conveyor system where it is conveyor-belted to the dock. There is also additional fixed infrastructure on the dock and a barge loading conveyor unit. The barge loader is used to fill the covered standard hopper barges. A towboat is used to keep the barge flush alongside and shift it as necessary to fill the barge evenly.

1.8.2 Titan Marine-Diesel Fuel

Titan Marine handles diesel fuel which is loaded from barges to trucks for transport cross-border to Mexico. The fuel is transferred from two barges to eight truck loading stations across the main cargo dock. Titan can handle an average of 90 to 100 trucks per day and as high as 120 trucks. When the sugar barge is being handled, only five loading stations can be used. Normal operating hours are from 9 pm to 5 pm daily.

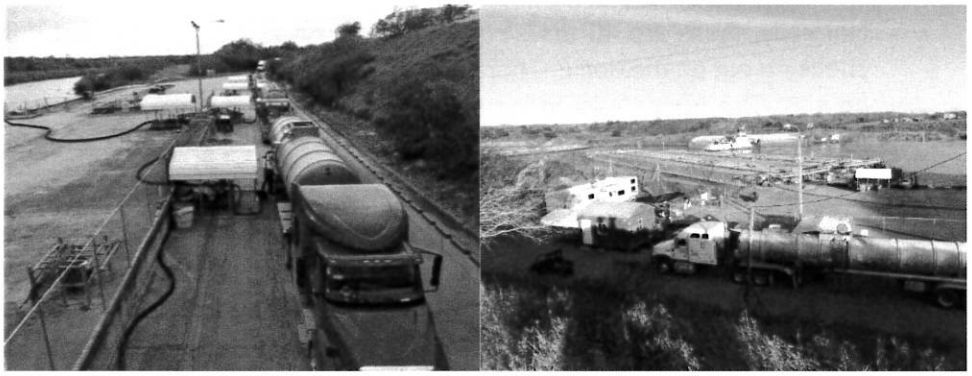


Figure 14 Truck Fuel Loading Queue

Fuel is pumped from each barge using the barge's pumping system to a combined line that moves over the dock by hose to a distribution manifold. Connections have catch basins to prevent accidental spills onto the dock or into the water. Line pressure is generally 30 pounds per square inch, which allows each truck to load between 20-25 minutes optimally. It can take longer if all truck loading stations are active. Loading is done to the tanker (trailer) manifold located on the passenger side of truck. Fuel loads are metered and then final paperwork and payment handled after loading at a location past the manifolds.

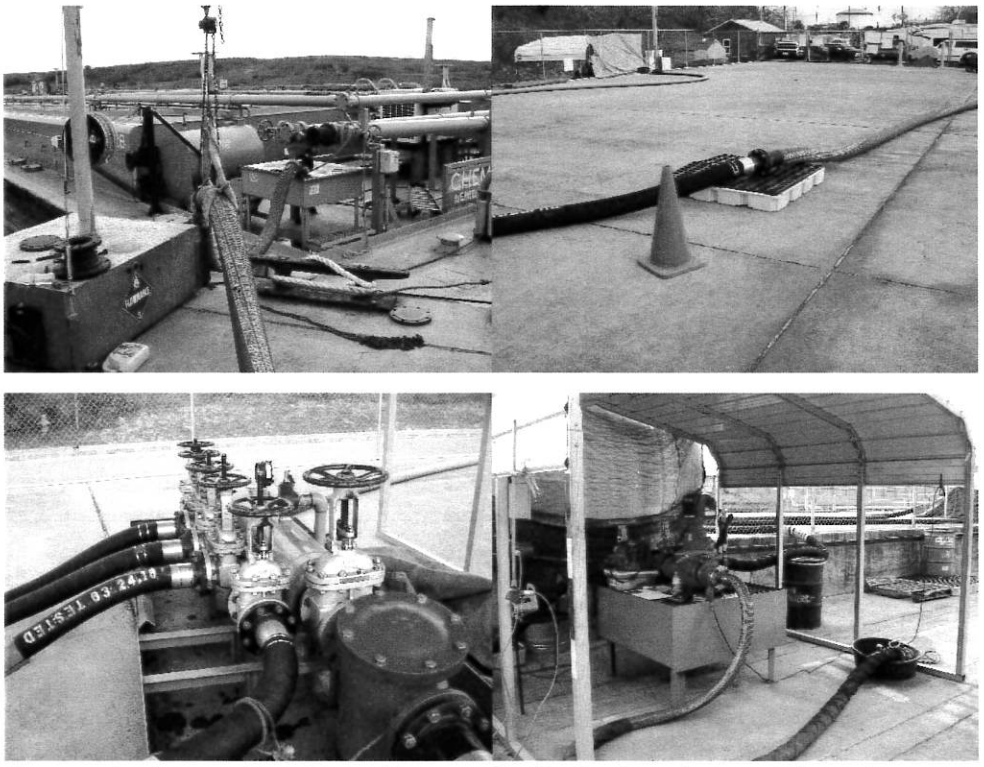


Figure 15 Barge Manifold (Top Left), Pollution Control Tray (Top Right), Truck Distribution Manifold (Bottom Left), Truck Loading Manifold (Bottom Right).

Normally, there are 10 to12 trucks queued on average, including those loading and checking out on the dock. There can be as many as an additional 20-30 trucks waiting on site. The trucks wait in a generally unorganized manner wherever they can find room along roadway shoulders and open areas within the Port's boundaries.

Titan handles 4 barges per week and it takes approximately 2.5 days (60 hours) to unload all of the barges to trucks. Due to draft limitations in the waterway, the 28,000 barrel (bbls) barges (operating capacity) are short loaded to only 23,000 bbls due to the shallow water depth in the channel. The barges and trucks handle approximately 20 million gallons per month (475,000 barrels) or approximately 5.7 million barrels annually (based on 12 months of operation).

The company has received permission from the Port Commissioners to redevelop a former warehouse site into a liquid fuel storage and transload facility. Currently, there are three, 35,000 barrel storage tanks being constructed on the existing concrete slab along with the truck system pumping station. The barge mooring would be relocated to enable the barges to pump to the tanks. The fuel would then be trans-loaded from the tanks to the trucks. Each tank would be 80 feet in diameter and 42 feet high. A containment berm would encircle the tanks. This would decrease barge unloading time to approximately 6 hours per barge. Business could then be expanded, as the facility throughput is currently limited by the number of trucks they can handle and barges per month. Various site configurations are being explored to address the need for truck handling while freeing up the Port's main dry cargo dock for other vessels and barges.

Reconstructing the old existing dock, and reorienting barges to enable direct connections between the barges and the new manifold and piping system is also planned. The pipeline(s) would run up the bank grade to the tank site from a new dock and manifold. The dock would also require a spill containment system to comply with federal regulations. A second pipe would bring fuel back down the hillside and over to the existing stations on the dry cargo dock. This enables the facility to operate the existing eight (8) stations and current truck operations. The developer is open to a revised plan that would relocate the truck operation off the dry cargo pier, to the benefit of the port, if the eight (8) stations could be relocated and operated more efficiently closer to the proposed tank site. This would require redevelopment of the proposed tank site below the concrete slab to provide truck loading lanes, queuing and check out areas. Titan can only use five (5) stations when the sugar is being handled so this would allow all 8 stations to be utilized at all times. There is also a processing facility for checkout and paperwork requirements including billing.

The amount of piping required to return product to the existing stations would also be dramatically reduced if a design could be developed to move all operations to the new site. Berthing could be improved, and additional waterway space opened up by extending the berth along the shoreline with dolphins, and mooring the barges end-to-end, rather than nested together side-by-side.

The new site would be within the 33 CFR Part 105 Secure Area and the truck loading area outside of the Secure Area. It would also be possible to include a rail track in the future for loading tanker cars. Titan also has a 4-acre site near the highway, currently

planned for potential use as a future gas terminal, which might be suitable for an alternative truck loading site.

1.8.3 Liquid Fertilizer

There are three liquid fertilizer handlers in the port, including Nutrien. The bulk liquid is handled by barge, rail and truck. There are a number of tanks on the Port utilized for storage and trans-loading. The main cargo dock also has a loading arm for connection to storage tanks on Port property.

1.8.4 Corn

Gavilon is the company that handles corn through the port. Corn and maize are the primary commodities handled by truck and rail through the onsite silo. Nothing is handled over the dock.

1.8.5 Nustar-Diesel, Gas, Ethanol

Most of the product in the Valley is supplied through the facility, which handles 4 to 6 barges monthly, each with an operational capacity of 25,000 bbls each, mostly delivered to the region. Product arrives from Texas City and Houston.

1.8.6 Sand and Gravel

Handled at the Port by several contractors on the Port proper and across the waterway.

1.9 Financial Analysis

As of September 2017, the Port of Harlingen as a positive total net position of $12, 612,335, with no financial restrictions. Approximately $8 million represents the net investments in capital assets. The rest of the approximately $4 million represent the unrestricted net position which may be used to meet the port's obligations to its creditors. The overall liabilities of the port are low, and are collaterally backed by a positive level of capital assets.

Road improvements were the largest capital transaction that year, amounting to nearly $88,000. In terms of revenue and expenses, the wharfage and lease rentals accounted for 95.5% of the Port's operating revenues. Due to an increase in salaries and professional fees, there was an increase in operating expenses. The port received funds for the granting of an easement, which increased the non-operating revenues. At the end of the year, the Port had an outstanding note payable balance of approximately $498,000.

1.9.1 Capital Improvements

The Port plans to continue with certain capital improvements, including railroad improvements, breasting structures in the channel, clearing land for future development, purchasing lots for expansion, and performing maintenance dredging of the channel to Harlingen and Gulf Intracoastal Waterway.

1.9.2 Risks

With regards to concentration of credit risk, the Port is highly dependent upon a small group of customers and upon the agribusiness economic climate. The Port is party to an interest rate swap agreement that matures on April 24, 2019. As of September 30th, 2017 this agreement bears a negative fair value. If the value of the interest rate swap becomes positive, only then is the port exposed to credit risk which amounts to the swap's fair value. Unless the counterparty to this swap agreement defaults or the swap is terminated, the Port is not exposed to interest rate risk. The counterparty's ratings according to Moody's Investors Services, Standard and Poor's and Fitch Inc. are Baa1, BBB+ and BBB+ respectively.

1.9.3 Grants and Funding

The Port was the recipient of a Texas Department of Transportation Rider 45 grant for road improvements. As of October 2017, the Port has committed to match $500,000 of these funds. The US Army Corp Engineers awarded a $2,400,000 to dredge the Arroyo Colorado and the Port's turning basin.

1.10 Staffing and Management

All ports, no matter the size of its staff, require the same level of management responsibilities. Staff are often stretched very thin, which ultimately slows the Port's development progress. In addition, business opportunities are lost because the Port's organization structure is centered on a single individual, or a very small, overworked staff. Generally, all ports have to address each of the following with the only real variance being in the size of the port and the number of activities. The proper management of any Port must include the following critical functions:

- Administration, Finance and Legal
- Business Development, Marketing and Sales
- Operations-Marine, Rail, Truck
- Regulatory Compliance, Safety & Security
- Property Management
- Tenant and Cargo services
- Planning and Development
- Government and Public Relations

From a regulatory standpoint alone, inland ports have to deal with the requirements established by federal, state, and local governments. These often include but are not limited to:

- Port and terminal Security
- Endangered Species
- Air Quality & Emissions
- Invasive Species
- Oil Pollution
- Regulated Trash
- Cargo Screening
- Fueling
- Sewage Discharge
- Migrants
- Cabotage issues
- New Regulations
- Funding of Dredging Projects

- Dredged Material Disposal
- Port Disruptions
- Harbor Safety-Aids to Navigation (ATONS)
- Wetlands Management
- Truck Weights
- Rail and Pipeline Safety
- Hazmat-Hazcom
- Service Agreements
- Technology Transfer
- Emergency Response
- Technology Transfer
- Emergency Response

Overall, many of these issues do not get addressed until they become critical. There is often an expectation on the part of governing boards that small staffs can work harder, often involving long hours and eventual burnout. Staffs must be organized and populated to plan for and address issues that impact every element of the port's operations, administration, development and compliance with regulatory frameworks.

1.10.1 Staffing

The Port has limited staff, which are responsible for a wide range of responsibilities. Currently, the Port is managed by a small staff of four (4) employees including Walker Smith, the Port Director, and his support staff which includes an Administrative Assistant/Bookkeeper, a Secretary, and a Maintenance Supervisor. The Port also utilizes a contract engineering firm, Ferris and Flinn Engineering, for required repairs and structural services[4].

In most cases, small staffs are unable to keep up with all of the requirements. It was apparent from discussions with the Commissioners and the Port Director that additional staff was needed. It will be critical for the Port to determine what staff should be added, and what their responsibilities will be. Key areas would include the development and updating of market and customer information as well as distribution of public information. In addition, property oversight and support in regard to general overall care of public areas, dock scheduling, site controls and general repair and maintenance.

1.10.2 Policies, Procedures and Plans

Policies are established by the Commissioners of the Port of Harlingen. They incorporate a wide range of practices including financial procedures, employee policies, applicable rules and regulations, the Port's tariff and other such documents as may be necessary to address the management of the Port. The policies are recommended by staff or the legal agent of the port, approved by the Commissioners and implemented by staff.

Procedures and other management plans are generally developed by staff, provided by equipment manufacturers or required by federal regulations. This plans include:

- Cargo Operating Plans
- Equipment Operating Plans
- Emergency Operations and Response Plan

[4] Port Staff Interview, February 2019.

- Security Plan
- Safety Plan
- Hazmat Plan
- Maintenance and Repair Plan

1.10.3 Tariffs and Port Regulations

The Port's Tariff covers a wide range of business activities including fees and some basic rules. Overall however, the current Tariff was published in 2012, and should be updated as it is not consistent with standard industry tariffs and lacks a number of provisions that are designed to protect the Port from certain liabilities.

A tariff, or schedule, is a policy document approved by the governing authority of a port or corporation. It is an implied contract established for marine terminals which is designed to include all terms, conditions and rates for using a specific facility or various facilities under control of a single port management authority. They are generally applied to common carriers and shippers who use marine facilities.

Tariffs are established to allow for rapid conclusions of agreement between the port/terminal operator and a vessel operator or shipper. The tariff is established under the authority of the port or terminal operator and in essence dictates all of the terms and conditions a vessel and the vessel's shippers are to comply with when using the terminal. The tariff system was designed to eliminate complex and diversified contracts. Tariffs have a long history of being upheld in international admiralty courts. When a tariff is published, the vessel operator and shipper agrees to all of the terms and conditions when the vessel ties up at the facility. Industry tariffs contain the following sections. Compared Port of Harlingen tariff provisions are noted by section. The current Harlingen tariff is contained in the Appendix.

Standard Industry Section	Corresponding POH Tariff Sections
Scope and applicability	Section 1: SR 1, 2, 3, 4, 5, 7, 8, 9, 10
Facility Owner's Rights:	Section 1: SR 13 Section 2: SR 29
Definitions	
Insurance Requirements	
Control of Facility, Vessels, Cargo	Section 2: SR 15, 16, 17 Section 2: SR 27, 28, 30, 33, 43
Prohibited/Hazardous Cargos	Section.3: Rule 46
Protection for the Terminal Operation Including Inspections	
Payment of Charges	Section 2: SR 18, 36, 37
Loss or Damage of the Facility	Section 2: SR 34

Standard Industry Section	Corresponding POH Tariff Sections
Complaint Processes	
Additional Provisions	
Rates/Charges	Section 1: SR 11, 12 Section 2: SR 19, 20, 21, 22, 23, 24, 25, 26, 31, 32, 34, 38, 39, 40, 41, 42 Section 3: SR 44, 45

Tariffs are meant to apply equally to all vessels and cargo handled at the terminal, and do not allow for preferential treatment. The Port can, however, establish special agreements such as incentives, and leaseholds outside of the tariff under the authority of the port or terminal management. It should be noted, however, that under U.S. Federal Maritime Commission rulings, such agreements must be available on an equal basis to all parties using the port or terminal.

The tariff is designed to provide an optimal amount of protection for the port/terminal operator as recognized by international law. A key advantage is that the tariff may be updated easily without having to reopen individual contracts. It can also be designed for shorter terms and can be modified regularly as conditions or circumstances dictate. Tariffs also allow for the adjustment of rates charged for terminal services as the market or revenue requirements of the terminal operator change. In addition to terms and conditions, the tariff should contain all of the rate structures that apply to the vessel and cargo. A port that provides marine terminal operator services and charges for services qualifies as a Marine Terminal Operator (MTO) under Federal Maritime Commission regulations. Tariffs, now referred to as schedules, are posted by ports and the FMC notified as to their location. A list of MTO and their organization numbers is on the FMC website. The Port of Harlingen Authority's Organization Number is 012312.

Many facilities also have terminal rules and regulations, which is a separate document to address specific operational, safety and security issues on site which are applicable to staff, vessel crews and other persons using the terminal. These are established under the authority of the tariff and the provisions and any changes to the rules and regulations are managed by port staff. The Port does not have a separate document which generally applies to personnel who enter port property and use facilities.

1.10.4 Rate Structures and Development

Most marine terminals categorize rate structures into each of the following key areas:

a. Dockage
b. Wharfage
c. Demurrage
d. Terminal handling
e. Leaseholds

f. Security
g. Miscellaneous fees

Not all marine terminals base their rate structures on the same methodology. The development of rates is, in most cases, a two-step process. First it involves the determination of actual operating cost vs. potential revenue and a second step which adjusts the rates based on market comparisons. The primary component is determined by the terminals actual operating and capital cost applied to the potential revenue for an average year and then projected forward. While components vary for each terminal, the basic framework is as follows:

Dockage

A fee which is applied to the vessel for use of a pier, wharf or berth at a facility. It includes towboats and barges and may be applied collectively or for each piece of equipment separately. The fee is intended to cover the cost of maintenance and capital improvements to the portion of the terminal where the ship is moored. It is determined by the annual maintenance and operating costs and amortized cost of past, current or future capital improvements applied to potential revenue. The capital improvements include the cost of piers, aprons, support and pier structures, fendering systems and berth dredging. Marine terminals use a length overall (LOA) measurement, gross (GT) or net tonnage (NT) method to determine the total cost which is applied on a 24 hour basis or portion of that period. The LOA standard is easier to calculate. It is considered by many to be more realistic in compensating a terminal for maintenance requirements due to the dynamic force of a ship operating against a pier. Dockage is paid by the operator of the vessel. Rates are applied as follows:

- Overall length (LOA) of a vessel - based on length overall (LOA) measured in feet or meters applied to the longest continuous point from the bow of the vessel to the stern of the vessel.
- Gross tonnage (GT)-based on the cubic capacity of a vessel including all internal spaces. The cubic capacity is converted to metric tons and varies, depending on the construction of the vessel as well as the classification society used for tonnage certification.
- Net tonnage (NT) - based on the cubic carrying capacity of a vessel with certain spaces removed from the calculation such as engine rooms or living spaces which are normally included in the gross tonnage (GT). The net tonnage is provided on a vessel's survey certificate as determined by a classification society. NT can vary dramatically between 50% and 80% of the GRT, depending upon the type of vessel and how it was certified.
- Scale-Dockage rates can be established for different size vessel based on a structured scale for types of vessels or range of sizes.

Wharfage

Wharfage is a fee that is applied to the cargo and is paid by the cargo owner or shipper. It is determined by the annual cost of terminal facilities including operating costs,

utilities, insurance, personnel, equipment, administration, security and other costs associated with the operation of the terminal applied to potential cargo volume. The rate also includes an operational contingency percentage and profit margin. Fees are applied to units, barrels, or weight generally in tons handled to and from a vessel. Unit fees are generally applied to cargo contained in intermodal containers, for equipment or automobiles. Tonnage rates are applied to dry bulk cargoes such as coal, aggregate, salt or agricultural products. Per barrel rates are generally applied to liquid bulk cargoes. Rates are commonly broken down by commodity based on the type of cargo a port or terminal handles. Rates are applied as follows:

- Per unit - cost per unit based on loaded, empty or on a value per unit basis. Generally applied to containers or packaged material as well as palletized cargo.
- Per ton - based on short tons equal to 2000 pounds per ton, long tons which is equal to 2240 pounds or the metric ton which is the most common international standard equal to 2204 pounds or 1000 kilograms per ton.
- Per barrel rate - based upon the specific gravity of the liquid measured at 60 degrees Fahrenheit.

Demurrage

Demurrage is a fee based on per units or per ton that is applied to cargo that exceeds a specific number of allotted free days for storage at the terminal. Demurrage fees are utilized by terminal operators to reduce terminal congestion and prevent a customer from "warehousing" at the terminal. Rates are based on a per unit or weight of measure basis exceeding a specific number of days retained or stored on site.

Security

Security fees are an assessment being applied by terminals to cover the cost of requirements as set forth under the Marine Transportation Security Act of 2002 (33 CFR Part 105) in the United States. It is a universal charge that applies to all vessels and terminal users designed to cover the cost of terminal security including personnel, surveillance equipment and access controls. Supplemental security fees are applied when escorts for vessel crews are provided by the terminal or if a particular cargo has a hazardous nature. These fees are based on a per unit or per ton rate structures, may be a flat fee per vessel call or for specialized operations, or may be contractor cost plus port/terminal administrative margin.

Miscellaneous Fees

Miscellaneous fees are developed by terminal operators to cover any unique terminal requirements or services that may be required for vessels or cargo handling. These can include use of over the road trucking fees (also called gate fees), fees for cargo handling equipment, fenders, gangways, ground vehicles, vendor services, utilities, water, sewage or any other service that is provided. Some ports include pilot fees and harbor fees in their tariffs or in similar separate documents depending on the level of

control the port has over these charges. Not all terminals offer the same services and include them in the tariff. Some examples of miscellaneous rate structures include:

- Fleeting, anchoring and mooring fees
- In/Out Fees
- Over the road fees for cargo entering the terminal not conveyed over wharves
- Crane hire-per hour
- Gangways-per day
- Search and Rescue fees
- Ground vehicles-per unit per hour by type
- Vendor services-annual or temporary licenses
- Utilities-electrical per kilowatt hour plus administrative fee
- Water-per ton or gallon
- Sewage-per ton or gallon
- Hookup fees-per man hour, straight or overtime, plus benefits and management
- Labor
- Administrative fees

1.10.5 Port and Terminal Rules and Regulations

Port and terminal rules and regulations are developed by a port or terminal's marine manager and generally apply to persons or firms using marine facilities. The rules and regulations are established to promote safety, enhance security and address various operational needs of facilities. They carry the same authority as the tariff, are provided for in the tariff and the authority is provided to port staff by the tariff approval to set rules and regulations that can include a wide range of rules that apply to persons on the terminal. When the tariff is approved, authority to establish rules and regulations is given to staff. These rules generally deal with the numerous behavioral requirements such as safety vests, speed limits, use of seat belts and security provisions that if included in the main tariff would make the tariff cumbersome to use. In addition, it allows staff to set out a rule without returning to the council for policy consideration. Most of these document put out by the port mirror federal regulations.

Safety and Security

Safety and Security may be addressed in separate plans or may be incorporated into the Port/Terminal Rules and Regulations, which is the most common method.

1.11 Public Perception

The Port of Harlingen, its function, business and impacts, like many other Ports is generally not understood by the general public. In many cases, the Port itself does not have the ability to provide the public and the media with regular information because of time constraints on the existing small staff. Public relations however is the key to insuring there is support for port growth and activities.

Public relations is a key function of port management. It is the deliberate, planned and sustained effort to establish mutual understanding between the organization and the public. It also gives the same organized and careful attention to the port's image and goodwill as it gives to any other major asset of the business. Good public understanding of the port also preserves the image of the organization and public confidence in times of emergencies. For the Port's Director, it is a fully supported and dedicated effort to educate and work with the public.

The Port's public consists of Port and tenant employees, brokers and forwarders, shippers, carriers, insurance underwriters, financial institutions, the maritime community, government agencies, elected and appointed officials, the port's competition, trade press, shipping associations and the general public. The Port's general public consists of community leaders, community activists, local citizens, politicians, potential jurors and the local, state and national press.

The public is considered a stakeholder in the Port. As a stakeholder, public attention affect the success or failure of the strategic or master plan or any part of it. Citizens can be advocates or adversaries, can be both supporters and detractors and should always be respected as neighbors. Management needs to recognize that public perception can affect the outcome of a planning process, business development, and growth. The public can also affect the outcome of a crisis or emergency in the port.

Branding and messaging is critical to the success of the Port. The Port can also focus on developing an image statement. This gives the Port some identity recognition. Image statements might be crafted as follows:

"Port Harlingen - Anchor Port of the Intercostal Waterway"
"Port Harlingen - The Valley's Gateway to the World"

Regular information distributed in the form of Press Releases should be undertaken to continue to provide the press and public with Port information and activities. The releases should also be posted on web sites and to the extent possible, social media such as Facebook and Linked In. Press releases can be general or indicate a new opportunity for the Port. They convey the type of information that might interest the public while showing positive activity at the Port.

Press releases are put on the Port's Mast head with a note "For Immediate Distribution", date and contact information. A press release may be generated for any of the following:

- PORT OF HARLINGEN REPORTS TONNAGE INCREASE IN 2018
- PORT UNDERTAKES NEW DREDGING PROJECT TO HANDLE MORE CARGO
- PORT TO UNDERTAKE ROADWAY IMPROVEMENTS
- PORT RAIL LINE EXPANDS
- PORT WELCOMES NEW INDUSTRIAL TENANT
- NEW STAFF MEMBER JOINS PORT MANAGEMENT TEAM
- PORT ADDS NEW CARGO CRANE TO PUBLIC TERMINAL
- MAYOR AND CONGRESSMAN VISITS PORT

- PORT COMMISSION APPROVES NEW DEVELOPMENT BY TENANT
- PORT UNDERTAKES STRATEGIC AND MASTER PLANNING PROCESS
- STUDY REPORTS EMISSIONS LOWEST FROM MARINE OPERATIONS
- BARGE ACTIVITY LOWERS COST OF ROADWAY MAINTENANCE NEAR PORT
- PORT RESPONSIBLE FOR STEADY JOB GROWTH IN VALLEY

News released by the Port can address what may seem to be business as usual but regular distribution of information keeps the Port in the public eye. The Port may not always see its news published or picked up by local media but it does reinforce the presence of the Port and the business going on there.

The Port should also develop a Public Relations Plan which is used to guide the Port's management in dealing with public relations and media issues. The Public Relations Plan covers the following:

- Who can speak (spokesman policies)
- What informational support is necessary
- Where are media events held
- Background information and press handouts
- Guidance on presentations and press conferences
- How to prepare for press and PR events
- Required internal communications and who to refer calls to
- Media and press outlets including contact names and numbers
- Internal method of controlling information and notifications
- Record keeping system of critical data related to possible incidents

Good information builds public trust, calms fears in midst of a crisis and develops a level of confidence that the Port is managed well by the Commission and staff. The Harlingen media market which also includes Brownsville, is a concise market and public information will in most cases be picked up if crafted in a reportable manner. Constantly having the Port in front of the public through media outlets, social media and on web sites gives the public a positive frame of reference. It also allows the Port to be transparent if an accident or casualty should occur. This is always critical to sustaining what will be hopefully, a good image of the Port and its business activities.

Some of the suggested local news outlets include the Brownsville Herald, Valley Morning Star, Cameron County News, KRGV-TV Channel 5, KGBT-TV Channel 4, KVEO-TV Channel 23, KNOV-TV Channel 48, and radio stations KMIL, KUSJ, KTTX and KOOC. In addition, press releases should also be provided to the Port's Congressional Delegation, State legislative leaders, Cameron County officials and the Mayors and Councils of local communities as well as selected community leaders.

1.12 Summary Findings

There are key areas that need to be addressed by the Port's management. While many ports do not always address similar issues, it was apparent in HDR's conversations with the Port that there was a desire to take the next steps that would

lead to growth and new development. These potential steps are outlined in the recommendations.

Market Analysis

1.13 Introduction[5]

The Cameron County in which the Port of Harlingen is situated in, includes the cities of Brownsville, Harlingen, San Benito and various other smaller cities and rural areas. The focus area of this project is known as the Brownsville-Harlingen Metropolitan Statistical Area (MSA). Brownsville is the principal and the county seat. Harlingen is the second largest city in the MSA and approximately twenty miles out of Brownsville. According to the US Census 2000, the Brownsville-Harlingen MSA was ranked as the 28th fastest growing MSA in the United States by percentage change in population. It was also the 9th fastest growing area in the state from 2000 to 2010. The 2010 population for this MSA was 406,220. In 2017 it was estimated to be 423,725 – a 4.31% increase in population. According to the Texas State Data Center, the 2017 population of the City of Harlingen was 65,462 – an approximate 0.95% increase from the 2010 population.

The median household income is $38,230 and there are 19,945 total households in the City of Harlingen. In the Brownsville-Harlingen MSA, there are 123,024 households with a median household income of $36,975. The annual average labor data for this MSA has been summarized in Table 4 below:

Table 4 Employment Data 2013-2017

Year	2013	2014	2015	2016	2017
Labor Force	167,481	166,343	164,295	168,792	166,268
Employed	150,912	152,494	152,603	156,409	154,837
Unemployed	16,569	13,849	11,692	12,383	11,431
Unemployment Rate	9.89%	8.33%	7.12%	7.34%	6.88%

1.13.1 Port of Harlingen

According to the 2016Texas Ports Authority Report, the annual economic impact of this port is $19.3 million. The port transports 100% of the sugar produced in the Rio Grande Valley out of the region. The port also brings in critical valley resources, such as 90% of the fertilizer used by South Texas farmers and 70% of the refined petroleum products for the South of Texas region.

Port of Harlingen has 218 vessel calls annually (including barge/tug calls), representing 939 annual truck trips, and 161 Railcar Transits. This port has access to the Union Pacific Railroad. It has roadway connections to the IH 69, US 77, US 83.

[5] Martin Associates,2015

Assets: 650 linear feet general dry/liquid cargo wharf and 100 linear feet dry bulk wharf. Five smaller docks (50 feet X 25 feet) located near the turning basin and extend into the Harlingen Channel. Over 150 acres of open storage.

1.14 Trade

Cameron County is one of the leading agricultural producing counties in the State of Texas, primarily producing the following products: cotton, citrus, grains, vegetables, and sugar cane. Livestock includes cattle and dairy products, hogs, poultry and horses. In addition, major businesses include retail and wholesale trade, food processing, international shipping, other agribusinesses, tourism, mineral operations and a diversified industrial base.

1.14.1 Inbound Commodities

Liquid Fertilizer: This comes from Corpus Christi or the Mississippi river via barge for local consumption. It is seasonal, but utilizes 30-40 trucks per month when in season.

Diesel: This port uses trucks to transport diesel and gasoline to the rest of the Valley.

1.14.2 Outbound Commodities

Diesel: This port exports diesel fuels to Mexico at a rate of approximately 90 to 100 trucks a day.

Sugar: Sugar moves from Santa Rosa through the Port to Louisiana for refining. Raw sugar is brought to the Port, where it is processed in a mill. The sugar is then loaded onto a barge and transported to a sugar refining plant in New Orleans.[6]. The total amount of sugar transported is around 110,000 to 150,000 tons a year.

Road construction materials, rocks, grey rocks: These are shipped up to Houston from Mexico by barge.

Cotton Bales: These are primarily transported out of the Valley by trucks. Approximately, 800,000 bales a year are transported out of the port.

Corn and Grains: The corn and grains are brought from the Rio Grande Valley into the port where they are handled through the on- site silo, after which the corn and grains are transported out of the Valley by truck or rail.

1.15 SWOT Analysis

A high-level Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was conducted to assess the future market potential for the Port of Harlingen. The analysis is primarily based on literature review and discussions with local stakeholders knowledgeable of the region and the operations at this port.

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[6] Impact Study

1.15.1 Strengths

Free Trade International Bridge at Los Indios[7]: This Bridge is jointly owned by the Cameron County and the cities of Harlingen and San Benito. This International Bridge is located 10 miles south of Harlingen. It provides a fast route to the border cities of Matamoros, Reynosa and the industrial city of Monterrey. It is well equipped to handle both commercial as well as private vehicles. It can accommodate approximately 75 trucks at a time. This Bridge is conveniently connected to major highway routes on both sides of the border. This would allow easy access to markets in Mexico, which is the main trade partner for Texas.

Foreign Trade Zone[8]: Port of Harlingen is conveniently situated in the Foreign Trade Zone #62. This Zone is the largest in Texas and one of the largest of the United States. It was ranked second in the nation for the value of exports and ranked 21 overall in the nation for the value of imports. Being located in this zone can allow Port of Harlingen to easily trade with other countries.

Availability of Land for Expansion: HDR estimated that the port has approximately 1,500 acres under its control. According to three commissioners of the port, property expansion for new business development is key as is the optimization of existing property. Additionally, the port can sell unutilized land such as the Goat Island property to the Texas Parks and Wildlife Department, as it is a refuge. Funds from the sale could then be used to purchase more suitable land surrounding the port, which would be developed to support future expansion. Weaknesses

Low channel depth and narrow turning basis: The Harlingen Channel has a width of 125 feet and a depth of 12 feet (16 feet in the turning basin). This width and depth is insufficient for larger ships to enter the port. Barges using the channel must typically operate at reduced capacity, in order to safely navigate the channel. This limits the quantity of cargo entering and leaving this port.

Lack of adequate infrastructure to grow business: Through HDR's primary research analysis, it was revealed that infrastructure was the major concern for this port. The waterway requires a significant amount of improvement which includes dredging and dredge spoils disposal. In order to expand the business the port generates it also requires:

- Accommodation of Barge traffic: Barges require approximately 6 hours to be offloaded.[9] There is insufficient amount of infrastructure available to offload many barges at once. This causes barge traffic concerns. Thus, the efficiency of offloading barges must increase.
- Roadway repair: The roadways requires markings and signage. Truck queuing is required on the site for better organization. Additional lanes, passing areas,

[7] https://harlingenedc.com/economic-development/international-opportunity/

[8] https://www.portofbrownsville.com/about/foreign-trade-zone-no-62/

[9] Walker Smith, Harlingen Port Authority

expanded roadway width and queue space and truck control methods are also required.

- Main Cargo Pier: According to HDR's primary research study, this pier is highly congested. This dock is used for sugar and diesel barge unloading. The schedules of both these commodities overlap which causes higher inefficiency.

Insufficient Funding to expand operations: In order to expand as a port, it requires funds which it plans to collect by increasing the taxes. It may receive backlash from residents of the Valley. The Authority is planning to levy a tax of 3 cents on $100 valuation of property for residents. Thus the annual tax levied on a $100,000 home would be $30.

Inefficient Transportation: The port is served by Union Pacific Railroad (UPR). However, the maintenance of the tracks located inside the port property is the responsibility of the Port Authority. This raises costs and leads to underutilization of the railway. According to the HDR primary research, derailments occur even at slow speeds. There is poor drainage for the roadbed which causes delays and functionality problems. UPR will not handle more than two trains until the port improves the rail tracks.

1.15.2 Other

Need additional staff to accommodate future expansion in operations: The port currently only employs 4 full-time staff including the Port Director (Walker Smith). In order to grow, the port must add employees with specific responsibilities such as business development, asset management, etc.

Need for strategic guidance document (Strategic and Master Plans): The overall port governance requires improvement. The Port requires a policy manual, public relations plan, grant writing methodologies, tariff review and port regulations review. The Port has not been designated as a port zone by the port's attorney consistent with Texas State Law. The Port also requires a revamp of their safety and security measures, business development, and operations. Some of these aspects could be addressed as part of the development of a Master Plan.

Need to improve Public Outreach: According to the Commissioners of the Port of Harlingen, the people of the Rio Grande Valley are unaware of the functions of the Port and its importance as a significant driver to their local economy. Thus, this population may be unwilling to pay the "Port Tax" mentioned above. If the population is made aware of the outcomes resulting in the collection of this tax, they would be more welcoming to the potential growth of the port.

Minimal Documentation: Through HDR's primary research, it was realized that Port of Harlingen has minimal documentation on the details of the trade of the commodities passing through its facilities. This may cause difficulty in future analysis of the port's functions.

1.15.3 Opportunities

The Port of Harlingen is currently a small port with a growth potential. Due to its unique location, it has an opportunity to expand in the products they handle. Additionally, the port is a multimodal transportation facility which gives this port an opportunity to expand in different modes of transportation as well. Hence, for easier analysis HDR has divided the opportunities into products and transportation modes.

Products:

Petroleum: As shown in the figure below, U.S. refineries have a capacity of 18.3 million barrels per day as of 2016. Refined petroleum products include liquefied petroleum gases and other, motor gasoline, jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feed stocks and other petroleum. HDR anticipates that the capacity will reach about 19.0 million barrels per day in 2050. [10]

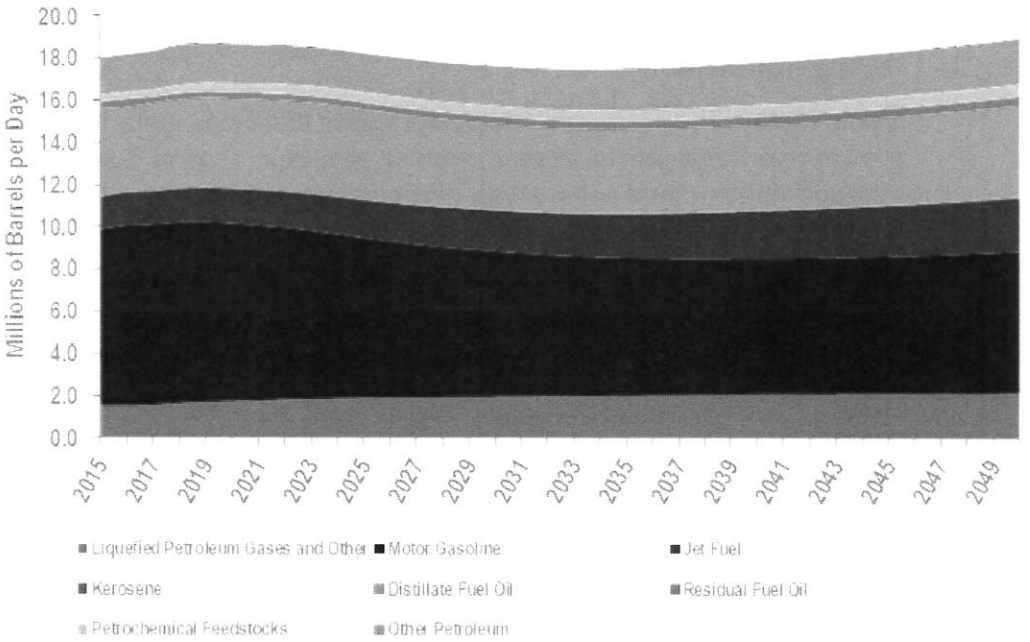


Figure 16 Forecast of capacity of refineries in the United States for refined petroleum products

According to data from the Transearch database,[11] the other ports in Texas also handle large quantities of petrochemical liquids, coal, gas, and diesel. However, through HDR's primary research, it was identified that the demand for these products is high. Thus, this is large opportunity for Port of Harlingen. It is expected that the number of trucks which are used to export of Diesel would increase by 50-60 trucks. [12] The Port

[10] Bunker Fuel Analysis Final Report conducted by HDR for PANYNJ.

[11] Transearch is a product from IHS Markit. HDR analyzed this database as part of the Port Mobility Study being developed for the Houston-Galveston Area (H-GAC).

[12] Walker Smith, the Harlingen Port Authority

of Harlingen already has important companies such as Titan Marine and NuStar Energy working on its docks. With a growth in infrastructure, products specifically such as diesel, gasoline and propane are a viable opportunity for this port.

Liquid and Dry fertilizer: The global market to increase to reach $13,530 million by 2023 growing at a CAGR of 2.8% from 2017 to 2023.[13] From the Transearch database, it can be seen that the Port of Houston exports chemical liquid fertilizers and imports fertilizers whereas the Port of Freeport exports fertilizers as well. With an increase in infrastructure, Harlingen has a potential to increase the quantity of fertilizer cargo handled. In particular, the Port of Harlingen has potential to import fertilizers for local use in the Rio Grande Valley.

Gravel and Sand: River Sand brought to Harlingen from Victoria, Texas is considered to be high quality material to make concrete. Wind farms are the biggest consumers of concrete in the Rio Grande Valley as they require this concrete to construct bases for the turbines. Port of Harlingen can take advantage of the growing demand for concrete and create a niche market for itself.[14] Gravel and Sand is a common product exported by the Port of Houston, Port of Galveston and Freeport which shows that there is high demand. [15]

Scrap Metal: The Transearch database shows that scrap metal is a viable market for the Port of Harlingen to expand. Port of Houston, Port of Galveston and Port of Freeport import metal cans, scrap and miscellaneous waste. However, the amount handled by these three ports is relatively low compared to the other products.

Machinery parts: The Transearch database shows that machinery parts such as fittings, pipes and forgings can be a potential market for the Port of Harlingen to expand into. The other ports handle relatively small amounts of these products.

Cotton[16]: Cotton has been a major crop in Texas since the 1800's. Most of the cotton grown in Texas is exported. The top three countries who import cotton from Texas are China, Turkey and Mexico. The Pacific Rim countries are also major importers. Port of Harlingen has two cotton gins on the property and can handle raw cotton.[17] According to the Transearch database, Houston and Freeport export cotton. It is likely that Harlingen transports this cotton to these ports. With a growth in existing infrastructure, Port of Harlingen could consider exporting this cotton instead of transporting it to another port. This port should take advantage of its location, near the Rio Grande Valley which produces the highest amount of cotton in Texas. [18]

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[13] https://www.alliedmarketresearch.com/press-release/liquid-fertilizers-market.html

[14] https://valleybusinessreport.com/industry/manufacturing-industrial/port-of-harlingen/

[15] HDR analysis using the Transearch database.

[16] HDR conducted extensive literature review on Port Harlingen's cotton trade. However, no substantial information was find. Hence, HDR has focused on Texas's overall cotton trade.

[17] https://valleybusinessreport.com/industry/manufacturing-industrial/port-of-harlingen/

[18] https://www.farmprogress.com/cotton/cotton-s-economic-benefit-texas-tops-24-billion

Sugar: The Sugarcane growers in Texas are largely based out of the Lower Rio Grande Valley in the counties of Cameron, Hidalgo and Willacy. Over 126 of these growers are part of the Rio Grande Valley Sugar Growers Inc. (RGVSG). This is the main company which handles the sugar on the docks of Port Harlingen. RGVSG employs approximately 500 employees every year when production is normal. The Port of Harlingen can take advantage of its location in the Valley and improve its infrastructure to better serve this client. Actively inviting more sugar processing plants to establish themselves on site would allow the port to handle larger quantities of sugar.[19]

Agricultural Products: Since Port of Harlingen is located in a very strategically important agricultural area, the Rio Grande Valley, the port can make a niche market for itself in agricultural products. From the Transearch database, it can be seen that the other ports in the region do not handle large quantities of fresh fruit and vegetables relative to other products. This could be a market opportunity for the Port of Harlingen to capture this market in its entirety through the provision of services that better address the need of this type of cargo.

Limestone: The Port of Brownsville currently specializes in limestone. Limestone is one of the highest imported commodities of Texas. In 2014, sand, gravel, stone, rock, limestone and soil made up 6.2% of the total imports for the state. [20] According to a 2016 market analysis report on Port of Brownsville, Vulcan Construction Materials was the main cargo owner and trader of limestone. Limestone made up approximately 6.1% of all the cargo handled by Port of Brownsville. [21]

By 2025, the value of the global limestone market is expected to increase to over 9 billion USD. This growth is expected due to increase in consumption in the construction industry, iron and steel processing and agricultural industries. [22] If the infrastructure spending in Texas increases as well as the use of limestone in agriculture, Port of Harlingen will have a potential opportunity to enter this growing market.

Special Economic Zones in Mexico: In 2018, two Special Economic Zones (SEZs) in Campeche and Tabasco were created and approved. For the state of Tabasco, the development sectors identified for this SEZ are agribusiness (production of sugars, chocolates, sweets, and processing animals), beverage, manufacture of rubber products machinery and equipment for the manufacturing of air conditioning equipment, heating, industrial and commercial refrigeration, machinery and equipment for the metalworking industry and industry in general. For the state of Campeche, the development sectors identified for this SEZ are agribusiness (grain milling and seed, production of oils and fats, processing of sugar, chocolates, sweets, and preservation

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[19] https://www.rgvsugar.com

[20] TxDOT Commission Port Study 2014.

[21] https://www.portofbrownsville.com/wp-content/uploads/2017/03/PoB-Strategic-Market-Analysis_RKJA.pdf

[22] http://www.wboc.com/story/39718986/li

of fruits, vegetables and prepared foods), beverages , chemical (pharmaceutical) and plastic and rubber.[23]

The establishment of these 2 SEZ's could create easier access for the Port of Harlingen to trade with Mexico. As mentioned above, the Port of Harlingen has a potential to create a niche in the market of machinery parts. This could be achieved through trade with the state of Tabasco. Similarly, chemicals, plastic and rubber could be potential markets for the port, which could expand through trade with Campeche. Exports to Mexico are also likely to increase as the growth of these SEZ's will cause an increase in overall demand in those respective areas.

Transportation Modes

The Port of Harlingen has roadway, railway and barge; making it a multimodal transportation facility.

Railways: UPR is willing to increase the use of Rail through the port if the quantity of products increases. Diesel, Gas and Propane can be transferred from Barge to Railway to Mexico. Titan Marine Fuels, already supplies fuel to Mexico through Harlingen from Corpus Christi. Titan is willing to increase business but is limited due to the number of trucks which run between Harlingen and Mexico and barges.

Thus, funding must increase to maintain the railways. This will allow the port to gain a lot of business in the growing trade industry of diesel, gas and propane with Mexico. Grant money can also be used or due to inefficiency from UPR, the port could consider another railway company to contract the railways to.

1.15.4 Threats

Pipeline: The Trans-Pecos Pipeline would transport natural gas from the United States to the Rio Grande Valley and into Mexico. This large natural gas pipeline from Texas to Mexico has been delayed until April 2019 due to weather conditions and delays in completion of the Mexican portion of the project. [24] Once completed, the pipeline would transport up to 1.4 billion cubic feet of natural gas per day. As gas and diesel are one of the major products handled by the Port of Harlingen, this pipeline could heavily impact the business.

Grains and Cotton: In 2018, the growth of cotton production in the Rio Grande Valley was expected to remain static. However, low grain commodity prices could drive the farmers to use all available land to plant Cotton. Additionally, due to the multiple hurricanes and weather conditions, there is excessive moisture present in the soil. Wheat has been majorly affected.[25]

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23 https://www.bakermckenzie.com/en/insight/publications/2018/05/decree-creating-special-economic-zones

24 https://www.houstonchronicle.com/business/energy/article/Texas-to-Mexico-natural-gas-pipeline-delayed-13281332.php#photo-15414245

25 https://www.wacotrib.com/townnews/agriculture/planted-cotton-acres-to-rise-slightly-or-remain-static/article_ba59ce42-d379-5923-a2c1-5f3e355eae6f.html

Port of Brownsville: Brownsville is the sixth fastest growing manufacturing area in the United States, and is a major competitor for the Port of Harlingen. Agriculture, electronics, apparel, metal fabrication and food processing among others are growing industries. Brownsville/Matamoros is the third largest border employment area. Brownsville is the only location on the US/Mexico border that provides full intermodal cargo transport, with its deep-water port; access to the Gulf's Intracoastal Waterway and Ohio and Mississippi River Systems; the Brownsville & Rio Grande International Railway; the Rio Grande Highway system; and the Brownsville/South Padre Island International Airport.

With a total of 13 cargo docks, 5 of which handle liquid cargo, the Port of Brownsville has the ability to serve a wide variety of commodity types. The top three commodities are petroleum products, steel and metals (including iron scraps). Exported commodities are valued at $3.6 billion and imported commodities are valued at $3.2 billion. The Brownsville & Rio Grande International Railway (BRG) is a 45 mile on-port rail service. The port is located on the M-10 and M-69 Marine Highway corridors. Activities in the Port of Brownsville include: construction of offshore drilling rigs, ship dismantling and ship repairing, steel fabrication, LPG storage/distribution, waste oil recovery, bulk terminaling for petroleum products and miscellaneous liquids, and grain handling and storage.

Under the Prioritized Capital Program 2017-2018, the Port of Brownsville was given a grant to build a multimodal rail dock and road to allow access to over 500 acres of undeveloped waterfront property and provide a platform for future clients. The work included construction of a two-mile long rail link and roadway to a new 112,500 square foot multimodal dock, as well as a new rail spur to the Palo Alto yard.[26] This project was to provide the following benefits:

- Creates an estimated 1,249 direct and indirect jobs
- Creates $5.6 million in local purchases from project-related construction activities
- Creates a total economic impact of $19.4 million and generates $1.5 million in state and local taxes
- Achieves over 25,000 new railcar movements at the port per year
- Improves system efficiency, removes bottlenecks, and opens over 500 acres of leasable land for future development
- Improves highway safety by increasing rail usage/decreasing truck usage to move cargo to and from the port.

Port of Harlingen has a competitor and should try to use comparative advantage and maximize its revenues.

[26] Texas Ports 2017-2018 : Capital Program Project Summaries

1.16 Summary of Market Opportunities

Infrastructure: Because the Port of Brownsville is a larger, established competitor, the Port of Harlingen should seek to identify and leverage its competitive advantages to maximize revenues. Improvement of the Port's transportation infrastructure would increase efficiencies and allow the Port to expand and take advantage of additional opportunities to support movement of cargo through the region. This would also result in an increase of the overall revenues for the port.

Transportation: The port requires improvement in transportation efficiency by investing in rail improvements and to explore other multimodal options (such as barge-to-rail or container-on-barge movements). The port can take advantage of access to UPR and use this to increase the throughput of petroleum products such as diesel, gas and propane.

Agriculture: The Port of Harlingen is located near the center of the Rio Grande Valley which is strategically important from the agriculture perspective. Thus, the Port can take advantage of the agricultural production occurring nearby to increase its throughput.

Foreign Trade Zone (FTZ): This port is strategically located in the Foreign Trade Zone #62. This is one of the most important FTZ's in the United States. Port Harlingen can take advantage of this Zone by specializing in products closely linked to international trade. It is also located in a strategically important location to trade with Mexico.

Port Development Plan

Operational and property adjustments on site are critical to optimizing the utilization of the property. In the short term, the most significant changes recommended are improvements to the the dock, road and rail system. This requires some property realignment and improvements to transportation and marine infrastructure. In relation to the dock, the diesel fuel operation needs to be relocated. The rail and associated drainage are critical areas that need to be addressed also in the near term. Sometime in the future, as opportunities arise, new Port owned equipment for handling other cargoes would expand the Port's offerings. The roadway network is in good condition and just needs to have flow patterns adjusted.

In addition, waterway improvements will be required including expanded berthing, new turning basin, new fleeting area, industrial property development, rail corridor expansion and storage yards.

Future steps for the Port to meet development visions include a variety of short and long term steps that can be undertaken in the near future and planned for long term. These include the following for the short term:

- US Army Corps Port Boundary
- Operational Adjustments
- Short Term Property Adjustments
- Fleeting
- Equipment Acquisition

In the long term, the following investments should be considered:

- Dock expansion
- Turning basin development
- Property expansion and acquisition for expanded industrial park
- Rail expansion to new property development areas

1.17 US Army Corps Port Boundary

One of the most critical areas for potential grants and waterways projects is the definition of the Port's Boundary according to US Army Corps standards. This boundary defines the areas in which USACE projects are developed and undertaken, as well as funded. According to the Corps, the boundary need only be established by a "credible public entity". This could include the State, County, Municipality or the Port itself. The "port Boundary" is recommended to be established from the river entrance at the intersection of the GIWW and continue to the extent of the navigable boundary of the river in the Port. This would include the entire 25 miles of the waterway. It is recommended that the Port's attorney look into the vehicle by which the boundary can be established and declared within the legal parameters of the State of Texas.

1.18 Operational Adjustments

The Port property has a wide range of possibilities with the major area that needs to be addressed being the cargo pier. This is the most immediate change required. Rail infrastructure needs to be improved and expanded modestly in the near term. Traffic patterns and flow needs to be realigned as well once infrastructure is adjusted. Key areas in order of importance are as follows:

- Short Term Property Changes
    - Development of the Titan Marine fuel depot including upper and lower sites.
    - Relocation of the existing diesel fuel truck loading area to the new fuel depot.
- Improvement of rail right-of-way and track expansion for railcar storage
- Preliminary development of cargo/container storage yard
- Long Term Infrastructure Development

1.19 Short Term Property Changes-Diesel Fuel Operation

As the new fuel depot for Titan Marine Fuels is developed, the most critical operational component that has to be relocated is the truck loading area for diesel fuel from barge operation. A preliminary design was developed to optimize space near the proposed tank farm that Titan is building. This area utilizes the relocation of the existing eight truck loading stations, a check out area for the trucks and queuing area at a location on the upper end of the Port. The relocation of the truck loading allows for the development and use of the existing cargo pier for other activities including break bulk, neo-bulk, dry bulk and project cargoes. Trucks would enter from the upper roadway, queue on expanded roadway shoulders and exit through the Port's main entrance

when loaded. For the developer, it reduces the amount of infrastructure required, particularly piping or hoses to the loading stations.

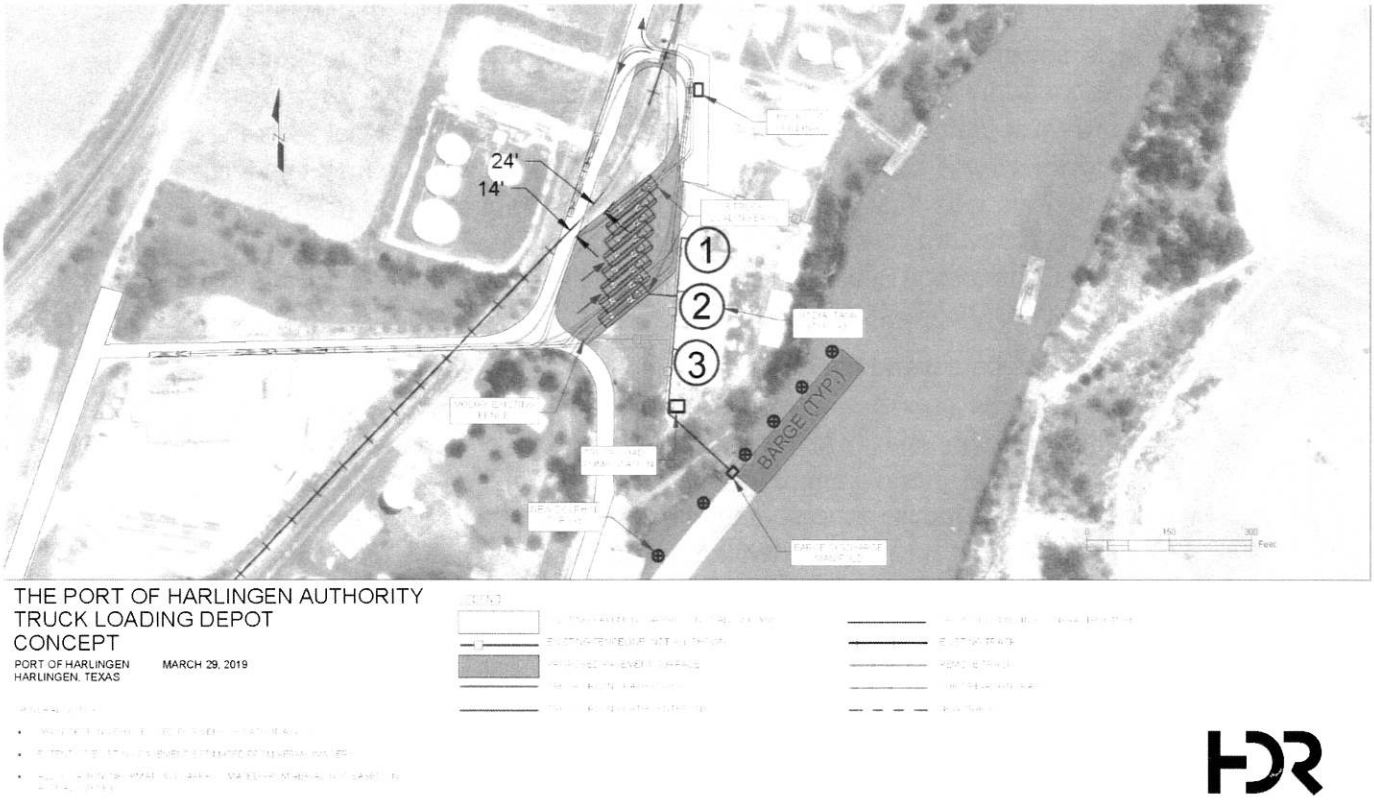


Figure 17 Relocation and Layout for New Truck Loading Area

1.20 Improvement of Rail Infrastructure

Rail capability is a critical component allowing for multiple intermodal flexibilities for Port expansion/growth development. HDR recommends an extension of the existing lead track to the north approximately 1200 feet and the construction of a new parallel siding track with a clear length of 1543 feet (25 cars at 60 feet long over coupler pulling faces). This siding track will provide significant operational flexibility, including either storage of cars or the ability to run around a long cut of cars. The length of the tail track north of the siding, from point of switch to the bumper, is 284 feet, which provides room for locomotives to clear the north siding turnout and perform run-around moves.

It is assumed that all current rail operations within the Port of Harlingen will be performed by Union Pacific Railroad, or at some future date, by a short line or rail terminal operator. The track plan concept presented is somewhat arbitrary, and while it does increase capacity and flexibility, it should not be assumed that it is adequate for specific individual and/or multiple rail shippers' traffic and level of service. It is assumed new track will be constructed in accordance with Union Pacific's Industrial Track Construction Specifications, and will include 112 pound or heavier rail, and either Douglas fir or concrete crossties.

There will be several intermediate grade crossings required along the length of the new siding to provide road access to the existing industries east of the track. The nominal 25 car capacity of the siding is based on a continuous coupled string of cars, and does not include any capacity deduction due to grade crossings. Therefore, assuming the industries east of the track require vehicular access, it is assumed that railcars will not be left for extended periods of time on any grade crossings that are being regularly used.

As an alternative to using this new siding only for running around or storing cars, specific locations along the siding could be utilized for small-scale transload operations, with easy truck access to paralleling Port Rd.

In addition to the new track, HDR recommends the rehabilitation, shifting, and/or re-aligning of existing track at several locations identified on the exhibit below to allow for continued and steady rail access.



THE PORT OF HARLINGEN AUTHORITY RAIL EXPANSION / REHABILITATION CONCEPT

PORT OF HARLINGEN
HARLINGEN, TEXAS

APRIL 1, 2019

GENERAL NOTES

- CURVATURE ON NEW TRACK SHALL NOT EXCEED 10°
- GRADES ON NEW TRACK SHALL NOT EXCEED 1.2%
- CONSIDERATIONS HAVE NOT YET BEEN MADE FOR EARTHWORK AND/OR DRAINAGE REQUIREMENTS

LEGEND

- EXISTING TRACK
- REMOVE PORT TRACK
- REHABILITATE/REALIGN PORT TRACK
- NEW PORT TRACK
- EXISTING ROADS

SHEET NUMBER
1 of 2

Figure 18-A Expanded Rail Right of Way Including Storage Track



Figure 19-B Expanded Rail Right of Way Including Storage Track

In looking at long-term possibilities, a conceptual layout for a full rail build-out was developed to illustrate growth and development opportunites for the Port. This future rail expansion can be performed in several incremental phases depending on Port funding, property acquisition, as well as tenant needs.

It is assumed that the Port would pay for the construction and ongoing maintenance of "Lead Tracks" extending from the Union Pacific main throughout the Port, while individual Port tenants would pay for the construction and maintenance of their own industry tracks.

The conceptual layout below accomodates a wide variety of rail-served customers with differing required levels of service, ranging from high-throughput unit train service to loose commodity/manifest traffic.

A conceptual rendering of a highly-capable "Infinity Loop" (an HDR-patent pending rail design) is shown just west of the existing Port of Harlingen. The Infinity Loop is a revolutionary track design which wraps a staging yard around a unit train facility, and allows the utilization of the same staging tracks for both arriving and departing trains, which can greatly reduce the amount of required track in a high-throughput facility. The conceptual Infinity Loop shown below accomodates up to three individual unit train customers, and also incorporates independent lead tracks reaching into the interior of the loop, where additional non-unit train tenants can be located (this greatly reduces wasted acreage when compared to a conventional rail loop track).

Like other Port tenants, it would be expected that the tenants using the Infinity Loop would construct and maintain the track (with the Port still providing the lead tracks for the unit trains to transit from the main line to the facility). The most important consideration for the Port if they wish to accommodate a future unit train facility is to be forward-thinking and reserve adequate land aquisitons.

A dedicated Port-owned rail yard would only be required if the rail traffic in the Port increases to a sufficient quantity to justify it. By that point, it could prove more beneficial to have a shortline or terminal operator perform the switching for the Port, while Union Pacific would simply arrive and depart trains.

1.21 Preliminary Development-Cargo/Container Storage Yard

A cargo and potential container laydown yard should be developed in the area above the pier. This area, which would consist of approximately 6.5 acres would be used in the short term for cargo storage that would be handled over the dock or in the Port in general. Although the laydown area would be on higher ground that the dock, this should not compromise cargo handling given the width of the pier road. Cargo movements would have to be coordinated. The other advantage of the higher ground is that cargo would not have to be relocated if waterway levels rise and lowing lying areas flood.

The area should be cleared and leveled and in the near term with hard packed dirt or stone applied to the site. Reclaim can also be used which is the residue from macadam (bitumen) roads when they are resurfaced. This area can be used for storage of dry cargo, containers, neo-bulk cargo, and break-bulk cargo.



Figure 20 New Cargo and Container Laydown Area/Expanded Dock

Eventually, the cargo area can be paved as requirements dictate. Flow on site would have to be properly and efficiently controlled. Security should also be included such as access control and fencing. The standard for container handling at a small facility is approximately 2,000 containers per acre per year, which would create a capacity of plus or minus 12,000 containers per year adjusted for traffic patterns. Most likely the containers would be wheeled (set on chassis) allow storage of 100 units per acre at any one time. If the containers are stacked, additional equipment would be required at the cargo yard such as a reach stacker and storage capacity could be doubled or tripled. Storage areas on Port property would also have to be developed for empty containers and chassis as the cargo yard fills up. This could be located in another

area within the Port's boundaries. The site can also handle project cargoes, break bulk cargoes (palletized) or neo-bulk cargo (steel, rolled steel, vehicles). The key to use of this yard is maintaining its flexibility which would require management by the Port or a contract terminal operator/stevedore.

A new cargo/container yard laydown area of approximately 6 acres, with a caliche base approximately $32 per cubic yard. A gravel base is approximately $65 per yard. Including site preparation, clearing, fill/leveling, and fencing around the site, the approximate cost range is $375,000 to $550,000. This is estimated on a gravel/caliche base and not concrete. Note that this estimate does not include design fees or perimeter lighting.

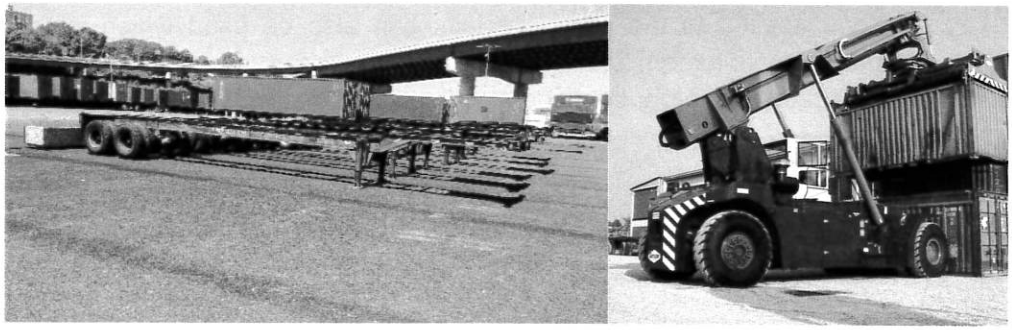


Figure 21 Container on Chassis, Stacked Containers and Reach Stacker

1.21.1 Development of a Fleeting Area and Modified Berthing

The desire of the Port is to increase cargo volume over the dock. This will create the demand for expanded fleeting capacity as well as additional mooring Dolphins along the bank. The narrow waterway will only accommodate a few nested barges at one time, generally 2 or 3, assuming a 195 foot standard hopper barge that is 38 feet in width, or a standard tank barge which is 297 feet in length and 54 feet in width. Barges currently are short loaded to draw only 12 feet of water depth in the waterway although the barges of either type can draw up to 16 feet. Barges will have to be fleeted in a linear fashion. The fleeting area can either be equipped with simple mooring dolphins (A frame or piles) or have shore based anchoring systems for tie up. Synthetic piles would be adequate for these uses which are less expensive to maintain over the long term.

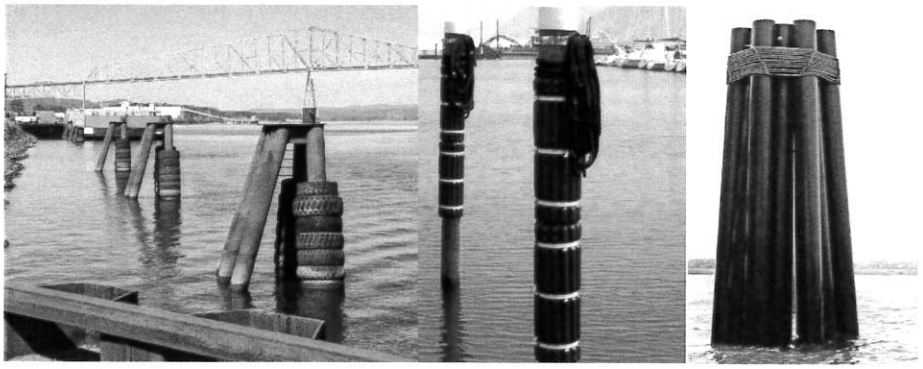


Figure 22 Mooring Dolphins-A Frame (Left), Steel and Synthetic Piles

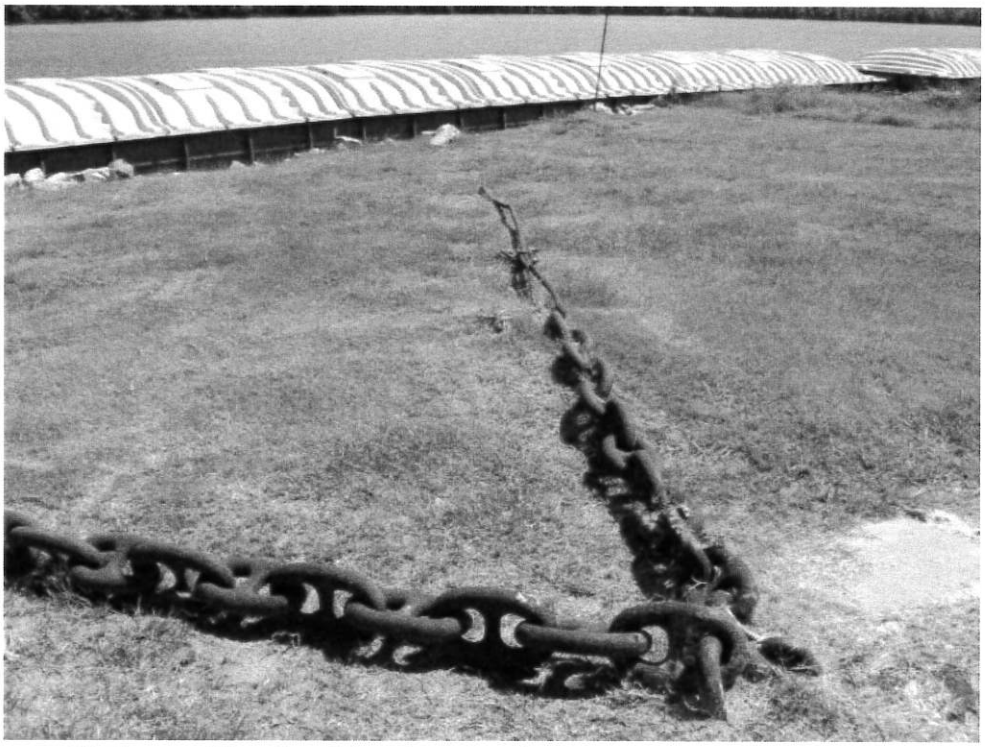


Figure 23 Barge Fleeting Mooring Anchoring

The location of the fleeting areas will be dependent upon the geography of the channel and placed so as to not interfere with passing traffic or other waterway users. A new dedicated fleeting area could accommodate approximately six barges at a single time. The waterway would most likely accommodate more as necessary.

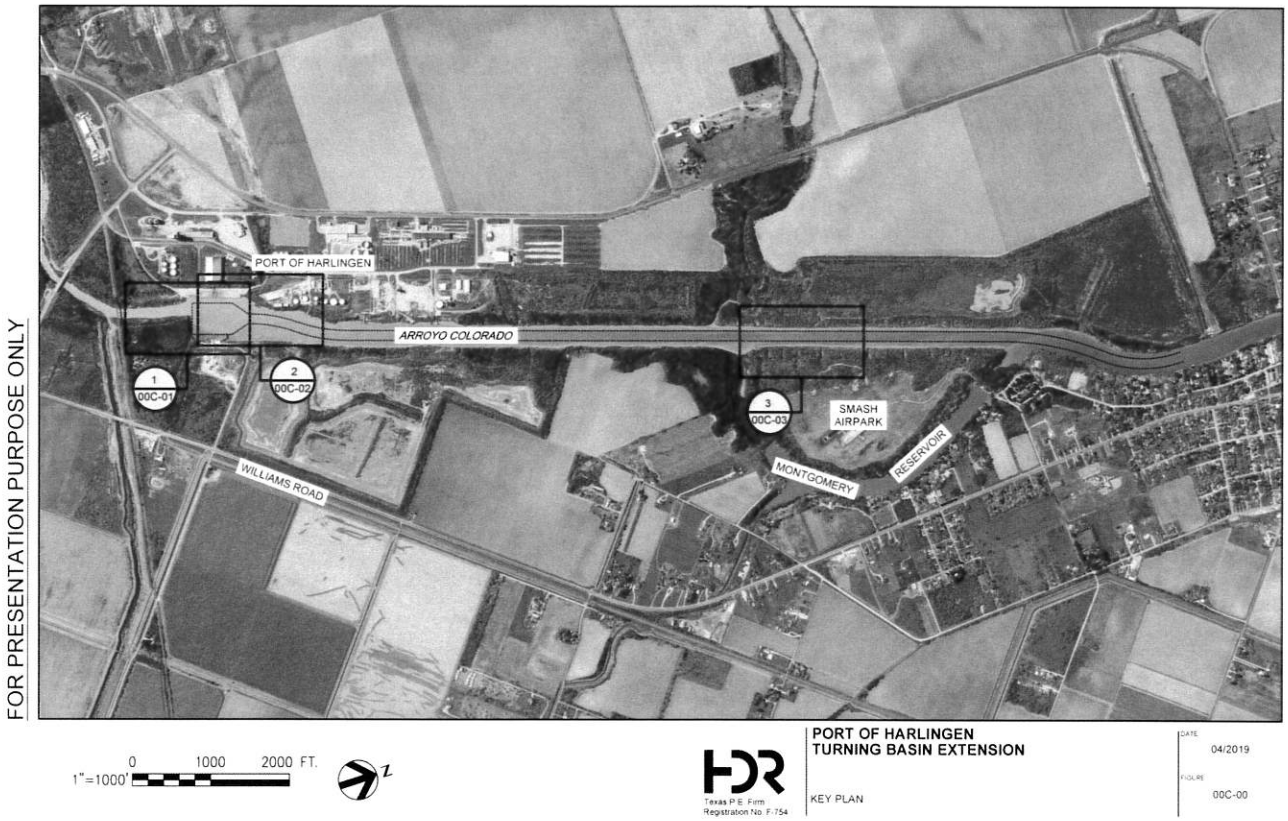
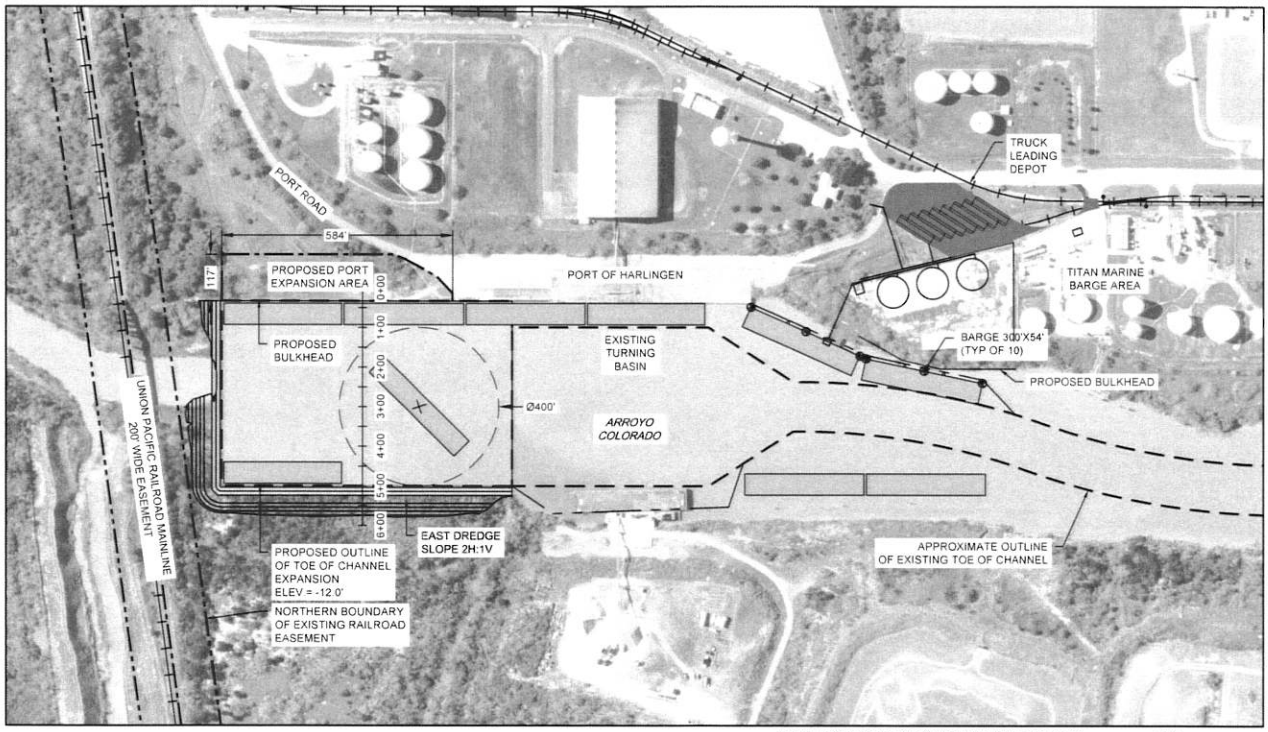


Figure 24 Fleeting and Turning Basin Areas



FOR PRESENTATION PURPOSE ONLY

Figure 25 Turning Basin Extension

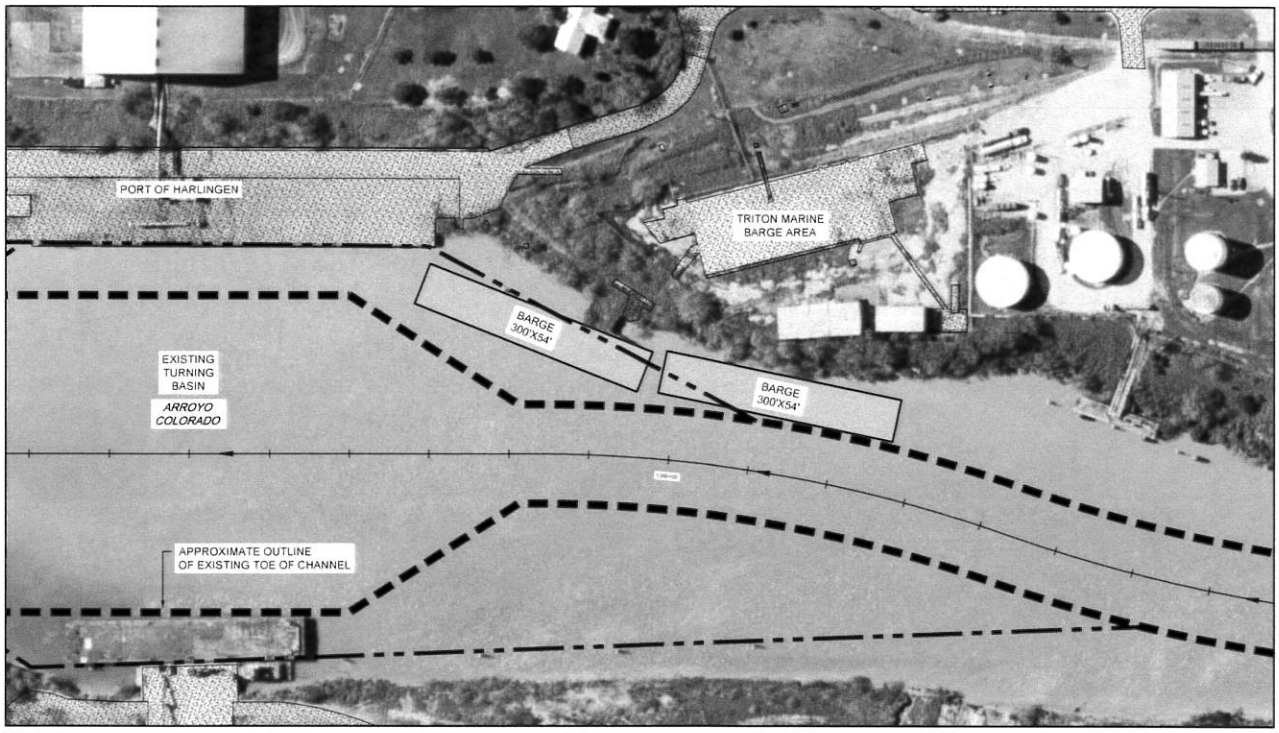


Figure 26 Triton Marine Barge Area

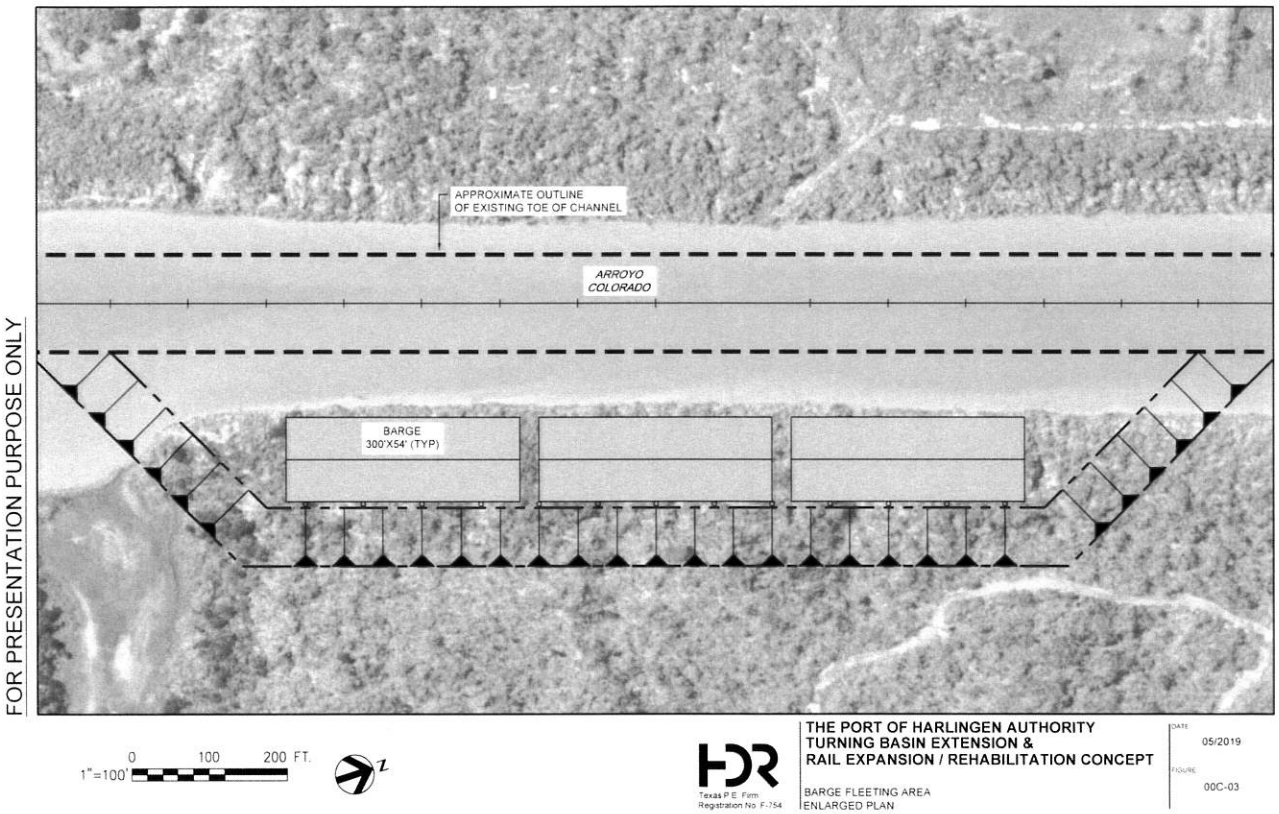


Figure 27 Barge Fleeting Area (Smash Airpark)

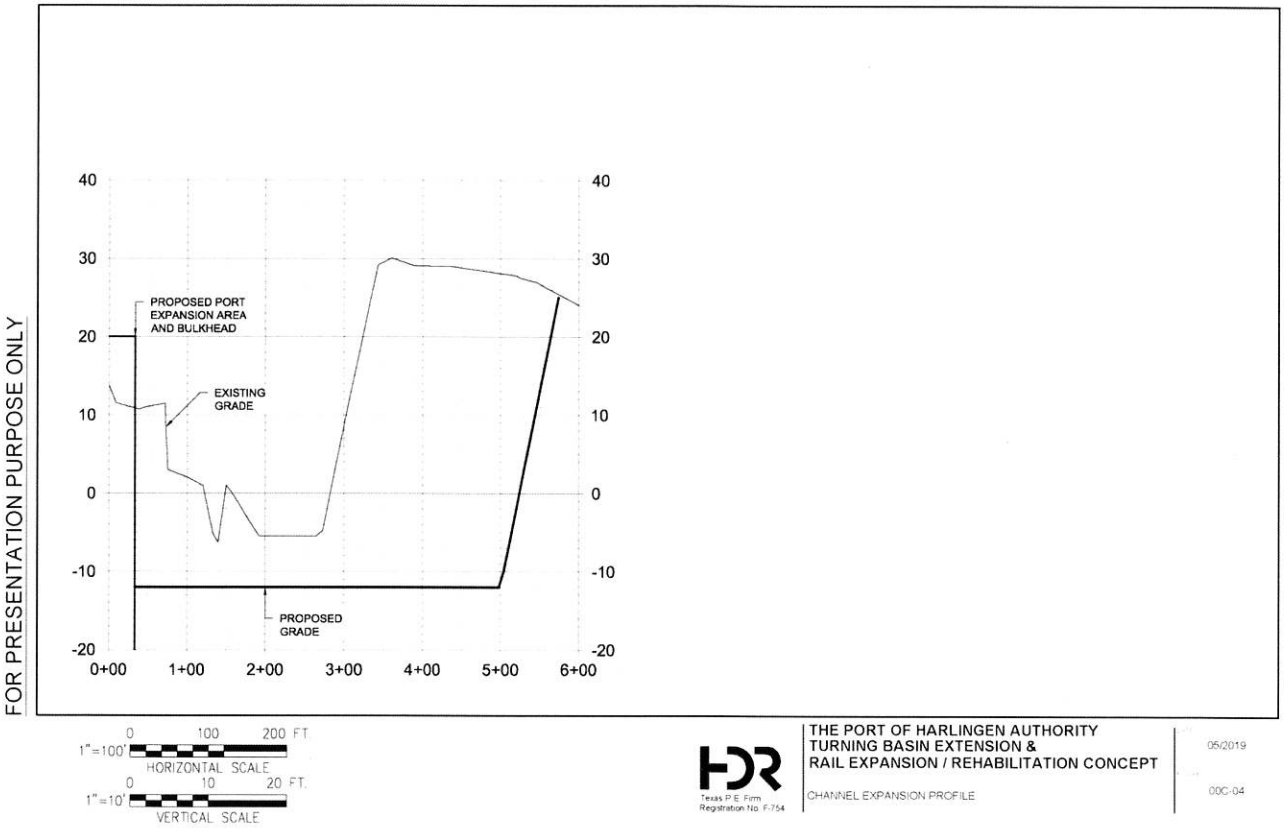


Figure 28 Channel Expansion Profile

1.22 Long Term Infrastructure Development

The primary changes noted in the proposed site realignment include each of the following:

- Final development of a cargo and container storage yard'
- Linear dock expansion on the south side of the Port
- Development of a turning basin
- Industrial park with new rail corridors

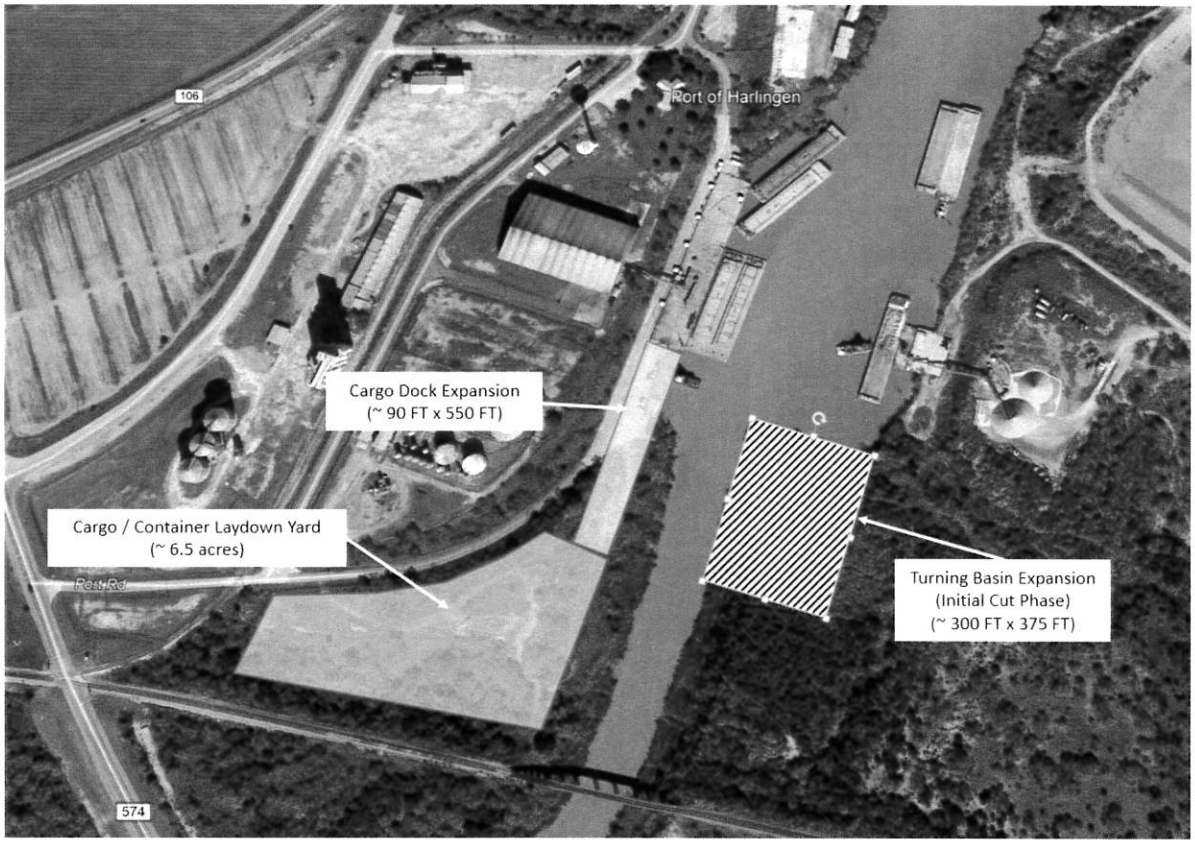


Figure 29 New Turning Basin Expansion Area (Initial Phase Cut)

1.22.1 Final development of a cargo and container storage yard

Depending on demand, this site should eventually be hard paved to accommodate the storage and handling of container cargo or large bulk either coming over the dock or in and out of the Port. One such commodity would be cotton. Currently, cotton bales are stored on Port property, but trucked to a warehouse in the Valley and then eventually trucked to the Houston area market for marine transit. Cotton is not currently transported out of the Port's dock. A recommendation is for the Port to start utilizing barge vessels for transit of cotton versus the use of truck. Other commodities could be bulk steel, wind turbine components, and other containerized cargos. Additional property should be identified for purchase near the Port for off-site storage. The current estimated cost range of hard paving the cargo laydown area is approximately $750,000 for an asphalt surface to approximately $1.2 million for a

concrete paving surface. Gravel or asphalt could be installed as an initial laydown bed with eventual concrete as a more stable surface as the container storage yard is utilized. This can be installed in a phased effort with driveways and dock access areas being developed first with hard surface and then expanding as the container commodity product line increases. This estimated costs does not include any perimeter lighting or storm drainage system. It is anticipated that the site will be sloped to provide natural drainage.

1.22.2 Linear dock expansion on the south side of the Port

A linear dock expansion is recommended long term when it becomes obvious that the existing cargo dock has reached its full capacity. Either a sheet pile dock with an apron equal in width to the existing apron, or a pier/apron on steel or concrete piles would be workable.

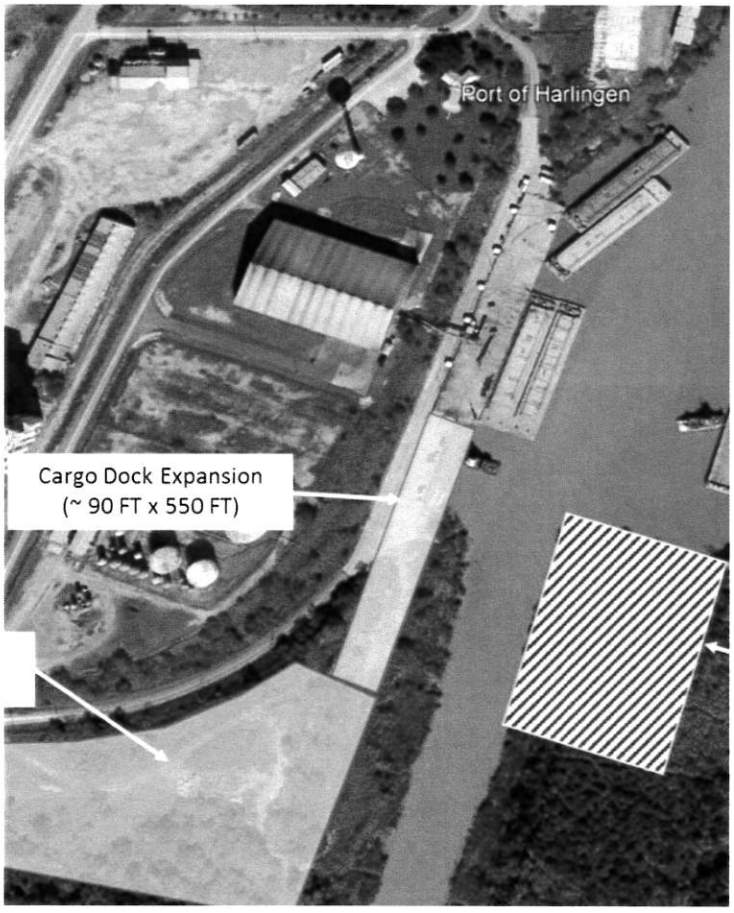


Figure 30 Expanded Dock Area (Pier and Apron)

The proposed expanded pier area can be less in length than the existing pier (550 feet) which would increase pier availability to 1,200 feet. The new expanded pier should include an approximately 90 foot wide concrete apron rated at 1,000 pounds per square foot static landing weight. All of the pier structures should be outfitted with a fendering system that is consistent across the entire length of the pier. The apron level should be equal to the existing pier structure. An estimated cost for a 650 feet

by 90 feet concrete pier rated at a load capacity of 1,000 pounds per square foot would be approximately $8 million to $10 million.



Figure 31 Sheet Pile Pier Construction

A second option would be the utilization of a floating dock system. Floating docks generally have less load capacity than fixed structures, but are self-adjusting to the level of the waterway. Floating docks are relatively less expensive but have space and load limitations. Estimated cost for a floating dock with anchor piles and ramp would be approximately $6 to $7 million.



Figure 32 Floating Cargo Pier

1.22.3 Development of an Expanded Turning Basin and Barge Fleeting Area

Expansion of the Turning Basin would allow better maneuverability of barge traffic as well as provide for additional loading/offloading of material. Proposed expansion would consist of widening of the East Basin portion (~ 7 acres) to the approved channel depth of -12 feet and West Basin expansion (-2 acres). See Figure 32. This would allow for the proposed expanded pier area and containment yard area. All of the pier structures should be outfitted with a fendering system that is consistent across the entire length of the pier. Estimated cost for the East Basin Turning Basin Expansion is approximately $4.2 million to $5 million. The estimated cost for the West Basin Turning Basin Expansion is approximately $1 million to $2 million. The Turning Basin expansion could be performed in phases with an Initial Cut along East Basin area and then eventually a full cut expansion of the whole turning basin.

Bulkhead expansion would add approximately 750 LF of a steel sheet pile bulkhead with reinforced concrete. This would also include approximately 8,300 SY of concrete paving area. The bulkhead expansion is approximately $8.5 million.

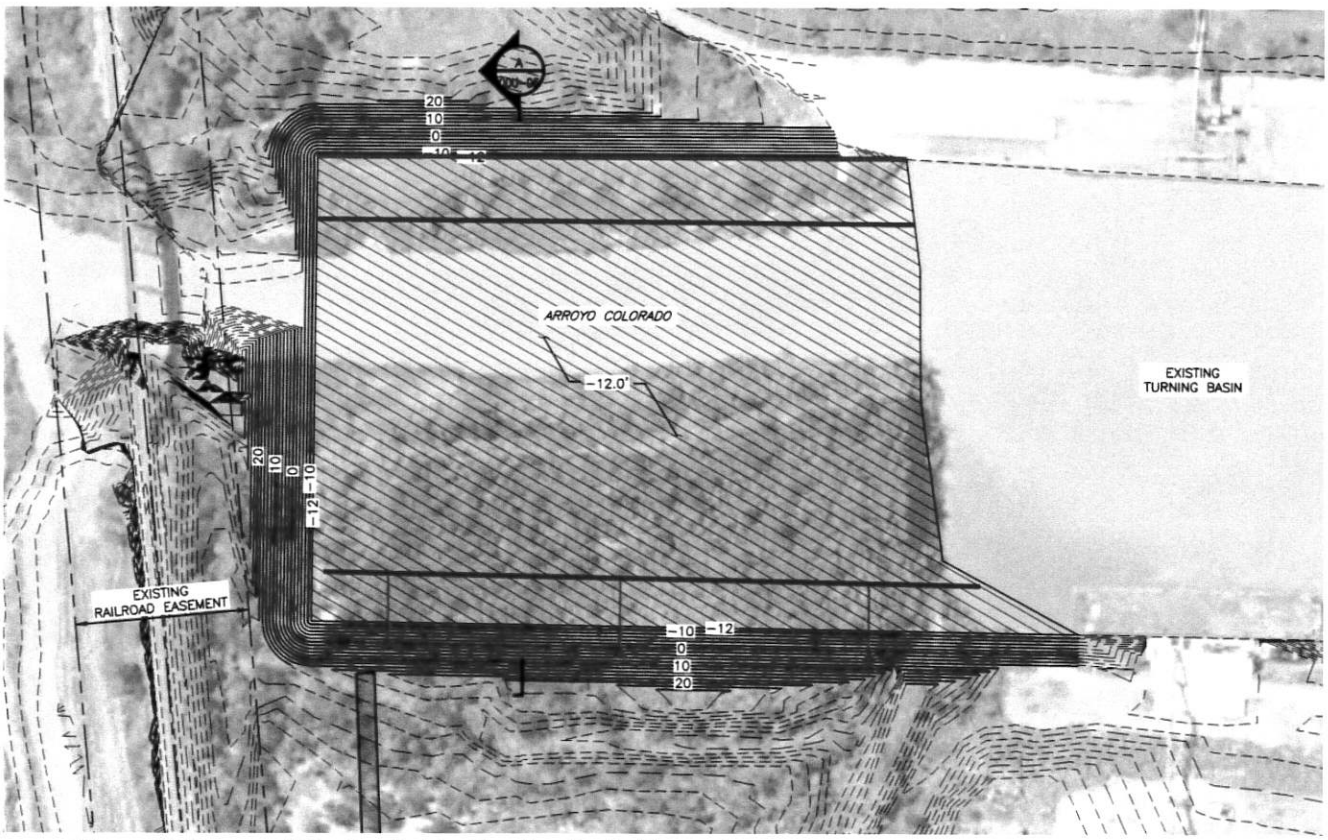


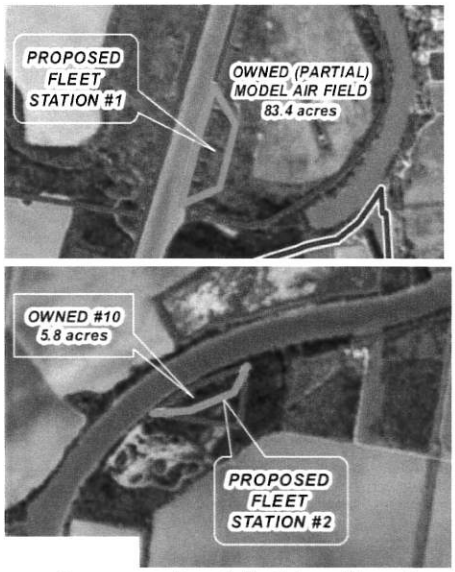
Figure 33 Proposed Dredge Cut for Turning Basin Expansion



Figure 34 Proposed Turning Basin (Full Phase Cut and Proposed DMPA)

In order to optimize dock frontage space, it is recommend to install additional Monopile Breasting dolphin structures in front of the Titan Marine facility. This would include some additional 350 LF of steel sheet pile bulkhead facing along with rubber guides and barge bollards. Some additional dredging would be required in order to maximize barge fleeting depth. Estimated cost for the Breasting Structure and Bulkhead at the Titan Marine facility is approximately $3.5 million - $3.8 million.

The Port indicated the need of a barge fleeting area to assist in traffic management. Two potential areas were identified. The initial barge fleeting location would be near the Smash Airport located approximately 1.4 miles from the Port dock in the Turning Basin. The second location could be located on Port owned property near Fernando East Road on county road 1846 approximately 6.1 miles from the Port dock.



Each barging area recommended would be designed for double stacks. The intended design concept is to utilize mechanical and hydraulic dredging to cut and notch out into the earthen shoreline. Monopile breasting structures would be installed with rubber guides and barge bollards. Estimated cost for each barge fleeting area is approximately $4 million to $4.5 million. The Port will also need to ensure planning and coordination with the USACE for necessary regulatory and permitting efforts.

1.22.4 Short Term Infrastructure Master Plan

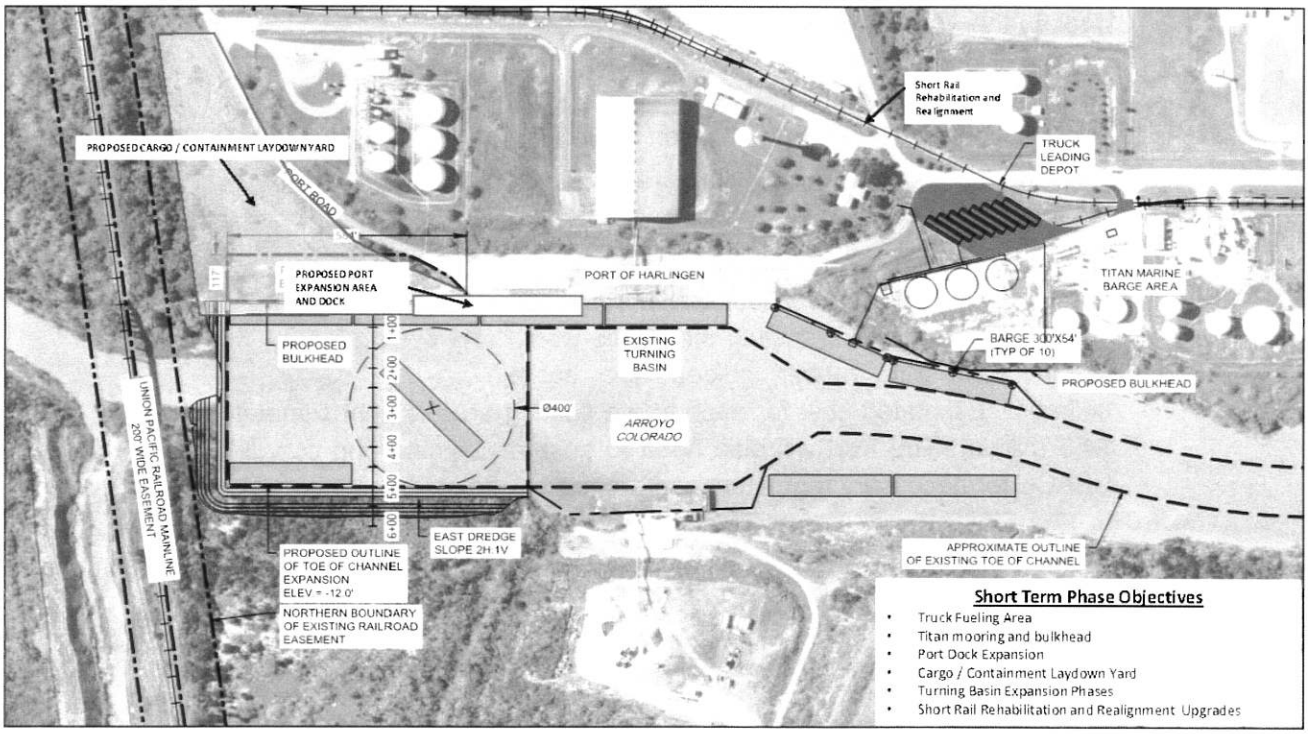


Figure 35 Proposed Short Term Plan

Investment Requirements and Recommendations

1.23 Infrastructure

1.23.1 Roadways

Roadways are currently being addressed under grant the Port received. New concrete drives are currently being installed which are critical due to the high traffic volume of fuel trucks. No additional roadwork is currently needed.

1.23.2 Short Term Rail Plan

Better utilization of the rail system is critical for growth of the Port and movement of commodities. It is recommended to rehabilitate and re-align the track and provide some expansion with proper grade rail and address flooding and drainage issues near the grain elevators and avoid derailments. For short term, it is recommended to reconstruction/replace/add approximately 5000 LF of track from the UP Mainline and terminate near the Cotton Gin. This would include realignment of the track, installing new timber crossing tracks, installing #9 turnouts, new timbers and sub-ballasts with a geotextile fabric. Estimated costs for this initial section of rail would be $2 to $3 million.

1.23.3 Long Term Rail Plan

In looking at future rail build-out opportunities, the Port can develop long term rail development in phases. Under Phase 1, adjacent property would need to be acquired to provide expansion capabilities to the Port. Phase 1 include would be the South Industrial Park to be approximately $25 million to $30 million. Phase 2 would expand northward to the Central Industrial Park Expansion area. This would include a rail bridge over the existing drainage ditch. Estimate cost for Phase 2 is ranges between $15 - $20 million. Phase 3 expansion would consist of four 2,600-foot-long tracks to the North Industrial Park area and would cost approximately $9 million - $12 million. For full build out, a multiple bulk commodity unit or Infinity Loop could be designed and construction with six 8,000-foot-long tracks in the South Industrial park area. The full build cost of the Infinity loop is between $50 million - $65 million. The Infinity Loop (Full Build) cost is informational only, as it is assumed that the multiple individual customers using the Infinity Loop would be the ones to pay for its construction, not the Port of Harlingen. The purpose of it is to give the Port a general idea of the total cost of it if they were to have any discussions with potential port customers interested in high-throughput bulk facilities.

Even individual phases can be easily broken down into even smaller bite-sized pieces, there is not necessarily a need to build all as Phase 1 at one time.

1.23.4 Water / Sewer / Electrical

The utility systems along the Port property seemed to be adequate for the existing Port conditions. The Port Director indicated possible replacement or removal of the elevated water storage tank near the Port office. Additional detailed analysis of these systems were not evaluated. The Port indicated that it is the client's responsibility to coordinate with local utility providers to obtain any additional utility expansion efforts if needed. No electrical substations were noted on the Port property.

1.23.5 Security / Fire Fighting

The Port does not have a security force or a Fire Station. The Port relies on local police and fire fighters from Harlingen or Rio Hondo as needed. There is a fire hydrant loop system along the Port property. The age or condition was not known. Recommendation is to have the system inspected to ensure its operation condition and pressure flow. Estimated cost for inspection and detailed testing of the fire hydrant system is $3,000 - $5,000.

1.23.6 Cultural/Hazardous Material

There are no visual or known cultural or historic structures on the Port property such as burial sites, cemeteries, churches, or other related historic buildings. There is no indication of known HTRW (Hazardous, Toxic, or Radioactive Waste) material storage areas or dumps located on the Port property. Specific cultural, historic, or HTRW assessments would need to be performed prior to any development on the properties.

1.24 Diesel Fuel Truck Loading Area

In order to remove congestion from the dock due to fuel deliveries, it is recommended to provide a Fuel Truck Loading Area. The loading area would be ~2 acres adjacent to the Titan Marine facility and the Port office. The conceptual design is based on 6-inch concrete pavement on top of 8-inch base material. The final design would need to be based on traffic and/or Texas pavement design standards. The Loading Area would be designed to accommodate approximately 8 truck fueling stations with piping to the Titan Marine facility bulk tanks. Pump systems or fuel loading skids are not included. In relocating the Fuel Truck Loading Area, this will relieve traffic congestion along the dock and allow multiple egress points from the site. This would allow additional usage of the dock. The estimated cost for the truck loading area is approximately $550,000 - $770,000.

1.25 Equipment

Once the Port's dock is cleared up for other types of cargoes, it is recommended that the Port consider the purchase of a dock crane for the handling of other than liquid and dry bulk cargoes. There are three types of cranes well suited for the Harlingen dock.

The first type is the Mobile Harbor Crane. These were designed for smaller ports and have a wide range of functions. Most significant is their lifting ability, flexibility and their ability to be repositioned anywhere on the pier. The crane cost is based on their type and lifting capacity. Cost for these cranes average between $2.5 million and $4 million and a number of them nationwide have been bought through Marine Highway Grant Programs or similar federal grant programs. The cranes can be outfitted with the proper equipment to handle dry bulk cargoes, project cargo and containers. They can be moved easily up and down the dock area and would fit on the current dock apron at the Port. Once the static landing weight is confirmed, the right size crane weight can be determined. Liebherr and Kone-Gottwald are the two largest manufacturers of mobile harbor cranes. Construction crawler cranes can also be used but they have limited capacity for other cargo types and lower productivity.

The second type of crane is called a material handler because it is designed to operate in different manners including like a crane. Material handlers are used to lift and swing cargo to and from the shore and vessel. They have heavy lift capability and can be mounted on crawlers, rail or wheels. They will handle containers and a wide variety of dry cargos including lumber, dry bulk with buckets and project cargoes. Mantsinen Hybrilift units are one type designed for ports similar to Harlingen.

The third type of crane appropriate for the operation at the Port is the pedestal crane. Least expensive, the cranes can be installed directly onto the dock or a barge and can be utilized by barges handling a reasonable wide range of cargoes. They are appropriate for container handling and can handle lighter loads of project cargo and dry bulk cargo. Their primary disadvantage is that they are stationary. Their positioning can interfere with other activities and the barge they are handling cargo to or from has to be moved and repositioned under the reach of the crane.



Figure 36 Mobile harbor crane (r-l), material handler and pedestal crane.

Overall the mobile harbor crane or the material handler provide the greatest flexibility for the Port. They can adequately handle container on barge if that business evolves

and can handle project cargo such as wind turbine components. It can also be fitted with buckets or grapples to handle dry or neo-bulk cargoes. Productivity is also higher on a mobile harbor crane and material handler than a pedestal crane. Mobile harbor cranes can cost between $2.5 million and $3 million each, material handlers between $1 million and $3 million and pedestal cranes between $1.5 million and $2 million each.

If other cargo opportunities evolve, the Port should also invest in a spreader for containers and project cargoes. This is fitted to the lifting hook of the crane and is utilized for lifting cargo in a proper weight distributed manner as well as protecting the cargo from damage by the lifting wires or slings. For containers, the spreader can be adjusted based on the length of the unit, either 20 feet or 40 feet, or some variation of those lengths up to 55 feet. Spreaders average between $ 150,000 and $250,000.

Cranes and spreaders are usually purchased and owned by the Port which allows the Port to provide the equipment to anyone who needs to use it. The Port charges for crane hire and equipment usage to cover the cost of annual maintenance, certification and insurance.

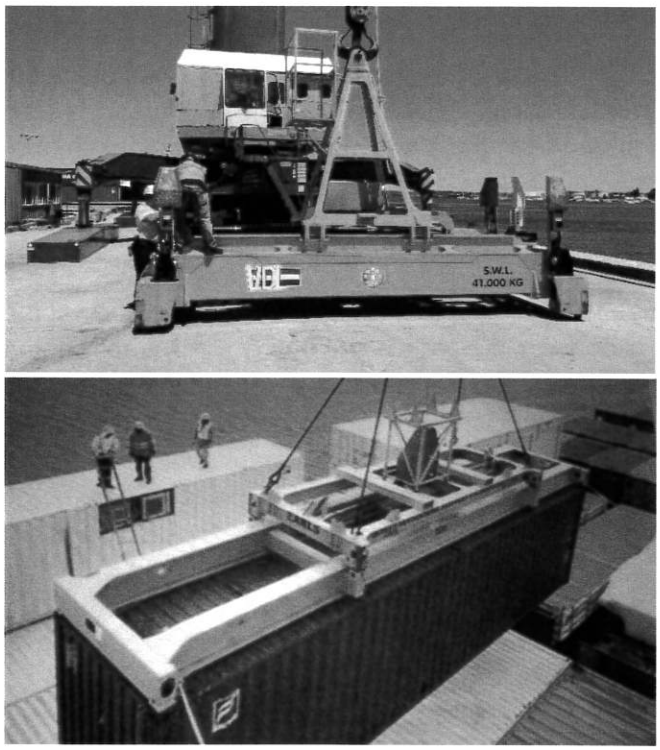


Figure 37 Container Spreaders

Initially, ports often utilize readily available construction type crawler cranes for handling containers. The crane must have the lifting capacity to lift a standard 30 ton intermodal container. Renting such cranes are a good initial step as the business develops.



(Source: Port of Baton Rouge)

Figure 38 Container on Barge Using Standard Hopper Barge

Standard hopper barges can carry up to 48 forty-foot-long containers. This assumes a mix of empty and loaded boxes. If loaded that is generally limited to 36 forty foot containers (more units if 20 feet). If loaded on a deck barge, the loads are less. Barge loading and unloading can take between 6 and 12 hours depending on the equipment used and the number of picks required per barge. Reach stackers are also used instead of cranes to handle barge loading and unloading but again the flexibility for other cargoes is limited.

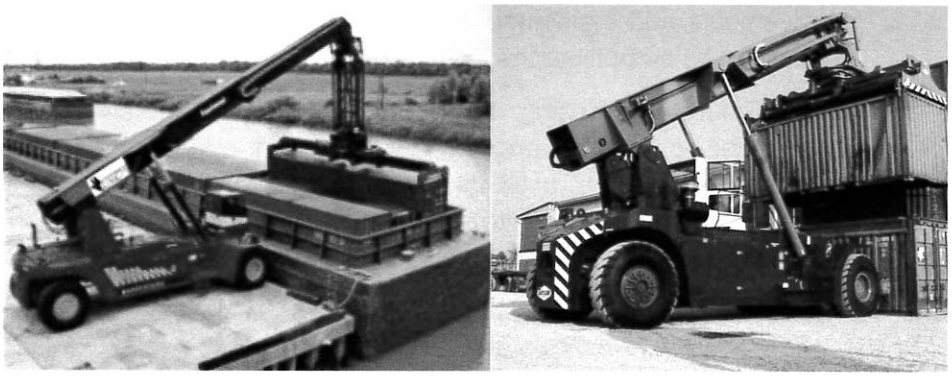


Figure 39 Top Loaders and Container on Barge

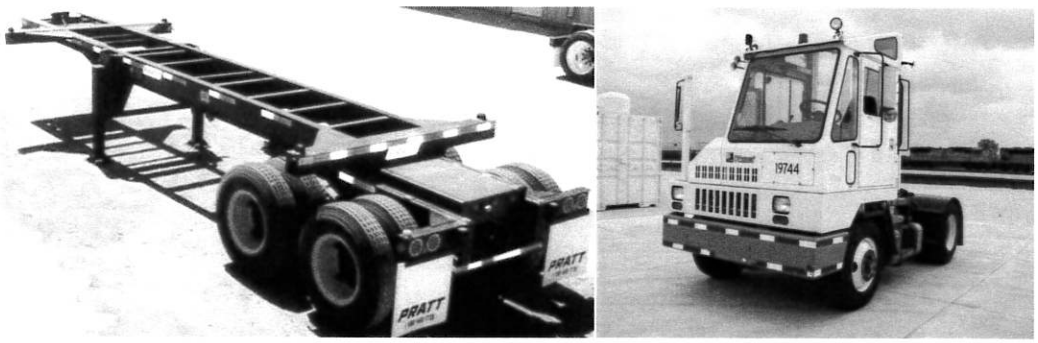


Figure 40 Container Chassis and Yard Hostler

In addition, a firm that handles containers or other cargo generally supplies the ground equipment necessary for handling the units. For containers, chassis and yard hostlers and potentially a top loader or reach stacker would be used. This equipment is generally not Port owned equipment, but can be. Like cranes and other Port equipment, if owned by the Port, the use of the equipment can be charged to the user.

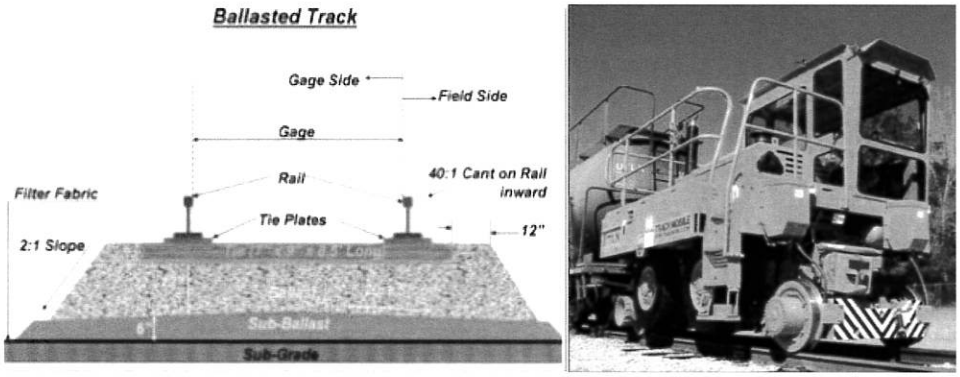
Containers do not need to be stacked near the dock and there is sufficient land in other areas of the Port where containers can be stored after being discharged or before loading.

1.26 Rail

Rail improvements need to be undertaken which would include several key areas to be addressed. The rail needs to be leveled and roadbed ballast added. Track joints should be checked and tightened and ties replaced where necessary. The weight of the rail should be all the same along the entire length of the right of way and may have to be improved to accommodate the heavier service engines used by UP. Most significant is the improvement of drainage in the rail right of way. Drainage ditches should be deepened and runoff improved along the entire length of the track within the Port's boundaries.

The current track and right of way should be extended further north along the Port's main roadway and a second by pass and storage track added where the shoulder widens past the proposed Titan Diesel facility. The Port should also consider having a Port railroad company provide switching services on site as well as handle the improvements and maintenance of the right of way. Future rail expansion to site tenants should be put into the Port's long term planning.

The consideration of using on site rail switching equipment might be considered. These small light weight engines reduce annual maintenance costs and allow the service railroad (UP) to undertake drop and pick operations at the boundary of the Port. Often, this is the main railroads preferred way of handling rail cars. Track equipment can be provided in most cases by the contractor hired to look after rail maintenance and operations.



(Source: IAMPE)

Figure 41 Typical Track/Railbed Cross Section and Track Mobile Road

Overall, the roadways within the Port's boundaries are in good condition. Mostly made of concrete with some extensions off the main road dirt or macadam, the roads

appeared to handle the current volume of traffic adequately on site. A drainage improvement project was underway and further project work is anticipated.

Safety is a key issue in most Port areas including Harlingen. The roads need to have improved surface markings including night reflectors marking shoulders. The addition of speed limit signs and enforcement is also a critical issue in regard to safety.

To compensate the Port for road maintenance costs, the Port can issue licenses to each truck and their respective companies calling on the Port.

1.27 Support Services

The Port utilizes outside engineering and legal services. These are adequate for the current activity at the Port. With the recent restoration of public taxes, outside accounting review services may be required in the future. Port personnel also discussed the contracting of a Public Relations firm which if staff changes move forward, is not recommended at this time.

1.28 Staffing

The Port is managed by a small staff of 4 including the Port Director and support staff including an Administrative Assistant/Bookkeeper, Secretary, and Maintenance Supervisor. The Port also utilizes a contract engineering firm, Ferris and Flinn Engineering, for required repairs and structural services[27]. It is recommended that three additional staff be added to the existing staff and several reclassifications made.

New staff include a Port Administrator who would serve also as the Chief Financial Officer, Business Development Assistant and a general Maintenance Assistant. The Port Administrator/Chief Financial Officer, Business Development Assistant would report to the Port Director and the Maintenance Assistant to a reclassified Maintenance and Operations Supervisor. The Administrative Assistant would be reclassified as the Executive Assistant and support executive staff and continue to manage some bookkeeping. Recommended job descriptions including duties and responsibilities are included in the Appendix.

Funding Sources

There are numerous grant opportunities available for smaller Ports which are summarized in the Committee on the Marine Transportation System Federal Funding Handbook for Marine Transportation Infrastructure, a copy of which is included in the Appendix.

One of the most active grant programs is the one designed to assist with the Marine Highway System administered by the US Maritime Administration. The program is part of a comprehensive set of programs within MARAD's Ports & Waterways division, designed to improve the nation's ports and the efficient movement of freight to support

[27] Port Director Follow-up Conference Call, March 2019.

the nation's economy. Harlingen is the Anchor Port of the Gulf Intracoastal Waterway which should be promoted as key to the Marine Highway System.

The Office of Ports and Waterways promotes port infrastructure development and intermodal connectivity and provides technical assistance to agencies and organizations concerned with transportation planning. The primary areas of emphasis include Port Infrastructure Development, Port Conveyance and Deep Water Port Licensing, and Ports and Waterways Planning through the America's Marine Highway and Strong Ports programs. Outreach to Ports and Waterways is primarily done through MARAD's nine regional gateway offices which are strategically located throughout the country.

In addition to facilitating grant programs, the Office of Ports and Waterways collaborate with the Office of the Secretary and the Build and Infra grant programs when there is a maritime related interest. The Office is constantly increasing its level of engagement as the programs continue to receive increased levels of maritime interest from ports[28].

To facilitate investment in the Marine Highway System, Congress authorized the Secretary of Transportation through 46 U.S. Code § 55601 to establish a short sea transportation program and designate short sea transportation projects to mitigate landside congestion or to promote short sea transportation. This includes designating routes, also called Marine Highways, to relieve congestion on America's roads and railways. Marine Highway designations are intended to assist the maritime industry in meeting national freight transportation needs[29].

The key elements of the Program include the use of short sea transportation through the development and expansion of documented vessels, shipper utilization; port and landside infrastructure; and marine transportation strategies by State and local governments.

The evaluation criteria are in accordance with 46 USC 55601(g)(2)(B) which states that: "the applicant must demonstrate that the project is financially viable, the funds received will be spent efficiently and effectively, and a market exists for the service of the proposed project as evidenced by financial statements, cost models, contracts and written statements of potential customers". Eligible applicants include State governments or State Departments of Transportation, Metropolitan or Regional Planning Organizations, Port Authorities, and Tribal governments[30]. Harlingen qualifies as a Port Authority as an applicant. To be eligible, any request must have been designated as part of a Marine Highway Project. MARAD will issue a call for projects which will be evaluated in the following manner:

- Whether the project offers a lower-reduction of external cost, as well as a public benefit
- Cost alternative to increasing land-based capacity
- Demonstration of the likelihood of financial viability

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[28] US Maritime Administration Grant Program Presentation, November 2018.

[29] IBID

[30] US Maritime Administration Grant Program Presentation, November 2018

- project scope, impact
- public-benefit, environmental effects
- offsetting costs, and cost to the Government (if any)
- the likelihood of long-term self-supporting operations
- market/customer commitment
- operational costs
- the relationship to its designated Marine Highway Route

There are a number of other programs that are also viable for funding opportunities. The two biggest challenges with any application is 1.) the content of the application and 2.) the ability of the applicant to actually do the grant and submit it. All grants are competitive and often "political" support can mean the difference between a successful or unsuccessful application.

The grant application needs to address five key elements that make up the foundation of the application. The following are excerpts from the MARAD Grant Guide for grant applications is an example of grant content, mostly related to Marine Highway Projects, but is applicable to other federal agency grant processes.

1. MARKET STORY - About 70% of the application should be telling the story of "Why". This is your Market and Value Proposition and every service will have its own story. This is the bulk of the application, and how the grant will benefit those it is looking to assist. Questions need to be answered such as: Who is going to be the customer? What does the current supply chain look like? How does that supply chain compare with the new supply chain that benefits from the investment? How do the total door to door freight rates compare between the status quo and any alternatives? And how does the transit time compare?

2. SERVICE STORY - About 10% should tell the story of the service or investment specifics. This includes the details of the day to day operations of your (proposed) service. Who is going to operate it? Modal types? How much of that capacity do you expect to utilize during the initial, growth, and sustainment phases of operations? What kind of frequency will the service offer? How reliable will it be and what are the externalities that may impact that reliability and predictability? What is the transit capability for that asset, meaning how much more use can you get out of that existing asset before additional assets are required. What type of shore side equipment, infrastructure, technology, and intermodal connectors are available and what is needed to be obtained? How much will that cost? Do you have a secure facility? Do you have laydown areas to stage containers or cargo? Do you have access to chassis and ground equipment? Do you have load planning and yard planning technology for tracking and reporting to customers?

3. COSTS - Another 10% should tell the story of the cost model - The cost modeling is the key aspect of service development. In the end, even with some level of public support, the numbers have to make sense. The cost model should take into account drayage, Loading and Discharge costs, Vessel and Fuel Costs, Landside Equipment Costs; Operating overhead and insurance And a comparative analysis between the alternative and a numerical demonstration of the value proposition to the shipper.

4. PUBLIC BENEFITS STORY - The fourth piece should tell the story of the public benefits which expect to be gained. While some of these benefits may be difficult to quantify without significant investment in time and effort, if the current supply chain is clearly understood, you can capture what a modal shift would produce. Included would be miles saved using a new service; Air emissions reduced or saved through using the economies of scale that your service will provide; Road maintenance savings through reduced truck traffic Reduced congestion for the same reason; Improved system resiliency that would be obtained by your service because a new alternative now exists that did not previously; and improved safety for users of the system.

5. WRITEUP – Preparation and submission of the grant proposal is critical. The document needs to be clear, concise, and be able to clearly outline the needs, economics, and plan to utilize grant funding. The Port will need to commit to a Grant Writing Task association with specific projects that are consistent with the Port's Strategic and Master Plans. This requires each of the following:

1. Designated staff member, sub-contractor or consultant to identify projects and complete the grant writing process
2. Update economic impact and benefit data based on the earlier Economic Study by Martin Associates
3. Liaison with the agency offering the grants to determine timelines and submission deadlines
4. Letters of support from the private sector and support from political leaders

The following table is taken from the US Committee on the Marine Transportation System Federal Funding Handbook. A copy of the entire Handbook is included in the Appendix. These grants and their associated criteria are the most likely areas where grants applications may be solicited.

Table 5 Selected Federal Funding Programs and Agencies (CMTS)

Type	Agency
Economic Development Assistance Program	US Department of Commerce-USDOC
General Small Business Loans	USDOC-Small Business Admin.
Planning Program/Technical Assistance	USDOC-Economic Development Admin.
Real Estate/Equipment Loans	USDOC-Small Business Admin.
Coastal Impact Assistance Program	US Department of the Interior
Civil Infrastructure Systems	National Science Foundation
Grant Anticipation Revenue (GARVEES)	USDOT-Federal Highway
BUILD Discretionary Grants	USDOT
Marine Highway Grants	US DOT-Maritime Administration

INFRA Discretionary Grants	USDOT
National Highway Performance Program	USDOT-Federal Highway
Private Activity Bonds	USDOT-Federal Highway/Transit
Railroad Rehab/Improvement	USDOT-Federal Railroad Admin.
State Infrastructure Banks	USDOT-Federal Highway
Structural/Arch Engineering/Materials	National Science Foundation
Transportation Alternatives Set-Aside	USDOT-Federal Highway

(Complete Guide in Appendix)

Perhaps one of the most successful grant program for ports has been the Better Utilizing Investments to Leverage Development program, or BUILD Transportation Discretionary Grant program, allows the USDOT to invest in road, rail, transit and port projects that meet or potentially meet national objectives. Previously called TIGER Grants, there is nearly $7.1 billion for ten rounds of National Infrastructure Investments. DOT generally receives hundreds of applications to build and repair critical pieces of freight transportation systems, each evaluated on their merits to help ensure that federal public dollars are effectively spent.

The eligibility requirements of BUILD allow project sponsors at the State and local levels to obtain funding for multi-modal, multi-jurisdictional projects that are more difficult to support through traditional DOT programs. BUILD can fund port and freight rail projects, for example, which play a critical role in freight movement, but have limited sources of Federal funds. The program can provide capital funding directly to any public entity, including municipalities, counties, port authorities, tribal governments, MPOs, or others in contrast to traditional Federal programs which provide funding to very specific groups of applicants (mostly State DOTs and transit agencies). This program allows the USDOT and State and local agencies to work directly with a host of entities that own, operate, and maintain transportation infrastructure, but otherwise cannot turn to the Federal government for support.

1.29 Potential Business Targets by Priority

The following is a list of key business opportunities for the Port based on the market analysis conducted by HDR. The most probable are listed by priority. While there may be other opportunities that arise, in the near term, once infrastructure issues are resolved, these are the commodities the Port should focus on attracting.

Table 6 Priority for Business Development Opportunity

Rank	Products	Reason
1	Sugar	Raw sugar is already an ongoing commodity handled by the Port in large quantities. The port is strategically located in the Rio Grande Valley near to the sugarcane growers.
2	Agricultural Products	The port is strategically located in the Rio Grande Valley where there is high agricultural production of corn and sorghum. Additionally, the other

Rank	Products	Reason
		ports in the region do not handle large quantities of agricultural products and hence Port of Harlingen can leverage this advantage.
3	Petroleum	The demand of petroleum products such as diesel, gasoline and propane is forecasted to increase. The port already has two major companies working on the docks – Titan Marine and NuStar Energy. The Port is a major exporter of trucked fuel to local Mexico markets.
4	Cotton	The port is strategically located in the Rio Grande Valley where there is high cotton production. The port already has two cotton gins which handle raw cotton. Cotton can be containerized and barged to Houston for international shipments.
5	Liquid and Dry Fertilizer	The port is strategically located in the Rio Grande Valley where there is high agricultural production. The global market for fertilizers is forecasted to increase by 2.8% in the next few years. The port already hast three fertilizer companies on site – Nutrien Ag Solutions, Helena Chemical, and Sanders Fertilizer.
6	Gravel and Sand	Wind Farms are big consumers of concrete in the Rio Grande Valley. River sand and gravel are important materials to make concrete. Industry growth within the Rio Grande Valley is increasing. Need for cement, sand, and gravel will have high demand.
7	Limestone	The global market of limestone is to increase to $9 billion. Limestone is a product highly used in the agriculture and construction industry.
8	Plastics	Among all the states, Texas leads in the plastics industry shipments. Most of the resin production is also concentrated in Texas. There is a large growth anticipated for resin demand globally.
9	Butane	In 2017, the country's demand for Butane grew by 58.6%. In 2017, Texas showed an increasing trend in total refining production of Butane.
10	Scrap Metals	The other ports in the region do not handle large quantities of scrap metals. This gives the Port of Harlingen comparative advantage if it were to enter this market.
11	Machinery Parts	The other ports in the region do not handle large quantities of machinery/bulk parts. This gives the Port of Harlingen a competitive advantage if it were to enter this market. Solar components are currently trucked to the region. Shipment via barge could be a beneficial market for the Port providing they obtain offloading cargo handling capabilities.
12	Airplane Parts	The Harlingen Air Force Base is located close to the port.

The potential for business development is a driving force in many ports. It can also be a significant diversion since many opportunities that come up may in the long run prove to be hollow. Business development can be either pro-active with targeted industries and opportunities or reactive as proponents present themselves to the Port. In either case, the Port needs to be prepared to prequalify opportunities and develop a focused approach and timeline for either moving ahead to closing, or setting aside in the early stages. A pre-qualification process which looks into realistic potential based on financial capability, business plan, past successes, experience, and infrastructure needs along with any regulatory requirements should be undertaken in any effort.

Working with business entities requires management of the entity and the process. This needs to be factored into any business development process for the Port. Proactive business development must begin with good information and comprehensive data for each target.