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16. Abstract

A key element of a port's viability and efficiency is its ability to distribute and receive cargo from its location to the inland area that it serves. This ability is largely affected by a port's access to and from the hinterland provided by roadways, rail, and waterways. Use of particular transport modes at any individual port will depend on the transport networks that it is connected to, the markets that it serves, and the principal commodities that it handles. Access to and from mainlines is provided by branch lines and spurs, and these secondary connector lines are critical to providing optimal commodity movement capabilities. To identify potential deficiencies in port-rail access, the infrastructure along with current and projected levels of trade must be considered. This study is an evaluation of current and future rail access needs of key public deepwater ports along the Western Gulf - Texas Coast.

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CURRENT AND FUTURE RAIL ACCESS NEEDS OF WESTERN GULF - TEXAS PORTS

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ABSTRACT

A key element of a port's viability and efficiency is its ability to distribute and receive cargo from its location to the inland area that it serves. This ability is largely affected by a port's access to and from the hinterland provided by roadways, rail, and waterways. Use of particular transport modes at any individual port will depend on the transport networks that it is connected to, the markets that it serves, and the principal commodities that it handles. Access to and from mainlines is provided by branch lines and spurs, and these secondary connector lines are critical to providing optimal commodity movement capabilities. To identify potential deficiencies in port-rail access, the infrastructure along with current and projected levels of trade must be considered. This study is an evaluation of current and future rail access needs of key public deepwater ports along the Western Gulf - Texas Coast.

EXECUTIVE SUMMARY

This research project examines the trade activity of four seaports along the Western Gulf of Mexico - Texas Coast and evaluates the anticipated needs for improved rail access to these ports based upon projected freight transportation demand. Of specific interest in this study are the branch rail lines that connect the ports to the Class I railroad network mainlines in the Western Gulf area. This research project, funded by the Southwest Region University Transportation Center (SWUTC) and the U.S. Department of Transportation (US DOT), has been undertaken to enhance the understanding of port-rail connections in the Western Gulf of Mexico-Texas Coast region, specifically branch lines that connect the port's rail facilities with the mainline serving the port, and an assessment of forecasted trade and how it could affect existing rail infrastructure in this part of the state.

This report focuses on rail-freight connectors of four deepwater public seaports on the Texas Gulf Coast: Port Freeport, Port of Port Lavaca-Point Comfort, Port of Corpus Christi, and Port of Brownsville. Collectively, these ports are referred to in this summary report as the *Western Gulf-Texas Coast (WG-Tex)* ports, to distinguish them from other ports in the Gulf Region either in the United States or Mexico. Regionally, these ports represent the deepwater U.S. ports that are located to the west of the Galveston Bay port complex. The WG-Tex ports include a range of sizes, from the Port of Brownsville, which was 87th nationally in 2001 total tonnage according to U.S. Army Corps of Engineers (USACE) data, to the Port of Corpus Christi, which was 6th nationally in 2001 total tonnage.[1]

The predominant commodities handled at these ports are bulk and breakbulk commodities, including crude petroleum products, chemicals, ores, and grains. The commodities flowing through the four ports in this study were examined for their potential for movement by rail. Currently, the study ports have minimal intermodal rail container movements, but three of the four ports have plans that include development of specialized container terminals in anticipation of increased container flows that have been forecasted by the US DOT and others. Such plans, if brought to fruition, will require improved rail infrastructures to support these new terminals. Forecasted freight levels for WG-Tex ports were also evaluated to assess the need for improvements to the rail infrastructure.

While attempting to state with certainty the pace at which rail needs will grow at these ports is extremely difficult, there are certain rail needs that have been identified for which solutions must be sought. The main focus of this project has been on the connectors; however, three categories of rail needs in the south Texas area have been identified—mainline limitations, connector needs, and other rail improvements. Each of these areas has needs which should be addressed to increase the ability to move freight by rail in south Texas.

[1] U.S. Army Corps of Engineers Navigation Data Center. *The U.S. Waterway System Transportation Facts.* December 2002.

MAINLINE LIMITATIONS

The WG-Tex seaports' mainline rail needs are served, in the north-south direction, by the Union Pacific Railroad (UP) mainline (Brownsville and Angleton Subdivisions) that roughly parallels the Texas coastline below Galveston Bay. Spur lines near each of the study ports connect the mainline to the ports and, in some cases, to inland transportation hubs such as San Antonio or to the larger rail complex surrounding Houston. Burlington Northern Sante Fe Railway (BNSF) has trackage rights for the entire length of the UP mainline from Houston to Brownsville, and Tex-Mex Railway (TM) has trackage rights for the UP mainline between Robstown where its own line intersects the Brownsville Subdivision into the Houston area.

The 1979 Texas State Rail Plan shows both Missouri Pacific (MP) Railroad and Southern Pacific Transportation Company (SP) having mainlines serving the south Texas coastal area and the Rio Grande Valley. By the time of the UP-SP merger in 1996, the SP mainline and several other SP rail lines in south Texas had been abandoned—leaving the UP (former MP) mainline as the only major rail line serving the area.

The federal Surface Transportation Board (STB) rulings granting BNSF and TM trackage rights over segments of this mainline have preserved multiple carrier options to many shippers along the line, but have left maintenance and track ownership in UP's hands. Because UP maintains the line and the other railroad companies pay fees in proportion to their usage, many of the competitive forces that would have previously encouraged UP to make large investments in improving the Angleton and Brownsville Subdivisions are gone.

Since UP is legally required to share its line in this area with its competitors, UP corporate leadership is disinclined to add upgraded facilities, at their own expense, that will be to another railroad's advantage. The maintenance fees that are paid by these companies under trackage rights agreements do not cover the costs of upgraded infrastructure—just the costs of maintaining existing facilities (and UP would probably protest that the fees that they are allowed to charge do not meet the full maintenance costs). This condition leads to a situation where UP must make an internal business decision over whether to spend its limited capital to add infrastructure on a line where it must compete with its rivals for business or to spend its capital adding infrastructure where it does not have to allow its competition to use the improvements for which it is paying.

A second factor affecting the capacity of this mainline is the increased track maintenance needs resulting from increased industrial production and the North American Free Trade Agreement (NAFTA) trade going to and from northeastern Mexico. The improvements brought about by the privatization of the Mexican rail system and the growth of Monterrey as an industrial center will lead to more freight traffic moves north and south to service its needs. Currently the majority of rail traffic from both central Mexico and the Monterrey area enter the U.S. through the Laredo gateway on Transportacion Ferroviaria Mexicana (TFM), however, as facilities there become more capacity constrained, TFM could shift more of its rail traffic to the Matamoros/ Brownsville area. This added traffic would further strain the UP mainline there by adding more daily trains in the south Texas area.

Each of the study ports has preserved right of way or developed specific plans that call for increased rail usage in the future. The Port of Brownsville has a plan in place to develop a rail-based land-bridge between the Mexican Pacific Port of Lazaro Cardenas in southwestern Mexico and the Port of Brownsville. The Port of Corpus Christi has long-term plans to develop a land-bridge from the Ports of Los Angeles and Long Beach and its planned La Quinta container terminal in San Patricio County. The Port of Port Lavaca-Point Comfort has preserved rail right of way for use if container-on-barge traffic develops to a point that warrants its use. Port Freeport has plans to develop some of its inland property into rail-served industrial sites and increase its handling of containers as Houston's capacity to do so is reached. All of these projects would add traffic to the UP mainline in south Texas or add congestion to it as the number of crossing trains at intersections with the connector lines increases.

Another limiting factor on the UP mainline is the length of the sidings along the Brownsville and Angleton Subdivisions. In general, train capacity can most easily be added by increasing the length of the train; however, the siding lengths along these subdivisions limit the number of trains that can use the mainline simultaneously. Railroad companies prefer to operate long unit trains between 9,000 and 10,000 feet in length when possible because doing so reduces the number of locomotives and crews needed when compared to operating two or more shorter trains. On the Brownsville Subdivision, there is only one siding that has a length greater than 10,000 feet, located in Sinton. This effectively limits train lengths between Brownsville and Corpus Christi to operations of either one longer train at a time in either direction or two opposing trains operating in this area if the second one is limited in length to 7,400 feet or less to enable use of the siding at Armstrong. Similarly, the Angleton Subdivision has only one siding with a length greater than 10,000 feet located just south of Algoa. This limits the length for any opposing second train operating between Freeport and Bloomington to the siding average length of between 7,500 and 8,300 feet.

Train dispatchers have developed operational means of maximizing usage of the track in this area in order to increase its capacity to the level at which it operates today; however, the addition of even a portion of the expected traffic outlined in this study has the potential to upset this balance. Additional trains operating over short segments of the line can have effects that cascade throughout the south Texas system. For example, the one to three trains per day that are expected in each direction at the Port of Corpus Christi's La Quinta container terminal will not only add trains to the Kosmos Subdivision, but will also necessitate that more trains operate on the mainline section between the intersection of the Kosmos Subdivision and the intersection with the Corpus Christi Subdivision at Odem where the train could head inland toward San Antonio.

Even though this is a relatively short segment of track, the effects are felt outside this segment because of the single-track nature of the system. To accommodate the container train, a unit train may have to be held in the siding at Sinton until the container train completes its transit. Likewise, other trains needing to use the mainline may have to wait south of Odem or in the Viola Yard area (from either the existing Corpus Christi Terminal Railroad (CCTR) lines or the new Joe Fulton International Corridor line) while this train completes its movement on the mainline. Many of these conflicts may be avoided by use of careful scheduling on behalf of the dispatchers, but add in the fact that two additional railroad companies are operating their trains over this segment, and the difficulty in managing such additional trains over the present infrastructure becomes apparent. Existing sidings will need to be lengthened, new sidings added, or segments will need to be double-tracked as traffic levels grow, to give dispatchers the flexibility needed to efficiently manage movement. As stated earlier in this section, much of the incentive for UP to unilaterally invest in such improvements to the line as long as its competitors also operate over it is gone since there is not a separate competing rail line. Only dramatic degradation in their own service due to traffic conflicts, resulting in lost business opportunities, would oblige them to do so.

RAIL CONNECTOR NEEDS

As international trade grows, the rail connectors between the UP mainline and the ports examined in this study will require improvements. The pace at which these improvements will be made will be driven by several factors. The growth in international trade, largely carried out using shipboard containers, entering the WG-Tex area is expected to exceed the capacity of the Galveston Bay port facilities necessitating movement of containers through one or more of the study ports. Secondarily, the bulk and commodity cargoes handled by the study ports are expected to remain steady or grow in magnitude. This will put a strain on the existing rail lines that connect the ports and the national rail system. Since each Texas port operates independently, as a niche port, rather than the state having a stronger planning role like some other nearby states, these and other Texas ports will have to work with the private rail companies to perform connector line upgrades as new rail traffic develops.

Public sector rail involvement in funding rail upgrades has also been limited in the past; however, recent changes in Texas law allow the state department of transportation to purchase or improve rail facilities if such actions can be shown to reduce congestion. Since traffic that cannot be moved by rail must move by truck from the ports, port rail and other intermodal connectors could be a focus of such spending in the future. The single change with the largest potential to affect the connector lines is the development of container facilities at the study ports. Container facility development at the WG-Tex ports would necessitate detailed studies for each of the connector lines and the mainline; however, certain impacts to the connectors can be anticipated.

Port Freeport

According to the UP Timetables, track on the Freeport Industrial Lead is maintained to Federal Railroad Administration (FRA) Class 1 or Class 2 standards allowing trains to operate between speeds of 10 and 20 miles per hour, with a railcar weight limit of 143 tons. The limiting factor for future rail development at the port is the swing bridge and the track between it and the port's public facilities. The swing bridge and rail infrastructure to the port is not often used at this time, resulting in deferred maintenance and degradation over time. Any future development of train traffic to and from the port area would be expected to necessitate replacement of the swing bridge and substantial upgrade of the track serving the port due to the speed restrictions on the current infrastructure.

Port Freeport's development of its inland greenfield land holdings may also necessitate additional rail improvements. The new berths being added at the port in the next five years portend additional need for rail service to and from the port. The construction of a new rail spur that connects the port to BNSF or UP mainlines in Bay City is being considered as an alternative to reconstructing the facilities along the Freeport Industrial Lead. Additional trains operating on either of these lines would add to the number of trains seeking access to the Angleton Subdivision and additional storage tracks/sidings would need to be added along the northern part of the Freeport Industrial Lead or near Bay City as traffic grows. New rail traffic would also impact at-grade crossings in the area or require construction of grade-separated bridges.

Port of Port Lavaca-Point Comfort

Due to its focus on liquid bulk traffic, the growth in rail traffic from the Port of Port Lavaca-Point Comfort will probably be the least likely to grow dramatically. The extension of the rail line to its multi-purpose dock for movement of container on barge traffic could require that further rail improvements be made along the Point Comfort and Northern Railway Company (PCN) line between the port and Lolita. This track is maintained at FRA Class 2 standards allowing a top speed of 20 miles per hour. This speed should be sufficient for the anticipated growth in rail traffic at this time. If container movement were to exceed expectations along this line, increased maintenance to maintain Class 2 status or improve speed may be necessitated.

It is also likely that some yard capacity would need to be added in the Lolita area near the PCN maintenance shop to allow for longer trains and for PCN to exchange crews/cars with UP. PCN's current trackage rights allow them to move over UP tracks, but this is almost exclusively limited to movement of Alcoa loads. Containers would likely be interchanged with UP at Lolita, or an overhead agreement would be reached that would allow UP trains to service the port over the PCN line; however, the small numbers of containers projected to move by rail from the port most likely would not reach a level that interested UP in providing direct service.

Port of Corpus Christi

As the second-busiest port area in Texas, the need for efficient port-rail connections in the Corpus Christi area is great. Currently, the port is served by three railroads (UP, BNSF, and TM) plus its own switching and terminal railroad (CCTR). Rail capacity to and from the port will be aided by the construction of the Joe Fulton International Trade Corridor road and rail facility to the northern side of the inner harbor. This construction allows for removal of the Tule Lake Lift Bridge that would improve ship operations to and from the western end of the inner harbor. These improvements should aid in moving traffic by rail between the port and the Brownsville Subdivision; however, increased traffic along the Corpus Christi Subdivision to Odem, combined with the rail traffic from the planned development of the La Quinta Container Terminal on the northern side of Corpus Christi Bay, will necessitate that more train storage be in place along the Corpus Christi Subdivision south of Odem. A new, larger rail yard is planned near the western end of the Fulton Corridor to address this need.

The container traffic to and from La Quinta may necessitate improvements along the Kosmos Subdivision to accommodate more daily trains. These trains will affect vehicular traffic at the several at-grade crossings along US 181 located in Gregory, Taft, and Sinton. The La Quinta Environmental Impact Statement states that such movements can be scheduled to minimize these conflicts; however, as these cities and their traffic grow, additional grade crossing protection devices or grade separations may become necessary. Yard improvements at Sinton may also become necessary to hold trains waiting for access to the Brownsville Subdivision when conflicting traffic is approaching from an opposing direction, either north or south.

Port of Brownsville

While the Port of Brownsville has recently completed a 30-year-long process to relocate the main rail route from downtown Brownsville, there remain many potential rail improvements that could facilitate rail movement to and from the port. The relocation shifted rail traffic to the north and east of the city allowing for interchange between Brownsville and Rio Grande International Railroad (BRG) and UP at UP's Olmito yard near San Benito. Projections by BRG of railcar numbers at the port show that the number is expected to double by 2010 and double again by 2020. These numbers may be affected by economic conditions such as the steel tariffs that have been put in place; however, this growth will further burden an already taxed rail infrastructure between the port and the Brownsville and Matamoros (B&M) bridge via the Brownsville Subdivision.

Should trade between Monterrey and/or central Mexico and the U.S. grow as expected, additional yard capacity would be needed along the connectors in the Brownsville and Harlingen areas. While the Brownsville-Matamoros Railroad Relocation Demonstration Project will aid in reducing congestion and conflicts in downtown Brownsville, other rail improvements such as the West Rail Relocation Plan must be considered. This new rail route to Mexico necessitates construction of a new bridge 20 miles up the Rio Grande from the B&M Bridge. The reduction in at-grade crossings and conflicts in Brownsville, as well as the reduction in transit time between Monterrey and Olmito Yard of 2.5 hours and the elimination of traffic windows in Matamoros could increase the efficiency of international rail movements along this route.

The port's long-range plans have also called for construction of a new rail/truck "freight-only" bridge located on port property and eastern Matamoros. Such a bridge could reduce the distance that rail traffic headed for the port had to travel by avoiding the bypass via Olmito and could also deal with the problem of overweight trucks between the B&M Bridge and the port. This bridge would require rather extensive development of highway and rail connectors on the Mexican side of the border from the current crossing to the area adjacent to the port. The costs of this bridge are estimated to be between $50 and $60 million.[2] It is unlikely that either TFM or UP would be able to contribute substantially to such a project, despite the positive impacts that it would have on rail movement by enhancing the ability of the port to develop land-bridge opportunities through Mexico.

[2] Hartnett, Dewayne. *Brownsville Port of Call.* The Brownsville Herald, September 10, 2001.

The Port of Brownsville's planned container facility would also require BRG to extend its lines from the existing port facilities eastward to the mouth of the ship channel. BRG's estimates of new container business would increase rail traffic to the port by greater than 50,000 cars per year. Accordingly, the port and BRG believe that acquisition of the Palo Alto Yard from UP enhances its operating capabilities for staging such traffic (it is currently leased from UP). BRG also stated that additional parallel tracks to the branch lines serving the port would also be needed as would reductions in the degree of curvature for four curves on trackage serving the south side of the port (where most of the existing traffic is generated) and an increase in track weights of certain rail sections at the port from 90 lb. rail to 112 lb. rail.

OTHER RAIL IMPROVEMENTS

In addition to facility improvements along the mainline and to the connectors, several other rail needs must be addressed in this area. These include:

- **Rail capacity/infrastructure needs on port property:** In addition to the improvements "outside the gate," ports will need to add facilities that make rail service more accessible. These include on-dock or near-dock rail service, loop tracks, additional sidings, and additional rail-car storage areas.

- **Grade crossing studies:** If rail traffic increases at the projected rate and the population continues to grow as it has, many at-grade crossings in the WG-Tex area will need to be evaluated and consideration given to improving crossing protection devices or constructing grade-separated rail facilities.

- **Storage facilities for railcars and empty containers:** As rail movement grows, the need for public (i.e. port-owned) or private railcar storage facilities in the WG-Tex area will also grow. Container movement at ports has also historically tended to result in accumulations of empty containers that must be stored either on the port or at off-site facilities.

- **Development of inland intermodal facilities:** As rail traffic in the WG-Tex area grows, connections to other rail and intermodal facilities will be vital. Inland sorting and classification facilities may be developed near the port areas to free up dockside space or specialized intermodal facilities may be constructed along the Trans Texas Corridor routes. In either case, the ports must be connected to such systems.

- **Military surge capacity:** Ports that are designated as a Department of Defense (DoD) strategic port require adequate rail capacity and loading equipment to allow for deployments of equipment and personnel from military bases and other installations. In Texas, the Port of Corpus Christi and the Port of Beaumont are designated as DoD strategic ports, and will have to work with the private rail companies to ensure that improvements are in place that accommodate both new commercial traffic and military deployment requirements.

PUBLIC SECTOR IMPACTS

The additional freight moving into and out of the WG-Tex area ports will necessitate that improvements and additions be made to the rail infrastructure of south Texas.

Detailed planning for trade growth has begun at the ports and to a certain degree at the port railroads. However, the same cannot generally be said for the Class I and II railroad companies (UP, BNSF, and TM), which link the study ports to the national rail system, or for public sector transportation planners, even though growing trade movements through the ports have the potential to worsen congestion and air quality issues in and around the port areas. Planning to address the expected trade growth must take place to prevent future transportation problems from becoming more acute as this trade comes to fruition. Balancing private and public investments to meet demand is vital.

The public sector must become more active in wide-ranging planning efforts to meet the rail transportation needs of the study ports in the future. Moving goods by rail to and from ports should be considered in the public interest due to its benefits related to reduced congestion, reduced pollution, increased fuel efficiency, and savings in roadway maintenance costs. The complexity and nature of the improvements needed requires that the private railroad companies be involved in carrying out infrastructure plans that will add to or enhance existing facilities; however, due to the scale of the projects described and identified in this report, the public sector may need to facilitate such improvements by investing state and federal funds to accelerate the pace at which they can be made.

Coordinated planning at the local metropolitan planning organization (MPO) and state levels will be necessary to ensure that the ports and the railroads have projects included in public sector plans such as the MPO Transportation Improvement Plan (TIP) and the statewide TIP (STIP) so that these plans can qualify for public funding. Other public sector funding programs such as the federal Congestion Mitigation and Air Quality (CMAQ) funds for non-attainment areas and federal loans through the Rail Rehabilitation and Improvement Financing (RRIF) program should be explored. The formation of public-private partnerships among the ports, the state department of transportation, and the railroad companies to complete rail infrastructure projects in this area are another possibility allowed by recent legislation passed in Texas.

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CHAPTER 1: OVERVIEW

INTRODUCTION

This study examines the trade activity of four seaports along the Western Gulf of Mexico-Texas Coast and evaluates the anticipated needs for improved rail access to these ports based upon projected freight transportation demand. Of specific interest in this study are the branch rail lines that connect the ports to the Class I railroad network mainlines in the Western Gulf area. This project, funded by the Southwest Region University Transportation Center (SWUTC) and the U.S. Department of Transportation (US DOT), has been undertaken to enhance the understanding of port-rail connections in the Western Gulf of Mexico-Texas Coast region, specifically branch lines that connect the port's rail facilities with the mainline serving the port, and an assessment of forecasted trade and how it could affect existing rail infrastructure in this part of the state.

The ports examined in this study are the Port of Brownsville, the Port of Corpus Christi, the Port of Port Lavaca-Point Comfort, and Port Freeport, Texas. Texas Transportation Institute (TTI) and Texas A&M University at Galveston collaborated in this effort, with the assistance of these ports Class I and Class II railroads, and shortline rail companies. The rail line connectors and portions of the national mainline railroad system are inventoried, as well as trade levels and forecasts to qualitatively evaluate future needs for freight movement to and from the ports. This information is then analyzed to identify potential rail infrastructure improvement needs.

BACKGROUND

Seaports are an important component of the national transportation network. Nationally, it is estimated that over 95percent by weight and 75percent by value of the United States' foreign trade moves through the nation's seaports, and port activity contributes more that $780 billion annually to the U.S. Gross Domestic Product.[3] Truck and railroad operators gain access between ports and primary transportation corridors such as state and interstate highways and mainline railroads by means of "connectors" – secondary and branch routes that link port facilities with inland transportation networks. To accommodate the needs of a growing population, and ensure that Texas' seaports maintain their ability to compete against the seaports of other states and nearby countries, it is critical that the linkages and connectors between Texas seaports and the primary transportation corridors be able to safely and efficiently accommodate forecasted levels of freight movement.

In June 2000, the FHWA released the National Highway System (NHS) Intermodal Connectors Study. That study stated that a number of infrastructure, operational, jurisdictional, institutional, regulatory, financial, and competitive issues exist which may significantly inhibit the efficiency and effectiveness of highway intermodal freight connectors. The study identified that while the NHS has been well developed and maintained by local, state, and federal transportation agencies, there are serious deficiencies in the condition of many "connectors" between the NHS and the freight transportation facilities, including ports, intermodal terminals, manufacturers, and other

[3] Americas Ports: Gateways to Global Trade. American Association of Port Authorities. Available online at http://www.aapa-ports.org.

freight origins that it exists to serve. Such deficiencies are often exacerbated by the “orphaned” status of such corridors – ownership of the connectors is not within the jurisdiction of either the freight originators or state or federal agencies. In effect, many well-maintained highway segments meant to service quality port facilities are separated by a “last mile” which does not meet the necessary standards.

The NHS Connectors Study states that jurisdiction of highway freight connectors often falls to local governments such as cities, counties, or Metropolitan Planning Organizations (MPOs), which may lack sufficient monetary, planning, or political resources to adequately account for the importance of freight transportation to local, state, or national economic well-being. The report also states that many involved in the freight transportation industry feel that freight issues are underrepresented when it comes to private freight transportation providers’ participation in the public sector transportation planning process. Private firms typically do not wish to invest large portions of their operating capital for repair and maintenance of local streets that serve the public as well. They make business and operations choices and expect the public sector to maintain the roadways.

The conceptual background for this report was based on the premise that a similar weakness might exist in the rail connectors to ports. Private rail companies are generally responsible for making choices regarding funding of improvements to their rail networks. Where branch lines connect to public and quasi-public facilities such as ports, the rail company must make investments that will allow them to gain traffic that can be moved to their primary rail network for long-distance transport. Railroad companies decide at what level a line will be maintained and, thereby, at what speed a train can safely travel the line.

Investment in rail maintenance and improvement therefore tends to occur on those segments of track where more rail traffic occurs. In other words, railroad companies tend to invest more heavily in maintenance of mainlines (rail lines on their primary network) where most of their freight traffic moves, allowing for faster and more efficient movement of larger and longer trains. Because of limited available capital funding and the high percentage of profits that must be reinvested in its physical plant, rail companies may choose to defer maintenance or upgrades of branch lines that have lower traffic levels. This circumstance potentially leaves the connector lines to ports in a susceptible state, similar to that of the highway connectors identified by FHWA. Private ownership and maintenance of these lines also has historically limited the role of the public sector in rehabilitating or improving rail connector lines.

The vulnerable state of freight connectors in the planning process is well recognized and may be addressed in the upcoming re-authorization of the Transportation Efficiency Act (TEA-21) legislation in the U.S. Congress; however, regardless of the new legislation, the fact remains that historically freight issues have been neglected throughout the planning process when compared with passenger transportation needs. The condition of connectors is a serious consideration in the ability to move freight from the ports to inland markets at both the state and national level, as noted in the 2002 *Trade and Transportation Study of North American Port and Intermodal Systems* conducted for the National Chamber Foundation (NCF).

The most efficient and technologically advanced freight terminals and the best interstate and mainline railroad networks can be developed in close proximity to each other, but if the connectors between such facilities are not adequate, their ability to move freight is effectively limited by the capacity constraints or bottlenecks caused by the connectors. Additionally, inadequate port-rail and port-highway connections may have negative impacts on air quality and vehicle noise, reduce the safety of roadways, induce routing of truck traffic through residential neighborhoods, create traffic conflicts at railroad grade crossings, adversely affect commercial vehicle maintenance costs and service life, and increase the loss of time and revenue due to motorist delays. Because of the importance of efficient freight movement to local, state, and national interests, the needs of freight connectors must be adequately assessed and monitored.

RAIL FREIGHT CONNECTORS IN WESTERN GULF-TEXAS COAST REGION

Since the initial development of roadway systems and networks, trucks have played an increasingly dominant role in freight transportation. Today, freight trucking is the principal mode of transportation for high-value, time-sensitive, non-bulk commodities including freight that originates at ports. The Interstate Highway System, the National Highway System, the Texas Trunk System, and many other improved highway plans over the last five decades have provided essential infrastructure for commodity movement by trucks to and from U.S. ports.

In contrast to trucking, the rail industry's market share of freight transportation has been decreasing over time when measured by value. Today, rail freight is the principal land-based mode of transportation (with the exception of pipelines, which transport liquid and gas commodities) for long-distance, bulk freight commodities such as coal and grain. Rail transportation carries approximately 42 percent of all U.S. intercity freight ton-miles each year.[4] One area in which rail traffic is growing is long-distance intermodal container movement, including those over "landbridges" and between seaports and distant inland areas. The reduced cost of long-distance mixed freight, bulk, and intermodal container transport by rail are essential to many public seaports, shippers, and consumers alike.

SELECTION OF PORTS TO BE STUDIED

This report focuses on rail freight connectors of four deepwater public seaports on the Texas Gulf Coast: Port Freeport, Port of Port Lavaca-Point Comfort, Port of Corpus Christi, and Port of Brownsville. Collectively, these ports are referred to in this report as the *Western Gulf-Texas Coast (WG-Tex)* ports, to distinguish them from other ports in the Gulf Region either in the United States or Mexico. Regionally, these ports represent the deepwater U.S. ports that are located to the west of the Galveston Bay port complex. The WG-Tex ports include a range of sizes, from the Port of Brownsville, which was 87th nationally in 2001 total tonnage according to U.S. Army Corps of Engineers (USACE) data, to the Port of Corpus Christi, which was 6th nationally in 2001 total tonnage.[5]

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4 Association of American Railroads. Economic Impact of U.S. Railroads. July 2003, Available at http://www.aar.org, Accessed: November 1, 2003, p. 1.

5 U.S. Army Corps of Engineers Navigation Data Center. *The U.S. Waterway System Transportation Facts.* December 2002.

The four ports studied in this project were selected for several reasons. Much of the publicly available analysis of port landside access issues to date has been limited to ports serving the largest urban areas in the U.S. For example, TTI was recently involved in conducting the NCF's *Trade and Transportation Study,* in which 16 ports in the U.S. were evaluated regarding their ability to move freight inland over existing transportation infrastructure. These ports were typically located in major urban areas with extensive highway and rail systems that service them. Texas ports in the Galveston Bay port complex were included in that study. *The study team chose to look at rail infrastructure of Texas ports located in smaller urban areas, which may not have the same level of rail service or the same level of highway access as that found in the large urban areas.*

Second, *ports outside of major intermodal transportation hubs will play an increasing role in handling "overflow" of containerized and other types of port traffic if freight traffic grows at forecasted levels*. The volume of international freight is projected to triple and the volume of domestic freight to double in the next 20 years in the U.S. according to the American Association of State Highway and Transportation Officials (AASHTO).[6] For example, the Port of Houston is regarded as a major regional, national, and international transportation hub, but

> "Many ports like the Port of Houston are operating at capacity now, yet face increases of 50 percent to 70 percent by 2020. At many hubs, the connector roads or tracks between seaport or freight center and the interstate highway or trunk rail line are way too small and often in poor condition. Where efficient modal carriers come together with high cargo volumes under surge conditions, infrastructure costs are enormous. It is these intermodal choke points where national attention is desperately needed, the [NCF's *Trade and Transportation Study*] warns."[7]

Although "a majority of the cargo that crosses Houston's wharves is destined for the immediate metro area – 17 million people live within 300 miles"[8], and another 43 million people live within 700 miles. Rail is primarily used for long-haul transport, but public-private partnerships are increasingly being considered as mechanisms by which shorter transport distances may viably be considered for rail. Even with planned expansions of container terminals in the Galveston Bay port complex, it is possible that drastic increases in Texas' freight transportation needs may necessitate development of additional infrastructure and public-private partnerships to accommodate increased trade through the Gulf region that cannot be accommodated by larger urban intermodal hubs. In doing so, truck traffic levels and potential congestion and air quality problems can be avoided.

Third, *the limited freight road and rail infrastructure that currently exists in South Texas, and along the western Gulf of Mexico in general, would seem to indicate that these ports will need financial and planning assistance from a variety of sources to meet projected demand.* Additional highways, such as the planned I-69 road/rail corridor, will aid in this effort; however,

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[6] American Association of State Highway and Transportation Officials (AASHTO). *Freight Transportation: Responding to Growth and Change*. March 2003, Washington, DC, p. 1.

[7] Plume, Janet. Intermodal freight continues steady climb: Study warns bottlenecks could impact entire supply chain. *Gulf Shipper Online*. June 23, 2003. Available online at http://www.gulfshipper.com.

[8] Ibid.

commodities that could move by rail must also have adequate connectors to intermodal facilities such as the ports in place to make that possible. Rail companies and the public sector may have to develop public-private partnerships capable of constructing rail connects that are able to efficiently move freight traffic to and from the ports.

The predominant commodities handled at these ports are bulk and breakbulk commodities, including crude petroleum products, chemicals, ores, and grains. The commodities flowing through the four ports in this study were examined for their potential for movement by rail. Currently, the study ports have minimal intermodal rail container movements, but three of the four ports have plans that include development of specialized container terminals in anticipation of increased container flows that have been forecasted by the US DOT and others. Such plans, if brought to fruition, will require improved rail infrastructures to support these new terminals. Forecasted freight levels for WG-Tex ports were also evaluated to assess the need for improvements to the rail infrastructure.

OUTLINE OF REPORT

Chapter 2 of this report discusses the various trade and cargo traffic sources used in this report to identify recent commodity throughputs at the WG-Tex ports, and project future trade activity in the region.

Chapter 3 of this report is an assessment of regional trade activity and forecasted cargo movements, and will describe the freight that is forecast to enter this region during the next 20 years based upon several recent studies sponsored at both the state and federal levels.

Chapters 4 through 7 identify the individual trade and infrastructure characteristics of each of the ports considered in this study, including types of commodities historically handled at each port, the location of rail facilities, and typical rail service levels. Interconnections between port rail facilities and Class I railroads are also described. Based on this information, rail access needs of individual ports are assessed.

Chapter 8 discusses rail implications and specific recommendations as a result of the study.

Chapter 9 provides conclusions of the report.

CHAPTER 2: TRADE AND CARGO TRAFFIC DATA SOURCES

Historical freight traffic and trade through the WG-Tex ports covered in this study are available from the U.S. Maritime Administration, U.S. Army Corps of Engineers, public seaports, and railroads. These data sources vary in degrees of detail and are not necessarily consistent for commodity categories and port locations. These data sources are discussed in further detail below.

TRADE DATA SOURCES

U.S. Maritime Administration and U.S. Customs

The U.S. Maritime Administration (MARAD) publishes the *Official Waterborne Transportation Statistics,* which the U.S. Army Corps of Engineers maintains. They are categorized according to U.S. Customs District and published on the MARAD website at http://www.marad.dot.gov. Import and export data for U.S. foreign trade are summarized according to U.S. Customs Districts and ports within those districts for years 1998 through 2001. This information is useful for describing overall foreign trade levels of ports, regions, and the nation as a whole, but can only be disaggregated for total trade, liner trade, and tanker trade.

U.S. Army Corps of Engineers

The USACE Navigation Data Center maintains waterborne freight traffic statistics for waterways under USACE jurisdiction. These comprehensive, well-accepted data are publicly available and include foreign and Canadian inbound and outbound traffic, and domestic and coastwise traffic. Although this data source does not directly include information on landside transportation operations, the data do provide information that can contribute to a baseline assessment of commodity throughput and facility utilization on the waterside. Inferences can then be made regarding commodity movement by landside modes, since commodity characteristics (time-sensitivity, weight, bulkiness, etc.) often influence the mode of inland transport. The USACE's Waterborne Commerce Statistics Center publishes these data in annual *Waterborne Commerce of the United States* (WCUS) reports. Descriptions of data categories, collection, and reporting methodologies are also provided in the reports, and are available online at http://www.iwr.usace.army.mil/ndc/.

FHWA Freight Analysis Framework

The FHWA Office of Freight Management and Operations initiated the Freight Analysis Framework (FAF) project in 1999. The FAF assessment features county-level freight transportation flows for truck, rail, water, and air modes at the four-digit Standard Transportation Commodity Classification Code (STCC) level. The database was developed from various government and private sector databases for domestic and international freight traffic, the foundation of which is Reebie Associate's TRANSEARCH database. For water, TRANSEARCH uses various components of USACE waterborne commerce data including state-to-state annual volumes for broad commodity groupings. TRANSEARCH then uses USACE's waterborne traffic originating and terminating volumes by port and commodity category (as described above), along with port and private facility directories to disaggregate the state-to-state level information. Commodity descriptions adopted by the USACE are transformed to STCC codes through data bridges developed and maintained by Reebie Associates. Final documents describing the FAF methodology are not yet available for public consumption, but draft documentation on the methodology are available from the FHWA's Office of Freight Management and Operations.

The 1998 base year FAF tonnage information is not compared in this report with tonnage information from other sources. The methodology of using data specific to certain locations and modes, such as USACE waterborne data, disaggregating it to the state-to-state level, and then using model predictions to identify county-level commodity throughputs is, for the purposes of identifying recent historical waterborne trade activity, believed by the study team to be less accurate than using the actual modal data for those specific locations. In the case of WG-Tex ports, this is possible because of the availability of waterway specific data from the USACE for the WG-Tex ports.

This study is not suggesting limited merit of the FAF data, rather, that for freight modes with numerous data sources and/or numerous routing options (e.g., truck traffic) recent historical cargo movements might be more realistically modeled using the FAF methodology than waterways, for which commodity movement information is more directly available from the USACE and/or port authorities. However, the FAF methodology is particularly useful in the analysis and forecasting of future growth for commodity categories through the WG-Tex port counties.

The FAF forecasts for years 2010 and 2020 are based on WEFA's *Macroeconomic Service Long-Term Trend Scenario*, starting from the second quarter of year 2000 as a basis. Forecasts are developed for a base case, and also under assumptions of higher and lower long-term growth. Further detail regarding the forecasting methodology are provided in FHWA methodology documentation, and Table 1 shows the underlying long-term growth assumption for the base forecast case.

The FHWA developed a FAF database subset and traffic forecasts specifically for the WG-Tex counties covered by this study: Cameron (Brownsville), Nueces (Corpus Christi), Calhoun (Port Lavaca-Point Comfort), and Brazoria (Freeport). Due to the proprietary nature of the TRANSEARCH database, DRI-WEFA data, and agreements between Reebie Associates/DRI-WEFA, and FHWA, the data cannot be released to the public at the county-level, or for mode-specific commodity volumes. However, aggregated data have been provided by FHWA to the study team for the combined four counties that include the public seaports covered by this study.

The FAF baseyear and forecast output tonnages are for domestic, international import, international export, and supplemental tonnages. While the first three categories do not include pipeline tonnages, the supplemental category does include pipeline-transported tonnages (primarily crude, petroleum product, and chemical commodities). TTI has totaled the tonnages provided by the FHWA and compared baseyear and forecasted quantities in order to identify predicted changes in regional commodity throughputs both on a total percentage and average annual percentage basis. The study team recognizes that the forecasted quantity throughputs are not mode-specific. However, an understanding of the commodity categories handled at the WG-

Tex ports and associated shipping channels, and inland transportation mode advantages of rail versus truck allows for use of these forecasts in identifying predicted commodity throughput changes and their potential impacts on port-rail branch line infrastructure needs.

Table 1: WEFA Long-Term Baseline Forecast Assumptions.

ECONOMIC INPUT CATEGORY	BASELINE FORECAST ASSUMPTION
Population and Labor Force	Population growth will slow from 1 percent to 0.8 percent annually, slowing civilian labor force growth.
Employment and Unemployment	Manufacturing employment will continue to decline as a share of total employment, while service sectors will generate an increasing share of employment growth.
Productivity and Aggregate Supply	Potential GDP growth will slow relative to historical rates due to slower growth in the labor force, while productivity growth will remain steady.
Government Policy	The government sector share of GDP will decline due to slower growth in defense spending and a reduction in the share of interest payments relative to the federal budget.
Monetary and Financial	The Federal Reserve Board will remain watchful of inflation while ensuring growth in output consistent with potential output.
Consumption	The share of real consumption devoted to services and durable goods will rise, while it falls for nondurable goods, such as energy.
Business Investment	The investment share of structures will decline, while equipment's share will rise. The fastest growing sector of the economy for investment will be producers' durable equipment.
International Trade	Real export growth will slow growth in the trade deficit due to a decline in the value of the dollar and a reduction in U.S. real unit labor costs relative to the rest of the industrialized world.
Industrial Production	Manufacturing of durable goods, particularly non-electrical machinery such as computers, will grow faster than nondurable goods. Plastics and paper will lead nondurable goods production.

Source: FHWA and WEFA.

Public Seaports

Trade information was also provided to the study team by the four public seaports included in this study. Trade data were generally provided for those terminals and facilities within the jurisdiction of the seaports. The study team also conducted on-site interviews with port officials and observations of the port and adjacent facilities. This information is presented in the following chapters on port-specific implications for rail access.

Railroads

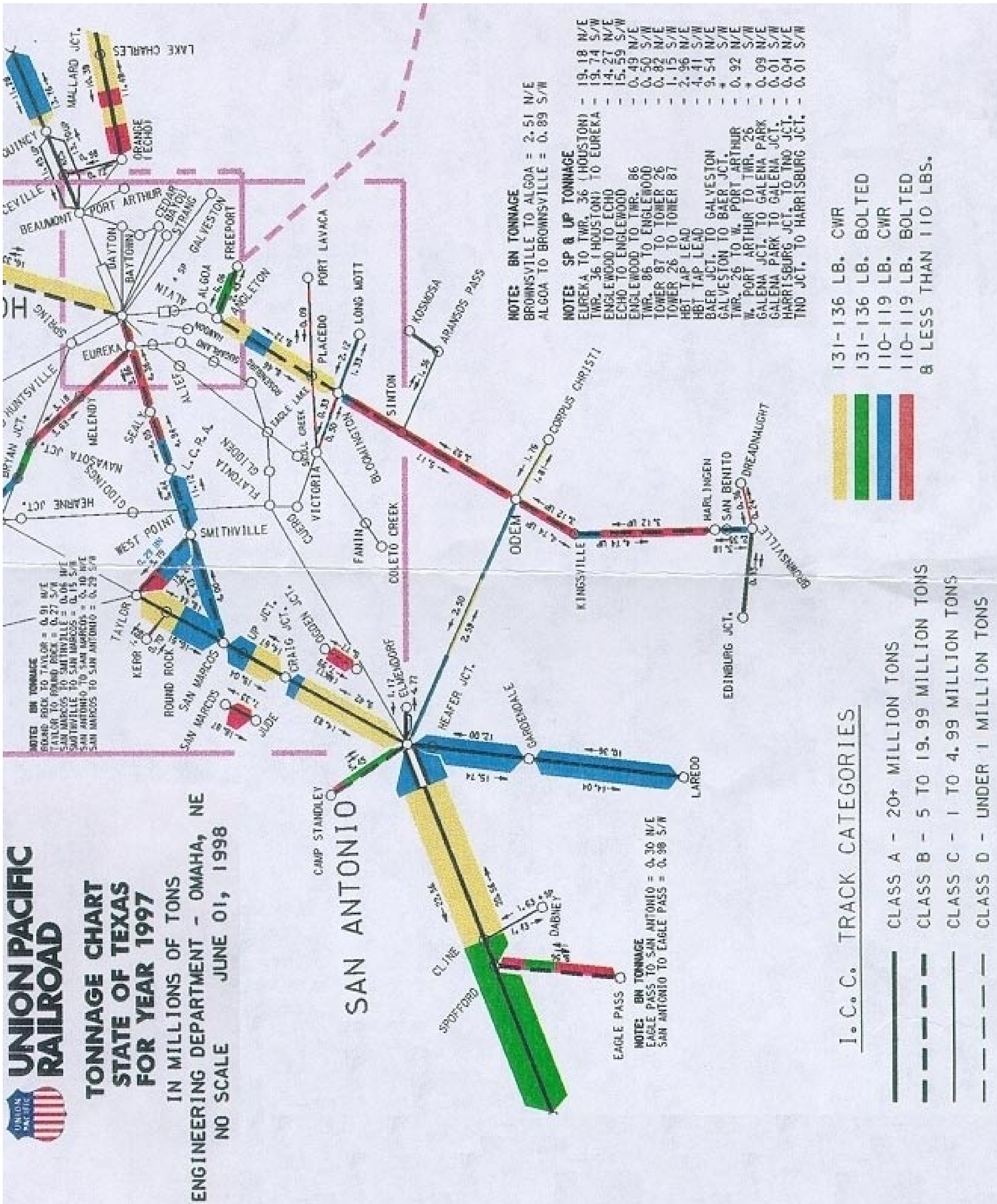
The Union Pacific Railroad (UP) is the predominant railroad in the WG-Tex port region, and has provided railroad traffic and tonnage information for the state of Texas. This information, in the form of annual tonnage bandwidth charts, has been provided to the study team by UP for years 1997, 1999, 2000, and 2001. The 1997 and 1999 charts also include Interstate Commerce Commission (ICC) Track Categories and rail weight classification.

CHAPTER 3: REGIONAL TRADE ASSESSMENT

RAILROAD NETWORK

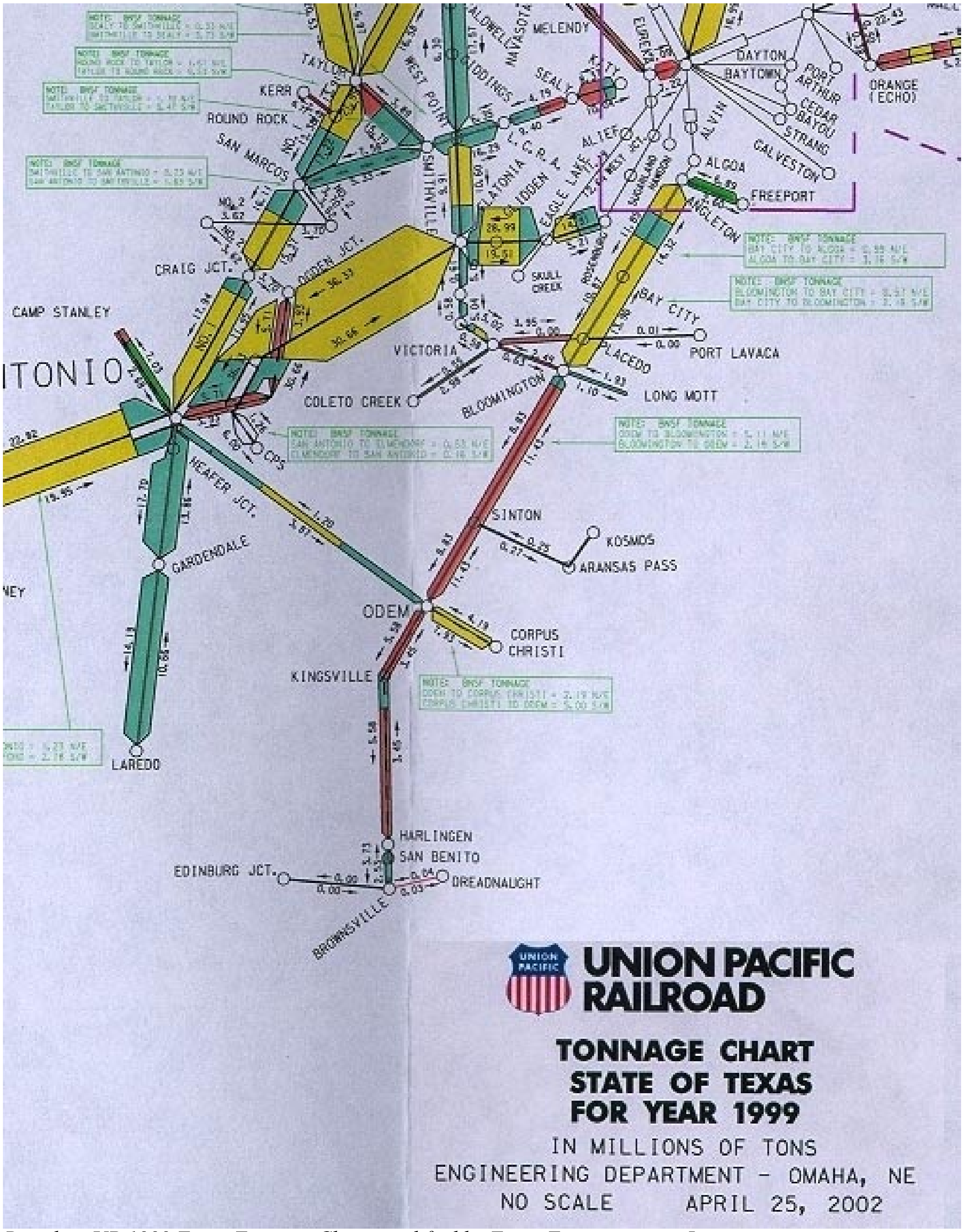
Figures 1 through 4 show tonnage charts for the UP rail network in the WG-Tex port region, including the Brownsville Subdivision and branch lines to private and public port facilities, for years 1997, 1999, 2000, and 2001. These charts were provided to the study team by the UP Railroad. Tonnage charts were not provided for 1998. Additionally, the degree of precision provided on the charts decreased from two decimal places for 1997 and 1999 tonnage totals to zero decimal places for 2000 and 2001. However, the information provided does allow for rough comparisons of rail traffic over the indicated segments.

Table 2 summarizes annual rail tonnage (in millions of gross ton-miles per mile, or tons) for segments of the rail network, as identified by junction and terminus names corresponding to the charts. In cases where the junction and terminus points are geographically close, these locations are identified as the same locations for the sake of information summary.



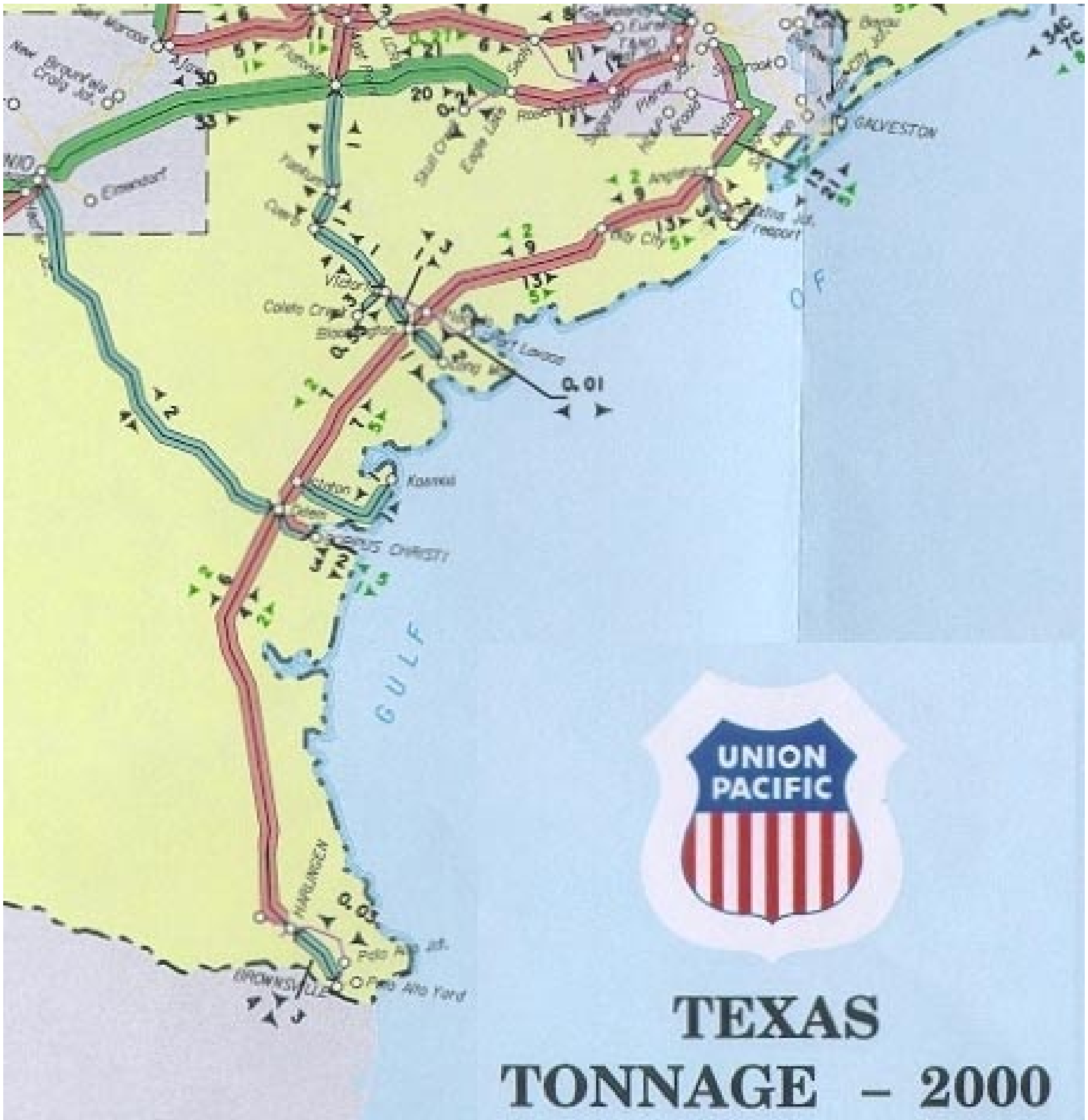
Based on UP 1997 Texas Tonnage Chart, modified by Texas Transportation Institute.

Figure 1: 1997 Texas Gulf Region Rail Tonnage.



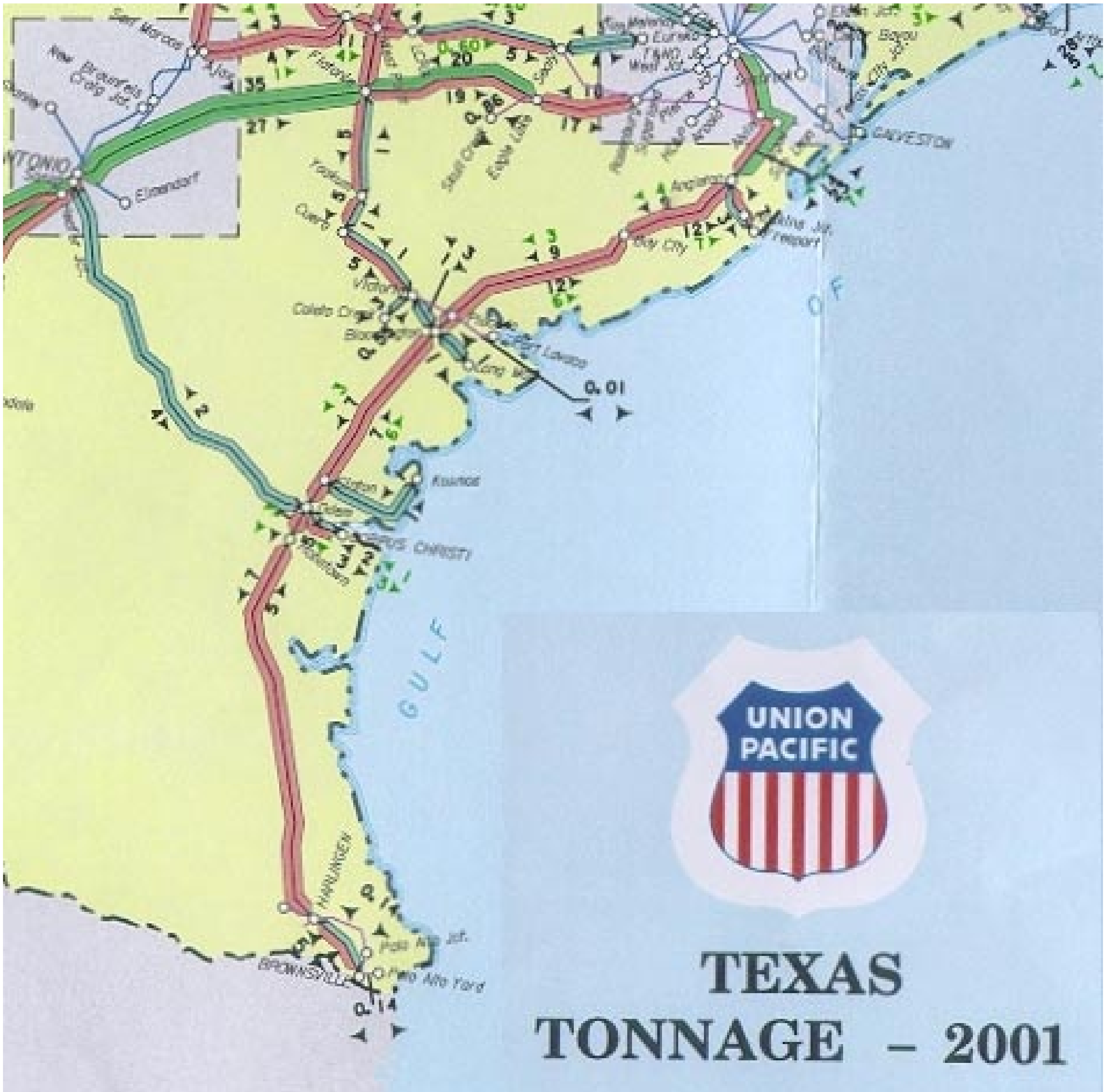
Based on UP 1999 Texas Tonnage Chart, modified by Texas Transportation Institute.

Figure 2: 1999 Texas Gulf Region Rail Tonnage.



Based on UP 2000 Texas Tonnage Chart, modified by Texas Transportation Institute.

Figure 3: 2000 Texas Gulf Region Rail Tonnage.



Based on UP 2001 Texas Tonnage Chart, modified by Texas Transportation Institute.

Figure 4: 2001 Texas Gulf Region Rail Tonnage.

Table 2: UP Chart Tonnage Totals for the Brownsville and Angleton Subdivision Mainlines.

Junction/Terminus		Annual Totals (Million Gross Ton-Miles Per Mile)							
		1997		1999		2000		2001	
NORTH	SOUTH	N	S	N	S	N	S	N	S
Angleton	BayCity / Placedo	12.23	9.35	15.31	15.01	18	11	17	11
Bay City / Placedo	Bloomington	12.23	9.35	14.47	13.05	18	11	18	12
Bloomington	Odem	6.03	6.06	16.54	10.62	12	9	13	10
Odem	Harlingen	5.63	5.63	3.45	5.58	6	8	5	7
Harlingen	Brownsville	4.86	4.07	2.53	3.73	3	4	4	5

Source: Union Pacific Texas Tonnage Charts for 1997, 1999, 2000, 2001.

Table 3: UP Chart Tonnage Totals for Branch Lines Serving Port Facilities.

Junction/Terminus		Annual Totals (Million Gross Ton-Miles Per Mile)							
		1997		1999		2000		2001	
Inbound	Outbound	In	Out	In	Out	In	Out	In	Out
Angleton	Freeport	6.06	2.43	6.89	2.6	7	3	7	3
Port Lavaca	Placedo	0.09	0.09	0	0.01	0.01	0.01	0.01	0.01
Long Mott	Bloomington	2.12	1.33	1.93	1.1	2	1	1	1
Sinton	Aransas Pass / Kosmos	1.36	1.36	0.25	0.27	1	1	1	1
Odem	Corpus Christi	1.76	1.81	9.19	10.12	7	4	3	6
Brownsville	Palo Alto Yd / Dreadnaught	0.36	0.24	0.04	0.03	0	0	0.14	0.14

Source: Union Pacific Texas Tonnage Charts for 1997, 1999, 2000, 2001.

Table 2 shows tonnage, measured in millions of gross ton-miles per mile (tons), carried over the UP mainlines: the Brownsville Subdivision line, the mainline that runs from Brownsville on the Mexican border (where it joins with the Mexican TFM line) up to Bloomington, where it joins the Angleton Subdivision Mainline, which continues on to the Houston metropolitan area at Alvin. These mainline sections are the principal connector for the WG-Tex ports of this study, with tonnage gradually increasing from Brownsville moving north past the Port of Corpus Christi branch line junction at Odem, past the Port Lavaca-Point Comfort junctions at Placedo and Lolita (between Placedo and Bay City), and the Port Freeport branch line junction at Angleton. For the same rows under the Mainline section of the table, junctions in the "North" column refer to more northerly locations, and junctions in the "South" column refer to the more southerly locations. Thus, "North" data for any given year shown refer to northbound tonnage, and "South" data for any given year refer to southbound tonnage.

As can be seen from Table 2, rail tonnage quantities over the identified mainline segments increased between 1997 and 1999. This is a result of the 1997 merger between the Union Pacific and Southern Pacific (SP) railroads, in which UP absorbed SP infrastructure and operations.

Also as a result of the merger, the Burlington Northern Santa Fe (BNSF) Railway and Tex-Mex Railway (TM) gained increased trackage rights over certain UP lines as a result of that merger. BNSF tonnage movements are indicated in lighter font (green) on the tonnage charts shown in Figures 1 through 4, and illustrate the increases beyond UP tonnage quantities shown in black numbers between Angleton and Brownsville.

For the Port Branch Lines section of Table 3, junctions in the Inbound (from ports to inland locations) column refer to locations on the Brownsville Subdivision and Angleton Subdivision Mainlines, while termini in the Outbound column (from inland junctions to the ports) refer to branch line end locations at ports or other facilities. Thus, "In" data for any given year refer to tonnage moving from ports to the mainline, and "Out" data for any given year refer to tonnage moving from the mainline to the ports. Considering the data limitations due to differences in reporting precision, the annual tonnage quantities appear to be relatively consistent over both the mainline segments and branch line segments shown in Tables 2 and 3 for years 1999 through 2001. Whether this in fact represents capacity limitations of the rail network following absorption of SP and BNSF traffic levels, due to market limitations, or is due to routing choices of railroad operators is difficult to determine.

The project team conducted a preliminary Texas railroad waybill sample data analysis of connector segment traffic between ports and the mainline railroad. Each record in a waybill identifies originating and terminating freight stations, the names of all railroads participating in the movement, the point of all railroad interchanges, the number of cars, the car types, the movement of weight, the commodity, and the freight revenue. The preliminary results of the analysis for number of railcars and total railcar tonnage, are not consistent with records provided by railroads or the WG-Tex ports. It is believed that this discrepancy is due to the fact that the waybill is a very limited statistical sample of rail traffic between specific locations on the rail networks, or SPLCs. (SPLCs are indicated by name and SPLC number on the rail access map shown for each port in Chapters 4 through 7 of this report). In comparison with heavily used mainline rail segments, branch lines serving port facilities and lesser used mainlines may not contain sufficient records to accurately identify total annual railcar tonnage or railcar volumes through statistical analysis. However, averages across individual record sets may provide some information about rail traffic characteristics across this segment with the understanding that the completeness of these records may not accurately describe the full scope of rail traffic over those segments. With this consideration, analysis results for average tonnage per railcar using this data is presented for years 1990 through 1998 for four rail line segments in the WG-Tex port region in Table 4. Where applicable, this information is discussed in port-specific chapters of this report.

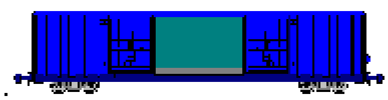
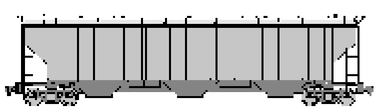
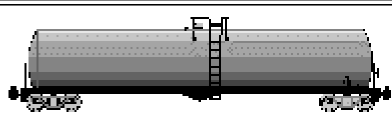
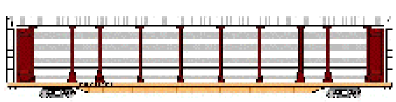
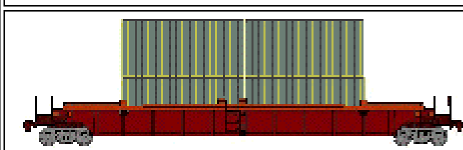
Figure 5 shows typical empty and loaded weights for different types of railcars.[9] The average railcar tonnages shown for the sections in Table 5 indicate movement of empty and loaded railcars, with average tonnage per railcar shown for all railcars, as a result of averaged empty and loaded weights and depending on traffic characteristics and the mix of car types for rail traffic over those segments.

[9] Railcar Movers Industry Online. Available online at http://www.railcarmover.com/appissue.asp.

Table 4: Average Railcar Tonnage Per Segment by Year from Railroad Waybill Records.

SEGMENT YEAR	Brownsville – Harlingen	Port Lavaca – Kamey*	Point Comfort – Lolita	Freeport – Angleton
1998	75.8	89.0	96.8	90.1
1997	72.5	91.1	98.8	89.6
1996	77.0	89.8	98.4	90.6
1995	69.7	86.3	99.1	89.0
1994	73.7	83.4	96.8	88.3
1993	71.3	100.0	96.8	90.6
1992	70.6		97.8	90.1
1991	60.3	93.9	97.8	90.4
1990	55.0		96.7	89.3
1989	60.7		97.9	90.2
Ten-Year Average	68.6	90.5	97.7	89.8

Source: Texas Transportation Institute using AAR Texas Waybill data.
*Data not available for years 1989 and 1990. Data omitted for 1992 as extreme outlier.

	Box cars can vary from 50' 6" to 60' in length, weigh 30 to 35 tons empty and 110 to 143 tons fully loaded.
	Generally hopper and gondola cars average 40' 6" to the center of the rail trucks and weigh 27 tons empty or 130 tons fully loaded. Jumbo hopper railcars commonly are 44' 4-1/2" on the truck centers and weigh 32 tons empty or 143 tons fully loaded.
	Tank cars, depending upon type can vary from 53' to 60' in length and weigh 30 – 35 tons empty with capacities of 95 – 102 tons.
	Automobile car carriers usually are 64' to the truck centers with an overall length of approximately 94'. In addition the empty railcar is lighter than the average hopper car and fully loaded is lighter than a comparably loaded hopper car.
	A typical container car is approximately 72' in length, 57' 6" to the truck centers, 27 tons unloaded, and 110 tons fully loaded.

Source: Railcar Movers Industry Online. Available online at http://www.railcarmover.com/appissue.asp.

Figure 5: Railcar Characteristics.

Certain infrastructure or operating conditions could and may in fact limit tonnage throughput over the mainline and branch line segments. However, as indicated previously, the operating practices of private railroad companies have historically been to provide enhancements where it is determined they will result in maximum profit generation. Limiting conditions are discussed in the following chapters of individual ports and needs assessment, along with discussion of trends in public-private partnerships that may enhance the bottom line for the private sector, as well as benefits to the public sector of congestion mitigation, air quality improvement, and economic enhancement.

SEAPORT THROUGHPUT

TTI summarized MARAD statistics of foreign import and export trade for the WG-Tex ports covered in this study, and for all deepwater Texas ports, as shown in Tables 5 and 6. The statistics do not include domestic trade. The four ports in this study have wide ranges of foreign tonnage, from a fraction of 1 percent to nearly 5 percent of total U.S. trade tonnage. In aggregate, these ports account for over 7 percent of total U.S. foreign port tonnage, and over a quarter of Texas foreign port tonnage. Some estimates project that the population of Texas will approximately double from year 2000 levels to over 40 million persons by the year 2040.[10] This growing population will require more raw materials, finished commodities, perishables, and other items that will all necessitate the movement of freight through the state's seaports.

Table 5: 2001 Texas Port Foreign Trade Volumes.

2001 Foreign Trade Tonnage			
Location	**Tonnage (kg)**	**Percent of U.S. Tonnage**	**Percent of Texas Tonnage**
Brownsville	**655,261,020**	0.1%	0.2%
Freeport	**21,727,620,643**	2.1%	7.7%
Corpus Christi	**48,811,749,167**	4.8%	17.3%
Port Lavaca	**4,476,005,449**	0.4%	1.6%
Project Ports Total	**75,670,636,279**	*7.4%*	*26.8%*
Texas Total	**282,315,033,160**		
U.S. Total:	**1,026,265,222,727**		

Source: Texas Transportation Institute using MARAD Waterborne Databanks and US Customs data.

[10] Post-2000 Populations Projection Data. Texas Sate Data Center and Office of State Demographics of Rural Sociology in the Texas A&M University System. Available online at http://txsdc.tamu.edu/.

Table 6: 2001 Texas Port Foreign Trade Values.

2001 Foreign Trade Value			
Location	**Value ($)**	**Percent of U.S. Value**	**Percent of Texas Value**
Brownsville	**111,578,921**	0.0%	0.2%
Freeport	**4,155,805,459**	0.7%	5.6%
Corpus Christi	**7,678,853,571**	1.3%	10.4%
Port Lavaca	**401,499,729**	0.1%	0.5%
Project Ports Total	**12,347,737,680**	*2.1%*	*16.7%*
Texas Total	**73,860,749,858**		
U.S. Total:	**589,033,212,420**		

Source: Texas Transportation Institute using MARAD Waterborne Databanks and U.S. Customs data.

Table 7 shows aggregated cargo tonnage data from USACE's Waterborne Commerce Statistics Center for the shipping channels associated with the WG-Tex ports. Aggregated tonnage includes Foreign and Canadian Inbound and Outbound Traffic, and Coastwise and Internal Domestic shipments. Tonnages are shown for years 1998 through 2001. Year 1998 is included because it is a baseline year for the Freight Analysis Framework forecasting models developed for the FHWA. Year 2001 is the latest data publicly available from USACE at the time of this report. Years 1999 and 2000 are included to provide recent trending information over the time period. Since sometime during 2001, national and global economic recessions, trade issues (for example, U.S. trade tariffs on imported steel) and other factors have impacted tonnage throughput at many U.S. ports.

In aggregate, the major commodities moved through the deepwater shipping channels associated with the WG-Tex ports during the 1998 – 2001 time period were Petroleum and Petroleum Products, including crude and refined petroleum, followed by Chemicals and Related Products, Inedible Crude Materials, Food and Farm Products, and Primary Manufactured Goods.

Table 7: Aggregated Tonnage, Western Gulf – Texas Region Deepwater Shipping Channels.

USACE Commodity Category / Year	Aggregated Tonnage, West Gulf – Texas Region Deepwater Shipping Channels (Thousand Short Tons)			
	1998	1999	2000	2001
Total All Commodities	**125,989**	**117,610**	**127,777**	**120,789**
Total Coal	204	82	58	33
Total Petroleum and Petroleum Products	96,406	87,412	92,595	88,682
Subtotal Crude Petroleum	60,478	55,189	56,411	52,058
Subtotal Petroleum Products	35,926	32,270	36,383	36,624
Total Chemicals and Related Products	13,691	13,876	17,105	16,811
Total Crude Materials, Inedible, Except Fuels	12,440	12,215	12,855	10,937
Subtotal Forest Products, Wood, and Chips	18	11	7	9
Subtotal Pulp and Waste Paper	7	0	2	1
Subtotal Soil, Sand, Gravel, Rock, and Stone	554	332	326	652
Subtotal Iron Ore and Scrap	107	61	44	383
Subtotal Non-ferrous Ores and Scrap	11,122	11,354	11,837	9,420
Subtotal Sulphur, Clay, and Salt	36	66	25	70
Subtotal Slag	7	11	4	0
Subtotal Other Non-metal Minerals	586	376	556	403
Total Primary Manufactured Goods	831	1,199	2,027	1,528
Subtotal Paper Products	11	3	2	6
Subtotal Lime, Cement, and Glass	91	271	436	332
Subtotal Primary Iron and Steel Products	711	767	1,511	1,061
Subtotal Primary Non-ferrous Metal Products	12	157	79	128
Total Food and Farm Products	2,264	2,564	2,634	2,598
Subtotal Grain and Subtotal Feeds	1,915	2,224	2,293	2,380
Subtotal Agricultural Products	349	341	339	217
Total All Manufactured Equipment, Machinery, and Products	102	91	288	144
Machinery (not Elec.)	43	23	149	96
Electrical Machinery	1	1	1	13
Vehicles, Ships, and Boats	48	53	29	5
Manufactured Wood Products	0	0	0	0
Textiles	6	9	21	19
Rubber	2	2	78	3

Source: USACE Waterborne Commerce Statistics Center.

Federal Highway Administration Freight Analysis Framework

Table 8 shows the FAF base case forecasted percent change for commodity groups handled at the WG-Tex deepwater public ports and private facilities on shipping channels serving those ports, as well as the 1998 USACE tonnages aggregated according to FAF commodity categories.

Table 8: Aggregated 1998 USACE Tonnage and FAF Forecasted Base Case Percent Change for Commodity Groups Handled at WG-Tex Ports and Associated Shipping Channels.

USACE Waterborne Cargo Traffic by Associated FAF Commodity Category	Aggregated USACE Tonnage, West Gulf Region Ports (Thousand Short Tons)	FAF Base Case Average Annual Forecasted Percent Change, Since 1998	
Year	**1998**	**2010**	**2020**
Total All Commodities	125,989	2.3	1.9
Chemicals/Allied	13,691	3.0	2.3
Clay/Concrete/Glass/Stone	681	4.3	3.7
Coal	204	1.9	1.9
Crude Petroleum/Natural Gas	60,478	1.9	1.4
Electrical Machinery/Equip Supp	1	8.6	7.2
Farm	1,915	1.7	1.1
Food/Kindred	349	3.6	4.1
Forest	18	7.1	4.9
Lumber/Wood	0	3.6	3.2
Machinery Excl. Electrical	43	6.3	5.6
Metallic Ores	11,229	-0.6	0.1
Non-metallic Ores	586	1.3	0.7
Petroleum/Coal	35,933	2.4	2.0
Primary Metal	723	3.5	2.9
Pulp/Paper/Allied	18	2.3	2.3
Rubber/Plastics	2	3.5	3.2
Textile Mill	6	1.3	1.3
Transportation Equipment	48	2.1	1.7

Source: Texas Transportation Institute using USACE Waterborne Commerce Statistics Center and Federal Highways Administration data.

As shown in Table 8, the average annual percent change for all waterborne commodities passing through the WG-Tex ports are forecasted to increase by an average of 2.3 percent annually between 1998 and 2010, and by an average of 1.9 percent annually between 1998 and 2020. Compared with USACE waterborne cargo data from Table 4, total cargo throughput decreased from 126.0 to 117.6 million tons from 1998 to 1999, increased to 127.8 million tons in 2000 and subsequently decreased to 120.8 million tons in 2001. According to the FHWA's draft FAF report, "total domestic freight flows are expected to grow an average of 3.4 percent from 1998 – 2010, and 2.4 percent from 2010 – 2020 on a national average."

Crude Petroleum/Natural Gas is the largest waterborne commodity category moved regionally, accounting for 48 percent of the volume moved through the WG-Tex ports in 1998 and declining to 43 percent of the volume moved in 2001, based on USACE data. This tonnage is moved primarily through the Port of Corpus Christi and private facilities in Freeport Harbor. This category forecasts an increase slower than the regional average, at 1.9 percent annual average between 1998 and 2010 and 1.4 percent annually between 1998 and 2020.

Petroleum/Coal, made up in the WG-Tex region by primarily refined petroleum products, is the second-largest FAF commodity category moved through the WG-Tex ports, at approximately 28 percent of total tonnage moved in 1998. Over 85 percent of this volume moved through the Port of Corpus Christi and approximately 8 percent moved through Freeport Harbor in 1998. The FAF forecasts for Petroleum/Coal commodities are just slightly greater than the regional average at 2.4 percent annual average between 1998 and 2010 and 2.0 percent annually between 1998 and 2020.

Chemicals/Allied Products is the third-largest FAF commodity category moved through the WG-Tex ports, at approximately 11 percent of total tonnage moved in 1998. As shown in Table 5, WG-Tex regional waterborne tonnage for this category increased from over 13.6 million tons annually in 1998 to approximately 17 million tons in 2000 and 2001 for Chemicals/Allied Products. Of this volume 48 percent moved through the Port of Corpus Christi, 42 percent through Freeport Harbor, and 8 percent moved through Matagorda Ship Channel in 1998. The FAF forecasts for Chemicals/Allied Products was greater than the regional average at 3.0 percent annual average between 1998 and 2010 and 2.3 percent annually between 1998 and 2020, but slightly below the national average forecasted growth rates of 3.4 percent and 2.4 percent for the same time periods, respectively.

Metallic Ores is the fourth-largest FAF commodity category moved through the WG-Tex ports, at 11,229 thousand tons or approximately 9 percent of total tonnage moved in 1998. As shown in Table 7, WG-Tex regional waterborne tonnage for this category was between approximately 11.2 and 11.8 million tons annually from 1998 to 2000, and decreased to approximately 9.8 million tons in 2001. Fifty-one percent of the volume in 1998 moved through the Port of Corpus Christi, and 49 percent moved through Matagorda Ship Channel, with fractions of a percent moved through the other ports. The FAF forecasts for Metallic Ores were projected at 0.6 percent average annual decrease between 1998 and 2010 and 0.1 percent average annual increase between 1998 and 2020.

Farm Products, including grain and feeds, is the fifth-largest FAF commodity category moved through the WG-Tex ports, at 1.92 million tons or 1.5 percent of total tonnage moved in 1998, and increasing to 2.38 million tons or nearly 2.0 percent of total tonnage moved in 2001. During this time, tonnage increased from 1.46 million tons in 1998 to 1.88 million tons in 2001 at the Port of Corpus Christi. Tonnage increased from 272 thousand tons in 1998 to 612 thousand tons in 2000, and then decreased to 425 thousand tons in 2001 at Port Freeport. The FAF forecasts for Farm Products were below national and regional average at 1.7 percent average annual increase between 1998 and 2010 and 1.1 percent average annual increase between 1998 and 2020.

Primary Metals, including primary iron and steel products and primary non-ferrous metal products as defined by USACE, is the sixth-largest FAF commodity category moved through the WG-Tex ports, at 723 thousand tons or 0.6 percent of total tonnage moved in 1998, and increasing to 1,189 thousand tons or nearly 1.0 percent of total tonnage moved in 2001. Between 93 percent and 98 percent of this volume moved through the Port of Brownsville between 1998 and 2001. The FAF forecasts for Primary Metals were above national and regional average at 3.5 percent average annual increase between 1998 and 2010 and 2.9 percent average annual increase between 1998 and 2020.

Clay/Concrete/Glass/Stone, including USACE categories for soil, sand, gravel, rock and stone; sulphur, clay and salt; and lime, cement, and glass, is the seventh-largest FAF commodity category moved through the WG-Tex ports, at 681 thousand tons or 0.5 percent of total tonnage moved in 1998, and increasing to 1,054 thousand tons or 0.8 percent of total tonnage moved in 2001. Fifty-three percent of this tonnage moved through the Port of Brownsville in 1998 but declined to 27 percent of the total in 1999 and 2000 before increasing to 38 percent of total category tonnage in 2001. Of this tonnage, 38 percent moved through the Port of Corpus Christi in 1998, increasing to over 50 percent of the total in 1999 and 2000 before declining to 36 percent of total category tonnage in 2001. Nine percent of this tonnage moved through Port Freeport in 1998, increasing to 26 percent of the total in 2001. The FAF forecasts for Clay/Concrete/Glass/Stone were well above national and regional averages at 4.3 percent average annual increase between 1998 and 2010 and 3.7 percent average annual increase between 1998 and 2020.

Non-metallic Ores is the eighth-largest FAF commodity category moved through the WG-Tex ports, at 586 thousand tons or 0.5 percent of total tonnage moved in 1998. In 1998, 60 percent of this tonnage moved through the Port of Corpus Christi, 22 percent moved through the Port of Brownsville and 16 percent moved through the Matagorda Ship Channel. The FAF forecasts for Primary Metals were well below national and regional averages at 1.3 percent average annual increase between 1998 and 2010 and 0.7 percent average annual increase between 1998 and 2020.

Food/Kindred Products is the ninth-largest FAF commodity category moved through the WG-Tex ports, at 349 thousand tons or 0.3 percent of total tonnage moved in 1998. On average, over 95 percent of this tonnage moved through the Port Freeport between 1998 and 2001. The FAF forecasts for Food/Kindred Products were above national and regional averages at 3.6 percent average annual increase between 1998 and 2010 and 4.1 percent average annual increase between 1998 and 2020.

Coal was the ninth-largest FAF commodity category moved through the WG-Tex ports in 1998, at 204 thousand tons, but decreased to 33 thousand tons by 2001. Almost all of this tonnage was through the Port of Corpus Christi. Approximately 136 thousand tons of a variety of bulk and breakbulk commodities, manufactured equipment, and machinery moved through the WG-Tex ports in 1998, including FAF categories of Electrical Machinery/Equipment Supplies, Forest Products, Machinery (Excluding Electrical Equipment, Pulp/Paper/Allied Products, Rubber/Plastics, Textile Mill, and Transportation Equipment.)

Table 9 shows the FAF high case and low case forecasted percent change for commodity groups handled at the WG-Tex deepwater public ports and private facilities on shipping channels serving those ports.

Table 9: FAF Forecasted High Case and Low Case Percent Change for Commodity Groups Handled at WG-Tex Ports and Associated Shipping Channels.

USACE Waterborne Freight Traffic by Associated FAF Commodity Category	FAF High Case Average Annual Forecasted Percent Change, Since 1998		FAF Low Case Average Annual Forecasted Percent Change, Since 1998	
Year	**2010**	**2020**	**2010**	**2020**
Total All Commodities	4.0	4.3	1.5	1.1
Chemicals/Allied	3.4	2.7	2.7	2.0
Clay/Concrete/Glass/Stone	4.6	4.0	4.0	3.5
Coal	2.2	2.2	1.5	1.5
Crude Petroleum/Natural Gas	4.8	5.4	0.6	0.2
Electrical Machinery/Equip Supp	9.1	7.7	8.2	6.8
Farm	2.0	1.5	1.3	0.8
Food/Kindred	4.0	4.5	3.4	3.8
Forest	7.4	5.2	6.7	4.5
Lumber/Wood	4.0	3.6	3.3	2.8
Machinery Excl. Electrical	6.9	6.2	5.8	5.0
Metallic Ores	-0.2	0.5	-0.9	-0.2
Non-metallic Ores	1.7	1.2	0.9	0.3
Petroleum/Coal	2.8	2.4	2.2	1.7
Primary Metal	3.8	3.3	3.1	2.5
Pulp/Paper/Allied	2.7	2.7	2.0	1.9
Rubber/Plastics	3.8	3.6	3.1	2.7
Textile Mill	1.7	1.7	1.0	1.0
Transportation Equipment	2.4	2.1	1.7	1.3

Source: Texas Transportation Institute using FHWA data.

The waterborne tonnages for many of these categories differ in trend direction shown from the USACE data set and the FAF freight forecasts. These discrepancies may be due to impacts of the recent economic recession that are not accounted for in the FAF forecast. It should also be recognized that the FAF forecasts are for commodity movements across modes, and may not necessarily reflect cargo movement trends through seaports but rather by truck, rail, or pipeline. Although it would be uncertain whether any singular facility would be accounted for in the FAF forecasting model (but may be reflected in overall forecasted trends for the region), development or closure of individual facilities can greatly affect local and regional tonnages. For example, a Dow Corporation press release states that a new, privately held liquefied natural gas (LNG) facility at Quintana Island, southeast of Freeport, is expected to come on-line in 2007 importing 3.6 million tons per year of LNG. The press release notes that from Freeport LNG Development, L.P.'s facility, "The natural gas would be transported through a 9.4-mile pipeline that will extend to Stratton Ridge, Texas, which is a major point of interconnection for a number of Texas intrastate systems."[11]

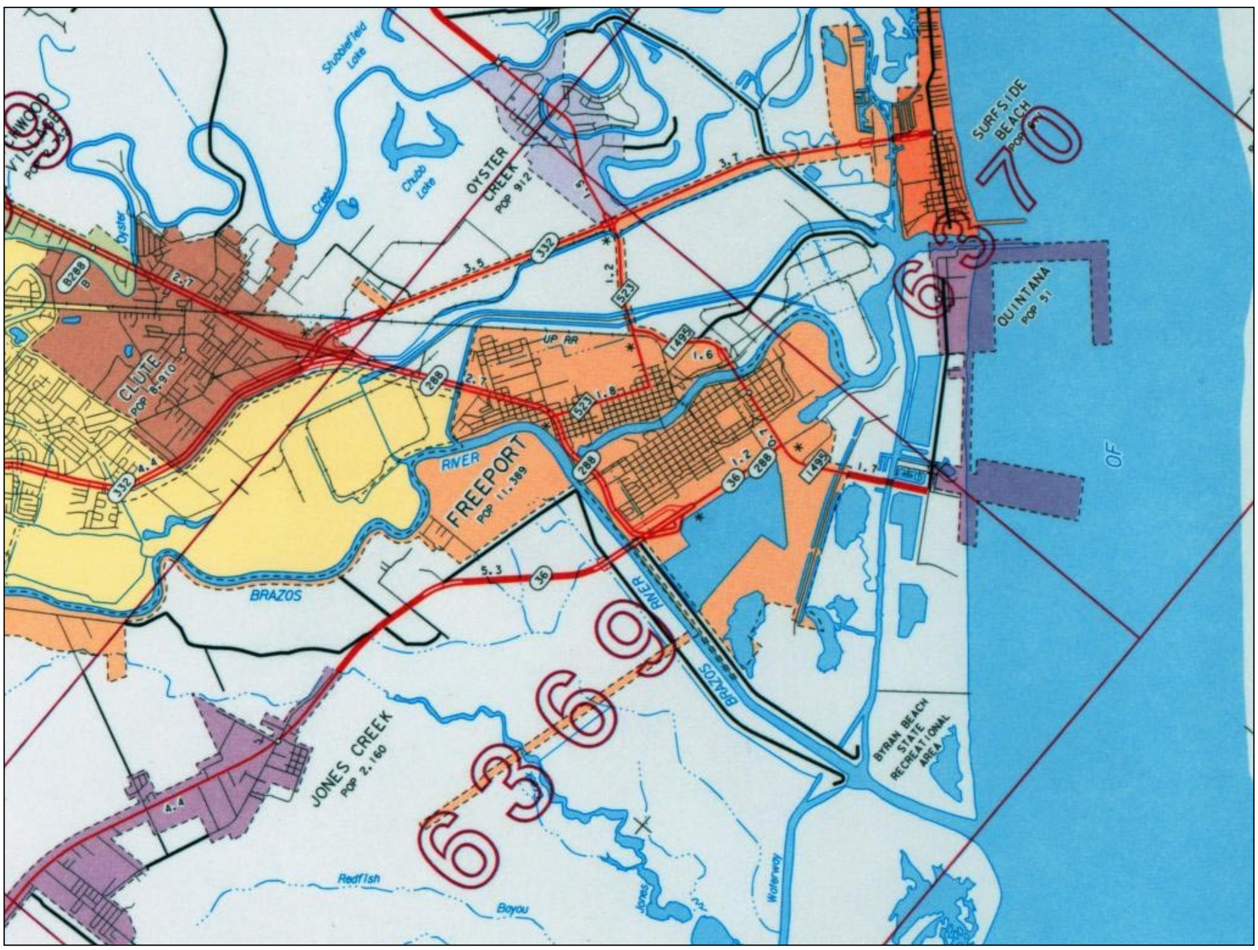
The USACE Waterborne Commerce cargo tonnage information and FAF forecasts, described above, are used to assess the commodities historically moving through WG-Tex ports, along with forecasted regional trends. Characteristics of individual commodity groups allows for implications to be identified for port-rail access needs because of the nature and advantages of one mode versus another. For example, long distance transport of high-density bulk and breakbulk commodities (other than liquid) are more likely to move by rail, while time-sensitive or short distance commodities are less likely to move by rail. Information provided by the ports, railroad companies, investigator site visits, USACE cargo throughput, and FAF forecasts are used to identify implications for port-rail branch lines and corridors in the following chapters.

[11] Dow Corporation News Center. *The Dow Chemical Company and Freeport LNG Development L.P. Sign Agreement Regarding Proposed Gulf Coast Liquefied Natural Gas Terminal.* Available online at http://www.dow.com/dow_news/corporate/2003/20030619b.htm. June 19, 2003.

CHAPTER 4: PORT FREEPORT

GENERAL PORT DESCRIPTION

Port Freeport is located in Brazoria County on the Upper Central Texas Gulf Coast, down the Texas Coast from Galveston and up the coast from Point Comfort. The population of Brazoria County was 241,767 in Year 2000 and is projected to be 322,819 in Year 2020, according to the U.S. Census Bureau. The port is located three miles from the mouth of the old course of the Brazos River, where a jetty and channel into the Gulf of Mexico were first constructed in 1889, and the Brazos River Harbor Navigation District was created by the Texas Legislature in 1925. "Port Freeport land and operations currently include 186 acres of developed land and 7,723 acres of undeveloped land, 5 operating berths, a 45-foot deep Freeport Harbour Channel and a 70-foot deep sink hole.[12]" Figure 6 is a map of the Port Freeport area.



Source: Texas Department of Transportation.

Figure 6: Map of Port Freeport Area.

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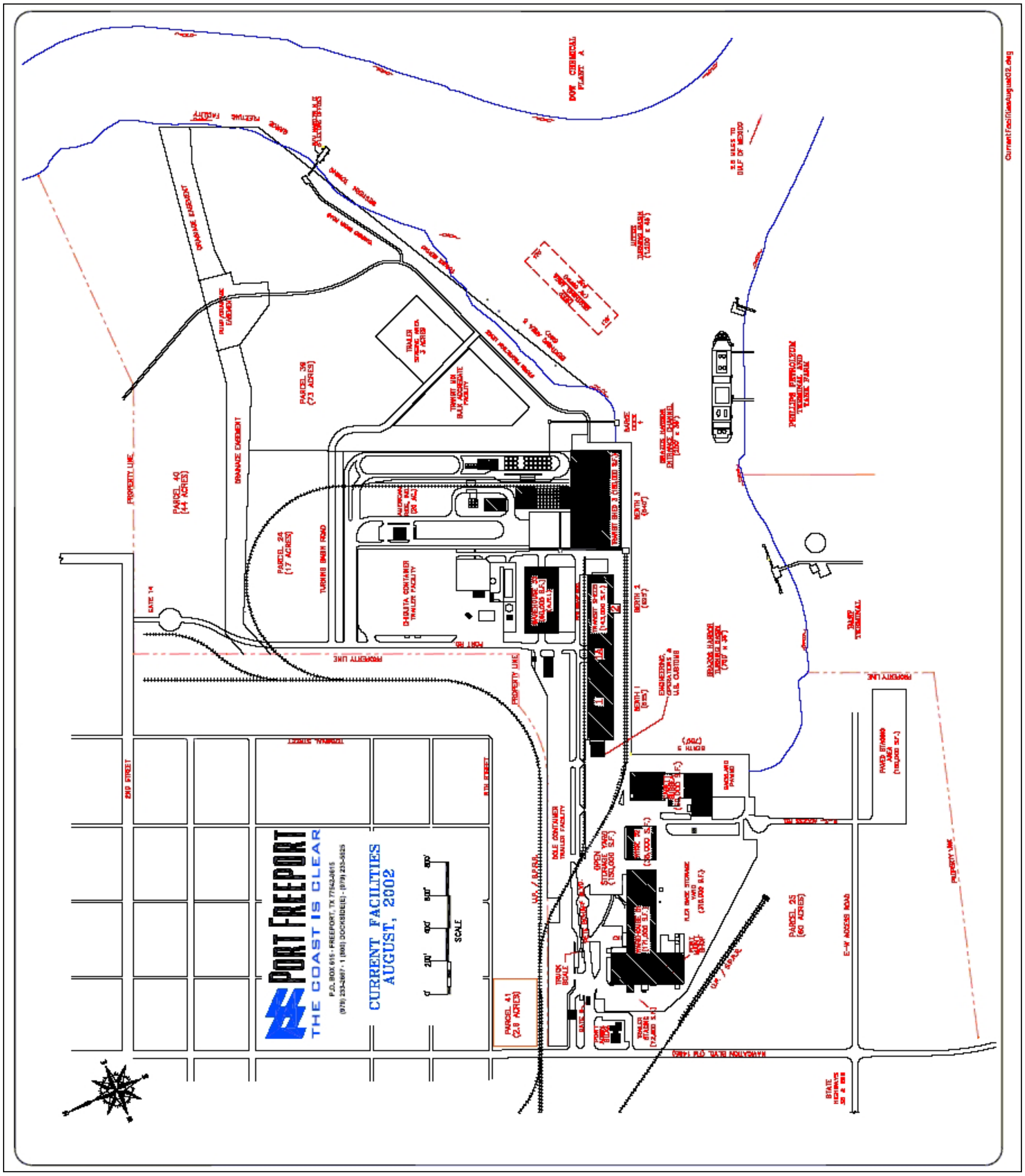
[12] Port Freeport Impact Statistics. Available online at http://www.portfreeport.com/stats.htm.

Port Facilities

Figure 7 is a map of facilities at Port Freeport, showing the American Rice Company, the Chaquita Container Facility, the Dole Container Facility, and transit sheds. Rail access is shown to the container areas and American Rice. A bulk aggregate facility is shown adjacent to the American Rice Company and associated transit shed.

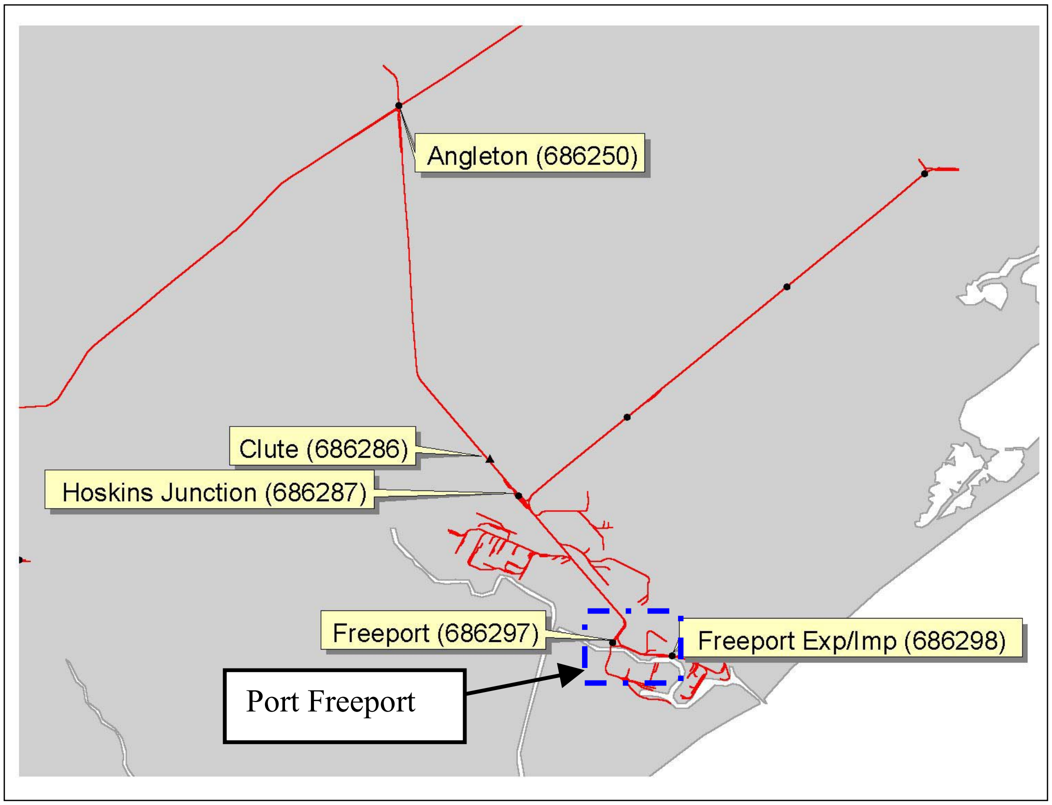


Source: Port Freeport website. Available online at http://www.portfreeport.com.

Figure 7: Port Freeport Facilities Map.

Rail Access

Rail access to Port Freeport is provided by the Union Pacific Railroad. The port is located at the southern end of the Freeport Industrial Lead, which also serves numerous chemical companies between the port and the junction with the railyard at Angleton on UP's Angleton Subdivision. A map of the rail access for Port Freeport is shown in Figure 8. The port's facilities are located at the southernmost part of the trackage to the south of the industrial harbor, as indicated on the map.



Source: Texas Transportation Institute using Bureau of Transportation Statistics NTAD 2001 data.

Figure 8: Map of Freeport Area Rail Line Access.

According to the UP Timetable for the Angleton Subdivision, trains on the Freeport Industrial Lead operate between speeds of 10 and 20 miles per hour over the 15.6 mile distance from Angleton to the swing bridge that connects the port's public facilities with the industrial lead. The maximum railcar weight permitted on the Freeport Industrial Lead is 143 tons. Compared with the main trackage on the Freeport Industrial lead, the swing bridge and rail infrastructure to the port is little-used, and any significant level of rail traffic to the port can be expected to necessitate replacement of the swing bridge and an upgrade of trackage serving the port. Current rail service to the port over this infrastructure must operate at minimal speeds. Figure 9 is a photograph of the Port Freeport rail swing bridge.

Source: Texas Transportation Institute.

Figure 9: Port Freeport Swing Bridge.

The Angleton Subdivision joins up with UP's Houston area rail network at Algoa, approximately 23 miles northeast of Angleton. There are three rail sidings between Angleton and Algoa, with lengths of approximately 8,300 feet, 7,600 feet, and 10,000 feet. Moving down the Angleton mainline to the southwest, there is a 7,600-foot length siding at Brazoria, a railyard at Sweeny, and a 7,700-foot siding at Allenhurst prior to a junction with BNSF traffic at Bay City. The speed limit over the Angleton Subdivision is 50 miles per hour, and speed restrictions over this section include 20 miles per hour at Angleton yard, two 25-mile-per-hour sections near Brazoria, and 30 miles per hour near the BNSF junction. The Angleton Subdivision is operated under Centralized Traffic Control (CTC), an automated control system in which "a train may occupy a main track in CTC territory if it has been permitted to do so by signal indication. This means that a train may enter a CTC track from another track, or move within the CTC territory on signal indication alone. A signal indicating it is safe to proceed is thus also the authority to proceed. A CTC track can be used for traffic in both directions, though one direction may be preferred in daily operations."[13]

Commodities and Ranking

USACE aggregated cargo tonnages for Freeport Harbor, Texas are shown in Table 10 for years 1998 through 2001. These data are for both private and public waterway facilities, and show that

[13] Lundsten, Carsten S. *Railroad Rules, Signaling, Operations: North American Signaling Basics.* Available online at: http://www.lundsten.dk/us_signaling/movement.html#basicterms.

Petroleum and Petroleum Products, and Chemicals and Related Products, are the predominant commodity categories handled on the Freeport Harbor waterway section. Of these categories, Crude Petroleum accounts for the most tonnage, approximately two-thirds of the total tonnage handled on the waterway during the time period. The volumes handled of these commodities reflect the activities of private refining and chemical processing industry in the Freeport area. Table 11 shows the USACE data aggregated according to FAF commodity categories, and corresponding FAF forecasted average annual percent growth rates through 2010 and 2020 for the WG-Tex counties included in this study.

Table 10: 1998-2001 USACE Waterborne Cargo for Freeport Harbor, Texas.

USACE Commodity Category / Year	Aggregated Tonnage, Freeport Harbor, Texas[14] (Thousand Short Tons)			
	1998	1999	2000	2001
Total All Commodities	**29,013**	**28,076**	**30,984**	**30,132**
Total Coal	0	0	0	0
Total Petroleum and Petroleum Products	22,450	21,123	23,103	22,947
Subtotal Crude Petroleum	19,562	18,417	19,895	19,341
Subtotal Petroleum Products	2,887	2,754	3,207	3,606
Total Chemicals and Related Products	5,772	5,888	6,553	6,180
Total Crude Materials, Inedible, Except Fuels	64	135	136	292
Subtotal Forest Products, Wood, and Chips	1	0	0	0
Subtotal Pulp and Waste Paper	0	0	2	1
Subtotal Soil, Sand, Gravel, Rock and Stone	58	128	121	261
Subtotal Iron Ore and Scrap	0	0	0	0
Subtotal Non-ferrous Ores and Scrap	0	3	0	0
Subtotal Sulphur, Clay, and Salt	3	2	5	13
Subtotal Slag	0	0	0	0
Subtotal Other Non-metal Minerals	1	2	9	17
Total Primary Manufactured Goods	16	10	110	10
Subtotal Paper Products	11	3	2	6
Subtotal Lime, Cement, and Glass	1	2	47	1
Subtotal Primary Iron and Steel Products	1	3	58	1
Subtotal Primary Non-ferrous Metal Products	3	1	3	1
Total Food and Farm Products	609	726	910	639
Subtotal Grain and Subtotal Feeds	272	389	612	425
Subtotal Agricultural Products	337	338	296	214
Total All Manufactured Equipment, Machinery, and Products	49	28	170	70
Machinery (not Elec.)	25	11	66	44
Electrical Machinery	0	0	0	1
Vehicles, Ships, and Boats	16	4	1	1
Manufactured Wood Products	0	0	0	0
Textiles	6	9	20	16
Rubber	2	2	76	2

Source: USACE Waterborne Commerce Statistics Center.

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[14] USACE defines the Freeport Harbor, Texas Section as including: Gulf of Mexico to Diversion Dam at Freeport, Texas, on Old Brazos River, about 9.0 miles.

Table 11: 1998 USACE Waterborne Freight for Freeport Harbor, Texas by Associated FHWA Freight Analysis Forecast Commodity Category.

USACE Waterborne Freight Traffic by Associated FAF Commodity Category	Aggregated Tonnage, Port Freeport (Thousand Short Tons)	FAF Base Case Regional Average Annual Forecasted Percent Change, Since 1998	
Year	**1998**	**2010**	**2020**
Total All Commodities	29,013	2.3	1.9
Chemicals/Allied	5,772	3.0	2.3
Clay/Concrete/Glass/Stone	62	4.3	3.7
Coal		1.9	1.9
Crude Petro/Natural Gas	19,562	1.9	1.4
Electrical Machinery/Equip Supp	0	8.6	7.2
Farm	272	1.7	1.1
Food/Kindred	337	3.6	4.1
Forest	1	7.1	4.9
Lumber/Wood	0	3.6	3.2
Machinery Excl. Electrical	25	6.3	5.6
Metallic Ores	0	-0.6	0.1
Non-metallic Ores	1	1.3	0.7
Petroleum/Coal	2,887	2.4	2.0
Primary Metal	4	3.5	2.9
Pulp/Paper/Allied	11	2.3	2.3
Rubber/Plastics	2	3.5	3.2
Textile Mill	6	1.3	1.3
Transportation Equipment	16	2.1	1.7

Source: Texas Transportation Institute using USACE Waterborne Commerce Statistics Center and FHWA data.

Crude Petroleum/Natural Gas is the largest waterborne commodity category moved through Freeport Harbor, at nearly 20 million tons in 1998. This category forecasts an increase slower than the regional average, at 1.9 percent annual average between 1998 and 2010 and 1.4 percent annually between 1998 and 2020. Chemicals/Allied Products is the second-largest FAF commodity category moving through Freeport Harbor, at 5.7 million tons in 1998. The FAF forecasts for Chemicals/Allied Products was greater than the regional average at 3.0 percent annual average between 1998 and 2010 and 2.3 percent annually between 1998 and 2020, but slightly below the national average forecasted growth rates of 3.4 percent and 2.4 percent for the same time periods, respectively.

Petroleum/Coal was the third-highest commodity category moving through Freeport Harbor in 1998 at approximately 2.9 million tons. The FAF forecasts for Petroleum/Coal commodities are just slightly greater than the regional average at 2.4 percent annual average between 1998 and 2010 and 2.0 percent annually between 1998 and 2020. Given the nature of Crude and Petroleum Product commodities, it is unlikely that tonnage increases or decreases in these categories will greatly impact rail traffic levels or needs at the Port Freeport, given that their primary transport modes are waterborne and pipeline. Tonnage increases of Chemicals/Allied Products through Freeport are likely to result in some impacts on rail traffic for private facilities on the Freeport Industrial Lead. As shown in Table 3, tonnage on the Freeport Industrial Lead between Freeport and Angleton has totaled around 7 million tons inbound and 3 million tons outbound for years 1999 through 2001. Comparatively little of this tonnage was generated by Port Freeport.

The public port at Freeport, Texas is a bulk, project, and general cargo port. Tables 12 and 13 show annual port trade data for years 2000 through 2002, and 10-year commodity totals, respectively.

Table 12: Port Freeport Trade Statistics: Commodity Group Tonnages for Years 2000 through 2002.

Commodity/Year	2000	2001	2002
Rice	548,624	538,063	415,406
Bananas/Misc. Fruit	296,617	326,940	314,231
Miscellaneous/General Cargo	211,207	329,965	385,150
Chemicals	30,060	33,690	19,265
Bagged Agricultural Products (Excluding Rice)	86,049	-	-
Heavy Equipment	2,201	-	-
Steel Pipe Products	2,324	-	-
Annual Port Tonnage Short Tons	1,177,082	1,228,658	1,134,052

Source: Brazos River Harbor Navigation District.

Table 13: Port Freeport Trade Statistics: Ten-Year Commodity Group Totals for Years 1993 through 2002.

Ten Year Cargo Quantities Analysis		
Commodity	**Quantity (short tons)**	**Percent Total**
Rice	4,852,154	49.77%
Bananas and Misc. Fruit	2,414,290	24.76%
Misc./General Cargo	1,694,978	17.39%
Chemicals	671,476	6.89%
Bagged Agricultural Products	99,624	1.02%
Heavy Equipment	10,313	0.11%
Steel and Pipe	6,113	0.06%
Total	9,748,968	100.00%

Source: Brazos River Harbor Navigation District.

As shown in Tables 12 and 13, rice has been the predominant commodity category moved through the public docks at Port Freeport. Port Director A.J. "Pete" Reixach suggests that rice exports could be boosted by 20 – 25 percent from the port if the trade embargo with Cuba were lifted. Cuba was once the "number one export buyer of rice from Texas," and while Southeast Asia is currently the largest Cuban rice supplier, Texas exports to the nation could grow from $200 – $300 million in the first years after lifting the embargo, and result in total trade between Texas and Cuba between $1.3 and $2.0 billion per year.[15] However, the condition of the swingbridge serving Port Freeport and existing track infrastructure inhibits the transport of significant quantities of rice or other cargo by the existing rail infrastructure to the port without extensive upgrades.

Port Freeport also has a niche market handling tropical fruits. This commodity group is the predominant volume of container traffic that made Port Freeport the 26th in the U.S. in terms of Foreign Waterborne Containerized Trade at approximately 54,000 twenty foot equivalent unites (TEUs) in 2002, and including domestic trade, the port handled over 74,000 TEUs in that year. Because of the nature of the tropical fruits business, these commodities are stored under specific conditions and transported in refrigerated containers via truck. The time-sensitivity of this cargo presents little opportunity for rail transport, unless a special handling deal is worked out with a railroad carrier.

PLANNED AND POTENTIAL RAIL PROJECTS

Port Freeport is pursuing development of its substantial greenfield properties. A map that identifies the Brazos River Harbor Navigation District's properties is shown in Figure 10. Already one new project is in the works: "When Berth No. 7 is completed in 2006, Port Freeport's ability to handle containers, breakbulk and project cargoes will be significantly enhanced. As the marketplace demands, Berth No. 7 will ultimately be joined by two more new berths next to a 140-acre backland area to be developed along with them. The area is immediately adjacent to current port facilities….The 1,200-foot-long berth, with 45-foot depth alongside, is to eventually be joined by a new 1,200-foot-long Berth No. 6 (on a site currently used on a limited basis by vessels carrying bulk aggregate materials). Berth No. 6 and the remodeled Berth No. 7 will provide 2,400 feet of contiguous berthing."[16] Design work on the project is being conducted by TranSystems, Inc.

In association with this development, the construction of new rail connections with railroad networks near Bay City is being considered rather than pursuing costly investments to replace existing rail infrastructures. As shown in Table 2, this portion of the Angleton Subdivision line is heavily traveled – between Bay City/Placedo and Angleton the combined BNSF and UP traffic over the Angleton Subdivision carried 18 and 17 million tons northbound in 2000 and 2001, respectively, and 11 million tons southbound annually in each of those years. Between Bay City/Placedo and Bloomington these traffic levels over the Angleton Subdivision line were virtually unchanged with the exception of an increase to 12 million southbound tons per year in 2001. Connection at this point would also create the possibility of connection with BNSF trackage, which might, from the port's perspective, enhance access to alternate markets and create a more competitive rate scenario.

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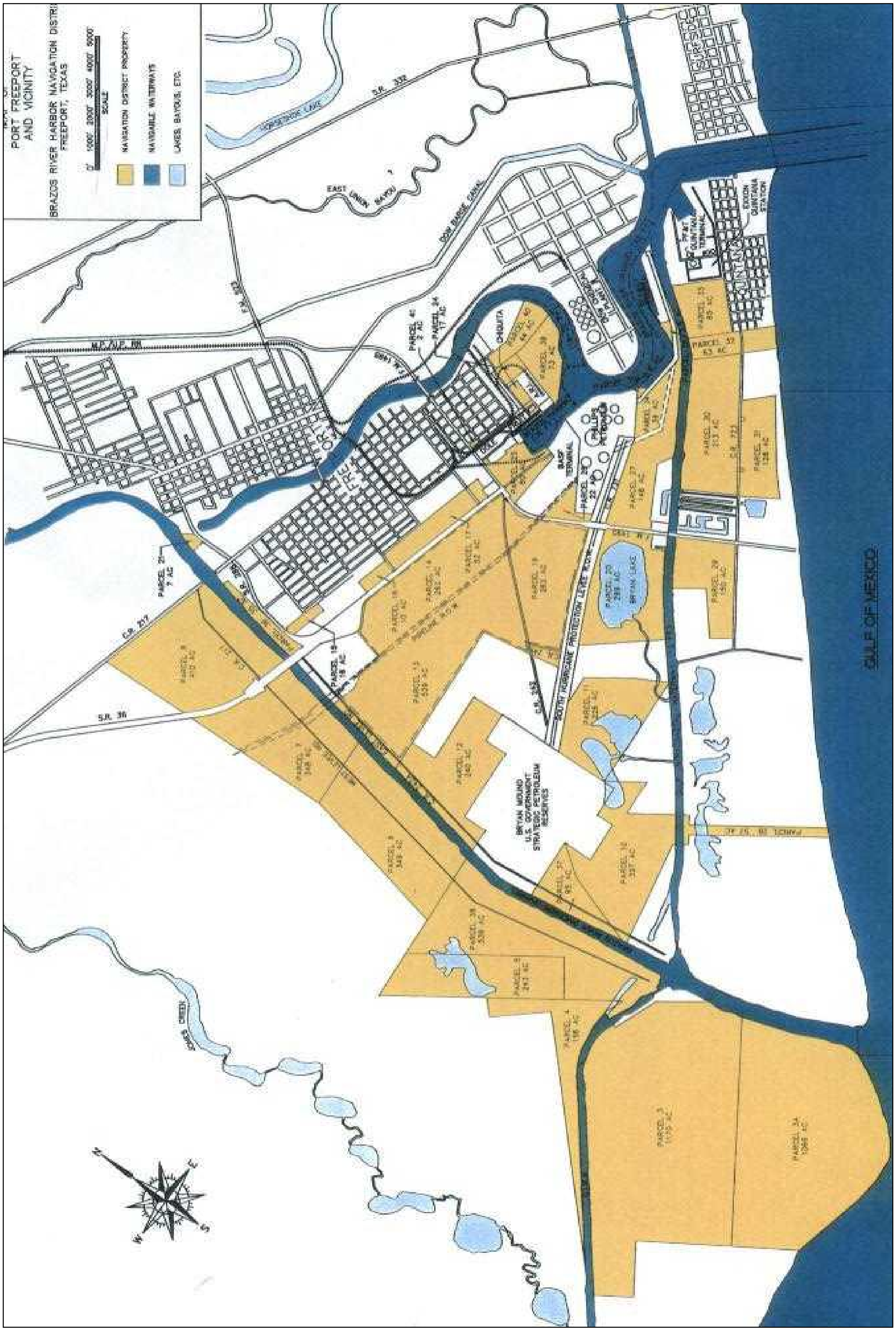
[15] *Dockside.* A Port Freeport Publication, Summer 2002.
[16] *Dockside* . A Port Freeport Publication, Spring/Summer 2003.



Source: Brazos River Harbor Navigation District.

Figure 10: Brazos River Harbor Navigation District.

CHAPTER 5: PORT OF PORT LAVACA–POINT COMFORT

GENERAL PORT DESCRIPTION

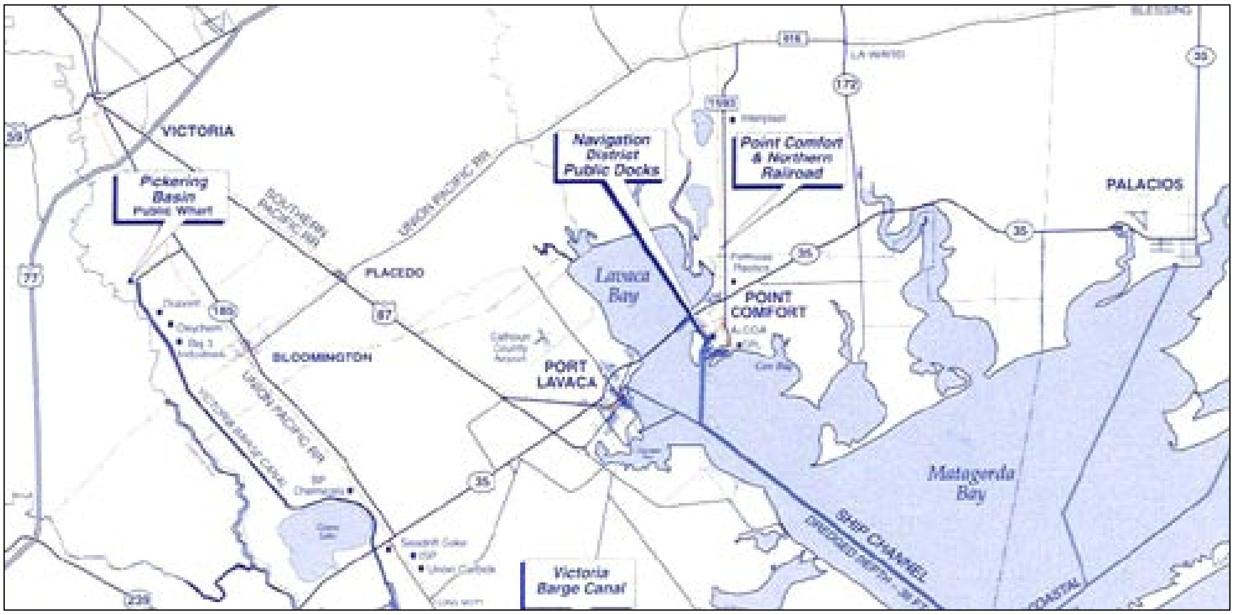
The Port of Port Lavaca-Point Comfort (PLPC) is located in Calhoun County at the end of the 24-mile long Matagorda Ship Channel, down the Texas Coast from Port Freeport and up the coast from Corpus Christi. The population of Calhoun County was 20,467 in Year 2000 and is projected to be 26,027 in Year 2020, according to the U.S. Census Bureau. The Calhoun County Navigation District controls all of the port-owned facilities in the area. The ship channel is dredged to a depth of 36 feet and crosses Matagorda Bay and Matagorda Island before entering the open ocean.

Port Facilities

The Port of Port Lavaca-Point Comfort has specialized in liquid bulk cargoes since about 1996.[17] This has led to the development of and investment in facilities that cater to these commodities. PLPC has a liquid cargo ship terminal with two 36-foot draft berths and a liquid cargo barge terminal with six berths. Additionally, a 36-foot draft general cargo dock berth and warehouse as well as a 30-foot operating depth multi-purpose dock capable of handling a variety of commodities and/or containers are located on opposite sides of the port facilities in Point Comfort. Rail spurs serve the general cargo docks and warehouse. A rail right of way has been extended to serve the multipurpose dock to facilitate future rail landside access needs.[18]

The port's main facilities are located in Point Comfort with secondary facilities located elsewhere in the county. Bulk metallic ores are also handled at facilities on the Point Comfort section of the Matagorda Ship Channel, most notably by the Aluminum Company of America, Inc. (Alcoa) plant that is physically located on land immediately adjacent to the port facilities. Alcoa also is the majority owner of the Point Comfort and Northern Railway Company (PCN) that provides rail service to the port. Figure 11 is a map of the Port Lavaca-Point Comfort area.

[17] Interview with Robert H. Van Borssum, Port Director, Port of Port Lavaca-Point Comfort, conducted by the study team on November 29, 2001.
[18] Compiled from Port of Port Lavaca-Point Comfort website information. Available at http://www.portofplpc.com.



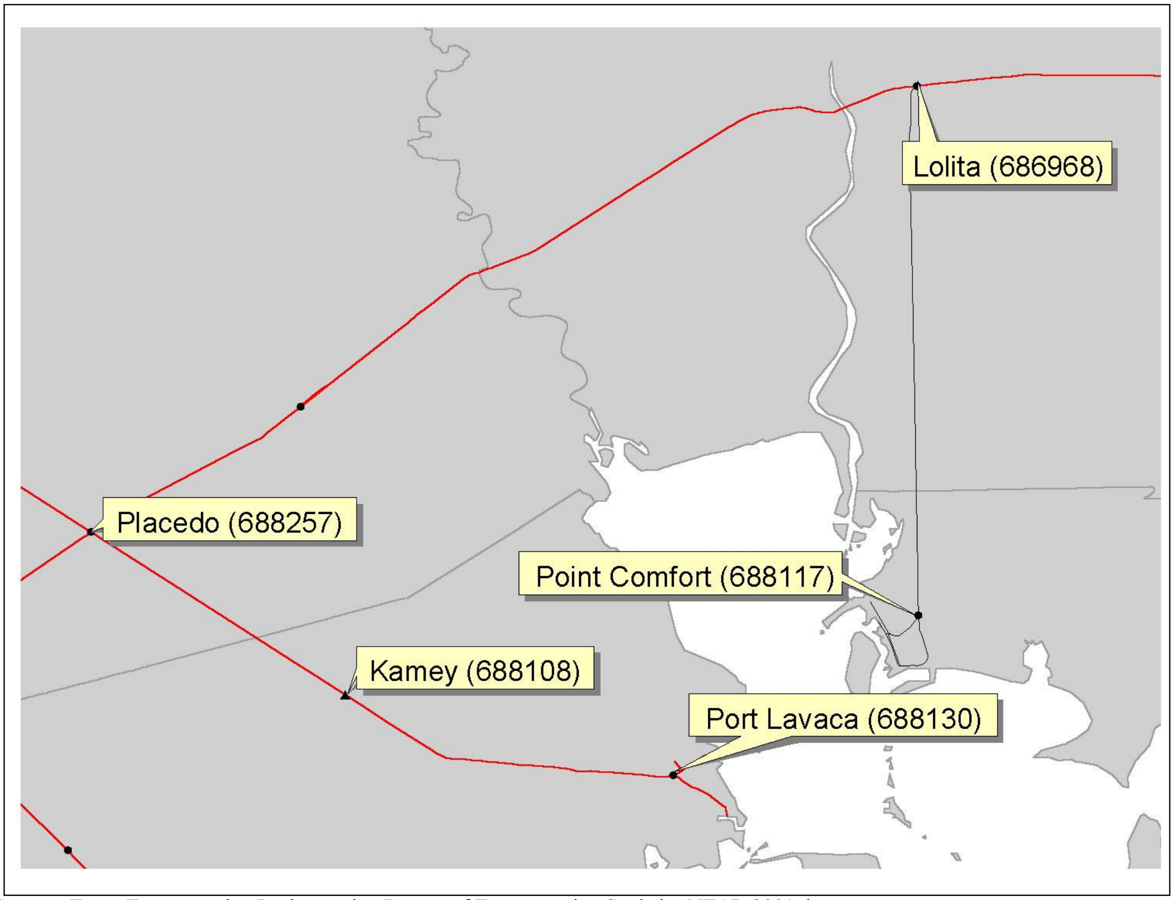
Source: Port of Port Lavaca-Point Comfort website. Available at http://www.portofplpc.com.

Figure 11: Map of Port of Port Lavaca-Point Comfort and the Matagorda Ship Channel.

Rail Access

Figure 12 is a map of the rail access to the Port Lavaca-Point Comfort area. The Union Pacific Railroad Angleton Subdivision passing through Calhoun County is the primary railroad line in the area. The Angleton Subdivision joins the UP's Brownsville Subdivision at Bloomington. The upper portion of the Angleton Subdivision between the BNSF junction near Bay City and Algoa is discussed in the previous chapter on Port Freeport. Between the BNSF junction and the junction with the PCN at Lolita there are four rail sidings with lengths of approximately 5,600 feet, 8,200 feet, 7,800 feet, and 7,700 feet. Also on this stretch of mainline track is the UP business track serving Formosa Plastics three miles northeast of the PCN connection. Some of the liquid cargo handled at Point Comfort is used by Formosa.

The speed limit over the Angleton Subdivision is 50 miles per hour, and the only speed restriction between Bloomington and Bay City is a limit for a distance of 0.3 mile to 25 miles per hour between Placedo and Lolita. The Angleton Subdivision is operated under Centralized Traffic Control track authority. Moving southwest down the Angleton mainline between Lolita and the yard at Bloomington, there are sidings of 6,600 feet and 5,600 feet and a junction at Placedo with the UP Port Lavaca Subdivision that connects the City of Port Lavaca and inland cities to the northwest such as Victoria and Flatonia. Below the junction at Placedo, Port Lavaca Subdivision is identified in the timetable as an industrial lead that is 14 miles in length. As shown in Table 4, the 10-year average railcar weight over the Port Lavaca-Placedo section was 90.5 tons. While the upper portion of this lead is maintained to better condition to support business traffic, the lower portion of the track is in poor condition.



Source: Texas Transportation Institute using Bureau of Transportation Statistics NTAD 2001 data.

Figure 12: Map of Port Lavaca and Point Comfort Area Rail Lines.

CTC authority continues on the Brownsville Subdivision between Bloomington and the 7,600-foot siding at Inari. Speed over this section is a maximum of 50 miles per hour except for the barge canal bridge limit of 35 miles per hour. Track Warrant Control (TWC) is in effect between Inari and the junction with UP's Kosmos Subdivision at Sinton. TWC "is a verbal authorization system … used to authorize trains to occupy Main Tracks. TWC can be used as a stand-alone dispatching and safety system in unsignaled territories, or can be supplemented with Automatic Block Signaling (ABS) to increase flexibility and traffic capacity."[19] It requires verbal contact between a train crew and a dispatcher, exchanging the permitted locations and conditions for which a train is permitted to operate. There are two additional sidings between Inari and Sinton, one is 7,200 feet in length and the other 6,300 feet in length. Speed over this section is limited to 49 miles per hour with the exception of 25 miles per hour at the Refugio business track, and is reduced to 40 miles per hour approaching the Sinton junction, and then 20 miles per hour approaching the Sinton yard. Lower sections of the Brownsville Subdivision are discussed in the chapters on the Port of Corpus Christi and Port of Brownsville in this report.

[19] Lundsten, Carsten S. *Railroad Rules, Signalling, Operations: Track Warrant Control.* Available online at http://www.lundsten.dk/us_signaling/twc/index.html.

Although the Burlington Northern Santa Fe Railway (BNSF) and Texas Mexican Railway Company (TM) have trackage rights over the Angleton Subdivision as a result of rulings of the federal Surface Transportation Board (STB) during the UP-Southern Pacific merger in 1996. UP, BNSF, and TM do not have direct access to the port area in Point Comfort. The only railroad serving the port directly is the Point Comfort and Northern Railway Company (PCN). This shortline railroad, owned and operated by Alcoa, owns and maintains a branch line between Lolita, on the UP Angleton Subdivision, and the port area in Point Comfort. The line owned by PCN is maintained to FRA Class 2 rail standards that allow a maximum speed of 20 miles per hour for operation of freight trains.[20] As shown in Table 4, the ten-year average railcar weight over the Point Comfort-Lolita section was 97.7 tons.

The PCN is primarily used to transport aluminum ore and other materials between the Alcoa plant in Point Comfort and another Alcoa plant located in Rockdale, Texas. PCN has trackage rights that allow its crews to operate trains over UP trackage to the north to reach the Rockdale Plant where another Alcoa-owned Texas shortline, the Rockdale, Sandow, and Southern, owns the final few miles of track. The fluctuations in business cycles experienced by Alcoa and the worldwide aluminum market directly affect the traffic levels experienced and served by PCN. PCN once served some other industrial customers in the port area; however, these customers have built their own branch lines/sidings in recent years, effectively limiting PCN's market to its Alcoa traffic and any that might be generated by the port.[21] The rail right-of-way that has been extended to the multi-purpose dock provides the possibility of future development of limited rail traffic from container on barge service, should it develop at the port.

Commodities and Ranking

Table 14 shows USACE Waterborne Commerce data for the Port of Port Lavaca-Point Comfort for 1998 through 2001. Table 15 shows the USACE data aggregated according to FAF commodity categories, and corresponding FAF forecasted average annual percent growth rates through 2010 and 2020 for the WG-Tex counties included in this study.

[20] Interview with Dave Besio, Point Comfort and Northern Railroad, conducted by the study team on November 29, 2001.
[21] Besio interview.

Table 14: 1998-2001 USACE Waterborne Cargo for Matagorda Ship Channel, Texas.

USACE Commodity Category / Year	Aggregated Tonnage, Matagorda Ship Channel, Texas[22] (Thousand Short Tons)			
	1998	1999	2000	2001
Total All Commodities	**8,040**	**9,039**	**10,552**	**9,086**
Total Coal	0	0	0	0
Total Petroleum and Petroleum Products	1,161	975	965	1,184
Subtotal Crude Petroleum	39	64	78	110
Subtotal Petroleum Products	1,122	911	888	1,074
Total Chemicals and Related Products	1,291	1,442	2,955	3,243
Total Crude Materials, Inedible, Except Fuels	5,585	6,612	6,631	4,565
Subtotal Forest Products, Wood and Chips	0	0	0	0
Subtotal Pulp and Waste Paper	0	0	0	0
Subtotal Soil, Sand, Gravel, Rock and Stone	0	0	0	0
Subtotal Iron Ore and Scrap	0	0	0	0
Subtotal Non-ferrous Ores and Scrap	5,487	6,537	6,578	4,493
Subtotal Sulphur, Clay and Salt	0	0	0	0
Subtotal Slag	0	0	0	0
Subtotal Other Non-metal Minerals	98	71	54	72
Total Primary Manufactured Goods	0	8	0	0
Subtotal Paper Products	0	0	0	0
Subtotal Lime, Cement, and Glass	0	0	0	0
Subtotal Primary Iron and Steel Products	0	8	0	0
Subtotal Primary Non-ferrous Metal Products	0	0	0	0
Total Food and Farm Products	2	0	0	38
Subtotal Grain and Subtotal Feeds	2	0	0	38
Subtotal Agricultural Products	0	0	0	0
Total All Manufactured Equipment, Machinery, and Products	2	0	0	4
Machinery (not Elec.)	1	0	0	4
Electrical Machinery	0	0	0	0
Vehicles, Ships and Boats	0	0	0	0
Manufactured Wood Products	0	0	0	0
Textiles	0	0	0	0
Rubber	0	0	0	0

Source: USACE Waterborne Commerce Statistics Center.

[22] USACE defines the Matagorda Ship Channel, Texas Section as including: Humble Gulf of Mexico to Point Comfort, about 25.2 miles; to Port Lavaca, about 4.1 miles; to Harbor of Refuge, about 2.5 miles; to Lynn Bayou, about 1.5 miles; and to Red Bluff, about 20.2 miles.

Table 15: 1998-2001 USACE Waterborne Freight for Matagorda Ship Channel, Texas by Associated FHWA Freight Analysis Forecast Commodity Category.

USACE Waterborne Freight Traffic by Associated FAF Commodity Category/Year	Aggregated Tonnage, Matagorda Ship Channel (Thousand Short Tons)	FAF Base Case Average Annual Forecasted Percent Change, Since 1998	
	1998	2010	2020
Total	8,040	**2.3**	**1.9**
Chemicals/Allied	1,291	3.0	2.3
Clay/Concrete/Glass/Stone	0	4.3	3.7
Coal	0	1.9	1.9
Crude Petro/Natural Gas	39	1.9	1.4
Electrical Machinery/Equip Supp	0	8.6	7.2
Farm	2	1.7	1.1
Food/Kindred	0	3.6	4.1
Forest	0	7.1	4.9
Lumber/Wood	0	3.6	3.2
Machinery Excl. Electrical	1	6.3	5.6
Metallic Ores	5,487	-0.6	0.1
Non-metallic Ores	98	1.3	0.7
Petroleum/Coal	1,122	2.4	2.0
Primary Metal	0	3.5	2.9
Pulp/Paper/Allied	0	2.3	2.3
Rubber/Plastics	0	3.5	3.2
Textile Mill	0	1.3	1.3
Transportation Equipment	0	2.1	1.7

Source: Texas Transportation Institute using USACE Waterborne Commerce Statistics Center and FHWA data.

Metallic Ores is the largest FAF commodity category moved through the Matagorda Ship Channel to the Alcoa Facility in Point Comfort, which accounts for approximately half of such tonnage moved through the WG-Tex port region. The FAF forecasts for Metallic Ores were projected to be below national and regional averages at 0.6 percent average annual decrease between 1998 and 2010 and 0.1 percent average annual increase between 1998 and 2020.

Chemicals/Allied Products is the second-largest FAF commodity category moved through the Matagorda Ship Channel and Port of Port Lavaca-Point Comfort, increasing from 1.2 million tons annually in 1998 to over 3.2 million tons annually in 2001. The FAF forecasts for Chemicals/Allied Products was greater than the regional average at 3.0 percent annual average between 1998 and 2010 and 2.3 percent annually between 1998 and 2020, but slightly below the national average forecasted growth rates of 3.4 percent and 2.4 percent for the same time periods, respectively. As discussed in other chapters, at ports for which chemicals represent a large share of the tonnage, regional rail traffic from private facilities may also increase due to this growth, as rail is an important transport mode for chemicals.

Petroleum/Coal commodity tonnage remained relatively steady over the 1998 to 2001 time period with approximately 1 million tons annually. Most of this tonnage was naphtha and related solvents, gasoline, and fuel oils. The FAF forecasts for Petroleum/Coal commodities are just slightly greater than the regional average at 2.4 percent annual average between 1998 and 2010 and 2.0 percent annually between 1998 and 2020.

According to the UP tonnage charts, combined UP, BNSF and TM traffic on the Angleton Subdivision above Bloomington was 18 million tons annually northbound in 2000 and 2001, and 11 and 12 million tons annually southbound in those years, respectively. South of Bloomington on the Brownsville Subdivision Line to Odem, combined traffic was 12 and 13 million tons northbound, and 9 and 10 million tons southbound in 2000 and 2001, respectively. The branch line from Port Lavaca to Placedo carried 0.01 million tons annually inbound and outbound in 2000 and 2001. Bureau of Transportation Statistics (BTS) data from the 2001 National Transportation Atlas Database shows that the PCN line from Lolita to Point Comfort carries between 0 and 0.99 million tons annually.

PLANNED AND POTENTIAL RAIL PROJECTS

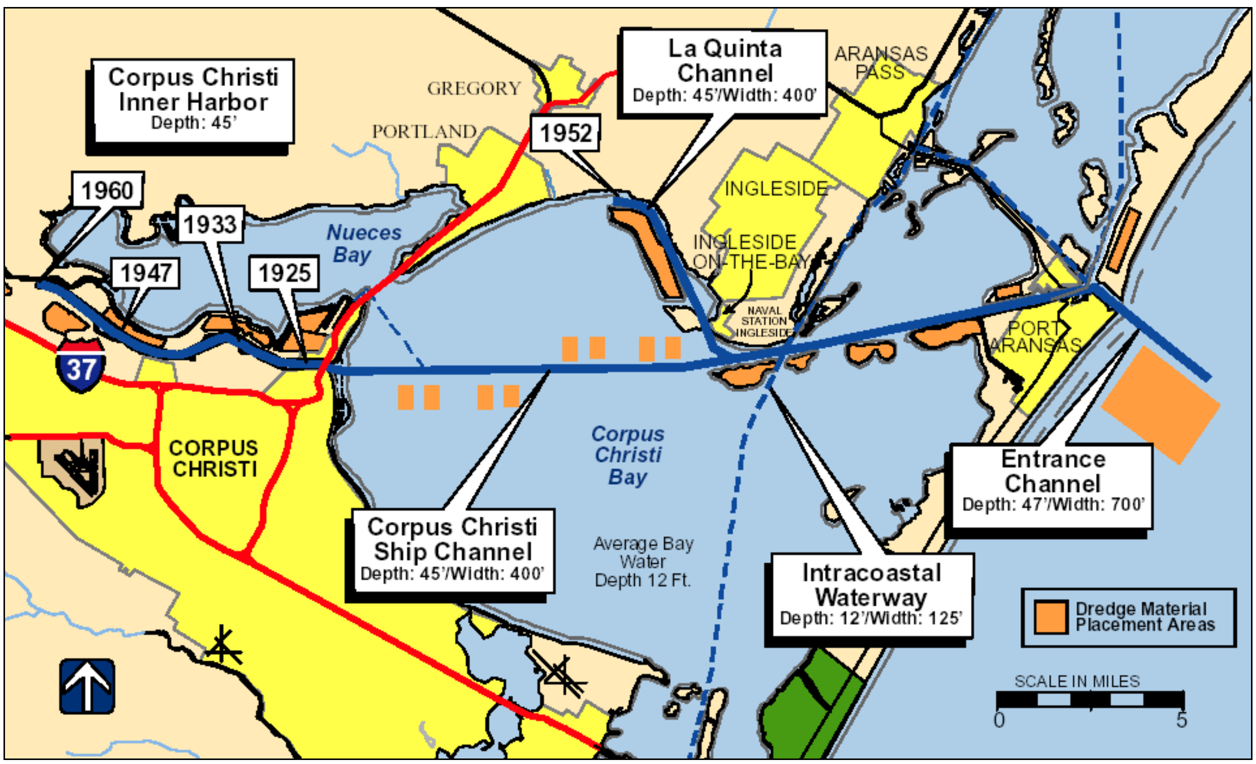
No major rail projects or improvements are planned for the Port of Port Lavaca-Point Comfort. The use of pipelines from the port and the focus that the port has placed upon handling petrochemicals and other liquid bulk items will limit the need for added rail infrastructure at the port. The port is constrained in its ability to expand or to add rail facilities due to being surrounded by Alcoa and other industrial sites in Point Comfort where the main port facilities are located; however, the port has preserved a right-of-way for future extension of rail service to its multipurpose dock. This facility might see increased use if container on barge services were to grow at the port. The port will continue to be served by the PCN as necessary.

During its site visit to the port, the study team also assessed the condition and feasibility of constructing port facilities on the opposite side of the bay in the City of Port Lavaca where the UP Port Lavaca Subdivision approaches the coast. This option does not appear to be a viable one. Although there is some undeveloped waterfront land in Port Lavaca, the land is currently used as a public park/boat ramp, the rail line traverses the downtown area in the City of Port Lavaca with many at-grade rail crossings, and the segment of the ship channel leading to this side of the bay is maintained to a shallower depth than the one serving Point Comfort. All of these factors point to limited potential for development of a container facility or other rail-port facility in Port Lavaca during the 20- year time frame of this study.

CHAPTER 6: PORT OF CORPUS CHRISTI

GENERAL PORT DESCRIPTION

The Port of Corpus Christi is primarily located in Nueces County on the Central Texas Gulf Coast, down the Texas Coast from Port Lavaca-Point Comfort and up the coast from Port Brownsville. The population of Nueces County was 313,645 in Year 2000 and is projected to be 422,288 in Year 2020, according to the U.S. Census Bureau. The Port Authority operates several facilities in and around Corpus Christi and Nueces Bays; however, the port's main facility is located along a 9-mile-long, 400-foot-wide inner harbor on the western side of Corpus Christi Bay at the western end of a 36-mile-long ship channel network that leads to the open ocean via the U.S. Naval Station facility at Ingleside and Port Aransas. The current channel depth is 45 feet and plans have been made to deepen the channel to 52 feet in the future as part of a larger project that will also widen the channel to 530 feet with a 200-foot barge shelf on each side.[23] Figure 13 is a map of the Port of Corpus Christi area.



Source: Port of Corpus Christi: Building for the Future, Presentation by Frank Brogan, Director of Engineering Services, POCCA, June 25, 2001. Available at http://gulliver.trb.org/conferences/2001SummerPorts/Session3Brogan.pdf. Accessed October 31, 2003.

Figure 13: Map of Port of Corpus Christi and the Corpus Christi Ship Channel.

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[23] Port of Corpus Christi: Building for the Future. Presentation by Frank Brogan, Director of Engineering Services, POCCA, March 7, 2003.

Port Facilities

The Port of Corpus Christi Inner Harbor has two general cargo terminals—the Southside General Cargo Terminal with three docks and heavy lift equipment; and the Northside General Cargo Terminal with two docks, a cold-storage facility, and a roll-on/roll-off ramp. Both of these facilities have dockside rail access. Additionally, the harbor has a bulk terminal with two docks and extensive storage facilities; 11 public oil docks (five with 45-foot draft to accommodate large crude oil tankers); and 14 other docks for handling petroleum ships and barges. Rail service is available on both the north and south sides of the inner harbor at the existing facilities. Rail lines in the port are maintained to FRA Class 1 rail standards, allowing for a maximum operational speed of 10 miles per hour.[24] Future plans for rail expansion and new rail facilities are discussed later in this chapter.

Rail Access

Four different railroad companies service the Corpus Christi area. The Corpus Christi Terminal Railroad (CCTR) provides service and maintains the rail lines on port property. CCTR also performs interchanges with the UP at its yard near Viola. The BNSF and TM interchange with CCTR at the Port's Common Interchange Yard on the north side of the inner harbor. BNSF and TM have trackage rights over several of the UP lines in the area as a result of federal Surface Transportation Board (STB) rulings enacted during the UP-Southern Pacific merger proceedings in 1996. Figure 14 shows a map of the rail access in the Corpus Christi area.

According to the UP Timetable for the Corpus Christi Subdivision, trains on the Corpus Christi Subdivison operate under yard limits between the junction with the Corpus Christi Terminal Authority Railroad track at the Tule Lake Lift Bridge and the yard at the end of the line, and "between the Viola Yard and Corpus Christi [will] be governed by instructions of yardmaster at Corpus Christi. When yardmaster not on duty, contact the train dispatcher." When close to train yards and other major line intersections, a train may be required to operate under Yard Limits, which "denotes a main track on which movements are to be at Restricted Speed. Trains can therefore occupy main tracks without further authority."[25] The maximum speed is 10 miles per hour over the 4 mile section, which is effectively a branch line serving the general cargo docks on the port's south side. Between the CCTA junction and Odem, the UP's Viola yard provides additional storage and interchange capabilities. Maximum railcar weight permitted on the Corpus Christi Subdivision is 143 tons.

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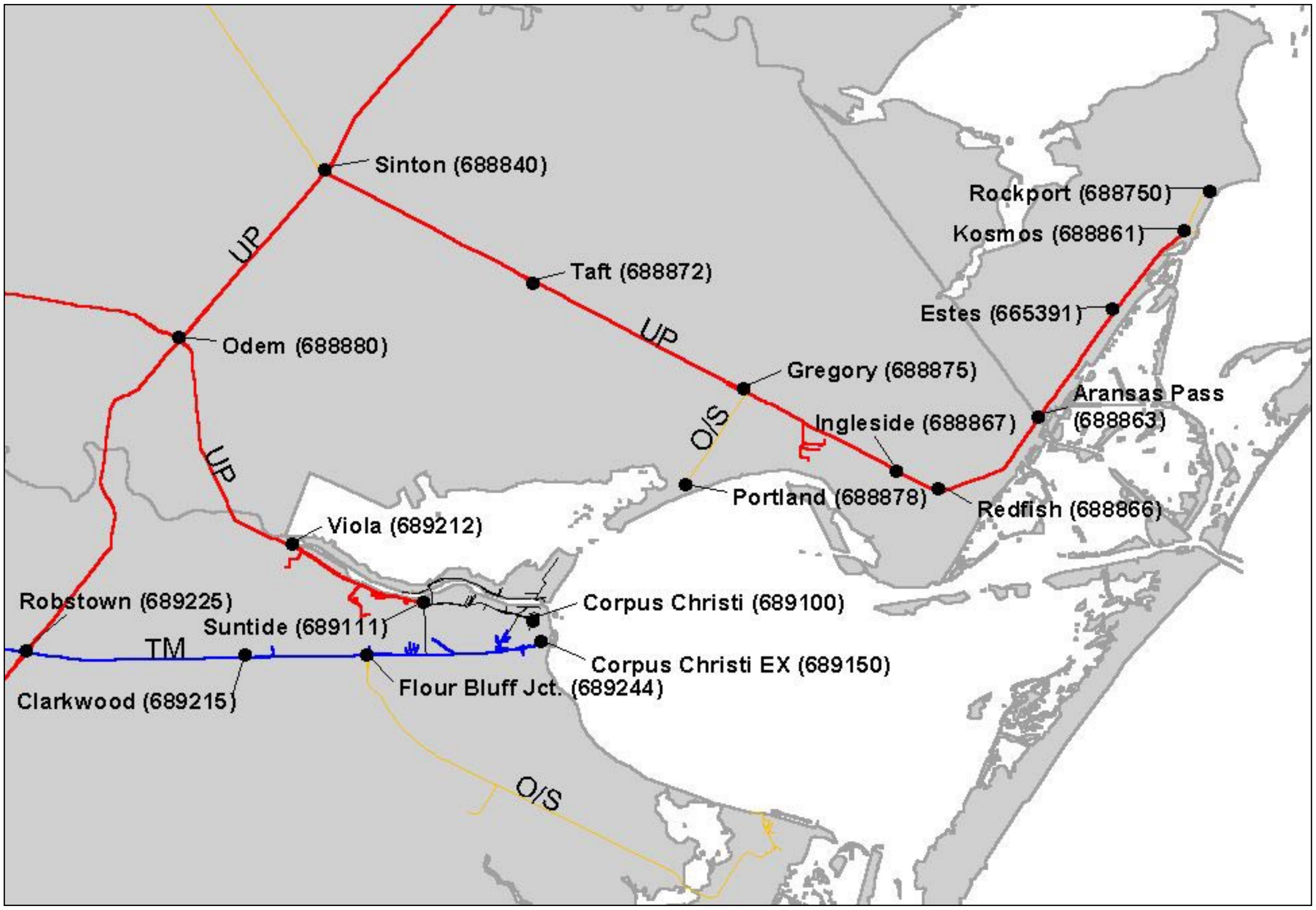
[24] Interview with Fred Babin, Transportation Manager, Port of Corpus Christi, conducted by the study team on November 15, 2001.

[25] Lundsten, Carsten S. *Railroad Rules, Signalling, Operations: Track Warrant Control.* Available online at http://www.lundsten.dk/us_signaling/twc/index.html.



Source: Texas Transportation Institute using Bureau of Transportation Statistics NTAD 2001 data.

Figure 14: Map of Corpus Christi Area Rail Line Access.

According to the UP Timetable for the Brownsville Subdivision, trains operate under Track Warrant Control between the TM at Robstown and the intersection with the Corpus Christi Subdivision at Odem. Trains operate under Centralized Traffic Control with a speed limit of 49 miles per hour between Odem and the junction with the Kosmos Subdivision at Sinton, where there is also an 11,000-foot siding and the speed limit is reduced to 20 miles per hour. The maximum railcar weight permitted on the Brownsville Subdivision is 143 tons.

The Kosmos Subdivision is a 29-mile-long corridor that runs by Taft, Gregory, Portland, Ingleside, Aransas Pass, and on towards Rockport serving various chemical refineries, including Occidental Chemical Company and Du Pont Chemical Company, and also the Sherwin Alumina Company. The speed limits over this line are between 10 and 25 miles per hour, and there are no sidings. The maximum railcar weight permitted on the Kosmos Subdivision is 125 tons. At Gregory, a branch line once was in place that served the Portland area. This line was abandoned several years ago and the track was removed. The Portland area is a potential site for a container terminal on land owned by the Port of Corpus Christi Authority. Plans for this project are discussed later in this chapter.

Commodities and Ranking

The Port of Corpus Christi is the largest port considered in this study. The port is home to five refineries that process approximately 13percent of Texas' and 5percent of national refinery capacity. While the port has undertaken many projects to help diversify the commodities that it moves, petrochemical products continue to make up approximately 90percent of the tonnage that passes through it.[26] Table 16 shows USACE Waterborne Commerce data for the Port of Corpus Christi for 1998 through 2001. Table 17 shows the USACE data aggregated according to FAF commodity categories, and corresponding FAF forecasted average annual percent growth rates through 2010 and 2020 for the WG-Tex counties included in this study.

[26] Port of Corpus Christi: Building for the Future. Presentation by Frank Brogan, Director of Engineering Services, POCCA, March 7, 2003.

Table 16: 1998-2001 USACE Waterborne Cargo for Corpus Christi, Texas.

USACE Commodity Category/Year	Aggregated Tonnage, Corpus Christi Ship Channel, Texas[27] (Thousand Short Tons)			
	1998	1999	2000	2001
Total All Commodities	**86,139**	**78,003**	**82,973**	**77,471**
Total Coal	204	79	54	33
Total Petroleum and Petroleum Products	71,530	64,239	67,429	62,710
Subtotal Crude Petroleum	40,877	36,708	36,429	32,602
Subtotal Petroleum Products	30,652	27,530	31,199	30,108
Total Chemicals and Related Products	6,551	6,507	7,528	7,344
Total Crude Materials, Inedible, Except Fuels	6,236	5,131	5,604	5,099
Subtotal Forest Products, Wood and Chips	0	0	0	1
Subtotal Pulp and Waste Paper	0	0	0	0
Subtotal Soil, Sand, Gravel, Rock and Stone	168	89	6	21
Subtotal Iron Ore and Scrap	83	28	0	26
Subtotal Non-ferrous Ores and Scrap	5,621	4,797	5,191	4,816
Subtotal Sulphur, Clay and Salt	0	1	0	28
Subtotal Slag	7	11	4	0
Subtotal Other Non-metal Minerals	356	204	347	207
Total Primary Manufactured Goods	113	291	434	348
Subtotal Paper Products	0	0	0	0
Subtotal Lime, Cement, and Glass	90	269	385	331
Subtotal Primary Iron and Steel Products	24	20	4	5
Subtotal Primary non-ferrous Metal Products	0	2	45	12
Total Food and Farm Products	1,466	1,695	1,615	1,884
Subtotal Grain and Subtotal Feeds	1,463	1,695	1,573	1,881
Subtotal Agricultural Products	3	1	42	3
Total All Manufactured Equipment, Machinery, and Products	39	59	107	49
Machinery (not Elec.)	9	11	78	44
Electrical Machinery	0	0	0	1
Vehicles, Ships and Boats	29	48	27	4
Manufactured Wood Products	0	0	0	0
Textiles	0	0	1	0
Rubber	0	0	1	0

Source: USACE Waterborne Commerce Statistics Center.

[27] USACE defines the Corpus Christi, Texas Section as including: Humble Oil Basin to turning basins at Corpus Christi, at Avery Point, near Tule Lake, and at Viola, about 25.3 miles; branch channel to La Quinta, about 5.6 miles.

Table 17: 1998 USACE Waterborne Freight for Corpus Christi, Texas by Associated FHWA Freight Analysis Forecast Commodity Category.

USACE Waterborne Freight Traffic by Associated FAF Commodity Category/Year	Aggregated Tonnage, Port of Corpus Christi (Thousand Short Tons)	FAF Base Case Average Annual Forecasted Percent Change, Since 1998	
	1998	2010	2020
Total All Commodities	86,139	**2.3**	**1.9**
Chemicals/Allied	6,551	3.0	2.3
Clay/Concrete/Glass/Stone	258	4.3	3.7
Coal	204	1.9	1.9
Crude Petroleum/Natural Gas	40,877	1.9	1.4
Electrical Machinery/Equip Supplies	0	8.6	7.2
Farm	1,463	1.7	1.1
Food/Kindred Products	3	3.6	4.1
Forest	0	7.1	4.9
Lumber/Wood	0	3.6	3.2
Machinery Excluding Electrical	9	6.3	5.6
Metallic Ores	356	-0.6	0.1
Non-metallic Ores	5,704	1.3	0.7
Petroleum/Coal	30,659	2.4	2.0
Primary Metal	24	3.5	2.9
Pulp/Paper/Allied Products	0	2.3	2.3
Rubber/Plastics	0	3.5	3.2
Textile Mill	0	1.3	1.3
Transportation Equipment	29	2.1	1.7

Source: Texas Transportation Institute using USACE Waterborne Commerce Statistics Center and FHWA data.

Crude Petroleum/Natural Gas is the largest waterborne commodity category moved through the Port of Corpus Christi, but one that declined steadily between 1998 and 2001, as shown in Table 16. This category forecasts an increase slower than the regional average, at 1.9 percent annual average between 1998 and 2010 and 1.4 percent annually between 1998 and 2020. Petroleum/Coal commodity tonnage remained relatively steady over the 1998 to 2001 time period with average annual tonnage of 30 million tons, representing over 85 percent of the commodity category volume moved through WG-Tex ports. The FAF forecasts for Petroleum/Coal commodities are just slightly greater than the regional average at 2.4 percent annual average between 1998 and 2010 and 2.0 percent annually between 1998 and 2020.

Chemicals/Allied Products is the third-largest FAF commodity category moved through Port of Corpus Christi, increasing from 6.5 million tons annually in 1998 and 1999 to over 7.3 million tons annually in 2000 and 2001. The FAF forecasts for Chemicals/Allied Products was greater than the regional average at 3.0 percent annual average between 1998 and 2010 and 2.3 percent annually between 1998 and 2020, but slightly below the national average forecasted growth rates of 3.4 percent and 2.4 percent for the same time periods, respectively. Given the nature of Crude and Petroleum Product commodities, it is unlikely that tonnage increases or decreases in these categories will greatly impact rail traffic levels or needs at the Port of Corpus Christi, given that their primary transport modes are waterborne and pipeline. However, tonnage increases of Chemicals/Allied Products are likely to result in increased rail traffic, as rail is an important transport mode for chemicals. For example, in September 1997 it was reported that "About half of OxyMar's VCM [vinyl chloride monomer] is shipped by rail by Union Pacific Railroad to Occidental Chemical plants in Pottstown, Pa., and Burlington, N.J."[28] This is about 500,000 tons annually, or about half of the rail tonnage transported on the Kosmos-Sinton branch line, which serves numerous chemical facilities and the Sherwin Aluminum Plant (discussed below). At that time plant officials estimated worldwide VCM demand growth at approximately 5-6 percent per year.[29] Impacts from traffic increases in this commodity category would affect rail operations to the numerous other private and public facilities at the port's main terminals as well.

Metallic Ores is the fourth-largest FAF commodity category moved through the Port of Corpus Christi, which accounts for approximately half of such tonnage moved through the WG-Tex port region. The majority of this tonnage is bauxite used by the Sherwin Alumina Company and manufactured into alumina. According to the company's website, "Our deep water port, accessible by vessels with displacement up to 60,000 tonnes, is the primary transportation mode for incoming bauxite and outgoing alumina" but that they "can also ship to customers by barge, rail, and truck."[30] The FAF forecasts for Metallic Ores were projected at 0.6 percent average annual decrease between 1998 and 2010 and 0.1 percent average annual increase between 1998 and 2020. Sherwin's manufacturing location is on the north side of Corpus Christi Bay, adjacent to the proposed site for the La Quinta container terminal, which is discussed below.

Farm Products, including grain and feeds, is the fifth-largest FAF commodity category moved through the Port of Corpus Christi, with tonnage increasing from 1.4 million tons in 1998 to 1.8 million tons in 2001. With respect to rail transport, the port's rail cargo has historically been dry bulk: grain, grain products and U.S. Food Aid Program cargoes as well as bulk materials, ores and minerals[31], making this an important rail commodity group. However, the FAF forecasts for Farm Products were below national and regional average at 1.7 percent average annual increase between 1998 and 2010 and 1.1 percent average annual increase between 1998 and 2020.

The UP's Brownsville Subdivision originates from the southern tip of Texas and is the nearest Class I rail line to pass near the port area. Bureau of Transportation Statistics data from the 2001 National Transportation Atlas Database (NTAD) indicate that this major UP line carries 5 to 9.99 million gross ton-miles (MGTM) annually. BNSF carries 1 to 4.99 MGTM per year over this line under its trackage rights agreement.

Several miles southeast of the port area, the Brownsville Subdivision intersects the TM at Robstown where TM has an interchange yard. A few miles further north at Odem, the Brownsville Subdivision intersects with the UP Corpus Christi Subdivision line, which connects the port and the San Antonio area. Between Odem and San Antonio the Corpus Christi

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[28] Caller-Times Interactive: News. Available online at http://www.caller2.com/busarch/bus997.htm.

[29] Ibid.

[30] Sherwin Alumina Company website. Available online at http://www.sherwinalumina.com/home.htm.

[31] Plume, Janet. Intermodal freight continues steady climb: Study warns bottlenecks could impact entire supply chain. *Gulf Shipper Online*. June 23, 2003. Available online at http://www.gulfshipper.com.

Subdivision carried 2 million tons per year northbound and 4 million tons per year southbound in 2000 and 2001. Between Corpus Christi and Odem the Corpus Christi Subdivision carried 7 and 3 million tons northbound, and carried 4 and 6 million tons southbound in 2000 and 2001, respectively.

Immediately north of the port area, total UP and BNSF traffic over the Brownsville Subdivision between Odem and Bloomington was 12 and 13 million tons northbound and 9 and 10 million tons southbound in 2000 and 2001, respectively, as shown in Table 2. Under their trackage rights agreement with UP, the TM moves 1 to 4.99 MGTM north toward Houston according to 2001 NTAD information. A few miles north of Odem at Sinton, the Brownsville Subdivision intersects with the UP Kosmos Subdivision. Tonnage for this line is shown in Table 3 to be at or less than 1 million tons per year between 1999 and 2001.

The Port of Corpus Christi is looking to improve rail access to existing facilities via the Joe Fulton International Trade Corridor. It is also examining the potential for development of an intermodal container terminal at the La Quinta Trade Gateway Container Terminal. These proposed developments are discussed below.

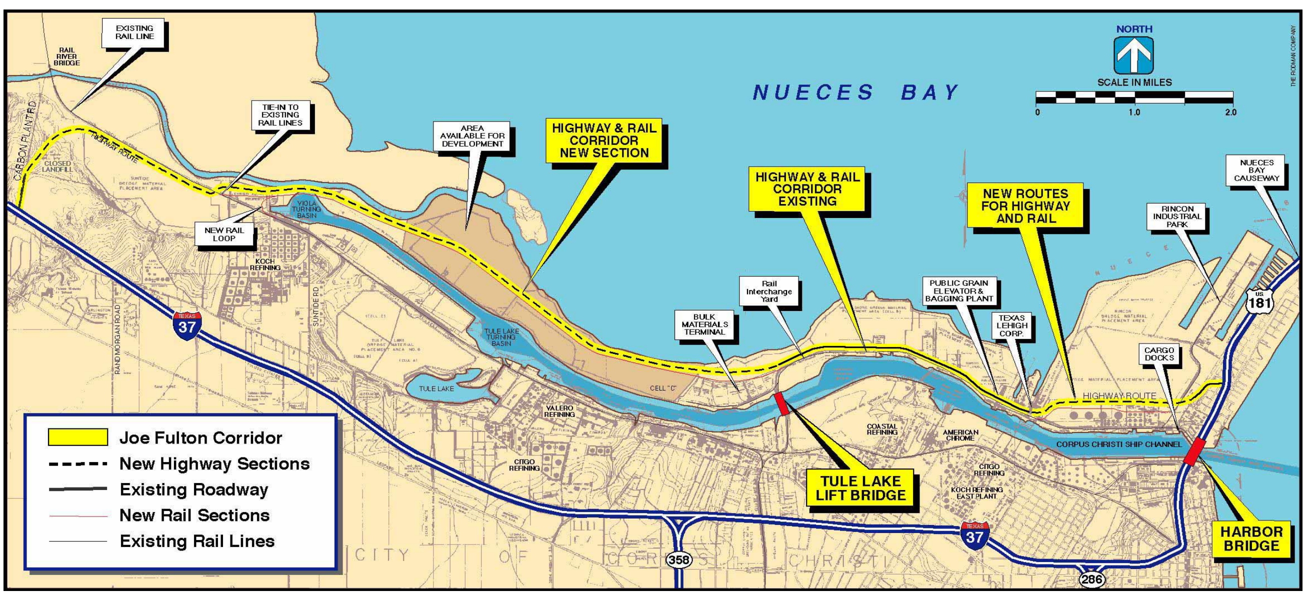
PLANNED AND POTENTIAL RAIL PROJECTS

Joe Fulton International Trade Corridor

The Joe Fulton Trade Corridor is a new road and rail corridor that will allow rail traffic from the northern side of the inner harbor to be moved directly to the west along the harbor and its turning basins for connection to the UP rail system. Currently, all rail traffic originating on the northern side of the inner harbor must be moved by CCTR via the Tule Lake Lift Bridge that crosses the channel approximately four miles inland. CCTR has a small yard just north of the bridge where it stages trains that must be interchanged with UP, BNSF, and TM to the south of the bridge. The lift bridge is an impediment to navigation, as ships must wait to enter or leave the western end of the harbor where the turning basins are located whenever the bridge is lowered for trains and trucks to cross. Figure 15 is a photograph of the Tule Lake Lift Bridge, showing truck crossings. Figure 16 is a map of the proposed Joe Fulton International Trade Corridor.

Source: Texas Transportation Institute

Figure 15: Tule Lake Lift Bridge at Port of Corpus Christi.

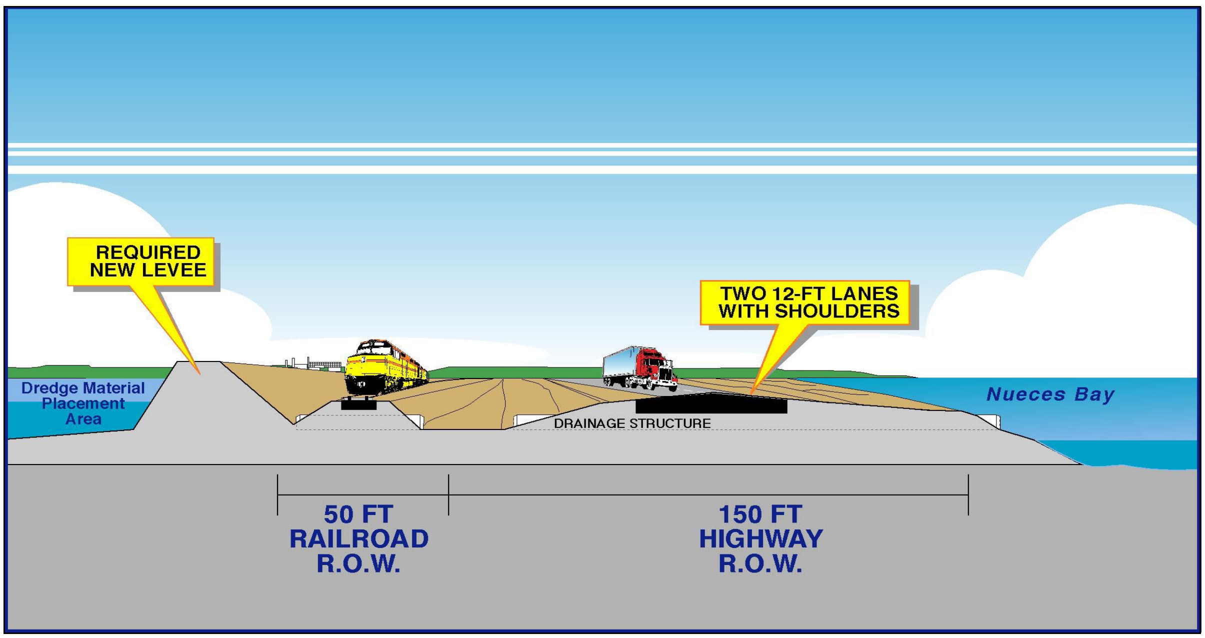


Source: Port of Corpus Christi: Building for the Future. Presentation by Frank Brogan, Director of Engineering Services, POCCA, March 7, 2003.

Figure 16: Map of Joe Fulton International Trade Corridor.

The Joe Fulton International Rail Corridor consists of 11.5 miles of new road and 7 miles of new rail that will improve access to 2,000 acres of land for development as well as connect US -181 and I-37 through the north side of the harbor[32] as shown in Figure 16. Plans also call for construction of a larger rail yard for CCTR on the route as well as new rail connections to the existing UP Corpus Christi Subdivision west of the inner harbor near the UP Viola yard[33].

Forty-two million dollars in funding for the Fulton Corridor has already been approved at the federal level and construction is in the early stages.[34] The transportation corridor will have a cross-section as shown in Figure 17. Construction is expected to begin in 2003 and be completed by 2006.[35]



Source: Port of Corpus Christi: Building for the Future, Presentation by Frank Brogan, Director of Engineering Services, POCCA, March 7, 2003.

Figure 17: Cross-section View of Joe Fulton International Trade Corridor.

La Quinta Trade Gateway Container Terminal

A second major project being undertaken at the Port of Corpus Christi that has the potential to affect rail traffic in the long term is the La Quinta Trade Gateway container terminal. La Quinta is a planned facility that would be built on approximately 1,100 acres of land owned by the port authority on the northern side of Corpus Christi Bay in San Patricio County near Portland.

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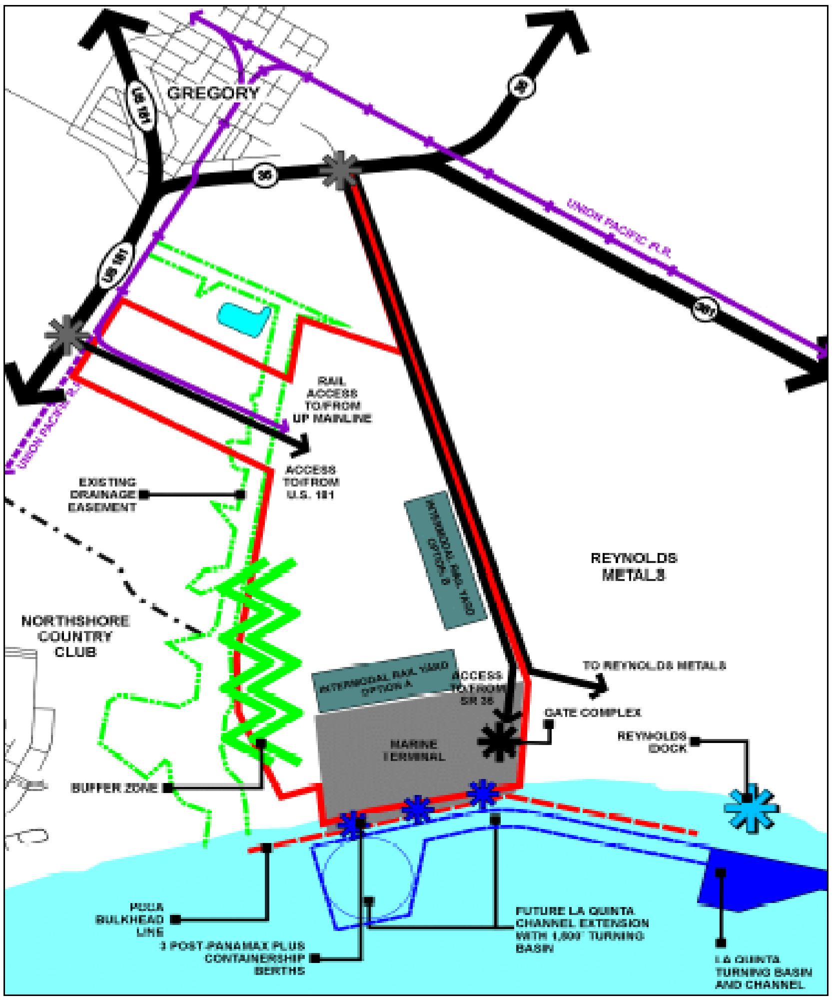
[32] Joe Fulton International Trade Corridor, Port of Corpus Christi Authority Website. Available at http://www.portofcorpuschristi.com/JoeFultnTradeCorr.html, Accessed: October 5, 2001.
[33] Interview with Fred Babin, Manager of Transportation, Port of Corpus Christi Authority, January 8, 2002.
[34] Joe Fulton International Trade Corridor, Port of Corpus Christi Authority Website. Available at http://www.portofcorpuschristi.com/JoeFultnTradeCorr.html, Accessed: October 5, 2001.
[35] Texas Department of Transportation, Joe Fulton International Trade Corridor Newsletter, August 2001. Available at http://www.portofcorpuschristi.com/pdfs/Color-Fulton-Newsletter.pdf, Accessed: November 12, 2001.

Currently, the La Quinta Ship Channel, a northern branch off of the Corpus Christi Ship Channel (as shown in Figure 13), ends just to the south and east of the planned La Quinta Terminal site. Figure 18 shows a preliminary layout of the planned facility that would have approximately 3,800 feet of shoreline—potentially allowing for three containership berths—and development of an inland intermodal rail yard on the facility.[36]

The potential rail access route to the La Quinta Terminal would be via the UP Kosmos Subdivision—through rebuilding a portion of the abandoned rail line in the existing rail right-of-way between Gregory and Portland as shown in Figure 18.



Source: La Quinta Trade Gateway Preliminary Master Plan, Executive Summary, 2001, p. iv.

Figure 18: Preliminary La Quinta Trade Gateway Site Organization Plan.

A market analysis of the projected cargo for the container terminal predicted a very large market for a facility of this type in this area. The consultant team that conducted the study predicted that volume could be over 200,000 TEUs by 2008 and over 400,000 TEUs by 2011 if the terminal

[36] La Quinta Trade Gateway Preliminary Master Plan, Executive Summary. Available online at http://www.portofcorpuschristi.com/pdfs/LaQuintaExecSummary.pdf. Accessed: October 31, 2003.

was constructed in a phased manner between 2000 and 2011.[37] Both the preliminary Master Plan and the recently completed draft Environmental Impact Statement (EIS) for the La Quinta Container Terminal estimate that throughput at the terminal will average about 800,000 TEUs annually at full build-out.[38] Obviously, however, not all of these containers would move by rail.

The draft EIS for La Quinta, released in July 2003, looks at two scenarios regarding rail traffic generated by construction of the container terminal. The first of these assumes that during the early years of operation, the modal split for containers will be 80 percent truck and 20 percent rail, while in future years, if a land-bridge between Corpus Christi and the West Coast container ports of the Port of Los Angeles and the Port of Long Beach were to develop, the split would be 50 percent trucks and 50 percent rail. The modal splits under these scenarios would generate one daily train in each direction and 2 – 3 trains daily in each direction, respectively.[39] These trains would be added to the existing traffic of between 4 – 6 average trains daily that operate over the Kosmos Subdivision.[40] The added train traffic going to and from the container terminal would impact the many at-grade crossings along the line that parallels US 181 between Gregory and Sinton. The draft EIS suggests that scheduling train arrivals and departures to avoid peak highway traffic hours would reduce this impact.[41]

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[37] Kingsley Group, *Market Feasibility Appraisal for a Container Terminal at Corpus Christi, Texas: Final Report*. March 14, 2001.
[38] Shiner, Moseley, and Associates. Draft Environmental Document for the Proposed La Quinta Container Terminal. July 2003, p. 59.
[39] Ibid, p. 60.
[40] Ibid, p. 59.
[41] Ibid, p. 62.

CHAPTER 7: PORT OF BROWNSVILLE

General Port Description

The Port of Brownsville/Brownsville Navigation District is located in Cameron County, the southernmost county in Texas and bordered to the south by the Rio Grande River and Mexico. Port Brownsville is down the Texas Coast from Corpus Christi. The population of Cameron County was 335,227 in Year 2000 and is projected to be 476,992 in Year 2020, according to the U.S. Census Bureau. The Port was constructed in 1936 and is located at the western end of the 17-mile-long Brownsville Ship Channel. The port's facilities are located along a four-mile stretch that includes the Turning Basin and associated approaches. The current channel ranges in widths between 250 and 300 feet (Turning Basin ranges from 500 to 1,200 feet wide) and is authorized to a minimum depth of 42 feet (36 feet in the Turning Basin).[42] The USACE is currently reviewing plans for deepening the Ship Channel to 55 feet deep to accommodate larger vessels, particularly mega container vessels.[43],[44] Figure 19 shows a map of the Brownsville area, including the Port of Brownsville, the ship channel, the City of Brownsville, and connecting roadways.

Port Facilities

The Port of Brownsville's cargo facilities include 10 deepwater dry cargo docks, 8 shedded cargo docks, 4 deepwater liquid cargo docks, 2 liquid cargo barge docks, and 1 dry cargo barge dock, with all dry cargo docks served by railroad.[45] The Port of Brownsville has an extensive rail infrastructure. "The Port of Brownsville has over 33 miles of railroad trackage, with rail sidings serving warehouses, industries and all docks in the port area. General Cargo Docks 10, 11, 12 and 13 have shipside tracks and all general cargo facilities, with the exception of Dock 11, have double depressed tracks at the rear of the transit sheds. Storage and classification tracks are capable of holding 500 cars."[46] Most of the port's facilities, shown on the map of the port's facilities and rail lines (Figure 20), are located on the western end of the Brownsville Ship Channel. The West Yard, shown on the map, has a capacity for around 200 railcars, and is the primary railcar staging location for the port's shortline railroad, the Brownsville and Rio Grande Valley International Railroad (BRG).

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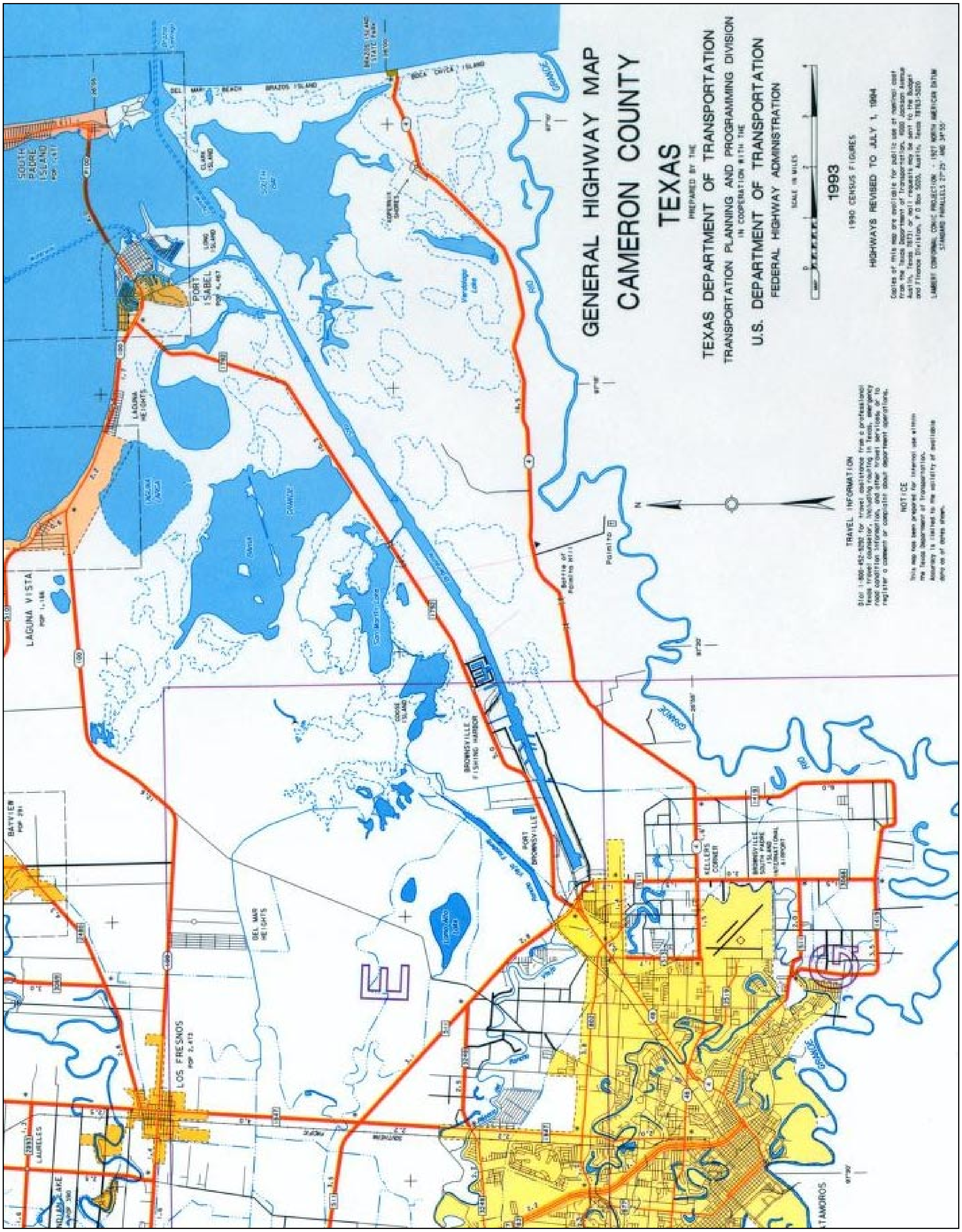
[42] Port of Brownsville website. Available online at http://www.portofbrownsville.com
[43] Hartnett, Dewayne. *Business' Port of Call.* The Brownsville Herald, September 10, 2001.
[44] Mega container vessels refers to the largest class sizes of container ships.
[45] Port of Brownsville website. Available online at http://www.portofbrownsville.com
[46] Brownsville Navigation District. *Directory of Port Facilities and Services.*



Source: Texas Department of Transportation.

Figure 19: Brownsville Area Map.

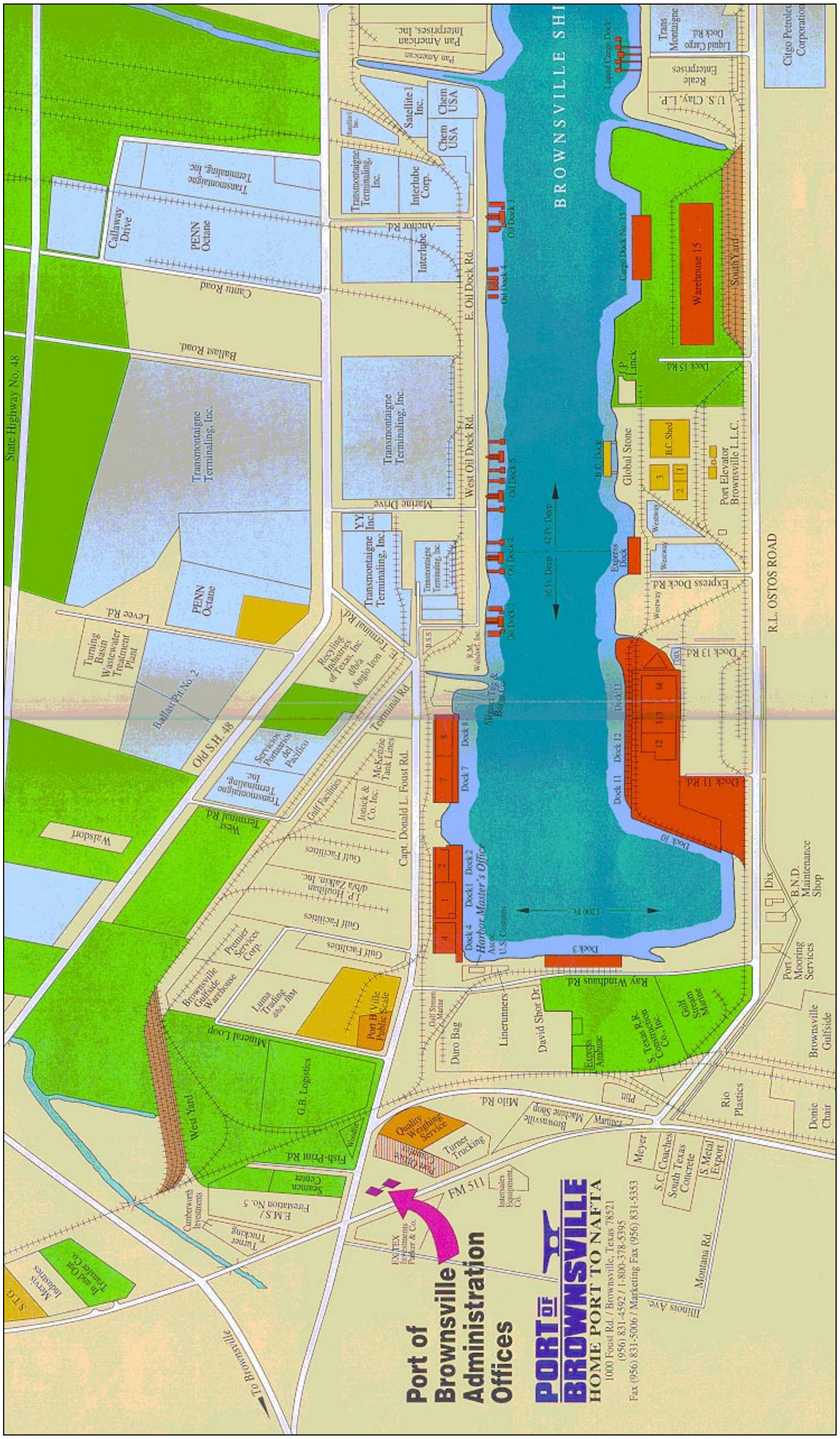


Figure 20: Facility and Rail Map of the Port of Brownsville.

Rail Access

The investigators met with the Port of Brownsville, the Union Pacific Railroad Company, and the Brownsville Rio Grande International Railroad in February 2002 and with Port personnel in October 2002 to discuss rail activity at the port and improvements to the railroad access infrastructures. Railroad access is provided by the UP on the U.S. side, nearly at the southern terminus of the Brownsville Subdivision mainline. The Burlington Northern Santa Fe Railway also has trackage rights over the UP line to serve the port. Connection with Mexico's rail network and the TFM railroad is also provided by both the UP and BNSF over the Brownsville Subdivision.

UP Mainline – Brownsville Subdivision – Mexico Interchange

The Brownsville Subdivison operates under Track Warrant Control from Brownsville to the junction with UP's Corpus Christi Subdivision at Odem. According to UP timetables, between rail yards at Brownsville and the junction with the Corpus Christi Subdivision at Odem (serving the Port of Corpus Christi), there are two additional yards at Harlingen and Kingsville. The speed limit between the Brownsville and Odem yards is 49 miles per hour, with speed reductions to 25 miles per hour at the Robstown Junction with the Tex-Mex Railroad; to 20 and 15 miles per hour at the Driscoll and Bishop (near Kingsville) business tracks, respectively; to 35 miles per hour approaching Raymondville; to 40 miles per hour at the Lyford business track (near Raymondville); and to 35 miles per hour at the Harlingen yard, inhibiting train movements.

There are four train sidings between Harlingen and the Kingsville yard, a distance of over 92 miles, at Sarita (5,168 feet), at Armstrong (7,456 feet), at Norias (4,496 feet), and at Raymondville (5,730 feet). According to the UP timetable, only one of them (at Armstrong) is generally used, as the other three are "equipped with derails and must not be used for meeting or passing trains unless otherwise instructed by the train dispatcher." [47] According to UP personnel, two other sidings are alternately used at Sarita and Norias, rather than Armstrong and Raymondville.[48] Siding length can limit throughput of unit trains, generally considered to be over 10,000 feet long, over this section of the system. Because trains cannot use sidings shorter than their length, rail traffic is restricted over this single-track section during the presence of unit trains on this section of the system. Typical train lengths run over this segment are between 5,000 and 7,000 feet.[49] Railcar weights are limited to 143 tons over this section as well, restricting permissible railcar loadings for heavier grain, ore, or other commodity railcars.

According to UP personnel, the "capacity" of the Brownsville Subdivision line between Brownsville and Odem is, on average, four to six trains daily. However, in early 2002 the line was running seven trains daily (including UP and BNSF traffic) over the segment, and at times approaching 11 trains daily.

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[47] Union Pacific Railroad Houston Area Timetable Schedule, Brownsville Subdivision, p. 43.
[48] Interview with Carlos Colorado, Union Pacific, conducted by study team on February 21, 2002.
[49] Interview with Carlos Colorado, Union Pacific, conducted by study team on February 21, 2002.

Port Branch Lines

A $50 million project to improve the railroad network in Brownsville was completed in June 2003 after three decades of planning, implementation, and construction. The project, called the Brownsville-Matamoros Railroad Relocation Demonstration Project, was conducted in three segments:

- Segment I – Construction of an overpass for State Highway 49 at FM 511, and at the port's lead railroad track, resulting in the elimination of two at-grade highway-railroad crossings.
- Segment II – Connection of the old Southern Pacific rail line and the UP rail line, between US 77/83 and FM 1847 to the north of Brownsville.
- Segment III – Connection of the UP rail line to the port's lead railroad track and switching yard, and construction of overpasses at FM 1847 and FM 511.

Funding for the project was provided by the Federal Railroad-Highway Crossing Demonstration Program and ISTEA Demonstration Project Funding, as well as local private match.[50] The project also added two new rail yards, and diverted traffic out of downtown Brownsville.[51] The new rail yard at Olmito provides the interchange with the branch line to the port, and the Palo Alto Yard (at the old junction of the SP and UP lines between Olmito and the port) now provides additional infrastructure with capacity for 350 railcars[52] on the section. Figure 21 shows the Brownsville area railroad network before completion of the relocation project. Figure 22 is a map showing the completed relocation project (route in teal color), along with planned routes for future projects, as described later in this chapter.

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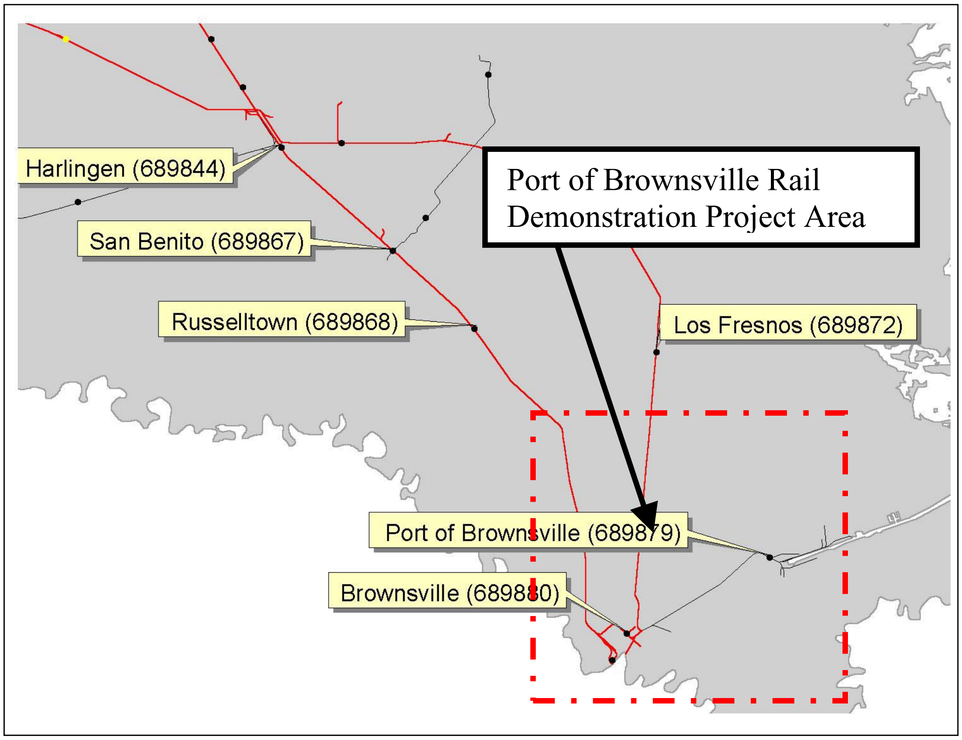
[50] Federal Highway Administration *Brownsville/Matamoros Railroad Relocation Demonstration Project.* Project Summary Description. Available online at http://www.fhwa.dot.gov/freightplanning/lop4.html.

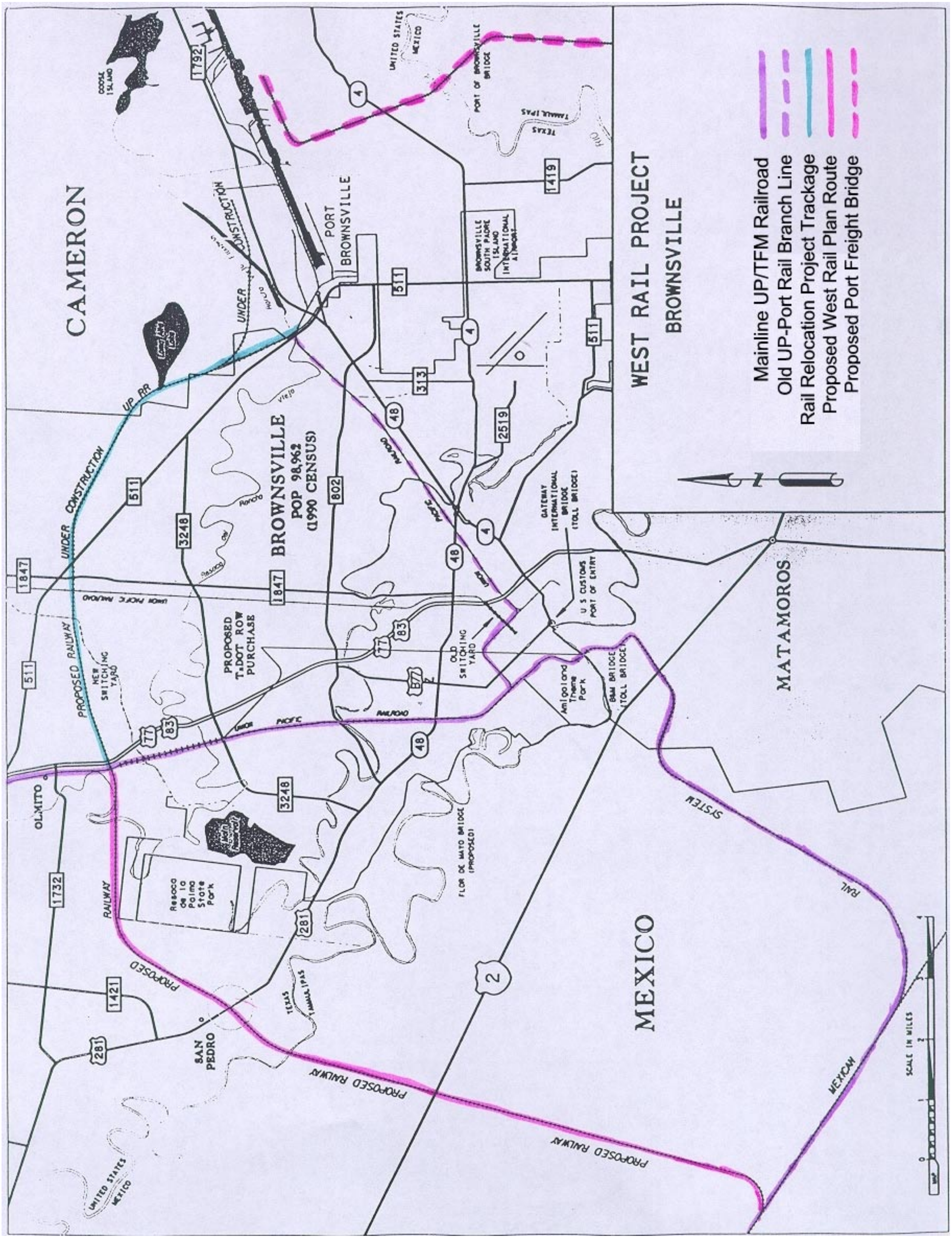
[51] Brownsville-Harlingen-San Benito Market Overview 2003: Infrastructure. Available online at http://recenter.tamu.edu/mreports/BrownHarSanB9.asp.

[52] Interview with Norma Torres, Brownsville and Rio Grande International Railroad, conducted by the study team on February 21, 2002.



Source: Texas Transportation Institute from BTS' 2001 National Transportation Atlas Database.

Figure 21: Pre-Relocation Project Port of Brownsville Rail Connectors.



Source: A West Rail Relocation Plan For Brownsville, Texas, USA and Matamoros, Tamaulipas, Mexico. Colored route identification and key added by Texas Transportation Institute.

Figure 22: Post-Relocation Project Port of Brownsville Rail Connectors.

Commodities and Ranking

According to the U.S. Army Corps of Engineers, the Port of Brownsville handled 4.1 million tons of cargo, including 1.8 million short tons of domestic cargo and 2.3 million tons of foreign cargo in 2001.[53] Table 18 shows USACE Waterborne Commerce data for the Port of Brownsville for 1998 through 2001. Table 19 shows the USACE data aggregated according to FAF commodity categories, and corresponding FAF forecasted average annual percent growth rates through 2010 and 2020 for the WG-Tex counties included in this study.

Table 18: 1998-2001 USACE Waterborne Cargo for Brownsville, Texas.

USACE Commodity Category/Year	Aggregated Tonnage, (Thousand Short Tons)			
	1998	1999	2000	2001
Total All Commodities	**2,797**	**2,492**	**3,268**	**4,100**
Total Coal	0	3	4	0
Total Petroleum and Petroleum Products	1,265	1,075	1,098	1,841
Subtotal Crude Petroleum	0	0	9	5
Subtotal Petroleum Products	1,265	1,075	1,089	1,836
Total Chemicals and Related Products	77	39	69	44
Total Crude Materials, Inedible, Except Fuels	555	337	484	981
Subtotal Forest Products, Wood, and Chips	17	11	7	8
Subtotal Pulp and Waste Paper	7	0	0	0
Subtotal Soil, Sand, Gravel, Rock, and Stone	328	115	199	370
Subtotal Iron Ore and Scrap	24	33	44	357
Subtotal Non-ferrous Ores and Scrap	14	17	68	111
Subtotal Sulphur, Clay, and Salt	33	63	20	29
Subtotal Slag	0	0	0	0
Subtotal Other Non-metal Minerals	131	99	146	107
Total Primary Manufactured Goods	702	890	1,483	1,170
Subtotal Paper Products	0	0	0	0
Subtotal Lime, Cement, and Glass	0	0	4	0
Subtotal Primary Iron and Steel Products	686	736	1,449	1,055
Subtotal Primary Non-ferrous Metal Products	9	154	31	115
Total Food and Farm Products	187	143	109	37
Subtotal Grain and Subtotal Feeds	178	140	108	36
Subtotal Agricultural Products	9	2	1	0
Total All Manufactured Equipment, Machinery, and Products	12	4	11	21
Machinery (not Elec.)	8	1	5	4
Elec Machinery	1	1	1	11
Vehicles, Ships, and Boats	3	1	1	0
Manufactured Wood Products	0	0	0	0
Textiles	0	0	0	3
Rubber	0	0	1	1

Source: USACE Waterborne Commerce Statistics Center.

[53] U.S. Army Corps of Engineers Navigation Data Center. *The U.S. Waterway System Transportation Facts.* December 2002.

Table 19: 1998 USACE Waterborne Freight for Brownsville, Texas by Associated FHWA Freight Analysis Forecast Commodity Category.

USACE Waterborne Freight Traffic by Associated FAF Commodity Category/Year	Aggregated Tonnage, Port of Brownsville (Thousand Short Tons)	FAF Base Case WG-Tex Port Regional Average Annual Forecasted Percent Change, Since 1998	
	1998	2010	2020
Total All Commodities	**2,797**	**2.3**	**1.9**
Chemicals/Allied	77	3.0	2.3
Clay/Concrete/Glass/Stone	361	4.3	3.7
Coal	0	1.9	1.9
Crude Petro/Natural Gas	0	1.9	1.4
Electrical Machinery/Equip Supp	1	8.6	7.2
Farm	178	1.7	1.1
Food/Kindred	9	3.6	4.1
Forest	17	7.1	4.9
Lumber/Wood	0	3.6	3.2
Machinery Excl. Electrical	8	6.3	5.6
Metallic Ores	38	-0.6	0.1
Non-metallic Ores	131	1.3	0.7
Petroleum/Coal	1,265	2.4	2.0
Primary Metal	695	3.5	2.9
Pulp/Paper/Allied	7	2.3	2.3
Rubber/Plastics	0	3.5	3.2
Textile Mill	0	1.3	1.3
Transportation Equipment	3	2.1	1.7

Source: Texas Transportation Institute using USACE Waterborne Commerce Statistics Center and Federal Highways Administration data.

Petroleum/Coal is the largest commodity category by tonnage moving through the Port of Brownsville via the waterway. As shown in Table 18, tonnage throughput at the port for this category ranged from between 1,075 thousand tons in 1999 and 1,836 thousand tons in 2001. The majority of petroleum commodity throughput at the Port of Brownsville includes gasoline, fuel oils, and lubricating oils, and receipts of domestic shipments via the Gulf Intracoastal Waterway to supply the Rio Grande Valley region. The FAF forecasts for Petroleum/Coal commodities are just slightly greater than the regional average at 2.4 percent annual average between 1998 and 2010 and 2.0 percent annually between 1998 and 2020.

Primary Metals, including primary iron and steel products and primary non-ferrous metal products as defined by USACE, is the second-largest FAF commodity category moved through the Port of Brownsville, and the most important commodity group currently moved by rail for the port. As shown in Table 18 tonnage at the port increased from 686 thousand tons in 1998 to over 1,400 thousand tons in 2000 and 1,055 thousand tons in 2001. This makes up between 93 percent and 98 percent of the annual tonnage moved through the WG-Tex Region port waterways from 1998 and 2001. The majority of this tonnage is from foreign inbound shipments. The FAF forecasts for Primary Metals were above national and regional average at 3.5 percent average annual increase between 1998 and 2010 and 2.9 percent average annual increase between 1998 and 2020.

Clay/Concrete/Glass/Stone is the third-largest FAF commodity group moving through the Port of Brownsville, the majority of which is building stone and limestone. As shown in Table 18, tonnage throughput at the port of these materials ranged from between 115 thousand tons in 1999 and 370 thousand tons in 2001. The FAF forecasts for Clay/Concrete/Glass/Stone were well above national and regional averages at 4.3 percent average annual increase between 1998 and 2010 and 3.7 percent average annual increase between 1998 and 2020.

Farm Products, including grain and feeds, is the fourth-largest FAF commodity category moved through the WG-Tex ports, at 1,915 thousand tons or approximately 1.5 percent of total tonnage moved in 1998. However, according to USACE Waterborne Commerce data as shown in Table 18, only 178 thousand tons of this commodity group moved through the Port of Brownsville waterways in 1998, decreasing to 36 thousand tons annually in 2001. Thus, import and export of grain commodities through the port has played a decreasing role in recent years in comparison with other commodities. The FAF forecasts for Farm Products were below national and regional average at 1.7 percent average annual increase between 1998 and 2010 and 1.1 percent average annual increase between 1998 and 2020.

Combined, these four commodity groups account for nearly 90 percent of the waterborne tonnage at the Port of Brownsville.

According to UP tonnage charts, shown in Figures 1 through 4, combined UP and BNSF rail traffic over the Brownsville Subdivision line from Brownsville to Harlingen averaged around 3 – 4 million tons per year northbound the years shown in Table 2. Combined southbound UP and BNSF traffic over the Brownsville Subdivision line from Brownsville to Harlingen ranged between 3.7 and 5 million tons per year in the years shown in Table 2. Approximately 30 percent of the Brownsville interchange traffic is affiliated with the port.[54] Table 20 shows Port of Brownsville-generated rail traffic for years 1998 – 2001, along with projected rail traffic volumes for years 2010, and 2020. Projected rail volumes "Assume 100 percent of B&M Bridge Traffic over 10 years."[55]

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54 Interview with Carlos Colorado, Union Pacific, conducted by study team on February 21, 2002.

55 Port of Brownsville. *Land Bridge Project.*

Table 20: Recent and Projected Port of Brownsville Railcar Volumes.

Year	Number of Railcars
1998	13,325
1999	16,446
2000	20,797
2001	25,981
2010	56,597
2020	106,863

Table 21 shows the number of railcar crossings over the Brownsville-Matamoros International Bridge, by direction.[56]

Table 21: Brownsville-Matamoros International Bridge Rail Crossings.

Year	1998	1999	2000	2001	2002
Northbound Cars	12,134	15,354	12,426	11,255	7,832
Southbound Cars	32,717	31,780	36,074	40,642	50,309
Total	44,851	47,134	48,500	51,897	58,141

According to BRG personnel interviewed in early 2002, approximately 85 percent of port-generated rail traffic was inbound grain and steel going south to Mexico[57]. The grain, brought in seasonally from inland U.S. locations such as Kansas, was shipped to the grain elevators at the port prior to transfer to TFM railcars at the port. The steel products consist primarily of foreign sourced slabs and coils.

Using this percentage, approximately 22,000 southbound railcars were generated by the port in 2001, or over 50 percent of the traffic over the B&M International Bridge in that year. Approximately 18,000 railcars would have been already southbound on the UP line prior to the addition of port-generated traffic, based on information presented in Table 21. Assuming the balance of the port's rail traffic (approximately 3,900 railcars) was northbound, a total of approximately 14,700 railcars were northbound from the Brownsville area in 2001. Railcar weight restrictions over this segment are 143 tons and the 10-year average railcar weight for this segment shown in Table 3 is 68.6 tons (75.8 tons in 1998). Assuming an average railcar weight of 75.8 tons, at a volume of 13,325 railcars generated by Port of Brownsville traffic in 1998, approximately 1 million port railcar tons were moved in that year. This is approximately one-third of the total tonnage moved through the Port of Brownsville in that year, indicating the importance of this transport mode to the port and WG-Tex regional trade.

[56] Texas A&M University Real Estate Center. *Brownsville-Harlingen-San Benito Market Overview 2003: Infrastructure.* Available online at: http://recenter.tamu.edu/mreports/BrownHarSanB9.asp.

[57] Interview with Norma Torres, Brownsville and Rio Grande International Railroad, conducted by the study team on February 21, 2002.

PLANNED AND POTENTIAL RAIL PROJECTS

West Rail Relocation Project

While the aforementioned Brownsville-Matamoros Railroad Relocation Demonstration Project was just recently completed, there are future plans to continue rail improvement projects in the Brownsville area. The West Rail Relocation Plan would reroute rail traffic from the existing southerly route between the Olmito yard (the new junction for the UP mainline and the branch line to the port) and the current B&M International Bridge. The new rail route would "begin at the UP's junction with the route to the Port of Brownsville and south of Olmito and then continue westward to the San Pedro community and continue across the Rio Grande, 20 river miles upstream from the existing B&M rail bridge, for its connection into the TFM route to Monterrey, Mexico."[58] A map of the proposed relocation is shown in Figure 23.

Proponents of the $39 million West Rail Relocation Plan cite the following benefits[59]:

- Removal of the rail system from the residential and downtown areas of Brownsville and Matamoros.
- Elimination of 17 existing at-grade street-rail crossings in Brownsville over which 100,000 vehicles cross daily and six major crossings in Matamoros.
- Elimination of rail and rail switching operations in downtown Matamoros.
- Reduction of rail freight travel time from the Brownsville UP switching yard to Monterrey, Mexico by 2.5 hours.
- Elimination of the current three hours of time restrictions for trains to cross the international bridge during the AM and PM peaks in Matamoros due to heavy traffic conditions.
- Improvement of safety and reduction of congestion and traffic-rail delays.
- Creation of new vehicle transportation corridor, a "west loop" for the two communities.
- Improved emergency access to west Brownsville.

Freight-Only Bridge at Port of Brownsville

The port also has developed preliminary plans for the construction of a new rail/truck bridge between the southern part of port properties and to the eastern side of Matamoros, also shown in the Map in Figure 22. The bridge would be capable of handling overweight trucks, currently a limitation for northbound truck traffic from Mexico, requiring a special permit for direct transport over the existing B&M International Bridge to the port and averaging over 30,000 trucks annually between 1998 and 2001.[60] Connection with the bridge would also require development of highway and rail connectors on the Mexico side between the port and the eastern part of Matamoros, a limitation cited by critics of the project. Initial estimates for the cost of this bridge are between $50 and $60 million.[61]

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[58] A West Rail Relocation Plan For Brownsville, Texas, USA and Matamoros, Tamaulipas, Mexico.
[59] A West Rail Relocation Plan For Brownsville, Texas, USA and Matamoros, Tamaulipas, Mexico.
[60] Port of Brownsville. *Land Bridge Project*.
[61] Hartnett, Dewayne. *Brownsville Port of Call*. The Brownsville Herald, September 10, 2001.

Both the West Rail Relocation Project and a rail/truck bridge from port properties would enhance the port's goal of increasing its existing business by improving steel transport capabilities between the port and manufacturing locations in Mexico. Return traffic could also be provided for Mexican mines and two steel mills in Manzanillo and Monterrey that use 100 percent rail for transport.[62] The projects would also assist the port in diversifying its economic base and developing a container terminal near the entrance of the Brownsville Shipping Channel. This project would provide the ability to move products from East Asia, particularly China, by land bridge between the Mexican Pacific port of Lazaro Cardenas through Mexico to Brownsville, where it could be moved by container-on-barge to inland U.S. locations, or transport to megacontainer ships for routing to the eastern U.S. or European markets.

Port personnel believe that this land-bridge would offer an alternative to existing land-bridges between the U.S. West Coast and the U.S. Gulf or East Coasts. They estimate cost savings of several hundred dollars per container and several days on the overall trip. Brownsville offers advantages over Mexican Gulf Coast ports of lower congestion, deeper drafts, and no overhead rail restrictions over the land-bridge route.[63]

BRG personnel estimate that new container business would increase rail traffic to the port by greater than 50,000 cars per year. The port and BRG believe that acquisition of the Palo Alto Yard from the UP would enhance its operating capabilities for such traffic (it is currently leased). Within port properties, rail infrastructure would have to be extended from the port east to the mouth of the ship channel, and three additional tracks in parallel to the branch lines serving the port would also be needed. Other improvements include the need to reduce the degree of curvature for four curves on trackage serving the south side of the port (where most of the existing traffic is generated) and increase the weight of certain rail sections at the port from 90 lb. rail to 112 lb. rail or greater.

[62] Interview with German Rico, Port of Brownsville, conducted by the study team on February 21, 2002.
[63] Interview with German Rico, Port of Brownsville, conducted by the study team on February 21, 2002.

CHAPTER 8: REGIONAL RAIL IMPLICATIONS AND NEEDS

INTRODUCTION

This report identifies deficiencies in the rail infrastructure serving ports in the WG-Tex region so that measures may be taken to address them as necessary. Just as the highway freight/intermodal connectors were identified as the "weak link" in the highway freight transportation chain, the branch lines that connect the port's rail facilities with the mainline rail systems are also the "weak link" that will determine the future role of rail transportation at these ports and the modal split that rail can expect to achieve at each port. In addition, mainline components connect with other parts of the national rail network and allow for further cargo distribution to the hinterlands.

The types of commodities currently traded at the study ports are conducive to increased movement by rail, if the infrastructure can be improved to accommodate and encourage such movement. The growth in container movement that cannot be handled adequately by the existing and planned facilities along the Houston Ship Channel and the Galveston Bay ports, means that these south Texas ports may also need upgraded rail capacity to serve container trains. The funding to accomplish such dramatic rail improvements at the pace necessary to expand rail usage may be beyond the ability of the private sector rail companies to add at a rate that meets demand for new service. This brings in the possibility that public financing assistance for rail infrastructure or public-private partnerships between the ports and/or other public entities and the rail companies serving the ports may be necessary to prevent overwhelming traffic congestion on the public highways serving the port areas.

This chapter discusses anticipated needs for improved rail access for the WG-Tex ports based upon the projected freight transportation demand outlined in earlier chapters. While attempting to state with certainty the pace at which rail needs will grow at these ports is extremely difficult, there are certain rail needs that have been identified for which solutions must be sought. The main focus of this project has been on the connectors; however, three areas of rail needs in the South Texas area have been identified—mainline limitations, connector needs, and other rail improvements. Each of these areas has needs that should be addressed to increase the ability to move freight by rail in south Texas.

MAINLINE LIMITATIONS

As stated in the previous chapters on each port, The WG-Tex seaports' mainline rail needs are served, in the north-south direction, by the UP mainline (Brownsville and Angleton Subdivisions) that roughly parallels the Texas coastline below Galveston Bay. Spur lines near each of the study ports connect the mainline to the ports and, in some cases, to inland transportation hubs such as San Antonio or to the larger rail complex surrounding Houston. BNSF has trackage rights for the entire length of the UP mainline from Houston to Brownsville and TM has trackage rights for the UP mainline between Robstown where its own line intersects the Brownsville Subdivision into the Houston area.

The 1979 Texas State Rail Plan shows both Missouri Pacific (MP) Railroad and Southern Pacific Transportation Company (SP) having mainlines serving the south Texas coastal area and the Rio Grande Valley. By the time of the UP-SP merger in 1996, the SP mainline and several other SP rail lines in south Texas had been abandoned—leaving the UP (former MP) mainline as the only major rail line serving the area.

The federal Surface Transportation Board (STB) rulings granting BNSF and TM trackage rights over segments of this mainline have preserved multiple carrier options to many shippers along the line, but have left maintenance and track ownership in UP's hands. Because UP maintains the line and the other railroad companies pay fees in proportion to their usage, many of the competitive forces that would have previously encouraged UP to make large investments in improving the Angleton and Brownsville Subdivisions are gone.

Since UP is legally required to share its line in this area with its competitors, UP corporate leadership is disinclined to add upgraded facilities, at their own expense, that will be to another railroad's advantage. The maintenance fees that are paid by these companies under trackage rights agreements do not cover the costs of upgraded infrastructure—just the costs of maintaining existing facilities (and UP would probably protest that the fees that they are allowed to charge do not meet the full maintenance costs). This condition leads to a situation where UP must make an internal business decision over whether to spend its limited capital to add infrastructure on a line where it must compete with its rivals for business or to spend its capital adding infrastructure where it does not have to allow its competition to use the improvements for which it is paying.

A second factor affecting the capacity of this mainline is the increased track maintenance needs resulting from increased industrial production and NAFTA trade going to and from northeastern Mexico. The improvements brought about by the privatization of the Mexican rail system and the growth of Monterrey as an industrial center will lead to more freight traffic moves north and south to service its needs. Currently the majority of rail traffic from both central Mexico and the Monterrey area enter the U.S. through the Laredo gateway on TFM, however, as facilities there become more capacity constrained, TFM could shift more of its rail traffic to the Matamoros/ Brownsville area. This added traffic would further strain the UP mainline there by adding more daily trains in the south Texas area.

As stated earlier in this report, each of the study ports has preserved right of way or developed specific plans that call for increased rail usage in the future. The Port of Brownsville has a plan in place to develop a rail-based land-bridge between the Mexican Pacific Port of Lazaro Cardenas in southwestern Mexico and the Port of Brownsville. The Port of Corpus Christi has long-term plans to develop a land-bridge from the Ports of Los Angeles and Long Beach and its planned La Quinta container terminal in San Patricio County. The Port of Port Lavaca-Point Comfort has preserved rail right of way for use if container-on-barge traffic develops to a point that warrants its use. Port Freeport has plans to develop some of its inland property into rail-served industrial sites and increase its handling of containers as Houston's capacity to do so is reached. All of these projects would add traffic to the UP mainline in south Texas or add congestion to it as the number of crossing trains at intersections with the connector lines increases.

Another limiting factor on the UP mainline is the length of the sidings along the Brownsville and Angleton Subdivisions. In general, train capacity can most easily be added by increasing the length of the train; however, the siding lengths along these subdivisions limit the number of trains that can use the mainline simultaneously. Railroad companies prefer to operate long unit trains between 9,000 and 10,000 feet in length when possible because doing so reduces the number of locomotives and crews needed when compared to operating two or more shorter trains. On the Brownsville Subdivision, there is only one siding that has a length greater than 10,000 feet, located in Sinton. This effectively limits train lengths between Brownsville and Corpus Christi to operations of either one longer train at a time in either direction or two opposing trains operating in this area if the second one is limited in length to 7,400 feet or less to enable use of the siding at Armstrong. Similarly, the Angleton Subdivision has only one siding with a length greater than 10,000 feet, located just south of Algoa. This limits the length for any opposing second train operating between Freeport and Bloomington to the siding average length of between 7,500 and 8,300 feet.

Train dispatchers have developed operational means of maximizing usage of the track in this area in order to increase its capacity to the level at which it operates today; however, the addition of even a portion of the expected traffic outlined in this study has the potential to upset this balance. Additional trains operating over short segments of the line can have effects that cascade throughout the south Texas system. For example, the one to three trains per day that are expected in each direction at the Port of Corpus Christi's La Quinta container terminal will not only add trains to the Kosmos Subdivision, but will also necessitate that more trains operate on the mainline section between the intersection of the Kosmos Subdivision and the intersection with the Corpus Christi Subdivision at Odem where the train could head inland toward San Antonio.

Even though this is a relatively short segment of track, the effects are felt outside this segment because of the single-track nature of the system. To accommodate the container train, a unit train may have to be held in the siding at Sinton until the container train completes its transit. Likewise, other trains needing to use the mainline may have to wait south of Odem or in the Viola Yard area (from either the existing CCTR lines or the new Joe Fulton International Corridor line) while this train completes its movement on the mainline. Many of these conflicts may be avoided by use of careful scheduling on behalf of the dispatchers, but add in the fact that two additional railroad companies are operating their trains over this segment, and the difficulty in managing such additional trains over the present infrastructure becomes apparent. Existing sidings will need to be lengthened, new sidings added, or segments will need to be double-tracked as traffic levels grow to give dispatchers the flexibility needed to efficiently manage movement. As stated earlier in this section, much of the incentive for UP to unilaterally invest in such improvements to the line as long as its competitors also operate over it is gone since there is not a separate competing rail line. Only dramatic degradation in their own service due to traffic conflicts, resulting in lost business opportunities, would oblige them to do so.

RAIL CONNECTOR NEEDS

As international trade grows, the rail connectors between the UP mainline and the ports examined in this study will require improvements. The pace at which these improvements will be made will be driven by several factors. The growth in international trade, largely carried out using shipboard containers, entering the WG-Tex area is expected to exceed the capacity of the Galveston Bay port facilities necessitating movement of containers through one or more of the study ports. Secondarily, the bulk and commodity cargoes handled by the study ports are expected to remain steady or grow in magnitude. This will put a strain on the existing rail lines that connect the ports and the national rail system. Since each Texas port operates independently, as a niche port, rather than the state having a stronger planning role like some other nearby states, these and other Texas ports will have to work with the private rail companies to perform connector line upgrades as new rail traffic develops.

Public sector rail involvement in funding rail upgrades has also been limited in the past; however, recent changes in Texas law allow the state department of transportation to purchase or improve rail facilities if such actions can be shown to reduce congestion. Since traffic that cannot be moved by rail must move by truck from the ports, port rail and other intermodal connectors could be a focus of such spending in the future. The single change with the largest potential to affect the connector lines is the development of container facilities at the study ports. Container facility development at the WG-Tex ports would necessitate detailed studies for each of the connector lines and the mainline; however, certain impacts to the connectors can be anticipated.

Port Freeport

According to the UP Timetables, track on the Freeport Industrial Lead is maintained to FRA Class 1 or Class 2 standards allowing trains to operate between speeds of 10 and 20 miles per hour, with a railcar weight limit of 143 tons. The limiting factor for future rail development at the port is the swing bridge and the track between it and the port's public facilities. The swing bridge and rail infrastructure to the port is not often used at this time, resulting in deferred maintenance and degradation over time. Any future development of train traffic to and from the port area would be expected to necessitate replacement of the swing bridge and substantial upgrade of the track serving the port due to the speed restrictions on the current infrastructure.

Port Freeport's development of its inland greenfield land holdings may also necessitate additional rail improvements. The new berths being added at the port in the next five years portend additional need for rail service to and from the port. As stated in Chapter 4, the construction of a new rail spur that connects the port to BNSF or UP mainlines in Bay City is being considered as an alternative to reconstructing the facilities along the Freeport Industrial Lead. Additional trains operating on either of these lines would add to the number of trains seeking access to the Angleton Subdivision and additional storage tracks/sidings would need to be added along the northern part of the Freeport Industrial Lead or near Bay City as traffic grows. New rail traffic would also impact at-grade crossings in the area or require construction of grade-separated bridges.

Port of Port Lavaca-Point Comfort

Due to its focus on liquid bulk traffic, the growth in rail traffic from the Port of Port Lavaca-Point Comfort will probably be the least likely to grow dramatically. The extension of the rail line to its multi-purpose dock for movement of container on barge traffic could require that further rail improvements be made along the PCN line between the port and Lolita. This track is maintained at FRA Class 2 standards allowing a top speed of 20 miles per hour. This speed should be sufficient for the anticipated growth in rail traffic at this time. If container movement were to exceed expectations along this line, increased maintenance to maintain Class 2 status or improve speed may be necessitated.

It is also likely that some yard capacity would need to be added in the Lolita area near the PCN maintenance shop to allow for longer trains and for PCN to exchange crews/cars with UP. PCN's current trackage rights allow them to move over UP tracks, but this is almost exclusively limited to movement of Alcoa loads. Containers would likely be interchanged with UP at Lolita or an overhead agreement would be reached that would allow UP trains to service the port over the PCN line; however, the small numbers of containers projected to move by rail from the port most likely would not reach a level that interested UP in providing direct service.

Port of Corpus Christi

As the second busiest port area in Texas, the need for efficient port-rail connections in the Corpus Christi area is great. Currently, the port is served by three railroads (UP, BNSF, and TM) plus its own switching and terminal railroad (CCTR). Rail capacity to and from the port will be aided by the construction of the Joe Fulton International Trade Corridor road and rail facility to the northern side of the inner harbor. This construction allows for removal of the Tule Lake Lift Bridge that would improve ship operations to and from the western end of the inner harbor. These improvements should aid in moving traffic by rail between the port and the Brownsville Subdivision; however, increased traffic along the Corpus Christi Subdivision to Odem, combined with the rail traffic from the planned development of the La Quinta Container Terminal on the northern side of Corpus Christi Bay, will necessitate that more train storage be in place along the Corpus Christi Subdivision south of Odem. A new, larger rail yard is planned near the western end of the Fulton Corridor to address this need.

The container traffic to and from La Quinta may necessitate improvements along the Kosmos Subdivision to accommodate more daily trains. These trains will affect vehicular traffic at the several at-grade crossings along US 181 located in Gregory, Taft, and Sinton. The La Quinta Environmental Impact Statement states that such movements can be scheduled to minimize these conflicts; however, as these cities and their traffic grow, additional grade crossing protection devices or grade separations may become necessary. Yard improvements at Sinton may also become necessary to hold trains waiting for access to the Brownsville Subdivision when conflicting traffic is approaching from an opposing direction, either north or south.

Port of Brownsville

While the Port of Brownsville has recently completed a 30-year-long process to relocate the main rail route from downtown Brownsville, there remain many potential rail improvements that could facilitate rail movement to and from the port. The relocation shifted rail traffic to the north and east of the city allowing for interchange between BRG and UP at UP's Olmito yard near San Benito. Projections by BRG of railcar numbers at the port show that the number is expected to double by 2010 and double again by 2020. These numbers may be affected by economic conditions such as the steel tariffs that have been put in place; however, this growth will further burden an already taxed rail infrastructure between the port and the Brownsville and Matamoros (B&M) bridge via the Brownsville Subdivision.

Should trade between Monterrey and/or central Mexico and the U.S. grow as expected, additional yard capacity would be needed along the connectors in the Brownsville and Harlingen areas. While the Brownsville-Matamoros Railroad Relocation Demonstration Project will aid in reducing congestion and conflicts in downtown Brownsville, other rail improvements such as the West Rail Relocation Plan must be considered. This new rail route to Mexico necessitates construction of a new bridge 20 miles up the Rio Grande from the B&M bridge. The reduction in at-grade crossings and conflicts in Brownsville, as well as the reduction in transit time between Monterrey and Olmito Yard of 2.5 hours and the elimination of traffic windows in Matamoros could increase the efficiency of international rail movements along this route.

The port's long-range plans have also called for construction of a new rail/truck "freight-only" bridge located on port property and eastern Matamoros. Such a bridge could reduce the distance that rail traffic headed for the port had to travel by avoiding the bypass via Olmito and could also deal with the problem of overweight trucks between the B&M Bridge and the port. This bridge would require rather extensive development of highway and rail connectors on the Mexican side of the border from the current crossing to the area adjacent to the port. The costs of this bridge are estimated to be between $50 and $60 million.[64] It is unlikely that either TFM or UP would be able to contribute substantially to such a project, despite the positive impacts that it would have on rail movement by enhancing the ability of the port to develop land-bridge opportunities through Mexico.

The Port of Brownsville's planned container facility would also require BRG to extend its lines from the existing port facilities eastward to the mouth of the ship channel. BRG's estimates of new container business would increase rail traffic to the port by greater than 50,000 cars per year. Accordingly, the port and BRG believe that acquisition of the Palo Alto Yard from UP enhances its operating capabilities for staging such traffic (it is currently leased from UP). BRG also stated that additional parallel tracks to the branch lines serving the port would also be needed as would reductions in the degree of curvature for four curves on trackage serving the south side of the port (where most of the existing traffic is generated) and an increase in track weights of certain rail sections at the port from 90 lb. rail to 112 lb. rail.

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[64] Hartnett, Dewayne. *Brownsville Port of Call.* The Brownsville Herald, September 10, 2001.

OTHER RAIL IMPROVEMENTS

In addition to facility improvements along the mainline and to the connectors, several other rail needs must be addressed in this area. These include:

- **Rail capacity/infrastructure needs on port property:** In addition to the improvements "outside the gate," ports will need to add facilities that make rail service more accessible. These include on-dock or near-dock rail service, loop tracks, additional sidings, and additional rail-car storage areas.

- **Grade crossing studies:** If rail traffic increases at the projected rate and the population continues to grow as it has, many at-grade crossings in the WG-Tex area will need to be evaluated and consideration given to improving crossing protection devices or constructing grade-separated rail facilities.

- **Storage facilities for railcars and empty containers:** As rail movement grows, the need for public (i.e. port-owned) or private railcar storage facilities in the WG-Tex area will also grow. Container movement at ports has also historically tended to result in accumulations of empty containers that must be stored either on the port or at off-site facilities.

- **Development of inland intermodal facilities:** As rail traffic in the WG-Tex area grows, connections to other rail and intermodal facilities will be vital. Inland sorting and classification facilities may be developed near the port areas to free up dockside space or specialized intermodal facilities may be constructed along the Trans Texas Corridor routes. In either case, the ports must be connected to such systems.

- **Military surge capacity:** Ports that are designated as a DoD strategic port require adequate rail capacity and loading equipment to allow for deployments of equipment and personnel from military bases and other installations. In Texas, the Port of Corpus Christi and the Port of Beaumont are designated as DoD strategic ports, and will have to work with the private rail companies to ensure that improvements are in place that accommodate both new commercial traffic and military deployment requirements.

CHAPTER 9: CONCLUSIONS

TRADE GROWTH

Projected trade growth in the WG-Tex area is expected to increase the need for rail infrastructure. Commodities groups currently moved by rail or for which the ports are making plans to add provide opportunities for rail companies to generate additional business at each of the ports. The Port of Port Lavaca-Point Comfort will probably experience the least growth in rail service due to its specialization in liquid bulk products, but each of the other ports in this study have plans to expand container service, which has historically been linked to more frequent use of the rail mode. The additional freight moving into and out of the WG-Tex area ports will necessitate that improvements and additions be made to the rail infrastructure of south Texas.

Detailed planning for trade growth has begun at the ports and to a certain degree at the port railroads. However, the same cannot generally be said for the Class I and II railroad companies (UP, BNSF, and TM) which link the study ports to the national rail system, or for public sector transportation planners, even though growing trade movements through the ports have the potential to worsen congestion and air quality issues in and around the port areas. Planning to address the expected trade growth must take place in order to prevent future transportation problems from becoming more acute as this trade comes to fruition. Balancing private and public investments to meet demand is vital.

RAIL INFRASTRUCTURE NEEDS

Rail infrastructure projects are necessary in the WG-Tex region in order to meet the expected demand for freight transportation in the coming decades. These improvements include lengthening of sidings on the UP mainline (Brownsville and Angleton Subdivisions), improving track classification of the connector routes to several port facilities, replacing or upgrading bridges, as well as enhancements to grade crossing warning devices and signalization systems. The magnitude and speed at which these improvements must be made depends upon the continued health of the U.S. and world economies, the ability of the individual ports to implement their plans, and the availability of funding, both public and private, to construct and encourage rail options in south Texas.

PUBLIC SECTOR IMPACTS

The public sector must become more active in wide-range planning efforts to meet the rail transportation needs of the study ports in the future. Moving goods by rail to and from ports should be considered in the public interest due to its benefits related to reduced congestion, reduced pollution, increased fuel efficiency, and savings in roadway maintenance costs. The complexity and nature of the improvements needed requires that the private railroad companies be involved in carrying out infrastructure plans that will add to or enhance existing facilities; however, due to the scale of the projects described and identified in this report, the public sector may need to facilitate such improvements by investing state and federal funds to accelerate the pace at which they can be made.

Coordinated planning at the local metropolitan planning organization (MPO) and state levels will be necessary to ensure that the ports and the railroads have projects included in public sector plans such as the MPO Transportation Improvement Plan (TIP) and the statewide TIP (STIP) so that these plans can qualify for public funding. Other public sector funding programs such as the federal Congestion Mitigation and Air Quality (CMAQ) funds for non-attainment areas and federal loans through the Rail Rehabilitation and Improvement Financing (RRIF) program should be explored. The formation of public-private partnerships among the ports, the state department of transportation, and the railroad companies to complete rail infrastructure projects in this area are another possibility allowed by recent legislation passed in Texas.