

USDOT MARITIME ADMINISTRATION

PORT INFRASTRUCTURE DEVELOPMENT PROGRAM
2022 GRANT APPLICATION

PORT OF DAVISVILLE
QUONSET BUSINESS PARK

RECONSTRUCTING THE NORTH BERTH AT PIER 1

QUONSET
DEVELOPMENT CORPORATION

Port of Davisville, Rhode Island, in the Quonset Business Park

INTRODUCTORY INFORMATION

Name of applicant:	Quonset Development Corporation
Is the applicant applying as a lead applicant with any private entity partners or joint applicants?	No
What is the project name?	Reconstruction of the North Berth at Pier 1
Project description:	This project will fund the reconstruction of the active north berth on Pier 1 at the Port of Davisville.
Is this a planning project?	No
Is this a project at a coastal, Great Lakes, or inland river port?	Coastal
GIS Coordinates (in Latitude and Longitude format):	41.61328728836372, -71.40679401881289
Is this project in an urban or rural area?	Urban Area
Project Zip Code:	02852
Is the project located in a Historically Disadvantaged Community or a Community Development Zone? (A CDZ is a Choice Neighborhood, Empowerment Zone, Opportunity Zone, or Promise Zone.)	No
Has the same project been previously submitted for PIDP funding?	PIDP FY 2019 as part of a larger project; PIDP FY 2021 with a larger scope
Is the applicant applying for other discretionary grant programs in 2022 for the same work or related scopes of work?	No

Has the applicant previously received TIGER, BUILD, RAISE, FASTLANE, INFRA or PIDP funding?	TIGER FFY 2009; PIDP FFY 2020
PIDP Grant Amount Requested:	$11.25 million
Total Future Eligible Project Costs:	$22.2 million
Total Project Cost:	$22.2 million
Total Federal Funding:	$13.2 million
Total Non-Federal Funding:	$9.0 million
Will RRIF or TIFIA funds be used as part of the project financing?	No

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I. PROJECT DESCRIPTION

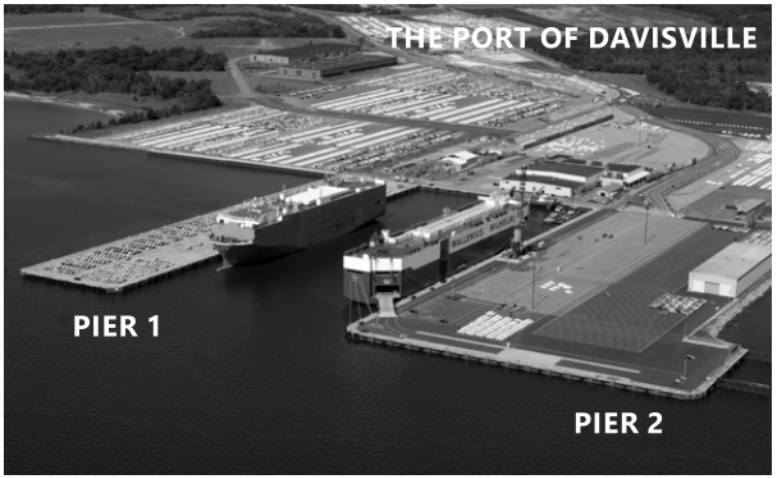
I.A. SUMMARY

Reconstruction of the North Berth at Pier 1 is a project to increase the resilience of the marine supply chain by securing the continued, long-term use of a heavily used, active cargo berth at the Port of Davisville in North Kingstown, Rhode Island. Built by the Navy in 1943, the over 78-year old Pier 1 is well past its original design life and is in need of a major reconstruction to continue supporting the high volume of international cargo that is transferred through the Port each year. Without Port Infrastructure Development Program funding, the North Berth at Pier 1 will likely be forced out of use within the next five to ten years. **Reconstruction of the North Berth at Pier 1** is considered a small project at a small port under 46 U.S.C. 54301(b).

The Port of Davisville is a two-pier facility (see ***Photo 1***) located within the highly developed and successful Quonset Business Park, which hosts more than 200 companies and nearly 13,000 employees. The Port of Davisville is a vital component of Rhode Island's continued economic success. In 2019, the Port of Davisville accounted for approximately $375 million in business output within the State of Rhode Island, supporting over 1,650 jobs and over $97 million in household earnings. The Port of Davisville is within the top ten ports in North America for import of finished automobiles, and prior to the COVID-19 pandemic and the microchip shortage, continually exceeded previous year actuals relative to finished automobile import. In 2019, the Port of Davisville's two active berths processed over 296,000 finished vehicles, and over 177,000 of those vehicles passed through the North Berth at Pier 1.

In addition to finished automobiles, the items that are moved into and out of the Port and Business Park include submarine hull cylinders and components for the U.S. defense industry, propane, lumber, food products, product packaging, 3D printed objects, wind turbine components, and much more. The Quonset Business Park and the Port of Davisville are positioned to play a major role in the region's continued economic and job growth, and in the region's pandemic recovery, while providing opportunities to expand the national economy and global trade activities.

Photo 1: Aerial view of the Port of Davisville



QDC is requesting $11.25 million in funding from USDOT's Maritime Administration Port Infrastructure Development Program, to be matched with $9.0 million in funding from QDC and $1.95 million in State Fiscal Recovery Funds, for the **Reconstruction of the North Berth at Pier 1**. The total cost of the Project is $22.2 million and it has a **Benefit Cost Ratio of 1.74.**

I.B. THE PORT OF DAVISVILLE

The Port of Davisville, Rhode Island's only publicly-owned port, facilitates the waterborne movement of goods with two primary assets – Pier 1

and Pier 2. The Quonset Business Park (the Park) and the Port of Davisville (the Port) are operated by the Quonset Development Corporation (QDC), a quasi-state agency responsible for the development and management of the Park and the Port.

Constructed by the Navy in 1943, Pier 1 is a 1200-ft long by 250-ft wide concrete deck pier supported by over 9,000 timber piles. Pier 1 currently has one active berth, located on the north face (the North Berth at Pier 1). The north berth of Pier 1 has a dredge depth of -32 MLLW, which has been maintained to accommodate service vessels in the pure car carrier (PCC) class (see ***Photo 2***).

Photo 2: Pure Car Carrier (PCC) Class (image courtesy of nyk.com)



Also constructed by the Navy, the over 65-year old Pier 2 is an approximately 16-acre land mass pier. Pier 2 has two berths, one located on the south face (the South Berth at Pier 2) and one on the east face (the East Berth at Pier 2). Construction of the East Berth at Pier 2 was completed in 2020 (bringing the number of active berths from 2 to 3), and the South Berth at Pier 2 is currently undergoing a reconstruction and modernization project, which will be completed in Summer of 2022. Once construction is completed, Pier 2 will have a vertical load rating capacity of 1,000 pounds per square foot (psf). The total cost of the Pier 2 reconstruction and expansion project is approximately $83.1 million, funded entirely by General Obligation Bonds, Rhode Island Capital Plan Funding and QDC capital expenditures.

In 2020, QDC applied for and was awarded an $11.14 million PIDP grant to conduct the first part of the reconstruction of the south face of Pier 1. The south face of Pier 1 was not previously usable for Ro-Ro cargo, due to the water depth and the condition of the pier. In the winter of 2021-2022, QDC dredged the area south of Pier 1 to a depth of -32 MLLW. This dredging, combined with the construction project partially funded by the PDIP grant, will create a new Ro-Ro berth at the Port. When construction is completed, there will be a total of four active berths at the Port, which will enable QDC to dedicate one berth at the land-mass Pier 2, and the Pier's accompanying acreage, for processing heavy project cargo, including cargo related to the construction of offshore wind farms (discussed in more depth in **Section I.C.2. The Burgeoning Offshore Wind Industry on page 4**). When the South Berth at Pier 1 is open, the Port will have one berth dedicated to heavy project cargo and the operations and maintenance activities of the offshore wind industry (on Pier 2) and three berths that will support the Port's existing Ro-Ro users (two on Pier 1, North and South, and one on Pier 2).

QDC and the State of Rhode Island have a long history of investing in improvements to the Port of Davisville, recognizing the value provided by the Port's continued success and growth. In addition to the $83.1 million project at Pier 2, paid for entirely by State and QDC funding, QDC has invested significant funding in maintaining Pier 1 (further discussed in **Section I.C.3. Pier 1's Structural Deficiency on page 4**). In 2012, QDC began a multi-phase dredge program to maintain a depth of -32 MLLW. Three phases of the dredge program have been completed, and now vessels visiting the Port are not restricted to performing turning movements only during high tide, creating operational efficiencies and reducing ship idling.

In 2021, Rhode Island voters approved a $20.0 million General Obligation Bond to support infrastructure improvements at the Port of Davisville. In the winter of 2021-2022, QDC utilized this funding to complete the third phase of the dredge program, in the area south of Pier 1. This dredge project increased the depth to -32 feet, which will allow Ro-Ro class vessels to berth once the Pier 1 South project is complete. Another portion of the GO Bond funding will be used to expand the scope of the Pier 1 South project to include both Part 1 and Part 2 as outlined in the PIDP 2020 grant narrative. Additionally, Rhode Island Governor Daniel McKee has included State Fiscal Recovery Funds for infrastructure improvements at the Port of Davisville in his FY 2022-2023 budget. While the Governor's budget is still in the legislative approval process, QDC is optimistic that funding will be granted for improvements to the Port.

All of these improvements are part of a larger Master Plan for the Port of Davisville, which seeks to create redundancy, flexibility and resiliency at the Port. While the Port's primary cargo has historically been finished vehicles delivered on Ro-Ro vessels, it is QDC's intent to transform the Port of Davisville into a multi-use facility, able to simultaneously support increased growth in the finished automobile industry, the operational needs of the offshore wind industry, and any miscellaneous additional marine transportation needs that may be derived due to disruptions in the regional supply chain.

I.C. THE TRANSPORTATION CHALLENGE

Due to the age and condition of Pier 1, the continued, long-term use of the North Berth at Pier 1 is unsecured. Without Port Infrastructure Development Program funding, the North Berth at Pier 1 will likely be forced out of use within the next five to ten years due to further decay. If a natural disaster were to occur, such as a strong hurricane or nor'easter, this time line may be further reduced. If Pier 1 North were to become unusable the Port would be limited to two berths to support the Port's existing Ro-Ro cargo, which is insufficient given future growth projections.

I.C.1. THE GROWING EXISTING IMPORT BUSINESS

The Port of Davisville is a vital component of Rhode Island's continued economic success. In 2019, the Port of Davisville accounted for approximately $375 million in business output within the State of Rhode Island, supporting over 1,650 jobs and over $97 million in household earnings, as described in **Attachment 7 - Port of Davisville Economic Impact Assessment**. More than 75 companies use the Port and/or employ people whose jobs depend on it. The Port of Davisville is within the top ten ports in North America for import of finished automobiles, and continually exceeds previous year actuals relative to finished automobile import. In 2019, prior to the COVID-19 pandemic and the resulting microchip shortage, the Port of Davisville processed over 296,000 finished vehicles, and over 177,000 of those vehicles passed through the North Berth at Pier 1. Finished automobiles are shipped to the Port from manufacturers in Germany, Mexico, and Japan, among others, and include Porsche, Bentley, Audi, Volkswagen, Subaru, General Motors, Honda, Fiat and Jeep vehicles. Overall, automobile imports to the Port have grown significantly. In 1996, only 35,084 vehicles were imported through the Port; in 2019, 296,706 automobiles were imported through the Port, which set a new annual record (up from 241,851 automobiles in 2018). As demonstrated in the project's Benefit Cost Assessment, QDC anticipates that the import of finished automobiles will resume pre-COVID activity levels by 2023 and will continue to increase in line with expected US population growth.

In addition to finished automobiles, the Port of Davisville is a key component in the import of U.S. defense industry cargo. General Dynamics Electric Boat utilizes the Port to import large components from Great Britain that are utilized in the construction of its Columbia Class submarines.

I.C.2. THE BURGEONING OFFSHORE WIND INDUSTRY

At the same time, Rhode Island is gearing up to fully support the burgeoning offshore wind industry. The current offshore wind energy construction pipeline includes a significant amount of offshore wind lease area to be located off the coast of Rhode Island and Massachusetts. The State of Rhode Island has entered into a power purchase agreement to purchase 400 MW of offshore wind energy from the Revolution Wind project, which is a joint venture between Eversource Energy and Orsted Wind Power North America. With a national Federal target to install 30 GW of offshore wind capacity by 2030, there will continue to be significant and sustained demand for port facilities to support offshore wind over the next few decades. However, the U.S. Department of Energy has determined that the existing port facilities in the northeast region are insufficient in capacity to support the slated growth. The development and maintenance of offshore wind farm infrastructure relies on the availability of ports in close proximity to the designated lease areas, presenting a significant marine transportation challenge.

The Port is the second closest port to the Massachusetts Bureau of Energy Management (MA BOEM) Lease Areas, at approximately 56 nautical miles (65 miles) from the Areas' center. To support the Federal offshore wind energy goal, as well as Rhode Island's own climate change goals, it is essential that the Port provide dedicated berthing and lay-down for offshore wind project components.

The Port of Davisville will be the marine transportation hub for the Revolution Wind project. QDC has entered into an agreement with Orsted Wind Power North America (Orsted) to berth five (5) crew transfer vessels at the Port of Davisville. Furthermore, Orsted is seeking a long-term port use agreement with QDC to berth Service Operation Vessels (SOVs) at the Port. QDC has also had discussions with multiple offshore wind developers, suppliers and contractors to bring project components, as well as operations and maintenance activities, to the Port. Given its location, the Port of Davisville is the ideal location for staging offshore wind project components, and once additional wind farms are through permitting, the Port will become a central location for marine logistics and operations.

As such, once construction activities at both the South Berth at Pier 1 and the South Berth at Pier 2 are completed, QDC will dedicate one of the Pier 2 berths for offshore wind, in line with the Port of Davisville Master Plan. In addition to the agreements already underway with Orsted, it is anticipated that QDC will enter into a long-term arrangement with one (or more) offshore wind developers or suppliers for a dedicated heavy cargo berth and use of the majority of the Pier 2 acreage for lay-down.

I.C.3. PIER 1'S STRUCTURAL DEFICIENCY

Pier 1 is well past its original design life and the continued, long-term use of the North Berth at Pier 1 is uncertain. In 2018, QDC completed a Condition Assessment of Pier 1 (see **Attachment 8 - Pier 1 Condition Assessment**), which included below water and above water inspections of the Pier at representative pile bents, as well as the adjacent bulkheads, moorings and fender system. The Assessment

identified structural repairs and long-term capital improvement measures that would be needed to extend the service life of the Pier. The Assessment concluded that Pier 1 was in fair condition considering its age, which was largely attributed to the amount of maintenance and repair made throughout the Pier's life.

Since the last major rehabilitation measure in the mid-1990s to preserve the timber substructure with preventative measures (see ***Photo 3***), maintaining the Pier in a state of good repair has been an ongoing maintenance expense. Since 1995, QDC has completed the following maintenance activities on Pier 1:

1995: Repairs to the bulkhead, mooring hardware and new fender units were installed on the north side of the pier.

1997: Repairs to the mooring hardware and new fender units were installed on the south side as well as upgrading the east end corner piles to a cluster pile system.

2005: Repairs were made to the north side fender system, concrete deck, joint, and fascia beam were performed.

2009: Repairs to the north end fender system and mooring hardware.

2011: Structural repairs and the installation of leg fenders to address ongoing deck damage.

2012: Repairs were made to the timber piles; the pier was painted and a CCTV system was installed.

2016: Mooring hardware was cleaned and re-coated.

2019: Additional concrete deck and pile cap repairs are being performed due to damage from cargo operations.

The Assessment noted that although the primary structural elements of the Pier were generally sound, the Pier exhibits widespread deterioration of the active north berth, isolated areas of advanced deterioration of the concrete superstructure, and isolated areas of severe marine borer damage on the timber piles throughout the Pier (see ***Photos 4 and 5***). The Assessment stated that some amount of significant rehabilitation or replacement would need to occur in the subsequent 2 to 10 years (2020 to 2030) or the Port would be at risk of losing use of the Pier 1 asset.

Photo 3: Preventative repairs to structural timber piles performed in the mid-1990s



Photo 4: Severely deteriorated timber pile



Photo 5: Widespread deterioration of pier deck along north face



I.C.4. SUMMARY

These three challenges – growing existing business, the burgeoning offshore wind industry, and Pier 1's structural deficiency – combine to produce a perfect storm of negative impact for the Port of Davisville, the national economy and the regional supply chain. As documented in the project's Benefit Cost Assessment, the impending loss of the North Berth at Pier 1 will produce significant delays in the processing of the Port's growing international cargo, resulting in increased operating costs, increased inventory costs, and an increase in the amount of polluting emissions released as vessels wait at anchor for an available berth. An alloction of PIDP grant funding would provide an opportunity to proactively address a potential failure in the regional supply chain.

I.D. RECONSTRUCTION OF THE NORTH BERTH AT PIER 1 – THE TRANSPORTATION SOLUTION

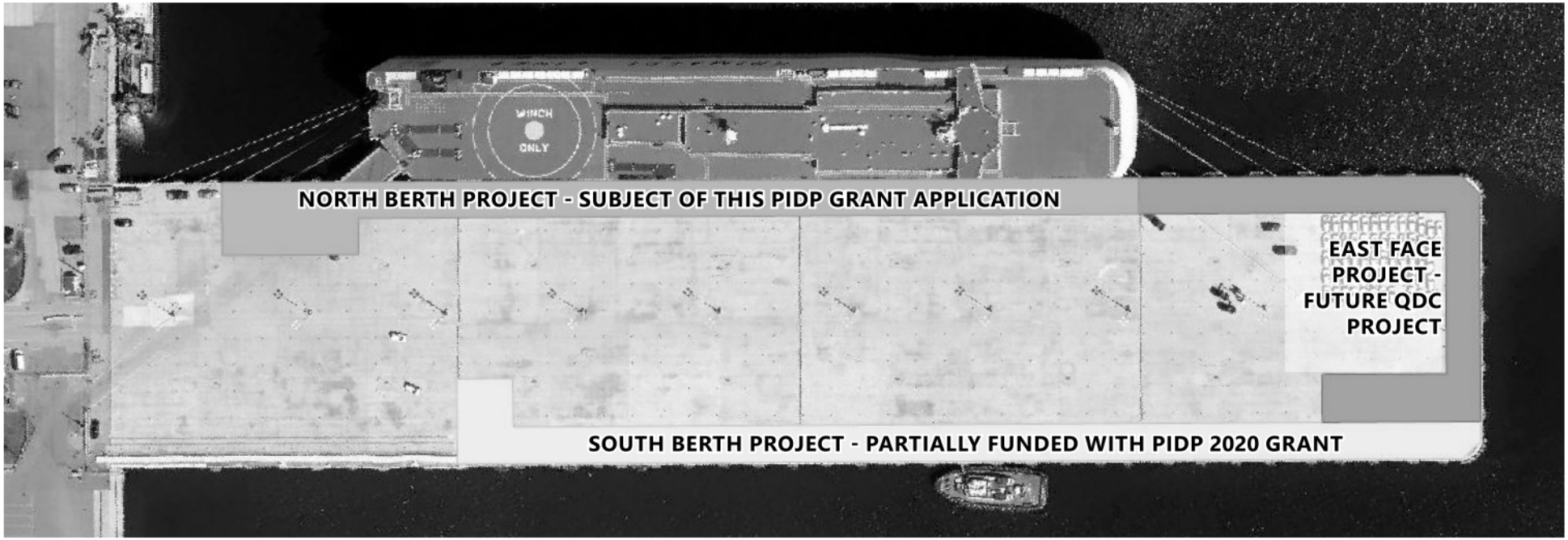
Reconstruction of the North Berth at Pier 1 will increase the Pier's ability to withstand the berthing and mooring loads of vessels by installing a steel pile supported north face, including high-performance marine-grade concrete pile caps, deck, and curbing, and new energy-absorbing fenders and mooring bollards.

The **Reconstruction of the North Berth at Pier 1** is the second phase of a larger project to reconstruct the entire perimeter of the Pier, as depicted in **Figure 1**. Construction of the first phase will begin in summer of 2022, and is partially funded by an FFY 2020 PIDP grant. These two projects, reconstructing the South Berth and the North Berth, will extend the entire Pier's design life by a minimum of an additional 50 years, as the remaining wood piles and concrete deck will be protected from the repetitive forces of berthing and mooring by the steel pile supported berths. QDC will continue to perform maintenance activities on the interior of the Pier so that the Pier's nearly 7-acres of deck can continue to be used for cargo laydown. When additional funding is available, QDC will undertake the third phase of the reconstruction project, which will activate the east face for berthing of smaller vessels. Each phase of the multi-phase reconstruction has independent utility and improves the Port as a stand-alone project.

At this point, QDC has fully engineered and permitted the reconstruction of the South Berth at Pier 1, which is a significant benefit to this project. QDC will design and construct the North Berth at Pier 1 utilizing the engineering that has been finalized for the South Berth. The **Reconstruction of the North Berth at Pier 1** is expected to consist of approximately 806-linear feet of steel-pile supported concrete deck. This will accommodate the berthing forces and off-loading operations of the selected design Ro-Ro vessel, the Grimaldi Lines Grande New York, including providing an expanded area for supporting the vessel stern ramp. The Grande New York has an overall length of approximately 653-feet and a beam (width) of 105-feet, which is representative of a typical Ro-Ro vessel berthed at Pier 1.

In order to construct the new structure, a portion of the existing timber pile foundation, pile caps, and concrete deck will be demolished and removed. New steel piles will be driven within the footprint of the demolished structure, and new high-performance marine-grade concrete pile caps, deck, and curbing will be installed. To facilitate berthing and mooring operations, approximately 20 new energy-absorbing fenders and mooring bollards will be installed along the face of the new pier section. Mooring line loads will primarily be supported at the ends of the proposed pier, while berthing impact loads will be absorbed primarily by the middle portion of the proposed pier. The vertical load capacity of the new berth is expected be 1,000 pounds per square-foot (psf) to support vehicle/cargo unloading and storage, and the vessel ramp contact loads.

FIGURE 1: THREE PHASES OF THE RECONSTRUCTION OF PIER 1



This project will produce multiple resiliency, operational, economic and equity benefits. These benefits are described in **Section IV. MERIT CRITERIA on page 11**.

II. PROJECT LOCATION

Pier 1 is located at the Port of Davisville, a Coastal Port on the west shore of Narragansett Bay, and is situated within the Quonset Business Park in North Kingstown, Rhode Island, as depicted in **Figures 2 and 3**. The Port of Davisville is considered a "small port" under 46 U.S.C. 54301(b) as the average annual tonnage of cargo is approximately 450,000 short tons. This project is considered a "small project at a small port" as it is seeking $11.25 million in PIDP funding.

Pier 1 is connected to a multi-modal transportation network that is unmatched in Rhode Island and the surrounding region. Pier 1 sits along the M-95 Marine Highway, and the Quonset Business Park has direct rail access to Amtrak's Northeast Corridor, which is used for freight transport by the Genesee and Wyoming Railroad, which recently purchased the Providence and Worcester Railroad, and for commuter travel by the Massachusetts Bay Transit Authority. The Quonset Business Park is situated between Providence, RI and New London, CT, and is connected via a 4- and 6-lane highway to Interstate 95, as shown in **Figure 4**.

FIGURE 2: REGIONAL LOCATION OF PORT OF DAVISVILLE

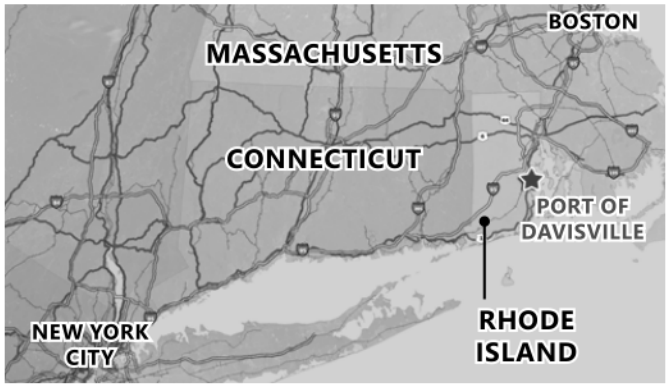
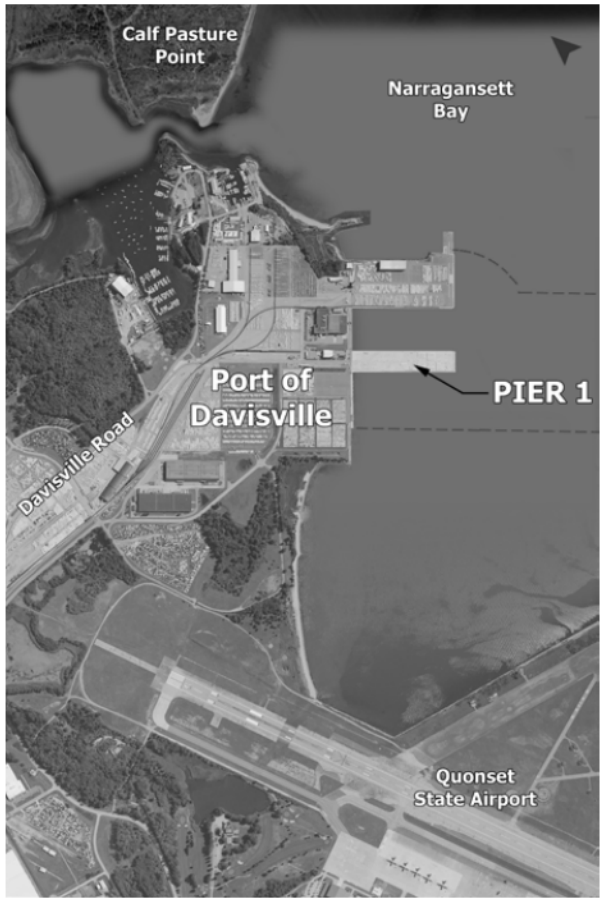


FIGURE 3: LOCATION OF PIER 1 WITHIN THE PORT OF DAVISVILLE



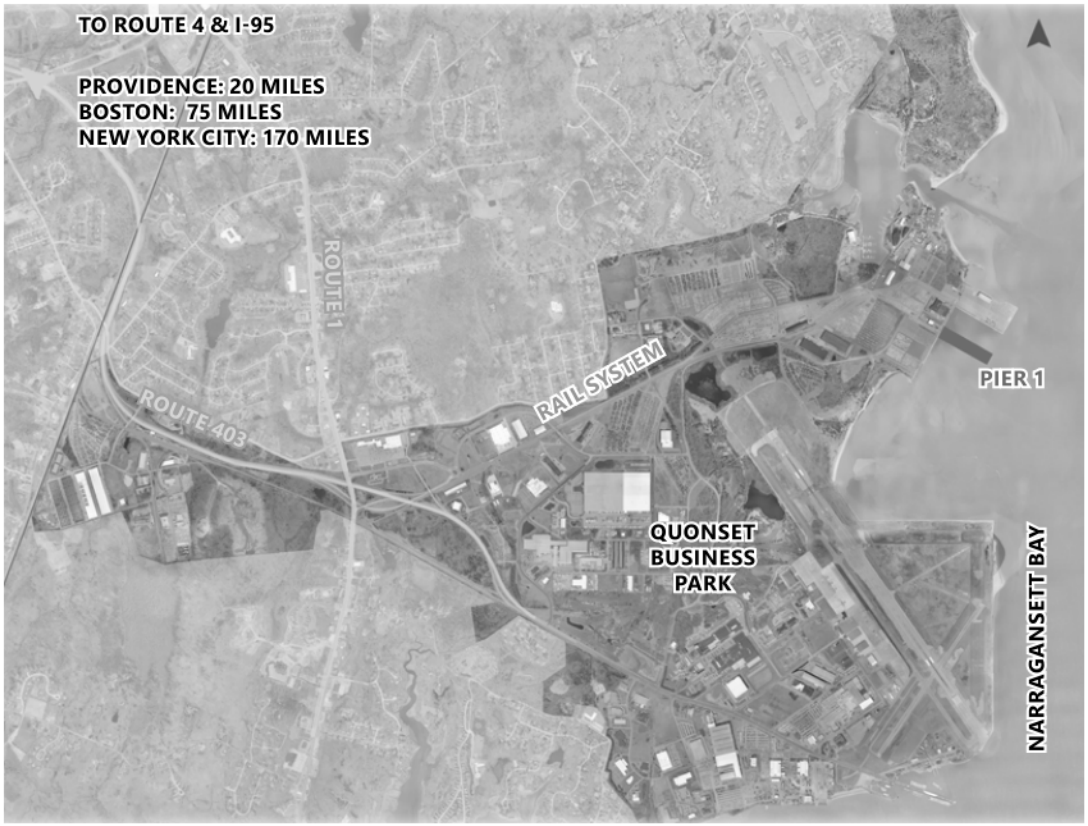


FIGURE 4: QUONSET BUSINESS PARK TRANSPORTATION NETWORK

The project is within the Providence, RI – MA Urbanized Area as defined by the U.S. Census Bureau, and the major metropolitan areas of Boston and New York City are 1 hour and 3 hours away, respectively. While not located in a Qualified Opportunity Zone, 880 acres within Quonset Business Park, including the Port of Davisville, have been designated as a Foreign-Trade Zone Magnet Site. The project is not located in a Historically Disadvantaged Community.

The Quonset Business Park, including the Port of Davisville, is a major economic engine in the State of Rhode Island and southern New England, supporting 22,300 jobs in 2018, which represents 4.5 percent of total employment based in Rhode Island. The Park is home to over 200 businesses and more than 12,900 employees, more than half of whom (6,748) are employed in the manufacture of various items, from plastic film to food to nuclear submarines.

The manufacturing jobs at the Quonset Business Park represent 17 percent of the manufacturing employment in Rhode Island. On average, the wages of the manufacturing jobs within the Park are 19% higher than manufacturing wages in Rhode Island as a whole. Since 2005 when QDC was created, businesses within the Park have created over 7,000 new jobs and catalyzed over $1.2 billion (inflation-adjusted) in private investment. Because of its location and multi-modal transportation infrastructure assets, the Park is a center for warehousing and distribution of automobiles, lumber, consumer goods, and propane. There are 188 acres of available development land in the Park, as well as upland terminal space creating unique opportunities for industrial growth, global shipping, and job creation. More information about the Port of Davisville, the Park and its economic impact on the region, can be found in **Attachment 7**.

III. GRANT FUNDS, SOURCES, AND USES

III.A. PROJECT COSTS

Reconstruction of the North Berth at Pier 1 includes demolition of a portion of the existing structure and reconstruction of the face of the Pier with steel piles, pile caps, deck and curbing, as described in **Section I.D. Reconstruction of the North Berth at Pier 1 – The Transportation Solution on page 6**. The total project cost is estimated at $22.2 million, which includes construction costs, contingency and indirects. The costs of design and permitting have not been included as part of this project as QDC intends to fully design and permit the project in preparation for a potential award.

QDC will utilize the fully engineered South Berth of Pier 1 as the basis for the design of the North Berth; QDC intends to construct the North Berth in exactly the same manner as the South Berth. A full set of construction plans for the South Berth was prepared in April 2022 and the cost estimate for the **Reconstruction of the North Berth at Pier 1** was derived utilizing the opinion of probable cost for the South Berth plans as applied to the North Berth project extent and components.

A detailed breakdown of the project budget based on construction tasks and their associated costs is provided in **Table 1**. Funding allocations by sub-phase and year can be found in **Table 2**.

TABLE 1: TOTAL PROJECT COSTS

Description	Quantity	Unit	Unit Price	Subtotal
Construction				
Mobilization/Demobilization	1	ls	$552,400	$542,000
Demolition & Removal	1	ls	$1,555,508	$1,555,508
Pier Foundation, Pile Caps & Deck	32,000	sf	$394	$12,608,000
Mooring Bollards	20	each	$9,641	$1992,818
Berthing Fenders	20	each	$29,596	$591,920
Construction Indirects*			29.9%	$4,640,893
			Construction Subtotal	**$20,141,539**
Construction Contingency			10%	$2,014,154
			Total Project Cost	**$22,155,693** *(rounded to $22.2 million)*

**Comprised of 12% for General Requirements (based on the Opinion of Probable Cost for the South Berth project), 1.5% for bonds and 16% contractor profit.*

TABLE 2: PROJECT COSTS BY YEAR AND SUB-PHASE

Phase	Start	Duration	2022	2023	2024	2025
QDC Planning, Schematic Design & Permitting	9/1/2022	12 months	$0			
Design Development & Construction Documents	9/1/2023	12 months		$0		
Construction	9/1/2024	15 months			$3,330,000	$18,870,000
		Total	**$0**	**$0**	**$3,330,000**	**$18,870,000**

TABLE 3: FUNDING SOURCES BY PHASE, WITH SFRF FUNDING

Phase	Non-Federal/ QDC	PIDP Grant	Other Federal (SFRF)	Total
Construction	$9,000,000	$11,250,000	$1,950,000	$22,200,000
Total Project Cost	**$9,000,000**	**$11,250,000**	**$1,950,000**	**$22,200,000**
Ratio	**40.5%**	**50.7%**	**8.8%**	**100%**

TABLE 4: FUNDING SOURCES BY PHASE, WITHOUT SFRF FUNDING

Phase	Non-Federal/ QDC	PIDP Grant	Other Federal (SFRF)	Total
Construction	$10,950,000	$11,250,000	$0	$22,200,000
Total Project Cost	**$10,950,000**	**$11,250,000**	**$0**	**$22,200,000**
Ratio	**49.3%**	**50.7%**	**0%**	**100%**

III.B. SOURCES OF FUNDING

The $11.25 in funding requested from USDOT's Maritime Administration Port Infrastructure Development Program (PIDP) represents 50.7% of the total project cost. QDC would not be able to complete this project without the requested PIDP funding as no other sources of funding are available to fill the funding gap.

At minimum, QDC will provide $9.0 million in matching funds for this project (or 40.5% of the total project cost). In March of 2021, Rhode Island voters approved a $20.0 million General Obligation Bond to support infrastructure improvements at the Port of Davisville. QDC's funding commitment will be derived from a combination of the General Obligation Bond funding and QDC's capital funds.

Rhode Island Governor Daniel McKee has included federal State Fiscal Recovery Funds (SFRF) for infrastructure improvements at the Port of Davisville in his FY 2022-2023 budget. The Governor's budget is still in the legislative approval process, and so while QDC is optimistic that some level of funding will be granted for improvements to the Port, this funding has not been fully secured. If the SFRF funding is allocated to the Port, QDC intends to utilize $1.95 million (or 8.8% of the total project cost) for this project. If SFRF funding is not allocated, QDC commits to providing the full $10.95 million in funding necessary to complete this project. Details on the two potential funding scenarios are included in **Table 3** and **Table 4**.

Documentation of QDC's funding commitment can be found in **Attachment 4 - QDC Matching Fund Commitment Letter**. The funding from QDC, whether from QDC's capital budget or from the General Obligation Bond, is not bound or restricted by any conditions, stipulations, or time requirements, and may be utilized throughout the project as needed.

IV. MERIT CRITERIA

IV.A. ACHIEVING SAFETY, EFFICIENCY, OR RELIABILITY IMPROVEMENTS

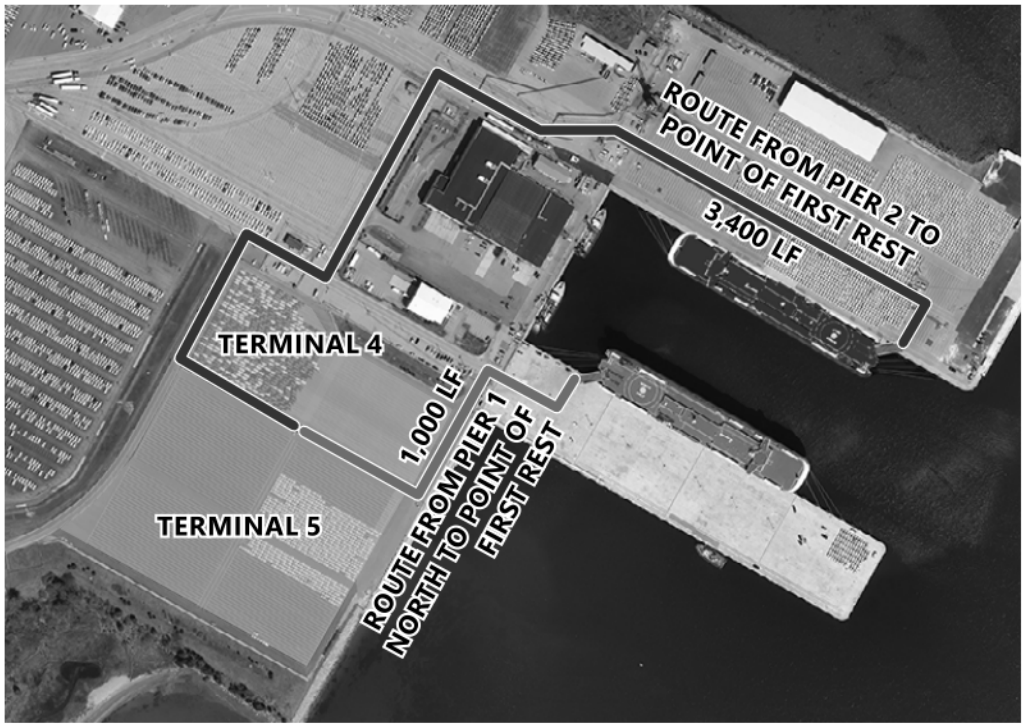
Reconstruction the North Berth at Pier 1 will achieve safety, efficiency and reliability improvements at the Port of Davisville, providing benefits in all four of the identified project categories.

IV.A.1. LOADING AND UNLOADING OF GOODS AT A PORT

The primary cargo handled by the Port of Davisville is finished automobiles, which arrive at the Port on Ro-Ro vessels. At the completion of the two construction projects described in **Section I.B. The Port of Davisville on page 1**, the Port will be equipped with four berths, three of which (the North Berth at Pier 1, the South Berth at Pier 1 and one of the berths at Pier 2) will be dedicated to handling Ro-Ro vessels and cargo. As discussed throughout this narrative, it is anticipated that without this grant funding the North Berth at Pier 1 will be removed from use in approximately five to ten years (2027-2037) due to its deteriorated condition. If that were to occur, the Ro-Ro vessels would need to berth more frequently at Pier 2, and the travel distance for each finished vehicle to its point of first rest would increase substantially.

It is anticipated that given the burgeoning needs of the offshore wind industry, the land mass of Pier 2 will be dedicated to lay-down area for heavy project cargo. The approximately 16-acres on Pier 2 that currently serve as a point of first rest for the Ro-Ro cargo will no longer be available. All Ro-Ro cargo will be required to travel to Terminals 4 and 5 when unloading from the vessels. As depicted in **Figure 5**, the center of the Terminal 4/Terminal 5 cargo area is approximately 3,400 linear feet from the ramp location of Pier 2's closest Ro-Ro berth. The center of the Terminal 4/Terminal 5 cargo area is approximately 1,000 linear feet from the location of the Ro-Ro ramp at Pier 1's North Berth. Each finished automobile that is forced to unload from Pier 2, rather than from Pier 1 North, will travel an average of 2,400 additional linear feet to its point of first rest. This additional distance will cause longer unloading times and more vessel queuing. Additionally, when onloading at Pier 2, the Ro-Ro cargo must traverse public roadways to get to Terminals 4 and 5, including crossing through two intersections. From Pier 1, the cargo stays completely on Port right-of-ways and no intresection crossings are necessary.

FIGURE 5: OPERATIONAL IMPACTS WITH LOSS OF THE NORTH BERTH AT PIER 1



IV.A.2. MOVEMENT OF GOODS INTO, OUT OF, AROUND OR WITHIN A PORT

This project is anticipated to increase the speed of cargo movements through the Port of Davisville. As explained in **Attachment 2A - BCA Narrative**, one of the principal benefits of this project is the avoided increase in queueing times for Ro-Ro vessels waiting to be served at the Port of Davisville. With this project, it is anticipated that, on average, vessels will have to wait approximately 43 minutes for an available berth. As call volumes increase over the analysis period, the wait times will increase steadily to an average of about 100 minutes per call. Without this project, when the North Berth at Pier 1 has to cease operation, the average wait time per vessel is expected to be approximately 331 minutes per call. As the volume of calls increases, the average wait time is expected to increase to 720 minutes per call by 2052.

FIGURE 6: LOCATION OF GENERAL DYNAMICS ELECTRIC BOAT RELATIVE TO THE PORT OF DAVISVILLE



The Port of Davisville plays an important role in the national supply chain, consistently ranking as one of the top ten Ports in the U.S.A for finished automobiles. Prior to the pandemic and microchip shortage, the Port of Davisville processed over 296,000 finished vehicles, and automobiles arriving at the Port are shipped to all 48 contiguous U.S. states and Canada. An increase in the vessel wait times from 331 minutes per call to 720 minutes per call in 2052 would cause substantial delays in the supply chain and increases in the product cost (as further detailed in the **Attachment 2A**). Additionally, with the loss of a functioning berth, it will be more difficult for the Port of Davisville to accommodate overflow cargo from other ports in the event of human-caused or natural disasters.

Should PIDP funding not be secured, and the North Berth not be reconstructed, there will also be significant delays in the handling of the defense industry cargo currently being processed at the Port. This cargo arrives at the Port on a Ro-Ro vessel and is transported to General Dynamics Electric Boat by truck to its manufacturing facility within the Quonset Business Park (see **Figure 6**). Given its size and destination, this cargo must be processed by the Port of Davisville. If Ro-Ro vessel queue times increase due to the loss of the North Berth at Pier 1, as documented in the **BCA Narrative**, it is likely that off-loading this important cargo will be severely delayed as well.

IV.A.3. OPERATIONAL IMPROVEMENTS & RESILIENCY

In addition to the operational improvements described in **Section IV.A.1. Loading and Unloading of Goods at a Port on page 11** relative to cargo movements, **Reconstruction of the North Berth** at Pier 1 is a project to substantially improve the resilience of operations at the Port of Davisville and in the region to withstand natural and human-made disruptions. This project will increase the resiliency of the North Berth, will create resiliency in the Ro-Ro supply chain, especially for finished automobiles and defense industry cargo, and will allow QDC to increase the variety of cargo being processed through the Port, enabling other types of cargo to be rerouted to the Port if disruptions occur.

As described in **Section I.D. Reconstruction of the North Berth at Pier 1 – The Transportation Solution on page 6**, reconstruction of the North Berth at Pier 1 will include installing steel piles to support the reconstructed pier. Currently, Pier 1 is supported by existing timber piles that have an estimated embedment of about 21 to 25 feet. This embedment is limited by the fact that timber piles cannot be spliced into longer segments (about 65-foot max). However, the proposed steel support piles can be spliced, and as a result, can be driven to bedrock. Based on soil borings conducted as a part of a geotechnical investigation in 2021, driving the proposed piles to bedrock would result in up to 80 feet of embedment, depending on the location of the pile relative to the existing mud line elevations. As a result, the proposed steel piles driven to bedrock will make the new structure more resilient and stable during severe weather events, natural disasters, and the effects of seismic events.

When reconstructed, the North Berth at Pier 1 will have a vertical load rating of 1,000 pounds per square foot (psf), rather than the existing 250 psf. This increased load rating capacity will permit the Port of Davisville to handle a wider range and variety of cargo at the North Berth, making the Port able to accommodate sudden changes in cargo and vessel type due to natural or human-made hazards affecting the regional supply chain.

The reconstructed North Berth will include large-sized scuppers, which do not currently exist on Pier 1, allowing for quicker drainage of water from the Pier in the event of severe precipitation or a coastal storm. Additionally, the reconstructed North Berth will have a one-foot higher curb height, which will allow the curbing to act as a wave attenuator for the non-reconstructed portions of the Pier. The additional curb height will also allow QDC to increase the height of the concrete decking by one-foot when funding for that portion of the reconstruction project is identified.

IV.A.4. ENVIRONMENTAL & EMISSIONS MITIGATION MEASURES

As documented in the **Attachment 2A - BCA Narrative**, **Reconstruction of the North Berth at Pier 1** will avoid substantial additional vessel queue time, reducing port-related criteria pollutants and greenhouse gas emissions. The reductions over the 30-year analysis period are provided in **Table 5**.

TABLE 5: EMISSIONS SAVINGS

Emission Type	Emission Savings (metric tons)
Carbon Dioxide (CO2)	35,364
Nitrogen Oxides (NOx)	712
Fine Particles (PM2.5)	12
Sulfur Oxides (SOx)	21

IV.B. SUPPORTING ECONOMIC VITALITY AT THE REGIONAL OR NATIONAL LEVEL

IV.B.1. BENEFIT-COST RATIO

Reconstruction of the North Berth at Pier 1 has been determined to have a **Benefit-Cost Ratio of 1.74**, as explained in **Attachments 2A and 2B**. All estimates were calculated over a 30-year period, starting at the project's completion in 2026. A discount rate of 7% was used throughout the analysis, except for the CO2 emission benefits for which a 3% rate was used per the USDOT BCA guidelines for 2022, and all values are presented in 2020 dollars. A summary of the quantified benefits can be found in **Table 6**.

TABLE 6: BENEFIT-TO-COST ANALYSIS OUTPUTS (US$)

Category	Present Value (2020, 7% discount)
Benefits - Economic Vitality	$28,594,788
Benefits - Environmental Sustainability	$7,073,838
Maintenance & Operating Costs	($1,159,422)
Total Benefits	**$35,430,487**
Project Cost	$20,420,934
Net Present Value	$15,009,553
Benefit-to-Cost Ratio	**1.74**

As discussed throughout this narrative, it is anticipated that due to the condition of the North Berth at Pier 1, the berth will be removed from use in approximately 5-10 years. Under the No-Build Scenario, QDC does not complete the project and as a result, the North Berth at Pier

1 reaches the end of its service life and shuts down operations due to safety concerns and the degradation of infrastructure in 2027. The Port continues operations as a two-berth Ro-Ro facility. This reduction in capacity impacts vessel wait time at the Port, causing vessels to take on additional operating costs as they spend time waiting for an available berth. There is also inventory cost that is incurred by shippers bringing in cargo to the Port. The high value of cargo moving through the Port leads to increased costs over the course of the 30-year analysis period. The increased wait times also cause vessels to release a higher amount of polluting emissions as they wait at anchor, adding social costs to the No-Build Scenario.

Under the Build Scenario, QDC can complete the project by 2026, following completion of the South Berth project. The service life of the North Berth is extended to 2075 and the entirety of Pier 1 becomes generally more resilient to natural disaster and human-caused shifts in the supply chain. In this Scenario, the Port is able to continue operating as a three-berth Ro-Ro facility, keeping vessel wait times to a minimum, and handling additional vessel call growth.

The Benefit Cost Analysis did not address the benefits of the avoided operational costs described in **Section IV.A.1. Loading and Unloading of Goods at a Port on page 11**. These benefits would provide economic vitality and emissions benefits relative to avoiding the increased amount of time required to unload the Ro-Ro vessel from Pier 2, rather than from the North Berth at Pier 1.

IV.B.2. ECONOMIC ADVANTAGE

This Project will enhance the Port of Davisville's economic advantage by increasing Port capacity and creating more efficient access for Port customers. If the North Berth were no longer in service, the increased vessel wait times and unit costs (outlined in the **Attachment 2A**) would create an economic disadvantage for the Port, forcing customers to incur increased cost or to choose another facility. Without this project, there is a high risk that the combined future Ro-Ro and offshore wind vessel traffic to the Port will become so great that offshore wind vessels may be required to go elsewhere. There is only one port closer to the MA-BOEM lease areas, the port in New Bedford-MA; traveling to all other ports from the lease areas will create increases in the cost of constructing offshore wind. See **Section I.C.2. The Burgeoning Offshore Wind Industry on page 4** for additional information.

IV.B.3. CONTRIBUTION TO FREIGHT TRANSPORTATION AT, AROUND AND THROUGH THE PORT

As described in **Sections IV.A.1, IV.A.2 and IV.A.3**, this project improves the physical process of transporting goods and commodities through and within the Port of Davisville, increases the resilience of the Port's operations and the regional supply chain, including for critical defense industry cargo, and eliminates a potential point of failure in the U.S. supply chain by securing the long-term use of the North Berth at Pier 1.

IV.C. ADDRESSING CLIMATE CHANGE AND ENVIRONMENTAL JUSTICE IMPACTS

IV.C.1. CLIMATE CHANGE & ENVIRONMENTAL JUSTICE IN PROJECT PLANNING

The State of Rhode Island conducts extensive outreach and equity analysis when conducting transportation planning. As Rhode Island's only publicly-owned port, infrastructure improvements at the Port of Davisville are often included in statewide transportation plans, and QDC, the port operator, participates in statewide transportation planning activities. In 2021, as part of the State Transportation Improvement Program (STIP) the Rhode Island Division of Statewide Planning (RIDSP) conducted a Transportation Equity Benefit Analysis (TEBA)[1] that identified and geographically located Select Population Groups (SPGs) in the State that are protected from discrimination under the law, and groups that may face transportation challenges. The SPGs identified in the TEBA are either directly protected under Title VI of the Civil Rights Act of 1964, or can be linked to protected populations under Title VI. While the TEBA specifically focused on the impacts of transportation improvements included in the fiscally constrained years of the STIP, the tools utilized to conduct the assessment are helpful when seeking to address environmental justice in project planning. To create the TEBA, RIDSP created Census Tract-level maps identifying the locations of Environmental Justice Tracts throughout the State. The Tract in which the project is located (501.03) was not identified as an Environmental Justice Tract.

In addition to the TEBA, QDC utilized DOT's Disadvantaged Census Tract tool and EPA's EJScreen to further assess the project. The reports from these tools are included as **Attachment 5**. Utilizing DOT's Disadvantaged Census Tract tool, QDC identified that Census Tract 501.03, in which the project lies, does not meet the criteria for being a Transportation Disadvantaged Census Tract (Historically Disadvantaged Communities).

QDC utilized the EJScreen tool to look at the areas within 1 mile and within 2 miles of the project. EJScreen identified zero population within 1 mile of the project area and therefore produced a result of "N/A" for all variables. EJScreen identified a population of 3,182. within 2 miles of the project For four of the variables, the values within the 2 mile area were identified as in excess of the State average and the EPA Region Average: Superfund Proximity, RMP Facility Proximity, Population Under Age 5 and Population Over Age 64. One additional variable was identified as in excess of the EPA Region Average: Ozone.

The Port of Davisville and the surrounding Quonset Business Park is situated on lands that were formerly the Davisville Naval Construction Battalion Center (DNCBC) and the Quonset Naval Air Station (QNAS). The identified Superfund Sites are related to the Navy installations; any environmental issues present within the area were remediated as part of the transfer of the land to the State of Rhode Island. Relative to the Risk Management Plan (RMP) Facilities, the Quonset Business Park has been developed primarily as an industrial park, and many of the Park's businesses hold regulated substances.

While the Ozone variable is concerning, **Reconstruction of the North Berth at Pier 1** will positively impact Ozone levels by avoiding the additional nitrogen oxides that would be created if the Berth were to fall out of use. See **Section IV.A.4. Environmental & Emissions Mitigation Measures on page 14**.

The State of Rhode Island has also begun considering climate change and environmental sustainability in its transportation planning, including within the Rhode Island Long Range Transportation Plan (LRTP), "Moving Forward RI 2040"[2]. While not identified by name, monitoring port operations is specifically listed as a strategy for promoting environmental sustainability. Under the goal of "Promote Environmental Sustainability", the LRTP lists the objective of "Reduce Transportation Greenhouse Gas Emissions" and the Strategy of "Monitor major transportation sources of greenhouse gas emissions (e.g. port operations) and develop reduction countermeasures."

The modernization of Pier 1 is listed as a "high priority" in the Rhode Island Freight and Goods Movement Plan (Freight Plan), which was last updated in September 2016[3]. The Freight Plan discusses the importance of port growth (page 24), the improvements conducted to date (page 114), and the needs and challenges to be addressed by the modernization of Pier 1 (page 143). In adopting the Freight Plan, RIDSP conducted extensive public participation activities, including holding monthly public meetings with a steering committee, maintaining a plan website, holding focus groups with local associations, conducting 21 stakeholder interviews, and holding public meetings. One of the public meetings was held at the Quonset Business Park, in which the project is located.

Infrastructure improvements at the Port of Davisville are supported by Rhode Island voters. In March 2021, 58.9% of Rhode Island voters approved a $20 million General Obligation Bond to support infrastructure improvements at the Port of Davisville. Support for the Bond was strong in Rhode Island's four most diverse cities, as shown in **Table 7**.

TABLE 7: RHODE ISLAND'S 4 MOST DIVERSE CITIES & LEVEL SUPPORT FOR PORT INFRASTRUCTURE IMPROVEMENT BOND
(Select Population Characteristics from 2020 U.S. Census)

City	% of Population Identifying as Other than "White Alone"	% of Population Identifying as Hispanic	Median Income	% of Population Living in Poverty	% of Votes Received in Favor of the Port Infrastructure Bond
Central Falls	51.2%	69.3%	$34,689	29.9%	75.1%
Pawtucket	40.4%	25.0%	$52,902	14.1%	64.0%
Providence	46.8%	43.5%	$49,065	23.0%	71.3%
Woonsocket	30.3%	19.7%	$44,310	21.0%	56.4%

IV.C.2. CLIMATE CHANGE MITIGATION & RESILIENCY

This project aligns with the President's greenhouse gas reduction goals and increases the resiliency of Pier 1 to climate change. As described in **Section IV.A.4. Environmental & Emissions Mitigation Measures on page 14** and in **Attachment 2A** this project will avoid the emission of additional Carbon Dioxide, Nitrogen Oxides, Fine Particles, and Sulfur Oxides through the avoidance of increased vessel wait times.

To the extent practicable, and as permitted by current law and Rhode Island regulation, **Reconstruction of the North Berth at Pier 1** will be designed and constructed consistent with the Federal Flood Risk Management Standard. Given the location of Pier 1 within Narragansett Bay and the requirements of the vessels it supports, reconstructing the Pier with additional freeboard may not be possible. However, as described in **Section IV.A.3. Operational Improvements & Resiliency on page 13**, the project has been designed to increase Pier 1's resiliency to severe coastal storms, with steel pile supports, a higher curb height and larger scuppers.

IV.D. ADVANCING EQUITY AND OPPORTUNITY FOR ALL

IV.D.1. EQUITY FOCUSED POLICIES AND INITIATIVES RELATED TO PLANNING AND PROJECT DELIVERY

QDC's standard construction procurement policies include strong bidding and labor standards to create opportunities for all workers. As a quasi-State agency, QDC has a specific set of rules governing the procurement of supplies and services, which have been adopted as regulations of the State (the Procurement Regulations, found at 880-RICR-00-00-01)[4]. The intent of the Procurement Regulations is to comply with the principles, policies and practices of the State Purchases Act, R.I. Gen. Laws Chapter 37-2, and "to set forth procedures to ensure fair and equitable treatment of all persons who deal with the Corporation's procurement system [...]" (Rule 1.1).

Pursuant to the Procurement Regulations, QDC will procure the project's construction contractor utilizing a competitive, sealed public bid process as outlined in Rule 1.6.2. Through the issuance of a public bid, there is opportunity for all potential contractors to become aware of the project, creating opportunities for all workers. All of QDC's public infrastructure construction projects expected to bid at $20,000 or more in value are:

- Posted for a minimum of 7-days on the Rhode Island Vendor Information Portal (RIVIP)[5];
- Posted in the local major statewide newspaper, The Providence Journal;
- Provided to trade organizations for posting on their websites and direct email to their membership; and
- Posted on the QDC website.

The bid documents clearly outline the regulatory and procedural requirements of the contract, as well as the criteria that will be used to evaluate the bids. The labor, wage and equal opportunity requirements (described more in **Section IV.D.2. Labor Standards and the Choice to Join a Union on page 19**) are clearly identified in the bid documents, so that all potential contractors are aware of the same prior to bidding. QDC utilizes a process by which all submittals are evaluated utilizing the same pre-identified criteria. The contractor will be selected on the basis of lowest evaluated bid price.

The Procurement Regulations require all contractors to comply with the requirements of R.I. Gen. Laws § 28-5.1-10 (Equal Opportunity and Affirmative Action, State Contracts)[6] and all regulations issued by the State Equal Opportunity Office (Rule 1.16.1). In compliance with this regulation, QDC includes "Equal Opportunity Employment Requirements" (the EOE Requirements) in all of its contract documents, a copy of which can be found as **Attachment 9**. The EOE Requirements require that the State Equal Opportunity Office make a determination that the selected contractor meets the EOE Requirements prior to contract execution. Additionally, a representative

from the State Equal Opportunity Office attends the pre-construction meeting and conducts on-site monitoring during construction to ensure compliance.

IV.D.2. LABOR STANDARDS AND THE CHOICE TO JOIN A UNION

QDC's labor standards and practices are derived from R. I. Gen. Laws Title 37, Chapter 13 and ensure that QDC's construction projects create good paying jobs, many of which offer free and fair choice to join a union.

QDC's standard invitation to bid documents, included as **Attachment 10**, require conformity with the provisions of R.I. Gen. Laws § 37-13. More specifically, the bid documents require that contractors pay Prevailing Wage according to the rate schedule found online at the U.S. System for Award Management. Selected contractors must submit completed RI Certified Weekly Payroll forms listing all employees working on the job site on a monthly basis. For contracts in excess of $1,000,000, including the contract for this project, contractors must maintain on the project site a Rhode Island Certified Prevailing Daily Wage log of employees working each day on the project by the contractor and any subcontractors.

QDC's construction projects have a long history of supporting union labor. Over the past 10 years, QDC has awarded over $167.4 million in construction and maintenance contracts to contractors utilizing union labor, representing 97% of all of QDC's constructionand maintenance contracts during this period. Additionally, all of the people working at the Port in the unloading of vessels are part of the International Longshoremen's Association (ILA). Since the Port of Davisville is a landlord port, not an operating port, the labor utilized to off-load vessels is contracted through the Port's three stevedores, Waterson Terminal Services, Ports America and New England Stevedore Services. All three of the stevedores active at the Port are contracted to utilize union labor under the ILA Master Contract with the United State's Maritime Alliance, Ltd.

Without the requested PIDP funding, the North Berth at Pier 1 will need to be taken out of service within five years. The loss of an active berth at the Port of Davisville will result in a loss of unionized employment opportunities related to the processing of port cargo. If the North Berth remains usable for an additional 50-years, the anticipated growth in Ro-Ro cargo documented in the **BCA Narrative** will cause an associated increase in unionized port employment opportunities.

IV.D.3. INVESTMENTS IN WORKFORCE DEVELOPMENT EFFORTS FOR & POLICIES TO PROMOTE HIRING OF UNDERREPRESENTED POPULATIONS

As a quasi-state agency, QDC's construction contracts valued at $1,000,000 or more require that contractors employ apprentices during the performance of the work, unless such requirement conflicts with the requirements of federal aid contracts or federal regulations. This requirement is documented in **Attachment 10**. The number of apprentices employed must comply with the apprentice-to-journeyman ratio for the applicable trade as determined by the Department of Labor and Training's Apprenticeship Council. According to the Department's website, "Registered Apprenticeship is a proven model of job preparation that combines paid on-the-job learning with related instruction to progressively increase worker's skill levels and wages."

Apprenticeship programs represent an alternative pathway to good-paying jobs for underrepresented populations. Rather than taking on the expense of secondary education, apprentices can learn on the job while making a living wage. Every Registered Apprenticeship program includes a wage progression, where apprentices start at a training wage that progresses to a full occupational wage as they achieve program milestones. Apprenticeship Programs ensure there is no cost of entry into the well-paying contruction trades.

Additionally, QDC is in the process of developing a partnership with the University of Rhode Island's College of Environmental and Life Sciences' Office of Diversity and Inclusion to support workforce training and placement of underrepresented populations in the Science, Technology, Engineering & Mathematics (STEM) fields. QDC intends to provide a paid internship to a student engaged with the Office of Diversity and Inclusion. The internship will focus on the daily tasks associated with engineering, planning, development, and marine affairs, and the position will be supervised by a member of QDC's Planning & Development Department. Partnerships such as this help to encourage individuals from underrepresented populations to see themselves in a variety of fields, while also assisting the employer in increasing the diversity of perspectives represented in their workforce.

IV.E. LEVERAGING FEDERAL FUNDING TO ATTRACT NON-FEDERAL SOURCES OF INFRASTRUCTURE INVESTMENT

Reconstructing the North Berth at Pier 1 proposes, at minimum, a 59.5/40.5 Federal/Non-Federal cost share, with 50.7% of the project funded through by the PIDP grant, 8.8% funded by federal State Fiscal Recovery Funds, and 40.5% funded by the Quonset Development Corporation. QDC, who manages the Port of Davisville and the Quonset Business Park, is a self-supporting entity, and receives no operational assistance from the State of Rhode Island outside of grants and General Obligation Bonds. QDC's funding is derived primarily from lease revenue, utility fees, and Port usage fees and tariffs. QDC does not receive formula funding from the Rhode Island general revenues.

QDC's annual budget has funding for operations and maintenance activities, as well as a modest self-funded annual capital budget. QDC's operational expenses include, among other things, operation of the Business Park's water and wastewater infrastructure, as well as the ground and rail transportation networks, which constrains QDC's ability to dedicate more funding to this project. By using capital dollars to match grant funding, rather than funding projects at 100%, QDC can stretch its dollars and complete more projects.

In March of 2021, Rhode Island voters approved a $20.0 million General Obligation Bond to support infrastructure improvements at the Port of Davisville. As described in **Section III.B. Sources of Funding on page 11**, QDC has already used a portion of this funding for dredging and plans to use the Bond funding to expand the Pier 1 South reconstruction project. QDC's funding commitment will be derived from a combination of the General Obligation Bond funding and QDC's capital funds.

While Rhode Island Governor McKee has included federal State Fiscal Recovery Funds (SFRF) for infrastructure improvements at the Port of Davisville in his FY 2022-2023 budget, the Governor's budget is still in the legislative approval process and funding can not be guaranteed. If approved, QDC will use a portion of this funding to supplement this project, and will use the remainder to undertake other Port improvements for which grant funding is not available. If the SFRF funding is allocated to the Port, QDC intends to utilize

$1.95 million (or 8.8% of the total project cost) for this project. If SFRF funding is not allocated, QDC commits to providing the full $10.95 million in funding necessary to complete this project.

QDC's phased approach to reconstructing Pier 1, as described in **Section V.A.2. Project Feasibility: Engineering & Design assessments on page 21**, will allow QDC to effectively leverage the available Federal funding to undertake a significant and important project for the State of Rhode Island. By bifurcating the Pier reconstruction into three phases, QDC has been able to request, and in some cases obtain, funding for the phases as such funding becomes available, rather than trying to align funding sources simultaneously for a single project.

V. PROJECT READINESS

V.A. TECHNICAL CAPACITY

V.A.1. ABILITY TO IMPLEMENT THE PROJECT

QDC is the applicant and Project Manager for this project. QDC executes an average of $10 million in infrastructure projects on an annual basis and is wrapping up an $83.1 million project that reconstructed and extended the Port of Davisville's Pier 2. QDC's staff engineers, construction managers, grant administrator, and financial professionals have the skills and internal procedures to efficiently administer projects in-house. QDC has successfully managed a previous TIGER grant for $22.3 million from design through to performance reporting and QDC is about to undertake a PIDP-funded project to reconstruct the South Berth at Pier 1. More information about QDC can be found at http://www.quonset.com/.

Staff of QDC will manage the Project using its consistent "Team Approach." Within the Planning & Development Department, the Manager of Engineering will be responsible for the advertisement of and compilation of bidding documents, recommendation of contract awards/procurements, acquisition of permits where necessary, coordination with RI CRMC, ACOE and other applicable regulatory agencies, managing and overseeing construction, and project closeout. The Department's Planning Manager will oversee grant administration and compliance, and the Director of Planning & Development will oversee the project implementation as a whole. QDC's Finance Department will oversee and track contract payments, and accounting relating to the grant. Finally, QDC's Managing Director will oversee all QDC Departments in their performance of the work as well as execute contract awards, procurements, payments, etc. The Team Approach management structure has successfully executed over $200 million in infrastructure investments over the past 10 years.

V.A.2. PROJECT FEASIBILITY: ENGINEERING & DESIGN ASSESSMENTS

As previously stated, Pier 1 is over 76 years old and has undergone numerous maintenance repairs and capital investments to extend its service life. Considering its age and importance to the Port's cargo operations, QDC has been planning for modernization or replacement

of the Pier for over a decade and took a significant step in its planning effort by developing the Port of Davisville Infrastructure Rehabilitation/Replacement Program in 2015. The goals of the program were to create 21st century infrastructure with the intent to replace Pier 2 within 5 years and Pier 1 within 10 years. The replacement of Pier 2 is currently under construction and is nearly complete. For Pier 1, this grant would not only make achieving the Port's program goals possible but more importantly, allow it to be executed in the most cost-efficient manner possible.

In 2016, QDC performed an Alternatives Analysis study to review the concepts put forth in the 2015 study, and also to consider other options. In 2018, as part of the Condition Assessment performed for Pier 1 (described in **Section I.C.3. Pier 1's Structural Deficiency on page 4**), QDC reaffirmed that the Pier would require significant capital investment. Considering its age and operational significance, QDC determined that a phased approach would afford the Port an opportunity to replace Pier 1 in a cost efficient manner, while ensuring operational readiness and capacity for the next 50-years and accommodating continued use and long-term growth.

With QDC's successful Pier 1 South PIDP application in 2020, the approval of the General Obligation Bond in 2021 for port improvements and the potential for port infrastructure funding from the Governor's budget in FY 2022, QDC continues to believe that the phased approach was the best path forward. As demonstrated in **Figure 1 on page 6**, when split into three, stand-alone projects with independent utility, QDC will be able to fully reconstruct the perimeter of Pier 1 utilizing a variety of funding sources and effectively leveraging the available Federal dollars.

V.A.3. PROJECT FEASIBILITY: BASIS OF DESIGN

An additional benefit of the phased approach is that it allows the Reconstruction of the North Berth at Pier 1 to share the exact same structural and operational requirements of the South Berth at Pier 1, which has been fully engineered and permitted. QDC is confident in the feasibility of designing the North Berth to these standards given the current status of the South Berth project, and due to the fact that the South Berth was engineered based on the design of the nearly completed Pier 2 Modernization and Expansion project. Additionally, in 2021, QDC completed a geotechnical study of the entirety of Pier 1, on which the Pier 1 South Berth engineering was based. The design criteria for the project will be as listed below:

1) VERTICAL LOADS
   a) 1000 PSF (UNIFORM LIVE LOAD)
2) WIND CRITERIA
   a) DESIGN WIND FOR STRUCTURES = 137 MPH (3 SECOND GUST). RISK CATEGORY II.
3) CURRENT CRITERIA
   a) DESIGN CURRENT VELOCITY = 2.0 FT/SEC
4) WAVE CRITERIA
   a) SIGNIFICANT WAVE HEIGHT = 6.4 FEET
   b) PERIOD = 4.5 SEC
5) BERTHING LOAD
   a) MAXIMUM DESIGN FENDER REACTION AT MAXIMUM RATED DEFLECTION = 340 KIPS, INCLUDES 10% TOLERANCE

6) MOORING LOAD
   a) 100 METRIC TON BOLLARDS (MARITIME INTERNATIONAL INC. MSB-100)
7) SOIL SEISMIC CRITERIA (ASCE7-10/IBC2012)
   a) SITE CLASS D
   b) Ss = 0.170g
   c) S1 = 0.059g
   d) RESPONSE MODIFICATION FACTOR = 3.0
8. DESIGN VESSELS
   a) MAXIMUM COMMERCIAL RO/RO VESSEL PARAMETERS
      i) DISPLACEMENT TONNAGE = 40500 MTON
      ii) LOA = 656 FEET
      iii) LENGTH B/P = 620 FEET
      iv) BEAM = 114.1 FEET
      v) DRAFT = 34.8 FEET
   b) MAXIMUM TUG BOAT PARAMETERS (MCALISTER)
      i) DISPLACEMENT TONNAGE = 1004 MTON
      ii) LOA = 120 FEET
      iii) LENGTH B/P = 109 FEET
      iv) BEAM = 33 FEET
      v) DRAFT = 16 FEET
   c) MAXIMUM BARGE PARAMETERS
      i) DISPLACEMENT TONNAGE = 1606 MTON
      ii) LOA = 195 FEET
      iii) LENGTH B/P = 195 FEET
      iv) BEAM = 35 FEET
      v) DRAFT = 9 FEET

V.A.4. PROJECT FEASIBILITY: COST BASIS AND CONTINGENCY DEVELOPMENT

Along with the design-related benefits, the fact that the Pier 1 South project has been fully engineered and permitted and the Pier 2 project has been bid and is nearing completion of construction puts the Port in the best possible position with respect to developing construction cost estimates for the Reconstruction of the North Berth at Pier 1. Also, the Pier 2 project provided QDC with first-hand experience with the risks involved with performing pile supported platform construction.

In planning phases of projects, the construction contingency is typically taken at 30-percent, though it can range from 20- to 50-percent depending on project complexity. When establishing budgetary costs for projects, the contingency drops in range from 15-percent to 25-percent. With the detailed construction cost information from the nearly completed construction at Pier 2, the contingency for the proposed project was selected to be 10-percent. If the total project cost exceeds $22.2 million due to the low contingency percentage applied, QDC will be responsible for the overage.

V.A.5. PROJECT FEASIBILITY: PROCUREMENT DELAYS

The bid for the Pier 1 South project will be advertised on May 17, 2022 and construction will begin shortly thereafter. The U.S. is currently experiencing extensive material procurement delays and bidding a construction project during this time will allow QDC to

have a strong understanding of the current procurement time lines. With this knowledge in-hand, QDC will be able to appropriately plan material procurement and deliveries in line with the construction schedule.

V.A.6. PROJECT SCHEDULE

Figure 7 and **Attachment 3** contain a matrix setting an anticipated schedule for each Project task: permitting, design, bidding, and construction. QDC will continue with schematic design and permitting for this project while awaiting potential notice of award. So to not create operational challenges, QDC proposes beginning construction in September 2024, after completion of the Pier 1 South project. Construction will conclude in by the end of 2025. Major milestones include:

September 2022: Schematic design and permitting begins

March 2023: Permit applications (USACE, RICRMC, RIDEM)

June 2023: 30% plans, list of specifications, and order of magnitude cost estimate submitted

February 2024: 90% plans, redline specifications, and definitive cost estimate submitted

March 2024: 100% plans and specifications submitted for final review

April 2024: Construction plans and specifications submitted for bidding

September 2024: Construction begins

November 2025: Construction finishes

Permit applications for the USACE and RICRMC are expected to be submitted in August 2023, providing 13-months to be approved and issued prior to construction. The proposed schedule reflects a 15-month construction schedule, which is based on the current pace of the construction ongoing at Pier 2. This project would be severely delayed if PIDP funding were not awarded, as project construction would need to wait until another source of funding was secured.

V.B. ENVIRONMENTAL RISK

V.B.1. NEPA STATUS: FONSI RECEIVED

On May 4, 2022, a Finding of No Significant Impact (FONSI) was signed by MARAD's Associate Administrator for Environmental Compliance for all three phases of the Pier 1 reconstruction project outlined in **Figure 7**. With this issuance of the FONSI, QDC does not anticipate any additional NEPA review.

FIGURE 7: DETAILED PROJECT SCHEDULE

Project Task	Duration (Months)	Schedule																																								
		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25
Permitting	18																																								
QDC Planning Period	6																																								
RICRMC and USACE Permit Applications	12																																								
RICRMC Review for Completeness	1																																								
USACE Review for Completeness	1																																								
Design	14																																								
Geotechnical Investigation	Complete																																								
Pier 1 North Face Design	14																																								
Prepare 30% Plans and Submit to QDC	4																																								
Prepare 90% Plans and Specifications and Submit to QDC	8																																								
Prepare Final Plans and Specifications and Submit to QDC	1																																								
Prepare Bidding Issue Plans and Specifications and Submit to QDC	1																																								
Bidding	4																																								
Construction	15																																								
Contractor Mobilization	1																																								
Demolition and Removal	2																																								
Pier	9																																								
Mooring Hardware	1																																								
Fender System	1																																								
Contractor Demobilization	1																																								

V.B.2. OTHER FEDERAL & STATE APPROVALS REQUIRED

The following federal and state permits are anticipated, based on the permitting that was required for the Pier 1 South Berth:

- Section 404/Section 10 Category 2 General Permit from the U.S. Army Corps of Engineers
- Maintenance Assent from the Rhode Island Coastal Resources Management Council (RICRMC)

V.B.3. OTHER ENVIRONMENTAL PERMITS NOT REQUIRED

QDC anticipates that the following permits and regulations will not need to be obtained or addressed:

- Section 401 Water Quality Certificate from the Rhode Island Department of Environmental Management (RIDEM): It is not anticipated that this permit will be required as it was not required for the South Berth.

- Endangered Species Act: There are no threatened or endangered species in the Town of North Kingstown as shown on the Fish and Wildlife Service website.[7]
- Magnuson-Stevens Fishery Conservation and Management Act: Narragansett Bay is not shown on any maps as a critical habitat for any endangered species per the National Marine Fisheries Service.[8]

V.B.4. STATE & LOCAL APPROVALS

No legislative approvals are required. The Quonset Development Corporation, under its existing enabling legislation, has the authority to implement the project.

The project is consistent with the following relevant planning documents, and therefore, no additional planning approvals are anticipated:

- Rhode Island State Freight Plan;
- Master Land Use and Development Plan for the Quonset Business Park (2019);
- Comprehensive Plan for the Town of North Kingstown;
- Moving Forward RI 2040, Rhode Island's Long Range Transportation Plan;
- Rhode Island 2030, the Governor's economic plan; and
- Land Use 2025, the Rhode Island State Land Use Plan.

V.C. RISK MITIGATION

As described in **Section V.A. Technical Capacity on page 21**, QDC will utilize its substantial experience with the Pier 2 and Pier 1 South Berth projects to plan appropriately, meaning that the risks to scope, schedule and budget are minimal. As proposed, QDC's ability to deliver this project on time and on budget has few challenges. In the Pier 1 South PIDP grant application, QDC listed a potential concern regarding the unknown geotechnical conditions. The geotechnical conditions are no longer a concern as QDC completed a full range of geotechnical borings at Pier 1 in 2021. One risk to the proposed budget, however, is that if operational changes dictate that additional mooring or breasting dolphins will be needed, then the construction costs may increase. The minimal risks to the project are outlined in **Table 8**.

VI. DOMESTIC PREFERENCE

All materials to be purchased for this project can and will be produced domestically. The project comprises primarily of steel pipe piles, steel reinforced concrete elements, and mooring hardware. Although, oversees manufacturers of steel elements, such as steel pipe piles and mooring hardware, have historically been more cost competitive than domestic suppliers, the raising of tariffs have minimized those savings. Domestic alternatives for the project's steel elements are readily available in the US, as outlined in **Table 9**. Typically, fenders are sourced from international manufacturers, but several domestic manufacturers can supply cylindrical foam filled

fenders as needed. The three manufacturers listed in **Table 9** were contacted and the manufacturers confirmed that they produce Buy America compliant fenders. During the pier design phase, various fender options will be explored to determine the most cost effective domestically produced fender for the project. No pieces of heavy equipment, such as cranes, are included in the project.

TABLE 8: PROJECT RISKS AND MITIGATION STRATEGIES

Risk	Description	Impact	Probability	Mitigation Strategy
Funding	$11.25 million shortfall	High	Moderate	PIDP Grant
Permitting	USACE or CRMC permits denied	High	Low	The structure will be built on the same footprint and perform the same function. Permits have been acquired for the South Berth project, which is a similar scope to this project. No mitigation required.
Construction	Construction delays occur	Moderate	Low	Using lessons learned from construction of Pier 2
Procurement	Steel pipe piles procurement delay	High	Low	Providing conservative 4-month window for bidding and contractor preparation
Procurement	Fender procurement delay	Low	Low	Coordinate fender selection with manufacturers during design and procurement early in the project schedule to provide conservative 6-month manufacturing and delivery window. Closely monitor the procurement schedules associated with the Pier 1 South Berth project to inform this project schedule. Specifically, fenders are one of the last items installed in the project; therefore the potential impact of delays on the project is low.

TABLE 9: DOMESTIC SOURCES OF REQUIRED COMPONENTS/MATERIALS

Item	To be Purchased for Project? (Y/N)	U.S. Source #1	U.S. Source #2	U.S. Source #3
Aluminum Anodes	Yes	M&N Industries, Inc. 800 West Front Street Chester, PA 19013 (610) 477-0663 www.mmanodes.com	Galvotec 181 Grefer Lane Harvey, LA 70058 (504) 362-7776 www.galvotec.com	Farwest Corrosion Control Company 12029 Regentview Ave Downey, CA 90241 (888) 532-7937 www.farwestcorrosion.com
Bollards	Yes	J.C. MacElroy Company, Inc. PO Box 850 91 Ethel Road West Piscataway, NJ 08855 (800)-MacElroy (732) 572-7100 www.macelroy.com/	Schoellhorn-Albrecht Machine Co., Inc. 1141 Reco Ave. St. Louis, MO 63126 (314) 965-3339 www.schoellhorn-albrecht.com	J.H. Menge & Company, Inc. PO Box 23602 New Orleans, LA 70183-0602 (504) 733-4871 jhmenge.com/
Fenders	Yes	Blue Ocean Marine Equipment 20423 SR 7 Suite 151 Boca Raton, FL 33498 (407 574-3927 blueoceanmarineequipment.com	Morse Rubber LLC 3588 Main Street Keokuk, IA 52632 (800) 553-7036 (319) 524-8430 morserubber.com	Marine Structures PO Box 433 Morehead City, NC 28557 (252) 241-8823 marinestructures.com/
Chains (for Fenders only)	Yes	Blue Ocean Marine Equipment 20423 SR 7 Suite 151 Boca Raton, FL 33498 (407 574-3927 blueoceanmarineequipment.com	Morse Rubber LLC 3588 Main Street Keokuk, IA 52632 (800) 553-7036 (319) 524-8430 morserubber.com	Marine Structures PO Box 433 Morehead City, NC 28557 (252) 241-8823 marinestructures.com/
Concrete	Yes	Cardi Corporation 400 Lincoln Ave Warwick, RI 02888 (401) 739-8300 www.cardi.com/	Consolidated Concrete Corporation Reservoir Rd Coventry, RI 02816 (401) 828-4700 www.flofill.com/	Cullion Concrete 375 Phenix Ave Cranston, RI 02921 (401) 783-4650 www.cullionconcrete.com
HDPE Sleeves	Yes	Performance Pipe 5085 W. Park Boulevard, Suite 500 Plano, TX 75093 (800) 233-6495 www.performancepipe.com/	JM Eagle 5200 West Century Boulevard Los Angeles CA 90045 (800) 621-4404 www.jmeagle.com/	WL Plastics 3575 Lone Star Circle, Suite 300 Fort Worth TX 76177 (682) 831-2700 www.wlplastics.com

TABLE 9 (*CONT.*): DOMESTIC SOURCES OF REQUIRED COMPONENTS/MATERIALS

Item	To be Purchased for Project? (Y/N)	U.S. Source #1	U.S. Source #2	U.S. Source #3
Steel Pipe Piles	Yes	Skyline Steel, Inc. 391 West Water Street Taunton, MA 02780 (508) 821-4700 www.nucorskyline.com/	JD Fields & Company, Inc. 99 Derby Street, Ste. 200 Hingham MA 02043 (508) 280-5244 jdfields.com/	Edgen Murray 56318 National Road Birdgeport, OH 43912 (740) 633-8830 www.edgenmurray.com
Steel Reinforcing	Yes	Harris Rebar 30 Lockbridge Street Pawtucket, RI 02860 (401) 724-9200 www.harrisrebar.com/	Mid City Steel 275 State Rd Westport, MA 02790 (774) 319-5400 midcitysteel.com/	Resteel Supply Co., Inc. 25 Bleachery Court, PO Box 7630 Warwick, RI 02887-7630 (401) 739-5304 www.resteel.com/

VII. DETERMINATIONS

Project Determination	Response
1. The project improves the safety, efficiency, or reliability of the movement of goods through a port or intermodal connection to the port.	This project improves the efficiency of the movement of goods within the Port by shortening the distance between the Ro-Ro vessel ramps and the point of first rest. The project improves the efficiency of the movement of goods through the Port by avoiding the loss of the active North Berth, which would create long queuing times for vessels. This project improves the reliability of moving goods through the Port by ensuring that there remain three active Ro-Ro berths for a variety of cargo. This project improves the reliability of moving goods through the Port by increasing Pier 1's resiliency to climate change, strong coastal storms, and seismic events. (See **Section IV.A. Achieving Safety, Efficiency, or Reliability Improvements on page 11**.)
2. The project is cost effective.	This project has a Benefit Cost Ratio of 1.74. (See **Attachment 2A - BCA Narrative**.)
3. The eligible applicant has the authority to carry out the project.	QDC is a quasi-state agency created by the Rhode Island General Assembly to develop and manage the Quonset Business Park and Port of Davisville on behalf of the State of Rhode Island, who owns the assets. (See http://webserver.rilin.state.ri.us/Statutes/TITLE42/42-64.10/INDEX.HTM)
4. The eligible applicant has sufficient funding available to meet the matching requirements.	QDC has the funding available to complete this project as described in this Project Narrative and the attached Matching Fund Documentation (see **Attachment 4**.) The funding from QDC will either come from QDC's capital budget or from the General Obligation Bond; neither source is bound or restricted by any conditions, stipulations, or time requirements, and both sources may be utilized throughout the project as needed.

Project Determination	Response
5. The project will be completed without unreasonable delay.	With the FONSI already completed, QDC expects that obligation can occur shortly after notice of grant award. QDC will continue to diligently pursue full engineering and permitting of the project to begin construction as soon as the Pier 1 South Berth project is completed, no later than September 2024. QDC has a long history of completing infrastructure projects on time and on budget, and will be able to complete the Pier 1 North Berth without delay by relying on our vast construction experience.
6. The project cannot be easily and efficiently completed without Federal funding or financial assistance available to the project sponsor.	**1.How would the project scope be affected if PIDP (or other Federal) funds were not received?** QDC would not be able to complete this project without PIDP funding. **2.How would the project schedule be affected if PIDP (or other Federal) funds were not received?** The project schedule would be delayed until another source of funding can be identified. **3.How would the project cost be affected if PIDP (or other Federal) funds were not received?** It is likely that project cost would go up if PIDP funds were not received due to delays in materials procurement and the current high rate of annual inflation.

ENDNOTES

1 http://www.planning.ri.gov/documents/tip/2021/Section%205-Transportation%20Equity%20Benefit%20Analysis.pdf

2 https://www.planri.com/documents.asp

3 http://www.planning.ri.gov/documents/trans/freight/freight-plan.pdf

4 https://rules.sos.ri.gov/regulations/part/880-00-00-1

5 https://purchasing.ri.gov/bidding/externalbidsearch.aspx

6 http://webserver.rilegislature.gov//Statutes/TITLE28/28-5.1/28-5.1-10.htm

7 http://www.fws.gov/northeast/newenglandfieldoffice/pdfs/RI%20species%20by%20town.pdf

8 http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm

RECONSTRUCTION OF THE NORTH BERTH AT PIER 1

PORT OF DAVISVILLE

FY 2022
Port Infrastructure Development Program
Grant Application

Benefit-Cost Analysis Report



Submitted by:
Quonset Development Corporation

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I. OVERVIEW

Quonset Development Corporation (QDC) is requesting a $11.25 million PIDP grant for the Reconstruction of the North Berth at Pier 1 (the Project) located at the Port of Davisville, RI (the Port). The Project will repair the North Berth of Pier 1, extending the berth's useful life by replacing the timber supports and making other structural improvements. Project construction is expected to begin in Fall 2024 and continue through the end of 2025. Without the Project, it is expected that the North Berth of Pier 1 will be closed in 2027 due to the state of its infrastructure making it unfit for the safe handling of cargo. If this were to happen, the Port and its users would experience limited ship berthing capacity resulting in unnecessary delays by reducing the Port from a three Ro-Ro berth facility to a two Ro-Ro berth facility.

The Port of Davisville is connected to a multi-modal (road, rail, and water) transportation network connecting the Port with economic centers in Rhode Island and the Northeast region. The Port has access to the M-95 Marine Highway, proximity to Interstate 95, and direct rail access to Amtrack's Northeast Corridor through the Quonset Business Park. The Port's primary cargo is roll-on/roll-of passenger vehicles (RoRo) and serves as an important gateway through its two cargo handling Piers.

Figure 1: Port of Davisville Overview



Pier 1 is divided into two areas: the North and South Berths. While the North Berth is currently operational, the South Berth is not as it undergoes its own rehabilitation project. Pier 2 also has one berth that is capable of handling RoRo cargo. The North Berth of Pier 1 is reaching the end of its service life, having been built by the US Navy in 1943. Both berths of Pier 1 have seen extensive use over the course of the Pier's 78-year lifespan and need repair to maintain current operations. Pier 1 was originally built using timber supports, which have eroded and weakened over the Pier's lifespan.

The current rehabilitation of Pier 1's South Berth will add a RoRo berth to the Port. This rehabilitation project, which is partially funded by a previous PIDP grant (2020), would make the Port a three Ro-Ro berth facility with a separate berth dedicated to heavy project cargo and/or offshore wind operations. The "Unlocking the South Berth at Pier 1" Project (South Berth Project) is currently underway and is expected to finish by 2025.

Without the Project, the North Berth at Pier 1 will have to shut down operations in 2027 as the South Berth becomes operational. If that were to happen, the benefits of the South Berth Project would not be fully realized. The benefits of the South Berth Project stem from the reduced wait times of a three-berth facility compared to wait times expected with a two-berth facility. If the Port were to remain a two-berth facility, there would be additional operating, inventory, and environmental costs incurred by the Port and its stakeholders as a result of the increased wait times.

For this analysis, the following Build and No-Build scenarios were considered:

- **Build Scenario**: The Port of Davisville can complete the Project by end of 2025, following the completion of the South Berth Project. The service life of the North Berth of Pier 1 is extended to 2075**.** In this scenario, the Port is able to continue operating as a three Ro-Ro berth facility with a separate berth dedicated to heavy project cargo and offshore wind operations, keeping vessel wait times to a minimum, and handling additional vessel call growth.
- **No-Build Scenario**: The Port does not complete the Project and as a result the North Berth of Pier 1 reaches the end of its service life and shuts down operations in 2027 due to safety concerns and the degradation of the North Berth infrastructure. The Port continues operations as a two Ro-Ro berth facility. This reduction in capacity impacts vessel wait time at the Port, causing vessels to take on additional operating costs as they spend time waiting for an available berth. There is also an inventory cost that is incurred by shippers bringing in cargo to the Port. The high value of the cargo moving through the Port, leads to increased costs over the course of the analysis period. The increased wait times also cause vessels to release a higher amount of polluting emissions as they wait at anchor adding to social costs of the No-Build scenario.

The BCA reflects USDOT's standard guidance regarding forecast periods and discount rates. As such, all estimates were calculated over a 30-year period, starting in 2026 following completion of the Project in 2025 in the build scenario, and a discount rate of 7 percent was used throughout the analysis (a discount rate of 3 percent was used for CO_2 emission benefits as suggested in USDOT BCA guidelines for 2022[1]). **The Reconstruction of the North Berth at Pier 1 Project has a Benefit-to-Cost Ratio of 1.74, in 2020 US$.** The results of the BCA are summarized in Table 1.

Table 1: Summary of Project Benefits (PV Discounted @ 7%, 2020 US$)

Category	Present Value
Economic Vitality Benefits	$28,594,788
Environmental Sustainability Benefits	$7,073,838
Operating & Maintenance Costs	($1,159,422)
Residual Value	$921,283
Total Benefits	**$35,430,487**
Project Cost	$20,420,934
Net Present Value	$15,009,553
Benefit to Cost Ratio	**1.74**

II. SUMMARY OF BENEFITS QUANTIFIED

The benefits quantified to determine the Benefit-to-Cost Ratio stem from the increase in vessel wait time in the No-Build scenario. The Project will have the following benefits:

- Avoided vessel operating costs that will accrue as a result of increased time spent waiting for an available berth at the Port in the No-Build scenario.
- Avoided inventory costs that will accrue due to the increased wait times. Due to the high value of the Pier's cargo (passenger vehicles), delays will lead to significant added inventory costs for cargo recipients intending to move vehicles through the Port.
- The additional time at anchor will cause an increase in the amount of polluting emissions released as vessels wait at anchor for a berth to become available. For this analysis, the avoided cost of additional tons of CO_2, NO_x, $PM_{2.5}$, SO_x were calculated as a benefit to the Build scenario.

[1] Benefit Cost Analysis Guidance 2022 (Revised).pdf (transportation.gov)

Table 2: Expanded Summary of Project Costs and Benefits (PV Discounted @ 7%, 2020 US$)

Category	Type of Impact	Present Value	Present Value
Economic Competitiveness	Avoided operating costs from increased wait times	$12,948,755	$28,594,788
	Avoided inventory costs from increased wait times	$15,646,034	
Environmental Sustainability	Reduced CO2 emissions	$1,331,664	$7,073,838
	Reduced NOx emissions	$3,067,168	
	Reduced PM emissions	$2,435,476	
	Reduced SO2 emissions	$239,529	
Maintenance & Operating Costs	Ongoing costs to maintain optimal conditions of the project		($1,159,422)
Residual Value	Remaining useful life of project after 30-year BCA period minus future maintenance costs		$921,283
		Total Benefits	**$35,430,487**
		Design, Construction and Maintenance & Operating Costs	$20,420,934
		Benefit-to-Cost Ratio	**1.74**
		Net Present Value	$15,009,553

III. ASSUMPTIONS

A. No Vessel Diversion

The analysis assumes that delays at the Port of Davisville will not lead to a diversion of RoRo cargo away from the Port. This is a result of the fact that RoRo shippers would be required to pay the Harbor Maintenance Tax (HMT) at alternate port. Today, users of the Port of Davisville are exempt from it at the Port of Davisville[2]. The above tax (0.125% of cargo value) holds a value higher than the daily pipeline inventory cost of RoRo cargo (0.017% of cargo value)[3]. This incentivizes RoRo shippers to maintain operations at the Port, regardless of the increased vessel wait times expected in the No-Build scenario.

B. Expected Vessel Call Forecast

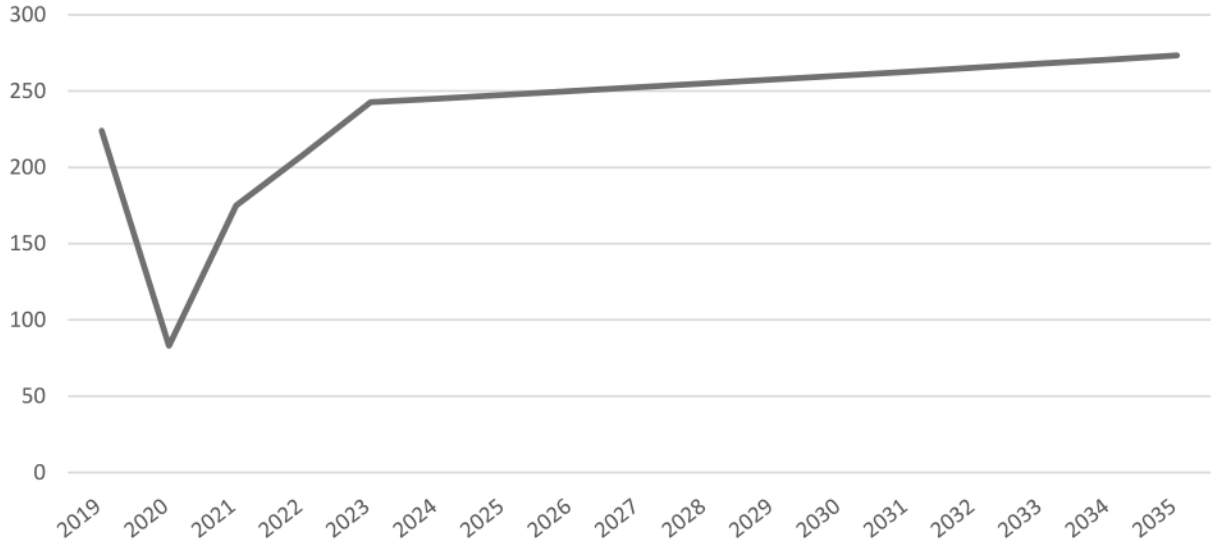
The analysis of the Build and No-Build scenarios were conducted under the assumption that vessel call volumes will return to levels seen before COVID-19. Vessel calls at the Port of Davisville fell 63% in the year 2020 due to the effects of the pandemic. In 2021, volumes rebounded, more than doubling 2020 figures, as vessel calls were now just 20% below 2019. It

[2] The Port of Davisville has opted to do dredging itself without the USACE and thus eliminated the use / access to HMT to fund dredging

[3] "Cost of Capital by Sector", http://people.stern.nyu.edu/adamodar/New_Home_Page/datafile/wacc.htm, Category: Automotive Retail (Cost of Capita/365)

is expected that calls for RoRo vessels will return to pre-pandemic levels by 2023, and then grow in line with expected US population growth (= 1.0% 2023 - 2050).

Figure 2: Vessel Call Forecast



C. Value of RoRo Cargo and Pipeline Inventory Costs

The following assumptions regarding characteristics of RoRo cargo moved through the Port of Davisville were used as inputs for the purposes of this BCA:

- Average Vehicle Capacity per Vessel: 6,000 cars
- Average Vessel Utilization: 80%
- Average Value of Vehicle: $28,994[4]
- Daily Cargo Devaluation: 0.017% of cargo value[5]

D. Wait Time Queuing Model

The removal of the North Berth at Pier 1 in the No-Build scenario will lead to increased queueing times for RoRo vessels waiting to be served at the Port of Davisville. An increase in queuing delays will lead to increase vessel operating costs and increased vessel emissions.

To predict the average wait time of future vessels, a basic queuing model (M/M/c) was used. Vessel queuing times in both the "With-Project" and "Without Project" scenarios were estimated by approximating the berth operation with a queue model and using an online queuing model solver.[6] In this model, the savings between the two scenarios were estimated by

[4] USA Trade Online, Average value of passenger vehicles imported into Providence, RI district in 2015-2019.
[5] "Cost of Capital by Sector", http://people.stern.nyu.edu/adamodar/New_Home_Page/datafile/wacc.htm, Category: Automotive Retail (Cost of Capita/365).
[6] "Queuing Theory Calculator", https://www.supositorio.com/rcalc/rcalclite.htm.

examining the transition from an M/M/3 (a system with a single queue governed by a Poisson process and three servers available representing three functional berths) to an M/M/2 setup (a system with a single queue governed by a Poisson process and two servers available representing two functional berths).

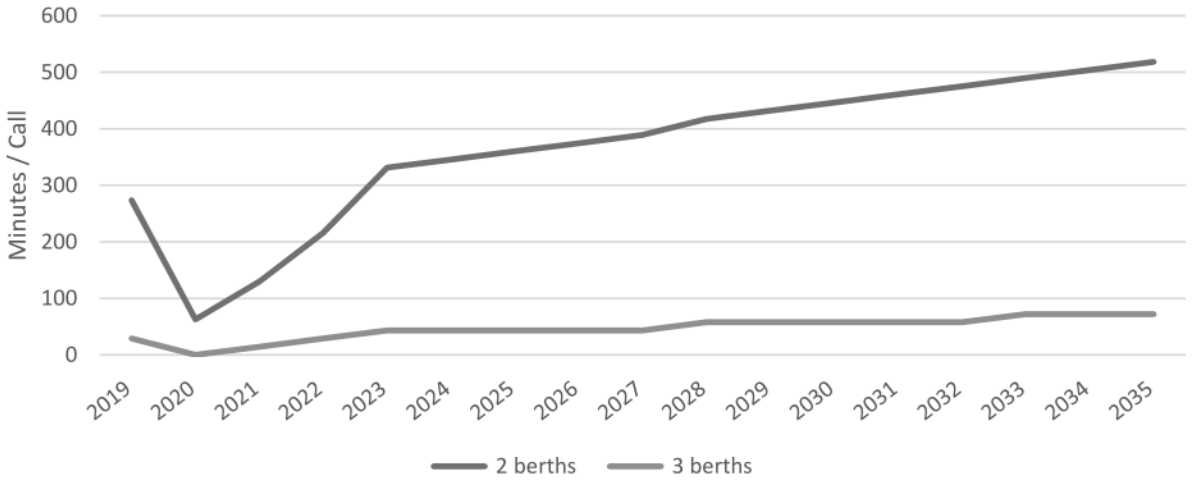
The following model inputs were obtained from QDC including its 2019 berth utilization data. 2019 values were used to represent normalized, pre-pandemic levels:

- 2019 Distinct Vessel Calls: 224 calls
- 2019 Days of Berth Utilization: 269 days
- Arrival Rate per Day: 0.63 (224/365)
- Vessel Served per Day per Berth: 0.83 (1/ (269/224)

The following are the results of the queuing model and are assumed to be a representative prediction of vessel wait time:

- In the Build scenario, while the Port is operating as three Ro-Ro berth facility, vessels will have limited wait times, and are not expected to experience significant delays. In 2027 its expected that vessels, on average, will have to wait about 43 minutes for an available berth. As call volumes increase over the analysis period, the wait time will increase steadily to an average of about 100 minutes per call.
- In the No-Build scenario, the call volume of the Port and loss of a berth causes increased delays at the facility. In 2027, when the North Berth is expected to be shut down, the average wait time is expected to be about 389 minutes per call. As the volume of calls increases, the average wait time increases to 720 minutes per call by 2056.

Figure 3: Average Wait Time Forecast



E. Project Cost

The total cost of the Project is estimated to be $28.34 million in 2020 US$. Since the Project is expected to begin in Fall 2024 and continue for 16 months, it was estimated that 15 percent of the total cost will be spent in 2024, and 85 percent will be spent in 2025. Using this cost schedule structure, the Project costs was discounted by 7 percent to derive the present value of the Project. The total cost of the Project will result in a present value of $20.42 million (present value discounted at 7 percent in 2020 US$).

F. Maintenance and Operating Costs

Maintenance and operating costs were determined for the Build scenario. The M&O costs for the No-Build were not calculated because it was assumed that there would be no ongoing M&O costs if the North Berth were to be decommissioned.

In the Build scenario, it is assumed that 0.5 percent of the total construction cost will have to be spent annually to keep the North Berth operating at full capacity. With this assumption, the M&O costs for each year of the project's life span would be equal to $141,719 in constant dollars. The total maintenance and operating costs for the analysis period was estimated to be $4.11 million in constant dollars, with a present value of $1.16 million (present value discounted at 7 percent in 2020 US$).

G. Residual Value

The Project has a design life cycle of 50-years. At the end of the BCA's analysis period, the Project is expected to have a remaining life of 20 years. The project has a total construction cost of $28.34 million (2020 US$). Using a linear depreciation method, the estimated value of the Project at the end of the BCA's analysis period is $11.34 million (in 2020 US$), or $1.06 million discounted at 7 percent. However, this does not include the maintenance and operating costs of the project between 2056 and 2075. The M&O costs for this period have a present value of $140,623 in 2020 US$ discounted by 7 percent. The Project has a residual value of $921,283 in 2020 US$ (present value discounted at 7 percent).

IV. PROJECT BENEFIT CALCULATIONS - DETAIL

A. Economic Vitality Benefits

i. Avoided Vessel Operating Cost Benefit

In order to estimate the vessel operating cost benefits resulting from the Project, the difference in wait times between the build and no-build scenarios shown in **Error! Reference source not found.** was multiplied by the daily cost of operating a RoRo vessel, which was estimated at $17,166 per day[7], and the total number of vessel calls (see Figure 2). The daily vessel operating cost used in this analysis does not consider fuel consumption costs for vessels waiting at the Port.

In total, the Project will provide $12.95 million (present value discounted at 7 percent) in avoided operating cost benefits over the 30-year analysis period.

ii. Avoided Inventory Cost Benefit

The continued operation of the North Berth at Pier 1 is crucial to minimizing vessel wait times at the Port. Increased vessel wait times will also lead to increased pipeline inventory costs in the No-Build scenario. The following assumptions regarding characteristics of RoRo cargo moved through the Port of Davisville were used as inputs for the purposes of this BCA:

- Average Vehicle Capacity per Vessel: 6,000 cars
- Average Vessel Utilization: 80%
- Average value per RoRo unit: $28,994, based on US trade date[8]
- Daily Cargo Devaluation: 0.017% of cargo value [9]

The average value of imported vehicles ($28,994) was multiplied by the 6,000 CEU (x 80 percent), which resulted in an average vessel cargo value of $139.17 million in 2020 US$. This results an average shipment having a pipeline inventory cost of cost of $20,742 per day, based on a daily cargo devaluation value of 0.017 percent.

In order to estimate the Project's impact on the pipeline inventory cost, the difference in wait times between the two scenarios shown in **Error! Reference source not found.** was multiplied by d aily pipeline inventory cost, and by the projected number of vessels calling the port in each year (as shown in Figure 2).

In total, the Project will provide $15.65 million (present value discounted at 7 percent) in avoided inventory cost benefits over the 30-year analysis period.

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[7] https://www.maritime.dot.gov/sites/marad.dot.gov/files/docs/resources/3651/comparisonofusandforeignflagoperatingcosts.pdf

[8] USA Trade Online, Average value of passenger vehicles imported into Providence, RI district in 2015-2019.

[9] "Cost of Capital by Sector", http://people.stern.nyu.edu/adamodar/New_Home_Page/datafile/wacc.htm, Category: Automotive Retail (Cost of Capita/365).

iii. Environmental Sustainability Benefits

The increase in vessels wait times in the No-Build scenario will lead to an increase in vessel operating times and, consequently, to an increase in fuel consumption. Using inputs from the California Air Resource Board (CARB) and a vessel study from Lloyds-Fairplay[10], the average RoRo auxiliary engine was estimated to use 2,605 kilowatts of energy per hour.

Table 3: Emission Factors

Emission Type	Factor	Unit
CO_2 emissions per kg of fuel oil	690.00	kg / gal
Auxiliary engine emission factors - NO_x	13.90	g / kWh
Auxiliary engine emission factors - $PM_{2.5}$	0.23	g / kWh
Auxiliary engine emission factors - SO_x	0.40	g / kWh

With the expected increase in wait time over the analysis horizon, the No-Build scenario would lead to an increased energy demand of 50.32 million kilowatt hours between 2027 and 2055. Guidelines set out by CARB on hoteling auxiliary engines were used as emission factor inputs for the calculation of total emission savings[11].

In total, the Project will provide $7.07 million (present value discounted at 7 percent) in avoided emission benefits over the 30-year analysis period, as shown in Table 4.

Table 4: Emission Savings (2020 US$, PV Discounted @ 7%, CO_2 Discounted @ 3%)

Emission Type	Emission Savings (metric tons)	Present Value
CO_2	34,719	$1,331,664
NO_x	699	$3,067,168
$PM_{2.5}$	12	$2,435,476
SO_x	20	$239,529
Total		**$7,073,838**

[10] https://ww2.arb.ca.gov/sites/default/files/classic/regact/2008/fuelogv08/appdfuel.pdf

[11] https://ww2.arb.ca.gov/sites/default/files/classic/regact/2008/fuelogv08/appdfuel.pdf

V.PROJECT SUMMARY

The North Berth Rehabilitation Project will have a positive effect on operations at the Port of Davisville, and economic conditions for vehicle shippers moving cargo through the Port. In the Build scenario, the Port will be able to continue to serve Ro-Ro vessels without significant vessel wait times. The Build scenario would avoid the significant costs of the No-Build scenario, derived from vessels waiting for an available berth at the Port of Davisville. The increased wait times would lead to increased operating costs, loss of cargo value, and the release of a significant number of pollutants into the environment. The Project has an annual ongoing maintenance and operating cost of $141,719 in constant dollars and a residual value of $921,283 (present value discounted at 7 percent in 2020 US$). The Project would generate a present value of $35.43 million in benefits in 2020 US$ at a 7 percent discount rate (3 percent for CO_2 emissions). The project cost has a present value of $20.42 million and a Benefit-to-Cost ratio of **1.74**.

Category	Present Value (Discounted at 7%, 2020 US$)
Economic Vitality Benefits	$28,594,788
Environmental Sustainability Benefits	$7,073,838
Operating & Maintenance Costs	($1,159,422)
Residual Value	$921,283
Total Benefits	**$35,430,487**
Project Cost	$20,420,934
Net Present Value	$15,009,553
Benefit to Cost Ratio	**1.74**

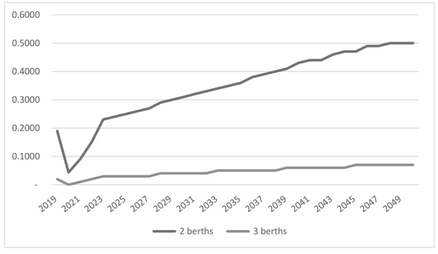
Category	Type of Impact	Present Value	Total Present Value
Economic Vitality	Avoided Operating Costs from increased wait times	$12,948,755	$28,594,788
	Avoided inventory costs from increased wait times	$15,646,034	
Environmental Sustainability	Reduced CO2 emissions	$1,331,664	$7,073,838
	Reduced NOx emissions	$3,067,168	
	Reduced PM emissions	$2,435,476	
	Reduced SO2 emissions	$239,529	
Operating & Maintenance Costs	Ongoing costs to maintain optimal conditions of the project		($1,159,422)
Residual Value	Remaining useful life of project after 30-year BCA period minus future maintenance costs		$921,283
Total Benefits			**$35,430,487**
Design, Construction and Maintenance & Operating Costs			$20,420,934
Benefit-to-Cost Ratio			**1.74**
Net Present Value			$15,009,553

Factor		Unit
CO2 emissions per kg of fuel oil	690.00	kg / gal
Auxiliary engine emission factors - NOx	13.90	g / kWh
Auxiliary engine emission factors - PM2.5	0.23	g / kWh
Auxiliary engine emission factors - SOx	0.40	g / kWh

Emission Type	Emission Savings in Tons	Cost (PV)
CO2	34,719	1,331,664
NOx	699	3,067,168
PM2.5	12	2,435,476
SOx	20	239,529
Total		**7,073,838**

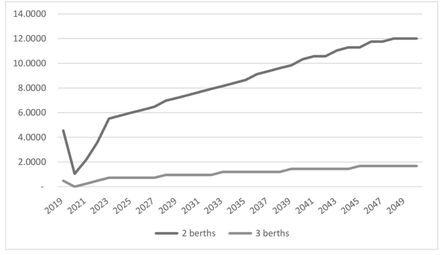
Days

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
2 berths	0.1900	0.0435	0.0900	0.1500	0.2300	0.2400	0.2500	0.2600	0.2700	0.2900	0.3000	0.3100	0.3200	0.3300	0.3400	0.3500	0.3600	0.3800	0.3900	0.4000	0.4100	0.4300	0.4400	0.4400	0.4600	0.4700	0.4700	0.4900	0.4900	0.5000	0.5000	0.5000
3 berths	0.0200	-	0.0100	0.0200	0.0300	0.0300	0.0300	0.0300	0.0300	0.0400	0.0400	0.0400	0.0400	0.0400	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700



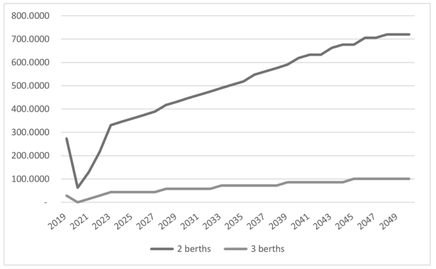
Hours

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
2 berths	4.5600	1.0440	2.1600	3.6000	5.5200	5.7600	6.0000	6.2400	6.4800	6.9600	7.2000	7.4400	7.6800	7.9200	8.1600	8.4000	8.6400	9.1200	9.3600	9.6000	9.8400	10.3200	10.5600	10.5600	11.0400	11.2800	11.2800	11.7600	11.7600	12.0000	12.0000	12.0000
3 berths	0.4800	-	0.2400	0.4800	0.7200	0.7200	0.7200	0.7200	0.7200	0.9600	0.9600	0.9600	0.9600	0.9600	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.6800	1.6800	1.6800	1.6800	1.6800	1.6800

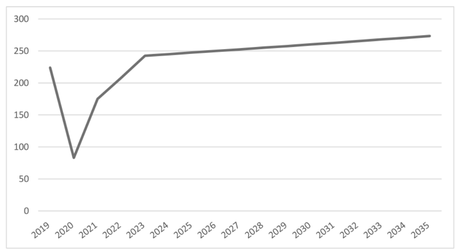


Minutes

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
2 berths	273.6000	62.6400	129.6000	216.0000	331.2000	345.6000	360.0000	374.4000	388.8000	417.6000	432.0000	446.4000	460.8000	475.2000	489.6000	504.0000	518.4000	547.2000	561.6000	576.0000	590.4000	619.2000	633.6000	633.6000	662.4000	676.8000	676.8000	705.6000	705.6000	720.0000	720.0000	720.0000
3 berths	28.8000	-	14.4000	28.8000	43.2000	43.2000	43.2000	43.2000	43.2000	57.6000	57.6000	57.6000	57.6000	57.6000	72.0000	72.0000	72.0000	72.0000	72.0000	72.0000	86.4000	86.4000	86.4000	86.4000	86.4000	86.4000	100.8000	100.8000	100.8000	100.8000	100.8000	100.8000



	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Vessel Calls	224	83	175	208	243	245	247	250	252	255	258	260	263	265	268	271	273	276	279	282	284	287	290	293	296	299	302	305	308	311	314	317



Inputs - Constants

	Constant	Unit	Notes	Mgmt.	Base Case	Upside	Downside	Scenario 5
SCENARIOS								
Active scenario name	Base Case							
Scenario selector	**2**			**1**	**2**	**3**	**4**	**5**
TIMING ASSUMPTIONS								
1st model column start date	01 Jan 15	date						
Forecast start date	2022	year						
Length of BCA period (operating)	30	years						
Months per model period	12	months						
Financial year end month number	12	month #						
North Berth shutdown start year - No-Build	2027	year						
Project operation start year	2026	year						
Base year	2020	year						
Discount rate (excluding CO2 emissions)	7.00%	percent						
Discount rate (for CO2 emissions)	3.00%	percent						
PROJECT ASSUMUPTIONS								
Project design life	50	years						
Annual maintenance and operating costs - Constant Dollars	141,719	US$						
Maintenance and operating costs as a share of total project costs	0.50%	percent						
ECONOMIC BENEFITS								
Vessel Operating Cost								
Vessel operating cost per day excluding fuel	17,166	US$	https://www.maritime.dot.gov/sites/marad.dot.gov/files/docs/resources/3651/comparisonofusandforeignflagoperatingcosts.pdf					
Average value of cargo - RoRo	28,994	US$	USA Trade Online, Average value of passenger vehicles imported into Providence, RI district in 2015-2019.					
Average vessel capacity - RoRo	6,000	CEU	Assumption					
RoRo vessel utilization	80.00%	percent	Assumption					
Congestion cost per day - Pipeline inventory cost	0.01%	percent	Cost of Capital for Auto Retailers Divided by 365 - http://people.stern.nyu.edu/adamodar/New_Home_Page/datafile/wacc.htm					
ENVIRONMENTAL BENEFITS								
Average RoRo auxiliary engine size	2,605	kilowatts	Lloyds-Fairplay PC Register database (Lloyds-Fairplay, 2007)					
Auxiliary Engine Load Factor - Hoteling RoRo Vessel	26.00%	percent	https://ww2.arb.ca.gov/sites/default/files/classic/regact/2011/ogv11/ogv11appd.pdf					
Emissions factor - Auxiliary engine - MDO (0.1% S) - CO2	690.00	g / kWh	https://ww2.arb.ca.gov/sites/default/files/classic/regact/2011/ogv11/ogv11appd.pdf					
Emissions factor - Auxiliary engine - MDO (0.1% S) - NOx	13.90	g / kWh	https://ww2.arb.ca.gov/sites/default/files/classic/regact/2011/ogv11/ogv11appd.pdf					
Emissions factor - Auxiliary engine - MDO (0.1% S) - PM 2.5	0.23	g / kWh	https://ww2.arb.ca.gov/sites/default/files/classic/regact/2011/ogv11/ogv11appd.pdf					
Emissions factor - Auxiliary engine - MDO (0.1% S) - SOx	0.40	g / kWh	https://ww2.arb.ca.gov/sites/default/files/classic/regact/2011/ogv11/ogv11appd.pdf					
NON CHANGEABLE MODEL TECHNICAL INPUTS								
Units in thousand	1,000	units / 000s						
kg per metric ton	1,000	kg / metric ton						
Gallons per ton - Bunker fuel	300	gallons / metric ton						
Kilowatt per horsepower	0.7457	kW / hp						
Hours per day	24	hours/day						
Grams per metric ton	1,000,000	g / metric ton						

Input - Time Series

Model Period Ending				**31 Dec 15**	**31 Dec 16**	**31 Dec 17**	**31 Dec 18**	**31 Dec 19**	**31 Dec 20**	**31 Dec 21**	**31 Dec 22**	**31 Dec 23**	**31 Dec 24**	**31 Dec 25**	**31 Dec 26**	**31 Dec 27**
Pre-forecast vs Forecast				Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Model Column counter	**Constant**	Unit	**Total**	1	2	3	4	5	6	7	8	9	10	11	12	13
PROJECT COSTS																
Construction cost - Build - Constant dollars		US$	28,343,806	-	-	-	-	-	-	-	-	-	4,251,571	24,092,235		-
PREVIOUS BCA INPUTS																
Annual vessel calls - Port of Davisville - RoRo		vessels	Queuing Analysis.xlsx	-	-	-	-	224	83	175	208	243	245	247	250	252
Average wait time - 2 berth facility		days / vessel	Queuing Analysis.xlsx	-	-	-	-	0.1900	0.0435	0.0900	0.1500	0.2300	0.2400	0.2500	0.2600	0.2700
Average wait time - 3 berth facility		days / vessel	Queuing Analysis.xlsx	-	-	-	-	0.0200	-	0.0100	0.0200	0.0300	0.0300	0.0300	0.0300	0.0300
												331.2000				
ENVIRONEMNTAL BENEFITS																
Emissions																
Damage costs for emissions - CO2 - 2020 US$		US$ / metric ton	Benefit Cost Analysis Guidance 2022 (Revised).pdf (transportation.gov)	-	-	-	-	-	50	52	53	54	55	56	57	58
Damage costs for emissions - NOx - 2020 US$		US$ / metric ton	Benefit Cost Analysis Guidance 2022 (Revised).pdf (transportation.gov)	-	-	-	-	-	15,700	15,600	15,800	16,000	16,200	16,500	16,800	17,100
Damage costs for emissions - PM - 2020 US$		US$ / metric ton	Benefit Cost Analysis Guidance 2022 (Revised).pdf (transportation.gov)	-	-	-	-	-	729,300	748,600	761,600	774,700	788,100	801,700	814,500	827,400
Damage costs for emissions - SO2 - 2020 US$		US$ / metric ton	Benefit Cost Analysis Guidance 2022 (Revised).pdf (transportation.gov)	-	-	-	-	-	40,400	41,500	42,300	43,100	44,000	44,900	45,700	46,500

Input - Time Series

Model Period Ending	31 Dec 28	31 Dec 29	31 Dec 30	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Model Column counter	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
PROJECT COSTS																			
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PREVIOUS BCA INPUTS																			
Annual vessel calls - Port of Davisville - RoRo	255	258	260	263	265	268	271	273	276	279	282	284	287	290	293	296	299	302	305
Average wait time - 2 berth facility	0.2900	0.3000	0.3100	0.3200	0.3300	0.3400	0.3500	0.3600	0.3800	0.3900	0.4000	0.4100	0.4300	0.4400	0.4400	0.4600	0.4700	0.4700	0.4900
Average wait time - 3 berth facility	0.0400	0.0400	0.0400	0.0400	0.0400	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0700	0.0700
ENVIRONEMNTAL BENEFITS																			
Emissions																			
Damage costs for emissions - CO2 - 2020 US$	60	61	62	63	64	65	66	67	68	69	70	71	72	73	75	77	78	79	80
Damage costs for emissions - NOx - 2020 US$	17,400	17,700	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100
Damage costs for emissions - PM - 2020 US$	840,600	854,000	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600
Damage costs for emissions - SO2 - 2020 US$	47,300	48,200	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100

Input - Time Series

Model Period Ending	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58	31 Dec 59	31 Dec 60
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
Model Column counter	33	34	35	36	37	38	39	40	41	42	43	44	45	46
PROJECT COSTS														
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PREVIOUS BCA INPUTS														
Annual vessel calls - Port of Davisville - RoRo	308	311	314	317	321	324	327	330	334	337	-	-	-	-
Average wait time - 2 berth facility	0.4900	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	-	-	-	-
Average wait time - 3 berth facility	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	-	-	-	-
ENVIRONEMNTAL BENEFITS														
Emissions														
Damage costs for emissions - CO2 - 2020 US$	81	82	83	85	85	85	85	85	85	85	85	85	85	85
Damage costs for emissions - NOx - 2020 US$	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100
Damage costs for emissions - PM - 2020 US$	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600
Damage costs for emissions - SO2 - 2020 US$	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100

Time and Escalation

Model Period Ending				31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29	31 Dec 30	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34
Pre-forecast vs Forecast				Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Model Column counter	**Constant**	**Unit**	**Total**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TIME RULER																							
Model column counter		counter		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
First model column flag		flag		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1st model column start date	01 Jan 15	date																					
Months per model period	12	months																					
First model column flag	-	flag	- -	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Model period beginning		date		01 Jan 15	01 Jan 16	01 Jan 17	01 Jan 18	01 Jan 19	01 Jan 20	01 Jan 21	01 Jan 22	01 Jan 23	01 Jan 24	01 Jan 25	01 Jan 26	01 Jan 27	01 Jan 28	01 Jan 29	01 Jan 30	01 Jan 31	01 Jan 32	01 Jan 33	01 Jan 34
Months per model period	12	months																					
Model period beginning	-	date	- -	01 Jan 15	01 Jan 16	01 Jan 17	01 Jan 18	01 Jan 19	01 Jan 20	01 Jan 21	01 Jan 22	01 Jan 23	01 Jan 24	01 Jan 25	01 Jan 26	01 Jan 27	01 Jan 28	01 Jan 29	01 Jan 30	01 Jan 31	01 Jan 32	01 Jan 33	01 Jan 34
Model period ending		date		31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29	31 Dec 30	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34
1st model column start date	01 Jan 15	date																					
First modeling column financial year	2015	year																					
First modeling column financial year	2015	year																					
Financial year end month number	12	month #																					
Model period ending	-	date	- -	31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29	31 Dec 30	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34
First model column flag	-	flag	- -	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending		year		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FLAGS AND ESCALATIONS																							
Timing Flags																							
Forecast start date	2022	year																					
Project operation start year	2026	year																					
Length of BCA period (operating)	30	years																					
Length of forecast period	33	year #																					
Forecast start date	2022	year																					
Length of forecast period	33	year #																					
Last forecast date	2055	date																					
Last forecast date	2055	date																					
Forecast start date	2022	year																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Forecast period flag		flag	34	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1
Forecast start date	2022	year																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Pre-forecast flag		flag	8	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Forecast period flag	-	flag	34 -	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1
Pre-forecast flag	-	flag	8 -	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast vs forecast		timeline label		Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Forecast start date	2022	year																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
First forecast period flag		flag	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast date	2055	date																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Last forecast period flag		flag	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Berth shutdown start year - No-Build	2027	year																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Forecast period flag	-	flag	34 -	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1
Operating period flag		flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
Project operation start year	2026	year																					
Project design life	50	years																					
Operating period flag	-	flag	29 -	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Post analysis period remaining service life flag		flag	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escalations																							
Base year	2020	year																					
Discount rate (excluding CO2 emissions)	7.00%	percent																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Discount rate multiplier - 7 percent		factor		0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672	2.1049	2.2522	2.4098	2.5785
Base year	2020	year																					
Discount rate (for CO2 emissions)	3.00%	percent																					
Financial year ending	-	year	- -	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Discount rate multiplier - 3 percent		factor		0.8626	0.8885	0.9151	0.9426	0.9709	1.0000	1.0300	1.0609	1.0927	1.1255	1.1593	1.1941	1.2299	1.2668	1.3048	1.3439	1.3842	1.4258	1.4685	1.5126

Time and Escalation

Model Period Ending	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Model Column counter	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
TIME RULER																								
Model column counter	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1st model column start date																								
Months per model period																								
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Model period beginning	01 Jan 35	01 Jan 36	01 Jan 37	01 Jan 38	01 Jan 39	01 Jan 40	01 Jan 41	01 Jan 42	01 Jan 43	01 Jan 44	01 Jan 45	01 Jan 46	01 Jan 47	01 Jan 48	01 Jan 49	01 Jan 50	01 Jan 51	01 Jan 52	01 Jan 53	01 Jan 54	01 Jan 55	01 Jan 56	01 Jan 57	01 Jan 58
Months per model period																								
Model period beginning	01 Jan 35	01 Jan 36	01 Jan 37	01 Jan 38	01 Jan 39	01 Jan 40	01 Jan 41	01 Jan 42	01 Jan 43	01 Jan 44	01 Jan 45	01 Jan 46	01 Jan 47	01 Jan 48	01 Jan 49	01 Jan 50	01 Jan 51	01 Jan 52	01 Jan 53	01 Jan 54	01 Jan 55	01 Jan 56	01 Jan 57	01 Jan 58
Model period ending	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58
1st model column start date																								
First modeling column financial year																								
First modeling column financial year																								
Financial year end month number																								
Model period ending	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
FLAGS AND ESCALATIONS																								
Timing Flags																								
Forecast start date																								
Project operation start year																								
Length of BCA period (operating)																								
Length of forecast period																								
Forecast start date																								
Length of forecast period																								
Last forecast date																								
Last forecast date																								
Forecast start date																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Forecast period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-
Forecast start date																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast vs forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast
Forecast start date																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
First forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast date																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
North Berth shutdown start year - No-Build																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Forecast period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-
Project operation start year																								
Project design life																								
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Post analysis period remaining service life flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Escalations																								
Base year																								
Discount rate (excluding CO2 emissions)																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Discount rate multiplier - 7 percent	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	6.2139	6.6488	7.1143	7.6123	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793
Base year																								
Discount rate (for CO2 emissions)																								
Financial year ending	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Discount rate multiplier - 3 percent	1.5580	1.6047	1.6528	1.7024	1.7535	1.8061	1.8603	1.9161	1.9736	2.0328	2.0938	2.1566	2.2213	2.2879	2.3566	2.4273	2.5001	2.5751	2.6523	2.7319	2.8139	2.8983	2.9852	3.0748

Time and Escalation

Model Period Ending	31 Dec 59	31 Dec 60	31 Dec 61	31 Dec 62	31 Dec 63	31 Dec 64	31 Dec 65	31 Dec 66	31 Dec 67	31 Dec 68	31 Dec 69	31 Dec 70	31 Dec 71	31 Dec 72	31 Dec 73	31 Dec 74	31 Dec 75	31 Dec 76	31 Dec 77	31 Dec 78	31 Dec 79	31 Dec 80	31 Dec 81	31 Dec 82
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Model Column counter	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
TIME RULER																								
Model column counter	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1st model column start date																								
Months per model period																								
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Model period beginning	01 Jan 59	01 Jan 60	01 Jan 61	01 Jan 62	01 Jan 63	01 Jan 64	01 Jan 65	01 Jan 66	01 Jan 67	01 Jan 68	01 Jan 69	01 Jan 70	01 Jan 71	01 Jan 72	01 Jan 73	01 Jan 74	01 Jan 75	01 Jan 76	01 Jan 77	01 Jan 78	01 Jan 79	01 Jan 80	01 Jan 81	01 Jan 82
Months per model period																								
Model period beginning	01 Jan 59	01 Jan 60	01 Jan 61	01 Jan 62	01 Jan 63	01 Jan 64	01 Jan 65	01 Jan 66	01 Jan 67	01 Jan 68	01 Jan 69	01 Jan 70	01 Jan 71	01 Jan 72	01 Jan 73	01 Jan 74	01 Jan 75	01 Jan 76	01 Jan 77	01 Jan 78	01 Jan 79	01 Jan 80	01 Jan 81	01 Jan 82
Model period ending	31 Dec 59	31 Dec 60	31 Dec 61	31 Dec 62	31 Dec 63	31 Dec 64	31 Dec 65	31 Dec 66	31 Dec 67	31 Dec 68	31 Dec 69	31 Dec 70	31 Dec 71	31 Dec 72	31 Dec 73	31 Dec 74	31 Dec 75	31 Dec 76	31 Dec 77	31 Dec 78	31 Dec 79	31 Dec 80	31 Dec 81	31 Dec 82
1st model column start date																								
First modeling column financial year																								
First modeling column financial year																								
Financial year end month number																								
Model period ending	31 Dec 59	31 Dec 60	31 Dec 61	31 Dec 62	31 Dec 63	31 Dec 64	31 Dec 65	31 Dec 66	31 Dec 67	31 Dec 68	31 Dec 69	31 Dec 70	31 Dec 71	31 Dec 72	31 Dec 73	31 Dec 74	31 Dec 75	31 Dec 76	31 Dec 77	31 Dec 78	31 Dec 79	31 Dec 80	31 Dec 81	31 Dec 82
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
FLAGS AND ESCALATIONS																								
Timing Flags																								
Forecast start date																								
Project operation start year																								
Length of BCA period (operating)																								
Length of forecast period																								
Forecast start date																								
Length of forecast period																								
Last forecast date																								
Last forecast date																								
Forecast start date																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast start date																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast vs forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Forecast start date																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
First forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast date																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Berth shutdown start year - No-Build																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Project operation start year																								
Project design life																								
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Post analysis period remaining service life flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-
Escalations																								
Base year																								
Discount rate (excluding CO2 emissions)																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Discount rate multiplier - 7 percent	13.9948	14.9745	16.0227	17.1443	18.3444	19.6285	21.0025	22.4726	24.0457	25.7289	27.5299	29.4570	31.5190	33.7253	36.0861	38.6122	41.3150	44.2071	47.3015	50.6127	54.1555	57.9464	62.0027	66.3429
Base year																								
Discount rate (for CO2 emissions)																								
Financial year ending	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082
Discount rate multiplier - 3 percent	3.1670	3.2620	3.3599	3.4607	3.5645	3.6715	3.7816	3.8950	4.0119	4.1323	4.2562	4.3839	4.5154	4.6509	4.7904	4.9341	5.0821	5.2346	5.3917	5.5534	5.7200	5.8916	6.0684	6.2504

Time and Escalation

Model Period Ending	31 Dec 83	31 Dec 84	31 Dec 85	31 Dec 86	31 Dec 87	31 Dec 88	31 Dec 89	31 Dec 90	31 Dec 91	31 Dec 92	31 Dec 93	31 Dec 94	31 Dec 95	31 Dec 96	31 Dec 97	31 Dec 98	31 Dec 99	31 Dec 00	31 Dec 01	31 Dec 02	31 Dec 03	31 Dec 04	31 Dec 05	31 Dec 06
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Model Column counter	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
TIME RULER																								
Model column counter	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1st model column start date																								
Months per model period																								
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Model period beginning	01 Jan 83	01 Jan 84	01 Jan 85	01 Jan 86	01 Jan 87	01 Jan 88	01 Jan 89	01 Jan 90	01 Jan 91	01 Jan 92	01 Jan 93	01 Jan 94	01 Jan 95	01 Jan 96	01 Jan 97	01 Jan 98	01 Jan 99	01 Jan 00	01 Jan 01	01 Jan 02	01 Jan 03	01 Jan 04	01 Jan 05	01 Jan 06
Months per model period																								
Model period beginning	01 Jan 83	01 Jan 84	01 Jan 85	01 Jan 86	01 Jan 87	01 Jan 88	01 Jan 89	01 Jan 90	01 Jan 91	01 Jan 92	01 Jan 93	01 Jan 94	01 Jan 95	01 Jan 96	01 Jan 97	01 Jan 98	01 Jan 99	01 Jan 00	01 Jan 01	01 Jan 02	01 Jan 03	01 Jan 04	01 Jan 05	01 Jan 06
Model period ending	31 Dec 83	31 Dec 84	31 Dec 85	31 Dec 86	31 Dec 87	31 Dec 88	31 Dec 89	31 Dec 90	31 Dec 91	31 Dec 92	31 Dec 93	31 Dec 94	31 Dec 95	31 Dec 96	31 Dec 97	31 Dec 98	31 Dec 99	31 Dec 00	31 Dec 01	31 Dec 02	31 Dec 03	31 Dec 04	31 Dec 05	31 Dec 06
1st model column start date																								
First modeling column financial year																								
First modeling column financial year																								
Financial year end month number																								
Model period ending	31 Dec 83	31 Dec 84	31 Dec 85	31 Dec 86	31 Dec 87	31 Dec 88	31 Dec 89	31 Dec 90	31 Dec 91	31 Dec 92	31 Dec 93	31 Dec 94	31 Dec 95	31 Dec 96	31 Dec 97	31 Dec 98	31 Dec 99	31 Dec 00	31 Dec 01	31 Dec 02	31 Dec 03	31 Dec 04	31 Dec 05	31 Dec 06
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
FLAGS AND ESCALATIONS																								
Timing Flags																								
Forecast start date																								
Project operation start year																								
Length of BCA period (operating)																								
Length of forecast period																								
Forecast start date																								
Length of forecast period																								
Last forecast date																								
Last forecast date																								
Forecast start date																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast start date																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast vs forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Forecast start date																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
First forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast date																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Berth shutdown start year - No-Build																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Project operation start year																								
Project design life																								
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Post analysis period remaining service life flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escalations																								
Base year																								
Discount rate (excluding CO2 emissions)																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Discount rate multiplier - 7 percent	70.9869	75.9559	81.2729	86.9620	93.0493	99.5627	106.5321	113.9894	121.9686	130.5065	139.6419	149.4168	159.8760	171.0673	183.0421	195.8550	209.5648	224.2344	239.9308	256.7260	274.6968	293.9255	314.5003	336.5154
Base year																								
Discount rate (for CO2 emissions)																								
Financial year ending	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106
Discount rate multiplier - 3 percent	6.4379	6.6311	6.8300	7.0349	7.2459	7.4633	7.6872	7.9178	8.1554	8.4000	8.6520	8.9116	9.1789	9.4543	9.7379	10.0301	10.3310	10.6409	10.9601	11.2889	11.6276	11.9764	12.3357	12.7058

Time and Escalation

Model Period Ending	31 Dec 07	31 Dec 08	31 Dec 09	31 Dec 10	31 Dec 11	31 Dec 12	31 Dec 13	31 Dec 14	31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Model Column counter	93	94	95	96	97	98	99	100	101	102	103	104	105	106
TIME RULER														
Model column counter	93	94	95	96	97	98	99	100	101	102	103	104	105	106
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1st model column start date														
Months per model period														
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Model period beginning	01 Jan 07	01 Jan 08	01 Jan 09	01 Jan 10	01 Jan 11	01 Jan 12	01 Jan 13	01 Jan 14	01 Jan 15	01 Jan 16	01 Jan 17	01 Jan 18	01 Jan 19	01 Jan 20
Months per model period														
Model period beginning	01 Jan 07	01 Jan 08	01 Jan 09	01 Jan 10	01 Jan 11	01 Jan 12	01 Jan 13	01 Jan 14	01 Jan 15	01 Jan 16	01 Jan 17	01 Jan 18	01 Jan 19	01 Jan 20
Model period ending	31 Dec 07	31 Dec 08	31 Dec 09	31 Dec 10	31 Dec 11	31 Dec 12	31 Dec 13	31 Dec 14	31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20
1st model column start date														
First modeling column financial year														
First modeling column financial year														
Financial year end month number														
Model period ending	31 Dec 07	31 Dec 08	31 Dec 09	31 Dec 10	31 Dec 11	31 Dec 12	31 Dec 13	31 Dec 14	31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20
First model column flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
FLAGS AND ESCALATIONS														
Timing Flags														
Forecast start date														
Project operation start year														
Length of BCA period (operating)														
Length of forecast period														
Forecast start date														
Length of forecast period														
Last forecast date														
Last forecast date														
Forecast start date														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast start date														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-forecast vs forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Forecast start date														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
First forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast date														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Berth shutdown start year - No-Build														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Project operation start year														
Project design life														
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Post analysis period remaining service life flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Escalations														
Base year														
Discount rate (excluding CO2 emissions)														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Discount rate multiplier - 7 percent	360.0714	385.2764	412.2458	441.1030	471.9802	505.0188	540.3701	578.1960	618.6697	661.9766	708.3150	757.8970	810.9498	867.7163
Base year														
Discount rate (for CO2 emissions)														
Financial year ending	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Discount rate multiplier - 3 percent	13.0870	13.4796	13.8839	14.3005	14.7295	15.1714	15.6265	16.0953	16.5782	17.0755	17.5878	18.1154	18.6589	19.2186

Volume

Model Period Ending				31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29
Pre-forecast vs Forecast				Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Model Column counter	**Constant**	**Unit**	**Total**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
VESSEL CALL FORECAST																		
Annual vessel calls - Port of Davisville - RoRo	-	vessels	Queuing Analysi	-	-	-	-	-	224	83	175	208	243	245	247	250	252	255	258
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Vessel call forecast - Port of Davisville - RoRo		vessels	8,445		-	-	-	-	-	-	-	-	-	-	-	-	252	255	258
VESSEL WAIT TIME FORECASTS																		
Difference in Wait Time																		
Average wait time - 2 berth facility	-	days / vessel	Queuing Analysi	-	-	-	-	-	0.1900	0.0435	0.0900	0.1500	0.2300	0.2400	0.2500	0.2600	0.2700	0.2900	0.3000
Average wait time - 3 berth facility	-	days / vessel	Queuing Analysi	-	-	-	-	-	0.0200	-	0.0100	0.0200	0.0300	0.0300	0.0300	0.0300	0.0300	0.0400	0.0400
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Increase in vessel wait time per vessel - No-build		days / vessel			-	-	-	-	-	-	-	-	-	-	-	-	0.2400	0.2500	0.2600
Vessel Wait Time Forecasts - Build																		
Vessel call forecast - Port of Davisville - RoRo	-	vessels	8,445	-	-	-	-	-	-	-	-	-	-	-	-	-	252	255	258
Average wait time - 3 berth facility	-	days / vessel	Queuing Analysi	-	-	-	-	-	0.0200	-	0.0100	0.0200	0.0300	0.0300	0.0300	0.0300	0.0300	0.0400	0.0400
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Vessel wait time - Build		days	492		-	-	-	-	-	-	-	-	-	-	-	-	8	10	10
Vessel Wait Time Forecasts - No-Build																		
Vessel call forecast - Port of Davisville - RoRo	-	vessels	8,445	-	-	-	-	-	-	-	-	-	-	-	-	-	252	255	258
Average wait time - 2 berth facility	-	days / vessel	Queuing Analysi	-	-	-	-	-	0.1900	0.0435	0.0900	0.1500	0.2300	0.2400	0.2500	0.2600	0.2700	0.2900	0.3000
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Vessel wait time - No-build		days	3,587		-	-	-	-	-	-	-	-	-	-	-	-	68	74	77

Volume

Model Period Ending	31 Dec 30	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46	31 Dec 47
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
Model Column counter	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
VESSEL CALL FORECAST																		
Annual vessel calls - Port of Davisville - RoRo	260	263	265	268	271	273	276	279	282	284	287	290	293	296	299	302	305	308
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vessel call forecast - Port of Davisville - RoRo	260	263	265	268	271	273	276	279	282	284	287	290	293	296	299	302	305	308
VESSEL WAIT TIME FORECASTS																		
Difference in Wait Time																		
Average wait time - 2 berth facility	0.3100	0.3200	0.3300	0.3400	0.3500	0.3600	0.3800	0.3900	0.4000	0.4100	0.4300	0.4400	0.4400	0.4600	0.4700	0.4700	0.4900	0.4900
Average wait time - 3 berth facility	0.0400	0.0400	0.0400	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0700	0.0700	0.0700
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Increase in vessel wait time per vessel - No-build	0.2700	0.2800	0.2900	0.2900	0.3000	0.3100	0.3300	0.3400	0.3500	0.3500	0.3700	0.3800	0.3800	0.4000	0.4100	0.4000	0.4200	0.4200
Vessel Wait Time Forecasts - Build																		
Vessel call forecast - Port of Davisville - RoRo	260	263	265	268	271	273	276	279	282	284	287	290	293	296	299	302	305	308
Average wait time - 3 berth facility	0.0400	0.0400	0.0400	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0700	0.0700	0.0700
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vessel wait time - Build	10	11	11	13	14	14	14	14	14	17	17	17	18	18	18	21	21	22
Vessel Wait Time Forecasts - No-Build																		
Vessel call forecast - Port of Davisville - RoRo	260	263	265	268	271	273	276	279	282	284	287	290	293	296	299	302	305	308
Average wait time - 2 berth facility	0.3100	0.3200	0.3300	0.3400	0.3500	0.3600	0.3800	0.3900	0.4000	0.4100	0.4300	0.4400	0.4400	0.4600	0.4700	0.4700	0.4900	0.4900
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vessel wait time - No-build	81	84	88	91	95	98	105	109	113	117	124	128	129	136	141	142	149	151

Volume

Model Period Ending	31 Dec 48	31 Dec 49	31 Dec 50	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58	31 Dec 59	31 Dec 60
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
Model Column counter	34	35	36	37	38	39	40	41	42	43	44	45	46
VESSEL CALL FORECAST													
Annual vessel calls - Port of Davisville - RoRo	311	314	317	321	324	327	330	334	337	-	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	-	-	-	-	-
Vessel call forecast - Port of Davisville - RoRo	311	314	317	321	324	327	330	334	-	-	-	-	-
VESSEL WAIT TIME FORECASTS													
Difference in Wait Time													
Average wait time - 2 berth facility	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	-	-	-	-
Average wait time - 3 berth facility	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	-	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	-	-	-	-	-
Increase in vessel wait time per vessel - No-build	0.4300	0.4300	0.4300	0.4300	0.4300	0.4300	0.4300	0.4300	-	-	-	-	-
Vessel Wait Time Forecasts - Build													
Vessel call forecast - Port of Davisville - RoRo	311	314	317	321	324	327	330	334	-	-	-	-	-
Average wait time - 3 berth facility	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	-	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	-	-	-	-	-
Vessel wait time - Build	22	22	22	22	23	23	23	23	-	-	-	-	-
Vessel Wait Time Forecasts - No-Build													
Vessel call forecast - Port of Davisville - RoRo	311	314	317	321	324	327	330	334	-	-	-	-	-
Average wait time - 2 berth facility	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	-	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	-	-	-	-	-
Vessel wait time - No-build	156	157	159	160	162	163	165	167	-	-	-	-	-

Benefits

Model Period Ending				31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29	31 Dec 30	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46
Pre-forecast vs Forecast				Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Model Column counter	Constant	Unit	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
ECONOMIC COMPETITIVENESS BENEFITS																																			
Avoided Vessel Wait Time Forecast - Build																																			
Vessel wait time - Build	-	days	492	-	-	-	-	-	-	-	-	-	-	-	-	8	10	10	10	11	11	13	14	14	14	14	17	17	17	18	18	18	21	21	
Vessel wait time - No-build	-	days	3,587	-	-	-	-	-	-	-	-	-	-	-	-	68	74	77	81	84	88	91	95	98	105	109	113	117	124	128	129	136	141	142	149
Increase in vessel wait times - No-build		days	3,095	-	-	-	-	-	-	-	-	-	-	-	-	61	64	67	70	74	77	78	81	85	91	95	99	100	106	110	111	118	123	121	128	
Hours per day	24	hours/day																																	
Increase in vessel wait times - No-build	-	days	3,095	-	-	-	-	-	-	-	-	-	-	-	-	61	64	67	70	74	77	78	81	85	91	95	99	100	106	110	111	118	123	121	128	
Increase in vessel wait times - No-build		hours	74,291	-	-	-	-	-	-	-	-	-	-	-	-	1,454	1,530	1,607	1,685	1,765	1,847	1,865	1,949	2,034	2,187	2,276	2,366	2,390	2,551	2,647	2,673	2,842	2,942	2,899	3,074	
Vessel Wait Time Benefits																																			
Vessel Wait Time Benefits																																			
Vessel operating cost per day excluding fuel	17,166	US$																																	
Increase in vessel wait times - No-build	-	days	3,095	-	-	-	-	-	-	-	-	-	-	-	-	61	64	67	70	74	77	78	81	85	91	95	99	100	106	110	111	118	123	121	128	
Increase in vessel operating costs during wait times - No-build		US$	53,138,220	-	-	-	-	-	-	-	-	-	-	-	-	1,040,106	1,094,278	1,149,430	1,205,575	1,262,728	1,320,904	1,334,113	1,393,918	1,454,786	1,564,130	1,627,643	1,692,270	1,709,193	1,824,929	1,892,994	1,911,924	2,032,677	2,104,329	2,073,534	2,198,983	
Increase in vessel operating costs during wait times - No-build	-	US$	53,138,220	-	-	-	-	-	-	-	-	-	-	-	-	1,040,106	1,094,278	1,149,430	1,205,575	1,262,728	1,320,904	1,334,113	1,393,918	1,454,786	1,564,130	1,627,643	1,692,270	1,709,193	1,824,929	1,892,994	1,911,924	2,032,677	2,104,329	2,073,534	2,198,983	
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Increase in vessel operating costs during wait times - No-build - PV		US$	12,948,755	-	-	-	-	-	-	-	-	-	-	-	-	647,726	636,880	625,214	612,853	599,913	586,497	553,610	540,586	527,281	529,825	515,270	500,682	472,606	471,596	457,183	431,546	428,787	414,861	382,047	378,655	
Inventory Cost Benefits																																			
RoRo vessel utilization	80.00%	percent																																	
Average vessel capacity - RoRo	6,000	CEU																																	
Average value of cargo - RoRo	28,994	US$																																	
Average value of RoRo shipment	139,171,200	US$ / vessel																																	
Average value of RoRo shipment	139,171,200	US$ / vessel																																	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Value of RoRo cargo shipments - Forecast		US$ / vessel	4,035,964,800	-	-	-	-	-	-	-	-	-	-	-	-	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	
Congestion cost per day - Pipeline inventory cost	0.01%	percent																																	
Value of RoRo cargo shipments - Forecast	-	US$ / vessel	4,035,964,800	-	-	-	-	-	-	-	-	-	-	-	-	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	
Inventory cost of increase vessel wait time per day		US$ / day	601,525	-	-	-	-	-	-	-	-	-	-	-	-	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	
Inventory cost of increase vessel wait time per day	-	US$ / day	601,525	-	-	-	-	-	-	-	-	-	-	-	-	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	
Increase in vessel wait times - No-build	-	days	3,095	-	-	-	-	-	-	-	-	-	-	-	-	61	64	67	70	74	77	78	81	85	91	95	99	100	106	110	111	118	123	121	128	
Increase in pipeline inventory costs - No-build		US$	64,207,129	-	-	-	-	-	-	-	-	-	-	-	-	1,256,765	1,322,221	1,388,861	1,456,702	1,525,760	1,596,054	1,612,014	1,684,277	1,757,824	1,889,944	1,966,687	2,044,777	2,065,224	2,205,070	2,287,313	2,310,186	2,456,092	2,542,670	2,505,460	2,657,040	
Increase in pipeline inventory costs - No-build	-	US$	64,207,129	-	-	-	-	-	-	-	-	-	-	-	-	1,256,765	1,322,221	1,388,861	1,456,702	1,525,760	1,596,054	1,612,014	1,684,277	1,757,824	1,889,944	1,966,687	2,044,777	2,065,224	2,205,070	2,287,313	2,310,186	2,456,092	2,542,670	2,505,460	2,657,040	
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Increase in pipeline inventory costs - No-build - PV		US$	15,646,034	-	-	-	-	-	-	-	-	-	-	-	-	782,650	769,545	755,448	740,513	724,878	708,667	668,929	653,192	637,116	640,190	622,603	604,976	571,052	569,832	552,416	521,439	518,105	501,279	461,629	457,530	
Total Economic Benefits																																			
Increase in vessel operating costs during wait times - No-build - PV	-	US$	12,948,755	-	-	-	-	-	-	-	-	-	-	-	-	647,726	636,880	625,214	612,853	599,913	586,497	553,610	540,586	527,281	529,825	515,270	500,682	472,606	471,596	457,183	431,546	428,787	414,861	382,047	378,655	
Increase in pipeline inventory costs - No-build - PV	-	US$	15,646,034	-	-	-	-	-	-	-	-	-	-	-	-	782,650	769,545	755,448	740,513	724,878	708,667	668,929	653,192	637,116	640,190	622,603	604,976	571,052	569,832	552,416	521,439	518,105	501,279	461,629	457,530	
Economic competitiveness benefits - Build - PV		US$	28,594,788	-	-	-	-	-	-	-	-	-	-	-	-	1,430,376	1,406,425	1,380,662	1,353,367	1,324,791	1,295,164	1,222,538	1,193,777	1,164,398	1,170,014	1,137,873	1,105,657	1,043,658	1,041,428	1,009,599	952,986	946,892	916,140	843,676	836,185	
ENVIRONMENTAL SUSTAINABILITY BENEFITS																																			
Fuel Consumption																																			
Fuel Consumption Calculations																																			
Average RoRo auxiliary engine size	2,605	kilowatts																																	
Auxiliary Engine Load Factor - Hoteling RoRo Vessel	26.00%	percent																																	
Increase in vessel wait times - No-build	-	hours	74,291	-	-	-	-	-	-	-	-	-	-	-	-	1,454	1,530	1,607	1,685	1,765	1,847	1,865	1,949	2,034	2,187	2,276	2,366	2,390	2,551	2,647	2,673	2,842	2,942	2,899	3,074	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vessel auxiliary engine energy demand forecast		kWh	50,317,628	-	-	-	-	-	-	-	-	-	-	-	-	984,897	1,036,194	1,088,418	1,141,583	1,195,703	1,250,790	1,263,298	1,319,929	1,377,566	1,481,105	1,541,247	1,602,444	1,618,468	1,728,062	1,792,514	1,810,439	1,924,782	1,992,631	1,963,470	2,082,260	
Emission Benefits																																			
CO2																																			
Emissions factor - Auxiliary engine - MDO (0.1% S) - CO2	690.0000	g / kWh																																	
Grams per metric ton	1,000,000	g / metric ton																																	
Vessel auxiliary engine energy demand forecast	-	kWh	50,317,628	-	-	-	-	-	-	-	-	-	-	-	-	984,897	1,036,194	1,088,418	1,141,583	1,195,703	1,250,790	1,263,298	1,319,929	1,377,566	1,481,105	1,541,247	1,602,444	1,618,468	1,728,062	1,792,514	1,810,439	1,924,782	1,992,631	1,963,470	2,082,260	
CO2 vessel emissions from auxiliary engine - No-Build		metric ton	34,719	-	-	-	-	-	-	-	-	-	-	-	-	680	715	751	788	825	863	872	911	951	1,022	1,063	1,106	1,117	1,192	1,237	1,249	1,328	1,375	1,355	1,437	
CO2 vessel emissions from auxiliary engine - No-Build	-	metric ton	34,719	-	-	-	-	-	-	-	-	-	-	-	-	680	715	751	788	825	863	872	911	951	1,022	1,063	1,106	1,117	1,192	1,237	1,249	1,328	1,375	1,355	1,437	
Damage costs for emissions - CO2 - 2020 US$	-	US$ / metric ton	Benefit Cost Analysis (	-	-	-	-	-	-	50	52	53	54	55	56	57	58	60	61	62	63	64	65	66	67	68	69	70	71	72	73	75	77	78	79	80	
CO2 emissions avoided cost - Build		US$	2,632,301	-	-	-	-	-	-	-	-	-	-	-	-	39,416	42,898	45,812	48,837	51,977	55,235	56,659	60,110	63,685	69,493	73,379	77,398	79,289	85,850	90,289	93,690	102,264	107,243	107,029	114,941	
CO2 emissions avoided cost - Build	-	US$	2,632,301	-	-	-	-	-	-	-	-	-	-	-	-	39,416	42,898	45,812	48,837	51,977	55,235	56,659	60,110	63,685	69,493	73,379	77,398	79,289	85,850	90,289	93,690	102,264	107,243	107,029	114,941	
Discount rate multiplier - 3 percent	-	factor	-	-	0.8626	0.8885	0.9151	0.9426	0.9709	1.0000	1.0300	1.0609	1.0927	1.1255	1.1593	1.1941	1.2299	1.2668	1.3048	1.3439	1.3842	1.4258	1.4685	1.5126	1.5580	1.6047	1.6528	1.7024	1.7535	1.8061	1.8603	1.9161	1.9736	2.0328	2.0938	2.1566	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CO2 emissions avoided cost - Build - PV		US$	1,331,664	-	-	-	-	-	-	-	-	-	-	-	-	32,048	33,864	35,111	36,339	37,549	38,741	38,582	39,739	40,877	43,306	44,395	45,463	45,217	47,533	48,535	48,896	51,816	52,757	51,118	53,297	
NOx																																			
Emissions factor - Auxiliary engine - MDO (0.1% S) - NOx	13.9000	g / kWh																																	
Grams per metric ton	1,000,000	g / metric ton																																	
Vessel auxiliary engine energy demand forecast	-	kWh	50,317,628	-	-	-	-	-	-	-	-	-	-	-	-	984,897	1,036,194	1,088,418	1,141,583	1,195,703	1,250,790	1,263,298	1,319,929	1,377,566	1,481,105	1,541,247	1,602,444	1,618,468	1,728,062	1,792,514	1,810,439	1,924,782	1,992,631	1,963,470	2,082,260	
NOx vessel emissions from auxiliary engine - No-Build		metric ton	699	-	-	-	-	-	-	-	-	-	-	-	-	14	14	15	16	17	17	18	18	19	21	21	22	22	24	25	25	27	28	27	29	
NOx vessel emissions from auxiliary engine - No-Build	-	metric ton	699	-	-	-	-	-	-	-	-	-	-	-	-	14	14	15	16	17	17	18	18	19	21	21	22	22	24	25	25	27	28	27	29	
Damage costs for emissions - NOx - 2020 US$	-	US$ / metric ton	Benefit Cost Analysis (	-	-	-	-	-	-	15,700	15,600	15,800	16,000	16,200	16,500	16,800	17,100	17,400	17,700	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	
NOx emissions avoided cost - Build		US$	12,629,588	-	-	-	-	-	-	-	-	-	-	-	-	234,100	250,614	267,783	287,211	300,827	314,686	317,833	332,081	346,582	372,631	387,762	403,159	407,190	434,763	450,978	455,488	484,256	501,326	493,989	523,876	
NOx emissions avoided cost - Build	-	US$	12,629,588	-	-	-	-	-	-	-	-	-	-	-	-	234,100	250,614	267,783	287,211	300,827	314,686	317,833	332,081	346,582	372,631	387,762	403,159	407,190	434,763	450,978	455,488	484,256	501,326	493,989	523,876	
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
NOx emissions avoided cost - Build - PV		US$	3,067,168	-	-	-	-	-	-	-	-	-	-	-	-	145,786	145,860	145,656	146,003	142,921	139,724	131,889	128,787	125,617	126,223	122,756	119,280	112,592	112,351	108,917	102,810	102,152	98,835	91,017	90,209	
PM2.5																																			
Emissions factor - Auxiliary engine - MDO (0.1% S) - PM 2.5	0.2300	g / kWh																																	
Grams per metric ton	1,000,000	g / metric ton																																	
Vessel auxiliary engine energy demand forecast	-	kWh	50,317,628	-	-	-	-	-	-	-	-	-	-	-	-	984,897	1,036,194	1,088,418	1,141,583	1,195,703	1,250,790	1,263,298	1,319,929	1,377,566	1,481,105	1,541,247	1,602,444	1,618,468	1,728,062	1,792,514	1,810,439	1,924,782	1,992,631	1,963,470	2,082,260	
PM2.5 vessel emissions from auxiliary engine - No-Build		metric ton	12	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PM2.5 vessel emissions from auxiliary engine - No-Build	-	metric ton	12	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Damage costs for emissions - PM - 2020 US$	-	US$ / metric ton	Benefit Cost Analysis (	-	-	-	-	-	-	729,300	748,600	761,600	774,700	788,100	801,700	814,500	827,400	840,600	854,000	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	
PM2.5 emissions avoided cost - Build		US$	10,021,836	-	-	-	-	-	-	-	-	-	-	-	-	187,428	200,336	213,787	227,801	238,600	249,593	252,089	263,389	274,890	295,552	307,553	319,764	322,962	344,831	357,692	361,269	384,086	397,625	391,807	415,511	
PM2.5 emissions avoided cost - Build	-	US$	10,021,836	-	-	-	-	-	-	-	-	-	-	-	-	187,428	200,336	213,787	227,801	238,600	249,593	252,089	263,389	274,890	295,552	307,553	319,764	322,962	344,831	357,692	361,269	384,086	397,625	391,807	415,511	
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PM2.5 emissions avoided cost - Build - PV		US$	2,435,476	-	-	-	-	-	-	-	-	-	-	-	-	116,721	116,597	116,286	115,802	113,357	110,822	104,608	102,147	99,633	100,114	97,363	94,607	89,302	89,111	86,387	81,543	81,022	78,391	72,190	71,549	
SOx																																			
Emissions factor - Auxiliary engine - MDO (0.1% S) - SOx	0.4000	g / kWh																																	
Grams per metric ton	1,000,000	g / metric ton																																	
Vessel auxiliary engine energy demand forecast	-	kWh	50,317,628	-	-	-	-	-	-	-	-	-	-	-	-	984,897	1,036,194	1,088,418	1,141,583	1,195,703	1,250,790	1,263,298	1,319,929	1,377,566	1,481,105	1,541,247	1,602,444	1,618,468	1,728,062	1,792,514	1,810,439	1,924,782	1,992,631	1,963,470	2,082,260	
SOx vessel emissions from auxiliary engine - No-Build		metric ton	20	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
SOx vessel emissions from auxiliary engine - No-Build	-	metric ton	20	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Damage costs for emissions - SO2 - 2020 US$	-	US$ / metric ton	Benefit Cost Analysis (	-	-	-	-	-	-	40,400	41,500	42,300	43,100	44,000	44,900	45,700	46,500	47,300	48,200	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	
SOx emissions avoided cost - Build		US$	986,076	-	-	-	-	-	-	-	-	-	-	-	-	18,319	19,605	20,985	22,421	23,484	24,566	24,811	25,923	27,055	29,089	30,270	31,472	31,787	33,939	35,205	35,557	37,803	39,135	38,563	40,896	
SOx emissions avoided cost - Build	-	US$	986,076	-	-	-	-	-	-	-	-	-	-	-	-	18,319	19,605	20,985	22,421	23,484	24,566	24,811	25,923	27,055	29,089	30,270	31,472	31,787	33,939	35,205	35,557	37,803	39,135	38,563	40,896	
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
SOx emissions avoided cost - Build - PV		US$	239,529	-	-	-	-	-	-	-	-	-	-	-	-	11,408	11,410	11,414	11,398	11,157	10,907	10,296	10,054	9,806	9,853	9,583	9,311	8,789	8,771	8,502	8,026	7,974	7,715	7,105	7,042	
Total Emissions Savings																																			
CO2 emissions avoided cost - Build - PV	-	US$	1,331,664	-	-	-	-	-	-	-	-	-	-	-	-	32,048	33,864	35,111	36,339	37,549	38,741	38,582	39,739	40,877	43,306	44,395	45,463	45,217	47,533	48,535	48,896	51,816	52,757	51,118	53,297	
NOx emissions avoided cost - Build - PV	-	US$	3,067,168	-	-	-	-	-	-	-	-	-	-	-	-	145,786	145,860	145,656	146,003	142,921	139,724	131,889	128,787	125,617	126,223	122,756	119,280	112,592	112,351	108,917	102,810	102,152	98,835	91,017	90,209	
PM2.5 emissions avoided cost - Build - PV	-	US$	2,435,476	-	-	-	-	-	-	-	-	-	-	-	-	116,721	116,597	116,286	115,802	113,357	110,822	104,608	102,147	99,633	100,114	97,363	94,607	89,302	89,111	86,387	81,543	81,022	78,391	72,190	71,549	
SOx emissions avoided cost - Build - PV	-	US$	239,529	-	-	-	-	-	-	-	-	-	-	-	-	11,408	11,410	11,414	11,398	11,157	10,907	10,296	10,054	9,806	9,853	9,583	9,311	8,789	8,771	8,502	8,026	7,974	7,715	7,105	7,042	
Environmental sustainability benefits - PV - Build		US$	7,073,838	-	-	-	-	-	-	-	-	-	-	-	-	305,963	307,731	308,467	309,543	304,984	300,195	285,375	280,727	275,933	279,496	274,097	268,662	255,900	257,766	252,342	241,275	242,965	237,697	221,430	222,098	
TOTAL BENEFITS																																			
Economic competitiveness benefits - Build - PV	-	US$	28,594,788	-	-	-	-	-	-	-	-	-	-	-	-	1,430,376	1,406,425	1,380,662	1,353,367	1,324,791	1,295,164	1,222,538	1,193,777	1,164,398	1,170,014	1,137,873	1,105,657	1,043,658	1,041,428	1,009,599	952,986	946,892	916,140	843,676	836,185	
Environmental sustainability benefits - PV - Build	-	US$	7,073,838	-	-	-	-	-	-	-	-	-	-	-	-	305,963	307,731	308,467	309,543	304,984	300,195	285,375	280,727	275,933	279,496	274,097	268,662	255,900	257,766	252,342	241,275	242,965	237,697	221,430	222,098	
Total project benefits - PV		US$	35,668,626	-	-	-	-	-	-	-	-	-	-	-	-	1,736,339	1,714,156	1,689,130	1,662,909	1,629,775	1,595,359	1,507,913	1,474,504	1,440,331	1,449,510	1,411,970	1,374,319	1,299,558	1,299,194	1,261,941	1,194,261	1,189,857	1,153,837	1,065,106	1,058,283	

Benefits

Model Period Ending	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58	31 Dec 59	31 Dec 60
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
Model Column counter	33	34	35	36	37	38	39	40	41	42	43	44	45	46
ECONOMIC COMPETITIVENESS BENEFITS														
Avoided Vessel Wait Time Forecast - Build														
Vessel wait time - Build	22	22	22	22	22	23	23	23	23	-	-	-	-	-
Vessel wait time - No-build	151	156	157	159	160	162	163	165	167	-	-	-	-	-
Increase in vessel wait times - No-build	129	134	135	136	138	139	141	142	143	-	-	-	-	-
Hours per day														
Increase in vessel wait times - No-build	129	134	135	136	138	139	141	142	143	-	-	-	-	-
Increase in vessel wait times - No-build	3,105	3,211	3,243	3,275	3,308	3,341	3,375	3,408	3,442	-	-	-	-	-
Vessel Wait Time Benefits														
Vessel Wait Time Benefits														
Vessel operating cost per day excluding fuel														
Increase in vessel wait times - No-build	129	134	135	136	138	139	141	142	143	-	-	-	-	-
Increase in vessel operating costs during wait times - No-build	2,220,973	2,296,592	2,319,557	2,342,753	2,366,181	2,389,842	2,413,741	2,437,878	2,462,257	-	-	-	-	-
Increase in vessel operating costs during wait times - No-build	2,220,973	2,296,592	2,319,557	2,342,753	2,366,181	2,389,842	2,413,741	2,437,878	2,462,257	-	-	-	-	-
Discount rate multiplier - 7 percent	6.2139	6.6488	7.1143	7.6123	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
Increase in vessel operating costs during wait times - No-build - PV	357,422	345,412	326,044	307,761	290,503	274,213	258,837	244,323	230,622	-	-	-	-	-
Inventory Cost Benefits														
RoRo vessel utilization														
Average vessel capacity - RoRo														
Average value of cargo - RoRo														
Average value of RoRo shipment														
Average value of RoRo shipment														
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
Value of RoRo cargo shipments - Forecast	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	-	-	-	-	-
Congestion cost per day - Pipeline inventory cost														
Value of RoRo cargo shipments - Forecast	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	139,171,200	-	-	-	-	-
Inventory cost of increase vessel wait time per day	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	-	-	-	-	-
Inventory cost of increase vessel wait time per day	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	20,742	-	-	-	-	-
Increase in vessel wait times - No-build	129	134	135	136	138	139	141	142	143	-	-	-	-	-
Increase in pipeline inventory costs - No-build	2,683,610	2,774,981	2,802,731	2,830,758	2,859,066	2,887,656	2,916,533	2,945,698	2,975,155	-	-	-	-	-
Increase in pipeline inventory costs - No-build	2,683,610	2,774,981	2,802,731	2,830,758	2,859,066	2,887,656	2,916,533	2,945,698	2,975,155	-	-	-	-	-
Discount rate multiplier - 7 percent	6.2139	6.6488	7.1143	7.6123	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
Increase in pipeline inventory costs - No-build - PV	431,874	417,363	393,960	371,869	351,016	331,333	312,754	295,216	278,662	-	-	-	-	-
Total Economic Benefits														
Increase in vessel operating costs during wait times - No-build - PV	357,422	345,412	326,044	307,761	290,503	274,213	258,837	244,323	230,622	-	-	-	-	-
Increase in pipeline inventory costs - No-build - PV	431,874	417,363	393,960	371,869	351,016	331,333	312,754	295,216	278,662	-	-	-	-	-
Economic competitiveness benefits - Build - PV	789,296	762,776	720,003	679,629	641,519	605,546	571,590	539,538	509,284	-	-	-	-	-
ENVIRONMENTAL SUSTAINABILITY BENEFITS														
Fuel Consumption														
Fuel Consumption Calculations														
Average RoRo auxiliary engine size														
Auxiliary Engine Load Factor - Hoteling RoRo Vessel														
Increase in vessel wait times - No-build	3,105	3,211	3,243	3,275	3,308	3,341	3,375	3,408	3,442	-	-	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
Vessel auxiliary engine energy demand forecast	2,103,083	2,174,688	2,196,435	2,218,399	2,240,583	2,262,989	2,285,619	2,308,475	2,331,560	-	-	-	-	-
Emission Benefits														
CO2														
Emissions factor - Auxiliary engine - MDO (0.1% S) - CO2														
Grams per metric ton														
Vessel auxiliary engine energy demand forecast	2,103,083	2,174,688	2,196,435	2,218,399	2,240,583	2,262,989	2,285,619	2,308,475	2,331,560	-	-	-	-	-
CO2 vessel emissions from auxiliary engine - No-Build	1,451	1,501	1,516	1,531	1,546	1,561	1,577	1,593	1,609	-	-	-	-	-
CO2 vessel emissions from auxiliary engine - No-Build	1,451	1,501	1,516	1,531	1,546	1,561	1,577	1,593	1,609	-	-	-	-	-
Damage costs for emissions - CO2 - 2020 US$	81	82	83	85	85	85	85	85	85	85	85	85	85	85
CO2 emissions avoided cost - Build	117,541	123,044	125,790	130,109	131,410	132,724	134,052	135,392	136,746	-	-	-	-	-
CO2 emissions avoided cost - Build	117,541	123,044	125,790	130,109	131,410	132,724	134,052	135,392	136,746	-	-	-	-	-
Discount rate multiplier - 3 percent	2.2213	2.2879	2.3566	2.4273	2.5001	2.5751	2.6523	2.7319	2.8139	2.8983	2.9852	3.0748	3.1670	3.2620
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
CO2 emissions avoided cost - Build - PV	52,916	53,780	53,378	53,603	52,562	51,542	50,541	49,560	48,597	-	-	-	-	-
NOx														
Emissions factor - Auxiliary engine - MDO (0.1% S) - NOx														
Grams per metric ton														
Vessel auxiliary engine energy demand forecast	2,103,083	2,174,688	2,196,435	2,218,399	2,240,583	2,262,989	2,285,619	2,308,475	2,331,560	-	-	-	-	-
NOx vessel emissions from auxiliary engine - No-Build	29	30	31	31	31	31	32	32	32	-	-	-	-	-
NOx vessel emissions from auxiliary engine - No-Build	29	30	31	31	31	31	32	32	32	-	-	-	-	-
Damage costs for emissions - NOx - 2020 US$	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100	18,100
NOx emissions avoided cost - Build	529,115	547,130	552,601	558,127	563,708	569,345	575,039	580,789	586,597	-	-	-	-	-
NOx emissions avoided cost - Build	529,115	547,130	552,601	558,127	563,708	569,345	575,039	580,789	586,597	-	-	-	-	-
Discount rate multiplier - 7 percent	6.2139	6.6488	7.1143	7.6123	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
NOx emissions avoided cost - Build - PV	85,151	82,290	77,675	73,320	69,208	65,327	61,664	58,206	54,942	-	-	-	-	-
PM2.5														
Emissions factor - Auxiliary engine - MDO (0.1% S) - PM 2.5														
Grams per metric ton														
Vessel auxiliary engine energy demand forecast	2,103,083	2,174,688	2,196,435	2,218,399	2,240,583	2,262,989	2,285,619	2,308,475	2,331,560	-	-	-	-	-
PM2.5 vessel emissions from auxiliary engine - No-Build	0	1	1	1	1	1	1	1	1	-	-	-	-	-
PM2.5 vessel emissions from auxiliary engine - No-Build	0	1	1	1	1	1	1	1	1	-	-	-	-	-
Damage costs for emissions - PM - 2020 US$	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600	867,600
PM2.5 emissions avoided cost - Build	419,666	433,955	438,294	442,677	447,104	451,575	456,091	460,652	465,258	-	-	-	-	-
PM2.5 emissions avoided cost - Build	419,666	433,955	438,294	442,677	447,104	451,575	456,091	460,652	465,258	-	-	-	-	-
Discount rate multiplier - 7 percent	6.2139	6.6488	7.1143	7.6123	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
PM2.5 emissions avoided cost - Build - PV	67,537	65,268	61,608	58,153	54,892	51,814	48,909	46,166	43,577	-	-	-	-	-
SOx														
Emissions factor - Auxiliary engine - MDO (0.1% S) - SOx														
Grams per metric ton														
Vessel auxiliary engine energy demand forecast	2,103,083	2,174,688	2,196,435	2,218,399	2,240,583	2,262,989	2,285,619	2,308,475	2,331,560	-	-	-	-	-
SOx vessel emissions from auxiliary engine - No-Build	1	1	1	1	1	1	1	1	1	-	-	-	-	-
SOx vessel emissions from auxiliary engine - No-Build	1	1	1	1	1	1	1	1	1	-	-	-	-	-
Damage costs for emissions - SO2 - 2020 US$	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100	49,100
SOx emissions avoided cost - Build	41,305	42,711	43,138	43,569	44,005	44,445	44,890	45,338	45,792	-	-	-	-	-
SOx emissions avoided cost - Build	41,305	42,711	43,138	43,569	44,005	44,445	44,890	45,338	45,792	-	-	-	-	-
Discount rate multiplier - 7 percent	6.2139	6.6488	7.1143	7.6123	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745
Operating period flag	1	1	1	1	1	1	1	1	1	-	-	-	-	-
SOx emissions avoided cost - Build - PV	6,647	6,424	6,064	5,724	5,403	5,100	4,814	4,544	4,289	-	-	-	-	-
Total Emissions Savings														
CO2 emissions avoided cost - Build - PV	52,916	53,780	53,378	53,603	52,562	51,542	50,541	49,560	48,597	-	-	-	-	-
NOx emissions avoided cost - Build - PV	85,151	82,290	77,675	73,320	69,208	65,327	61,664	58,206	54,942	-	-	-	-	-
PM2.5 emissions avoided cost - Build - PV	67,537	65,268	61,608	58,153	54,892	51,814	48,909	46,166	43,577	-	-	-	-	-
SOx emissions avoided cost - Build - PV	6,647	6,424	6,064	5,724	5,403	5,100	4,814	4,544	4,289	-	-	-	-	-
Environmental sustainability benefits - PV - Build	212,251	207,761	198,725	190,800	182,065	173,783	165,928	158,476	151,406	-	-	-	-	-
TOTAL BENEFITS														
Economic competitiveness benefits - Build - PV	789,296	762,776	720,003	679,629	641,519	605,546	571,590	539,538	509,284	-	-	-	-	-
Environmental sustainability benefits - PV - Build	212,251	207,761	198,725	190,800	182,065	173,783	165,928	158,476	151,406	-	-	-	-	-
Total project benefits - PV	1,001,547	970,536	918,728	870,429	823,585	779,329	737,518	698,014	660,690	-	-	-	-	-

Project Costs

Model Period Ending				31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29	31 Dec 30
Pre-forecast vs Forecast				Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Model Column counter	**Constant**	**Unit**	**Total**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PROJECT COSTS																			
Construction cost - Build - Constant dollars	-	US$	28,343,806	-	-	-	-	-	-	-	-	-	4,251,571	24,092,235	-	-	-	-	-
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672
Construction cost - Build - PV		US$	20,420,934	-	-	-	-	-	-	-	-	-	3,243,503	17,177,431	-	-	-	-	-
Construction cost - Build - PV	-	US$	20,420,934	-	-	-	-	-	-	-	-	-	3,243,503	17,177,431	-	-	-	-	-
Total project cost - Build - PV		US$	20,420,934		-	-	-	-	-	-	-	-	3,243,503	17,177,431	-	-	-	-	-
OPERATING & MAINTENANCE COSTS																			
Maintenance and operating costs as a share of total project costs	0.50%	percent																	
Construction cost - Build - Constant dollars	-	US$	28,343,806	-	-	-	-	-	-	-	-	-	4,251,571	24,092,235	-	-	-	-	-
Operating period flag	-	flag	29	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1
Maintenance and operating costs forecast - Build - Constant dollars		US$	4,109,852		-	-	-	-	-	-	-	-	-	-	-	141,719	141,719	141,719	141,719
Maintenance and operating costs forecast - Build - Constant dollars	-	US$	4,109,852	-	-	-	-	-	-	-	-	-	-	-	-	141,719	141,719	141,719	141,719
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	141,719	US$																	
Maintenance and operating costs forecast - Build - Constant dollars	-	US$	4,109,852	-	-	-	-	-	-	-	-	-	-	-	-	141,719	141,719	141,719	141,719
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672
Maintenance and operating costs - Build - PV		US$	1,159,422		-	-	-	-	-	-	-	-	-	-	-	88,255	82,482	77,086	72,043
RESIDUAL VALUE																			
Maintenance & Operating Costs																			
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	141,719	US$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period remaining service life flag	-	flag	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs		US$	2,834,381		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	US$	2,834,381	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672
Post analysis period maintenance and operating costs - PV		US$	140,623		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual Value																			
Length of BCA period (operating)	30	years																	
Project design life	50	years																	
Remaining service life at end of analysis period	20	years																	
Remaining service life at end of analysis period	20	years																	
Project design life	50	years																	
Construction cost - Build - Constant dollars	-	US$	28,343,806	-	-	-	-	-	-	-	-	-	4,251,571	24,092,235	-	-	-	-	-
Last forecast period flag	-	flag	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value		US$	11,337,522		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	US$	11,337,522	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	-	factor	-	-	0.7130	0.7629	0.8163	0.8734	0.9346	1.0000	1.0700	1.1449	1.2250	1.3108	1.4026	1.5007	1.6058	1.7182	1.8385	1.9672
Residual value - PV		US$	1,061,906		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value - PV	-	US$	1,061,906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs - PV	-	US$	140,623	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV		US$	921,283		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project Costs

Model Period Ending	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Model Column counter	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
PROJECT COSTS																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	6.2139	6.6488	7.1143	7.6123
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OPERATING & MAINTENANCE COSTS																				
Maintenance and operating costs as a share of total project costs																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maintenance and operating costs forecast - Build - Constant dollars	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719
Maintenance and operating costs forecast - Build - Constant dollars	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719
Maintenance and operating costs forecast - Build - Constant dollars - Annual average																				
Maintenance and operating costs forecast - Build - Constant dollars	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719
Discount rate multiplier - 7 percent	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	6.2139	6.6488	7.1143	7.6123
Maintenance and operating costs - Build - PV	67,330	62,925	58,808	54,961	51,365	48,005	44,865	41,930	39,186	36,623	34,227	31,988	29,895	27,939	26,112	24,403	22,807	21,315	19,920	18,617
RESIDUAL VALUE																				
Maintenance & Operating Costs																				
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period remaining service life flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	6.2139	6.6488	7.1143	7.6123
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual Value																				
Length of BCA period (operating)																				
Project design life																				
Remaining service life at end of analysis period																				
Remaining service life at end of analysis period																				
Project design life																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	2.1049	2.2522	2.4098	2.5785	2.7590	2.9522	3.1588	3.3799	3.6165	3.8697	4.1406	4.4304	4.7405	5.0724	5.4274	5.8074	6.2139	6.6488	7.1143	7.6123
Residual value - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project Costs

Model Period Ending	31 Dec 51	31 Dec 52	31 Dec 53	31 Dec 54	31 Dec 55	31 Dec 56	31 Dec 57	31 Dec 58	31 Dec 59	31 Dec 60	31 Dec 61	31 Dec 62	31 Dec 63	31 Dec 64	31 Dec 65	31 Dec 66	31 Dec 67	31 Dec 68	31 Dec 69	31 Dec 70
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070
Model Column counter	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
PROJECT COSTS																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745	16.0227	17.1443	18.3444	19.6285	21.0025	22.4726	24.0457	25.7289	27.5299	29.4570
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OPERATING & MAINTENANCE COSTS																				
Maintenance and operating costs as a share of total project costs																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	141,719	141,719	141,719	141,719	141,719	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	141,719	141,719	141,719	141,719	141,719	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars - Annual average																				
Maintenance and operating costs forecast - Build - Constant dollars	141,719	141,719	141,719	141,719	141,719	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745	16.0227	17.1443	18.3444	19.6285	21.0025	22.4726	24.0457	25.7289	27.5299	29.4570
Maintenance and operating costs - Build - PV	17,399	16,261	15,197	14,203	13,274	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RESIDUAL VALUE																				
Maintenance & Operating Costs																				
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period remaining service life flag	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Post analysis period maintenance and operating costs	-	-	-	-	-	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719
Post analysis period maintenance and operating costs	-	-	-	-	-	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719	141,719
Discount rate multiplier - 7 percent	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745	16.0227	17.1443	18.3444	19.6285	21.0025	22.4726	24.0457	25.7289	27.5299	29.4570
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	12,405	11,594	10,835	10,127	9,464	8,845	8,266	7,725	7,220	6,748	6,306	5,894	5,508	5,148	4,811
Residual Value																				
Length of BCA period (operating)																				
Project design life																				
Remaining service life at end of analysis period																				
Remaining service life at end of analysis period																				
Project design life																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast period flag	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	11,337,522	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	11,337,522	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	8.1451	8.7153	9.3253	9.9781	10.6766	11.4239	12.2236	13.0793	13.9948	14.9745	16.0227	17.1443	18.3444	19.6285	21.0025	22.4726	24.0457	25.7289	27.5299	29.4570
Residual value - PV	-	-	-	-	1,061,906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value - PV	-	-	-	-	1,061,906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	12,405	11,594	10,835	10,127	9,464	8,845	8,266	7,725	7,220	6,748	6,306	5,894	5,508	5,148	4,811
Residual value including future maintenance and operating cost - PV	-	-	-	-	1,061,906	(12,405)	(11,594)	(10,835)	(10,127)	(9,464)	(8,845)	(8,266)	(7,725)	(7,220)	(6,748)	(6,306)	(5,894)	(5,508)	(5,148)	(4,811)

Project Costs

Model Period Ending	31 Dec 71	31 Dec 72	31 Dec 73	31 Dec 74	31 Dec 75	31 Dec 76	31 Dec 77	31 Dec 78	31 Dec 79	31 Dec 80	31 Dec 81	31 Dec 82	31 Dec 83	31 Dec 84	31 Dec 85	31 Dec 86	31 Dec 87	31 Dec 88	31 Dec 89	31 Dec 90
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090
Model Column counter	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
PROJECT COSTS																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	31.5190	33.7253	36.0861	38.6122	41.3150	44.2071	47.3015	50.6127	54.1555	57.9464	62.0027	66.3429	70.9869	75.9559	81.2729	86.9620	93.0493	99.5627	106.5321	113.9894
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OPERATING & MAINTENANCE COSTS																				
Maintenance and operating costs as a share of total project costs																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars - Annual average																				
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	31.5190	33.7253	36.0861	38.6122	41.3150	44.2071	47.3015	50.6127	54.1555	57.9464	62.0027	66.3429	70.9869	75.9559	81.2729	86.9620	93.0493	99.5627	106.5321	113.9894
Maintenance and operating costs - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RESIDUAL VALUE																				
Maintenance & Operating Costs																				
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period remaining service life flag	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	141,719	141,719	141,719	141,719	141,719	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	141,719	141,719	141,719	141,719	141,719	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	31.5190	33.7253	36.0861	38.6122	41.3150	44.2071	47.3015	50.6127	54.1555	57.9464	62.0027	66.3429	70.9869	75.9559	81.2729	86.9620	93.0493	99.5627	106.5321	113.9894
Post analysis period maintenance and operating costs - PV	4,496	4,202	3,927	3,670	3,430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual Value																				
Length of BCA period (operating)																				
Project design life																				
Remaining service life at end of analysis period																				
Remaining service life at end of analysis period																				
Project design life																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	31.5190	33.7253	36.0861	38.6122	41.3150	44.2071	47.3015	50.6127	54.1555	57.9464	62.0027	66.3429	70.9869	75.9559	81.2729	86.9620	93.0493	99.5627	106.5321	113.9894
Residual value - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs - PV	4,496	4,202	3,927	3,670	3,430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	(4,496)	(4,202)	(3,927)	(3,670)	(3,430)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project Costs

Model Period Ending	31 Dec 91	31 Dec 92	31 Dec 93	31 Dec 94	31 Dec 95	31 Dec 96	31 Dec 97	31 Dec 98	31 Dec 99	31 Dec 00	31 Dec 01	31 Dec 02	31 Dec 03	31 Dec 04	31 Dec 05	31 Dec 06	31 Dec 07	31 Dec 08	31 Dec 09	31 Dec 10
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110
Model Column counter	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
PROJECT COSTS																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	121.9686	130.5065	139.6419	149.4168	159.8760	171.0673	183.0421	195.8550	209.5648	224.2344	239.9308	256.7260	274.6968	293.9255	314.5003	336.5154	360.0714	385.2764	412.2458	441.1030
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OPERATING & MAINTENANCE COSTS																				
Maintenance and operating costs as a share of total project costs																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars - Annual average																				
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	121.9686	130.5065	139.6419	149.4168	159.8760	171.0673	183.0421	195.8550	209.5648	224.2344	239.9308	256.7260	274.6968	293.9255	314.5003	336.5154	360.0714	385.2764	412.2458	441.1030
Maintenance and operating costs - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RESIDUAL VALUE																				
Maintenance & Operating Costs																				
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period remaining service life flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	121.9686	130.5065	139.6419	149.4168	159.8760	171.0673	183.0421	195.8550	209.5648	224.2344	239.9308	256.7260	274.6968	293.9255	314.5003	336.5154	360.0714	385.2764	412.2458	441.1030
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual Value																				
Length of BCA period (operating)																				
Project design life																				
Remaining service life at end of analysis period																				
Remaining service life at end of analysis period																				
Project design life																				
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Last forecast period flag	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	121.9686	130.5065	139.6419	149.4168	159.8760	171.0673	183.0421	195.8550	209.5648	224.2344	239.9308	256.7260	274.6968	293.9255	314.5003	336.5154	360.0714	385.2764	412.2458	441.1030
Residual value - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project Costs

Model Period Ending	31 Dec 11	31 Dec 12	31 Dec 13	31 Dec 14	31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Model Column counter	97	98	99	100	101	102	103	104	105	106
PROJECT COSTS										
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	471.9802	505.0188	540.3701	578.1960	618.6697	661.9766	708.3150	757.8970	810.9498	867.7163
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-
Construction cost - Build - PV	-	-	-	-	-	-	-	-	-	-
Total project cost - Build - PV	-	-	-	-	-	-	-	-	-	-
OPERATING & MAINTENANCE COSTS										
Maintenance and operating costs as a share of total project costs										
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-
Operating period flag	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-
Maintenance and operating costs forecast - Build - Constant dollars - Annual average										
Maintenance and operating costs forecast - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	471.9802	505.0188	540.3701	578.1960	618.6697	661.9766	708.3150	757.8970	810.9498	867.7163
Maintenance and operating costs - Build - PV	-	-	-	-	-	-	-	-	-	-
RESIDUAL VALUE										
Maintenance & Operating Costs										
Maintenance and operating costs forecast - Build - Constant dollars - Annual average	-	-	-	-	-	-	-	-	-	-
Post analysis period remaining service life flag	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	471.9802	505.0188	540.3701	578.1960	618.6697	661.9766	708.3150	757.8970	810.9498	867.7163
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	-	-	-	-	-
Residual Value										
Length of BCA period (operating)										
Project design life										
Remaining service life at end of analysis period										
Remaining service life at end of analysis period										
Project design life										
Construction cost - Build - Constant dollars	-	-	-	-	-	-	-	-	-	-
Last forecast period flag	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-
Residual value	-	-	-	-	-	-	-	-	-	-
Discount rate multiplier - 7 percent	471.9802	505.0188	540.3701	578.1960	618.6697	661.9766	708.3150	757.8970	810.9498	867.7163
Residual value - PV	-	-	-	-	-	-	-	-	-	-
Residual value - PV	-	-	-	-	-	-	-	-	-	-
Post analysis period maintenance and operating costs - PV	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	-	-	-	-	-	-	-	-	-	-

Benefit-Cost Analysis

Model Period Ending				31 Dec 15	31 Dec 16	31 Dec 17	31 Dec 18	31 Dec 19	31 Dec 20	31 Dec 21	31 Dec 22	31 Dec 23	31 Dec 24	31 Dec 25	31 Dec 26	31 Dec 27	31 Dec 28	31 Dec 29	31 Dec 30
Pre-forecast vs Forecast				Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Pre-forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending				2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Model Column counter	**Constant**	**Unit**	**Total**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PROJECT BENEFITS																			
Increase in vessel operating costs during wait times - No-build - PV	-	US$	12,948,755	-	-	-	-	-	-	-	-	-	-	-	-	647,726	636,880	625,214	612,853
Increase in pipeline inventory costs - No-build - PV	-	US$	15,646,034	-	-	-	-	-	-	-	-	-	-	-	-	782,650	769,545	755,448	740,513
Economic vitality benefits - Build - PV		US$	28,594,788	-	-	-	-	-	-	-	-	-	-	-	-	1,430,376	1,406,425	1,380,662	1,353,367
CO2 emissions avoided cost - Build - PV	-	US$	1,331,664	-	-	-	-	-	-	-	-	-	-	-	-	32,048	33,864	35,111	36,339
NOx emissions avoided cost - Build - PV	-	US$	3,067,168	-	-	-	-	-	-	-	-	-	-	-	-	145,786	145,860	145,656	146,003
PM2.5 emissions avoided cost - Build - PV	-	US$	2,435,476	-	-	-	-	-	-	-	-	-	-	-	-	116,721	116,597	116,286	115,802
SOx emissions avoided cost - Build - PV	-	US$	239,529	-	-	-	-	-	-	-	-	-	-	-	-	11,408	11,410	11,414	11,398
Environmental sustainability beneifts - Build - PV		US$	7,073,838	-	-	-	-	-	-	-	-	-	-	-	-	305,963	307,731	308,467	309,543
Economic vitality benefits - Build - PV	-	US$	28,594,788	-	-	-	-	-	-	-	-	-	-	-	-	1,430,376	1,406,425	1,380,662	1,353,367
Environmental sustainability beneifts - Build - PV	-	US$	7,073,838	-	-	-	-	-	-	-	-	-	-	-	-	305,963	307,731	308,467	309,543
Residual value including future maintenance and operating cost - PV	-	US$	921,283	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project benefits - Build - PV		US$	36,676,107	-	-	-	-	-	-	-	-	-	-	-	-	1,736,339	1,714,156	1,689,130	1,662,909

BENEFITS-COST RATIO			
Economic vitality benefits - Build - PV	-	US$	28,594,788
Environmental sustainability beneifts - Build - PV	-	US$	7,073,838
Maintenance and operating costs - Build - PV	-	US$	1,159,422
Residual value including future maintenance and operating cost - PV	-	US$	921,283
Total benefits		US$	35,430,487
Total project cost - Build - PV	-	US$	20,420,934
Net present value		US$	15,009,553
Benefit-cost ratio			1.74

Benefit-Cost Analysis

Model Period Ending	31 Dec 31	31 Dec 32	31 Dec 33	31 Dec 34	31 Dec 35	31 Dec 36	31 Dec 37	31 Dec 38	31 Dec 39	31 Dec 40	31 Dec 41	31 Dec 42	31 Dec 43	31 Dec 44	31 Dec 45	31 Dec 46	31 Dec 47	31 Dec 48	31 Dec 49	31 Dec 50
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Forecast
Financial Year Ending	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Model Column counter	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
PROJECT BENEFITS																				
Increase in vessel operating costs during wait times - No-build - PV	599,913	586,497	553,610	540,586	527,281	529,825	515,270	500,682	472,606	471,596	457,183	431,546	428,787	414,861	382,047	378,655	357,422	345,412	326,044	307,761
Increase in pipeline inventory costs - No-build - PV	724,878	708,667	668,929	653,192	637,116	640,190	622,603	604,976	571,052	569,832	552,416	521,439	518,105	501,279	461,629	457,530	431,874	417,363	393,960	371,869
Economic vitality benefits - Build - PV	1,324,791	1,295,164	1,222,538	1,193,777	1,164,398	1,170,014	1,137,873	1,105,657	1,043,658	1,041,428	1,009,599	952,986	946,892	916,140	843,676	836,185	789,296	762,776	720,003	679,629
CO2 emissions avoided cost - Build - PV	37,549	38,741	38,582	39,739	40,877	43,306	44,395	45,463	45,217	47,533	48,535	48,896	51,816	52,757	51,118	53,297	52,916	53,780	53,378	53,603
NOx emissions avoided cost - Build - PV	142,921	139,724	131,889	128,787	125,617	126,223	122,756	119,280	112,592	112,351	108,917	102,810	102,152	98,835	91,017	90,209	85,151	82,290	77,675	73,320
PM2.5 emissions avoided cost - Build - PV	113,357	110,822	104,608	102,147	99,633	100,114	97,363	94,607	89,302	89,111	86,387	81,543	81,022	78,391	72,190	71,549	67,537	65,268	61,608	58,153
SOx emissions avoided cost - Build - PV	11,157	10,907	10,296	10,054	9,806	9,853	9,583	9,311	8,789	8,771	8,502	8,026	7,974	7,715	7,105	7,042	6,647	6,424	6,064	5,724
Environmental sustainability beneifts - Build - PV	304,984	300,195	285,375	280,727	275,933	279,496	274,097	268,662	255,900	257,766	252,342	241,275	242,965	237,697	221,430	222,098	212,251	207,761	198,725	190,800
Economic vitality benefits - Build - PV	1,324,791	1,295,164	1,222,538	1,193,777	1,164,398	1,170,014	1,137,873	1,105,657	1,043,658	1,041,428	1,009,599	952,986	946,892	916,140	843,676	836,185	789,296	762,776	720,003	679,629
Environmental sustainability beneifts - Build - PV	304,984	300,195	285,375	280,727	275,933	279,496	274,097	268,662	255,900	257,766	252,342	241,275	242,965	237,697	221,430	222,098	212,251	207,761	198,725	190,800
Residual value including future maintenance and operating cost - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project benefits - Build - PV	1,629,775	1,595,359	1,507,913	1,474,504	1,440,331	1,449,510	1,411,970	1,374,319	1,299,558	1,299,194	1,261,941	1,194,261	1,189,857	1,153,837	1,065,106	1,058,283	1,001,547	970,536	918,728	870,429
BENEFITS-COST RATIO																				
Economic vitality benefits - Build - PV																				
Environmental sustainability beneifts - Build - PV																				
Maintenance and operating costs - Build - PV																				
Residual value including future maintenance and operating cost - PV																				
Total benefits																				
Total project cost - Build - PV																				
Net present value																				
Benefit-cost ratio																				

Benefit-Cost Analysis

Model Period Ending	**31 Dec 51**	**31 Dec 52**	**31 Dec 53**	**31 Dec 54**	**31 Dec 55**	**31 Dec 56**	**31 Dec 57**	**31 Dec 58**	**31 Dec 59**	**31 Dec 60**	**31 Dec 61**	**31 Dec 62**	**31 Dec 63**	**31 Dec 64**	**31 Dec 65**	**31 Dec 66**	**31 Dec 67**	**31 Dec 68**	**31 Dec 69**	**31 Dec 70**
Pre-forecast vs Forecast	Forecast	Forecast	Forecast	Forecast	Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070
Model Column counter	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
PROJECT BENEFITS																				
Increase in vessel operating costs during wait times - No-build - PV	290,503	274,213	258,837	244,323	230,622	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increase in pipeline inventory costs - No-build - PV	351,016	331,333	312,754	295,216	278,662	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	641,519	605,546	571,590	539,538	509,284	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2 emissions avoided cost - Build - PV	52,562	51,542	50,541	49,560	48,597	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NOx emissions avoided cost - Build - PV	69,208	65,327	61,664	58,206	54,942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PM2.5 emissions avoided cost - Build - PV	54,892	51,814	48,909	46,166	43,577	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOx emissions avoided cost - Build - PV	5,403	5,100	4,814	4,544	4,289	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	182,065	173,783	165,928	158,476	151,406	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	641,519	605,546	571,590	539,538	509,284	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	182,065	173,783	165,928	158,476	151,406	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	-	-	-	-	1,061,906	(12,405)	(11,594)	(10,835)	(10,127)	(9,464)	(8,845)	(8,266)	(7,725)	(7,220)	(6,748)	(6,306)	(5,894)	(5,508)	(5,148)	(4,811)
Total project benefits - Build - PV	823,585	779,329	737,518	698,014	1,722,596	(12,405)	(11,594)	(10,835)	(10,127)	(9,464)	(8,845)	(8,266)	(7,725)	(7,220)	(6,748)	(6,306)	(5,894)	(5,508)	(5,148)	(4,811)
BENEFITS-COST RATIO																				
Economic vitality benefits - Build - PV																				
Environmental sustainability beneifts - Build - PV																				
Maintenance and operating costs - Build - PV																				
Residual value including future maintenance and operating cost - PV																				
Total benefits																				
Total project cost - Build - PV																				
Net present value																				
Benefit-cost ratio																				

Benefit-Cost Analysis

Model Period Ending	31 Dec 71	31 Dec 72	31 Dec 73	31 Dec 74	31 Dec 75	31 Dec 76	31 Dec 77	31 Dec 78	31 Dec 79	31 Dec 80	31 Dec 81	31 Dec 82	31 Dec 83	31 Dec 84	31 Dec 85	31 Dec 86	31 Dec 87	31 Dec 88	31 Dec 89	31 Dec 90
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090
Model Column counter	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
PROJECT BENEFITS																				
Increase in vessel operating costs during wait times - No-build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increase in pipeline inventory costs - No-build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2 emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NOx emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PM2.5 emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOx emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	(4,496)	(4,202)	(3,927)	(3,670)	(3,430)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project benefits - Build - PV	(4,496)	(4,202)	(3,927)	(3,670)	(3,430)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENEFITS-COST RATIO																				
Economic vitality benefits - Build - PV																				
Environmental sustainability beneifts - Build - PV																				
Maintenance and operating costs - Build - PV																				
Residual value including future maintenance and operating cost - PV																				
Total benefits																				
Total project cost - Build - PV																				
Net present value																				
Benefit-cost ratio																				

Benefit-Cost Analysis

Model Period Ending	31 Dec 91	31 Dec 92	31 Dec 93	31 Dec 94	31 Dec 95	31 Dec 96	31 Dec 97	31 Dec 98	31 Dec 99	31 Dec 00	31 Dec 01	31 Dec 02	31 Dec 03	31 Dec 04	31 Dec 05	31 Dec 06	31 Dec 07	31 Dec 08	31 Dec 09	31 Dec 10
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110
Model Column counter	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
PROJECT BENEFITS																				
Increase in vessel operating costs during wait times - No-build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Increase in pipeline inventory costs - No-build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2 emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NOx emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PM2.5 emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOx emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total project benefits - Build - PV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BENEFITS-COST RATIO																				
Economic vitality benefits - Build - PV																				
Environmental sustainability beneifts - Build - PV																				
Maintenance and operating costs - Build - PV																				
Residual value including future maintenance and operating cost - PV																				
Total benefits																				
Total project cost - Build - PV																				
Net present value																				
Benefit-cost ratio																				

Benefit-Cost Analysis

Model Period Ending	**31 Dec 11**	**31 Dec 12**	**31 Dec 13**	**31 Dec 14**	**31 Dec 15**	**31 Dec 16**	**31 Dec 17**	**31 Dec 18**	**31 Dec 19**	**31 Dec 20**
Pre-forecast vs Forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast	Post-forecast
Financial Year Ending	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Model Column counter	97	98	99	100	101	102	103	104	105	106
PROJECT BENEFITS										
Increase in vessel operating costs during wait times - No-build - PV	-	-	-	-	-	-	-	-	-	-
Increase in pipeline inventory costs - No-build - PV	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	-	-	-	-	-	-	-	-	-	-
CO2 emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-
NOx emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-
PM2.5 emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-
SOx emissions avoided cost - Build - PV	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	-	-	-	-	-	-	-	-	-	-
Economic vitality benefits - Build - PV	-	-	-	-	-	-	-	-	-	-
Environmental sustainability beneifts - Build - PV	-	-	-	-	-	-	-	-	-	-
Residual value including future maintenance and operating cost - PV	-	-	-	-	-	-	-	-	-	-
Total project benefits - Build - PV	-	-	-	-	-	-	-	-	-	-
BENEFITS-COST RATIO										
Economic vitality benefits - Build - PV										
Environmental sustainability beneifts - Build - PV										
Maintenance and operating costs - Build - PV										
Residual value including future maintenance and operating cost - PV										
Total benefits										
Total project cost - Build - PV										
Net present value										
Benefit-cost ratio										

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Table 1.1.9. Implicit Price Deflators for Gross Domestic Product
[Index numbers, 2012=100]
Bureau of Economic Analysis
Last Revised on: February 24, 2022 - Next Release Date March 30, 2022

Line		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Line																													
1	**Gross domestic product**	70	72	73	74	75	76	78	80	81	83	85	88	90	93	94	95	96	98	100	102	104	105	106	108	110	112	114	118
2	**Personal consumption expenditures**	70	72	73	74	75	76	78	80	81	82	84	87	89	92	94	94	96	98	100	101	103	103	104	106	108	110	111	116
3	Goods	87	87	88	88	87	87	89	89	88	88	89	91	92	93	96	94	95	99	100	99	99	96	94	95	95	95	94	99
4	Durable goods	139	140	138	135	132	128	126	123	120	116	113	112	110	108	106	104	102	101	100	98	95	93	91	89	88	86	86	91
5	Nondurable goods	67	67	69	70	69	71	74	75	75	76	79	82	85	87	92	89	92	98	100	100	101	97	96	97	99	99	99	103
6	Services	63	64	66	68	69	71	73	75	77	80	82	85	88	91	93	94	96	98	100	102	105	107	109	112	115	118	120	124
7	**Gross private domestic investment**	85	86	86	86	86	86	87	87	88	89	91	95	98	100	101	99	98	99	100	101	103	104	104	105	107	109	110	113
8	Fixed investment	84	85	85	86	85	85	86	87	88	88	91	95	98	99	100	99	98	99	100	101	103	104	104	106	108	110	111	115
9	Nonresidential	95	96	95	95	93	92	93	92	92	91	92	94	97	98	100	99	97	99	100	100	101	102	101	102	103	104	105	106
10	Structures	44	46	48	49	52	53	55	58	61	63	67	76	85	90	94	93	92	95	100	101	107	109	110	113	114	119	121	128
11	Equipment	135	134	131	127	121	117	114	111	109	106	105	105	104	103	103	103	99	99	100	100	99	99	98	98	98	98	97	98
12	Intellectual property products	90	93	94	94	94	95	98	98	96	96	95	96	97	98	100	99	98	100	100	100	101	101	100	101	102	103	105	106
13	Residential	62	64	66	67	69	72	75	79	81	84	90	97	102	104	102	99	98	99	100	105	111	114	118	123	130	134	139	153
14	Change in private inventories	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	**Net exports of goods and services**	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16	Exports	81	83	82	81	79	78	80	79	78	80	82	85	88	91	95	90	93	99	100	100	100	95	93	96	99	99	96	107
17	Goods	85	87	85	82	80	79	80	80	79	79	82	85	88	91	96	89	93	100	100	99	98	91	88	90	93	92	88	101
18	Services	73	74	75	76	76	77	79	77	77	80	83	86	89	92	95	92	94	98	100	102	104	104	106	109	112	114	115	121
19	Imports	79	81	79	77	72	73	76	74	73	75	79	84	87	90	99	88	93	100	100	99	98	90	87	89	92	90	88	95
20	Goods	80	83	80	77	72	73	76	74	73	74	78	83	86	89	99	87	92	100	100	98	97	88	84	86	88	86	84	90
21	Services	70	72	74	74	72	75	74	73	75	80	84	87	90	93	98	94	96	99	100	102	104	103	103	105	108	109	110	116
22	**Government consumption expenditures and gross investment**	58	60	61	63	64	66	69	71	72	75	78	82	86	90	93	93	95	98	100	102	104	105	105	107	111	113	115	120
23	Federal	64	66	67	68	69	71	73	74	77	80	83	86	89	92	94	94	96	99	100	101	103	103	104	106	109	111	112	116
24	National defense	63	65	66	67	68	70	72	73	76	80	82	86	89	92	95	94	96	99	100	101	102	102	103	104	107	109	110	114
25	Nondefense	65	67	68	70	71	72	75	76	78	81	84	87	89	91	94	94	97	99	100	101	104	104	105	108	111	114	115	119
26	State and local	55	57	58	59	61	63	66	68	70	72	75	80	84	88	93	92	95	98	100	103	106	106	106	109	113	115	117	123
	Addendum:																												
27	Gross national product	70	72	73	74	75	76	78	80	81	83	85	87	90	93	94	95	96	98	100	102	104	105	106	108	110	112	114	---

		1.6155	1.5823	1.5539	1.5275	1.5106	1.4896	1.4566	1.4245	1.4026	1.3755	1.3395	1.2988	1.2599	1.2267	1.2037	1.1960	1.1818	1.1577	1.1365	1.1169	1.0964	1.0856	1.0748	1.0548	1.0302	1.0121	1.0000	
			2.10%	1.83%	1.72%	1.13%	1.41%	2.27%	2.25%	1.56%	1.97%	2.68%	3.14%	3.09%	2.70%	1.92%	0.64%	1.20%	2.08%	1.87%	1.75%	1.87%	1.00%	1.00%	1.90%	2.39%	1.79%	1.21%	4.16%
		1.0000	1.0210	1.0397	1.0576	1.0695	1.0846	1.1091	1.1341	1.1518	1.1745	1.2061	1.2439	1.2823	1.3169	1.3422	1.3508	1.3670	1.3954	1.4215	1.4464	1.4735	1.4882	1.5031	1.5317	1.5682	1.5963	1.6155	1.6827

Vessel Operating Cost (2014)

Capacity		Daily uperating Cost
2,000	CEU	5,000
4,000	CEU	6,000
6,500	CEU	8,000
8,500	CEU	9,500

Source: https://commons.wmu.se/cgi/viewcontent.cgi?article=1469&context=all_dissertations

Operating Cost of 6000 CEU	7,600	**2014**	
2014 - 2020 Inflation	1.1000		Benefit Cost Analysis Guidance 2022 (Revised).pdf (transportation.gov)
Operating Cost of 6000 CEU	8,360	**2020**	

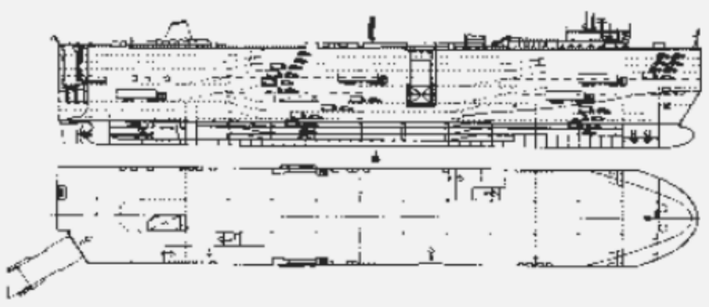
Fuel Consumption	51	ton/day		
Fuel Cost	730	$/ton	https://shipandbunker.com/prices/am/namatl/us-nyc-new-york	VLSFO - New York, Average Nov 2, '21 - Apr 29, '22
Fuel Cost Per Day	37,376	$		
Daily Operating Cost	45,736			

51 Avearge of 5000 and 7000 car carrier
http://hb.hr/wp-content/uploads/2014/12/ferries.pdf

Car Truck Carrier

7,000 cars





Builder: **Shipyard ULJANIK**
Owner / flag: Bahamas
Project No. 11303
Designed by: Shipyard ULJANIK

Classification: DNV, 1A1, Car carrier, RO-RO. E0, NAUT-OC, TMON

Length, overall	199.90 m
Length, btw perp.	188.70 m
Breadth, moulded	32.26 m
Depth, moulded	32.31 m
Depth to freeboard deck	14.58 m
Draught, design	8.00 m
Draught, scantling	8.80 m
Deadweight at design draught	12,800 t
Deadweight at scantling draught	16,600 t
Main engine:	ULJANIK/MAN-B&W; 9S50MC-S
MCR:	14,220 kW/127 RPM
Trial speed at 90% MCR, on draught of 8.00 m	20.8 knots

Capacities

Garage area;	58,819 m²
Number of cars	(4,125 x 1,550) 7034

Provisions

Heavy Fuel Oil	3,450 m³
Diesel oil	210 m³
Lubricating oil	150 m³
Fresh water	190 m³
Water ballast	5,300 m³
Consumption HFO:	54.2 t/24 hours
Cruising Range:	25,500 n.m.
Crew Complement:	32 persons

The vessel is suitable for world wide transport of passenger cars and trucks on thirteen cargo decks, of which two are hoistable decks. It is divided by six watertight bulkheads forming fore peak, deep tank, three cargo holds, engine room and after peak and by two/gas tight decks and one freeboard deck. The hull structure is designed to the following permissible loading and with following clear heights:

Deck No.	Clear height (mm)	Uniform load (t/m²)	Vehicle (t)
1	1850	0.18	1.7
2	2000	0.2	1.7
3	2200	0.25	2.1
4	2200	0.25	2.1
5	2200	0.25	2.1
6	2800/3150/4900	1.6/2	100 (58.2)
7	2200/1850/00	0.25	2.1
8	2200/2350/4300	0.5	18
9	2200/1850/00	0.25	2.1
10	2000	0.2	1.7
11	2000	0.2	1.7
12	1850	0.18	1.7
13	1850	0.18	1.7

Ship equipment

- Stern port with stern ramp, SWL 100.0 t, clear opening 10,1 x 5,1 and ramp with flap of 7.50 x 32.20.
- Side port with ramp, SWL 20.0 t, clear opening 5.5 x 6.5 and ramp with flap of 6.5 x 22
- Sliding and pivoting water/gas tight doors.
- Fixed and adjustable internal ramps.
- One el. driven bow thrusters of abt. 900 kW
- One el. driven stern thrusters of abt. 900 kW
- Six double drum el. driven mooring winches, pull 25.0 t.
- Hold ventilation with electro driven fans.
- Two el. driven ballast pumps, cap. 350 m³/h at 1.5 bar each

Steam plant

- One Oil fired boiler, steam capacity 2,000 kg/h at 7 bar and one exhaust gas boiler, steam capacity 1,000 kg/h of 7 bar.

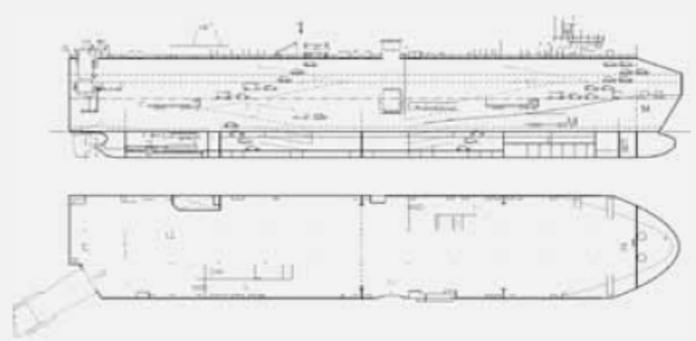
Auxiliary engines plant

- Three diesel generator sets of abt. 1,490 kVA.
- One emergency diesel generator of 160 kVA.

Car Truck Carrier

4,900 cars





Builder / Yard No.: **Shipyard ULJANIK** / 477, 478
Owner / flag: Bahamas
Designed by: Shipyard ULJANIK
Project No. 11903 B

Classification: 1 A1, "CAR CARRIER", RO/RO, E0, NAUT-OC, TMON

Length overall	176.00 m
Length btw perp.	165.00 m
Breadth moulded	31.10 m
Depth moulded	30.00 m
Depth to freeboard deck	14.50 m
Draught design	7.70 m
Draught scantling	8.75 m
Deadweight at design draught	8,300 t
Deadweight scantling draught	12,200 t
Main engine:	ULJANIK/MAN-B&W; 8S50MC-C, 12,640 kW/127 RPM
Trial speed at 90% MCR, on draught of 7.70 m	20.8 knots

Capacities

Garage area	40,755 m2
Number of cars (4,125 x 1,550)	4,844
Provisions: Heavy Fuel Oil	3,550 m³
Diesel oil	200 m³
Lubricating oil	150 m³
Fresh water	180 m³
Water ballast	4,000 m³
Consumption HFO:	48.2 t/24 hours
Cruising Range:	33,000 n.m.
Crew Complement:	36 persons

The vessel is suitable for world wide transport of passenger cars and trucks on 11 cargo decks, of which two are hoistable decks. Cargo area below freeboard deck will consist of two compartments, divided from each other by watertight bulkhead. Cargo area will have 11 decks for vehicle stowage while decks no. 5 and 7 will be hoistable. Decks no. 4 and 6 will be reinforced for stowage of trucks. Structural arrangement to be based on longitudinal framing system with transversally framed side shell.
The hull structure is designed to the following permissible loading and with following clear heights:

Deck No.	Clear height (mm)	Uniform load (t/m²)	Axle load (t)
1	1850	0.25	1.2/2
2	2000	0.25	1.2/2
3	2000	0.25	1.2/2
4	2100/4000	1.0	10/4
5	2000/0	0.3	1.6/2
6	900/3250/5000	2.0	50/4
7	2200/1850/00	0.3	1.6/2
8	2400	0.3	1.6/2
9	2100	0.25	1.2/2
10	2000	0.25	1.2/2
11	1700	0.20	1.2/2

Ship equipment

- Stern port with stern ramp, SWL 120.0 t, clear opening 7.50 x 5.20 and total lenght of 32.20 m and clear width 7.5 m.
- Side port with ramp, SWL 20.0 t, clear opening 4.20 x 5.2 and total length of 22.0 m and clear width of rampway of 4.20 m.
  Pivoting water/gas tight doors.
  Fixed internal ramps with movable flaps.
  One el. driven bow thruster of abt. 1,000 kW.
  One el. driven stern thruster of abt. 800 kW.
  Six double drum el. driven mooring winches, pull 25.0 t.
  Hold ventilation with electro driven fans.
  Two el. driven ballast pumps, cap. 350 m3/h at 1.5 bar each

Steam plant

- One Oil fired boiler steam capacity of 2,500 kg/h at 7 bar.
- One Exhaust gas boiler, steam capacity 1,000 kg/h at 7 bar.

Auxiliary engines plant

- Three diesel generator sets of abt. 1,490 kVA.
- One emergency diesel generator of 210 kVA.

shipName	imo	shipCountry	type	dwt	portCallStart	portCallEnd	portCallDuration	previousPort	nextPort
WOLF RIVER		United States of America	Other		2019-12-31 08:57 -05:00	2019-12-31 10:13 -05:00	1h 16m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-31 06:12 -05:00	2019-12-31 06:17 -05:00	5m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-30 21:17 -05:00	2019-12-30 21:25 -05:00	8m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-12-30 18:39 -05:00	2019-12-30 18:51 -05:00	12m	New Bedford	Davisville
BERING DAWN	653349	United States of America	Tug		2019-12-30 18:19 -05:00	2020-01-01 07:41 -05:00	1d 13h 22m	Providence	
WOLF RIVER		United States of America	Other		2019-12-30 17:58 -05:00	2019-12-30 18:08 -05:00	10m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-30 15:45 -05:00	2019-12-30 18:53 -05:00	3h 8m	Providence	Davisville
WOLF RIVER		United States of America	Other		2019-12-30 13:57 -05:00	2019-12-30 14:01 -05:00	4m	Davisville	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-30 13:07 -05:00	2020-01-01 07:59 -05:00	1d 18h 52m	Quonset Point	
WOLF RIVER		United States of America	Other		2019-12-30 11:09 -05:00	2019-12-30 13:16 -05:00	2h 7m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-30 07:09 -05:00	2019-12-30 10:54 -05:00	3h 45m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-12-30 06:48 -05:00	2019-12-30 16:38 -05:00	9h 50m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-12-30 06:41 -05:00	2019-12-30 16:39 -05:00	9h 58m	Emden	Jacksonville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-30 06:41 -05:00	2019-12-30 08:56 -05:00	2h 15m	Davisville	Davisville
WOLF RIVER		United States of America	Other		2019-12-30 06:14 -05:00	2019-12-30 06:19 -05:00	5m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-12-30 05:54 -05:00	2019-12-30 06:09 -05:00	15m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-30 05:53 -05:00	2019-12-30 06:10 -05:00	17m	Davisville	Davisville
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-12-30 05:53 -05:00	2019-12-30 18:51 -05:00	12h 58m	Jacksonville	Emden
WOLF RIVER		United States of America	Other		2019-12-30 01:37 -05:00	2019-12-30 02:36 -05:00	59m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-29 23:48 -05:00	2019-12-30 11:17 -05:00	11h 29m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-29 23:48 -05:00	2019-12-30 14:14 -05:00	14h 26m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-29 23:22 -05:00	2019-12-30 01:05 -05:00	1h 43m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-29 19:41 -05:00	2019-12-30 05:12 -05:00	9h 31m	Providence	Davisville
WOLF RIVER		United States of America	Other		2019-12-29 13:58 -05:00	2019-12-29 14:19 -05:00	21m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-29 13:52 -05:00	2019-12-29 22:45 -05:00	8h 53m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-29 13:15 -05:00	2019-12-29 13:30 -05:00	15m	New Bedford	New Bedford
WOLF RIVER		United States of America	Other		2019-12-29 07:10 -05:00	2019-12-29 10:52 -05:00	3h 42m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-29 06:08 -05:00	2019-12-29 06:15 -05:00	7m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-12-29 05:01 -05:00	2019-12-29 05:23 -05:00	22m	Providence	Davisville
AMERICAN HIGHWAY	9205976	Panama	Vehicles Carrier	16750	2019-12-29 05:01 -05:00	2019-12-29 19:57 -05:00	14h 56m	Charleston	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-29 05:01 -05:00	2019-12-29 05:26 -05:00	25m	Providence	Providence
WOLF RIVER		United States of America	Other		2019-12-29 04:09 -05:00	2019-12-29 04:12 -05:00	3m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-29 03:58 -05:00	2019-12-29 11:59 -05:00	8h 1m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-29 02:26 -05:00	2019-12-29 02:28 -05:00	2m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-28 18:24 -05:00	2019-12-29 03:29 -05:00	9h 5m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-28 16:44 -05:00	2019-12-31 11:09 -05:00	2d 18h 25m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-28 16:13 -05:00	2019-12-28 23:39 -05:00	7h 26m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-28 14:45 -05:00	2019-12-28 15:07 -05:00	22m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-28 14:08 -05:00	2019-12-28 14:15 -05:00	7m	Davisville	
GL54		United States of America	Other		2019-12-28 10:57 -05:00	2020-01-02 21:26 -05:00	5d 10h 29m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-28 10:53 -05:00	2019-12-28 13:07 -05:00	2h 14m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-28 07:24 -05:00	2019-12-28 14:07 -05:00	6h 43m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-28 06:07 -05:00	2019-12-28 06:16 -05:00	9m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-28 04:56 -05:00	2019-12-28 10:42 -05:00	5h 46m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-28 04:22 -05:00	2019-12-28 04:40 -05:00	18m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-28 04:07 -05:00	2019-12-28 04:11 -05:00	4m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 18:23 -05:00	2019-12-28 03:14 -05:00	8h 51m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-27 17:30 -05:00	2019-12-28 04:19 -05:00	10h 49m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-27 16:41 -05:00	2019-12-27 17:16 -05:00	35m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 13:27 -05:00	2019-12-27 14:06 -05:00	39m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 11:50 -05:00	2019-12-27 13:03 -05:00	1h 13m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-27 07:52 -05:00	2019-12-27 16:49 -05:00	8h 57m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 07:51 -05:00	2019-12-27 11:36 -05:00	3h 45m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-27 07:16 -05:00	2019-12-27 07:32 -05:00	16m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 07:06 -05:00	2019-12-27 07:39 -05:00	33m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 06:09 -05:00	2019-12-27 06:17 -05:00	8m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-27 03:58 -05:00	2019-12-27 04:00 -05:00	2m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-26 20:12 -05:00	2019-12-27 07:17 -05:00	11h 5m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-26 19:25 -05:00	2019-12-26 19:57 -05:00	32m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-26 19:09 -05:00	2019-12-27 03:27 -05:00	8h 18m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-26 18:25 -05:00	2019-12-26 18:52 -05:00	27m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-26 18:01 -05:00	2019-12-26 18:09 -05:00	8m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-26 09:33 -05:00	2019-12-26 10:24 -05:00	51m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-26 08:29 -05:00	2019-12-26 14:11 -05:00	5h 42m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-12-26 07:34 -05:00	2019-12-27 08:13 -05:00	1d 0h 39m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-26 07:08 -05:00	2019-12-26 08:13 -05:00	1h 5m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-26 06:11 -05:00	2019-12-26 06:22 -05:00	11m	Davisville	
CHARLES JAMES	8980737	United States of America	Tug		2019-12-26 03:53 -05:00	2019-12-26 19:45 -05:00	15h 52m	Bridgeport CT	
LARRY J HEBERT		United States of America	Tug		2019-12-25 22:55 -05:00	2019-12-25 23:54 -05:00	59m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-25 18:39 -05:00	2019-12-25 21:06 -05:00	2h 27m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-25 14:42 -05:00	2019-12-25 15:23 -05:00	41m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-25 13:07 -05:00	2019-12-25 14:31 -05:00	1h 24m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-25 11:56 -05:00	2019-12-25 12:45 -05:00	49m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-25 08:07 -05:00	2019-12-25 12:34 -05:00	4h 27m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-25 01:31 -05:00	2019-12-25 02:14 -05:00	43m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 18:37 -05:00	2019-12-24 20:22 -05:00	1h 45m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 16:57 -05:00	2019-12-24 17:03 -05:00	6m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 15:23 -05:00	2019-12-24 15:30 -05:00	7m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-24 14:00 -05:00	2019-12-24 14:44 -05:00	44m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 12:40 -05:00	2019-12-24 13:31 -05:00	51m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 10:49 -05:00	2019-12-24 10:54 -05:00	5m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 08:27 -05:00	2019-12-24 09:02 -05:00	35m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-24 00:23 -05:00	2019-12-24 00:56 -05:00	33m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-24 00:10 -05:00	2019-12-24 04:42 -05:00	4h 32m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-23 16:25 -05:00	2019-12-23 16:33 -05:00	8m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-23 15:46 -05:00	2019-12-23 15:51 -05:00	5m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-23 15:16 -05:00	2019-12-23 15:26 -05:00	10m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-23 14:34 -05:00	2019-12-23 14:58 -05:00	24m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-23 13:27 -05:00	2019-12-23 13:50 -05:00	23m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-23 12:52 -05:00	2019-12-23 13:32 -05:00	40m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-23 07:47 -05:00	2019-12-23 09:50 -05:00	2h 3m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-12-23 06:46 -05:00	2019-12-23 13:10 -05:00	6h 24m	Davisville	Davisville
CLOVER ACE	9363950	Liberia	Vehicles Carrier	17280	2019-12-23 06:46 -05:00	2019-12-23 13:09 -05:00	6h 23m	New York	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-23 06:44 -05:00	2019-12-24 02:01 -05:00	19h 17m	Davisville	Providence
WOLF RIVER		United States of America	Other		2019-12-23 06:08 -05:00	2019-12-23 06:18 -05:00	10m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-12-23 05:59 -05:00	2019-12-23 06:15 -05:00	16m	Quonset Point	Davisville
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-12-23 05:58 -05:00	2019-12-23 16:50 -05:00	10h 52m	Jacksonville	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-23 05:58 -05:00	2019-12-23 06:14 -05:00	16m	Quonset Point	Providence
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-23 04:21 -05:00	2019-12-26 08:07 -05:00	3d 3h 46m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-23 03:38 -05:00	2019-12-23 03:54 -05:00	16m	Davisville	
AMY E HEBERT	7047667	United States of America	Tug		2019-12-23 00:21 -05:00	2019-12-23 00:50 -05:00	29m	Philadelphia	
WOLF RIVER		United States of America	Other		2019-12-22 17:56 -05:00	2019-12-22 18:02 -05:00	6m	Davisville	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-22 15:45 -05:00	2019-12-23 03:43 -05:00	11h 58m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-22 15:36 -05:00	2019-12-22 16:04 -05:00	28m	Davisville	New York
LARRY J HEBERT		United States of America	Tug		2019-12-22 15:08 -05:00	2019-12-22 15:38 -05:00	30m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-22 13:09 -05:00	2019-12-22 15:39 -05:00	2h 30m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-22 11:34 -05:00	2019-12-22 12:04 -05:00	30m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-22 07:37 -05:00	2019-12-22 14:31 -05:00	6h 54m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-22 07:04 -05:00	2019-12-22 07:24 -05:00	20m	Davisville	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-22 06:32 -05:00	2019-12-22 15:28 -05:00	8h 56m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-22 04:41 -05:00	2019-12-22 06:02 -05:00	1h 21m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-21 17:51 -05:00	2019-12-21 18:00 -05:00	9m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-21 16:14 -05:00	2019-12-22 07:22 -05:00	15h 8m	Davisville	New York
WOLF RIVER		United States of America	Other		2019-12-21 15:15 -05:00	2019-12-21 15:31 -05:00	16m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-21 14:51 -05:00	2019-12-21 15:52 -05:00	1h 1m	Davisville	New York
BERING DAWN	653349	United States of America	Tug		2019-12-21 14:12 -05:00	2019-12-21 14:28 -05:00	16m	Davisville	New York
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-21 10:38 -05:00	2019-12-21 16:39 -05:00	6h 1m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-21 10:20 -05:00	2019-12-21 10:39 -05:00	19m	Davisville	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-21 07:42 -05:00	2019-12-21 08:01 -05:00	19m	Boston	
G.L. 65		United States of America	Tug		2019-12-21 07:25 -05:00	2020-01-28 15:39 -05:00	1m 8d 8h 14m	Charleston	
WOLF RIVER		United States of America	Other		2019-12-21 07:10 -05:00	2019-12-21 07:35 -05:00	25m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-21 06:03 -05:00	2019-12-22 04:22 -05:00	22h 19m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-21 05:05 -05:00	2019-12-21 05:40 -05:00	35m	Davisville	New York
WOLF RIVER		United States of America	Other		2019-12-20 19:03 -05:00	2019-12-20 23:45 -05:00	4h 42m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-20 18:33 -05:00	2019-12-20 18:48 -05:00	15m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-20 17:53 -05:00	2019-12-21 05:13 -05:00	11h 20m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-20 17:09 -05:00	2019-12-20 17:26 -05:00	17m	Davisville	New York
WOLF RIVER		United States of America	Other		2019-12-20 16:02 -05:00	2019-12-20 16:12 -05:00	10m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-20 14:48 -05:00	2019-12-20 15:14 -05:00	26m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-12-20 13:24 -05:00	2019-12-21 04:02 -05:00	14h 38m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-20 12:08 -05:00	2019-12-20 14:31 -05:00	2h 23m	Davisville	
GULF DAWN	6709725	United States of America	Tug		2019-12-20 09:28 -05:00	2019-12-20 14:24 -05:00	4h 56m	Davisville	Baltimore
WOLF RIVER		United States of America	Other		2019-12-20 09:27 -05:00	2019-12-20 09:48 -05:00	21m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-20 07:51 -05:00	2019-12-20 08:50 -05:00	59m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-20 06:19 -05:00	2019-12-20 13:14 -05:00	6h 55m	Quonset Point	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-12-20 06:18 -05:00	2019-12-20 13:10 -05:00	6h 52m	Quonset Point	
GRAND DAHLIA	9355238	Panama	Vehicles Carrier	18054	2019-12-20 06:01 -05:00	2019-12-20 13:15 -05:00	7h 14m	Philadelphia	Davisville
GULF DAWN	6709725	United States of America	Tug		2019-12-19 17:35 -05:00	2019-12-20 08:39 -05:00	15h 4m	Davisville	Baltimore
GULF DAWN	6709725	United States of America	Tug		2019-12-19 16:58 -05:00	2019-12-19 17:20 -05:00	22m	Davisville	Baltimore
DREDGE 55	1101368	United States of America	Dredger		2019-12-19 16:52 -05:00	2019-12-22 05:30 -05:00	2d 12h 38m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-19 16:52 -05:00	2019-12-20 10:36 -05:00	17h 44m	Davisville	New York
GULF DAWN	6709725	United States of America	Tug		2019-12-19 16:25 -05:00	2019-12-19 16:43 -05:00	18m	Davisville	Baltimore
RAINBOW	8987345	United States of America	Tug		2019-12-19 14:38 -05:00	2019-12-19 15:40 -05:00	1h 2m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-19 14:37 -05:00	2019-12-19 16:36 -05:00	1h 59m	Davisville	Providence
BERING DAWN	653349	United States of America	Tug		2019-12-19 12:55 -05:00	2019-12-20 08:12 -05:00	19h 17m	Davisville	New York
GULF DAWN	6709725	United States of America	Tug		2019-12-19 12:54 -05:00	2019-12-19 15:35 -05:00	2h 41m	Davisville	Baltimore
GULF DAWN	6709725	United States of America	Tug		2019-12-19 12:40 -05:00	2019-12-19 12:41 -05:00	1m	Davisville	Baltimore
GULF DAWN	6709725	United States of America	Tug		2019-12-19 12:14 -05:00	2019-12-19 12:29 -05:00	15m	Davisville	Baltimore
LARRY J HEBERT		United States of America	Tug		2019-12-19 11:06 -05:00	2019-12-20 17:12 -05:00	1d 6h 6m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-19 10:19 -05:00	2019-12-19 10:23 -05:00	4m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-19 09:45 -05:00	2019-12-19 10:46 -05:00	1h 1m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-19 09:45 -05:00	2019-12-19 10:49 -05:00	1h 4m	Davisville	
DREDGE 55	1101368	United States of America	Dredger		2019-12-19 09:44 -05:00	2019-12-19 10:47 -05:00	1h 3m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-19 07:36 -05:00	2019-12-19 08:46 -05:00	1h 10m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-12-19 06:26 -05:00	2019-12-19 14:09 -05:00	7h 43m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-19 06:26 -05:00	2019-12-19 14:13 -05:00	7h 47m	Davisville	Providence
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-12-19 06:25 -05:00	2019-12-19 16:35 -05:00	10h 10m	Halifax	Houston
GULF DAWN	6709725	United States of America	Tug		2019-12-19 02:05 -05:00	2019-12-19 08:14 -05:00	6h 9m	Davisville	Baltimore
RAINBOW	8987345	United States of America	Tug		2019-12-19 01:51 -05:00	2019-12-19 05:23 -05:00	3h 32m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-19 01:09 -05:00	2019-12-19 04:01 -05:00	2h 52m	Davisville	Providence
GRANDE HALIFX	9784051	Italy	Vehicles Carrier	18353	2019-12-19 01:09 -05:00	2019-12-19 14:11 -05:00	13h 2m	Valencia	New York
WOLF RIVER		United States of America	Other		2019-12-18 22:59 -05:00	2019-12-19 01:37 -05:00	2h 38m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-18 22:17 -05:00	2019-12-19 09:33 -05:00	11h 16m	Davisville	
GL 701		United States of America	Other		2019-12-18 21:58 -05:00	2019-12-20 14:25 -05:00	1d 16h 27m	Jacksonville	
BERING DAWN	653349	United States of America	Tug		2019-12-18 21:12 -05:00	2019-12-19 08:10 -05:00	10h 58m	Davisville	New York
WOLF RIVER		United States of America	Other		2019-12-18 18:06 -05:00	2019-12-18 18:17 -05:00	11m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-18 17:12 -05:00	2019-12-18 22:06 -05:00	4h 54m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-18 14:13 -05:00	2019-12-18 14:23 -05:00	10m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-18 13:31 -05:00	2019-12-18 13:40 -05:00	9m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-18 12:29 -05:00	2019-12-18 12:54 -05:00	25m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-18 11:33 -05:00	2019-12-18 14:45 -05:00	3h 12m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 11:04 -05:00	2019-12-18 20:36 -05:00	9h 32m	Davisville	
GL54		United States of America	Other		2019-12-18 10:44 -05:00	2019-12-28 10:36 -05:00	9d 23h 52m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-18 07:45 -05:00	2019-12-18 10:41 -05:00	2h 56m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 07:39 -05:00	2019-12-18 10:41 -05:00	3h 2m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-18 07:08 -05:00	2019-12-18 07:10 -05:00	2m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 07:03 -05:00	2019-12-18 07:09 -05:00	6m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-18 06:06 -05:00	2019-12-18 06:11 -05:00	5m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 05:24 -05:00	2019-12-18 06:34 -05:00	1h 10m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 03:58 -05:00	2019-12-18 04:49 -05:00	51m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 03:16 -05:00	2019-12-18 03:26 -05:00	10m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 02:02 -05:00	2019-12-18 02:49 -05:00	47m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 00:45 -05:00	2019-12-18 01:49 -05:00	1h 4m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-18 00:28 -05:00	2019-12-18 00:34 -05:00	6m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 23:54 -05:00	2019-12-18 00:17 -05:00	23m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-17 23:39 -05:00	2019-12-17 23:40 -05:00	1m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 22:07 -05:00	2019-12-17 23:27 -05:00	1h 20m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 19:45 -05:00	2019-12-17 21:36 -05:00	1h 51m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-17 19:03 -05:00	2019-12-17 19:06 -05:00	3m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 18:54 -05:00	2019-12-17 19:18 -05:00	24m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-17 17:58 -05:00	2019-12-17 18:06 -05:00	8m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 17:00 -05:00	2019-12-17 18:30 -05:00	1h 30m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 16:20 -05:00	2019-12-17 16:37 -05:00	17m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 15:57 -05:00	2019-12-17 16:08 -05:00	11m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 15:35 -05:00	2019-12-17 15:37 -05:00	2m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-17 15:21 -05:00	2019-12-17 15:46 -05:00	25m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-17 13:46 -05:00	2019-12-17 14:01 -05:00	15m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-17 09:05 -05:00	2019-12-17 09:08 -05:00	3m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-17 08:24 -05:00	2019-12-17 14:28 -05:00	6h 4m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-17 07:41 -05:00	2019-12-17 08:16 -05:00	35m	Davisville	New York
RELENTLESS		United States of America	Fishing Vessel		2019-12-17 07:14 -05:00	2019-12-19 08:30 -05:00	2d 1h 16m	Davisville	

Vessel Type	Avg. DWT
Vehicles Carrier	18558.21

shipName	imo	shipCountry	type	dwt	portCallStart	portCallEnd	portCallDuratior	previousPort	nextPort
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-12-17 06:47 -05:00	2019-12-18 14:09 -05:00	1d 7h 22m	Jacksonville	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-17 06:47 -05:00	2019-12-19 00:10 -05:00	1d 17h 23m	Davisville	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-12-17 06:46 -05:00	2019-12-18 20:30 -05:00	1d 13h 44m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-12-17 05:51 -05:00	2019-12-17 06:12 -05:00	21m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-17 05:50 -05:00	2019-12-17 06:18 -05:00	28m	Providence	Providence
HARMONY LEADER	9441568	Bahamas	Vehicles Carrier	20434	2019-12-17 05:50 -05:00	2019-12-17 17:12 -05:00	11h 22m	Baltimore	Boston
LARRY J HEBERT		United States of America	Tug		2019-12-17 02:51 -05:00	2019-12-17 12:34 -05:00	9h 43m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-16 22:54 -05:00	2019-12-17 00:36 -05:00	1h 42m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-12-16 20:14 -05:00	2019-12-17 05:15 -05:00	9h 1m	New Bedford	Davisville
GULF DAWN	6709725	United States of America	Tug		2019-12-16 19:49 -05:00	2019-12-17 00:43 -05:00	4h 54m	Davisville	Baltimore
BERING DAWN	653349	United States of America	Tug		2019-12-16 19:24 -05:00	2019-12-16 19:35 -05:00	11m	Davisville	New York
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-16 18:35 -05:00	2019-12-16 20:14 -05:00	1h 39m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-16 18:15 -05:00	2019-12-16 18:22 -05:00	7m	Davisville	
GULF DAWN	6709725	United States of America	Tug		2019-12-16 17:04 -05:00	2019-12-16 19:13 -05:00	2h 9m	Davisville	Baltimore
WOLF RIVER		United States of America	Other		2019-12-16 16:29 -05:00	2019-12-16 17:05 -05:00	36m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-16 11:42 -05:00	2019-12-16 11:57 -05:00	15m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-16 10:36 -05:00	2019-12-16 10:45 -05:00	9m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-16 09:48 -05:00	2019-12-16 16:44 -05:00	6h 56m	Davisville	
GL54		United States of America	Other		2019-12-16 09:48 -05:00	2019-12-17 12:44 -05:00	1d 2h 56m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-16 08:18 -05:00	2019-12-16 13:56 -05:00	5h 38m	Davisville	
GULF DAWN	6709725	United States of America	Tug		2019-12-15 17:09 -05:00	2019-12-16 05:47 -05:00	12h 38m	Davisville	Baltimore
BERING DAWN	653349	United States of America	Tug		2019-12-15 16:38 -05:00	2019-12-16 06:25 -05:00	13h 47m	Davisville	New York
GULF DAWN	6709725	United States of America	Tug		2019-12-15 14:25 -05:00	2019-12-15 15:51 -05:00	1h 26m	Providence	Baltimore
BERING DAWN	653349	United States of America	Tug		2019-12-14 22:50 -05:00	2019-12-15 16:25 -05:00	17h 35m	Davisville	New York
LARRY J HEBERT		United States of America	Tug		2019-12-14 15:39 -05:00	2019-12-15 10:10 -05:00	18h 31m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-14 15:36 -05:00	2019-12-14 15:48 -05:00	12m	Davisville	New York
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-14 15:04 -05:00	2019-12-14 15:36 -05:00	32m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-14 14:55 -05:00	2019-12-14 15:12 -05:00	17m	Quonset Point	New York
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-14 07:40 -05:00	2019-12-14 15:53 -05:00	8h 13m	Providence	Providence
BERING DAWN	653349	United States of America	Tug		2019-12-13 18:32 -05:00	2019-12-14 07:18 -05:00	12h 46m	Quonset Point	New York
BERING DAWN	653349	United States of America	Tug		2019-12-13 17:28 -05:00	2019-12-13 17:46 -05:00	18m	Davisville	New York
LARRY J HEBERT		United States of America	Tug		2019-12-13 14:55 -05:00	2019-12-14 15:07 -05:00	1d 0h 12m	Davisville	
GULF DAWN	6709725	United States of America	Tug		2019-12-13 10:59 -05:00	2019-12-13 15:04 -05:00	4h 5m	New York	Baltimore
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-13 10:03 -05:00	2019-12-13 12:35 -05:00	2h 32m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-13 08:31 -05:00	2019-12-13 09:43 -05:00	1h 12m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-13 07:40 -05:00	2019-12-13 07:45 -05:00	5m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-12-13 06:57 -05:00	2019-12-13 16:20 -05:00	9h 23m	Davisville	Davisville
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-12-13 06:47 -05:00	2019-12-13 16:18 -05:00	9h 31m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-12-13 06:46 -05:00	2019-12-13 16:15 -05:00	9h 29m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-12-13 05:55 -05:00	2019-12-13 06:22 -05:00	27m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-12-13 05:54 -05:00	2019-12-13 06:09 -05:00	15m	Fall River	Davisville
IGUAZU HIGHWAY	9827243	Panama	Vehicles Carrier	20300	2019-12-13 05:53 -05:00	2019-12-14 15:51 -05:00	1d 9h 58m	Altamira	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-12 18:32 -05:00	2019-12-12 18:58 -05:00	26m	Davisville	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-12 13:30 -05:00	2019-12-12 17:48 -05:00	4h 18m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-12 12:08 -05:00	2019-12-12 12:14 -05:00	6m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-12 12:04 -05:00	2019-12-12 12:19 -05:00	15m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-12 01:49 -05:00	2019-12-12 07:48 -05:00	5h 59m	Davisville	New York
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-11 08:32 -05:00	2019-12-11 16:34 -05:00	8h 2m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-11 05:34 -05:00	2019-12-11 05:35 -05:00	1m	Davisville	
BERING DAWN	653349	United States of America	Tug		2019-12-10 17:26 -05:00	2019-12-11 14:35 -05:00	21h 9m	Davisville	New York
BERING DAWN	653349	United States of America	Tug		2019-12-10 14:07 -05:00	2019-12-10 17:03 -05:00	2h 56m	Providence	New York
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-09 14:23 -05:00	2019-12-10 12:57 -05:00	22h 34m	Davisville	Davisville
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-09 12:28 -05:00	2019-12-09 15:17 -05:00	2h 49m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-12-09 07:00 -05:00	2019-12-09 14:06 -05:00	7h 6m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-09 07:00 -05:00	2019-12-09 14:07 -05:00	7h 7m	Davisville	Davisville
HARVEST LEADER	9690523	Bahamas	Vehicles Carrier	20941	2019-12-09 07:00 -05:00	2019-12-09 14:07 -05:00	7h 7m	Baltimore	Boston
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-12-09 05:56 -05:00	2019-12-10 12:56 -05:00	1d 7h 0m	Jacksonville	Veracruz
RAINBOW	8987345	United States of America	Tug		2019-12-09 05:56 -05:00	2019-12-09 06:23 -05:00	27m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-09 05:56 -05:00	2019-12-09 06:08 -05:00	12m	Providence	Davisville
GL54		United States of America	Other		2019-12-09 05:43 -05:00	2019-12-09 11:19 -05:00	5h 36m	Boston	
AEGEAN DAWN	7721988	United States of America	Tug		2019-12-09 04:46 -05:00	2019-12-11 16:43 -05:00	2d 11h 57m	New York	
LARRY J HEBERT		United States of America	Tug		2019-12-09 03:53 -05:00	2019-12-09 11:19 -05:00	7h 26m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-08 07:55 -05:00	2019-12-08 12:37 -05:00	4h 42m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-07 08:42 -05:00	2019-12-07 13:32 -05:00	4h 50m	Davisville	
TITAN		United States of America	Other		2019-12-06 15:34 -05:00	2019-12-12 10:50 -05:00	5d 19h 16m	Quonset Point	New Bedford
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-06 11:50 -05:00	2019-12-06 16:20 -05:00	4h 30m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-06 03:44 -05:00	2019-12-06 04:40 -05:00	56m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-05 17:11 -05:00	2019-12-05 17:29 -05:00	18m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-05 16:47 -05:00	2019-12-05 18:29 -05:00	1h 42m	Providence	
WOLF RIVER		United States of America	Other		2019-12-05 13:44 -05:00	2019-12-05 13:49 -05:00	5m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-05 11:13 -05:00	2019-12-05 11:57 -05:00	44m	Davisville	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-05 08:33 -05:00	2019-12-06 04:45 -05:00	20h 12m	Quonset Point	
WOLF RIVER		United States of America	Other		2019-12-05 08:17 -05:00	2019-12-05 08:51 -05:00	34m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-05 07:12 -05:00	2019-12-05 07:14 -05:00	2m	Davisville	
ATLANTIC COAST	9484065	United States of America	Tug	346	2019-12-04 21:24 -05:00	2019-12-05 01:03 -05:00	3h 39m	Davisville	Providence
WOLF RIVER		United States of America	Other		2019-12-04 17:11 -05:00	2019-12-04 17:17 -05:00	6m	Davisville	
WOLF RIVER		United States of America	Other		2019-12-04 16:06 -05:00	2019-12-04 16:09 -05:00	3m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-04 13:30 -05:00	2019-12-04 13:40 -05:00	10m	Davisville	
LARRY J HEBERT		United States of America	Tug		2019-12-04 10:22 -05:00	2019-12-04 10:49 -05:00	27m	New York	
DREDGE 55	1101368	United States of America	Dredger		2019-12-04 10:20 -05:00	2019-12-06 04:40 -05:00	1d 18h 20m	Jacksonville	
RAINBOW	8987345	United States of America	Tug		2019-12-04 06:10 -05:00	2019-12-04 12:46 -05:00	6h 36m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-04 06:10 -05:00	2019-12-04 16:42 -05:00	10h 32m	Davisville	Davisville
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-12-04 06:10 -05:00	2019-12-05 18:31 -05:00	1d 12h 21m	Emden	Jacksonville
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-12-03 11:16 -05:00	2019-12-04 16:41 -05:00	1d 5h 25m	Veracruz	
RAINBOW	8987345	United States of America	Tug		2019-12-03 11:16 -05:00	2019-12-03 11:50 -05:00	34m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-12-03 11:09 -05:00	2019-12-04 05:29 -05:00	18h 20m	Providence	Davisville
ATLANTIC COAST	9484065	United States of America	Tug	346	2019-12-03 08:28 -05:00	2019-12-03 12:48 -05:00	4h 20m	Providence	Providence
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-12-02 11:15 -05:00	2019-12-02 14:00 -05:00	2h 45m	Quonset Point	
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-11-30 08:24 -05:00	2019-11-30 09:38 -05:00	1h 14m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-11-30 06:16 -05:00	2019-11-30 16:03 -05:00	9h 47m	Davisville	Davisville
PRECIOUS ACE	9554200	Japan	Vehicles Carrier	19045	2019-11-30 06:15 -05:00	2019-11-30 16:01 -05:00	9h 46m	Boston	Charleston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-11-30 06:15 -05:00	2019-11-30 16:01 -05:00	9h 46m	Davisville	Davisville
MICHAEL L.DAIGLE	8973095	United States of America	Tug		2019-11-29 08:08 -05:00	2019-11-29 13:16 -05:00	5h 8m	Baltimore	
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-11-29 06:17 -05:00	2019-11-29 18:19 -05:00	12h 2m	Halifax	Houston
RAINBOW	8987345	United States of America	Tug		2019-11-29 06:17 -05:00	2019-11-29 18:17 -05:00	12h 0m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-11-29 06:17 -05:00	2019-11-30 05:34 -05:00	23h 17m	Providence	Davisville
WOLF RIVER		United States of America	Other		2019-11-28 14:34 -05:00	2019-11-28 15:19 -05:00	45m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-11-27 06:02 -05:00	2019-11-27 15:28 -05:00	9h 26m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-11-27 06:02 -05:00	2019-11-27 15:32 -05:00	9h 30m	Quonset Point	Providence
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-11-27 06:01 -05:00	2019-11-27 15:28 -05:00	9h 27m	Jacksonville	Setubal
RAINBOW	8987345	United States of America	Tug		2019-11-26 15:44 -05:00	2019-11-26 16:46 -05:00	1h 2m	Fall River	Davisville
WOLF RIVER		United States of America	Other		2019-11-26 10:00 -05:00	2019-11-26 11:29 -05:00	1h 29m	Boston	
RAINBOW	8987345	United States of America	Tug		2019-11-25 06:16 -05:00	2019-11-25 06:30 -05:00	14m	Fall River	Davisville
ORION HIGHWAY	9728071	Panama	Vehicles Carrier	20532	2019-11-25 06:14 -05:00	2019-11-26 16:45 -05:00	1d 10h 31m	Altamira	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-25 06:13 -05:00	2019-11-26 01:10 -05:00	18h 57m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-24 14:33 -05:00	2019-11-25 05:21 -05:00	14h 48m	Davisville	Davisville
RELENTLESS		United States of America	Fishing Vessel		2019-11-24 09:30 -05:00	2019-11-29 11:26 -05:00	5d 1h 56m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-11-23 12:45 -05:00	2019-11-23 13:29 -05:00	44m	Fall River	Davisville
GRANDE BALTIMORA	9784037	Italy	Vehicles Carrier	18447	2019-11-23 06:54 -05:00	2019-11-23 13:30 -05:00	6h 36m	Baltimore	Jacksonville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-23 06:53 -05:00	2019-11-23 11:46 -05:00	4h 53m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-23 06:50 -05:00	2019-11-23 15:59 -05:00	9h 9m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-23 05:50 -05:00	2019-11-23 05:57 -05:00	7m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-23 05:49 -05:00	2019-11-23 06:28 -05:00	39m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-11-23 05:39 -05:00	2019-11-23 15:59 -05:00	10h 20m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-23 03:10 -05:00	2019-11-23 05:16 -05:00	2h 6m	Providence	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-23 00:05 -05:00	2019-11-23 05:12 -05:00	5h 7m	Davisville	
GEOQUIP SAENTIS	9282132	Bahamas	Tug Supply Vessel	3500	2019-11-22 19:40 -05:00	2019-11-25 15:21 -05:00	2d 19h 41m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-21 13:07 -05:00	2019-11-21 13:58 -05:00	51m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-11-21 12:52 -05:00	2019-11-21 13:52 -05:00	1h 0m	Fall River	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-21 08:05 -05:00	2019-11-21 15:00 -05:00	6h 55m	New Bedford	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-21 06:19 -05:00	2019-11-21 09:33 -05:00	3h 14m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-11-21 06:17 -05:00	2019-11-21 07:02 -05:00	45m	Quonset Point	Davisville
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-11-21 06:16 -05:00	2019-11-21 13:09 -05:00	6h 53m	Baltimore	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-20 20:45 -05:00	2019-11-21 05:16 -05:00	8h 31m	Davisville	Davisville
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-11-20 20:45 -05:00	2019-11-20 21:09 -05:00	24m	Quonset Point	Providence
MORNING CECILIE	9477830	Panama	Vehicles Carrier	22699	2019-11-20 20:44 -05:00	2019-11-21 13:29 -05:00	16h 45m	Philadelphia	Boston
RAINBOW	8987345	United States of America	Tug		2019-11-20 06:08 -05:00	2019-11-20 06:36 -05:00	28m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-20 06:08 -05:00	2019-11-20 19:54 -05:00	13h 46m	Providence	Davisville
GUARDIAN LEADER	9388716	Bahamas	Vehicles Carrier	21182	2019-11-20 06:08 -05:00	2019-11-20 13:49 -05:00	7h 41m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-18 11:47 -05:00	2019-11-18 19:34 -05:00	7h 47m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-18 11:01 -05:00	2019-11-18 19:29 -05:00	8h 28m	Davisville	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-11-18 11:00 -05:00	2019-11-18 19:32 -05:00	8h 32m	Emden	Jacksonville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-18 08:31 -05:00	2019-11-18 10:33 -05:00	2h 2m	Providence	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-17 20:09 -05:00	2019-11-18 10:24 -05:00	14h 15m	Davisville	Davisville
PERSISTENCE		United States of America	Other		2019-11-16 15:28 -05:00	2019-11-26 19:26 -05:00	10d 3h 58m	Davisville	
RELIANCE	7367407	United States of America	Tug		2019-11-16 10:44 -05:00	2019-11-16 11:18 -05:00	34m	Providence	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-16 10:40 -05:00	2019-11-16 11:19 -05:00	39m	Providence	Davisville
GEOQUIP SAENTIS	9282132	Bahamas	Tug Supply Vessel	3500	2019-11-16 08:43 -05:00	2019-11-18 22:16 -05:00	2d 13h 33m	New Bedford	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-15 11:11 -05:00	2019-11-15 14:24 -05:00	3h 13m	Providence	Davisville
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-11-15 11:10 -05:00	2019-11-16 11:17 -05:00	1d 0h 7m	Halifax	Houston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-15 11:10 -05:00	2019-11-15 13:03 -05:00	1h 53m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-11-15 10:07 -05:00	2019-11-18 15:04 -05:00	3d 4h 57m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-15 09:35 -05:00	2019-11-15 10:19 -05:00	44m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-14 16:40 -05:00	2019-11-14 17:35 -05:00	55m	Providence	Davisville
TITAN		United States of America	Other		2019-11-14 12:18 -05:00	2019-12-04 10:22 -05:00	19d 22h 4m	Quonset Point	New Bedford
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-11-13 12:12 -05:00	2019-11-14 16:57 -05:00	1d 4h 45m	Davisville	Veracruz
RAINBOW	8987345	United States of America	Tug		2019-11-13 12:04 -05:00	2019-11-13 12:30 -05:00	26m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-13 12:02 -05:00	2019-11-13 12:38 -05:00	36m	Davisville	Davisville
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-11-13 11:57 -05:00	2019-11-13 11:59 -05:00	2m	Jacksonville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-13 09:40 -05:00	2019-11-13 11:36 -05:00	1h 56m	Providence	Davisville
TITAN		United States of America	Other		2019-11-11 12:47 -05:00	2019-11-13 08:11 -05:00	1d 19h 24m	Pensacola	New Bedford
RAINBOW	8987345	United States of America	Tug		2019-11-09 06:26 -05:00	2019-11-09 06:30 -05:00	4m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-09 06:19 -05:00	2019-11-09 11:48 -05:00	5h 29m	Davisville	Davisville
SELENE LEADER	9498597	Japan	Vehicles Carrier	18082	2019-11-09 06:07 -05:00	2019-11-09 11:47 -05:00	5h 40m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-09 01:37 -05:00	2019-11-09 05:24 -05:00	3h 47m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-11-08 11:38 -05:00	2019-11-08 13:07 -05:00	1h 29m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-07 13:54 -05:00	2019-11-08 13:05 -05:00	23h 11m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-11-07 06:42 -05:00	2019-11-07 07:03 -05:00	21m	Fall River	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-11-07 06:37 -05:00	2019-11-07 15:57 -05:00	9h 20m	Quonset Point	Providence
POLARIS HIGHWAY	9728095	Panama	Vehicles Carrier	20494	2019-11-07 06:34 -05:00	2019-11-08 13:02 -05:00	1d 6h 28m	Altamira	
RELENTLESS		United States of America	Fishing Vessel		2019-11-06 05:48 -05:00	2019-11-09 09:03 -05:00	3d 3h 15m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-05 06:38 -05:00	2019-11-05 15:31 -05:00	8h 53m	Davisville	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-11-05 06:37 -05:00	2019-11-05 15:31 -05:00	8h 54m	Emden	
RAINBOW	8987345	United States of America	Tug		2019-11-05 06:36 -05:00	2019-11-05 15:26 -05:00	8h 50m	Davisville	Davisville
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-11-05 05:53 -05:00	2019-11-05 13:08 -05:00	7h 15m	Veracruz	Emden
RAINBOW	8987345	United States of America	Tug		2019-11-05 05:52 -05:00	2019-11-05 06:18 -05:00	26m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-05 05:52 -05:00	2019-11-05 06:13 -05:00	21m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-11-03 06:20 -05:00	2019-11-03 06:40 -05:00	20m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-11-03 06:20 -05:00	2019-11-03 12:53 -05:00	6h 33m	Fall River	Davisville
BESS	9531715	Panama	Vehicles Carrier	18013	2019-11-03 06:20 -05:00	2019-11-03 12:52 -05:00	6h 32m	Baltimore	Boston
RAINBOW	8987345	United States of America	Tug		2019-10-30 06:42 -04:00	2019-10-30 12:16 -04:00	5h 34m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-30 06:40 -04:00	2019-10-30 12:16 -04:00	5h 36m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-10-30 06:07 -04:00	2019-10-30 12:15 -04:00	6h 8m	Halifax	Houston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-29 16:30 -04:00	2019-10-30 05:27 -04:00	12h 57m	Quonset Point	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-10-29 12:29 -04:00	2019-10-29 16:12 -04:00	3h 43m	Quonset Point	Davisville
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-10-29 06:18 -04:00	2019-10-29 16:15 -04:00	9h 57m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-28 21:39 -04:00	2019-10-29 05:25 -04:00	7h 46m	Providence	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-28 13:49 -04:00	2019-10-28 16:04 -04:00	2h 15m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-10-28 06:54 -04:00	2019-10-28 13:40 -04:00	6h 46m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-28 06:53 -04:00	2019-10-28 13:37 -04:00	6h 44m	Davisville	
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-10-28 06:53 -04:00	2019-10-28 13:36 -04:00	6h 43m	Emden	Jacksonville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-28 05:52 -04:00	2019-10-28 06:20 -04:00	28m	Providence	
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-10-28 05:52 -04:00	2019-10-28 16:03 -04:00	10h 11m	Halifax	Brunswick GA
RAINBOW	8987345	United States of America	Tug		2019-10-28 05:37 -04:00	2019-10-28 06:08 -04:00	31m	Fall River	Davisville
RELENTLESS		United States of America	Fishing Vessel		2019-10-27 21:25 -04:00	2019-11-01 12:46 -04:00	4d 15h 21m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-25 15:20 -04:00	2019-10-25 17:14 -04:00	1h 54m	Providence	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-10-24 13:29 -04:00	2019-10-25 17:12 -04:00	1d 3h 43m	Davisville	Veracruz
RAINBOW	8987345	United States of America	Tug		2019-10-24 13:11 -04:00	2019-10-24 13:50 -04:00	39m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-24 13:08 -04:00	2019-10-24 14:00 -04:00	52m	Quonset Point	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-10-24 13:05 -04:00	2019-10-24 13:09 -04:00	4m	Jacksonville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-24 11:14 -04:00	2019-10-24 11:44 -04:00	30m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-10-24 11:06 -04:00	2019-10-24 11:59 -04:00	53m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-23 06:55 -04:00	2019-10-23 16:47 -04:00	9h 52m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-10-23 06:52 -04:00	2019-10-23 16:30 -04:00	9h 38m	Davisville	Davisville
ERIDANUS LEADER	9498602	Japan	Vehicles Carrier	18056	2019-10-23 06:50 -04:00	2019-10-23 16:32 -04:00	9h 42m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-23 05:56 -04:00	2019-10-23 06:25 -04:00	29m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-10-23 05:56 -04:00	2019-10-23 06:17 -04:00	21m	Fall River	Davisville

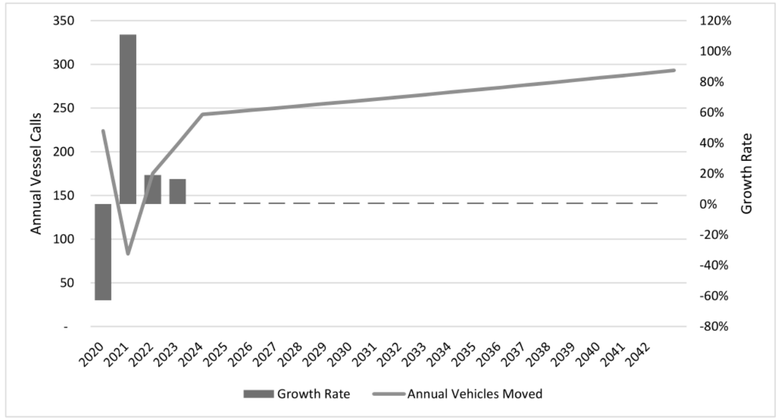
shipName	imo	shipCountry	type	dwt	portCallStart	portCallEnd	portCallDuratior	previousPort	nextPort
IONA MCALISTER	8023618	United States of America	Tug	355	2019-10-22 06:00 -04:00	2019-10-22 06:25 -04:00	25m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-10-18 13:38 -04:00	2019-10-18 19:15 -04:00	5h 37m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-10-18 10:44 -04:00	2019-10-18 12:29 -04:00	1h 45m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-18 10:43 -04:00	2019-10-18 11:28 -04:00	45m	Davisville	Providence
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-10-18 10:41 -04:00	2019-10-18 18:12 -04:00	7h 31m	Jacksonville	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-18 06:54 -04:00	2019-10-18 09:29 -04:00	2h 35m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-10-18 06:24 -04:00	2019-10-18 09:59 -04:00	3h 35m	Fall River	Davisville
ORCHID ACE	9381677	Japan	Vehicles Carrier	17289	2019-10-18 06:02 -04:00	2019-10-18 19:21 -04:00	13h 19m	Baltimore	Boston
RELENTLESS		United States of America	Fishing Vessel		2019-10-17 08:56 -04:00	2019-10-18 09:20 -04:00	1d 0h 24m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-10-14 13:35 -04:00	2019-10-17 08:27 -04:00	2d 18h 52m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-10-14 13:16 -04:00	2019-10-14 14:02 -04:00	46m	Fall River	Davisville
RAINBOW	8987345	United States of America	Tug		2019-10-14 06:01 -04:00	2019-10-14 06:27 -04:00	26m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-14 06:00 -04:00	2019-10-14 14:05 -04:00	8h 5m	Quonset Point	Providence
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-10-14 06:00 -04:00	2019-10-14 14:04 -04:00	8h 4m	Emden	Jacksonville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-12 22:33 -04:00	2019-10-13 06:44 -04:00	8h 11m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-12 11:05 -04:00	2019-10-12 15:01 -04:00	3h 56m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-10-12 06:27 -04:00	2019-10-12 08:29 -04:00	2h 2m	Davisville	Davisville
GLOVIS COMPANION	9460899	Marshall Islands	Vehicles Carrier	18671	2019-10-12 05:58 -04:00	2019-10-12 10:55 -04:00	4h 57m	Baltimore	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-10-12 03:10 -04:00	2019-10-12 05:21 -04:00	2h 11m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-11 21:52 -04:00	2019-10-12 05:19 -04:00	7h 27m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-10-09 06:28 -04:00	2019-10-09 19:37 -04:00	13h 9m	Davisville	Davisville
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-10-09 06:27 -04:00	2019-10-09 19:36 -04:00	13h 9m	Halifax	Houston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-09 06:16 -04:00	2019-10-09 19:38 -04:00	13h 22m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-08 15:46 -04:00	2019-10-09 05:26 -04:00	13h 40m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-08 14:33 -04:00	2019-10-08 15:36 -04:00	1h 3m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-10-08 06:53 -04:00	2019-10-09 05:19 -04:00	22h 26m	Fall River	Davisville
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-10-08 06:21 -04:00	2019-10-08 15:36 -04:00	9h 15m	Jacksonville	Vlissingen
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-10-07 17:28 -04:00	2019-10-08 05:29 -04:00	12h 1m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-10-07 03:22 -04:00	2019-10-07 15:32 -04:00	12h 10m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-07 03:21 -04:00	2019-10-07 15:33 -04:00	12h 12m	Providence	Davisville
MSC CRISTIANA	9453298	Panama	Vehicles Carrier	22287	2019-10-07 03:21 -04:00	2019-10-07 15:31 -04:00	12h 10m	New York	Providence
RELIANCE	7367407	United States of America	Tug		2019-10-04 06:19 -04:00	2019-10-04 17:02 -04:00	10h 43m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-10-04 06:19 -04:00	2019-10-04 17:01 -04:00	10h 42m	Davisville	Davisville
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-10-04 06:19 -04:00	2019-10-04 17:01 -04:00	10h 42m	Jacksonville	
RAINBOW	8987345	United States of America	Tug		2019-10-03 21:09 -04:00	2019-10-04 05:21 -04:00	8h 12m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-03 16:13 -04:00	2019-10-03 21:02 -04:00	4h 49m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-10-03 06:20 -04:00	2019-10-03 20:58 -04:00	14h 38m	Fall River	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-10-03 06:19 -04:00	2019-10-03 13:11 -04:00	6h 52m	Davisville	
MARTORELL	9267675	Panama	Vehicles Carrier	19531	2019-10-03 06:18 -04:00	2019-10-03 21:01 -04:00	14h 43m	New York	Boston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-10-02 06:21 -04:00	2019-10-02 06:40 -04:00	19m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-10-02 06:21 -04:00	2019-10-02 06:43 -04:00	22m	Fall River	Davisville
ORION HIGHWAY	9728071	Panama	Vehicles Carrier	20532	2019-10-02 06:21 -04:00	2019-10-03 13:10 -04:00	1d 6h 49m	Altamira	
RAINBOW	8987345	United States of America	Tug		2019-09-27 06:51 -04:00	2019-09-27 17:26 -04:00	10h 35m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-27 06:51 -04:00	2019-09-27 17:23 -04:00	10h 32m	Davisville	Providence
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-09-27 06:50 -04:00	2019-09-27 17:24 -04:00	10h 34m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-09-27 05:47 -04:00	2019-09-27 06:20 -04:00	33m	Fall River	Davisville
HEROIC LEADER	9441570	Bahamas	Vehicles Carrier	20434	2019-09-27 05:46 -04:00	2019-09-27 15:23 -04:00	9h 37m	Baltimore	Boston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-27 05:46 -04:00	2019-09-27 05:55 -04:00	9m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-25 17:02 -04:00	2019-09-26 19:26 -04:00	1d 2h 24m	Fall River	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-09-25 06:05 -04:00	2019-09-25 17:15 -04:00	11h 10m	Emden	Jacksonville
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-09-25 06:04 -04:00	2019-09-25 06:34 -04:00	30m	Davisville	Providence
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-25 05:57 -04:00	2019-09-25 15:08 -04:00	9h 11m	Davisville	Providence
EX1		United States of America	Other		2019-09-25 04:36 -04:00	2019-10-05 10:20 -04:00	10d 5h 44m	Davisville	
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-09-25 00:52 -04:00	2019-09-25 05:18 -04:00	4h 26m	Providence	Providence
GLOVIS SUNRISE	9702405	Marshall Islands	Vehicles Carrier	20056	2019-09-24 17:22 -04:00	2019-09-25 01:08 -04:00	7h 46m	Philadelphia	Boston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-24 17:21 -04:00	2019-09-25 05:13 -04:00	11h 52m	Quonset Point	Providence
RELIANCE	7367407	United States of America	Tug		2019-09-24 17:21 -04:00	2019-09-24 17:37 -04:00	16m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-09-23 11:00 -04:00	2019-09-23 19:44 -04:00	8h 44m	Davisville	Davisville
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-09-23 10:59 -04:00	2019-09-23 19:41 -04:00	8h 42m	Jacksonville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-23 10:59 -04:00	2019-09-23 19:41 -04:00	8h 42m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-09-23 06:05 -04:00	2019-09-23 17:05 -04:00	11h 0m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-09-23 06:05 -04:00	2019-09-23 10:18 -04:00	4h 13m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-23 06:04 -04:00	2019-09-23 10:23 -04:00	4h 19m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-09-19 06:48 -04:00	2019-09-19 13:16 -04:00	6h 28m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-19 06:47 -04:00	2019-09-19 13:17 -04:00	6h 30m	Davisville	Providence
INTEGRITY	8919934	United States of America	Vehicles Carrier	29152	2019-09-19 06:47 -04:00	2019-09-19 13:17 -04:00	6h 30m	Southampton	Baltimore
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-19 05:59 -04:00	2019-09-19 06:18 -04:00	19m	Providence	Providence
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-09-19 05:59 -04:00	2019-09-19 12:59 -04:00	7h 0m	Halifax	Houston
RAINBOW	8987345	United States of America	Tug		2019-09-19 05:59 -04:00	2019-09-19 06:16 -04:00	17m	Fall River	Davisville
RAINBOW	8987345	United States of America	Tug		2019-09-18 15:21 -04:00	2019-09-18 15:36 -04:00	15m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-18 14:29 -04:00	2019-09-18 15:40 -04:00	1h 11m	Quonset Point	Providence
OKEANOS EXPLORER	8835114	United States of America	Research Vessel	731	2019-09-18 14:22 -04:00	2019-10-05 10:17 -04:00	16d 19h 55m	Davisville	Miami
EX1		United States of America	Other		2019-09-18 07:20 -04:00	2019-09-18 12:09 -04:00	4h 49m	Halifax	
RAINBOW	8987345	United States of America	Tug		2019-09-17 21:12 -04:00	2019-09-17 21:39 -04:00	27m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-17 21:12 -04:00	2019-09-17 21:35 -04:00	23m	Davisville	Davisville
NOCC OCEANIC	9624029	Marshall Islands	Vehicles Carrier	15770	2019-09-17 21:11 -04:00	2019-09-18 15:40 -04:00	18h 29m	Baltimore	Boston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-17 05:56 -04:00	2019-09-17 20:17 -04:00	14h 21m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-09-17 05:56 -04:00	2019-09-17 20:28 -04:00	14h 32m	Providence	Davisville
CALIFORNIA HIGHWAY	9574078	Panama	Vehicles Carrier	18644	2019-09-17 05:56 -04:00	2019-09-17 17:05 -04:00	11h 9m	Jacksonville	Charleston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-16 15:52 -04:00	2019-09-17 05:04 -04:00	13h 12m	Quonset Point	Davisville
EXFRB1		United States of America	Search and Rescue Vessel		2019-09-16 12:47 -04:00	2019-12-04 14:40 -05:00	2m 18d 2h 53m	Halifax	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-09-16 06:43 -04:00	2019-09-16 16:21 -04:00	9h 38m	Davisville	
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-09-16 06:43 -04:00	2019-09-16 16:21 -04:00	9h 38m	Jacksonville	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-16 06:43 -04:00	2019-09-16 11:28 -04:00	4h 45m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-16 05:45 -04:00	2019-09-16 06:19 -04:00	34m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-09-16 05:43 -04:00	2019-09-16 06:20 -04:00	37m	Fall River	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-09-16 05:37 -04:00	2019-09-16 16:39 -04:00	11h 2m	Jacksonville	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-15 20:32 -04:00	2019-09-16 05:02 -04:00	8h 30m	Providence	Davisville
OKEANOS EXPLORER	8835114	United States of America	Research Vessel	731	2019-09-15 09:46 -04:00	2019-09-18 10:13 -04:00	3d 0h 27m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-13 12:16 -04:00	2019-09-13 18:39 -04:00	6h 23m	Quonset Point	Davisville
GRAND PHOENIX	9284764	Panama	Vehicles Carrier	18383	2019-09-13 12:16 -04:00	2019-09-13 18:39 -04:00	6h 23m	Baltimore	Boston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-13 12:15 -04:00	2019-09-13 18:37 -04:00	6h 22m	Providence	Davisville
POLARIS HIGHWAY	9728095	Panama	Vehicles Carrier	20494	2019-09-12 12:55 -04:00	2019-09-13 16:12 -04:00	1d 3h 17m	Jacksonville	Barcelona
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-12 12:53 -04:00	2019-09-12 13:28 -04:00	35m	Davisville	Fall River
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-12 12:45 -04:00	2019-09-13 07:22 -04:00	18h 37m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-11 18:43 -04:00	2019-09-12 11:50 -04:00	17h 7m	Davisville	Fall River
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-11 14:26 -04:00	2019-09-11 18:32 -04:00	4h 6m	Davisville	Fall River
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-11 06:14 -04:00	2019-09-11 06:21 -04:00	7m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-11 06:12 -04:00	2019-09-12 11:48 -04:00	1d 5h 36m	Davisville	Davisville
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-09-11 06:11 -04:00	2019-09-11 18:34 -04:00	12h 23m	Jacksonville	Emden
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-10 20:52 -04:00	2019-09-11 05:42 -04:00	8h 50m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-09-10 06:08 -04:00	2019-09-10 06:32 -04:00	24m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-10 06:08 -04:00	2019-09-11 05:44 -04:00	23h 36m	Davisville	Davisville
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-09-10 06:08 -04:00	2019-09-10 15:14 -04:00	9h 6m	Emden	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-09 07:49 -04:00	2019-09-10 05:27 -04:00	21h 38m	Quonset Point	Davisville
OLIVER HAZARD PERRY	8775560	United States of America	Sailing Vessel		2019-09-06 17:13 -04:00	2019-09-08 08:30 -04:00	1d 15h 17m	Newport RI	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-06 09:37 -04:00	2019-09-06 15:07 -04:00	5h 30m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-06 05:56 -04:00	2019-09-06 08:51 -04:00	2h 55m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-06 05:56 -04:00	2019-09-06 12:11 -04:00	6h 15m	Davisville	Providence
HARMONY LEADER	9441568	Bahamas	Vehicles Carrier	20434	2019-09-06 05:51 -04:00	2019-09-06 12:11 -04:00	6h 20m	Baltimore	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-05 15:10 -04:00	2019-09-06 05:22 -04:00	14h 12m	Davisville	
OKEANOS EXPLORER	8835114	United States of America	Research Vessel	731	2019-09-05 15:00 -04:00	2019-09-08 08:18 -04:00	2d 17h 18m	Halifax	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-05 09:19 -04:00	2019-09-05 14:58 -04:00	5h 39m	Quonset Point	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-05 06:13 -04:00	2019-09-06 05:26 -04:00	23h 13m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-09-05 06:13 -04:00	2019-09-05 06:37 -04:00	24m	Quonset Point	
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-09-05 06:13 -04:00	2019-09-05 15:01 -04:00	8h 48m	Halifax	Veracruz
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-09-03 07:12 -04:00	2019-09-03 18:45 -04:00	11h 33m	Quonset Point	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-09-03 07:12 -04:00	2019-09-03 07:39 -04:00	27m	Davisville	
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-09-03 07:12 -04:00	2019-09-03 18:43 -04:00	11h 31m	Jacksonville	Emden
NEWPORT		United States of America	Other		2019-08-31 17:48 -04:00	2019-08-31 17:51 -04:00	3m	Newport RI	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-29 06:11 -04:00	2019-08-29 15:12 -04:00	9h 1m	Fall River	
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-08-29 05:59 -04:00	2019-08-29 15:13 -04:00	9h 14m	Halifax	Houston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-29 05:58 -04:00	2019-08-29 15:11 -04:00	9h 13m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-08-28 15:15 -04:00	2019-08-28 15:45 -04:00	30m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-08-27 16:29 -04:00	2019-08-27 17:03 -04:00	34m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-27 16:29 -04:00	2019-08-27 17:00 -04:00	31m	Providence	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-27 07:09 -04:00	2019-08-27 08:02 -04:00	53m	Davisville	
IGUAZU HIGHWAY	9827243	Panama	Vehicles Carrier	20300	2019-08-27 07:04 -04:00	2019-08-28 15:29 -04:00	1d 8h 25m	Altamira	
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-08-27 06:50 -04:00	2019-08-27 07:40 -04:00	50m	Davisville	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-27 05:52 -04:00	2019-08-27 06:15 -04:00	23m	Davisville	
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-08-27 05:44 -04:00	2019-08-27 06:18 -04:00	34m	Providence	Providence
GRANDE BALTIMORA	9784037	Italy	Vehicles Carrier	18447	2019-08-27 05:44 -04:00	2019-08-27 17:05 -04:00	11h 21m	Halifax	New York
MORNING CAROLINE	9338723	Panama	Vehicles Carrier	22717	2019-08-26 06:16 -04:00	2019-08-26 16:13 -04:00	9h 57m	Baltimore	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-08-26 06:15 -04:00	2019-08-26 16:10 -04:00	9h 55m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-26 06:13 -04:00	2019-08-26 16:13 -04:00	10h 0m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-08-25 18:39 -04:00	2019-08-26 05:36 -04:00	10h 57m	Quonset Point	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-23 11:11 -04:00	2019-08-24 08:22 -04:00	21h 11m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-23 11:09 -04:00	2019-08-24 08:26 -04:00	21h 17m	Davisville	Providence
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-08-23 11:09 -04:00	2019-08-24 08:21 -04:00	21h 12m	Emden	Jacksonville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-23 06:06 -04:00	2019-08-23 10:29 -04:00	4h 23m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-23 06:06 -04:00	2019-08-23 10:51 -04:00	4h 45m	Davisville	
EMERALD ACE	9539236	Marshall Islands	Vehicles Carrier	18334	2019-08-23 06:06 -04:00	2019-08-23 15:31 -04:00	9h 25m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-22 16:33 -04:00	2019-08-23 05:20 -04:00	12h 47m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-22 16:30 -04:00	2019-08-23 05:20 -04:00	12h 50m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-22 06:23 -04:00	2019-08-22 16:20 -04:00	9h 57m	Davisville	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-08-22 06:21 -04:00	2019-08-22 16:19 -04:00	9h 58m	Halifax	Houston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-22 06:20 -04:00	2019-08-22 16:17 -04:00	9h 57m	Providence	Davisville
PERSISTENCE		United States of America	Other		2019-08-21 04:12 -04:00	2019-10-12 14:25 -04:00	1m 22d 10h 13m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-08-21 02:42 -04:00	2019-10-14 10:05 -04:00	1m 24d 7h 23m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-08-19 06:10 -04:00	2019-08-19 06:26 -04:00	16m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-19 06:10 -04:00	2019-08-19 17:28 -04:00	11h 18m	Quonset Point	Davisville
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-08-19 06:10 -04:00	2019-08-19 17:27 -04:00	11h 17m	Jacksonville	Emden
PERSISTENCE		United States of America	Other		2019-08-18 06:22 -04:00	2019-08-18 17:15 -04:00	10h 53m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-17 19:39 -04:00	2019-08-17 23:46 -04:00	4h 7m	Providence	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-16 06:20 -04:00	2019-08-16 06:52 -04:00	32m	Davisville	
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-08-16 06:17 -04:00	2019-08-16 12:59 -04:00	6h 42m	Emden	Jacksonville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-16 06:08 -04:00	2019-08-16 12:58 -04:00	6h 50m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-16 04:44 -04:00	2019-08-16 05:15 -04:00	31m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-16 04:43 -04:00	2019-08-16 05:09 -04:00	26m	Davisville	Davisville
STAR LOEN	9603790	Norway	Multi Purpose Carrier	50792	2019-08-16 04:43 -04:00	2019-08-17 23:46 -04:00	1d 19h 3m	Venice Louisiana	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-15 06:14 -04:00	2019-08-16 03:45 -04:00	21h 31m	Davisville	Davisville
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-08-15 06:14 -04:00	2019-08-15 14:43 -04:00	8h 29m	Jacksonville	
RAINBOW	8987345	United States of America	Tug		2019-08-15 06:13 -04:00	2019-08-15 06:54 -04:00	41m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-14 14:04 -04:00	2019-08-15 05:20 -04:00	15h 16m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-14 06:25 -04:00	2019-08-14 13:57 -04:00	7h 32m	Davisville	
TALIA	9311854	Bahamas	Vehicles Carrier	21021	2019-08-14 06:12 -04:00	2019-08-14 13:56 -04:00	7h 44m	Baltimore	Boston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-14 06:12 -04:00	2019-08-14 13:54 -04:00	7h 42m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-13 22:09 -04:00	2019-08-14 05:35 -04:00	7h 26m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-08-13 16:10 -04:00	2019-08-13 16:23 -04:00	13m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-13 10:38 -04:00	2019-08-14 05:33 -04:00	18h 55m	Quonset Point	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-13 07:05 -04:00	2019-08-13 19:47 -04:00	12h 42m	Davisville	
GRANDE HALIFX	9784051	Italy	Vehicles Carrier	18353	2019-08-13 07:05 -04:00	2019-08-13 19:46 -04:00	12h 41m	Gioia Tauro (Palmi)	Baltimore
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-13 07:02 -04:00	2019-08-13 07:28 -04:00	26m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-13 05:02 -04:00	2019-08-13 06:27 -04:00	1h 25m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-08-12 11:25 -04:00	2019-08-12 11:49 -04:00	24m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-12 11:25 -04:00	2019-08-12 11:48 -04:00	23m	Providence	Davisville
ORION HIGHWAY	9728071	Panama	Vehicles Carrier	20532	2019-08-12 11:24 -04:00	2019-08-14 13:06 -04:00	2d 1h 42m	Altamira	
RELENTLESS		United States of America	Fishing Vessel		2019-08-12 07:30 -04:00	2019-08-13 15:34 -04:00	1d 8h 4m	Davisville	
GULF COAST		United States of America	Tug		2019-08-12 07:29 -04:00	2019-08-12 08:25 -04:00	56m	New York	
PERSISTENCE		United States of America	Other		2019-08-09 17:51 -04:00	2019-08-11 15:58 -04:00	1d 22h 7m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-09 12:58 -04:00	2019-08-09 13:15 -04:00	17m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-08-09 12:55 -04:00	2019-08-09 14:09 -04:00	1h 14m	Providence	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-08-08 06:25 -04:00	2019-08-09 13:17 -04:00	1d 6h 52m	Halifax	Houston
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-08 06:25 -04:00	2019-08-08 19:02 -04:00	12h 37m	Davisville	Providence
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-08 05:43 -04:00	2019-08-08 05:48 -04:00	5m	Providence	Davisville
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-08-08 05:42 -04:00	2019-08-08 18:57 -04:00	13h 15m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-08-08 05:42 -04:00	2019-08-08 10:14 -04:00	4h 32m	Providence	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-08-06 21:04 -04:00	2019-08-06 23:06 -04:00	2h 2m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-08-06 20:15 -04:00	2019-08-06 23:00

shipName	imo	shipCountry	type	dwt	portCallStart	portCallEnd	portCallDuratior	previousPort	nextPort
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-08-01 05:50 -04:00	2019-08-01 05:54 -04:00	4m	Jacksonville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-31 22:00 -04:00	2019-08-01 05:11 -04:00	7h 11m	Providence	Providence
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-30 14:40 -04:00	2019-07-30 15:44 -04:00	1h 4m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-07-29 06:00 -04:00	2019-07-29 07:11 -04:00	1h 11m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-29 06:00 -04:00	2019-07-29 06:18 -04:00	18m	Providence	Davisville
POLARIS HIGHWAY	9728095	Panama	Vehicles Carrier	20494	2019-07-29 06:00 -04:00	2019-07-30 15:42 -04:00	1d 9h 42m	Altamira	Bremerhaven
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-27 21:46 -04:00	2019-07-27 23:13 -04:00	1h 27m	Providence	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-07-27 21:25 -04:00	2019-07-27 23:22 -04:00	1h 57m	Providence	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-07-26 06:15 -04:00	2019-07-27 23:18 -04:00	1d 17h 3m	Jacksonville	Emden
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-26 06:13 -04:00	2019-07-26 10:30 -04:00	4h 17m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-26 06:12 -04:00	2019-07-26 10:28 -04:00	4h 16m	Davisville	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-25 22:44 -04:00	2019-07-26 05:41 -04:00	6h 57m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-25 17:17 -04:00	2019-07-26 05:42 -04:00	12h 25m	Davisville	Providence
RAINBOW	8987345	United States of America	Tug		2019-07-25 05:49 -04:00	2019-07-25 06:18 -04:00	29m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-25 05:49 -04:00	2019-07-25 17:02 -04:00	11h 13m	Providence	Providence
LYRA LEADER	9284752	Japan	Vehicles Carrier	21453	2019-07-25 05:48 -04:00	2019-07-25 17:00 -04:00	11h 12m	Baltimore	Boston
RAINBOW	8987345	United States of America	Tug		2019-07-24 15:32 -04:00	2019-07-25 04:56 -04:00	13h 24m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-24 15:21 -04:00	2019-07-24 15:26 -04:00	5m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-07-24 11:42 -04:00	2019-07-25 16:22 -04:00	1d 4h 40m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-07-24 11:08 -04:00	2019-07-24 15:08 -04:00	4h 0m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-24 11:07 -04:00	2019-07-24 15:11 -04:00	4h 4m	Davisville	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-07-24 11:07 -04:00	2019-07-24 20:52 -04:00	9h 45m	Emden	
OKEANOS EXPLORER	8835114	United States of America	Research Vessel	731	2019-07-24 09:30 -04:00	2019-07-25 14:16 -04:00	1d 4h 46m	Norfolk	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-23 18:29 -04:00	2019-07-23 20:01 -04:00	1h 32m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-23 18:28 -04:00	2019-07-24 10:14 -04:00	15h 46m	Davisville	
PERSISTENCE		United States of America	Other		2019-07-23 17:58 -04:00	2019-07-23 19:26 -04:00	1h 28m	Davisville	
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-07-23 11:29 -04:00	2019-07-24 15:12 -04:00	1d 3h 43m	Halifax	Houston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-23 11:29 -04:00	2019-07-23 18:12 -04:00	6h 43m	Providence	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-23 11:28 -04:00	2019-07-23 18:14 -04:00	6h 46m	Providence	
PERSISTENCE		United States of America	Other		2019-07-23 02:35 -04:00	2019-07-23 17:34 -04:00	14h 59m	Davisville	
VIKING ADVENTURE	9673018	Singapore	Vehicles Carrier	18372	2019-07-20 09:21 -04:00	2019-07-20 17:38 -04:00	8h 17m	Brunswick GA	Altamira
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-20 09:20 -04:00	2019-07-20 17:38 -04:00	8h 18m	Providence	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-20 09:20 -04:00	2019-07-20 17:35 -04:00	8h 15m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-07-19 07:01 -04:00	2019-07-19 07:22 -04:00	21m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-19 07:00 -04:00	2019-07-19 07:21 -04:00	21m	Davisville	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-07-19 07:00 -04:00	2019-07-20 12:13 -04:00	1d 5h 13m	Veracruz	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-18 23:02 -04:00	2019-07-19 05:50 -04:00	6h 48m	Davisville	
MERMAID ACE	9561289	Panama	Vehicles Carrier	18828	2019-07-18 11:05 -04:00	2019-07-18 18:09 -04:00	7h 4m	New York	Boston
RAINBOW	8987345	United States of America	Tug		2019-07-18 11:04 -04:00	2019-07-19 05:51 -04:00	18h 47m	Quonset Point	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-18 11:04 -04:00	2019-07-18 18:09 -04:00	7h 5m	Davisville	
GRAND VEGA	9355252	Panama	Vehicles Carrier	18049	2019-07-17 06:20 -04:00	2019-07-17 15:36 -04:00	9h 16m	Davisville	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-17 06:08 -04:00	2019-07-17 07:00 -04:00	52m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-17 06:05 -04:00	2019-07-18 10:15 -04:00	1d 4h 10m	Davisville	
GRAND VEGA	9355252	Panama	Vehicles Carrier	18049	2019-07-17 06:01 -04:00	2019-07-17 06:02 -04:00	1m	Baltimore	Davisville
PERSISTENCE		United States of America	Other		2019-07-17 00:03 -04:00	2019-07-18 13:13 -04:00	1d 13h 10m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-16 16:31 -04:00	2019-07-17 05:31 -04:00	13h 0m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-16 10:29 -04:00	2019-07-17 05:33 -04:00	19h 4m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-16 10:21 -04:00	2019-07-16 16:19 -04:00	5h 58m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-16 06:05 -04:00	2019-07-16 06:19 -04:00	14m	Davisville	Davisville
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-07-16 06:04 -04:00	2019-07-16 16:19 -04:00	10h 15m	Emden	Jacksonville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-16 06:04 -04:00	2019-07-16 06:20 -04:00	16m	Davisville	Davisville
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-07-15 06:08 -04:00	2019-07-15 18:26 -04:00	12h 18m	Halifax	Veracruz
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-15 06:05 -04:00	2019-07-16 05:28 -04:00	23h 23m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-15 06:05 -04:00	2019-07-16 05:21 -04:00	23h 16m	Providence	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-14 21:56 -04:00	2019-07-15 05:34 -04:00	7h 38m	Providence	Davisville
RELENTLESS		United States of America	Fishing Vessel		2019-07-13 14:57 -04:00	2019-07-15 16:29 -04:00	2d 1h 32m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-12 18:31 -04:00	2019-07-13 11:57 -04:00	17h 26m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-12 07:16 -04:00	2019-07-12 18:19 -04:00	11h 3m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-07-12 06:41 -04:00	2019-07-12 18:23 -04:00	11h 42m	Davisville	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-07-12 06:41 -04:00	2019-07-12 18:21 -04:00	11h 40m	Jacksonville	Emden
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-12 06:41 -04:00	2019-07-12 07:05 -04:00	24m	Davisville	Davisville
MORNING CHERRY	9675585	Panama	Vehicles Carrier	18556	2019-07-12 05:56 -04:00	2019-07-12 15:45 -04:00	9h 49m	Baltimore	
RAINBOW	8987345	United States of America	Tug		2019-07-12 05:56 -04:00	2019-07-12 06:10 -04:00	14m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-12 05:55 -04:00	2019-07-12 06:18 -04:00	23m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-11 13:28 -04:00	2019-07-12 05:19 -04:00	15h 51m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-07-10 20:25 -04:00	2019-07-10 20:54 -04:00	29m	Davisville	Davisville
EMU ARROW	9144392	Bahamas	Multi Purpose Carrier	55457	2019-07-10 20:25 -04:00	2019-07-11 22:52 -04:00	1d 2h 27m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-10 20:18 -04:00	2019-07-11 02:31 -04:00	6h 13m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-07-10 19:47 -04:00	2019-07-10 20:07 -04:00	20m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-10 19:47 -04:00	2019-07-10 20:04 -04:00	17m	Providence	
EMU ARROW	9144392	Bahamas	Multi Purpose Carrier	55457	2019-07-10 06:47 -04:00	2019-07-10 20:04 -04:00	13h 17m	Baltimore	Davisville
RAINBOW	8987345	United States of America	Tug		2019-07-10 06:47 -04:00	2019-07-10 07:30 -04:00	43m	Davisville	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-10 05:57 -04:00	2019-07-10 06:32 -04:00	35m	Providence	
IGUAZU HIGHWAY	9827243	Panama	Vehicles Carrier	20300	2019-07-10 05:56 -04:00	2019-07-11 15:25 -04:00	1d 9h 29m	Altamira	
RAINBOW	8987345	United States of America	Tug		2019-07-10 05:44 -04:00	2019-07-10 06:10 -04:00	26m	Fall River	Davisville
PERSISTENCE		United States of America	Other		2019-07-09 15:49 -04:00	2019-07-09 17:13 -04:00	1h 24m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-08 14:20 -04:00	2019-07-08 16:02 -04:00	1h 42m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-07-08 06:46 -04:00	2019-07-08 16:04 -04:00	9h 18m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-07-08 06:44 -04:00	2019-07-08 16:04 -04:00	9h 20m	Emden	Jacksonville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-08 06:41 -04:00	2019-07-08 08:35 -04:00	1h 54m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-07-08 05:40 -04:00	2019-07-08 06:09 -04:00	29m	Fall River	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-08 05:40 -04:00	2019-07-08 06:10 -04:00	30m	Quonset Point	
AURIGA LEADER	9402718	Panama	Vehicles Carrier	18686	2019-07-08 05:35 -04:00	2019-07-08 15:33 -04:00	9h 58m	Baltimore	
GLOVIS STELLA	9749570	Marshall Islands	Vehicles Carrier	19638	2019-07-06 06:45 -04:00	2019-07-06 12:59 -04:00	6h 14m	New York	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-06 06:45 -04:00	2019-07-06 12:59 -04:00	6h 14m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-06 06:35 -04:00	2019-07-06 07:56 -04:00	1h 21m	Davisville	
GRANDE TORINO	9782675	Italy	Vehicles Carrier	15580	2019-07-05 19:27 -04:00	2019-07-05 22:23 -04:00	2h 56m	Halifax	New York
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-05 19:26 -04:00	2019-07-06 05:44 -04:00	10h 18m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-05 19:16 -04:00	2019-07-06 05:49 -04:00	10h 33m	Davisville	
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-05 11:29 -04:00	2019-07-05 18:21 -04:00	6h 52m	Quonset Point	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-07-05 11:26 -04:00	2019-07-05 18:29 -04:00	7h 3m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-07-05 06:00 -04:00	2019-07-05 14:31 -04:00	8h 31m	Fall River	Davisville
ERIC MCALLISTER	9707493	United States of America	Tug	207	2019-07-05 05:59 -04:00	2019-07-05 06:26 -04:00	27m	Providence	
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-07-05 05:59 -04:00	2019-07-05 17:15 -04:00	11h 16m	Halifax	Houston
RELENTLESS		United States of America	Fishing Vessel		2019-07-04 15:26 -04:00	2019-07-06 13:33 -04:00	1d 22h 7m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-07-02 11:29 -04:00	2019-07-02 18:32 -04:00	7h 3m	Davisville	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-07-02 06:01 -04:00	2019-07-02 18:30 -04:00	12h 29m	Jacksonville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-07-02 06:01 -04:00	2019-07-02 08:10 -04:00	2h 9m	Providence	
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-07-02 05:50 -04:00	2019-07-02 06:24 -04:00	34m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-07-01 16:31 -04:00	2019-07-01 21:19 -04:00	4h 48m	Davisville	Davisville
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-07-01 11:20 -04:00	2019-07-01 21:18 -04:00	9h 58m	Emden	Jacksonville
RAINBOW	8987345	United States of America	Tug		2019-07-01 11:19 -04:00	2019-07-01 16:18 -04:00	4h 59m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-07-01 11:18 -04:00	2019-07-01 16:55 -04:00	5h 37m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-07-01 06:38 -04:00	2019-07-01 10:22 -04:00	3h 44m	Fall River	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-07-01 06:38 -04:00	2019-07-01 07:04 -04:00	26m	Davisville	
POSEIDON LEADER	9335965	Japan	Vehicles Carrier	21449	2019-07-01 06:38 -04:00	2019-07-01 16:21 -04:00	9h 43m	Baltimore	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-06-30 14:32 -04:00	2019-06-30 21:18 -04:00	6h 46m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-06-30 06:21 -04:00	2019-07-01 06:04 -04:00	23h 43m	Davisville	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-06-30 06:21 -04:00	2019-06-30 17:23 -04:00	11h 2m	Halifax	Houston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-06-30 06:20 -04:00	2019-06-30 13:48 -04:00	7h 28m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-06-30 00:18 -04:00	2019-06-30 05:58 -04:00	5h 40m	Providence	Davisville
PERSISTENCE		United States of America	Other		2019-06-29 15:06 -04:00	2019-07-01 22:38 -04:00	2d 7h 32m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-06-28 11:16 -04:00	2019-06-28 11:35 -04:00	19m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-06-28 11:13 -04:00	2019-06-30 06:00 -04:00	1d 18h 47m	Davisville	
DRIVE GREEN HIGHWAY	9728069	Panama	Vehicles Carrier	20034	2019-06-28 11:12 -04:00	2019-06-29 15:46 -04:00	1d 4h 34m	Altamira	
RAINBOW	8987345	United States of America	Tug		2019-06-27 19:27 -04:00	2019-06-28 10:10 -04:00	14h 43m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-06-27 19:03 -04:00	2019-06-28 10:18 -04:00	15h 15m	Providence	
RELIANCE	7367407	United States of America	Tug		2019-06-27 10:50 -04:00	2019-06-27 11:17 -04:00	27m	Providence	
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-06-27 10:49 -04:00	2019-06-27 19:19 -04:00	8h 30m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-06-27 10:45 -04:00	2019-06-27 19:16 -04:00	8h 31m	Providence	Davisville
RELENTLESS		United States of America	Fishing Vessel		2019-06-25 06:15 -04:00	2019-06-27 11:23 -04:00	2d 5h 8m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-06-23 17:54 -04:00	2019-06-24 22:07 -04:00	1d 4h 13m	Davisville	
STAR LYSEFJORD	9616840	Norway	Multi Purpose Carrier	50728	2019-06-23 07:17 -04:00	2019-06-24 22:07 -04:00	1d 14h 50m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-06-23 07:16 -04:00	2019-06-23 16:59 -04:00	9h 43m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-06-23 07:14 -04:00	2019-06-23 07:37 -04:00	23m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-06-23 06:44 -04:00	2019-06-23 06:55 -04:00	11m	Davisville	
STAR LYSEFJORD	9616840	Norway	Multi Purpose Carrier	50728	2019-06-23 06:44 -04:00	2019-06-23 06:54 -04:00	10m	Charleston	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-06-23 06:06 -04:00	2019-06-23 06:24 -04:00	18m	Providence	
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-06-23 06:04 -04:00	2019-06-23 16:59 -04:00	10h 55m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-06-23 06:00 -04:00	2019-06-23 06:16 -04:00	16m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-06-20 16:56 -04:00	2019-06-20 23:10 -04:00	6h 14m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-20 10:57 -04:00	2019-06-20 23:07 -04:00	12h 10m	Davisville	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-06-20 10:57 -04:00	2019-06-20 23:06 -04:00	12h 9m	Emden	Jacksonville
RAINBOW	8987345	United States of America	Tug		2019-06-20 10:56 -04:00	2019-06-20 16:45 -04:00	5h 49m	Davisville	
ONYX ACE	9539212	Liberia	Vehicles Carrier	18529	2019-06-20 06:21 -04:00	2019-06-20 16:45 -04:00	10h 24m	Baltimore	Boston
RAINBOW	8987345	United States of America	Tug		2019-06-20 06:21 -04:00	2019-06-20 10:19 -04:00	3h 58m	Quonset Point	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-20 06:11 -04:00	2019-06-20 10:23 -04:00	4h 12m	Quonset Point	Davisville
PERSISTENCE		United States of America	Other		2019-06-18 02:27 -04:00	2019-06-20 12:05 -04:00	2d 9h 38m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-06-17 13:46 -04:00	2019-06-17 15:21 -04:00	1h 35m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-17 13:43 -04:00	2019-06-17 16:08 -04:00	2h 25m	Davisville	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-17 13:26 -04:00	2019-06-17 13:28 -04:00	2m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-17 13:25 -04:00	2019-06-17 13:27 -04:00	2m	Davisville	
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-06-17 06:07 -04:00	2019-06-17 16:07 -04:00	10h 0m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-06-17 06:07 -04:00	2019-06-17 12:42 -04:00	6h 35m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-17 06:06 -04:00	2019-06-17 12:41 -04:00	6h 35m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-16 20:19 -04:00	2019-06-17 05:36 -04:00	9h 17m	Providence	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-14 11:40 -04:00	2019-06-14 22:05 -04:00	10h 25m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-14 11:39 -04:00	2019-06-14 22:04 -04:00	10h 25m	Providence	
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-06-14 11:39 -04:00	2019-06-14 22:05 -04:00	10h 26m	Jacksonville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-12 06:33 -04:00	2019-06-12 06:51 -04:00	18m	Quonset Point	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-12 06:31 -04:00	2019-06-12 16:12 -04:00	9h 41m	Davisville	Providence
HARVEST LEADER	9690523	Bahamas	Vehicles Carrier	20941	2019-06-12 06:26 -04:00	2019-06-12 16:10 -04:00	9h 44m	Baltimore	Boston
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-11 21:34 -04:00	2019-06-12 05:21 -04:00	7h 47m	Providence	Providence
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-10 11:02 -04:00	2019-06-10 23:19 -04:00	12h 17m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-10 11:02 -04:00	2019-06-10 23:12 -04:00	12h 10m	Davisville	
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-06-10 11:02 -04:00	2019-06-10 23:15 -04:00	12h 13m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-06-10 00:32 -04:00	2019-06-10 10:17 -04:00	9h 45m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-06-09 17:14 -04:00	2019-06-10 00:20 -04:00	7h 6m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-09 17:12 -04:00	2019-06-10 10:16 -04:00	17h 4m	Davisville	Davisville
MORNING CINDY	9633185	Panama	Vehicles Carrier	18735	2019-06-09 17:12 -04:00	2019-06-10 00:25 -04:00	7h 13m	Philadelphia	Bremerhaven
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-09 08:10 -04:00	2019-06-09 16:16 -04:00	8h 6m	Quonset Point	Davisville
POLARIS HIGHWAY	9728095	Panama	Vehicles Carrier	20494	2019-06-09 08:09 -04:00	2019-06-10 13:11 -04:00	1d 5h 2m	Altamira	
RAINBOW	8987345	United States of America	Tug		2019-06-09 08:09 -04:00	2019-06-09 16:17 -04:00	8h 8m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-06-08 16:38 -04:00	2019-06-09 06:55 -04:00	14h 17m	Davisville	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-06-08 06:02 -04:00	2019-06-08 16:28 -04:00	10h 26m	Halifax	
RAINBOW	8987345	United States of America	Tug		2019-06-08 06:02 -04:00	2019-06-08 16:26 -04:00	10h 24m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-08 06:01 -04:00	2019-06-08 16:28 -04:00	10h 27m	Davisville	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-07 19:59 -04:00	2019-06-08 05:20 -04:00	9h 21m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-07 11:14 -04:00	2019-06-08 05:21 -04:00	18h 7m	Providence	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-07 11:12 -04:00	2019-06-07 11:20 -04:00	8m	Providence	Davisville
GRANDE BALTIMORA	9784037	Italy	Vehicles Carrier	18447	2019-06-07 11:06 -04:00	2019-06-07 15:04 -04:00	3h 58m	Valencia	New York
RAINBOW	8987345	United States of America	Tug		2019-06-06 14:31 -04:00	2019-06-06 17:06 -04:00	2h 35m	Quonset Point	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-06 13:37 -04:00	2019-06-06 17:07 -04:00	3h 30m	Quonset Point	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-06 06:24 -04:00	2019-06-06 07:00 -04:00	36m	Davisville	Davisville
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-06-06 06:23 -04:00	2019-06-06 17:08 -04:00	10h 45m	Jacksonville	Emden
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-05 20:35 -04:00	2019-06-06 05:18 -04:00	8h 43m	Providence	Davisville
RELENTLESS		United States of America	Fishing Vessel		2019-06-05 17:29 -04:00	2019-06-14 12:38 -04:00	8d 19h 9m	Davisville	
PERSISTENCE		United States of America	Other		2019-06-05 16:55 -04:00	2019-06-06 06:03 -04:00	13h 8m	Davisville	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-06-04 06:05 -04:00	2019-06-04 17:42 -04:00	11h 37m	Jacksonville	Emden
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-04 06:05 -04:00	2019-06-04 17:43 -04:00	11h 38m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-04 06:05 -04:00	2019-06-04 17:50 -04:00	11h 45m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-06-03 15:26 -04:00	2019-06-04 05:46 -04:00	14h 20m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-06-03 06:22 -04:00	2019-06-04 05:45 -04:00	23h 23m	Davisville	
RELIANCE	7367407	United States of America	Tug		2019-06-03 06:02 -04:00	2019-06-03 06:46 -04:00	44m	Providence	
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-06-03 05:59 -04:00	2019-06-03 16:18 -04:00	10h 19m	Emden	Jacksonville
RAINBOW	8987345	United States of America	Tug		2019-06-02 20:12 -04:00	2019-06-03 05:37 -04:00	9h 25m	Providence	
PERSISTENCE		United States of America	Other		2019-06-01 08:45 -04:00	2019-06-03 15:58 -04:00	2d 7h 13m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-31 07:16 -04:00	2019-05-31 13:17 -04:00	6h 1m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-31 06:18 -04:00	2019-05-31 06:24 -04:00	6m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-31 05:50 -04:00	2019-05-31 06:24 -04:00	34m	Davisville	Davisville
RHEA LEADER	9355214	Japan	Vehicles Carrier	21428	2019-05-31 05:48 -04:00	2019-05-31 13:16 -04:00	7h 28m	Baltimore	Boston
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-30 16:10 -04:00	2019-05-31 05:39 -04:00	13h 29m	Davisville	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-30 05:42 -04:00	2019-05

shipName	imo	shipCountry	type	dwt	portCallStart	portCallEnd	portCallDuratior	previousPort	nextPort
MSC CRISTIANA	9453298	Panama	Vehicles Carrier	22287	2019-05-28 15:17 -04:00	2019-05-28 23:23 -04:00	8h 6m	Halifax	New York
RAINBOW	8987345	United States of America	Tug		2019-05-28 15:17 -04:00	2019-05-28 23:21 -04:00	8h 4m	Quonset Point	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-28 15:15 -04:00	2019-05-28 23:23 -04:00	8h 8m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-28 06:19 -04:00	2019-05-28 06:41 -04:00	22m	Fall River	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-05-28 06:18 -04:00	2019-05-28 06:39 -04:00	21m	Quonset Point	
MEDITERRANEANHIGHWAY	9250220	Panama	Vehicles Carrier	17228	2019-05-28 06:17 -04:00	2019-05-28 16:10 -04:00	9h 53m	Emden	Jacksonville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-24 06:41 -04:00	2019-05-24 17:51 -04:00	11h 10m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-05-24 06:41 -04:00	2019-05-24 17:50 -04:00	11h 9m	Fall River	
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-05-24 06:41 -04:00	2019-05-24 17:52 -04:00	11h 11m	Halifax	Houston
ZEUS LEADER	9476733	Japan	Vehicles Carrier	18697	2019-05-24 05:55 -04:00	2019-05-24 15:55 -04:00	10h 0m	Baltimore	Boston
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-24 05:52 -04:00	2019-05-24 06:18 -04:00	26m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-23 22:47 -04:00	2019-05-24 04:49 -04:00	6h 2m	Providence	
PERSISTENCE		United States of America	Other		2019-05-21 00:32 -04:00	2019-06-01 05:37 -04:00	11d 5h 5m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-05-20 17:57 -04:00	2019-05-30 20:57 -04:00	10d 3h 0m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-05-19 17:51 -04:00	2019-05-19 18:07 -04:00	16m	Fall River	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-19 17:48 -04:00	2019-05-20 19:05 -04:00	1d 1h 17m	Providence	
IGUAZU HIGHWAY	9827243	Panama	Vehicles Carrier	20300	2019-05-19 17:41 -04:00	2019-05-20 19:03 -04:00	1d 1h 22m	Altamira	
RAINBOW	8987345	United States of America	Tug		2019-05-16 13:47 -04:00	2019-05-16 19:27 -04:00	5h 40m	Davisville	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-05-16 06:32 -04:00	2019-05-16 19:32 -04:00	13h 0m	Jacksonville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-16 06:29 -04:00	2019-05-16 19:31 -04:00	13h 2m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-16 06:28 -04:00	2019-05-16 13:17 -04:00	6h 49m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-05-16 05:53 -04:00	2019-05-16 06:01 -04:00	8m	Fall River	
LEO LEADER	9181558	Panama	Vehicles Carrier	22733	2019-05-16 05:52 -04:00	2019-05-16 16:42 -04:00	10h 50m	Baltimore	Boston
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-16 05:52 -04:00	2019-05-16 06:12 -04:00	20m	Providence	Davisville
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-05-14 06:19 -04:00	2019-05-14 16:08 -04:00	9h 49m	Emden	Jacksonville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-14 06:17 -04:00	2019-05-14 16:09 -04:00	9h 52m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-14 06:13 -04:00	2019-05-14 16:04 -04:00	9h 51m	Fall River	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-13 07:33 -04:00	2019-05-14 05:20 -04:00	21h 47m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-13 06:29 -04:00	2019-05-13 17:12 -04:00	10h 43m	Fall River	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-05-13 06:27 -04:00	2019-05-13 17:11 -04:00	10h 44m	Halifax	Houston
RELIANCE	7367407	United States of America	Tug		2019-05-13 06:27 -04:00	2019-05-13 06:48 -04:00	21m	Providence	
APHRODITE LEADER	9335953	Japan	Vehicles Carrier	21443	2019-05-12 06:08 -04:00	2019-05-12 13:55 -04:00	7h 47m	Baltimore	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-12 06:08 -04:00	2019-05-12 16:45 -04:00	10h 37m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-05-12 06:08 -04:00	2019-05-12 13:51 -04:00	7h 43m	Fall River	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-10 06:03 -04:00	2019-05-10 19:30 -04:00	13h 27m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-05-10 06:02 -04:00	2019-05-10 19:28 -04:00	13h 26m	Fall River	
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-05-10 06:02 -04:00	2019-05-10 19:30 -04:00	13h 28m	Jacksonville	Vlissingen
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-09 17:23 -04:00	2019-05-10 05:19 -04:00	11h 56m	Quonset Point	
DRIVE GREEN HIGHWAY	9728069	Panama	Vehicles Carrier	20034	2019-05-09 17:23 -04:00	2019-05-10 17:14 -04:00	23h 51m	Altamira	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-05-09 17:11 -04:00	2019-05-09 17:54 -04:00	43m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-06 17:41 -04:00	2019-05-06 18:28 -04:00	47m	Fall River	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-05-06 10:57 -04:00	2019-05-06 11:43 -04:00	46m	Davisville	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-06 10:56 -04:00	2019-05-06 18:28 -04:00	7h 32m	Providence	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-05-06 10:56 -04:00	2019-05-06 18:29 -04:00	7h 33m	Emden	Jacksonville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-05-06 05:07 -04:00	2019-05-06 10:09 -04:00	5h 2m	Providence	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-03 12:51 -04:00	2019-05-03 16:58 -04:00	4h 7m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-03 06:14 -04:00	2019-05-03 13:14 -04:00	7h 0m	Davisville	
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-05-03 06:13 -04:00	2019-05-03 16:56 -04:00	10h 43m	Halifax	Houston
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-03 06:13 -04:00	2019-05-03 06:36 -04:00	23m	Davisville	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-03 02:22 -04:00	2019-05-03 05:26 -04:00	3h 4m	Providence	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-02 06:30 -04:00	2019-05-02 06:48 -04:00	18m	Davisville	Davisville
HOEGH TROVE	9186302	Norway	Vehicles Carrier	21200	2019-05-02 06:29 -04:00	2019-05-03 13:16 -04:00	1d 6h 47m	Baltimore	Zeebrugge
RAINBOW	8987345	United States of America	Tug		2019-05-02 06:29 -04:00	2019-05-03 05:20 -04:00	22h 51m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-05-01 22:42 -04:00	2019-05-02 05:30 -04:00	6h 48m	Davisville	
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-05-01 22:41 -04:00	2019-05-02 21:57 -04:00	23h 16m	Jacksonville	Emden
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-01 22:41 -04:00	2019-05-02 05:50 -04:00	7h 9m	Davisville	Davisville
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-01 19:16 -04:00	2019-05-01 21:51 -04:00	2h 35m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-01 19:15 -04:00	2019-05-01 21:42 -04:00	2h 27m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-01 15:42 -04:00	-		Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-01 14:51 -04:00	2019-05-01 15:20 -04:00	29m	Davisville	Davisville
GRANDE TORINO	9782675	Italy	Vehicles Carrier	15580	2019-05-01 06:55 -04:00	2019-05-01 19:07 -04:00	12h 12m	Gioia Tauro (Palmi)	New York
RAINBOW	8987345	United States of America	Tug		2019-05-01 06:54 -04:00	2019-05-01 19:04 -04:00	12h 10m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-01 06:54 -04:00	2019-05-01 14:40 -04:00	7h 46m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-05-01 05:49 -04:00	2019-05-01 05:58 -04:00	9m	Fall River	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-05-01 05:48 -04:00	2019-05-01 06:16 -04:00	28m	Davisville	Davisville
GARNET LEADER	9357327	Bahamas	Vehicles Carrier	21020	2019-05-01 05:48 -04:00	2019-05-01 16:01 -04:00	10h 13m	Baltimore	Boston
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-04-30 19:42 -04:00	2019-05-01 05:02 -04:00	9h 20m	Providence	Davisville
PERSISTENCE		United States of America	Other		2019-04-29 11:13 -04:00	2019-05-18 22:27 -04:00	19d 11h 14m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-04-29 05:02 -04:00	2019-04-29 05:12 -04:00	10m	Davisville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-04-29 05:01 -04:00	2019-04-29 18:03 -04:00	13h 2m	Davisville	
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-04-29 05:01 -04:00	2019-04-29 18:02 -04:00	13h 1m	Davisville	
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-04-29 04:48 -04:00	2019-04-29 04:50 -04:00	2m	Jacksonville	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-04-28 18:27 -04:00	2019-04-29 04:19 -04:00	9h 52m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-04-28 16:48 -04:00	2019-04-29 04:23 -04:00	11h 35m	Davisville	
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-04-28 16:22 -04:00	2019-04-28 16:41 -04:00	19m	Providence	Providence
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-04-28 06:07 -04:00	2019-04-28 06:27 -04:00	20m	Davisville	
GLOVIS SUN	9749568	Marshall Islands	Vehicles Carrier	19638	2019-04-28 06:07 -04:00	2019-04-28 16:40 -04:00	10h 33m	Jacksonville	Boston
RAINBOW	8987345	United States of America	Tug		2019-04-28 06:07 -04:00	2019-04-28 16:37 -04:00	10h 30m	Providence	
JUSTINE MCALLITER	8107878	United States of America	Tug		2019-04-27 22:49 -04:00	2019-04-28 05:22 -04:00	6h 33m	Providence	
RELIANCE	7367407	United States of America	Tug		2019-04-25 14:39 -04:00	2019-04-25 15:22 -04:00	43m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-04-25 06:05 -04:00	2019-04-25 06:14 -04:00	9m	Fall River	
GENTLE LEADER	9391567	Bahamas	Vehicles Carrier	21122	2019-04-25 06:04 -04:00	2019-04-25 15:22 -04:00	9h 18m	Baltimore	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-25 06:04 -04:00	2019-04-25 06:14 -04:00	10m	Fall River	Davisville
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-04-24 15:50 -04:00	2019-04-24 16:41 -04:00	51m	Providence	Fall River
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-04-24 15:23 -04:00	2019-04-24 16:37 -04:00	1h 14m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-24 06:17 -04:00	2019-04-24 06:22 -04:00	5m	Davisville	Davisville
DIAMOND HIGHWAY	9293636	Panama	Vehicles Carrier	19086	2019-04-24 06:17 -04:00	2019-04-24 16:41 -04:00	10h 24m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-04-24 06:16 -04:00	2019-04-24 07:40 -04:00	1h 24m	Quonset Point	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-23 06:14 -04:00	2019-04-23 06:33 -04:00	19m	Providence	Fall River
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-04-23 06:14 -04:00	2019-04-23 15:59 -04:00	9h 45m	Emden	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-23 06:00 -04:00	2019-04-24 05:48 -04:00	23h 48m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-19 16:23 -04:00	2019-04-19 17:24 -04:00	1h 1m	Davisville	Providence
RAINBOW	8987345	United States of America	Tug		2019-04-19 16:19 -04:00	2019-04-19 17:20 -04:00	1h 1m	Davisville	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-04-19 06:41 -04:00	2019-04-19 17:22 -04:00	10h 41m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-04-19 06:38 -04:00	2019-04-19 12:25 -04:00	5h 47m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-19 06:37 -04:00	2019-04-19 12:20 -04:00	5h 43m	Davisville	Providence
RAINBOW	8987345	United States of America	Tug		2019-04-18 06:10 -04:00	2019-04-19 05:30 -04:00	23h 20m	Fall River	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-18 06:10 -04:00	2019-04-19 05:48 -04:00	23h 38m	Davisville	Providence
COLUMBIA HIGHWAY	9442873	Panama	Vehicles Carrier	18930	2019-04-18 06:10 -04:00	2019-04-18 16:53 -04:00	10h 43m	Halifax	Houston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-18 01:17 -04:00	2019-04-18 05:23 -04:00	4h 6m	Providence	Providence
RAINBOW	8987345	United States of America	Tug		2019-04-15 18:10 -04:00	2019-04-15 18:27 -04:00	17m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-15 18:10 -04:00	2019-04-16 19:04 -04:00	1d 0h 54m	Quonset Point	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-04-15 18:10 -04:00	2019-04-16 19:06 -04:00	1d 0h 56m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-04-15 16:11 -04:00	2019-04-15 17:20 -04:00	1h 9m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-04-15 06:03 -04:00	2019-04-15 15:57 -04:00	9h 54m	Fall River	
HORIZON LEADER	9441520	Bahamas	Vehicles Carrier	20434	2019-04-15 06:03 -04:00	2019-04-15 16:01 -04:00	9h 58m	Baltimore	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-15 06:02 -04:00	2019-04-15 16:06 -04:00	10h 4m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-15 00:48 -04:00	2019-04-15 05:28 -04:00	4h 40m	Quonset Point	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-11 14:29 -04:00	2019-04-12 00:34 -04:00	10h 5m	Davisville	
GRANDE NEW YORK	9784049	Italy	Vehicles Carrier	18360	2019-04-11 12:50 -04:00	2019-04-12 00:33 -04:00	11h 43m	Baltimore	Antwerp
RAINBOW	8987345	United States of America	Tug		2019-04-11 12:49 -04:00	2019-04-11 14:16 -04:00	1h 27m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-11 12:48 -04:00	2019-04-11 14:19 -04:00	1h 31m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-04-11 06:02 -04:00	2019-04-11 11:58 -04:00	5h 56m	Fall River	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-11 06:01 -04:00	2019-04-11 09:53 -04:00	3h 52m	Quonset Point	
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-04-11 06:01 -04:00	2019-04-11 14:18 -04:00	8h 17m	Jacksonville	Emden
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-04-10 10:51 -04:00	2019-04-10 11:06 -04:00	15m	Providence	Providence
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-10 06:05 -04:00	2019-04-10 06:21 -04:00	16m	Davisville	Davisville
HERMES LEADER	9690535	Bahamas	Vehicles Carrier	20941	2019-04-10 06:05 -04:00	2019-04-10 11:06 -04:00	5h 1m	Davisville	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-10 05:56 -04:00	2019-04-10 11:53 -04:00	5h 57m	Davisville	
HERMES LEADER	9690535	Bahamas	Vehicles Carrier	20941	2019-04-10 05:51 -04:00	2019-04-10 05:52 -04:00	1m	Baltimore	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-09 21:08 -04:00	2019-04-10 05:40 -04:00	8h 32m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-09 21:06 -04:00	2019-04-10 05:35 -04:00	8h 29m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-09 10:36 -04:00	2019-04-09 20:57 -04:00	10h 21m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-08 06:33 -04:00	2019-04-08 06:57 -04:00	24m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-08 06:33 -04:00	2019-04-09 20:54 -04:00	1d 14h 21m	Davisville	Davisville
POLARIS HIGHWAY	9728095	Panama	Vehicles Carrier	20494	2019-04-08 06:33 -04:00	2019-04-09 20:57 -04:00	1d 14h 24m	Altamira	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-08 05:55 -04:00	2019-04-08 06:16 -04:00	21m	Davisville	
IGUAZU HIGHWAY	9827243	Panama	Vehicles Carrier	20300	2019-04-08 05:55 -04:00	2019-04-09 19:29 -04:00	1d 13h 34m	Veracruz	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-08 05:55 -04:00	2019-04-08 06:23 -04:00	28m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-04-07 20:35 -04:00	2019-04-08 05:21 -04:00	8h 46m	Providence	Davisville
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-04-07 17:49 -04:00	2019-04-08 01:18 -04:00	7h 29m	Emden	Jacksonville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-07 17:36 -04:00	2019-04-08 05:19 -04:00	11h 43m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-04-07 17:36 -04:00	2019-04-07 18:15 -04:00	39m	Fall River	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-03 18:33 -04:00	2019-04-03 19:18 -04:00	45m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-04-03 06:15 -04:00	2019-04-03 19:12 -04:00	12h 57m	Quonset Point	
EUPHRATES HIGHWAY	9604926	Panama	Vehicles Carrier	18668	2019-04-03 06:15 -04:00	2019-04-03 19:17 -04:00	13h 2m	Halifax	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-03 06:14 -04:00	2019-04-03 16:55 -04:00	10h 41m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-04-03 02:51 -04:00	2019-04-03 03:21 -04:00	30m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-02 20:24 -04:00	2019-04-03 03:24 -04:00	7h 0m	Providence	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-01 06:52 -04:00	2019-04-01 18:13 -04:00	11h 21m	Davisville	Providence
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-04-01 06:50 -04:00	2019-04-03 03:24 -04:00	1d 20h 34m	Jacksonville	
RAINBOW	8987345	United States of America	Tug		2019-04-01 06:50 -04:00	2019-04-01 18:05 -04:00	11h 15m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-04-01 05:58 -04:00	2019-04-01 06:18 -04:00	20m	Providence	
GRANDE BALTIMORA	9784037	Italy	Vehicles Carrier	18447	2019-04-01 05:58 -04:00	2019-04-01 18:04 -04:00	12h 6m	Valencia	New York
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-01 05:58 -04:00	2019-04-01 06:28 -04:00	30m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-04-01 01:54 -04:00	2019-04-01 04:56 -04:00	3h 2m	Providence	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-29 08:00 -04:00	2019-03-29 18:10 -04:00	10h 10m	Davisville	Davisville
MORNING CARA	9574092	Panama	Vehicles Carrier	18907	2019-03-29 08:00 -04:00	2019-03-29 14:12 -04:00	6h 12m	Jacksonville	Boston
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-03-29 07:47 -04:00	2019-03-29 18:12 -04:00	10h 25m	Davisville	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-29 07:00 -04:00	2019-03-29 07:21 -04:00	21m	Davisville	Davisville
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-03-29 06:58 -04:00	2019-03-29 07:08 -04:00	10m	Providence	Providence
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-03-29 06:58 -04:00	2019-03-29 18:12 -04:00	11h 14m	Jacksonville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-29 00:14 -04:00	2019-03-29 06:12 -04:00	5h 58m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-03-27 06:48 -04:00	2019-03-27 15:58 -04:00	9h 10m	Providence	
CAPRICORNUS LEADER	9283863	Singapore	Vehicles Carrier	20120	2019-03-27 06:48 -04:00	2019-03-27 16:01 -04:00	9h 13m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-27 06:48 -04:00	2019-03-27 16:47 -04:00	9h 59m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-27 05:51 -04:00	2019-03-27 06:13 -04:00	22m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-03-27 05:50 -04:00	2019-03-27 16:46 -04:00	10h 56m	Emden	Jacksonville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-27 00:27 -04:00	2019-03-27 05:19 -04:00	4h 52m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-03-25 10:56 -04:00	2019-03-25 11:22 -04:00	26m	Providence	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-03-25 10:52 -04:00	2019-03-25 19:27 -04:00	8h 35m	Halifax	Houston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-25 10:51 -04:00	2019-03-25 19:27 -04:00	8h 36m	Providence	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-23 17:08 -04:00	2019-03-23 18:19 -04:00	1h 11m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-23 14:47 -04:00	2019-03-23 16:58 -04:00	2h 11m	Providence	Davisville
RELIANCE	7367407	United States of America	Tug		2019-03-23 06:19 -04:00	2019-03-23 06:50 -04:00	31m	Providence	
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-03-23 06:19 -04:00	2019-03-23 16:57 -04:00	10h 38m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-03-23 06:19 -04:00	2019-03-23 16:55 -04:00	10h 36m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-21 05:58 -04:00	2019-03-21 09:18 -04:00	3h 20m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-03-21 05:58 -04:00	2019-03-22 16:52 -04:00	1d 10h 54m	Davisville	
GRAND LEGACY	9355240	Panama	Vehicles Carrier	17550	2019-03-21 05:47 -04:00	2019-03-21 15:54 -04:00	10h 7m	Baltimore	Boston
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-03-21 02:21 -04:00	2019-03-21 05:34 -04:00	3h 13m	New Bedford	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-21 02:08 -04:00	2019-03-21 05:36 -04:00	3h 28m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-03-20 06:40 -04:00	2019-03-20 06:44 -04:00	4m	Providence	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-03-20 06:38 -04:00	2019-03-20 15:40 -04:00	9h 2m	Davisville	Jacksonville
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-03-20 06:26 -04:00	2019-03-20 06:27 -04:00	1m	Emden	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-20 06:22 -04:00	2019-03-20 15:39 -04:00	9h 17m	Quonset Point	Davisville
PERSISTENCE		United States of America	Other		2019-03-18 19:34 -04:00	2019-04-29 09:35 -04:00	1m 11d 14h 1m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-03-18 07:33 -04:00	2019-03-18 12:47 -04:00	5h 14m	Quonset Point	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-18 06:26 -04:00	2019-03-18 18:00 -04:00	11h 34m	Davisville	Providence
VIKING CONSTANZA	9407689	Singapore	Vehicles Carrier	5496	2019-03-18 06:26 -04:00	2019-03-18 17:55 -04:00	11h 29m	Veracruz	New York
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-18 05:26 -04:00	2019-03-18 05:46 -04:00	20m	Providence	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-17 05:15 -04:00	2019-03-17 05:33 -04:00	18m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-03-17 05:14 -04:00	2019-03-17 05:36 -04:00	22m	Quonset Point	
DRIVE GREEN HIGHWAY	9728069	Panama	Vehicles Carrier	20034	2019-03-17 05:14 -04:00	2019-03-18 12:55 -04:00	1d 7h 41m	Altamira	Davisville
GLOVIS SUPREME	9674177	South Korea	Vehicles Carrier	20138	2019-03-15 17:10 -04:00	2019-03-15 23:06 -04:00	5h 56m	Baltimore	Providence
RAINBOW	8987345	United States of America	Tug		2019-03-15 17:10 -04:00	2019-03-15 23:06 -04:00	5h 56m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-15 17:02 -04:00	2019-03-15 20:14 -04:00	3h 12m	Davisville	Davisville
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-03-15 06:55 -04:00	2019-03-15 15:59 -04:00	9h 4m	Halifax	Houston
RAINBOW	8987345	United States of America	Tug		2019-03-15 06:55 -04:00	2019-03-15 16:46 -04:00	9h 51m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-15 06:54 -04:00	2019-03-15 16:39 -04:00	9h 45m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-03-15 05:55 -04:00	2019-03-15 06:27 -04:00	32m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-15 05:50 -04:00	2019-03-15 06:29 -04:00	39m	Quonset Point	Providence
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-03-15 05:50 -04:00	2019-03-15 13

shipName	imo	shipCountry	type	dwt	portCallStart	portCallEnd	portCallDuratior	previousPort	nextPort
IONA MCALISTER	8023618	United States of America	Tug	355	2019-03-07 11:37 -05:00	2019-03-07 18:17 -05:00	6h 40m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-03-07 11:37 -05:00	2019-03-07 18:13 -05:00	6h 36m	Providence	
MEDITERRANEAN SEA	9451006	Marshall Islands	Vehicles Carrier	14774	2019-03-05 06:21 -05:00	2019-03-05 16:56 -05:00	10h 35m	Gioia Tauro (Palmi)	Jacksonville
RAINBOW	8987345	United States of America	Tug		2019-03-05 06:21 -05:00	2019-03-05 16:56 -05:00	10h 35m	Providence	
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-03-05 06:21 -05:00	2019-03-05 06:40 -05:00	19m	Fall River	Fall River
RELENTLESS		United States of America	Fishing Vessel		2019-03-03 01:58 -05:00	2019-05-20 06:25 -04:00	2m 17d 3h 27m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-02-27 06:15 -05:00	2019-02-27 06:49 -05:00	34m	Quonset Point	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-27 06:15 -05:00	2019-02-27 17:09 -05:00	10h 54m	Davisville	Davisville
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-02-27 06:15 -05:00	2019-02-27 17:07 -05:00	10h 52m	Jacksonville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-26 22:20 -05:00	2019-02-27 05:41 -05:00	7h 21m	Davisville	Davisville
RAINBOW	8987345	United States of America	Tug		2019-02-26 06:29 -05:00	2019-02-26 15:57 -05:00	9h 28m	Providence	
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-02-26 06:21 -05:00	2019-02-26 15:58 -05:00	9h 37m	Fall River	Fall River
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-02-26 06:18 -05:00	2019-02-26 15:58 -05:00	9h 40m	Emden	Jacksonville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-23 06:07 -05:00	2019-02-23 19:50 -05:00	13h 43m	Davisville	
INTEGRITY	8919934	United States of America	Vehicles Carrier	29152	2019-02-23 06:06 -05:00	2019-02-23 13:18 -05:00	7h 12m	Southampton	Baltimore
RAINBOW	8987345	United States of America	Tug		2019-02-23 06:06 -05:00	2019-02-23 19:48 -05:00	13h 42m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-02-22 06:06 -05:00	2019-02-22 17:54 -05:00	11h 48m	Quonset Point	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-02-22 06:05 -05:00	2019-02-22 17:58 -05:00	11h 53m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-22 06:04 -05:00	2019-02-23 05:37 -05:00	23h 33m	Davisville	
APOLLON HIGHWAY	9728083	Panama	Vehicles Carrier	20321	2019-02-21 21:37 -05:00	2019-02-23 19:48 -05:00	1d 22h 11m	Jacksonville	
RAINBOW	8987345	United States of America	Tug		2019-02-21 21:36 -05:00	2019-02-21 21:52 -05:00	16m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-21 21:35 -05:00	2019-02-22 05:33 -05:00	7h 58m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-02-21 19:23 -05:00	2019-02-21 20:41 -05:00	1h 18m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-21 06:54 -05:00	2019-02-21 20:45 -05:00	13h 51m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-02-21 06:54 -05:00	2019-02-21 19:13 -05:00	12h 19m	Davisville	
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-02-21 06:54 -05:00	2019-02-21 19:19 -05:00	12h 25m	Halifax	Houston
RAINBOW	8987345	United States of America	Tug		2019-02-21 05:58 -05:00	2019-02-21 06:17 -05:00	19m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-21 05:51 -05:00	2019-02-21 06:21 -05:00	30m	Providence	
GRAND DIAMOND	9303223	Panama	Vehicles Carrier	18058	2019-02-21 05:48 -05:00	2019-02-21 17:55 -05:00	12h 7m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-19 16:54 -05:00	2019-02-19 17:56 -05:00	1h 2m	Providence	
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-02-19 06:08 -05:00	2019-02-19 06:24 -05:00	16m	Fall River	Fall River
RAINBOW	8987345	United States of America	Tug		2019-02-19 06:07 -05:00	2019-02-19 17:59 -05:00	11h 52m	Providence	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-02-19 06:06 -05:00	2019-02-19 17:59 -05:00	11h 53m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-14 05:59 -05:00	2019-02-14 06:23 -05:00	24m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-02-14 05:58 -05:00	2019-02-14 17:42 -05:00	11h 44m	Providence	
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-02-14 05:58 -05:00	2019-02-14 17:41 -05:00	11h 43m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-02-12 14:46 -05:00	2019-02-12 15:03 -05:00	17m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-12 07:06 -05:00	2019-02-12 15:07 -05:00	8h 1m	Davisville	Davisville
EUPHRATES HIGHWAY	9604926	Panama	Vehicles Carrier	18668	2019-02-12 07:06 -05:00	2019-02-12 15:06 -05:00	8h 0m	Davisville	Jacksonville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-02-12 06:54 -05:00	2019-02-12 07:15 -05:00	21m	Quonset Point	Davisville
EUPHRATES HIGHWAY	9604926	Panama	Vehicles Carrier	18668	2019-02-12 06:46 -05:00	2019-02-12 06:50 -05:00	4m	Emden	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-02-11 17:21 -05:00	2019-02-11 17:54 -05:00	33m	Quonset Point	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-11 06:19 -05:00	2019-02-12 06:27 -05:00	1d 0h 8m	Davisville	Davisville
ANTARES LEADER	9539169	Panama	Vehicles Carrier	18646	2019-02-11 06:18 -05:00	2019-02-11 17:57 -05:00	11h 39m	Baltimore	Boston
RAINBOW	8987345	United States of America	Tug		2019-02-11 06:09 -05:00	2019-02-11 13:12 -05:00	7h 3m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-02-10 23:12 -05:00	2019-02-11 05:35 -05:00	6h 23m	Providence	
RELENTLESS		United States of America	Fishing Vessel		2019-02-10 13:42 -05:00	2019-02-14 10:11 -05:00	3d 20h 29m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-02-10 12:55 -05:00	2019-02-10 16:27 -05:00	3h 32m	New Bedford	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-10 06:34 -05:00	2019-02-11 05:19 -05:00	22h 45m	Quonset Point	Davisville
RAINBOW	8987345	United States of America	Tug		2019-02-10 06:33 -05:00	2019-02-10 06:35 -05:00	2m	Davisville	
HOEGH KOBE	9330616	Singapore	Vehicles Carrier	19670	2019-02-10 06:32 -05:00	2019-02-10 16:29 -05:00	9h 57m	New York	Antwerp
RAINBOW	8987345	United States of America	Tug		2019-02-09 21:00 -05:00	2019-02-10 06:07 -05:00	9h 7m	Providence	
POLARIS HIGHWAY	9728095	Panama	Vehicles Carrier	20494	2019-02-09 21:00 -05:00	2019-02-11 13:09 -05:00	1d 16h 9m	Altamira	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-09 20:58 -05:00	2019-02-09 21:26 -05:00	28m	Quonset Point	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-08 18:23 -05:00	2019-02-08 21:59 -05:00	3h 36m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-02-08 11:00 -05:00	2019-02-08 21:57 -05:00	10h 57m	Providence	
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-02-08 11:00 -05:00	2019-02-08 21:59 -05:00	10h 59m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-02-06 06:00 -05:00	2019-02-06 06:18 -05:00	18m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-06 05:57 -05:00	2019-02-06 16:03 -05:00	10h 6m	Davisville	Providence
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-02-06 05:45 -05:00	2019-02-06 16:02 -05:00	10h 17m	Halifax	Houston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-06 02:38 -05:00	2019-02-06 05:30 -05:00	2h 52m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-05 06:07 -05:00	2019-02-05 11:26 -05:00	5h 19m	Davisville	Providence
RAINBOW	8987345	United States of America	Tug		2019-02-05 06:05 -05:00	2019-02-06 05:34 -05:00	23h 29m	Providence	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-02-05 06:05 -05:00	2019-02-05 16:55 -05:00	10h 50m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-02-04 19:16 -05:00	2019-02-05 05:35 -05:00	10h 19m	Providence	Providence
JUDY ANN		United States of America	Tug		2019-01-31 16:14 -05:00	2019-02-01 08:07 -05:00	15h 53m	Norfolk	
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-01-29 13:27 -05:00	2019-01-29 14:44 -05:00	1h 17m	Fall River	Fall River
RAINBOW	8987345	United States of America	Tug		2019-01-29 06:10 -05:00	2019-01-29 14:40 -05:00	8h 30m	Quonset Point	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-29 06:10 -05:00	2019-01-29 08:54 -05:00	2h 44m	Quonset Point	Davisville
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-01-29 06:09 -05:00	2019-01-29 14:43 -05:00	8h 34m	Emden	Davisville
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-01-29 06:09 -05:00	-		Davisville	
RAINBOW	8987345	United States of America	Tug		2019-01-28 18:13 -05:00	2019-01-28 18:21 -05:00	8m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-28 12:47 -05:00	2019-01-28 18:21 -05:00	5h 34m	Providence	Davisville
GRANDE BALTIMORA	9784037	Italy	Vehicles Carrier	18447	2019-01-28 12:47 -05:00	2019-01-28 18:23 -05:00	5h 36m	New York	Baltimore
RAINBOW	8987345	United States of America	Tug		2019-01-28 12:47 -05:00	2019-01-28 12:59 -05:00	12m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-01-25 06:50 -05:00	2019-01-25 16:19 -05:00	9h 29m	Providence	
DELHI HIGHWAY	9536959	Panama	Vehicles Carrier	18891	2019-01-25 06:48 -05:00	2019-01-25 16:20 -05:00	9h 32m	Halifax	Houston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-25 06:46 -05:00	2019-01-25 16:22 -05:00	9h 36m	Davisville	Davisville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-24 23:15 -05:00	2019-01-25 05:46 -05:00	6h 31m	Providence	Davisville
RAINBOW	8987345	United States of America	Tug		2019-01-23 06:21 -05:00	2019-01-23 18:40 -05:00	12h 19m	Providence	
BISHU HIGHWAY	9409340	Japan	Vehicles Carrier	17649	2019-01-23 06:21 -05:00	2019-01-23 18:43 -05:00	12h 22m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-23 06:21 -05:00	2019-01-23 18:42 -05:00	12h 21m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-22 11:24 -05:00	2019-01-23 05:41 -05:00	18h 17m	Providence	
MORNING CELINE	9519133	Panama	Vehicles Carrier	22641	2019-01-22 11:24 -05:00	2019-01-22 19:38 -05:00	8h 14m	Baltimore	Boston
RAINBOW	8987345	United States of America	Tug		2019-01-22 11:23 -05:00	2019-01-22 19:38 -05:00	8h 15m	Davisville	
RELENTLESS		United States of America	Fishing Vessel		2019-01-22 07:46 -05:00	2019-01-25 09:09 -05:00	3d 1h 23m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-01-22 06:24 -05:00	2019-01-22 10:36 -05:00	4h 12m	Providence	
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-01-22 06:22 -05:00	2019-01-22 18:25 -05:00	12h 3m	Jacksonville	Emden
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-01-22 06:22 -05:00	2019-01-22 06:49 -05:00	27m	Fall River	Fall River
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-17 06:51 -05:00	2019-01-17 17:33 -05:00	10h 42m	Davisville	
SIEM CICERO	9762534	Liberia	Vehicles Carrier	17416	2019-01-17 06:51 -05:00	2019-01-17 17:32 -05:00	10h 41m	Halifax	Houston
RAINBOW	8987345	United States of America	Tug		2019-01-17 06:51 -05:00	2019-01-17 17:32 -05:00	10h 41m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-01-17 06:04 -05:00	2019-01-17 06:13 -05:00	9m	Providence	
HOJIN	8916267	Liberia	Vehicles Carrier	18273	2019-01-17 06:04 -05:00	2019-01-17 13:43 -05:00	7h 39m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-17 06:03 -05:00	2019-01-17 06:21 -05:00	18m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-16 22:43 -05:00	2019-01-17 05:22 -05:00	6h 39m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-16 06:12 -05:00	2019-01-16 13:07 -05:00	6h 55m	Quonset Point	
VIKING CONQUEST	9728851	Singapore	Vehicles Carrier	18521	2019-01-16 06:11 -05:00	2019-01-16 13:08 -05:00	6h 57m	Emden	Jacksonville
RAINBOW	8987345	United States of America	Tug		2019-01-16 06:11 -05:00	2019-01-16 13:10 -05:00	6h 59m	Providence	
MATTHEW MCALLISTER	8127505	United States of America	Tug		2019-01-14 16:17 -05:00	2019-01-14 16:35 -05:00	18m	Providence	Providence
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-14 06:19 -05:00	2019-01-14 09:16 -05:00	2h 57m	Quonset Point	
RAINBOW	8987345	United States of America	Tug		2019-01-14 06:17 -05:00	2019-01-14 16:31 -05:00	10h 14m	Providence	
EUPHRATES HIGHWAY	9604926	Panama	Vehicles Carrier	18668	2019-01-14 06:16 -05:00	2019-01-14 16:33 -05:00	10h 17m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-11 06:07 -05:00	2019-01-11 14:00 -05:00	7h 53m	Davisville	
SAGITTARIUS LEADER	9283887	Panama	Vehicles Carrier	20098	2019-01-11 06:00 -05:00	2019-01-11 13:58 -05:00	7h 58m	Baltimore	Boston
RAINBOW	8987345	United States of America	Tug		2019-01-11 06:00 -05:00	2019-01-11 13:55 -05:00	7h 55m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-01-10 06:13 -05:00	2019-01-10 06:29 -05:00	16m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-10 06:11 -05:00	2019-01-11 05:21 -05:00	23h 10m	Davisville	
VIKING QUEEN	9318462	Singapore	Vehicles Carrier	16890	2019-01-10 06:10 -05:00	2019-01-10 16:10 -05:00	10h 0m	Emden	Jacksonville
RAINBOW	8987345	United States of America	Tug		2019-01-09 16:36 -05:00	2019-01-10 05:36 -05:00	13h 0m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-01-09 15:59 -05:00	2019-01-09 16:25 -05:00	26m	Providence	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-09 15:44 -05:00	2019-01-10 05:19 -05:00	13h 35m	Providence	
RELENTLESS		United States of America	Fishing Vessel		2019-01-09 12:30 -05:00	2019-01-12 08:58 -05:00	2d 20h 28m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-08 06:08 -05:00	2019-01-08 12:41 -05:00	6h 33m	Davisville	
HOEGH BANGKOK	9318474	Norway	Vehicles Carrier	16632	2019-01-08 05:57 -05:00	2019-01-09 16:27 -05:00	1d 10h 30m	Jacksonville	Emden
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-01-08 05:54 -05:00	2019-01-09 03:50 -05:00	21h 56m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-07 12:52 -05:00	2019-01-08 05:35 -05:00	16h 43m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-01-07 12:47 -05:00	2019-01-08 05:39 -05:00	16h 52m	Davisville	Davisville
GREEN COVE	9181560	United States of America	Vehicles Carrier	22747	2019-01-07 06:55 -05:00	2019-01-07 12:40 -05:00	5h 45m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-07 06:52 -05:00	2019-01-07 12:40 -05:00	5h 48m	Davisville	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-01-07 06:52 -05:00	2019-01-07 12:36 -05:00	5h 44m	Davisville	Davisville
LAKE KIVU	9308792	Liberia	Vehicles Carrier	12322	2019-01-07 05:53 -05:00	2019-01-07 16:49 -05:00	10h 56m	Jacksonville	Emden
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-07 05:52 -05:00	2019-01-07 06:22 -05:00	30m	Providence	
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-01-07 05:42 -05:00	2019-01-07 06:16 -05:00	34m	Davisville	Davisville
BUCKLEY MCALLISTER	9665449	United States of America	Tug	189	2019-01-06 16:44 -05:00	2019-01-07 05:12 -05:00	12h 28m	Davisville	Davisville
PERSISTENCE		United States of America	Other		2019-01-04 08:49 -05:00	2019-01-06 10:50 -05:00	2d 2h 1m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-01-04 06:04 -05:00	2019-01-04 23:17 -05:00	17h 13m	Davisville	
SHANNON MCALLISTER	9032941	United States of America	Tug		2019-01-04 05:53 -05:00	2019-01-04 22:06 -05:00	16h 13m	Davisville	Fall River
EURASIAN HIGHWAY	9604938	Japan	Vehicles Carrier	18709	2019-01-04 05:48 -05:00	2019-01-04 22:00 -05:00	16h 12m	Emden	Jacksonville
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-03 06:33 -05:00	2019-01-04 00:48 -05:00	18h 15m	Davisville	
GOODWOOD	9701140	Liberia	Vehicles Carrier	18770	2019-01-03 06:32 -05:00	2019-01-03 18:39 -05:00	12h 7m	Jacksonville	Emden
RAINBOW	8987345	United States of America	Tug		2019-01-03 06:31 -05:00	2019-01-04 05:19 -05:00	22h 48m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-03 05:54 -05:00	2019-01-03 06:19 -05:00	25m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-03 05:54 -05:00	-		Davisville	
APOLLON HIGHWAY	9728083	Panama	Vehicles Carrier	20321	2019-01-03 05:54 -05:00	2019-01-04 00:49 -05:00	18h 55m	New York	Barcelona
RAINBOW	8987345	United States of America	Tug		2019-01-03 05:54 -05:00	2019-01-03 06:15 -05:00	21m	Davisville	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-03 02:05 -05:00	2019-01-03 05:11 -05:00	3h 6m	Providence	
RAINBOW	8987345	United States of America	Tug		2019-01-02 22:52 -05:00	2019-01-03 05:07 -05:00	6h 15m	Quonset Point	
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-02 08:38 -05:00	2019-01-02 14:11 -05:00	5h 33m	Quonset Point	
PRIMROSE ACE	9355185	Liberia	Vehicles Carrier	17339	2019-01-02 08:38 -05:00	2019-01-02 18:53 -05:00	10h 15m	Halifax	Houston
RAINBOW	8987345	United States of America	Tug		2019-01-02 08:27 -05:00	2019-01-02 18:54 -05:00	10h 27m	Davisville	
RAINBOW	8987345	United States of America	Tug		2019-01-02 06:17 -05:00	2019-01-02 07:31 -05:00	1h 14m	Providence	
TAURUS LEADER	9700550	Singapore	Vehicles Carrier	19278	2019-01-02 06:11 -05:00	2019-01-02 14:11 -05:00	8h 0m	Baltimore	Boston
IONA MCALISTER	8023618	United States of America	Tug	355	2019-01-02 06:11 -05:00	2019-01-02 06:23 -05:00	12m	Quonset Point	

Year		31 Dec 19	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Growth Rate			-62.95%	110.84%	19.03%	16.47%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Vessel		224	83	175	208	243	245	247	250	252	255	258	260	263	265	268
		112	42	88	104	121	123	124	125	126	127	129	130	131	133	134
Days per call		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Calls per day		0.61	0.23	0.48	0.57	0.66	0.67	0.68	0.68	0.69	0.70	0.71	0.71	0.72	0.73	0.73
Services per day		0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Average wait times 2 berths		0.19	0.04	0.09	0.15	0.23	0.24	0.25	0.26	0.27	0.29	0.30	0.31	0.32	0.33	0.34
Average wait times 3 berths		0.02	0.00	0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05
Average wait times 1 berth		3.34	0.72	1.3	2.37	4.68	5.46	5.94	6.49	7.13	8.8	9.91	11.3	13.08	15.46	18.8
				-21.88%												
RoRo Vessel Daily Operating Cost	23049	37%	14%	29%	34%	40%	40%	41%	41%	41%	42%	42%	43%	43%	44%	44%
Increase from 2 to 3		877,706	83,218	322,686	624,153	1,118,366	1,186,027	1,254,929	1,325,091	1,396,531	1,469,267	1,543,318	1,618,703	1,695,442	1,773,553	1,791,289
Discount Factor		1.07	1.14	1.23	1.31	1.40	1.50	1.61	1.72	1.84	1.97	2.10	2.25	2.41	2.58	2.76
Increase from 2 to 3 - PV		820,286	72,686	263,408	476,163	797,379	790,300	781,507	771,215	759,620	746,901	733,219	718,724	703,548	687,815	649,246
Increase from 2 to 3 - PV	12,571,130															
Reduction from 2 to 1		16,263,374	1,294,190	4,880,626	10,658,614	24,883,639	29,481,241	32,457,039	35,892,694	39,917,515	50,013,853	57,043,415	65,887,222	77,263,709	92,530,558	114,024,801
Discount Factor		1.07	1.14	1.23	1.31	1.40	1.50	1.61	1.72	1.84	1.97	2.10	2.25	2.41	2.58	2.76
Reduction from 2 to 1 - PV		15,199,415	1,130,396	3,984,044	8,131,406	17,741,691	19,644,596	20,212,613	20,889,875	21,712,483	25,424,507	27,100,916	29,254,715	32,061,692	35,884,946	41,327,835
Reduction from 2 to 1 - PV	2,251,822,373															
Average cars per vessel	6000															
Average value per car	28994															
Congestion Cost Per Day	0.02%	0.06205														
Increase from 2 to 3		1,126,173	106,776	414,034	800,843	1,434,961	1,521,776	1,610,184	1,700,208	1,791,871	1,885,198	1,980,212	2,076,938	2,175,400	2,275,624	2,298,380
Discount Factor		1.07	1.14	1.23	1.31	1.40	1.50	1.61	1.72	1.84	1.97	2.10	2.25	2.41	2.58	2.76
Increase from 2 to 3 - PV		1,052,498	93,263	337,975	610,959	1,023,107	1,014,024	1,002,742	989,537	974,659	958,339	940,784	922,185	902,714	882,526	833,039
Increase from 2 to 3 - PV	23,654,718															
Reduction from 2 to 1		20,867,330	1,660,559	6,262,269	13,675,933	31,927,883	37,827,007	41,645,216	46,053,461	51,217,658	64,172,142	73,191,684	84,539,060	99,136,087	118,724,787	146,303,778
Discount Factor		1.07	1.14	1.23	1.31	1.40	1.50	1.61	1.72	1.84	1.97	2.10	2.25	2.41	2.58	2.76
Reduction from 2 to 1 - PV		19,502,177	1,450,396	5,111,877	10,433,304	22,764,139	25,205,732	25,934,548	26,803,534	27,859,013	32,621,863	34,772,842	37,536,354	41,137,951	46,043,519	53,027,222
Reduction from 2 to 1 - PV	2,889,284,769															



Year	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
Growth Rate	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Vessel	271	273	276	279	282	284	287	290	293	296	299	302	305	308	311
	135	137	138	139	141	142	144	145	147	148	149	151	152	154	156
Days per call	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Calls per day	0.74	0.75	0.76	0.76	0.77	0.78	0.79	0.80	0.80	0.81	0.82	0.83	0.84	0.84	0.85
Services per day	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Average wait times 2 berths	0.35	0.36	0.38	0.39	0.4	0.41	0.43	0.44	0.44	0.46	0.47	0.47	0.49	0.49	0.5
Average wait times 3 berths	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07
Average wait times 1 berth	23.8	32.13	49	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
					Numbers in red trend towards infinity. 2037 values was just estended over this time frame.										
RoRo Vessel Daily Operating Cost	44%	45%	45%	46%	46%	47%	47%	48%	48%	49%	49%	50%	50%	51%	51%
Increase from 2 to 3	1,871,588	1,953,314	2,100,128	2,185,406	2,272,179	2,294,901	2,450,298	2,541,688	2,567,105	2,729,238	2,825,443	2,784,095	2,952,533	2,982,058	3,083,590
Discount Factor	2.95	3.16	3.38	3.62	3.87	4.14	4.43	4.74	5.07	5.43	5.81	6.21	6.65	7.11	7.61
Increase from 2 to 3 - PV	633,972	618,369	621,352	604,283	587,174	554,249	553,065	536,161	506,096	502,860	486,529	448,045	444,068	419,167	405,082
Increase from 2 to 3 - PV															
Reduction from 2 to 1	146,295,796	200,183,182	309,418,803	632,546,348	638,806,892	645,129,393	651,448,238	657,895,834	664,474,792	670,983,078	677,623,996	684,400,236	691,103,641	698,014,678	704,923,113
Discount Factor	2.95	3.16	3.38	3.62	3.87	4.14	4.43	4.74	5.07	5.43	5.81	6.21	6.65	7.11	7.61
Reduction from 2 to 1 - PV	49,555,448	63,372,869	91,545,859	174,904,336	165,079,840	155,807,191	147,040,444	138,781,076	130,998,959	123,628,080	116,683,798	110,140,781	103,943,517	98,114,908	92,603,717
Reduction from 2 to 1 - PV															
Average cars per vessel															
Average value per car															
Congestion Cost Per Day															
Increase from 2 to 3	2,401,411	2,506,272	2,694,647	2,804,066	2,915,404	2,944,558	3,143,947	3,261,207	3,293,820	3,501,850	3,625,290	3,572,237	3,788,358	3,826,241	3,956,516
Discount Factor	2.95	3.16	3.38	3.62	3.87	4.14	4.43	4.74	5.07	5.43	5.81	6.21	6.65	7.11	7.61
Increase from 2 to 3 - PV	813,441	793,422	797,249	775,348	753,396	711,149	709,630	687,942	649,365	645,213	624,259	574,881	569,777	537,827	519,756
Increase from 2 to 3 - PV															
Reduction from 2 to 1	187,710,283	256,852,506	397,011,348	811,612,209	819,645,034	827,757,354	835,864,984	844,137,813	852,579,191	860,929,890	869,450,768	878,145,275	886,746,330	895,613,793	904,477,919
Discount Factor	2.95	3.16	3.38	3.62	3.87	4.14	4.43	4.74	5.07	5.43	5.81	6.21	6.65	7.11	7.61
Reduction from 2 to 1 - PV	63,583,967	81,312,925	117,461,332	224,417,539	211,811,852	199,914,234	188,665,731	178,068,241	168,083,106	158,625,624	149,715,504	141,320,242	133,368,610	125,889,996	118,818,657
Reduction from 2 to 1 - PV															

Year	2049	2050	2051	2052	2053	2054	2055	2056
Growth Rate	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Vessel	314	317	321	324	327	330	334	337
	157	159	160	162	163	165	167	168
Days per call	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Calls per day	0.86	0.87	0.88	0.89	0.90	0.90	0.91	0.92
Services per day	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Average wait times 2 berths	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Average wait times 3 berths	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Average wait times 1 berth	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
RoRo Vessel Daily Operating Cost	52%	52%	53%	53%	54%	54%	55%	55%
Increase from 2 to 3	3,114,426	3,145,571	3,177,026	3,208,797	3,240,885	3,273,293	3,306,026	3,339,087
Discount Factor	8.15	8.72	8.72	8.72	8.72	8.72	8.72	8.72
Increase from 2 to 3 - PV	382,367	360,926	364,536	368,181	371,863	375,581	379,337	383,131
Increase from 2 to 3 - PV								
Reduction from 2 to 1	711,972,344	719,092,068	726,282,988	733,545,818	740,881,277	748,290,089	755,772,990	763,330,720
Discount Factor	8.15	8.72	8.72	8.72	8.72	8.72	8.72	8.72
Reduction from 2 to 1 - PV	87,410,985	82,509,435	83,334,529	84,167,874	85,009,553	85,859,649	86,718,245	87,585,428
Reduction from 2 to 1 - PV								
Average cars per vessel								
Average value per car								
Congestion Cost Per Day								
Increase from 2 to 3	3,996,081	4,036,042	4,076,402	4,117,166	4,158,338	4,199,921	4,241,920	4,284,340
Discount Factor	8.15	8.72	8.72	8.72	8.72	8.72	8.72	8.72
Increase from 2 to 3 - PV	490,611	463,100	467,731	472,408	477,132	481,904	486,723	491,590
Increase from 2 to 3 - PV								
Reduction from 2 to 1	913,522,698	922,657,925	931,884,505	941,203,350	950,615,383	960,121,537	969,722,752	979,419,980
Discount Factor	8.15	8.72	8.72	8.72	8.72	8.72	8.72	8.72
Reduction from 2 to 1 - PV	112,155,928	105,866,811	106,925,479	107,994,734	109,074,681	110,165,428	111,267,082	112,379,753
Reduction from 2 to 1 - PV								

Project Task	Duration (Months)	Schedule																																									
		Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25
Permitting	18																																									
QDC Planning Period	6																																									
RICRMC and USACE Permit Applications	12																																									
RICRMC Review for Completeness	1																																									
USACE Review for Completeness	1																																									
Design	14																																									
Geotechnical Investigation	Complete																																									
Pier 1 North Face Design	14																																									
Prepare 30% Plans and Submit to QDC	4																																									
Prepare 90% Plans and Specifications and Submit to QDC	8																																									
Prepare Final Plans and Specifications and Submit to QDC	1																																									
Prepare Bidding Issue Plans and Specifications and Submit to QDC	1																																									
Bidding	4																																									
Construction	15																																									
Contractor Mobilization	1																																									
Demolition and Removal	2																																									
Pier	9																																									
Mooring Hardware	1																																									
Fender System	1																																									
Contractor Demobilization	1																																									

QUONSET
DEVELOPMENT CORPORATION

STATEMENT OF AVAILABILITY OF MATCHING FUNDS

The Quonset Development Corporation (QDC) certifies that a minimum amount of matching funds in the amount of nine million dollars ($9,000,000) will be made available as the match for the Port Infrastructure Development Program (PIDP) project proposed in our application. Should State Fiscal Recovery Funds (SFRF) not be allocated in the Rhode Island FY 2022-2023 budget, as described in the Project Narrative, QDC will increase its matching fund commitment to $10.25 million.

The matching funds will come from our operating budget, capital budget and/or General Obligation Bond funding. Funds will be available according to the project cost schedule outlined in the application, from September 2024 through the end of 2025 and beyond if necessary.

Steven J. King
Managing Director
Quonset Development Corporation

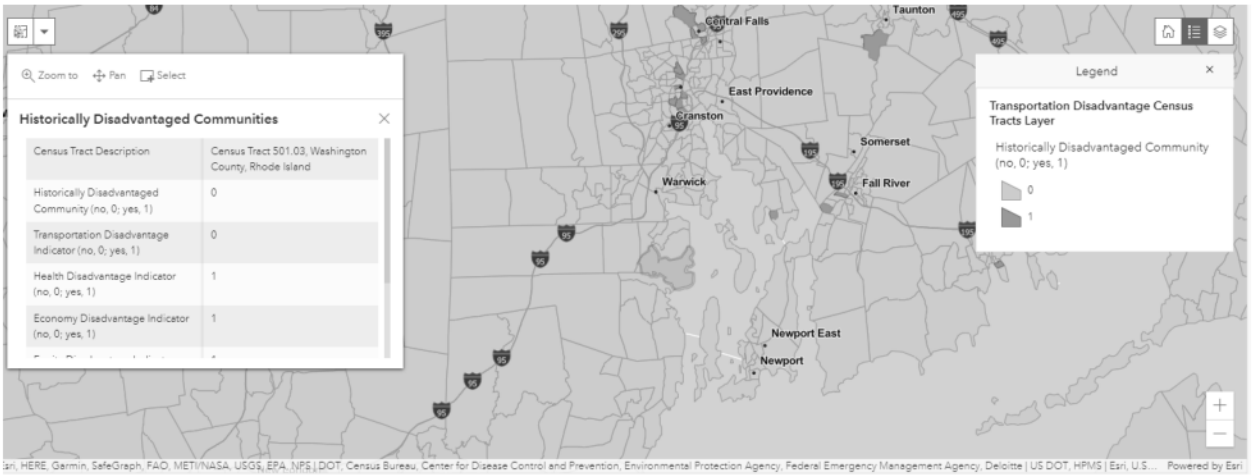
5/16/22
Date

95 Cripe Street, North Kingstown, RI 02852 T: (401) 295-0044 F: (401) 268-9885 www.quonset.com

https://usdot.maps.arcgis.com/apps/dashboards/d6f90dfcc8b44525b04c7ce748a3674a

Census tract 501.03 does not meet the criteria for being a Transportation Disadvantaged Census Tracts (Historically Disadvantaged Communities).

Census Tract Description	Census Tract 501.03, Washington County, Rhode Island
Historically Disadvantaged Community (no, 0; yes, 1)	0
Transportation Disadvantage Indicator (no, 0; yes, 1)	0
Health Disadvantage Indicator (no, 0; yes, 1)	1
Economy Disadvantage Indicator (no, 0; yes, 1)	1
Equity Disadvantage Indicator (no, 0; yes, 1)	1
Resilience Disadvantage Indicator (no, 0; yes, 1)	0
Environmental Disadvantage Indicator (no, 0; yes, 1)	0



EJScreen Report (Version 2.0)

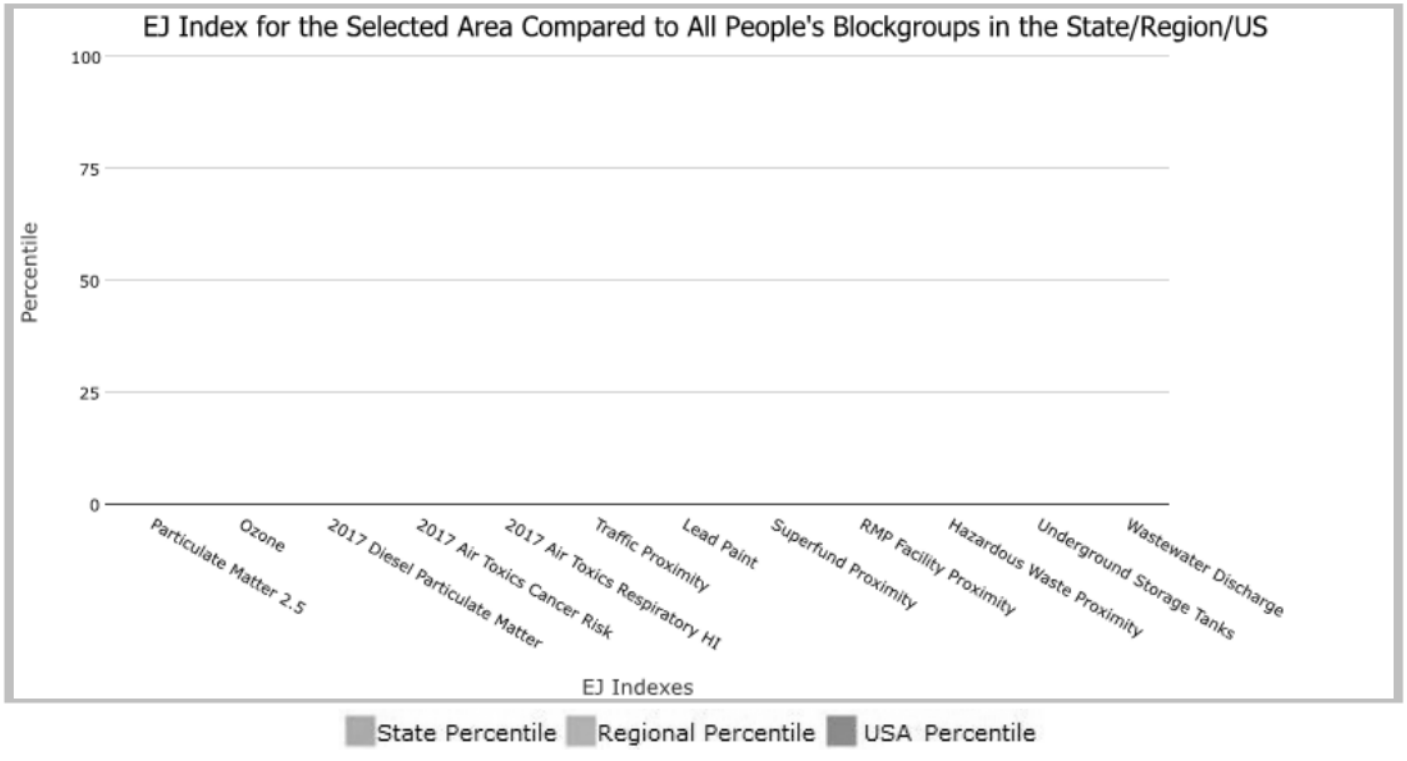
1 mile Ring around the Area, RHODE ISLAND, EPA Region 1

Approximate Population: 0

Input Area (sq. miles): 4.77

1milebuffer (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for 2017 Diesel Particulate Matter*	N/A	N/A	N/A
EJ Index for 2017 Air Toxics Cancer Risk*	N/A	N/A	N/A
EJ Index for 2017 Air Toxics Respiratory HI*	N/A	N/A	N/A
EJ Index for Traffic Proximity	N/A	N/A	N/A
EJ Index for Lead Paint	N/A	N/A	N/A
EJ Index for Superfund Proximity	N/A	N/A	N/A
EJ Index for RMP Facility Proximity	N/A	N/A	N/A
EJ Index for Hazardous Waste Proximity	N/A	N/A	N/A
EJ Index for Underground Storage Tanks	N/A	N/A	N/A
EJ Index for Wastewater Discharge	N/A	N/A	N/A



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJScreen Report (Version 2.0)

1 mile Ring around the Area, RHODE ISLAND, EPA Region 1

Approximate Population: 0

Input Area (sq. miles): 4.77

1milebuffer (The study area contains 1 blockgroup(s) with zero population.)



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

1 mile Ring around the Area, RHODE ISLAND, EPA Region 1

Approximate Population: 0

Input Area (sq. miles): 4.77

1milebuffer (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 ($\mu g/m^3$)	N/A	6.91	N/A	6.68	N/A	8.74	N/A
Ozone (ppb)	N/A	42.3	N/A	39.8	N/A	42.6	N/A
2017 Diesel Particulate Matter* ($\mu g/m^3$)	N/A	0.247	N/A	0.227	N/A	0.295	N/A
2017 Air Toxics Cancer Risk* (lifetime risk per million)	N/A	24	N/A	23	N/A	29	N/A
2017 Air Toxics Respiratory HI*	N/A	0.27	N/A	0.28	N/A	0.36	N/A
Traffic Proximity (daily traffic count/distance to road)	N/A	800	N/A	1300	N/A	710	N/A
Lead Paint (% Pre-1960 Housing)	N/A	0.5	N/A	0.44	N/A	0.28	N/A
Superfund Proximity (site count/km distance)	N/A	0.21	N/A	0.15	N/A	0.13	N/A
RMP Facility Proximity (facility count/km distance)	N/A	1	N/A	0.6	N/A	0.75	N/A
Hazardous Waste Proximity (facility count/km distance)	N/A	5.5	N/A	3.8	N/A	2.2	N/A
Underground Storage Tanks (count/km^2)	N/A	4.9	N/A	3	N/A	3.9	N/A
Wastewater Discharge (toxicity-weighted concentration/m distance)	N/A	3.5	N/A	0.4	N/A	12	N/A
Socioeconomic Indicators							
Demographic Index	N/A	28%	N/A	24%	N/A	36%	N/A
People of Color	N/A	28%	N/A	25%	N/A	40%	N/A
Low Income	N/A	27%	N/A	23%	N/A	31%	N/A
Unemployment Rate	N/A	5%	N/A	5%	N/A	5%	N/A
Linguistically Isolated	N/A	5%	N/A	5%	N/A	5%	N/A
Less Than High School Education	N/A	11%	N/A	9%	N/A	12%	N/A
Under Age 5	N/A	5%	N/A	5%	N/A	6%	N/A
Over Age 64	N/A	17%	N/A	17%	N/A	16%	N/A

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

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EJScreen Report (Version 2.0)

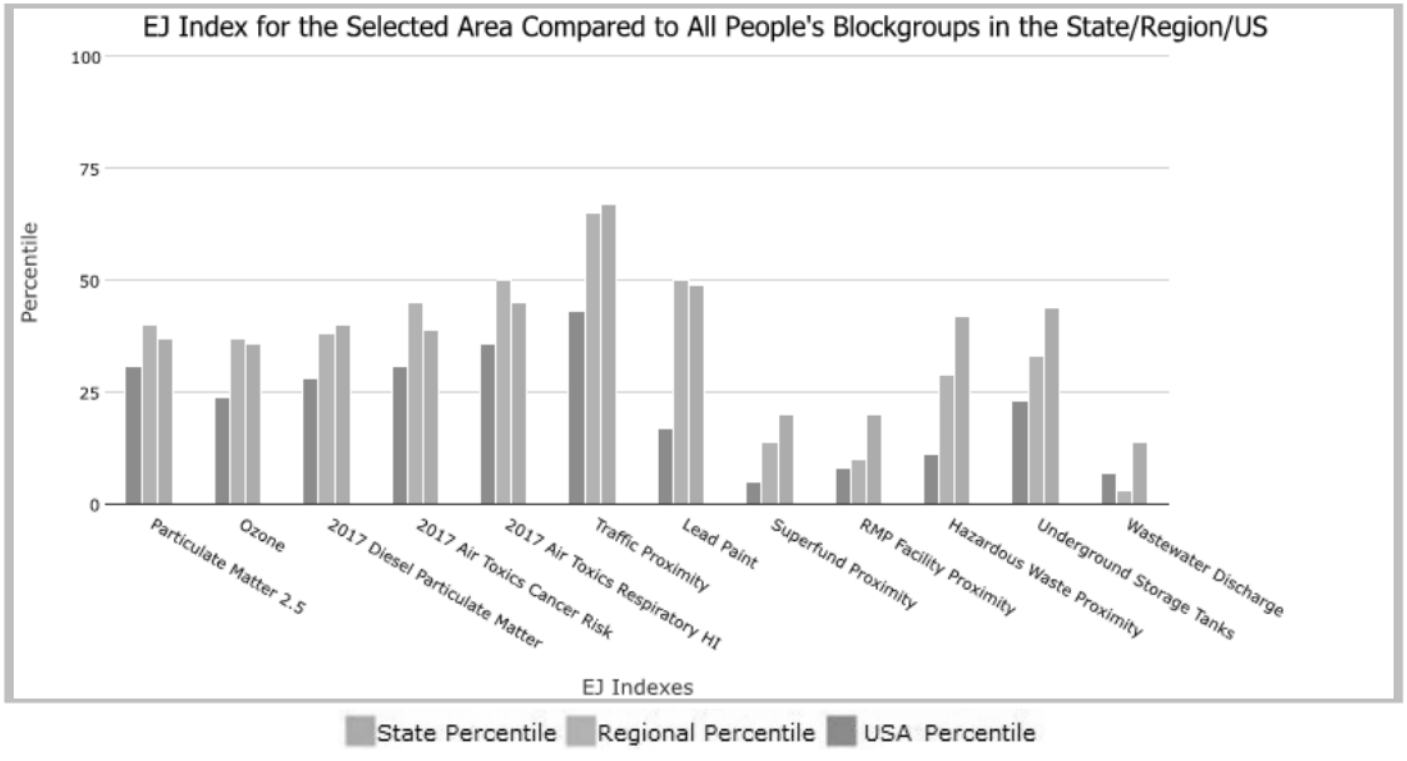
2 miles Ring around the Area, RHODE ISLAND, EPA Region 1

Approximate Population: 3,182

Input Area (sq. miles): 15.68

2milebuffer (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	37	40	31
EJ Index for Ozone	36	37	24
EJ Index for 2017 Diesel Particulate Matter*	40	38	28
EJ Index for 2017 Air Toxics Cancer Risk*	39	45	31
EJ Index for 2017 Air Toxics Respiratory HI*	45	50	36
EJ Index for Traffic Proximity	67	65	43
EJ Index for Lead Paint	49	50	17
EJ Index for Superfund Proximity	20	14	5
EJ Index for RMP Facility Proximity	20	10	8
EJ Index for Hazardous Waste Proximity	42	29	11
EJ Index for Underground Storage Tanks	44	33	23
EJ Index for Wastewater Discharge	14	3	7



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJScreen Report (Version 2.0)

2 miles Ring around the Area, RHODE ISLAND, EPA Region 1

Approximate Population: 3,182

Input Area (sq. miles): 15.68

2milebuffer (The study area contains 1 blockgroup(s) with zero population.)



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	5

EJScreen Report (Version 2.0)

2 miles Ring around the Area, RHODE ISLAND, EPA Region 1

Approximate Population: 3,182

Input Area (sq. miles): 15.68

2milebuffer (The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 ($\mu g/m^3$)	6.5	6.91	19	6.68	42	8.74	7
Ozone (ppb)	42.1	42.3	36	39.8	80	42.6	49
2017 Diesel Particulate Matter* ($\mu g/m^3$)	0.176	0.247	32	0.227	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	20	24	63	23	60-70th	29	<50th
2017 Air Toxics Respiratory HI*	0.2	0.27	33	0.28	<50th	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	170	800	24	1300	35	710	44
Lead Paint (% Pre-1960 Housing)	0.21	0.5	17	0.44	22	0.28	54
Superfund Proximity (site count/km distance)	0.37	0.21	91	0.15	91	0.13	93
RMP Facility Proximity (facility count/km distance)	2	1	83	0.6	93	0.75	90
Hazardous Waste Proximity (facility count/km distance)	2.3	5.5	33	3.8	56	2.2	74
Underground Storage Tanks (count/km^2)	1.3	4.9	33	3	52	3.9	50
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.1	3.5	75	0.4	93	12	84
Socioeconomic Indicators							
Demographic Index	20%	28%	52	24%	57	36%	31
People of Color	19%	28%	54	25%	57	40%	34
Low Income	22%	27%	50	23%	58	31%	40
Unemployment Rate	5%	5%	62	5%	65	5%	61
Linguistically Isolated	2%	5%	56	5%	58	5%	57
Less Than High School Education	4%	11%	24	9%	36	12%	26
Under Age 5	6%	5%	61	5%	61	6%	49
Over Age 64	22%	17%	75	17%	75	16%	80

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

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May 12, 2022

Chelsea Siefert, Director of Planning
Quonset Development Corporation
95 Cripe Street
North Kingstown, RI 02852

RE: Quonset Development Corporation (QDC) FFY20 MARAD Grant
Pier 1 Reconstruction – North Side

Dear Ms. Siefert,

Please accept this letter in support for the Quonset Development Corporation's application to USDOT for funding under the FFY20 MARAD PIDP program. The pier improvements will enhance the movement of freight to and from our facility, position the Park for the future growth of its tenants, and continue to support Rhode Island's economy.

North Atlantic Distribution has depended on the Port of Davisville in the Quonset Business Park since 1986. Our core business entails processing vehicles for 9 new car manufacturers on our 150-acre full-service campus. We provide value-added accessory installations, mechanical repairs, body repairs, storage and shipping as examples. Our distribution network spans throughout the Northeast and Canada with over 300,000 new vehicles processed and delivered in one year. By employing over 200 long term staff, investing over 30 million dollars in the last 20 years into our facility, it is evident that our commitment to the state of Rhode Island, QDC and the Port of Davisville is indisputable. Therefore, reliable port operations are critical to our business.

Having berthing space and laydown area is integral to our operation, keeping cargo flowing from the vessels into our facility smoothly is dependent on sufficient space for the ever-growing vessels, some RORO ships can now carry 8,000+ vehicles. Being served by multiple berths is a key factor in separating NORAD and the Port of Davisville from our neighboring competitors. Solidifying this advantage for years to come shows the dedication to our current customers and can also be used to entice new manufacturers who are feeling congestion and facing delays due to berthing space in their current ports of operation. Also, by strengthening and revitalizing Pier One North we can continue to expand our newest area of operations, exports. We have seen rapid growth in this sector and the customers have asked for increased abilities to move large cargo to developing nations, such as used trucks, trailers, and construction equipment; a stronger Pier 1 fits those needs perfectly. In addition, we are participating with the Port of Davisville' s initiative to transform our fleet of vehicles used at the Port for the possible conversion to electric vehicles.

In summary, we believe that the reconstruction of Pier 1 North Side is a prudent investment that will support continued growth and development of North Atlantic Distribution, as well as within the Business Park, and encourage job creation and increased competitiveness in this

global marketplace. Thank you for the opportunity to demonstrate our support for this application.

Sincerely,

Justin Miranda, VP of Operations
North Atlantic Distribution
100 Tidal Drive
North Kingstown, RI 02852

PORTS AMERICA

May 13, 2022

Chelsea Siefert, Director of Planning
Quonset Development Corporation
95 Cripe Street
North Kingstown, RI 02852

RE: Quonset Development Corporation (QDC) FFY20 MARAD Grant
Pier 1 Reconstruction – North Side

Dear Ms. Siefert,

Please accept this letter in support for the Quonset Development Corporation's application to USDOT for funding under the FFY20 MARAD PIDP program. The pier improvements will enhance the movement of freight to and from our facility, position the Park for the future growth of its tenants, and continue to support Rhode Island's economy.

Ports America has depended on the Port of Davisville in the Quonset Business Park for more than 20 years. Our core business entails stevedoring new and used automobiles, "roro" units and breakbulk cargo. Ports America employs ILA labor to perform these services. In 2021, over 40,000 ILA man-hours were employed at Davisville to move over 76,000 automobiles and other assorted cargo. Reliable port operations are critical to our business.

Davisville is an important component in the portfolio of Ports America's locations. We see Davisville as an important gateway for cargo destined for New England. Ports America under its new ownership group is poised to make investments in locations where opportunities for expansion exist. Obviously reliable infrastructure, including pier improvements, are critical components to any future expansion plans. In addition, we are participating with the Port of Davisville's initiative to transform our fleet of vehicles used at the Port for the possible conversion to electric vehicles.

In summary, we believe that the reconstruction of Pier 1 North Side is a prudent investment that will support continued growth and development of Ports America, as well as within the Business Park, and encourage job creation and increased competitiveness in this global marketplace. Thank you for the opportunity to demonstrate our support for this application.

Sincerely,

Rick Elliott
Manager, New England

Ports America
1 Black Falcon Avenue • Boston, MA 02210
Phone: 617-439-7773 • Fax: 617-439-7797 • Web: www.portsamerica.com

Waterson Terminal Services

Providence – Davisville – New Bedford

May 12, 2022

Chelsea Siefert, Director of Planning
Quonset Development Corporation
95 Cripe Street
North Kingstown, RI 02852

RE: Quonset Development Corporation (QDC) FFY20 MARAD Grant
Pier 1 Reconstruction – North Side

Dear Ms. Siefert,

Please accept this letter in support for the Quonset Development Corporation's application to USDOT for funding under the FFY20 MARAD PIDP program. The pier improvements will enhance the movement of freight to and from our facility, position the Park for the future growth of its tenants, and continue to support Rhode Island's economy.

Waterson Terminal Services, LLC (WTS) has depended on the Port of Davisville in the Quonset Business Park as a licensed stevedore since 2018. Our core business entails providing first class stevedoring service to port customers, including Volkswagen Logistics and other project cargo/breakbulk shippers. As a union employer with the International Longshoreman's Association, WTS's Davisville operations generated over 30,000-man hours in 2021. Reliable port operations are critical to our business.

In the coming years, we expect port activity to increase dramatically as offshore wind (OSW) projects enter the construction and operations phase. WTS is one of the few US organizations that has experience in this industry, and we expect that an improved Pier 1 will increase the capacity of the port to support OSW-related cargo. In addition to supporting OSW, we are also participating with the Port of Davisville's initiative to transform our fleet of vehicles used at the Port for the possible conversion to electric vehicles.

In summary, we believe that the reconstruction of Pier 1 North Side is a prudent investment that will support continued growth and development of WTS, as well as within the Business Park, and encourage job creation and increased competitiveness in this global marketplace. Thank you for the opportunity to demonstrate our support for this application.

Sincerely,

Christopher J. Waterson
General Manager
Waterson Terminal Services, LLC

FXM Associates

Technical Memorandum

Economic and Tax Effects on the Rhode Island Economy of Major Business Activity at the Port of Davisville in 2019

To: Quonset Development Corporation
ATTN: Joseph Riccio, Port Director
From: FXM Associates
Date: July 16, 2020

FXM Associates has been retained by the Quonset Development Corporation to prepare an updated assessment of economic and fiscal effects on the Rhode Island economy of business activity at the Port of Davisville. This report represents the fourth time FXM has prepared such an assessment. Prior reports were based on 2008, 2012, and 2014 operating data obtained by FXM in confidential interviews with the major businesses located at Davisville. The current update is based on 2019 operating data obtained from NORAD, Seafreeze Ltd, and the Seaview Transportation Co., Inc, each of whom were also the major businesses surveyed in FXM's prior studies.

As in the prior studies, FXM used the R/ECON Input-Output Model to estimate total direct, indirect & induced effects of economic activity at the Port of Davisville on the statewide economy. Analytic steps included the following:

1. One-on-one email surveys and interviews were conducted with representatives of key Port business owners or managers to obtain information on sales, expenditures, employment, payrolls, suppliers, customers, and other data relevant to this assessment of economic effects on the broader state economy. To protect the confidentiality of information provided by the private businesses interviewed, data in this report on revenues, wages, suppliers, customers, and other financially sensitive topics are aggregated for all Port businesses.

2. Using the profile of direct sales, jobs, payroll, location of suppliers and customers, location of employees, state and local taxes paid and so forth gathered from the interviews, FXM assessed total direct, indirect, and induced effects of Port of Davisville businesses on industry output, jobs, income, value added and taxes statewide using the R/ECON Input Output (I-O) model.[1]

    - *Direct Effects* are the proportion of direct spending by Port of Davisville businesses on goods and services produced in the State of Rhode Island.

[1] Input Output models are used by professional and academic economic analysts to trace out the full range of effects (including indirect and induced) of business sales, employment, or income directly attributable to existing economic activities or planned new ones on single or multiple regions or states. The technique derives from the national income and product accounts which trace money flows within and between industries and sectors within the national economy, with adjustments made for the specific makeup of industries and wages and taxes within individual regions and states. R/ECON (formerly PCIO) was originally developed by the Regional Science Research Institute and has been in continued use for over 45 years. It is updated regularly by economists at the Center for Policy Analysis at Rutgers University, and has been specifically updated for the Rhode Island economy for the purposes of this study. R/ECON is one of three widely used Input Output models in the US, the others being RIMS II (US Bureau of Economic Analysis) and IMPLAN (Minnesota IMPLAN Group).

- *Indirect Effects* are the value of goods and services purchased by businesses to support their direct sales of goods and services to Port of Davisville businesses.

- *Induced Effects* are the value of goods and services needed by households that provide the direct and indirect labor.

- In R/ECON and other Input Output models, *Output* is roughly equivalent to GDP and includes an accounting for materials, labor, income, profit, dividends, interest and rent, and capital consumption allowances (depreciation). *Jobs* in the R/ECON I-O Model are defined as roughly full-time equivalent employment (30 hours or more per week), and *Income* includes payroll and other income that accrues to households and that is directly and indirectly attributable to the Port of Davisville businesses. The R/ECON I-O model results shown are for the State of Rhode Island and *do not* include output, jobs, or income that would be expected to accrue outside the Rhode Island economy.

Data in Table 1 below summarize the total direct, indirect & induced economic and tax effects on the Rhode Island economy in each year studied by FXM. As shown in Table 1, output, employment, earnings, local and state tax effects have increased in each of the analysis years.

Table 1

Port of Davisville
Summary Economic and Tax Effects on the Rhode Island Economy

	2008	2013	2014	2019
Output	$ 119,012,000	$ 317,695,000	$ 332,686,000	$ 374,338,000
Employment	1,105	1,499	1,513	1,658
Earnings	$ 42,664,000	$ 92,572,700	$ 97,149,000	$ 98,813,000
Local Taxes	$ 4,839,000	$ 9,194,000	$ 9,661,000	$ 10,451,600
State Taxes	$ 3,733,100	$ 16,229,000	$ 16,974,000	$ 17,910,000
Federal Taxes	$ 12,860,000	$ 18,233,000	$ 19,110,000	$ 17,142,100

Sources: Quonset Development Corporation, confidential business interviews, R/ECON Input-Output Model, and FXM Associates.

Data in Table 2 show changes in these summary measures between 2014 and 2019, as well as between the initial study in 2008 and the current 2019 analysis.

Table 2

Port of Davisville
Changes in Economic and Tax Effects on the Rhode Island Economy

	Change 2014-2019	*% Change*	Change 2008-2019	*% Change*
Output	$ 41,652,000	*13%*	$ 255,326,000	*215%*
Employment	$ 145	*10%*	553	*50%*
Earnings	$ 1,664,000	*2%*	$ 56,149,000	*132%*
Local Taxes	$ 790,600	*8%*	$ 5,612,600	*116%*
State Taxes	$ 936,000	*6%*	$ 14,176,900	*380%*
Federal Taxes	$ (1,967,900)	*-10%*	$ 4,282,100	*33%*

Sources: Quonset Development Corporation, confidential business interviews, R/ECON Input-Output Model, and FXM Associates.

As shown by the data in Table 2, total direct, indirect & induced output increased by over $41 million between 2014 and 2019. Employment increased by 145 jobs, earnings by $1.6 million, local taxes by $791,000, and state taxes by $936,000 per year. Since 2008, output has increased by $255 million per year, a *215%* increase. Employment increased by 553 jobs, a *50%* gain over the 2008 total. Earnings grew by over $56 million, a *132%* increase. Annual state taxes increased by over $14 million, a *380%* increase, while local and federal taxes also increased substantially between 2008 and 2019.

Data in Table 3 present the more detailed results of this analysis of economic and tax effects in 2019. As shown by the data in Table 3, Port of Davisville businesses in 2019 accounted for about $374 million in business output within the State of Rhode Island, 1,658 jobs, and over $98 million in household earnings.

The State of Rhode Island received nearly $18 million in business and personal income, sales, and excise taxes in 2019; while local municipalities received over $10 million in business and residential property and excise taxes attributable directly and indirectly to the activities of the Davisville Port businesses.

The statewide Transportation and Warehousing sector, with approximately 530 jobs and $34 million in household earnings (direct, indirect & induced effects) attributable to operations at the Port of Davisville, followed by the Wholesale Trade sector with over 290 jobs and $22 million in household earnings and the Professional and Business Services sector with 200 jobs and nearly $12 million in household earnings are the largest beneficiaries of business activity at the Port of Davisville.

Table 3

Economic and Tax Impacts on Rhode Island of Major Businesses at the Port of Davisville 2019

Industry Sectors and Economic Components	Output ($1,000)	Employment (jobs)	Earnings ($1,000)
Total Effects (Direct + Indirect/Induced)			
Agriculture, Forestry, Fishing, and Hunting	$ 113	1	$ 30
Mining	$ 33	0	$ 6
Utilities	$ 1,885	3	$ 309
Construction	$ 1,501	11	$ 530
Manufacturing	$ 7,055	26	$ 1,668
Wholesale Trade	$ 75,851	291	$ 21,815
Retail Trade	$ 8,547	86	$ 3,722
Transportation and Warehousing	$ 110,183	530	$ 33,841
Information	$ 5,005	13	$ 953
Finance, Insurance, Real Estate, Rental, and Leasing	$ 35,044	130	$ 7,167
Professional and Business Services	$ 22,215	200	$ 11,655
Educational Services, Health Care, and Social Assistance	$ 11,301	105	$ 5,932
Arts, Entertainment, Recreation, and Hospitality	$ 4,794	77	$ 1,981
Other Services (including Government)	$ 90,811	185	$ 9,205
Total Effects	$ 374,338	1,658	$ 98,813
Distribution of Effects and Multipliers			
Direct Effects	$ 171,729	789	$ 52,729
Indirect Effects	$ 71,547	495	$ 28,903
Induced Effects	$ 131,062	375	$ 17,180
Total Effects	$ 374,338	1,658	$ 98,813
Multipliers (= 4 / 1)	*2.180*	*2.102*	*1.874*

Tax Accounts	Business	Household	Total
Labor Income	$ 83,186	$ 83,991	
Taxes	$ 25,691	$ 19,812	$ 45,503
a. Local	$ 5,511	$ 4,941	$ 10,452
b. State	$ 13,216	$ 4,694	$ 17,910
c. Federal	$ 6,964	$ 10,178	$ 17,142

Sources: Quonset Development Corporation, Confidential Business Interviews, R/ECON Input-Output Model, and FXM Associates

PIER 1

CONDITION ASSESSMENT

SEPTEMBER 2018

QUONSET DEVELOPMENT CORPORATION
NORTH KINGSTOWN, RI
CONTRACT NO. 2017-0016B

QUONSET DEVELOPMENT CORPORATION
NORTH KINGSTOWN, RI
CONTRACT NO. 2017-0016B

PIER 1

CONDITION ASSESSMENT

SEPTEMBER 2018

Prepared by:



moffatt & nichol

Executive Summary

In September of 2018, Moffatt and Nichol (M&N) completed a partial underwater and above water condition assessment of Pier 1 at the Port of Davisville located in North Kingstown, Rhode Island. The purpose of this inspection was to provide overall condition assessment rating of Pier 1 and the elements it is comprised of, evaluate and grade the structural elements, and provide repair recommendations to maintain the pier.

Condition Assessment

Pier 1 is in **Fair** condition overall due to isolated areas of advanced deterioration on the timber piles and widespread advanced deterioration of the topside and underdeck surfaces of the concrete deck, primarily along the pier's perimeter. The other primary structural elements, such as the timber piles, timber bulkhead, concrete pile caps and concrete beams typically exhibit minor to moderate deterioration with isolated areas of severe deterioration.

Timber Piles

The timber piles are overall in **Fair** condition with less than 4-percent (82) of the 2,144 timber piles inspected are observed to have major/severe deterioration. Since only 22-percent of the timber piles were inspected, if the number of major/severe timber piles is factored proportionally as if the entire pier was inspected, this would result in a possible 369 locations with major/severe deterioration. Based on an average mudline depth of EL. -18.0' (using bathymetric data surveyed in January and February of 2017), an exposed height of timber pile above MLW of 9-ft, and accounting for 2-ft of additional pile to be encased below the mudline, the total timber pile repair length was assumed to be 29-ft long. Repairing 369 timber piles that are 29-ft long with structural concrete encasements would cost approximately $13 million based on a unit price of $1,200/lf of concrete encasement (**FIGURE ES-1**). Due to the large expenditure in cost for the timber pile repairs, additional inspection and structural analysis is recommended to determine the number of piles that need to be preserved and then a review of the deteriorated pile locations to determine if the piles require repair. It should be noted that an engineering evaluation of Pier 1 performed by Sidney M. Johnson & Associates in 1989 determined that only one-half of the interior piles and one-third of the exterior apron piles (or 45-percent of the total) warranted repair in order to maintain a uniform live load capacity of 300-psf.

Long-term, it is highly likely that whichever piles are designated to be preserved during the structural analysis and review of deteriorated pile locations, that approximately 45-percent of the timber piles (4,340) will require the structural concrete encasements over the course of the next 20-years. During the inspection, approximately 15-percent of the piles (or 324) had a failed or loose pile wrap. Proportioning this value for a full inspection of the pier it is possible that 1,090 piles have failed or loose pile wraps. In the next 5-years, it is likely that the majority of these timber piles will exhibit major/severe deterioration due to marine borer infestation. Although a trend in pile wrap failure has not been determined, it is anticipated that the rate of failure will increase with age and it is not unreasonable to assume that another 1,090 pile wraps will be

compromised in 5 to 10-years and more than double that in 10 to 20-years. Repairing the estimated total of 4,340 piles over the course of 20-years will cost approximately $151 million.

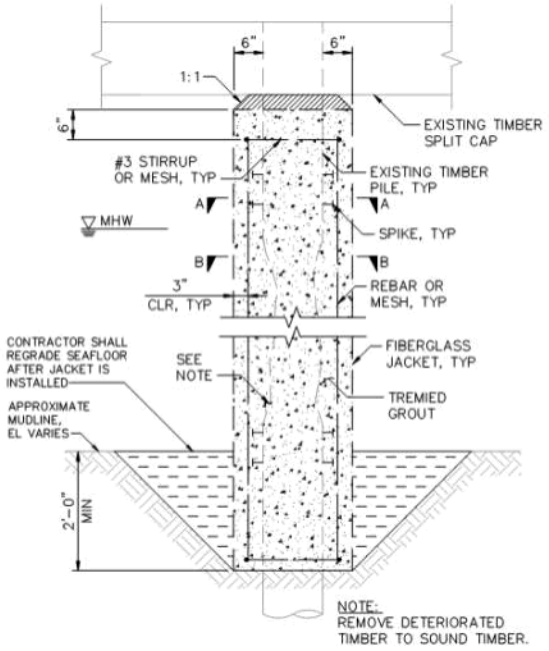


FIGURE ES-1: TIMBER PILE ENCASEMENT

TABLE ES-1 summarizes the cost of timber pile encasements for the current number of piles with major/severe deterioration and the total number of piles expected to have major/severe deterioration in 20-years.

TABLE ES - 1: OPINION OF PROBABLE COST FOR TIMBER PILE REPAIRS

Description	Quantity	Unit Cost	Total Cost
Timber pile encasement (current condition)	10,701-lf total (or 369 timber piles by 29-ft long)	$1,200/ft	$13 million
Timber pile encasement (20-years)	125,860-lf total (or 4,340 timber piles by 29-ft long)	$1,200/ft	$151 million

Concrete Pile Caps, Beams, and Deck

On September 19, 2018, the ramp from a RoRo vessel damaged the deck east of Bollard 19 between Bents 28.5 and 31 along the northern edge of Pier 1. Following the incident, a detailed underdeck inspection and an ultrasonic and ground penetrating radar survey was performed to assess the extent and severity of the damage. It was determined that the deck was fractured for a 25-ft long by 12.5-ft wide area. The anticipated

scope of repairs includes a full depth concrete deck repair for the 25-ft long by 12-ft wide area of fracture deck and additional areas of spalling and cracking of the concrete beams, pile caps and fascia within the same vicinity.

The topside surface of the concrete deck has widespread areas of major/severe deterioration. Along almost the entirety of the pier's north face, there is widespread longitudinal cracking found between the pier's edge and the northernmost crane rail slots, which is presumed to be attributed to vessel berthing directly against the concrete edge beam and transferring the lateral load to the thin deck section (**FIGURE ES-2**). Any repair of the deck along the north face should incorporate transverse beams behind the energy absorbing fenders in order to provide a strut between the concrete edge beam and crane rail beams. On the southern face, there is noticeably less longitudinal cracking which is likely because the large RoRo vessels do not use the south berth. Below deck on the concrete pile caps, beams, and underdeck, major/severe deterioration is also more commonly observed along the pier's perimeter.

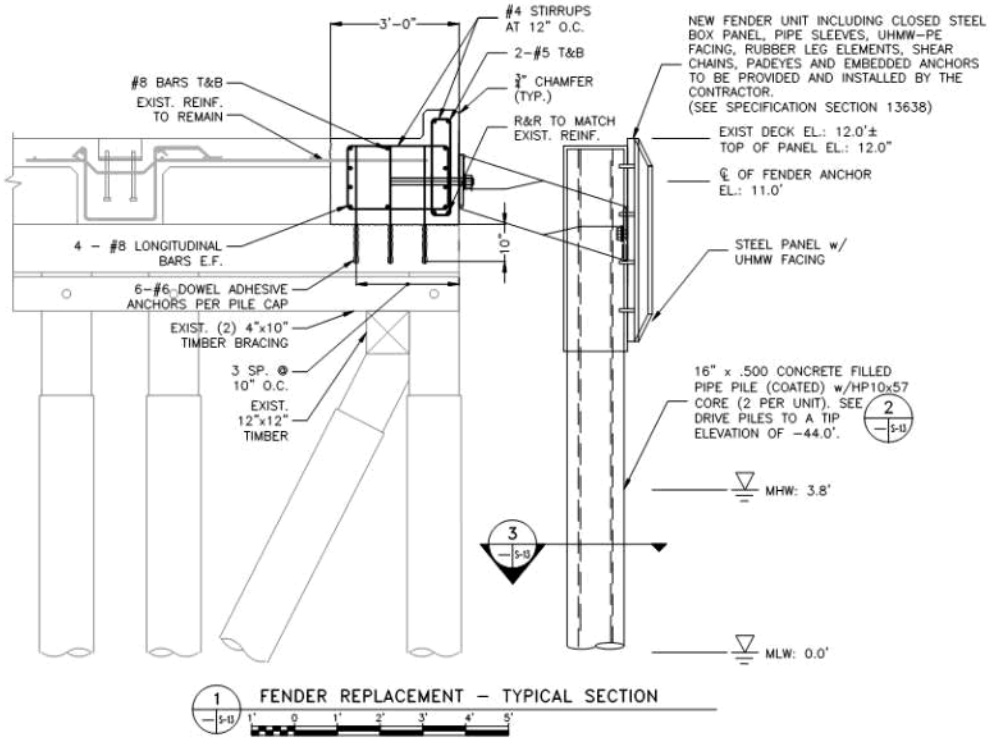


FIGURE ES-2: NORTH FACE SECTION

Based on the level of deterioration found on both the topside and underdeck along the perimeter of the north side of the pier, full depth deck replacement should be performed on a priority basis (i.e. in the next 3-years). At a minimum, the outer 12.5-ft, which correlates to the northernmost set of crane rail beams should be repaired but it is possible that the repair may need to extend 40-ft (**FIGURE ES-3**), which would include both sets of crane rail beams and the decking to the next longitudinal beam. The east face is in similar

condition to the north face, whereas the south face is in better condition and can repaired in 5 to 10 years. In order to determine the width and depth of damage, additional ultrasonic and ground penetrating radar surveys of the entire 40-ft wide perimeter of Pier 1 is recommended. The results of this survey will provide the means to determine the proper width of repair (i.e. 12.5-ft versus 40-ft) in addition to which areas of the decking should be repaired first. It should be noted that although the deck replacement along the north face is recommended to be performed within the next 3-years, it is also understood that large-scale repairs of the structure will be difficult due to the Port's need for two operational RoRo berths. If repairs to the concrete deck along the north berth at Pier 1 need to be delayed, periodic inspections are recommended to ensure its structural integrity.

TABLE ES-2 provides a summary of costs for replacing 12.5-ft and 40-ft width sections of the concrete deck and beams. The 12.5-ft wide and 40-ft wide deck replacement repairs around the north, east and south faces of the pier will cost approximately $9 million to $29 million, respectively.

TABLE ES - 2: OPINION OF PROBABLE COST FOR REPAIR OF EXISTING STRUCTURE

Description	Quantity	Unit Cost	Total Cost
12.5 ft Wide Deck Replacement	33,125-sf (or 2,650-ft by 12.5-ft)	$270/ft	$9 million
40 ft Wide Deck Replacement	106,000-sf (or 2,650-ft by 40-ft)	$270/ft	$29 million

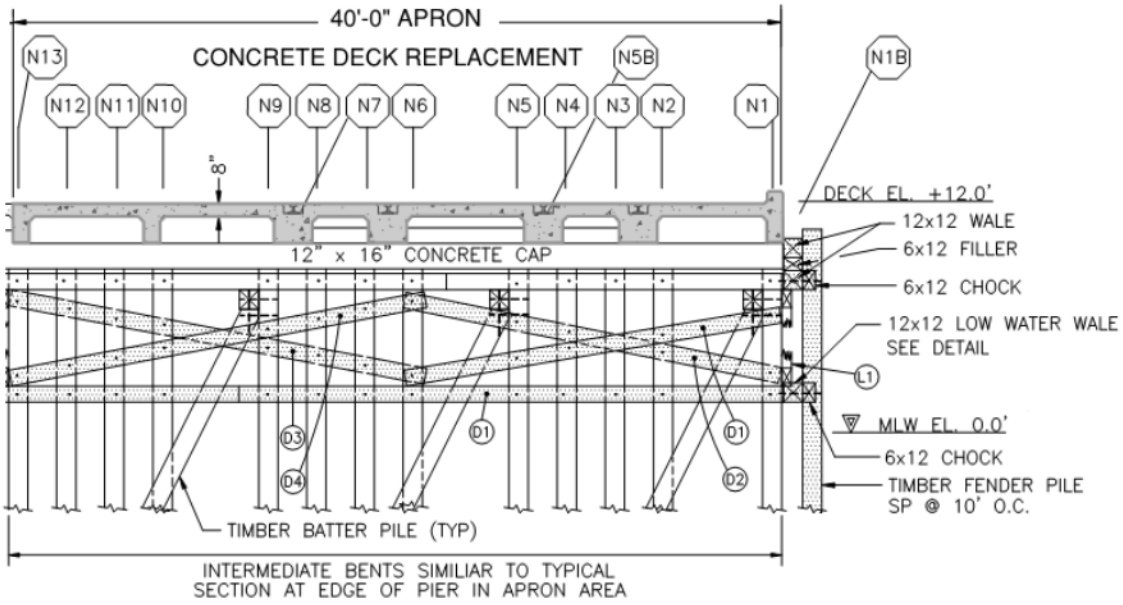


FIGURE ES-3: CONCRETE DECK REPLACEMENT SECTION

Additional Repair Recommendations

The timber bulkhead typically exhibits minor to moderate decay and voids with severe defects including section loss of the bottom wale and a large 10-ft wide void in the timber sheeting. The steel bulkheads to the north and to the south typically exhibit minor corrosion and coating loss. The north and south return walls also exhibit minor corrosion and coating loss of the steel elements. The mooring hardware typically exhibits minor to moderate cracking, corrosion, and pitting, with the exception of two (2) cleats rated Major and one (1) rated Severe, where cleat C-36 was found to exhibit a broken ear. The timber fender system typically exhibits minor to moderate defects, and isolated locations of severe defects such as significant shakes or splintering, and 14 broken piles. The leg fenders typically exhibit tears or dislodged rubber elements, coating loss, and corrosion. The pneumatic fenders typically exhibit minor coating loss and corrosion of the steel piles.

It is recommended to repair all minor and moderate deterioration on a routine basis, and to repair all major/severe deterioration on a priority basis. Additionally, all mooring hardware with moderate to major deterioration should be recoated and repaired on a priority basis. If repairs to the bulkhead are to be delayed, periodic inspections are recommended to ensure its structural integrity.

Capital Improvement Scenarios

Based on the inspection findings and the conclusions drawn in the above sections, two capital improvement scenarios are recommended. Beyond the typical maintenance required to keep the pier operational, based on its age and general condition, additional capital improvements will be required if the structure is to remain in a state-of-good repair over the course of the next 30-years. Two capital improvement scenarios including (1) a repair of the existing structure and (2) a replacement of the pier, are discussed below.

Scenario 1: Repair of Existing Structure

The first capital improvement scenario considers extending the service life of the existing structure for another 30-years. This scenario focuses on the two areas of the pier that will require the largest capital expenditure – replacing the perimeter of the pier deck within the next two (2) to ten (10) years and rehabilitation of the timber pile over the next 10 to 20-years. The deck repair is a systematic replacement of the outer 40-ft of concrete deck along the perimeter of the pier, which will include replacement of the concrete edge beam, the four concrete beams supporting the former slots for the crane rails, and the mooring hardware. The estimated cost for replacing the 40-ft wide perimeter of the north, east and south faces is $29 million. The timber pile rehabilitation, which will consist of structurally reinforcing 45-percent of the timber piles (4,340) with concrete encasements (average pile repair length of 29-ft), is estimated to cost $151 million. The total estimated cost for the partial deck replacement and timber pile rehabilitation is $180 million. It should be noted that this scenario only considers the two primary areas of concern and does not capture the full lifecycle costs for maintaining the pier over the next 30-years. Additional routine maintenance such as patching spalls and cracks on other concrete elements, isolated repairs to the timber and steel bulkheads, and damaged fender elements will still be warranted.

Scenario 2: Pier Replacement

The second capital improvement scenario considers replacing Pier 1 with a new steel pile-supported concrete platform similar to the Pier 2 Extension that is currently under construction. The replacement to Pier 1 would be designed for the same uniform live load, lateral loads, and design dredge depth as the Pier 2 Extension and provide a design life of 50-years. Based on the September 2018 contract award price for the construction of QDC's Pier 2 Extension of $380/sf and including a unit cost of $40/sf for demolition costs, the estimated total cost to demolish and construct the replacement pier is $126 million.

Long-Term Recommendation

In order to extend the service life of Pier 1, at a minimum, a comprehensive rehabilitation of the perimeter areas of the concrete deck and 45-percent of the timber piles will be required over the next 20-years. These improvements are estimated to cost $180 million. Beyond these improvements, additional maintenance repairs to the interior sections of the concrete deck, fender system, and bulkhead will also be necessary. In comparison, a replacement of Pier 1 is estimated to cost $126 million, nearly 30-percent less than the repair scenario. It should also be noted that all the repairs to the existing pier will likely last 20 to 30-years whereas a new structure will provide a design life of 50-years or more. Based on this preliminary evaluation, it is recommended that the structure be replaced rather than repaired. Depending on the amount of available funding, replacement of the structure can likely be phased as operations and the condition of the existing pier permits.

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1. Introduction

In September of 2018, Moffatt & Nichol (M&N) conducted an underwater and above water condition assessment of Pier 1 at the Port of Davisville in North Kingstown, Rhode Island.

The purpose of the assessment was to determine the general condition of Pier 1 based on a partial inspection of the structural, mooring and berthing elements, and provide recommendations for short and long-term maintenance repairs of the pier.

The scope of the inspection consisted of the inshore 120 ft of Pier 1, then 5 ft to 10 ft wide swaths at 120 ft intervals (i.e. at each bollard location) until the eastern edge of the pier. Within these areas a routine level inspection was performed on the below and above water surfaces of the timber piles, timber and steel piles for the various fender systems, underdeck components consisting of concrete pile caps, concrete longitudinal beams, concrete underdeck, and topside components consisting of the concrete and asphalt deck, concrete curb and fascia, various mooring hardware and various fender systems. A routine underwater and above water inspection was also performed on the timber bulkhead, 100-ft of steel sheet pile bulkhead to the north and south of the timber bulkhead, and the concrete panel and steel sheet pile returns walls. A design-level inspection to document the dimensions and spacings of the timber piles, steel sheet pile and timber bulkhead and other underdeck components was also performed in case structural analysis was warranted. An outline of the inspection procedures and methodology as well as the general and structural condition ratings used in this report are provided in the remaining portion of Section 1. Section 2 offers the overall facility description and a detailed structural description. Field inspection findings are presented in Section 3. Conclusions and recommendations are made in Section 4. Figures and photographs are presented in **Appendices A and B**, respectively.

1.1. Inspection Procedure and Methodology

The inspection procedure and methodology are based on the standards provided in the American Society of Civil Engineers (ASCE) Waterfront Facilities Inspection and Assessment.

The underwater inspection was conducted by a three (3) person team led by a Professional Engineer-Diver and consisting of an Engineer-Diver/Tender and Designated Person-In-Charge acting as a Dive Supervisor. All diving was performed using surface-supplied diving equipment staged from a box truck. The diving equipment included Kirby Morgan 37 diving helmets, a three-part umbilical with continuous hardwire communications, and other commercial diving gear. Various hand tools, photographic equipment, and measuring devices were utilized to assess and document the condition of the structural components.

The routine level inspection included a 100-percent visual (Level I), a 10-percent hands-on (Level II), and more than 5-percent detailed inspection(Level III).

Level I- Includes a visual/ tactile “swim by” of any particular structural element (pile, beam, etc.) to detect obvious deterioration due to overstressing or severe deterioration While marine growth on the piles and other submerged elements

often obscures finer detail from view, it is possible to see major defects such as breaks, fractures, severe deterioration as well as broken bands and loose pile wraps.

Level II- Includes cleaning marine growth from 1 ft. typical areas (patches or bands) above and below waterline for close visual inspection.

Level III- Detailed investigation of the timber piles included inspection of torn wraps to evaluation loss of cross-sectional area, dissolved Oxygen sampling to assess the pile wrap effectiveness, resistograph needle drilling to detect internal voids (deterioration) not visible from the outside of the pile(s). For steel elements such as H-piles, pipe and sheet piles, ultrasonic thickness (UT) measurements were taken at representative locations at each of the different steel sections/ shapes.

1.1.1. General Condition Ratings

The general condition rating for Pier 1 is based on a six (6) point assessment scale developed by the ASCE. The six (6) condition ratings are:

- Good: No visible damage or only minor damage is noted. Structural elements may show very minor deterioration, but no overstressing is observed. No repairs are required.
- Satisfactory: Limited minor to moderate defects or deterioration are observed, but no overstressing is observed. No repairs are required.
- Fair: All primary structural elements are sound, but minor to moderate defects or deterioration are observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
- Poor: Advanced deterioration or overstressing is observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may be carried out with moderate urgency.
- Serious: Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
- Critical: Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a high priority basis with strong urgency.

1.1.2. Structural Element Damage Ratings

The structural element damage ratings are based on a six (6) point assessment scale developed by the ASCE. The six (6) damage ratings for the various elements inspected are:

Timber Elements Damage Ratings

Damage Rating	Existing Damage	Exclusions [Defects Requiring Elevation to the Next Higher Damage Ratings]
NI – Not Inspected	• Not inspected, inaccessible, or passed by	
ND – No Defects	• Sound surface material	
MN – Minor	• Checks, splits, and gouges less than 0.5 in. wide • Evidence of fungal decay	Minor damage not appropriate if • Loss of cross section • Marine borer infestation • Displacement, loss of bearing, or connections
MD – Moderate	• Remaining dimeter loss up to 15% • Checks and splits wider than 0.5 in. • Cross-section area loss up to 25% • Corroded hardware • Evidence of marine borers or fungal decay with loss of section	Moderate damage not appropriate if • Displacements, loss of bearing or connections
MJ – Major	• Remaining diameter loss 15 to 30% • Checks and splits through full depth of cross-section • Cross-section area loss 25 to 50% heavily corroded hardware • Displacement and misalignments at connections	Major damage not appropriate if • Partial or complete breakage
SV – Severe	• Remaining diameter loss more than 30% • Cross-section area loss more than 50% • Loss of connections and/or fully non-bearing condition • Partial or complete breakage	

Steel Elements Damage Ratings

Damage Rating	Existing Damage	Exclusions [Defects Requiring Elevation to the Next Higher Damage Ratings]
NI – Not Inspected	• Not inspected, inaccessible, or passed by	
ND – No Defects	• Protective coating or wrap intact • Light surface rust • No apparent loss of material	
MN – Minor	• Protective coating or wrap damaged and loss of thickness up to 15% of nominal at any location • Loss of thickness up to 15% of nominal at any location	Minor damage not appropriate if • Changes in straight line configuration or local buckling • Corrosion loss exceeding fabrication tolerances (at any location)
MD – Moderate	• Protective coating or wrap damaged and loss of thickness 15% to 30% of nominal at any location • More than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness 15 to 30% of nominal at any location	Moderate damage not appropriate if • Changes in straight line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location
MJ – Major	• Protective coating or wrap damaged and loss of nominal thickness 30 to 50% at any location • Partial loss of flange edges or visible reduction of wall thickness on pipe piles • Loss of nominal thickness 30 to 50% at any location	Major damage not appropriate if • Changes in straight line configuration or buckling • Perforations or loss of wall thickness exceeding 50% of nominal
SV – Severe	• Protective coating or wrap damaged and loss of wall thickness exceeding 50% of nominal at any location • Structural bends or buckling, breakage and displacement at supports, loose or lost connections • Loss of wall thickness exceeding 50% of nominal at any location	

Reinforced Concrete Elements Damage Ratings

Damage Rating	Existing Damage	Exclusions [Defects Requiring Elevation to the Next Higher Damage Ratings]
NI – Not Inspected	• Not inspected, inaccessible, or passed by	
ND – No Defects	• Good original hard surface, hard material, sound	
MN – Minor	• Mechanical abrasion or impact spalls up to 1-in. in depth • Occasional corrosion stains or small pop-out corrosion spalls • General cracks up to 1/16-in. in width	Minor damage not appropriate if • Structural damage • Corrosion cracks • Chemical deterioration
MD – Moderate	• Structural cracks up to 1/16-in. in width • Corrosion cracks up to ¼-in. in width • Chemical deterioration: Random cracks up to 1/16-in. in width; "Soft" concrete and/or rounding of corners up to 1-in. deep • Mechanical abrasion or impact spalls greater than 1-in. in depth	Moderate damage not appropriate if • Structural breakage and/or spalls • Exposed reinforcement • Loss of cross section due to chemical deterioration beyond rounding of corner edges
MJ – Major	• Structural cracks 1/16-in. to ¼-in. in width and partial breakage (through section cracking with structural spalls) • Corrosion cracks wider than ¼-in. and open or closed corrosion spalls (excluding pop-outs) • Multiple cracks and disintegration of surface layer due to chemical deterioration • Mechanical abrasion or impact spalls exposing the reinforcing	Major damage not appropriate if • Loss of cross section exceeding 30% due to any cause
SV – Severe	• Structural cracks wider than ¼-in. or complete breakage • Complete loss of concrete cover due to corrosion of reinforcing steel with more than 30% of diameter loss for any main reinforcing bar • Loss of bearing and displacement at connections • Loss of concrete cover (exposed steel) due to chemical deterioration • Loss of more than 30% of cross section due to any cause	

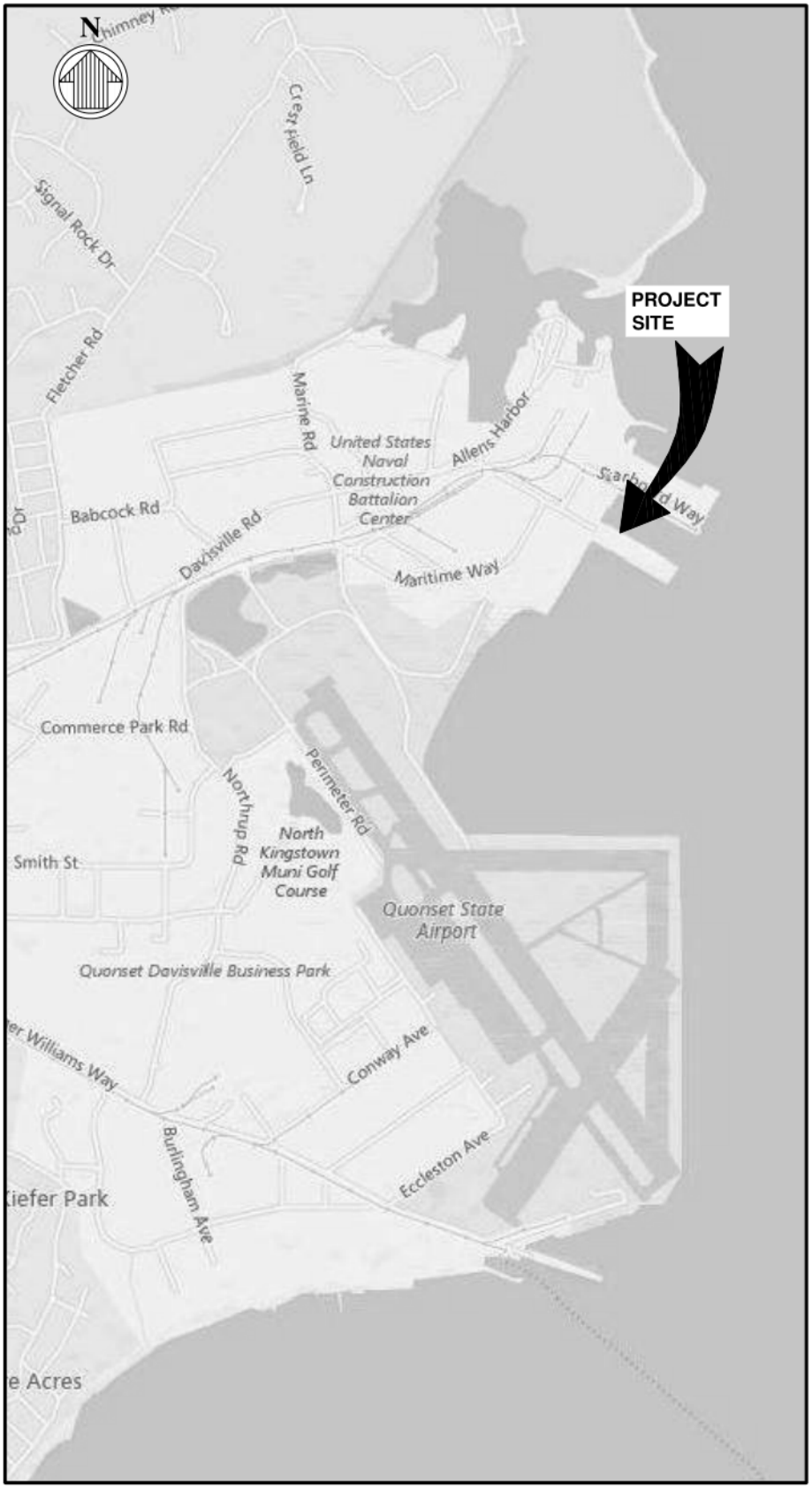
1.1.3. Repair Categories

Recommendations or a course of action are made through the engineering assessment of the structure or element based on the provided operational loads and conditions observed. The recommendations are in accordance with the definitions provided in the ASCE. The recommended repair scope of work is presented in generic form only.

Terminology	Definition
Immediate	Requires "immediate" action including possible closing of the structure or areas affected for Safety reasons until interim remedial measures, such as shoring or removal of potentially unsafe structures (or elements), can be implemented. These closings, if any, always require immediate action upon discovery.
Priority	Conditions for which no immediate action may be required, or for which immediate action has been completed, but for which further investigations, design and implementation of interim or long-term repairs should be undertaken on a Priority basis (i.e., taking precedence over all other scheduled work).
Safety	Conditions that present a potential hazard and which should be repaired as soon as possible.
Routine	Conditions requiring further investigation or remedial work which can be undertaken as part of a scheduled maintenance program, other scheduled project, or Routine facility maintenance depending on the action required.

2. Facility Description

Pier 1, located at the Port of Davisville in North Kingstown, Rhode Island, is pile-supported high-level platform that is 250-ft wide and extends 1200-ft into Narragansett Bay. The pier is structurally comprised of timber piles, concrete caps, concrete beams and a concrete deck. The earthen fill west of the pier is retained by a timber bulkhead within the 250-ft width of the pier. Steel sheet pile bulkheads continue to the north and south of the timber bulkhead. Perpendicular to the bulkheads, there is a steel sheet pile and H-pile return wall on the south side of the pier and a concrete panel and H-pile return wall on the north side of the pier. A vicinity map, location plan and facility plan are presented on the following pages, titled **Figure 2-1, 2-2, and 2-3**, respectively.



VICINITY MAP

QUONSET DEVELOPMENT CORPORATION

Development Services
95 Cripe Street
North Kingstown, RI 02852
Tel: (401) 295-0044
Fax: (401) 268-9885

moffatt & nichol
180 WELLS AVENUE, SUITE 320
NEWTON, MA 02464
617-299-7330
www.moffattnichol.com

SEAL

NO.	REVISION	DATE	APP.

DESIGN BY: DSGN	CHECKED BY: CHKR
DRAWN BY: DRFT	ENGINEER: REVR
SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018–004

FILE NAME: 995101–2–1.DWG

APPROVED

EDWARD J. SPINARD, JR., P.E.
QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

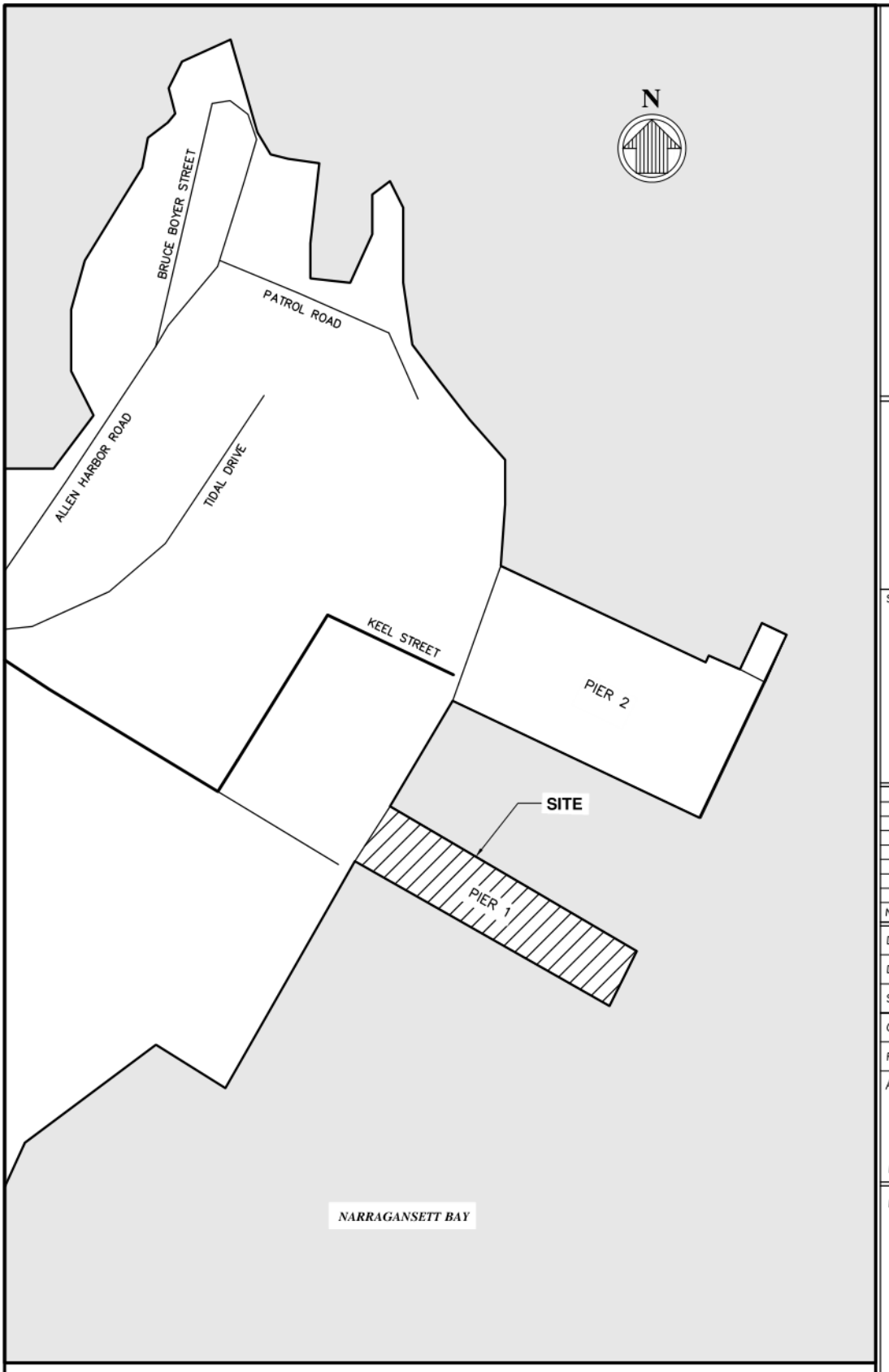
DRAWING TITLE

PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

VICINITY MAP

Quonset Business Park®

SHEET NO.	DRAWING NO.
2-1	



LOCATION MAP

QUONSET
DEVELOPMENT CORPORATION

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95 Cripe Street
North Kingstown, RI 02852
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SEAL

NO.	REVISION	DATE	APP.

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DRAWN BY: DRFT	ENGINEER: REVR
SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018–004

FILE NAME: 995201–2–2.DWG

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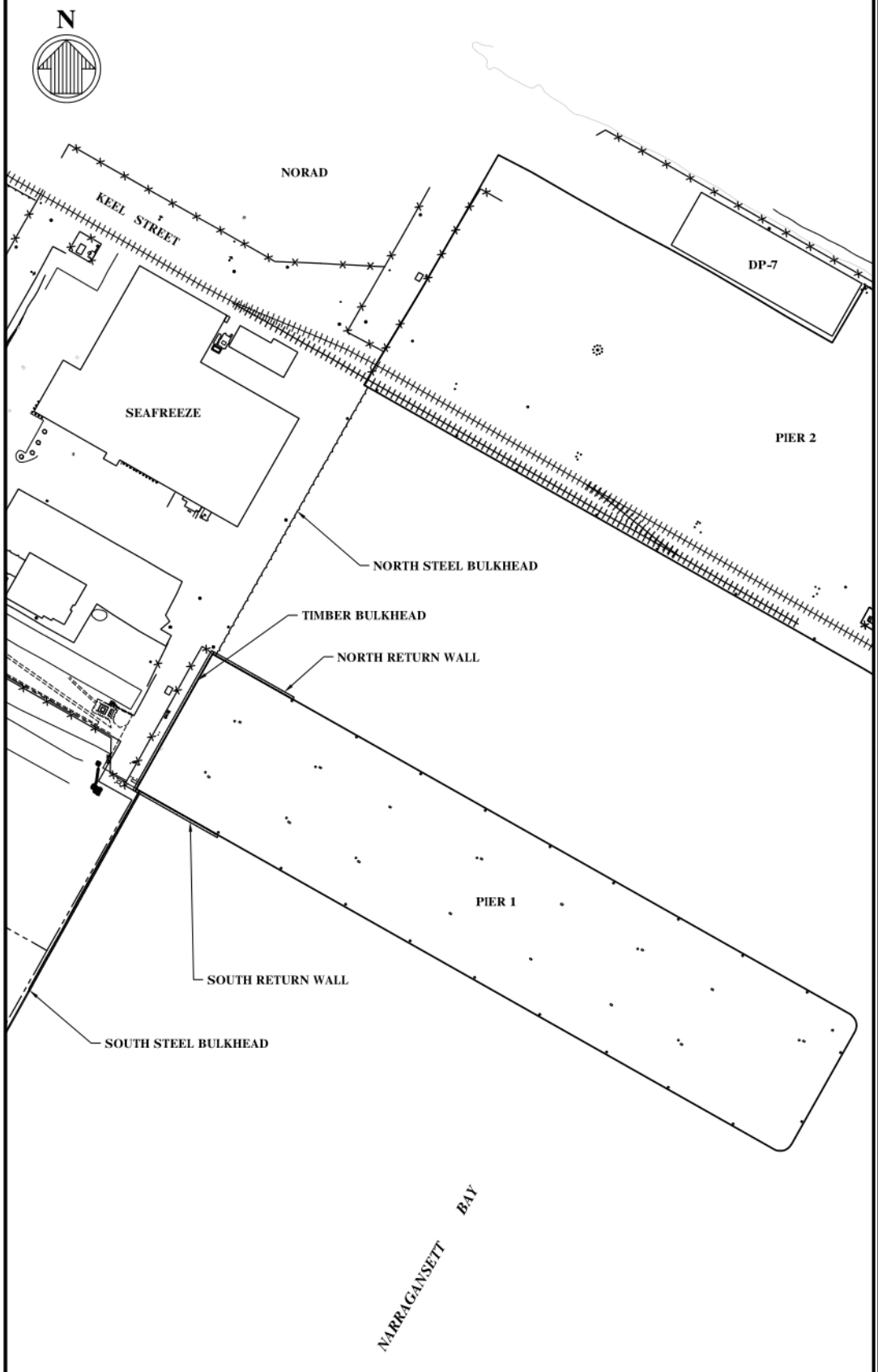
DRAWING TITLE

PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

LOCATION MAP

Quonset Business Park®

SHEET NO.	DRAWING NO.
2-2	



FACILITY MAP

QUONSET DEVELOPMENT CORPORATION

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SEAL

NO.	REVISION	DATE	APP.

DESIGN BY: DSGN	CHECKED BY: CHKR
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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-2-3.DWG

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QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

DRAWING TITLE

PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

FACILITY MAP

Quonset Business Park®

SHEET NO.	DRAWING NO.
2-3	

2.1. Pier 1

Built in 1943, the 250-ft wide by 1,200-ft long timber pile-supported structure was originally built with a timber superstructure. Following a fire after a little more than a decade of usage, the pier was retrofitted with concrete pile caps, beams and deck (**Photo 1**). A concrete curb lines the perimeter of the pier with mooring hardware spaced intermittently. Various types of fendering including timber fender panels, steel H-pile supported panels with pneumatic fenders and leg fenders protect the pier from vessel berthing.

Timber Piles

There are a total of 9,646 timber piles oriented in 121 bents, spaced 10-ft on-center, that extend the full width of the pier and intermediate bents at 5-ft on center along the 40-ft wide longitudinal edges of the pier. The full bents typically have 54 piles each while the intermediate bents have 13 piles on each 40-ft wide section (**Photo 2**). The 40-ft wide exterior sections have 13 timber piles (one pile at the edge beam and three 4-pile groups spaced 7'-6" apart). Within the 170-ft wide center section of the pier the 28 piles are spaced 5'-10" on-center. In the 1990s, partial length plastic wraps were installed on the timber piles to halt the continued intrusion and subsequent damage from marine borers. Each pile, except for those in Bent 121, has either a flexible white plastic wrap or a rigid black plastic wrap (**Photo 3**). The piles on the south side of the pier are wrapped in white, flexible wraps and the piles on the north side are wrapped in black, plastic wraps (**Photo 4 & Figure 2-4**).

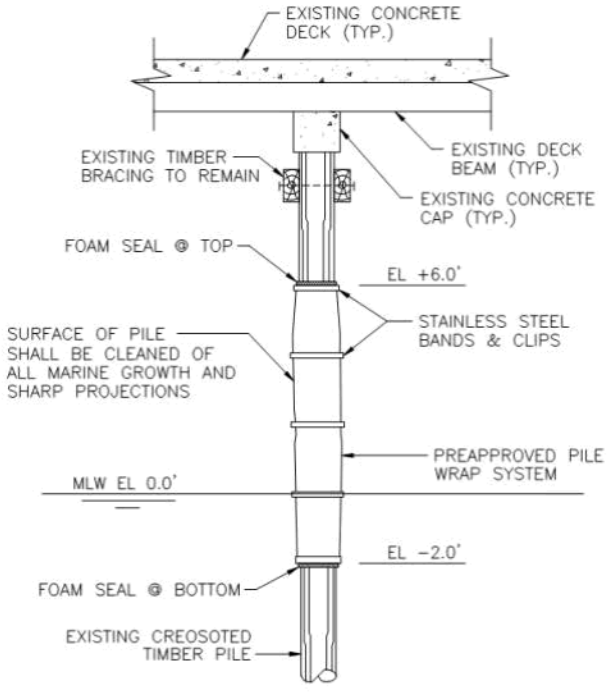


FIGURE 2-7: WRAPPED TIMBER PILE

Concrete Caps, Beams and Deck

The concrete pile caps within the 40-ft wide exterior sections of the pier are 16-in. high by 12-in. wide whereas the pile caps in the 170-ft wide center section of the pier are 14-in. high by 12-in. wide (**Photo 5**). The concrete beams are integral with the concrete deck in a T-beam design (**Photo 6**). At the 40-ft wide exterior sections, the T-beam webs beneath the rails are four 16-in. high by 24-in. wide, while the edge beam and two beams further towards the center of the pier are 16-in. high by 10-in. wide. The flange (i.e. deck portion) of the T-beam is 8-in. deep. At the 170-ft wide interior section of the pier, the T-beam webs are 11-in. high by 10-in. wide and are spaced at the 5'-10" pile spacing. The flange of the T-beam is 7-in. deep. See **FIGURE 2-5** below cap and T-beam configurations.

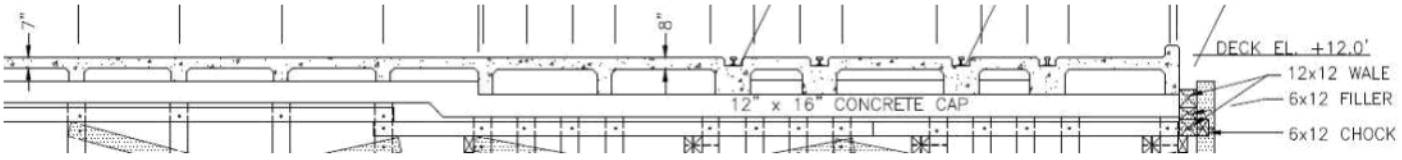


FIGURE 2-8: CONCRETE CAP AND T-BEAM CONFIGURATION

The topside area of Pier 1 is kept open since the pier functions as a roll-on roll-off facility and storage for vehicles. Only mooring hardware and light poles are found on the topside deck (**Photo 7**). The topside surface of the deck is primarily concrete except at the 12-in. wide by 6.5-in. deep rail slots that have been filled with asphalt. An 8-in. high by 10-in. wide concrete curb runs along the north, east and south edges of the pier.

Mooring Hardware

Pier 1 contains 21 bollards and 41 cleats (**Photos 8 & 9**). The north and south sides of the pier have three (3) cleats placed between the west end and the first bollard, then two (2) cleats between each bollard until there is one (1) cleat between the last bollard and the east end of the pier. The bollards are spaced every 120-ft on-center and the two cleats are spaced 40-ft on-center between each bollard. At the east face, there are two bollards 60-ft from the north and south edges and two cleats between the bollards spaced 40-ft on-center. A storm bollard is located at the interior of the pier, above piles 105-NR, 105-NS, 106-NR, and 106-NS, approximately 150-ft from the east edge of the pier.

Fender System

There are three (3) different fender types along the perimeter of Pier 1. Moving west to east, the north side of Pier 1 has 11 timber panel fenders typically spaced 30-ft on-center, then 18 leg fenders typically 40-ft on-center, and then two (2) timber fenders spaced 30-ft apart. The east end of the pier has five (5) timber panel fenders and a timber pile cluster as the northeast and southeast corners. Moving west to east, the south side of the pier has eight (8) timber fenders typically spaced 30-ft on-center, then three (3) pneumatic fenders spaced 60-ft on center, and finally 23 more timber fenders spaced 30-ft on-center (**Photo 10**). Each timber fender comprises two timber piles and blocks (**Photo 11**). Each leg fender comprises two steel piles and a steel fender panel with an exterior rubber layer (**Photo 12**).

2.2. Bulkheads and Return Walls

Timber Bulkhead

The west end of the pier is defined by a timber bulkhead, extending the full 250-ft width of the pier (**Photo 13**). The bulkhead comprises multiple layers of vertical timber sheeting measuring 12-in. wide. In some areas, typically at repairs, there are more than two (2) layers of sheeting.

Steel Sheet Pile Bulkhead

To the north and south of the timber bulkhead, there is steel sheet pile bulkhead. The north steel sheet pile bulkhead (**Photo 14**) extends approximately 500-ft to the southern edge of Pier 2, whereas the south steel sheet pile bulkhead (**Photo 15**) extends approximately 650-ft to the edge of Terminal 5.

Return Walls

At the connection between the timber bulkhead and the south steel bulkhead, there is a king pile return wall with steel H-piles and steel sheet piles that extends east approximately 100-ft (**Photo 16**). There are four (4) H-piles spaced 25-ft on-center.

At the connection between the timber bulkhead and the north steel bulkhead, there is a king pile return wall with steel H-pile and concrete panels that also extends 20-ft to the east (**Photo 17**). There are four (4) panel sections and each set of panels is progressively lower than the last, stepping down along the face of Pier 1 until the fourth panel, which is located approximately at Bent 3, has an exposed height of 3-ft 6-in. above the mudline.

3. Inspection Findings

3.1. Pier 1

Overall Condition

Pier 1 is in **Fair** condition due to delamination of the concrete deck, in particular along the north berth, and underdeck spalling along the perimeter of the pier. There are also isolated locations of severe deterioration on the timber piles, concrete pile caps, concrete beams, concrete underdeck, timber bulkhead, and fender system.

Pile, underdeck, and topside condition plans are provided in **Appendix A** on **Figures A-2** to **A-13**. Photographs of observed conditions are presented in **Appendix B**.

Timber Piles

Of the 2,144 of a total 9,646 inspected (22-percent), the timber piles supporting Pier 1 are in **Fair** condition due to isolated areas of moderate to major/severe deterioration such as splits, hollow areas, breaks, and section loss. A total of 82 piles, 3.8-percent of the inspected piles, were rated Severe or Major. These piles typically exhibit section loss over 35-percent and include three (3) missing piles and the ten (10) broken piles discovered during the inspection (**Photo 18**).

A total of 88 piles, 4.1-percent of the inspected piles, were rated Moderate. These piles typically exhibit section loss between 15-percent and 35-percent in addition to moderate checks and signs of marine borers (**Photo 19**). It should be noted that 16 of these piles are located in Bent 121. An additional five (5) piles in Bent 121 are rated Severe.

Comparing the north and south sections of the pier, the inspection revealed that the piles on the north side typically exhibit more advanced deterioration. There are 107 piles rated Moderate or Major/Severe on the north side versus 63 piles rated Moderate or Major/Severe on the south side.

The remaining 1,973 piles inspected make up the 92.1-percent rated as Minor. These piles typically exhibit section loss under 15-percent in addition to minor checks, freeze-thaw damage, and early signs of marine borers (**Photo 20**). A summary of the timber pile conditions are in **TABLE 1** below.

TABLE 1: SUMMARY OF PILE CONDITION RATINGS FOR PIER 1

Pile Type	No. Inspected	Minor		Moderate		Severe/Major	
		No.	% of total	No.	% of total	No.	% of total
Timber	2,144	1,973	92.1%	88	4.1%	82	3.8%

A total of 324 wrap defects were found during the inspection (**Photo 21**). The plastic wraps on the north side piles tended to have more defects than the flexible wraps on the south side piles. Of the 14 failed wraps, 12 of them were found on the north side (**Photo 22**). There were 75 torn wraps, 66 of which were found on the north side. Furthermore, of the total 122 wraps with loose bands, 113 are found on the north side. See the **TABLE 2** below for additional wrap defect information.

TABLE 2: SUMMARY OF WRAP DEFECT LOCATIONS FOR PIER 1

Defect	No. Total	South		North	
		No.	% of total	No.	% of total
Failed Wrap	14	2	14.3%	12	85.7%
Tear Wrap	75	9	12.0%	66	88.0%
Loose Wrap	16	2	12.5%	14	87.5%
Failed Band	12	1	8.3%	11	91.7%
Loose Band	85	7	8.2%	78	91.8%
Missing Band	122	9	7.4%	113	92.6%

Dissolved oxygen readings were taken at 25 piles. Taking measurements of the dissolved oxygen levels in the pile wraps provides insight as to how likely it is that marine borers are present. Low levels of dissolved oxygen (below two parts per million) are associated with low marine borer activity. Pile wraps function by creating a seal around a section of the pile, effectively reducing the dissolved oxygen levels in that space. Ambient measurements are taken to offer a comparison between the readings inside the wrap and outside the wrap to determine the wrap's effectiveness. Based on the readings, the wraps are effective to a degree. There were three (3) defective wraps on the north side of Pier 1 which exhibited a defect such as a small tear, missing bottom band, or a loose closure. These piles had slightly higher levels of dissolved oxygen than the other 22 piles with wraps in good condition. See **TABLE 3** below for average dissolved oxygen readings. Ambient readings showed dissolved oxygen concentrations between 6.3 and 8.0 parts per million (ppm).

TABLE 3: SUMMARY OF DISSOLVED OXYGEN READINGS FOR PIER ONE

Pile Region	Readings	Average (ppm)
North	8	3.4
North-Defective Wraps	3	5.2
South	14	4.3

Note: Dissolved oxygen levels below 2.0 ppm are associated with low levels of marine borer activity.

Resistograph readings, 54 in total, were taken above water, in the tidal zone, at 18 piles (**Photo 23**). A resistograph is used to detect soft or hollow areas in a timber pile. The needle extends into the pile and effectively measures the resistance over the distance drilled. A graph is produced from the data, and where the amplitude drops to near zero (0) indicates a potentially very soft or hollow area at the measured depth in the pile. An area such as this indicates the potential presence of marine borers. See **TABLE 4** below for a summary of ratings from resistograph tests.

The 54 readings, three (3) at each pile, were taken at varying elevations and axes to obtain a more accurate condition of the pile. After analysis, the rating of the pile was driven by the most severe of the three readings. Although the sample size is small, the resistograph readings show that internal voids in the timber piles do exist and that because they are not visible from the surface that the piles may be in worse condition than the ratings indicate.

TABLE 4: SUMMARY OF RESISTOGRAPH READINGS FOR PIER 1

Rating	Soft/Void Size (in.)	Readings	Percentage of Total
Minor	< 0.5	15	83%
Moderate	0.5 – 2	2	11%
Major/Severe	> 2	1	6%

Concrete Pile Caps, Beams, and Deck

The below deck concrete structural elements of Pier 1 are in **Fair** condition due to typical minor to moderate deterioration with areas of major/severe deterioration. Minor deterioration on the concrete elements include typical hairline cracking, efflorescence, and honeycombing (**Photos 24 & 25**). Moderate deterioration, including delamination, cracks up to 3/16-in., and spalls up to 4-in. deep without exposed rebar, was found in 65 locations (**Photo 26**). There are typical minor hairline cracks with efflorescence and rust staining surrounding deck drainage holes, and in some locations, minor spalling (**Photo 27**).

Major/Severe deterioration, including corrosion spalls with exposed rebar, mechanical spalls with exposed rebar, cracks wider than 3/16-in., and rebar pop-outs, was found in 77 locations throughout the entirety of the pier (**Photos 28 & 29**). There are three areas with higher concentrations of defects than the rest of the pier that may be indicate of more widespread deterioration throughout the areas of the pier that were not inspected.

The first area to note is at the south side of Pier 1 from Bent 1.5 to Bent 10, where approximately a dozen major/severe defects were observed between Pile-SA and Pile-SC' alone. The pile caps exhibit the worst deterioration, as the caps which make up Bent 2, Bent 2.5, Bent 3, Bent 5, Bent 6, Bent 6.5, Bent 8.5, Bent 9 all have major/severe cracks measuring ¼-in. to 1-in. wide in various locations between Pile-SA to Pile-SE' on those bents. In the interior of the pier, the underdeck between Bent 10 and Bent 11 exhibits a string of major/severe mechanical spalls 2-ft long and 2-ft wide exposing the rebar at each location between Pile-SI to Pile-SR in those bents.

Along Bent 75 is the second area observed with a higher concentration than the rest of the pier. Bent 75 exhibits major/severe defects at several locations for the length of the cap. These defects include upwards of ¼-in. wide cracks, corrosion spalls up to 3-ft wide and 4-in. deep exposing rebar, and rebar pop-outs. The previously described cracks are found in the pile cap between Pile-SA and Pile-SB, between Pile-SR and Pile-SU, between Pile-NP and Pile-NO, and between Pile-NJ and Pile-NG'. Large spalls with exposed rebar are found in the underdeck above the cap between Pile-SG' and Pile-SH, between Pile-NM and Pile-NL, and between Bent 75 and Bent 75.5 from Pile-ND to Pile-NC'. Bent 75 also features two pop-out locations where the rebar is exposed out of the cap, found at the pile connection at Pile-NU and on the east face of the cap between Pile-NH and Pile-NG' (**Photo 30**).

The third area with a high number of major/severe deterioration is found at the east end of Pier 1 between Bents 119 and 121. Typical conditions in this area include major/severe cracks over ¼-in. wide nearly full length of the beams, spalls exposing long lengths of rebar in the beams, and moderate to major/severe cracking and spalling on the pile caps and the outside fascia (**Photo 31**). The underdeck in this area exhibits minor to moderate defects.

On September 19, 2018, the ramp from a RoRo vessel damaged the deck east of Bollard 19 between Bents 28.5 and 31 along the northern edge of Pier 1 (**Photo 32**). Following the incident, a detailed underdeck inspection and an ultrasonic and ground penetrating radar survey was performed to assess the extent and severity of the damage. It was determined that the deck was fractured for a 25-ft long by 12.5-ft wide area. The damage extends from the topside deck to the underdeck surface, beams and caps in the immediate area, and the outside fascia. The deck in this area exhibits severe spalling, cracking, and hollow areas (**Photos 33 & 34**). The caps, beams and fascia in this area may be limited to cracking (**Photo 35**) although the full extent of the damage was not able to be assessed due to safety concerns. The findings and recommendations for repair from the detailed underdeck inspection and ultrasonic and ground penetrating radar inspection was issued on October 3, 2018. This letter is included as **Appendix D**.

Topside

The topside deck of Pier 1 is in **Poor** condition with areas of major to severe deterioration. The critical area with the most severe spalling, cracking, and failure is caused by the ramp damage, on the north side between Bent 28.5 and Bent 31 (**Photo 36**). The north side generally exhibits areas of major deterioration of the deck between the crane rails, which had been removed and filled, for nearly the full length of the pier (**Photo 37**). On both the north and south sides of Pier 1, there were several areas of deck delamination detected using the chain drag cart, typically 2-ft by 2-ft in size at both previous repairs and original deck, and some larger areas up to 25-ft by 50-ft were identified. Other defects include minor voids and spalls up to 1-ft in size to larger areas of minor cracking and moderate concrete deterioration with approximate dimensions up to 25-ft by 40-ft.

Mooring Hardware

The mooring hardware of Pier 1 is in **Fair** condition with minor to moderate deterioration and isolated locations of major/severe deterioration. The bollards typically exhibit minor to moderate corrosion, cracking, and pitting (**Photo 38**).

One bollard exhibits major deterioration resulting from advanced corrosion and pitting in addition to rust staining. There is a spall in the underdeck directly under bollard B-12.

The cleats typically exhibit minor corrosion, cracking, and pitting (**Photo 39**). One cleat has been identified as Severe, C-36 on the north side is completely broken, and two (2) other cleats have been identified as Major (**Photo 40**). See **Figure C-1** in **Appendix C** for a summary of the mooring hardware conditions.

Fender System

The fender system is overall in **Fair** condition due to isolated locations with advanced deterioration. Although the primary fender system used for RoRo vessel operations at the north berth (leg fenders) typically exhibit minor deterioration, there are isolated locations with tears or dislodged rubber elements. Furthermore, a number of the timber piles at the older timber fender panels are broken.

The timber fender system is in Fair condition with minor to moderate deterioration with isolated locations of major/severe deterioration. Minor and moderate defects include waterline decay, shakes, and splintering (**Photo 41**). The timber blocks typically exhibit minor deterioration due to general weathering.

Major/Severe defects include impact damage, significant shakes or splintering, and broken fender piles (**Photo 42**). There are 14 broken piles in total. See **TABLE 5** for the location of the broken fender piles.

TABLE 5: SUMMARY OF BROKEN TIMBER FENDER PILES

Face of Pier	Bent	Fender ID
North	B6.3	F-71
North	B6.7	F-71
North	B30.3	F63
South	B-51.7	F-14
South	B71.3	F-20
South	B71.7	F-20
South	B73.7	F-21
South	B77.7	F-22
South	B87.3	F-26
South	B93.3	F-28
South	B96.7	F-29
South	B111.3	F-34
South	B111.7	F-34
East	B121	F-73

The leg fender system is in Fair condition with typically minor deterioration but isolated locations of advanced deterioration due to vessel impact. The typical minor to moderate deterioration includes areas of coating loss and corrosion at and below the waterline. The advanced deterioration includes isolated tears in the rubber exterior, (**Photo 43**), and at two

locations leg fenders are tilting down under their own weight. The ultrasonic thickness readings of the steel piles measured 0.480-in. to 0.485-in. See **Figure C-2** in **Appendix C** for a summary of the leg fender conditions.

The pneumatic fender system is in Satisfactory condition with isolated locations of minor deterioration (**Photo 44**). The defects are limited to typical coating loss and corrosion at and below the waterline on the steel fender piles.

3.2. Bulkheads and Return Walls

Timber Bulkhead

The timber bulkhead of Pier 1 is in **Fair** condition with minor to moderate deterioration with isolated locations of severe deterioration (**Photo 45**). The minor to moderate deterioration includes typical localized decay of the timber sheeting up to 2-ft by 2-ft and typical voids between the bottom wale and the bottom of the exposed bulkhead (**Photo 46**).

The bottom wale exhibits severe deterioration and approximately 80-percent to 100-percent section loss from Pile-SO to Pile-NN (**Photo 47**). There is a large void resulting from severe deterioration near Pile-SM to Pile-SN. This void is approximately 10-ft wide and extends 10-ft deep. Additional timber piles were discovered behind this void.

North Steel Bulkhead

The north steel bulkhead of Pier 1 is in **Satisfactory** condition with minor deterioration (**Photo 48**). The defects of this steel sheet pile bulkhead are limited to typical minor corrosion and coating loss. See **TABLE 6** for a summary of the ultrasonic thickness readings.

TABLE 6: SUMMARY OF ULTRASONIC THICKNESS MEASUREMENTS ON NORTH BULKHEAD

Depth	Thickness (in.)	
	Flange	Web
Waterline	0.378-0.380	0.405-0.430
Mudline	0.200-0.350	0.305

South Steel Bulkhead

The south steel bulkhead of Pier 1 is in **Good** condition with isolated locations of minor coating loss (**Photo 49**). See **TABLE 7** for a summary of the ultrasonic thickness readings.

TABLE 7: SUMMARY OF ULTRASONIC THICKNESS MEASUREMENTS ON SOUTH BULKHEAD

Depth	Thickness (in.)		
	Outer	Web	Inner
Waterline	0.370-0.375	0.365-0.375	0.370-0.375
Middle	0.370-0.375	0.350-0.370	0.370-0.375
Mudline	0.365-0.375	0.360-0.375	0.370-0.375

North Return Wall

The north return wall along Pier 1 is in **Good** condition with isolated locations of minor deterioration (**Photo 50**). The defects of this H-pile and concrete panel wall are limited to minor coating loss and areas of corrosion of the H-piles.

South Return Wall

The south return wall along Pier 1 is in **Good** condition with isolated locations of minor deterioration (**Photo 51**). The defects of this H-pile and steel sheet pile wall are limited to minor coating loss and areas of corrosion.

4. Conclusions and Recommendations

Based on the partial inspection of the structure, Pier 1 is in **Fair** condition overall due to isolated areas of advanced deterioration on the timber piles and widespread advanced deterioration of the topside and underdeck surfaces of the concrete deck, primarily along the pier's perimeter. The other primary structural elements, such as the timber piles, timber bulkhead, concrete pile caps and concrete beams typically exhibit minor to moderate deterioration with isolated areas of severe deterioration.

4.1. Repair Recommendations

Timber Piles

The timber piles are overall in **Fair** condition with less than 4-percent (82) of the 2,144 timber piles inspected are observed to have major/severe deterioration. Since only 22-percent of the timber piles were inspected, if the number of major/severe timber piles is factored proportionally as if the entire pier was inspected, this would result in a possible 369 locations with major/severe deterioration. Based on an average mudline depth of EL. -18.0' (using bathymetric data surveyed in January and February of 2017), an exposed height of timber pile above MLW of 9-ft, and accounting for 2-ft of additional pile to be encased below the mudline, the total timber pile repair length was assumed to be 29-ft long. Repairing 369 timber piles that are 29-ft long with structural concrete encasements would cost approximately $13 million based on a unit price of $1,200/lf of concrete encasement (**FIGURE 4-1**). Due to the large expenditure in cost for the timber pile repairs, additional inspection and structural analysis is recommended to determine the number of piles that need to be preserved and then a review of the deteriorated pile locations to determine if the piles require repair. It should be noted that an engineering evaluation of Pier 1 performed by Sidney M. Johnson & Associates in 1989 determined that only one-half of the interior piles and one-third of the exterior apron piles (or 45-percent of the total) warranted repair in order to maintain a uniform live load capacity of 300-psf.

Long-term, it is highly likely that whichever piles are designated to be preserved during the structural analysis and review of deteriorated pile locations, that approximately 45-percent of the timber piles (4,340) will require the structural concrete encasements over the course of the next 20-years. During the inspection, approximately 15-percent of the piles (or 324) had a failed or loose pile wrap. Proportioning this value for a full inspection of the pier it is possible that 1,090 piles have failed or loose pile wraps. In the next 5-years, it is likely that the majority of these timber piles will exhibit major/severe deterioration due to marine borer infestation. Although a trend in pile wrap failure has not been determined, it is anticipated that the rate of failure will increase with age and it is not unreasonable to assume that another 1,090 pile wraps will be compromised in 5 to 10-years and more than double that in 10 to 20-years. Repairing the estimated total of 4,340 piles over the course of 20-years will cost approximately $151 million.

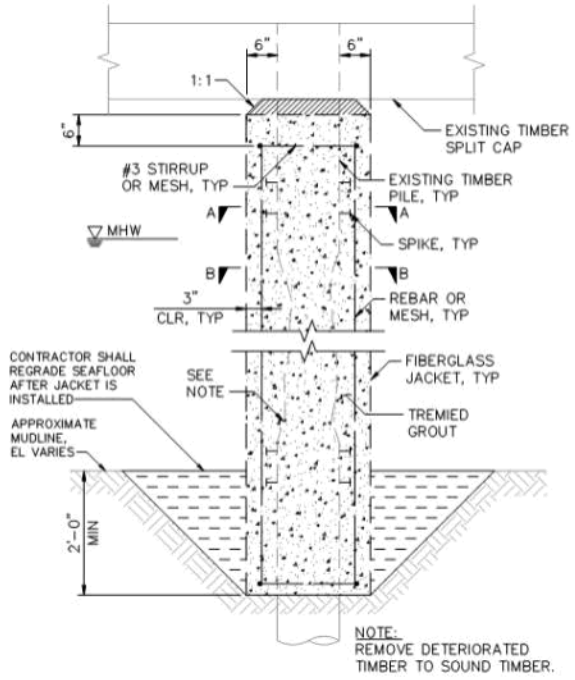


FIGURE 4-1: TIMBER PILE ENCASEMENT

TABLE 8 summarizes the cost of timber pile encasements for the current number of piles with major/severe deterioration and the total number of piles expected to have major/severe deterioration in 20-years.

TABLE 8: OPINION OF PROBABLE COST FOR TIMBER PILE REPAIRS

Description	Quantity	Unit Cost	Total Cost
Timber pile encasement (current condition)	10,701-lf total (or 369 timber piles by 29-ft long)	$1,200/ft	$13 million
Timber pile encasement (20-years)	125,860-lf total (or 4,340 timber piles by 29-ft long)	$1,200/ft	$151 million

Concrete Pile Caps, Beams, and Deck (including Topside)

The fractured concrete deck due to the RoRo vessel ramp impact located between Bents 28.5 and 31 should be repaired on an immediate basis. The anticipated scope of repairs includes a full depth concrete deck repair for the 25-ft long by 12-ft wide area of fracture deck and additional areas of spalling and cracking of the concrete beams, pile caps and fascia within the same vicinity.

The topside surface of the concrete deck has widespread areas of major/severe deterioration. Along almost the entirety of the pier's north face, there is widespread longitudinal cracking found between the pier's edge and the northernmost crane rail slots, which is presumed to be attributed to vessel berthing directly against the concrete edge beam and transferring the

lateral load to the thin deck section (**FIGURE 4-2**). Any repair of the deck along the north face should incorporate transverse beams behind the energy absorbing fenders in order to provide a strut between the concrete edge beam and crane rail beams. On the southern face, there is noticeably less longitudinal cracking which is likely because the large RoRo vessels do not use the south berth. Below deck on the concrete pile caps, beams, and underdeck, major/severe deterioration is also more commonly observed along the pier's perimeter.

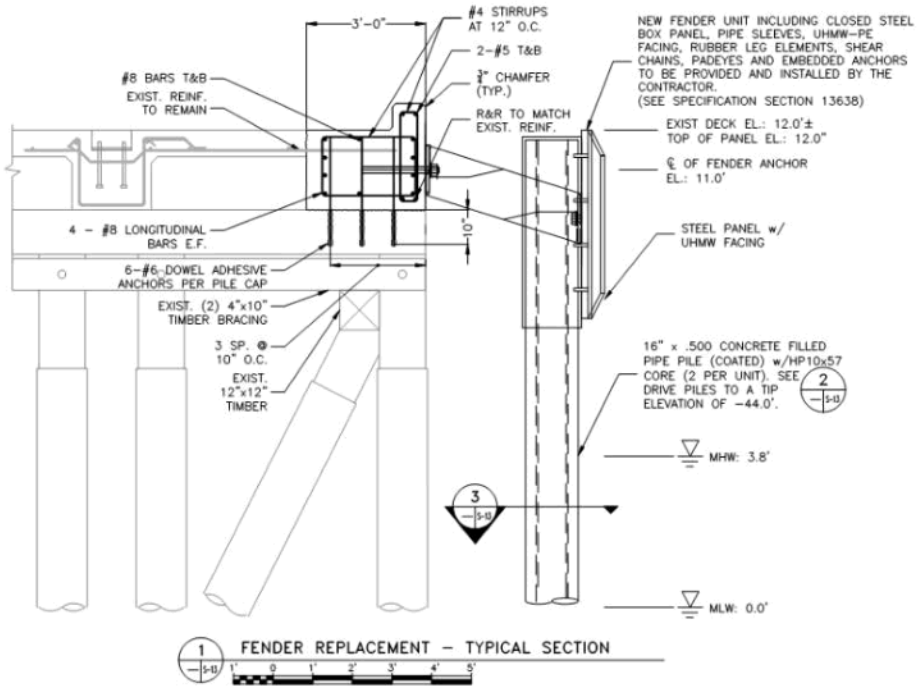


FIGURE 4-2: NORTH FACE SECTION

Based on the level of deterioration found on both the topside and underdeck along the perimeter of the north side of the pier, full depth deck replacement should be performed on a priority basis (i.e. in the next 3-years). At a minimum, the outer 12.5-ft, which correlates to the northernmost set of crane rail beams should be repaired but it is possible that the repair may need to extend 40-ft (**FIGURE 4-3**), which would include both sets of crane rail beams and the decking to the next longitudinal beam. The east face is in similar condition to the north face, whereas the south face is in better condition and can repaired in 5 to 10 years. In order to determine the width and depth of damage, additional ultrasonic and ground penetrating radar surveys of the entire 40-ft wide perimeter of Pier 1 is recommended. The results of this survey will provide the means to determine the proper width of repair (i.e. 12.5-ft versus 40-ft) in addition to which areas of the decking should be repaired first. It should be noted that although the deck replacement along the north face is recommended to be performed within the next 3-years, it is also understood that large-scale repairs of the structure will be difficult due to the Port's need for two operational RoRo berths. If repairs to the concrete deck along the north berth at Pier 1 need to be delayed, periodic inspections are recommended to ensure its structural integrity.

TABLE 9 provides a summary of costs for replacing 12.5-ft and 40-ft width sections of the concrete deck and beams. The 12.5-ft wide and 40-ft wide deck replacement repairs around the north, east and south faces of the pier will cost approximately $9 million to $29 million, respectively.

TABLE 9: OPINION OF PROBABLE COST FOR REPAIR OF CONCRETE DECK

Description	Quantity	Unit Cost	Total Cost
12.5 ft Wide Deck Replacement	33,125-sf (or 2,650-ft by 12.5-ft)	$270/ft	$9 million
40 ft Wide Deck Replacement	106,000-sf (or 2,650-ft by 40-ft)	$270/ft	$29 million

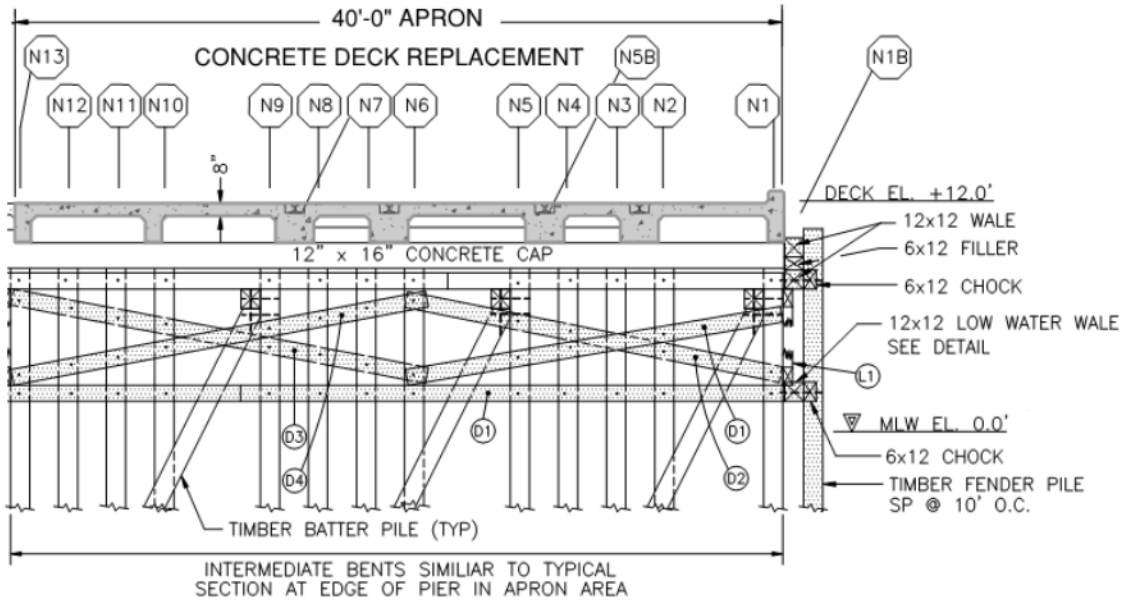


FIGURE 4-3: CONCRETE DECK REPLACEMENT SECTION

Mooring Hardware

The mooring hardware typically exhibits minor to moderate cracking, corrosion, and pitting. A total of 12 bollards were rated Moderate and one (1) rated Major due to the same defects. There were two (2) cleats rated Major and one (1) rated Severe, where cleat C-36 was found to exhibit a broken ear. It is recommended that the broken cleat be replaced and all Moderate to Major mooring hardware be recoated and repaired on a priority basis. It is recommended that all mooring hardware rated as Minor be repaired on a routine basis. Refer to Figure C-1 in Appendix C for a full breakdown of the mooring hardware ratings.

Fender System

The timber fender system typically exhibits minor to moderate defects such as waterline decay, shakes, splintering, and general weathering. Severe defects include significant shakes or splintering, and 14 broken piles. The leg fenders typically exhibit tears or dislodged rubber elements, coating loss, and corrosion. The pneumatic fenders typically exhibit minor coating loss and corrosion of the steel piles.

Because the leg fender system is the primary defense against impact damage from the large RoRo vessels, it is recommended to repair the tears and dislodged rubber elements on a priority basis. Additionally, it is recommended to repair the 11 broken timber fender piles on a priority basis. It is recommended to repair the minor defects of the timber fenders and the pneumatic fenders on a routine basis. Refer to Figure C-2 in Appendix C for a full breakdown of the leg fender ratings.

Timber Bulkhead

The timber bulkhead typically exhibits minor to moderate decay and voids. Severe defects include severe section loss of the bottom wale and a large 10-ft wide void in the timber sheeting. It is recommended to repair the severe deterioration found in the timber bulkhead on a priority basis. If repairs to the bulkhead are to be delayed, periodic inspections are recommended to ensure its structural integrity.

Steel Bulkheads and Return Walls

The north steel bulkhead of Pier 1 typically exhibits minor corrosion and coating loss. The south steel bulkhead typically exhibits minor coating loss. It is recommended to repair the minor deterioration on a routine basis.

The north and south return walls typically exhibit minor corrosion and coating loss. It is recommended that the minor corrosion and coating loss be maintained on a routine basis.

Future Inspection

In addition to the listed repairs, it is recommended that a structural inspection be performed within the next four (4) years, in accordance with ASCE guidelines. ASCE advises that a concrete structure in an aggressive environment (i.e., saltwater with moderate to swift currents) with a condition rating of Fair be inspected on a routine basis every four (4) years.

4.2. Capital Improvement Scenarios

Based on the inspection findings and the conclusions drawn in the above sections, two capital improvement scenarios are recommended. Beyond the typical maintenance required to keep the pier operational, based on its age and general condition, additional capital improvements will be required if the structure is to remain in a state-of-good repair over the course of the next 30-years. Two capital improvement scenarios including (1) a repair of the existing structure and (2) a replacement of the pier, are discussed below.

Scenario 1: Repair of Existing Structure

The first capital improvement scenario considers extending the service life of the existing structure for another 30-years. This scenario focuses on the two areas of the pier that will require the largest capital expenditure – replacing the perimeter of the pier deck within the next two (2) to ten (10) years and rehabilitation of the timber pile over the next 10 to 20-years. The deck repair is a systematic replacement of the outer 40-ft of concrete deck along the perimeter of the pier, which will include replacement of the concrete edge beam, the four concrete beams supporting the former slots for the crane rails, and the mooring hardware. The estimated cost for replacing the 40-ft wide perimeter of the north, east and south faces is $29 million. The timber pile rehabilitation, which will consist of structurally reinforcing 45-percent of the timber piles (4,340) with concrete encasements (average pile repair length of 29-ft), is estimated to cost $151 million. The total estimated cost for the partial deck replacement and timber pile rehabilitation is $180 million. It should be noted that this scenario only considers the two primary areas of concern and does not capture the full lifecycle costs for maintaining the pier over the next 30-years. Additional routine maintenance such as patching spalls and cracks on other concrete elements, isolated repairs to the timber and steel bulkheads, and damaged fender elements will still be warranted.

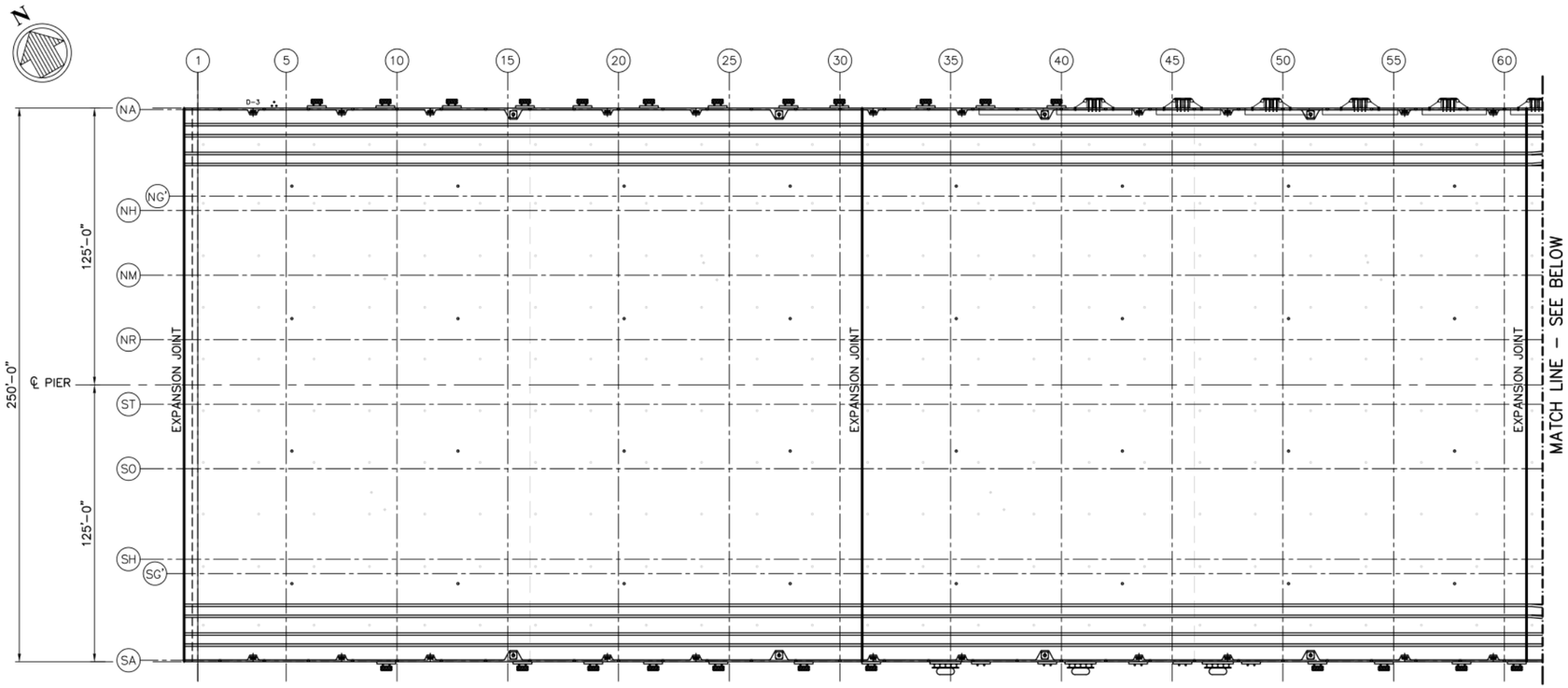
Scenario 2: Pier Replacement

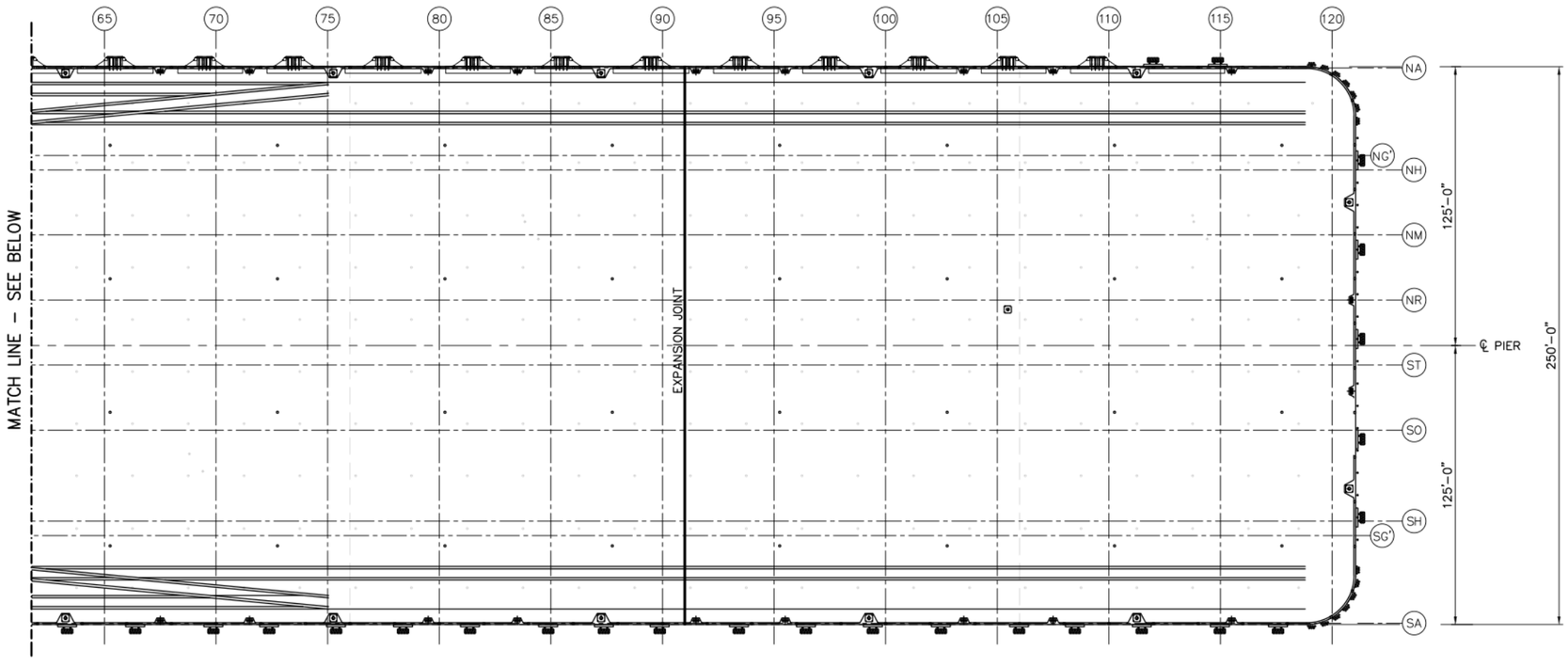
The second capital improvement scenario considers replacing Pier 1 with a new steel pile-supported concrete platform similar to the Pier 2 Extension that is currently under construction. The replacement to Pier 1 would be designed for the same uniform live load, lateral loads, and design dredge depth as the Pier 2 Extension and provide a design life of 50-years. Based on the September 2018 contract award price for the construction of QDC's Pier 2 Extension of $380/sf and including a unit cost of $40/sf for demolition costs, the estimated total cost to demolish and construct the replacement pier is $126 million.

Long-Term Recommendation

In order to extend the service life of Pier 1, at a minimum, a comprehensive rehabilitation of the perimeter areas of the concrete deck and 45-percent of the timber piles will be required over the next 20-years. These improvements are estimated to cost $180 million. Beyond these improvements, additional maintenance repairs to the interior sections of the concrete deck, fender system, and bulkhead will also be necessary. In comparison, a replacement of Pier 1 is estimated to cost $126 million, nearly 30-percent less than the repair scenario. It should also be noted that all the repairs to the existing pier will likely last 20 to 30-years whereas a new structure will provide a design life of 50-years or more. Based on this preliminary evaluation, it is recommended that the structure be replaced rather than repaired. Depending on the amount of available funding, replacement of the structure can likely be phased as operations and the condition of the existing pier permits.

Appendix A – Figures





30' 0 30' 60'
SCALE: 1"=30'

1 2 3 4 5

A B C D

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SEAL

NO.	REVISION	DATE	APP.

DESIGN BY: DSGN	CHECKED BY: CHKR
DRAWN BY: DRFT	ENGINEER: REVR
SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-1.DWG

APPROVED

EDWARD J. SPINARD, JR., P.E.
QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

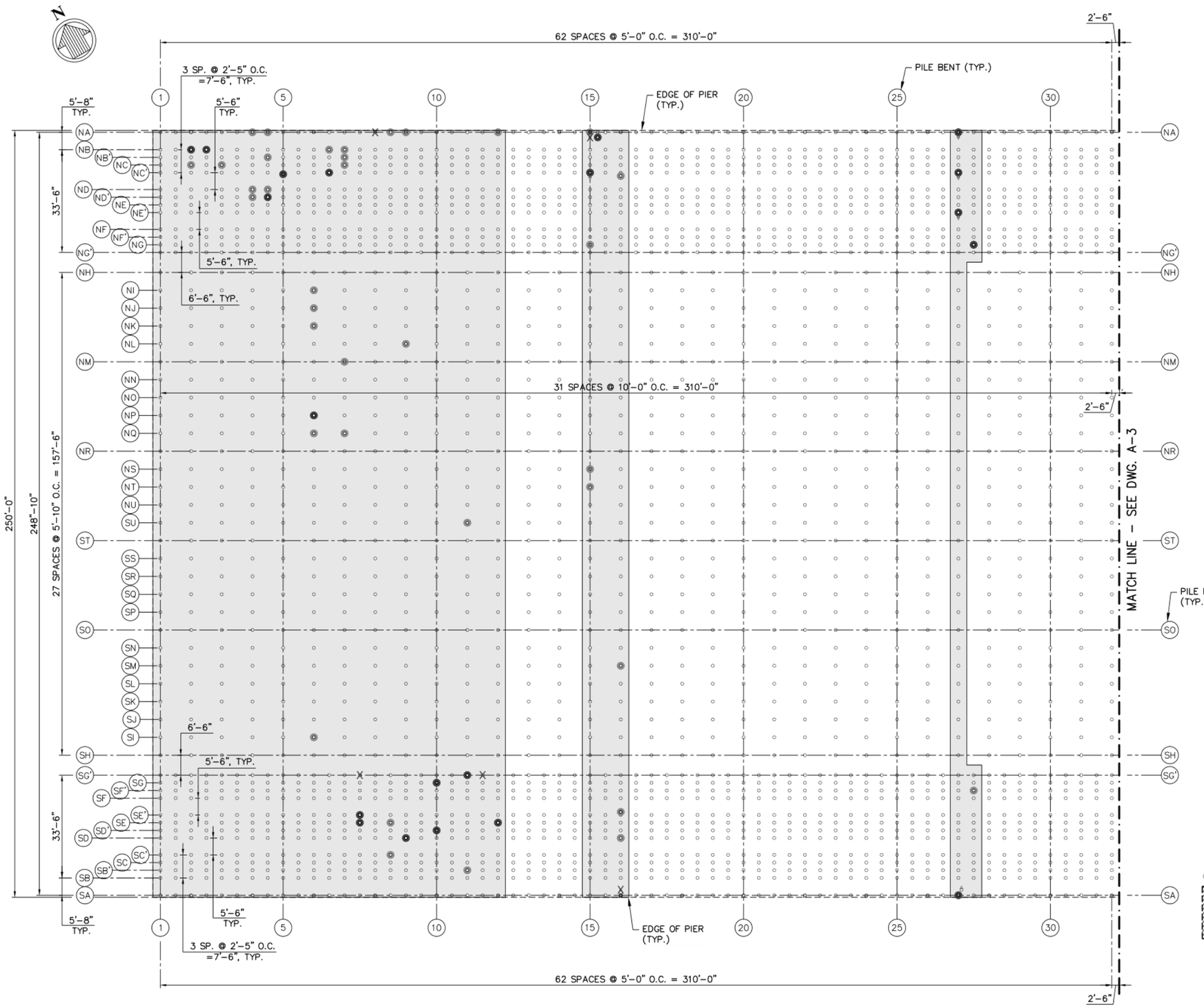
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PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

OVERALL PLAN

Quonset Business Park®

SHEET NO.	DRAWING NO.
A-1	



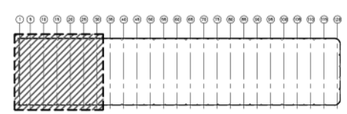
LEGEND

- ○ PILE
- ♀ BATTERED PILES

CONDITION RATING

- ● PILE RATED SEVERE/MAJOR
- ◎ PILE RATED MODERATE
- X BROKEN PILE OR MISSING PILE

INSPECTION AREA



KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

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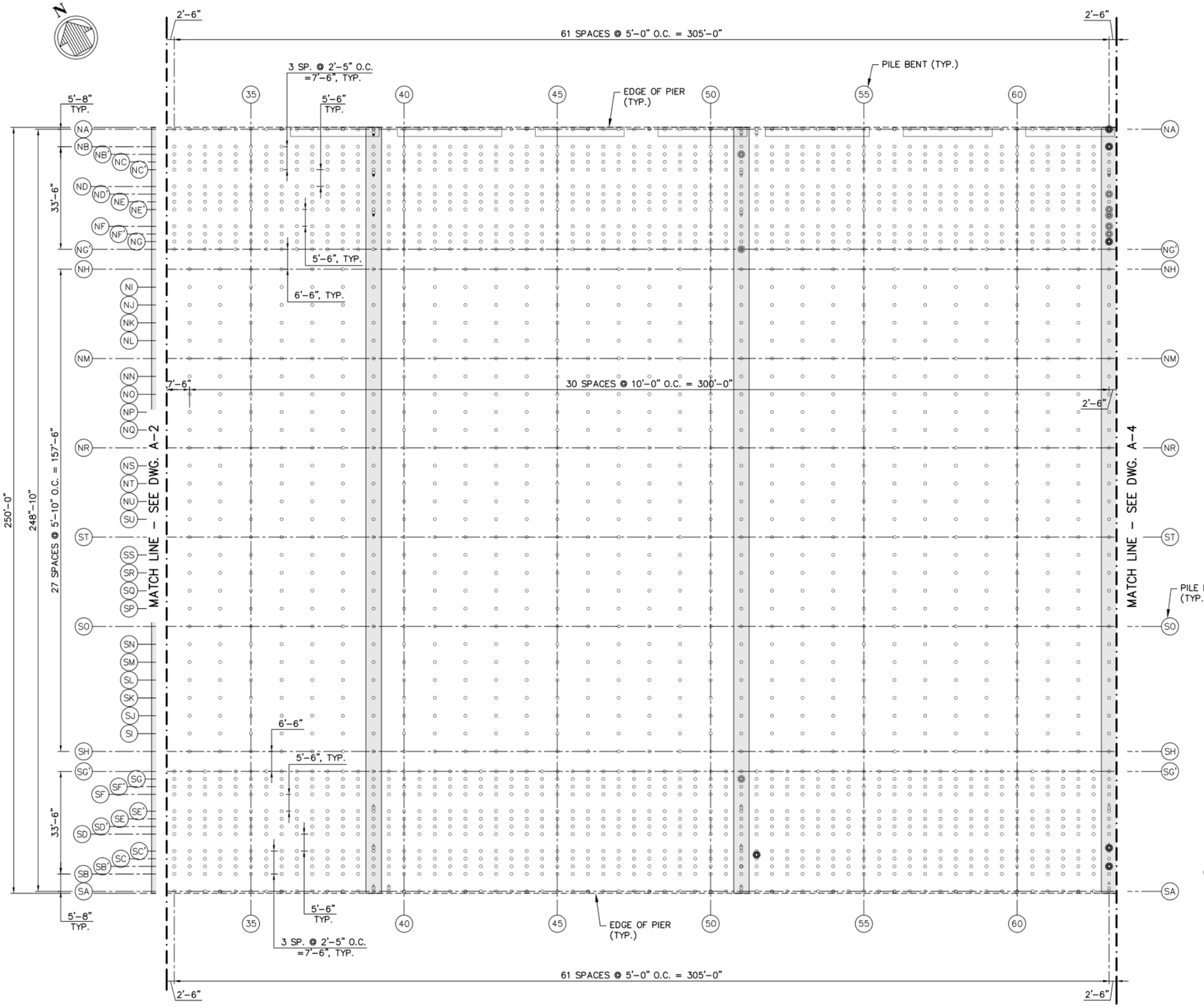
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NORTH KINGSTOWN, RHODE ISLAND

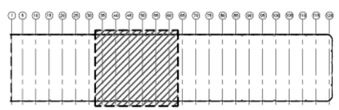
PILE CONDITION PLAN SHEET 1

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SHEET NO. **A-2**

DRAWING NO.





KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

LEGEND

- PILE
- BATTERED PILES

CONDITION RATING

- PILE RATED SEVERE/MAJOR
- PILE RATED MODERATE
- X BROKEN PILE OR MISSING PILE

INSPECTION AREA

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CONTRACT NO. 2018-004

FILE NAME: 995201-A-3.DWG

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QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

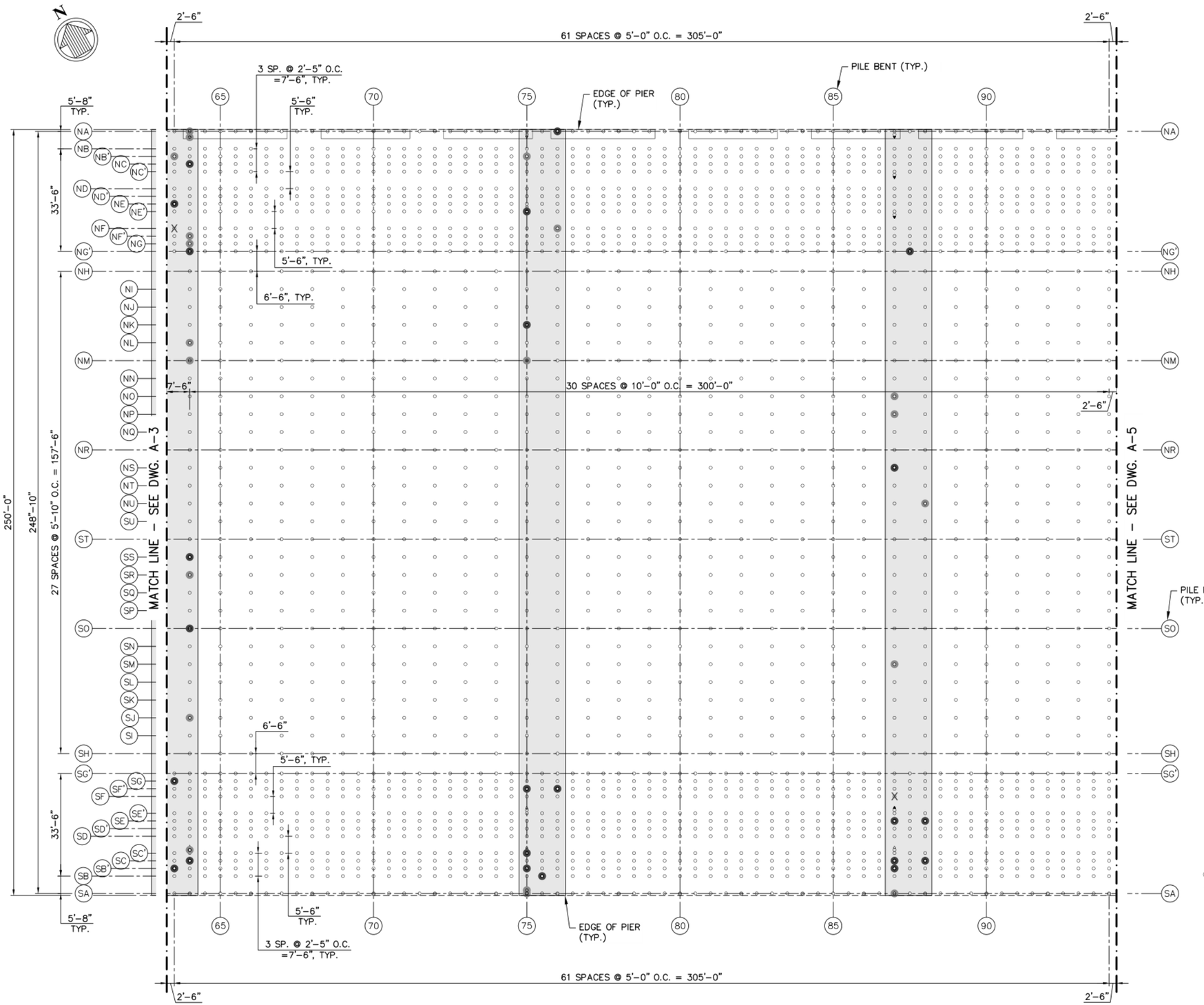
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PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

PILE CONDITION PLAN SHEET 2

Quonset Business Park®

SHEET NO.	DRAWING NO.
A-3	



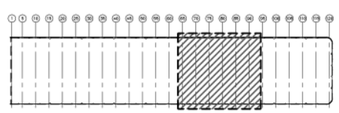
LEGEND

- ○ PILE
- ♀ BATTERED PILES

CONDITION RATING

- ● PILE RATED SEVERE/MAJOR
- ◎ PILE RATED MODERATE
- X BROKEN PILE OR MISSING PILE

INSPECTION AREA



KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

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NO.	REVISION	DATE	APP.

DESIGN BY: DSGN	CHECKED BY: CHKR
DRAWN BY: DRFT	ENGINEER: REVR
SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-4.DWG

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EDWARD J. SPINARD, JR., P.E.
QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

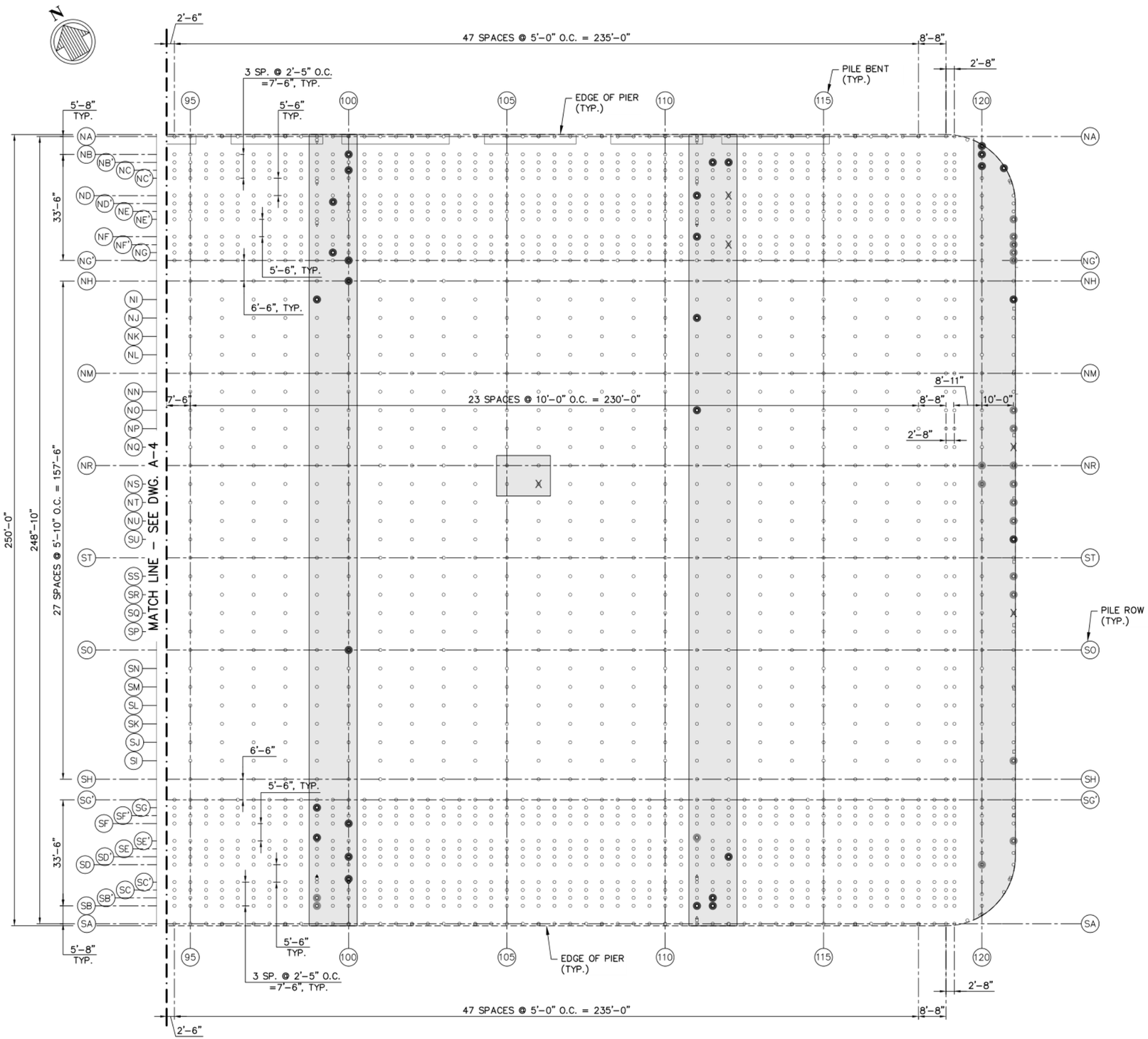
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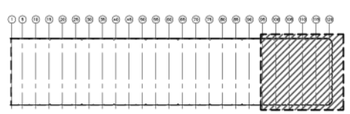
PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

PILE CONDITION PLAN SHEET 3

Quonset Business Park®

SHEET NO.	DRAWING NO.
A-4	





KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

LEGEND

- ○ PILE
- ♀ BATTERED PILES

CONDITION RATING
- ● PILE RATED SEVERE/MAJOR
- ◎ PILE RATED MODERATE
- X BROKEN PILE OR MISSING PILE

INSPECTION AREA

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DRAWN BY: DRFT	ENGINEER: REVR
SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-5.DWG

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QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

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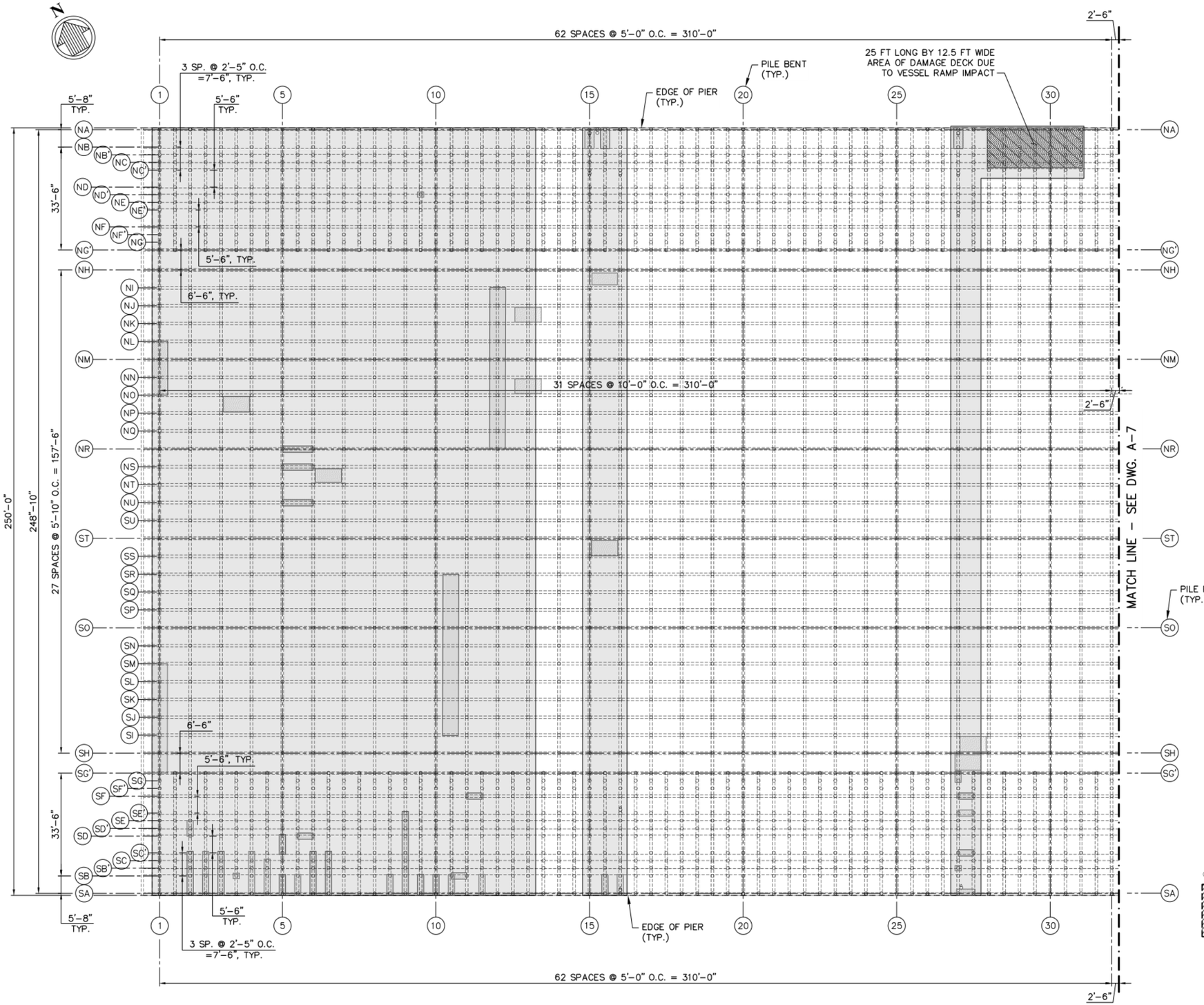
PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

PILE CONDITION PLAN SHEET 4

Quonset Business Park®

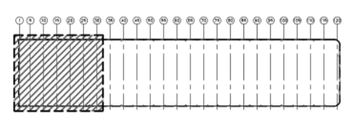
SHEET NO. **A-5**

DRAWING NO.



LEGEND

- PILE
- BATTERED PILES
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- AREA OF MAJOR/SEVERE DETERIORATION
- AREA OF MODERATE DETERIORATION
- INSPECTION AREA



KEY PLAN
SCALE: N.T.S.

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SCALE: 1"=16'

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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-6.DWG

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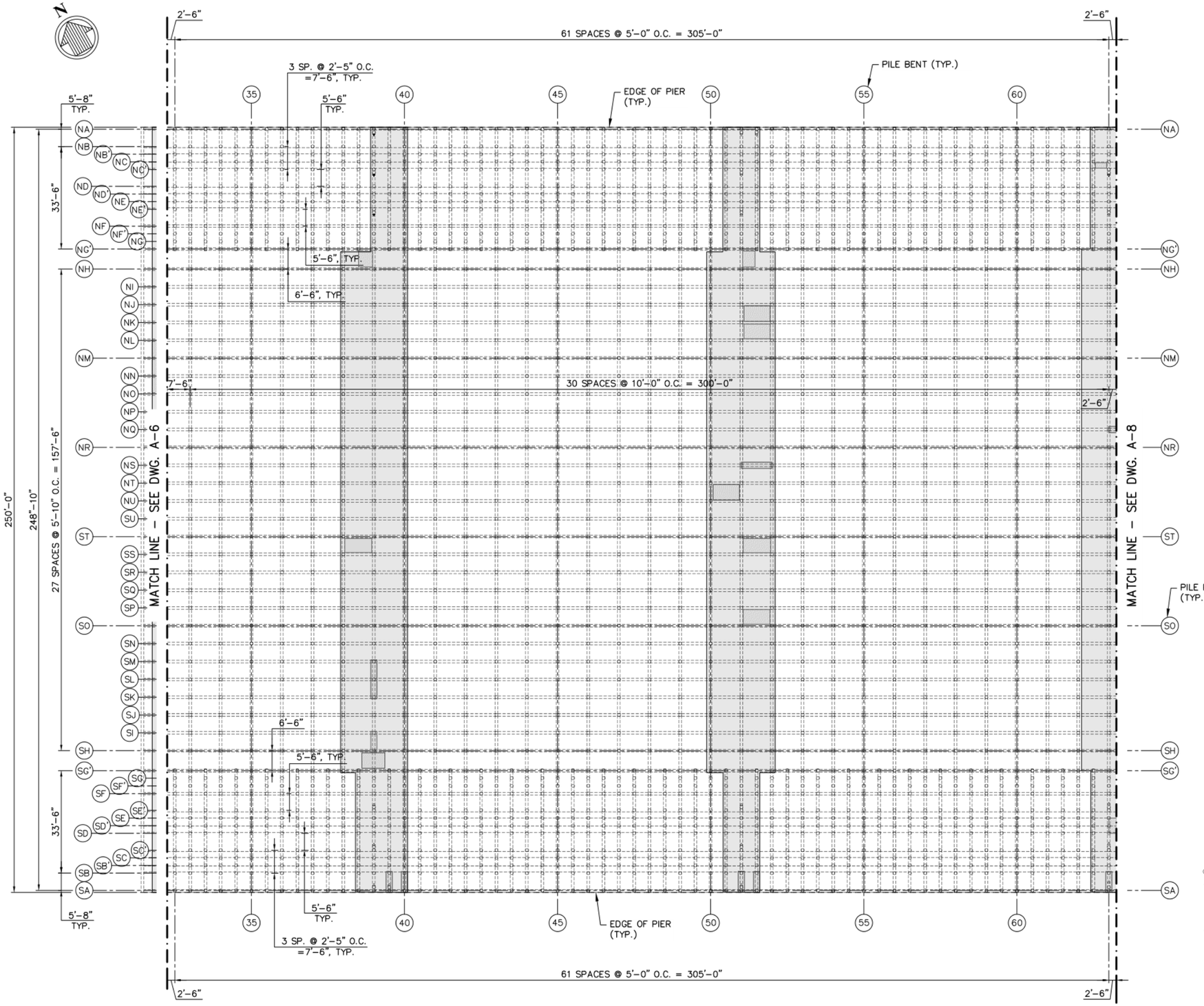
PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

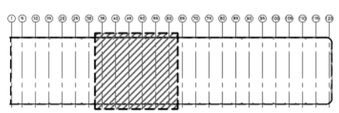
UNDERDECK CONDITION PLAN SHEET 1

Quonset Business Park®

SHEET NO. **A-6**

DRAWING NO.





KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

LEGEND

- PILE
- BATTERED PILES
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- AREA OF MAJOR/SEVERE DETERIORATION
- AREA OF MODERATE DETERIORATION
- INSPECTION AREA

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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-7.DWG

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DATE DATE

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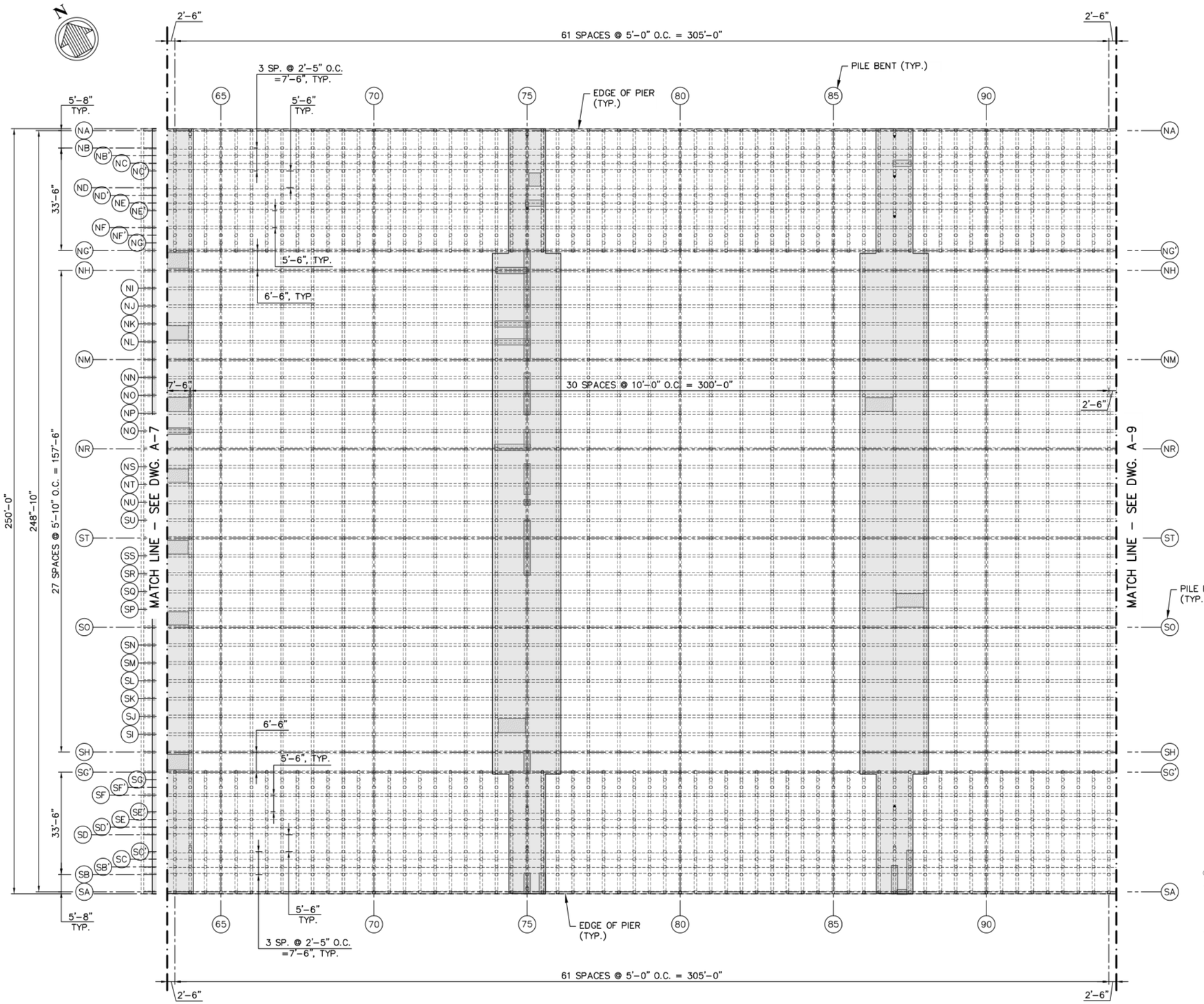
PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

UNDERDECK CONDITION PLAN SHEET 2

Quonset Business Park

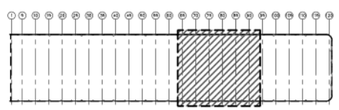
SHEET NO. **A-7**

DRAWING NO.



LEGEND

- PILE
- BATTERED PILES
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- AREA OF MAJOR/SEVERE DETERIORATION
- AREA OF MODERATE DETERIORATION
- INSPECTION AREA



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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-8.DWG

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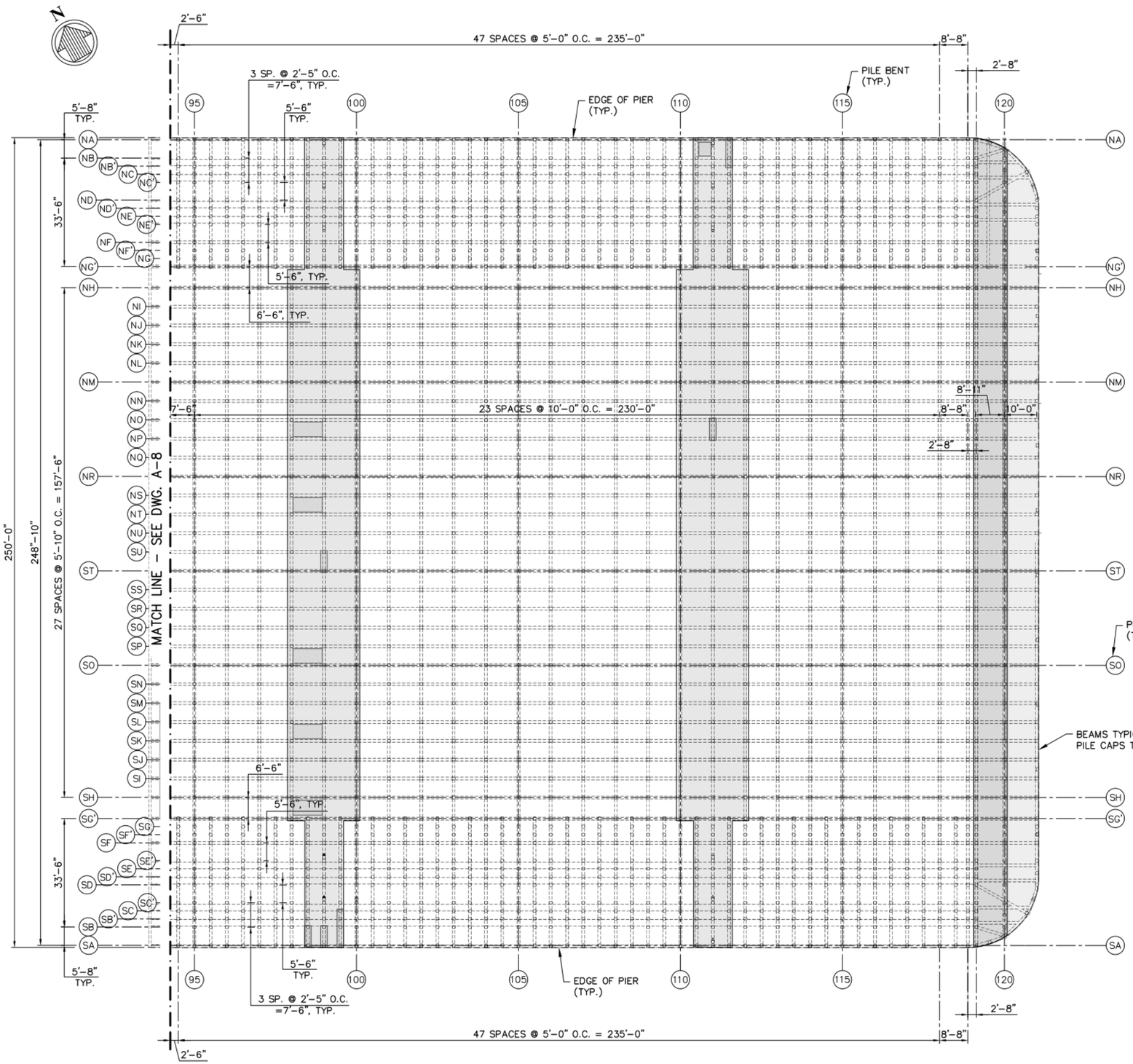
PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

UNDERDECK CONDITION PLAN SHEET 3

Quonset Business Park

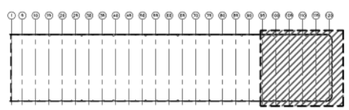
SHEET NO. **A-8**

DRAWING NO.



LEGEND

- PILE
- BATTERED PILES
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- AREA OF MAJOR/SEVERE DETERIORATION
- AREA OF MODERATE DETERIORATION
- INSPECTION AREA



KEY PLAN
SCALE: N.T.S.

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SCALE: 1"=16'

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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-9.DWG

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QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

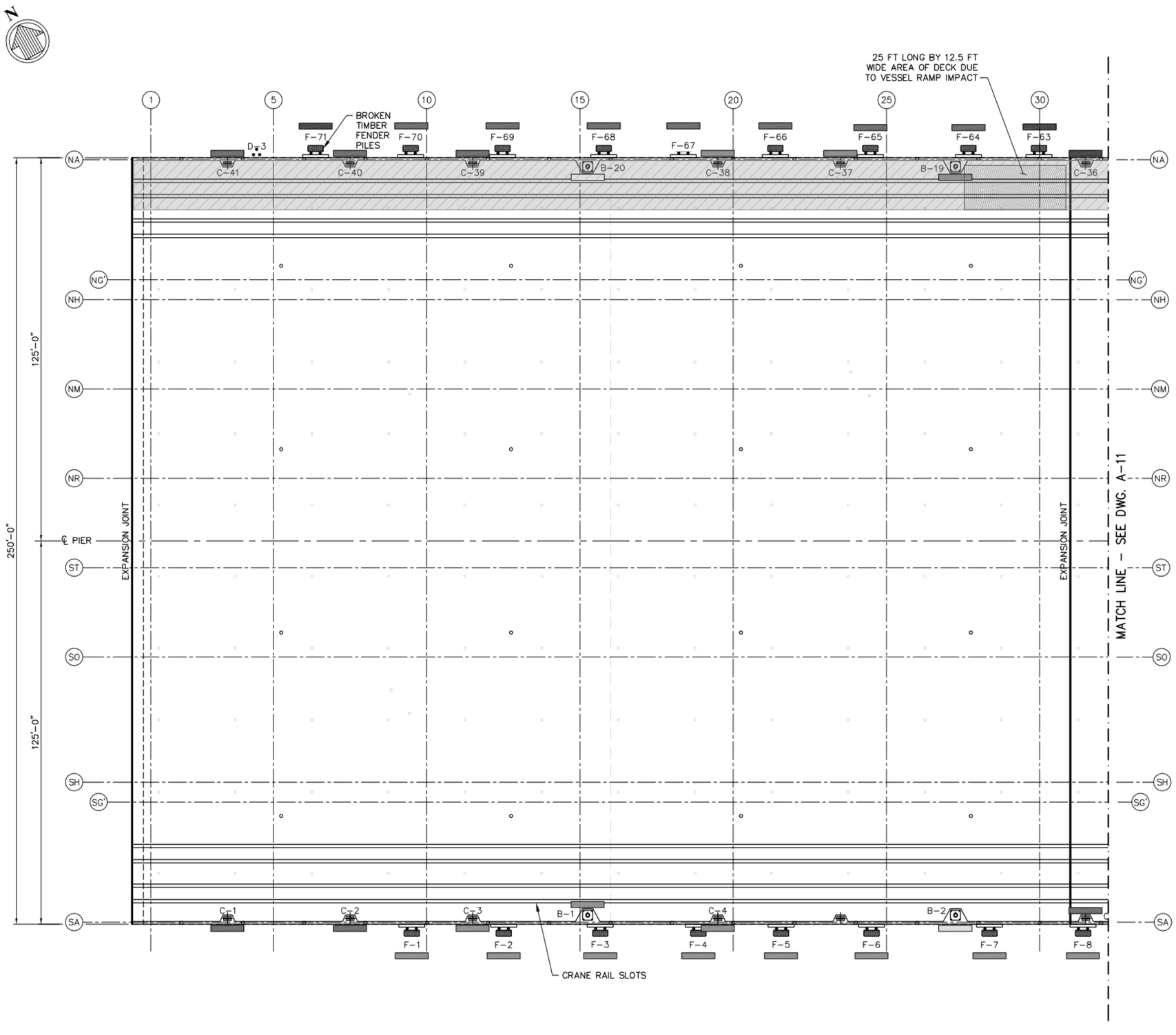
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PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

UNDERDECK CONDITION PLAN SHEET 4

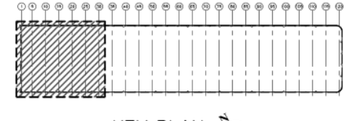
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SHEET NO.	DRAWING NO.
A-9	



LEGEND

- PILE
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- MAJOR/MODERATE DETERIORATION RECOMMENDED FOR ADDITIONAL INVESTIGATION
- HARDWARE/FENDER SEVERE CONDITION
- HARDWARE/FENDER MAJOR CONDITION
- HARDWARE/FENDER MODERATE CONDITION
- HARDWARE/FENDER MINOR CONDITION
- NO DEFECTS



KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

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DESIGN BY: DSGN	CHECKED BY: CHKR
DRAWN BY: DRFT	ENGINEER: REVR
SCALE: REVNO	PROJECT NO. 9952
CONTRACT NO. 2018-004	
FILE NAME: 995201-A-10.DWG	

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QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

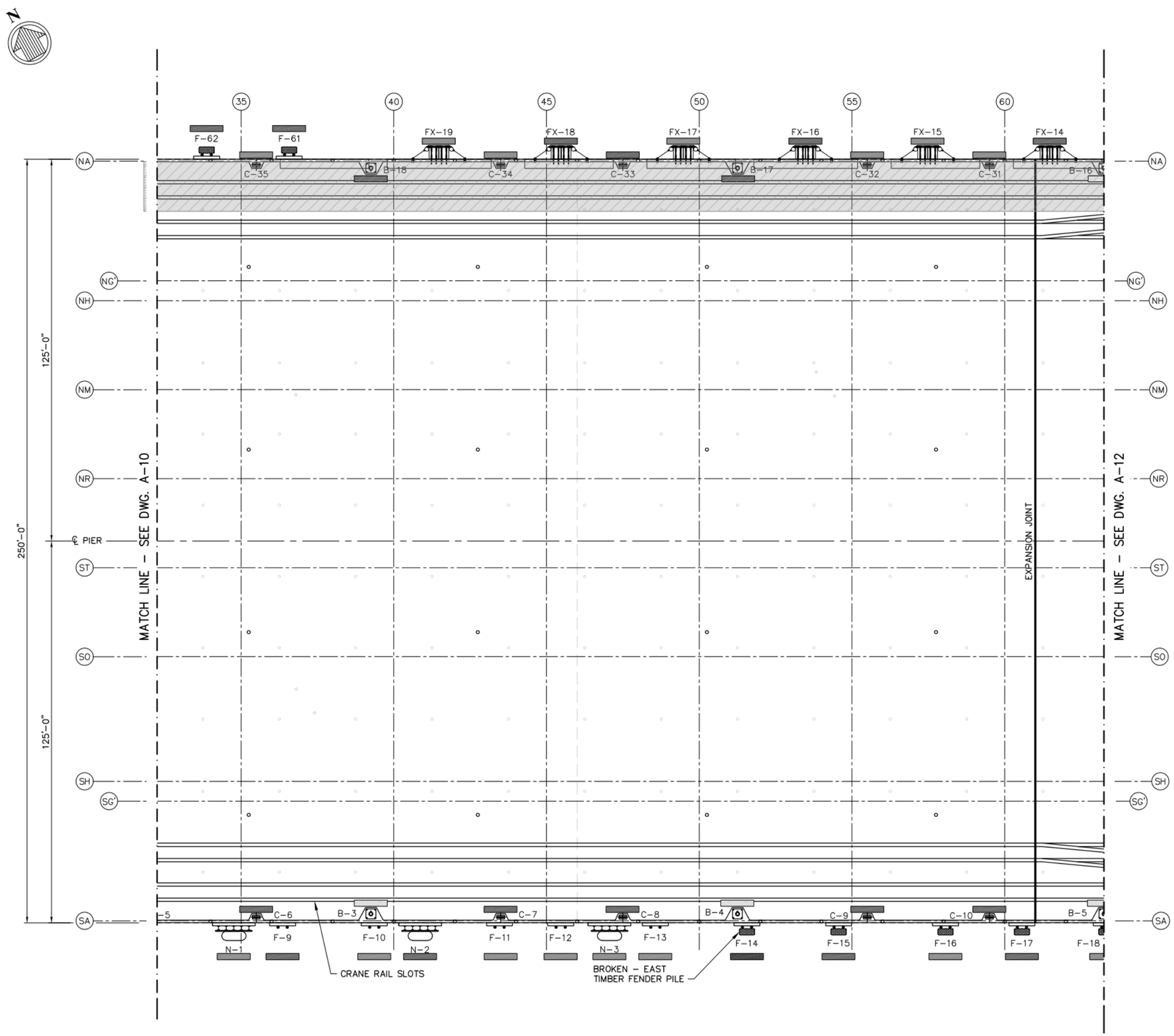
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PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

TOPSIDE CONDITION PLAN SHEET 1

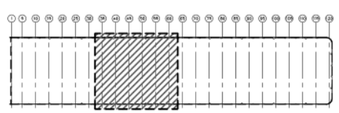
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SHEET NO.	DRAWING NO.
A-10	



LEGEND

- PILE
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- MAJOR/MODERATE DETERIORATION RECOMMENDED FOR ADDITIONAL INVESTIGATION
- HARDWARE/FENDER SEVERE CONDITION
- HARDWARE/FENDER MAJOR CONDITION
- HARDWARE/FENDER MODERATE CONDITION
- HARDWARE/FENDER MINOR CONDITION
- NO DEFECTS



KEY PLAN
SCALE: N.T.S.

16' 0 16' 32'
SCALE: 1"=16'

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CONTRACT NO. 2018-004

FILE NAME: 995201-A-11.DWG

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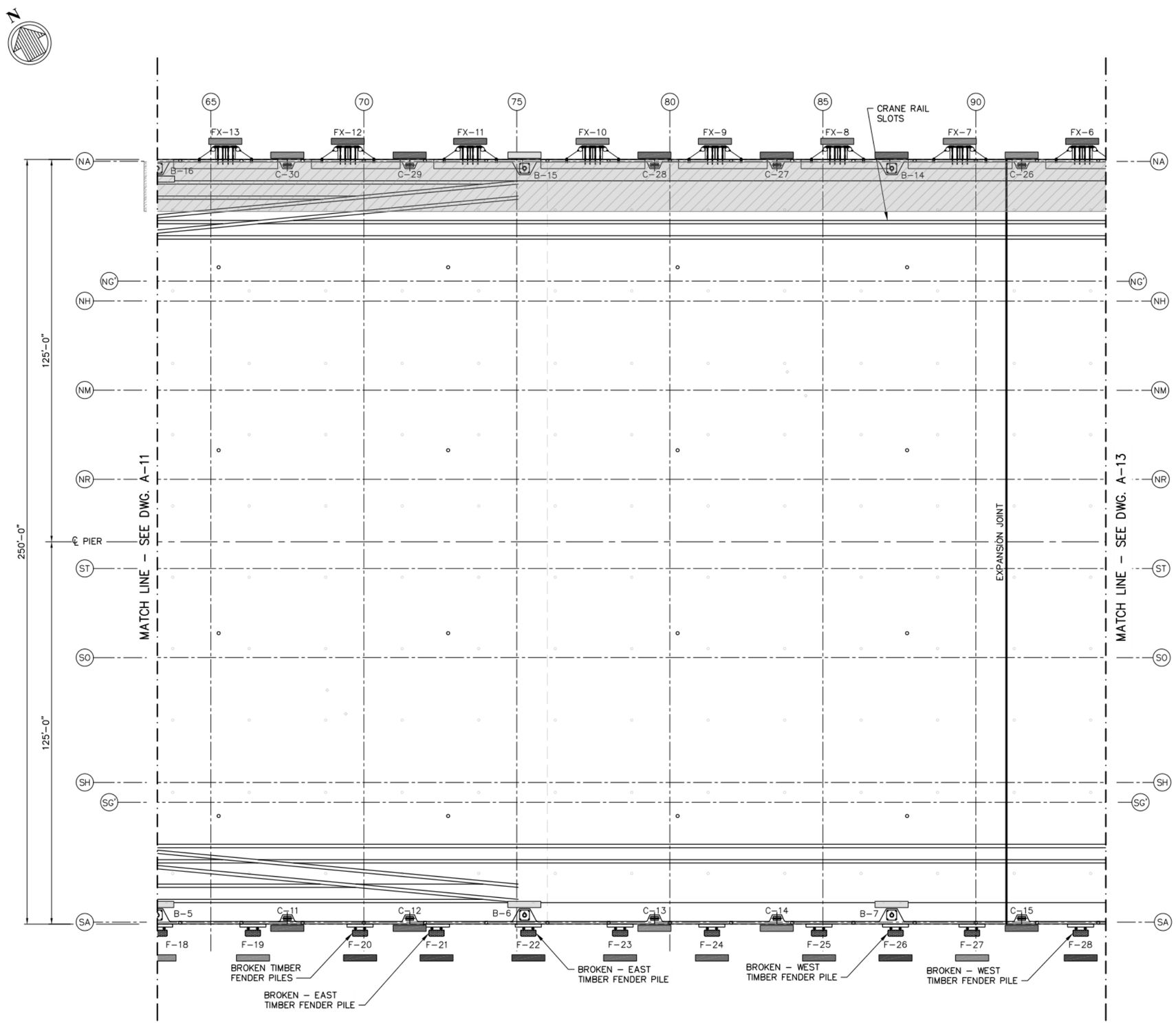
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PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

TOPSIDE CONDITION PLAN SHEET 2

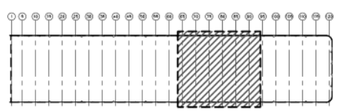
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SHEET NO.	DRAWING NO.
A-11	



LEGEND

- PILE
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- MAJOR/MODERATE DETERIORATION RECOMMENDED FOR ADDITIONAL INVESTIGATION
- HARDWARE/FENDER SEVERE CONDITION
- HARDWARE/FENDER MAJOR CONDITION
- HARDWARE/FENDER MODERATE CONDITION
- HARDWARE/FENDER MINOR CONDITION
- NO DEFECTS



KEY PLAN
SCALE: N.T.S.

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SCALE: 1"=16'

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CONTRACT NO. 2018-004

FILE NAME: 995201-A-12.DWG

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DATE DATE

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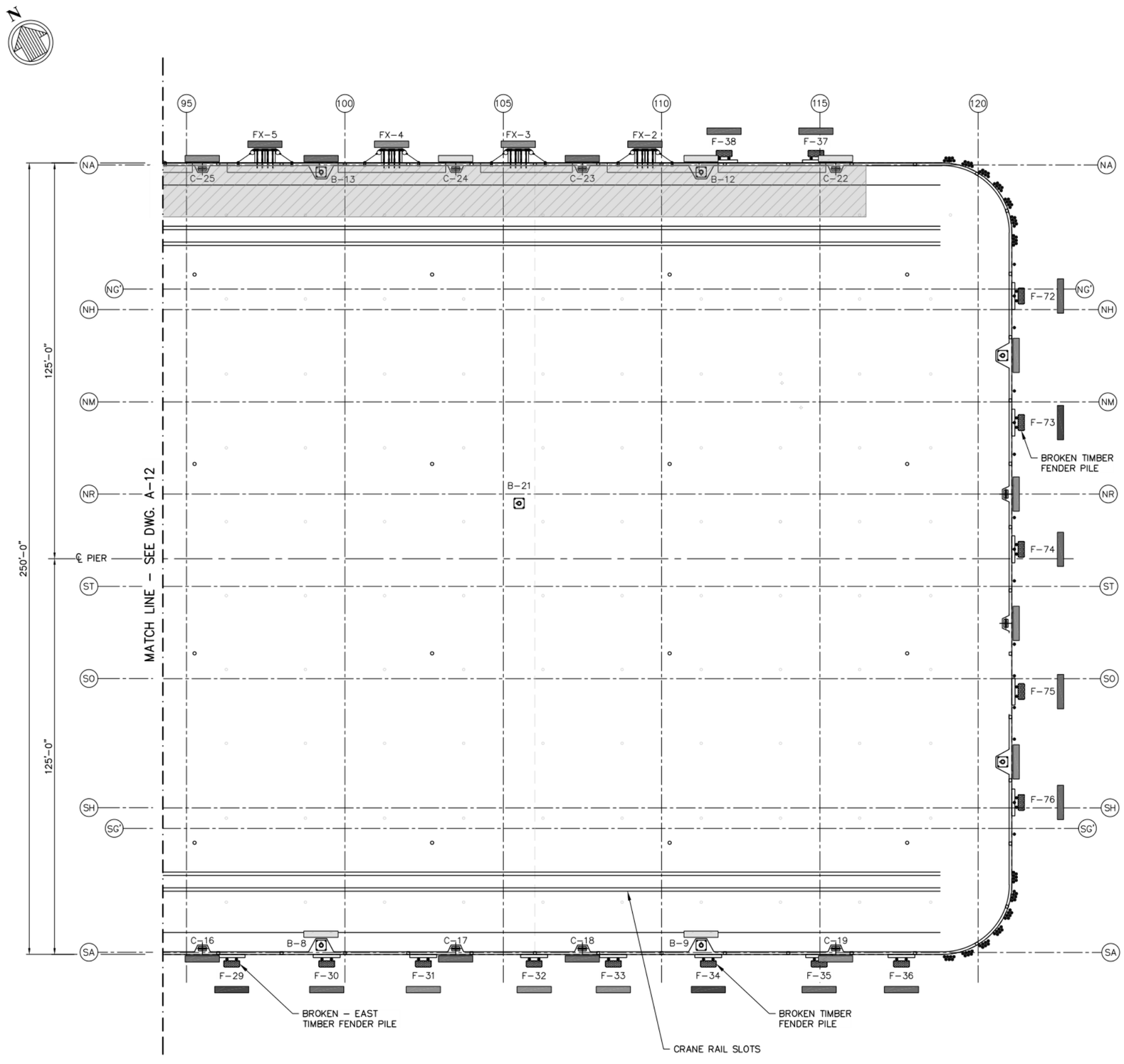
PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

TOPSIDE CONDITION PLAN SHEET 3

Quonset Business Park®

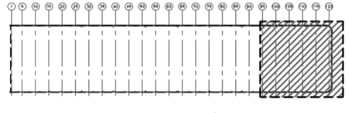
SHEET NO. **A-12**

DRAWING NO.



LEGEND

- PILE
- SEVERE DETERIORATION, RECOMMENDED FOR IMMEDIATE REPAIR
- MAJOR/MODERATE DETERIORATION RECOMMENDED FOR ADDITIONAL INVESTIGATION
- HARDWARE/FENDER SEVERE CONDITION
- HARDWARE/FENDER MAJOR CONDITION
- HARDWARE/FENDER MODERATE CONDITION
- HARDWARE/FENDER MINOR CONDITION
- NO DEFECTS



KEY PLAN
SCALE: N.T.S.

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SCALE: 1"=16'

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SCALE: REVNO	PROJECT NO. 9952

CONTRACT NO. 2018-004

FILE NAME: 995201-A-13.DWG

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QDC DEVELOPMENT SERVICES DIRECTOR

DATE DATE

DRAWING TITLE

PIER 1 INFRASTRUCTURE IMPROVEMENTS
NORTH KINGSTOWN, RHODE ISLAND

TOPSIDE CONDITION PLAN SHEET 4

Quonset Business Park

SHEET NO. **A-13**

DRAWING NO.

Appendix B – Photographs



01_DSCN0637 COPY.JPG

PIER 1

Photo 1 Overall view of Pier 1, looking southeast



02_P9240074.JPG

PIER 1

Photo 2 View of typical pile layout for Pier 1, south side looking north



Photo 3 View of typical plastic wraps on north piles



Photo 4 View of black plastic wraps on north piles and white flexible wraps on south piles



05_VIEW OF PILE CAP_P9250241.JPG

PIER 1

Photo 5 Typical concrete pile cap



06_VIEW OF BEAMS EXTERIOR SECTION P9240003.JPG

PIER 1

Photo 6 Typical concrete beams in exterior section of Pier 1



07_DSCN0213 COPY.JPG

PIER 1

Photo 7 Topside view of Pier 1, looking east



08_BOLLARD.JPG

PIER 1

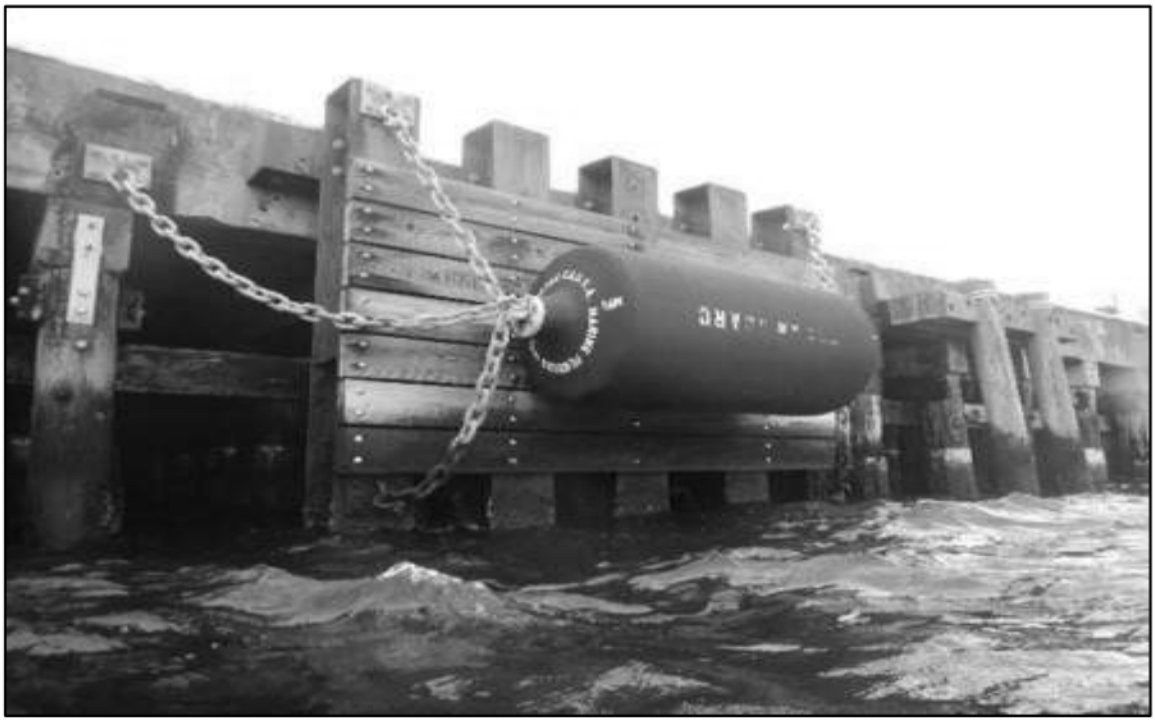
Photo 8 Typical bollard, north side of Pier 1



09_CLEAT.JPG

PIER 1

Photo 9 Typical cleat on Pier 1



10_PNEUMO.JPG

PIER 1

Photo 10 View of typical pneumatic fender on south side of Pier 1



11_TIMBER FENDER.JPG

PIER 1

Photo 11 View of typical timber fender on Pier 1



12_DSCN0368 COPY.JPG

PIER 1

Photo 12 View of the leg fenders on the north side of Pier 1, looking west



13_DSCN0019 COPY.JPG

PIER 1

Photo 13 Typical view of the timber bulkhead at the west end of Pier 1



14_DSCN0384 COPY.JPG

PIER 1

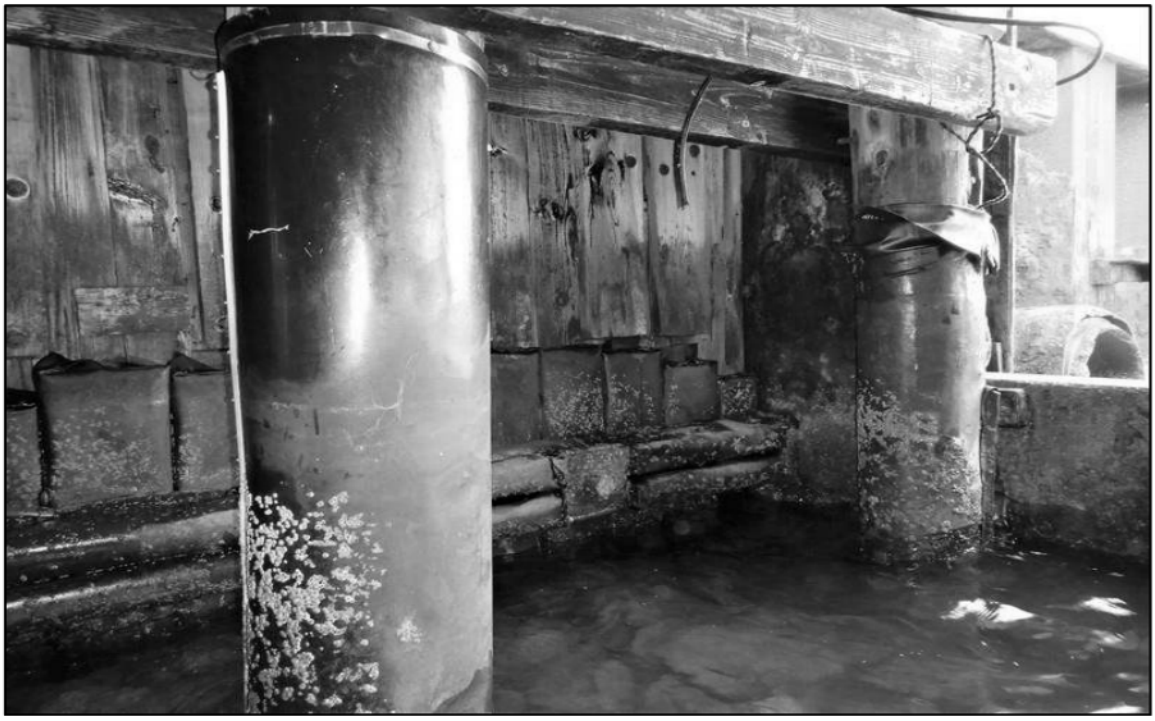
Photo 14 View of northern steel bulkhead



Photo 15 View of southern steel bulkhead



Photo 16 View of the steel pile return wall on south side of Pier 1



17_DSCN0643 COPY.JPG

PIER 1

Photo 17 View of the timber bulkhead and the concrete panel return wall on north side of Pier 1



18_BROKEN PILE.JPG

PIER 1

Photo 18 View of broken timber pile



19_MOD PILE DSCN0056.JPG

PIER 1

Photo 19 Timber pile exhibiting moderate section-loss



20_.JPG

PIER 1

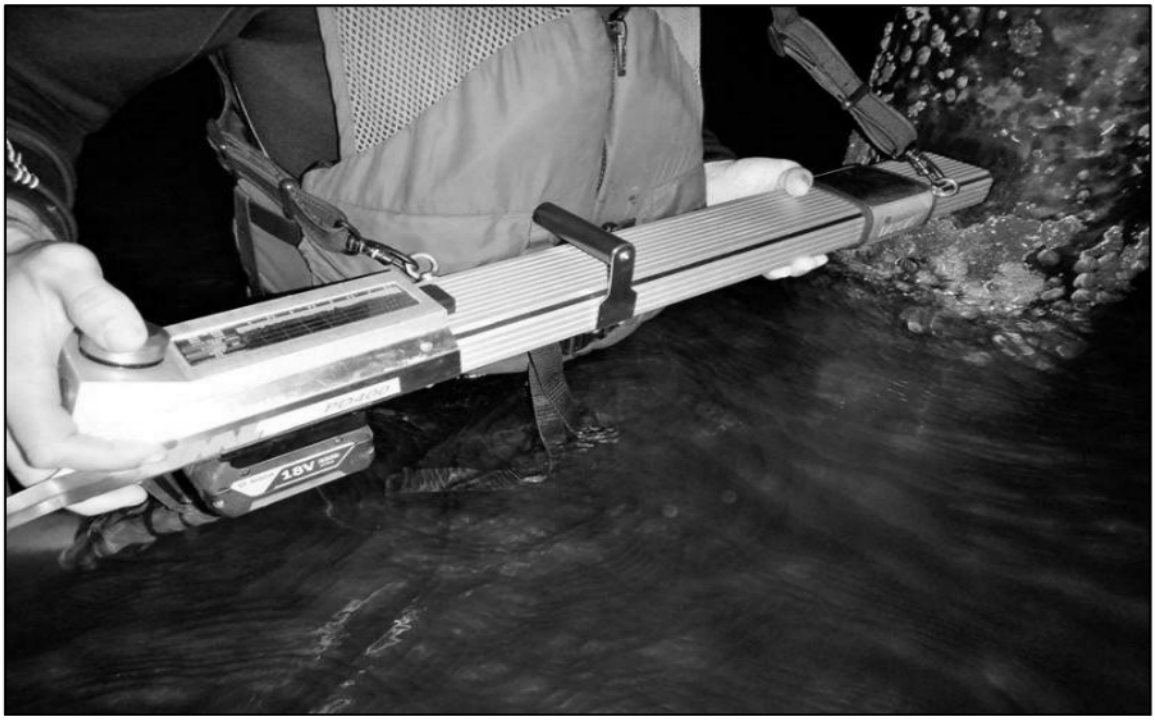
Photo 20 Typical timber pile exhibiting minor deterioration



Photo 21 Loose plastic pile wrap



Photo 22 Failed flexible pile wrap



23_RESISTOGRAPH READING.JPG

PIER 1

Photo 23 Resistograph testing



24_HONEYCOMB.JPG

PIER 1

Photo 24 Typical honeycombing on concrete beam



25_HAIRLINE CRACK AND EFFLOR.JPG

PIER 1

Photo 25 Typical hairline cracking and efflorescence on concrete elements



26_MOD DECK.JPG

PIER 1

Photo 26 Moderate spalling and cracking on concrete underdeck



27_TYP DRAIN_P9240105.JPG

PIER 1

Photo 27 Typical minor deterioration at underdeck drain



28_SEVERE CRACKING CAP P9240037.JPG

PIER 1

Photo 28 Severe cracks in concrete cap



29_SEVERE SPALL BEAM P9250127.JPG

PIER 1

Photo 29 Severe spall with exposed rebar in concrete beam



30_POPOUT B75 P9250140.JPG

PIER 1

Photo 30 Sand streaking and rebar pop-out at pile and cap connection in Bent 75



31_EAST EDGE BEAMS IMG_3412.JPG

PIER 1

Photo 31 Beam at Bent 120 of Pier 1 exhibiting a severe crack and another beam behind it with a severe spall exposing rebar



32_TOPSIDE DECK DAMAGE DSCN0518.JPG

PIER 1

Photo 32 Damage to deck on north side of Pier 1 caused by ramp damage



33_UNDERDECK SPALLS AND DELAM
DSCN0522.JPG
PIER 1

Photo 33 Severe spalling, cracking, and delamination of the underdeck caused by ramp damage



34_UNDERDECK CRACKING AND SPALL
DSCN0525.JPG
PIER 1

Photo 34 Severe cracking of the underdeck with efflorescence, spall on beam caused by ramp damage



35_FASCIA CAP DAMAGE DSCN0529.JPG

PIER 1

Photo 35 Damage to the fascia, pile caps, and underdeck caused by ramp damage



36_TOPSIDE DECK DAMAGE_DSCN0518.JPG

PIER 1

Photo 36 View of the ramp damage to the topside deck of Pier 1



37_TOPSIDE CRANE RAILS_IMG_3261.JPG

PIER 1

Photo 37 View of typical topside deterioration between the crane rails on north side of Pier 1



38_BOLLARD DSCN0589.JPG

PIER 1

Photo 38 View of a typical bollard, south side of Pier 1



39_CLEAT DSCN0575.JPG

PIER 1

Photo 39 View of a typical cleat, north side of Pier 1



40_BROKEN CLEAT DSCN0578.JPG

PIER 1

Photo 40 View of broken Cleat-36, north side of Pier 1



41_MINOR DEFECT TO TIMBER DOLPHIN DSCN0423 COPY.JPG

PIER 1

Photo 41 Typical minor to moderate deterioration of timber fenders



42_BROKEN TIMBER FENDER.JPG

PIER 1

Photo 42 Broken timber fender pile on north side of Pier 1



43_LEG FENDER TEAR.JPG
PIER 1

Photo 43 View of a leg fender with a tear in the rubber



44_PNEUMATIC MINOR DETERIORATION
DSCN0491..JPG
PIER 1

Photo 44 View of minor deterioration of pneumatic fender



45_TPYICAL TIMBER BULKHEAD
DSCN0007.JPG
PIER 1

Photo 45 View of timber bulkhead



46_TYPICAL TIMBER BULKHEAD WITH VOID
DSCN0008..JPG
PIER 1

Photo 46 View of timber bulkhead with typical minor to moderate decay and void near bottom section



47_BULKHEAD WALE LOSS DSCN0014.JPG

PIER 1

Photo 47 Timber bulkhead severe bottom wale section-loss



48_NORTH STEEL BULKHEAD DSCN0385 COPY.JPG

PIER 1

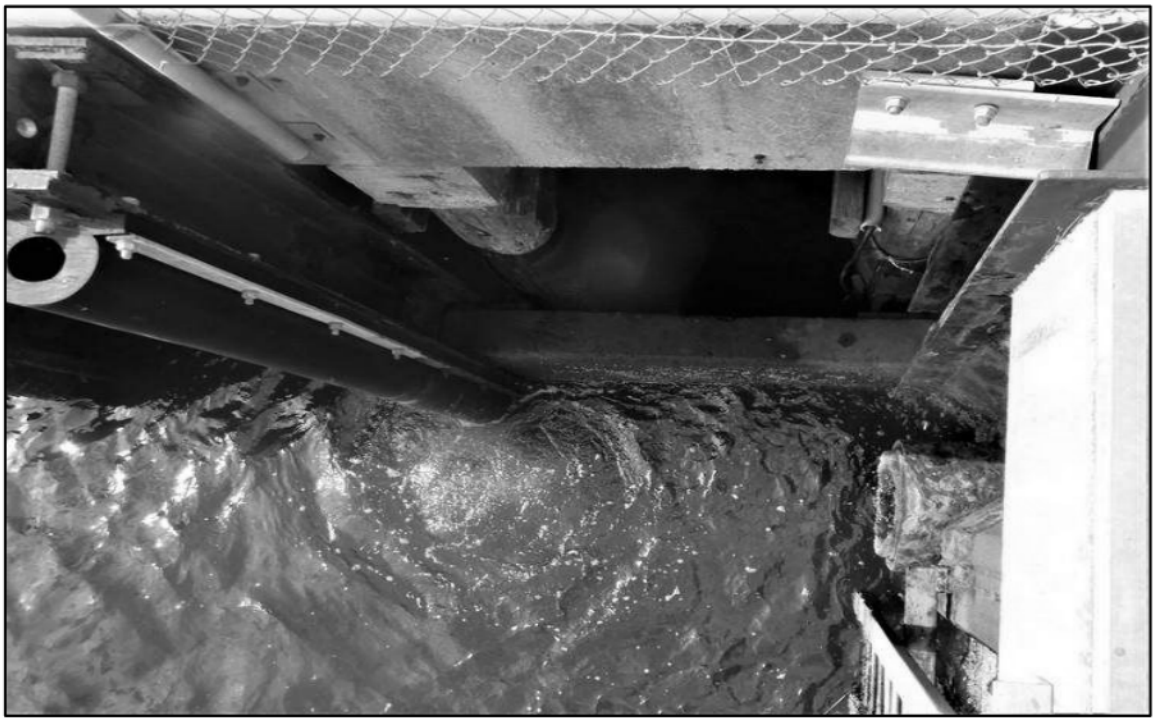
Photo 48 Minor deterioration of north steel bulkhead



49_CORROSION AND COATING LOSS SOUTH STEEL BULKHEAD.JPG

PIER 1

Photo 49 Minor deterioration of south steel bulkhead



50_NORTH RETURN WALL DSCN0545 COPY.JPG

PIER 1

Photo 50 Minor deterioration of north return wall



Photo 51 View of southern H-pile and steel sheet pile return wall

Appendix C – Mooring Hardware and Leg Fender Ratings

FIGURE C-1: MOORING HARDWARE CONDITIONS FOR PIER ONE



Asset Type: CLT

Fitting ID: CLEAT 1

Type: 42" Cleat

Condition
Fitting: 2
Base: 2
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 2

Type: 42" Cleat

Condition
Fitting: 2
Base: 2
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 3

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 1

Type: Bollard

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 4

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 2

Type: Bollard

Condition
Fitting: 3
Base: 1
Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 5 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 6 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 3 **Type:** Bollard	**Condition** Fitting: 3 Base: 1 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 7 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

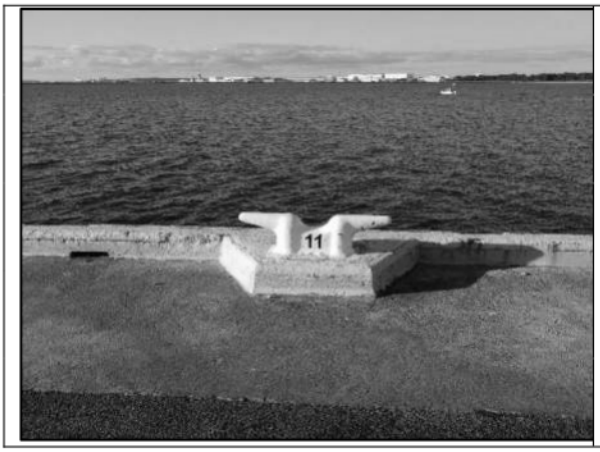
	**Asset Type:** CLT **Fitting ID:** CLEAT 8 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 4 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 9 **Type:** 42" Cleat	**Condition** Fitting: 2 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 10 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 5 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 11

Type: 42" Cleat

Condition
Fitting: 1
Base: 2
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 12

Type: 42" Cleat

Condition
Fitting: 1
Base: 2
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 6

Type: Bollard

Condition
Fitting: 3
Base: 1
Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 13 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 1 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 14 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 1 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 7 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 15 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 16 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 8 **Type:** Bollard	**Condition** Fitting: 3 Base: 1 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 17 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 18 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 9 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 19

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 20

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 10

Type: Bollard

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 21

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 22

Type: 42" Cleat

Condition
Fitting: 3
Base: 2
Connection: 1

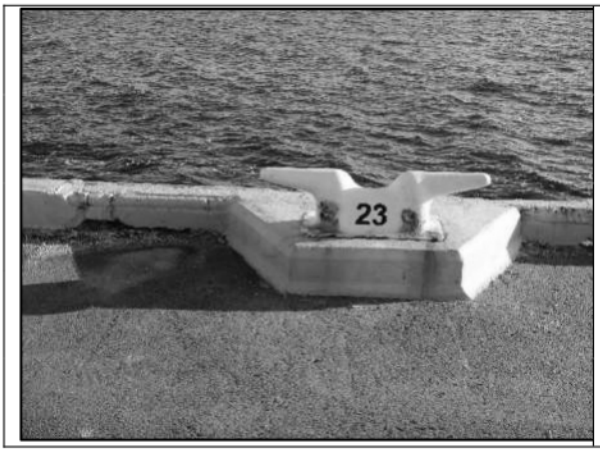


Asset Type: BLRD

Fitting ID: BOLLARD 11

Type: Bollard

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 23

Type: 42" Cleat

Condition
Fitting: 2
Base: 2
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 24

Type: 42" Cleat

Condition
Fitting: 3
Base: 2
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 12

Type: Bollard

Condition
Fitting: 3
Base: 3
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 25

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 26

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 13

Type: Bollard

Condition
Fitting: 2
Base: 1
Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 27 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 28 **Type:** 42" Cleat	**Condition** Fitting: 2 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 14 **Type:** Bollard	**Condition** Fitting: 2 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 29 **Type:** 42" Cleat	**Condition** Fitting: 2 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 30 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 1 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 15 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 31 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 1 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 32 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 1 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 16 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 33

Type: 42" Cleat

Condition
Fitting: 2
Base: 2
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 34

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1

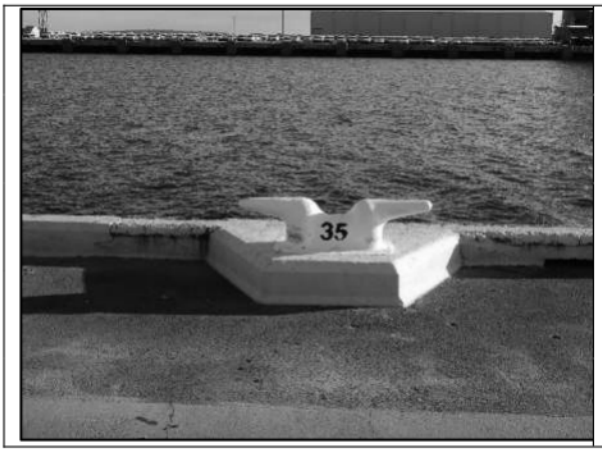


Asset Type: BLRD

Fitting ID: BOLLARD 17

Type: Bollard

Condition
Fitting: 2
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 35

Type: 42" Cleat

Condition
Fitting: 1
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 36

Type: 42" Cleat

Condition
Fitting: 5
Base: 2
Connection: 1



Asset Type: BLRD

Fitting ID: BOLLARD 18

Type: Bollard

Condition
Fitting: 2
Base: 1
Connection: 1



Asset Type: CLT

Fitting ID: CLEAT 37

Type: 42" Cleat

Condition
Fitting: 4
Base: 3
Connection: 2



Asset Type: CLT

Fitting ID: CLEAT 38

Type: 42" Cleat

Condition
Fitting: 4
Base: 3
Connection: 1

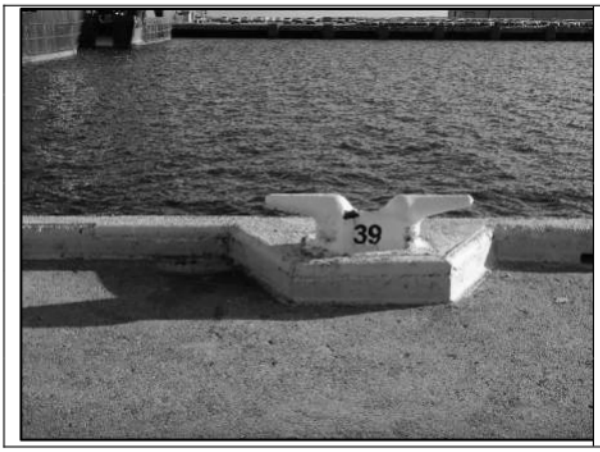


Asset Type: BLRD

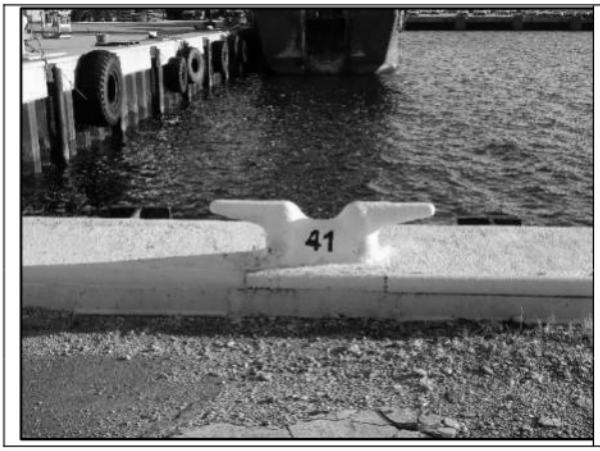
Fitting ID: BOLLARD 19

Type: Bollard

Condition
Fitting: 4
Base: 2
Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 39 **Type:** 42" Cleat	**Condition** Fitting: 2 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 40 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** CLT **Fitting ID:** CLEAT 41 **Type:** 42" Cleat	**Condition** Fitting: 1 Base: 2 Connection: 1

	**Asset Type:** BLRD **Fitting ID:** BOLLARD 20 **Type:** Bollard	**Condition** Fitting: 3 Base: 2 Connection: 1

	**Asset Type:** STRM BLRD **Fitting ID:** STRM BLRD **Type:** Bollard	**Condition** Fitting: 1 Base: 1 Connection: 1

Mooring Condition Rating Key: Rating System: ASCE

1	(Green)	No Defects
2	(Blue)	Minor Deterioration
3	(Yellow)	Moderate Deterioration
4	(Orange)	Major Deterioration
5	(Red)	Severe Deterioration

FIGURE C-2: LEG FENDER CONDITIONS FOR PIER ONE

	**Asset Type:** FNDR PNL **Fender ID:** FX - 2 **Type:** Leg Fender Panel	**Condition** Fender Element: 2 Foundation: 1 Hardware: 2
	**Asset Type:** FNDR PNL **Fender ID:** FX - 3 **Type:** Leg Fender Panel	**Condition** Fender Element: 1 Foundation: 1 Hardware: 1
	**Asset Type:** FNDR PNL **Fender ID:** FX - 4 **Type:** Leg Fender Panel	**Condition** Fender Element: 1 Foundation: 1 Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 5

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 6

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 7

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 8

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 9

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 10

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 11

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 12

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 2



Asset Type: FNDR PNL

Fender ID: FX - 13

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 14

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 15

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 16

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 17

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 18

Type: Leg Fender Panel

Condition
Fender Element: 2
Foundation: 1
Hardware: 1



Asset Type: FNDR PNL

Fender ID: FX - 19

Type: Leg Fender Panel

Condition
Fender Element: 1
Foundation: 1
Hardware: 1

Fender Condition Rating Key:

Rating System: ASCE

1	(Green)	No Defects
2	(Blue)	Minor Deterioration
3	(Yellow)	Moderate Deterioration
4	(Orange)	Major Deterioration
5	(Red)	Severe Deterioration

Appendix D – Pier 1 Ramp Damage Assessment Letter

moffatt & nichol

180 Wells Avenue, Suite 302
Newton, MA 02459
(617) 299-7330
www.moffattnichol.com

October 3, 2018

Edward J. Spinard, PE
Quonset Development Corporation
95 Cripe Street
North Kingstown RI 02852

Subject: Pier 1 Ramp Damage Assessment

Dear Mr. Spinard,

On September 19, 2018, Moffatt & Nichol (M&N) was notified that the deck area east of Bollard 19 was damaged by the M/V Hoegh Manila's ramp on the previous day. Bollard 19 is located 270 ft east of the bulkhead line along the north face of Pier 1. Photos 1 and 2 depict the condition of the deck just east of Bollard 19 the day after the impact.



Photos 1 & 2: Deck damage east of Bollard 19

M&N performed an emergency visual inspection on September 19, 2018 and then a follow-up ultrasonic and ground penetrating radar survey on September 24, 2018 to determine the full extent of the damage (**Appendices 1 & 2**). The emergency inspection was performed by the three-man inspection team that was already onsite performing the underwater inspection of Pier 1. A subconsultant, NDT Corporation,

performed the ultrasonic and ground penetrating radar testing of the deck surface and with the assistance of two M&N engineers operating the boat for the underdeck portion of the testing.

Inspection Findings

Topside, the damaged area of deck is approximately 12 ft long by 5 ft wide and located approximately 12 ft east of Bollard 19 (or 282 ft from the bulkhead line) between Bents 28.5 to 30 longitudinally and between Piles A and B transversely. M&N's underdeck inspection on September 19, 2018 confirmed that the same areas showed visible evidence of damage on the underside of the deck. The damage consisted of widespread cracking, open spalls and broken pieces of concrete decking that were hanging, partially supported on the concrete pile caps. Photos 3 and 4 depict the underside damage between Bents 29 and 30.



Photos 3 & 4: Underside deck damage, between Bents 29 & 29.5 (left), between Bents 29.5 and 30 (right)

Cracking was also observed on the concrete fascia/edge beam between Bents 29 and 29.5 and on the concrete cap above Pile 29.5-A (see Photos 5 and 6).



Photos 5 & 6: Cracks at concrete fascia beam Bents 29 & 29.5 (left) and concrete pile cap above Pile 29.5-A (right)

The ultrasonic testing and ground penetrating radar survey determined that the deck was fully fractured and that the extent of damage extended further east to the expansion joint located at Bent 31. As shown in Figure 1, the deck is severely cracked and spalled for an 8 ft wide section (up to the first crane rail beam) between Bents 28.5 to 30 and for a 12 ft wide section (up to the second crane rail beam) between Bents 30 to the expansion joint. The full extent of damage is approximately 25 ft long by 12 ft wide. The areas in red indicate portions of decking with frequency measurements correlating to missing or no thickness. Areas in blue are deck sections with full thickness and areas in green and orange are transitional areas that represent partial thickness. It should be noted that the survey also picked up an area of delamination just west of Bollard 19 between the crane rails. This finding is consistent with M&N's visual inspection in that the areas between the crane rails typically have greater levels of deterioration both on the top of deck and underside surfaces.

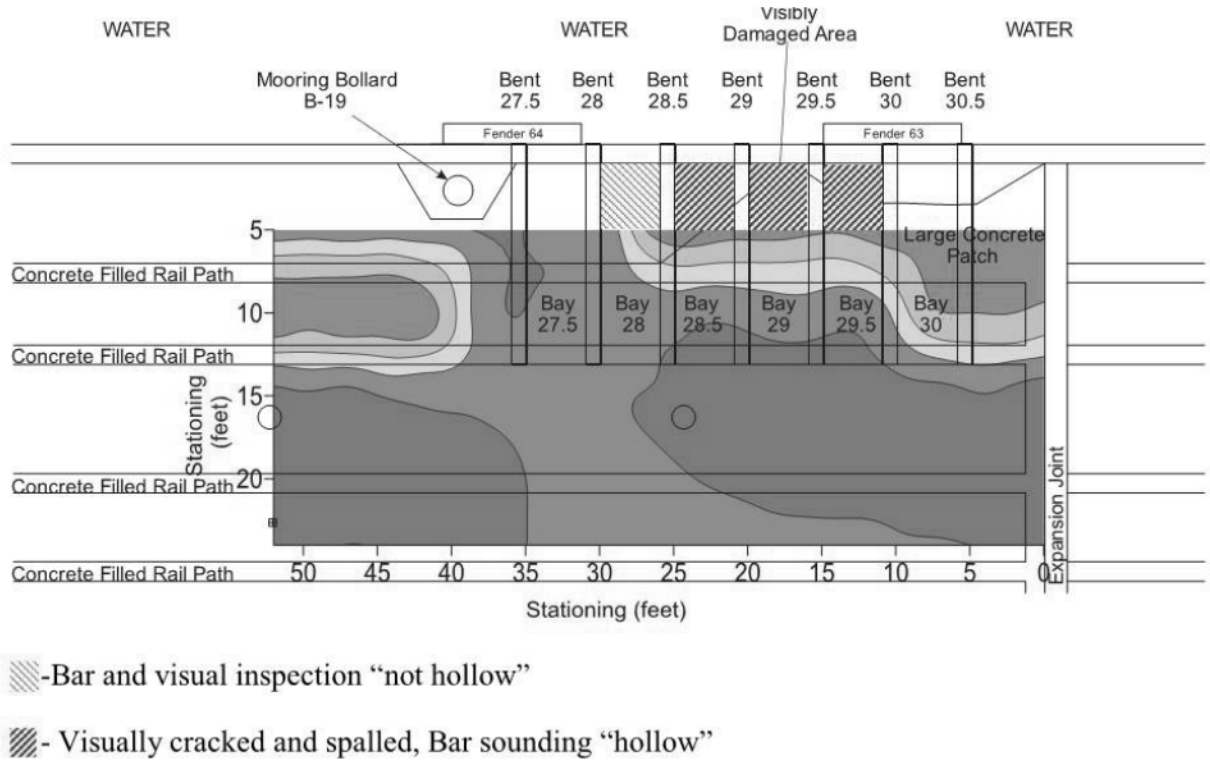


Figure 1: Ultrasonic Testing Results

Conclusion and Recommendations

The 25 ft long by 12 ft wide area of the concrete deck that is damaged should be cordoned off and restricted from loading until repairs are performed (see Figure 2). The area begins at Bent 28, which is located approximately 12 ft east of Bollard 19 and extends east to the expansion joint at Bent 31.

The damaged portions of the concrete deck and the cracks in the concrete fascia beam and pile cap should be repaired on an immediate basis. Portions of the crane rails will have to be selectively demolished and the expansion joint will need to be restored.

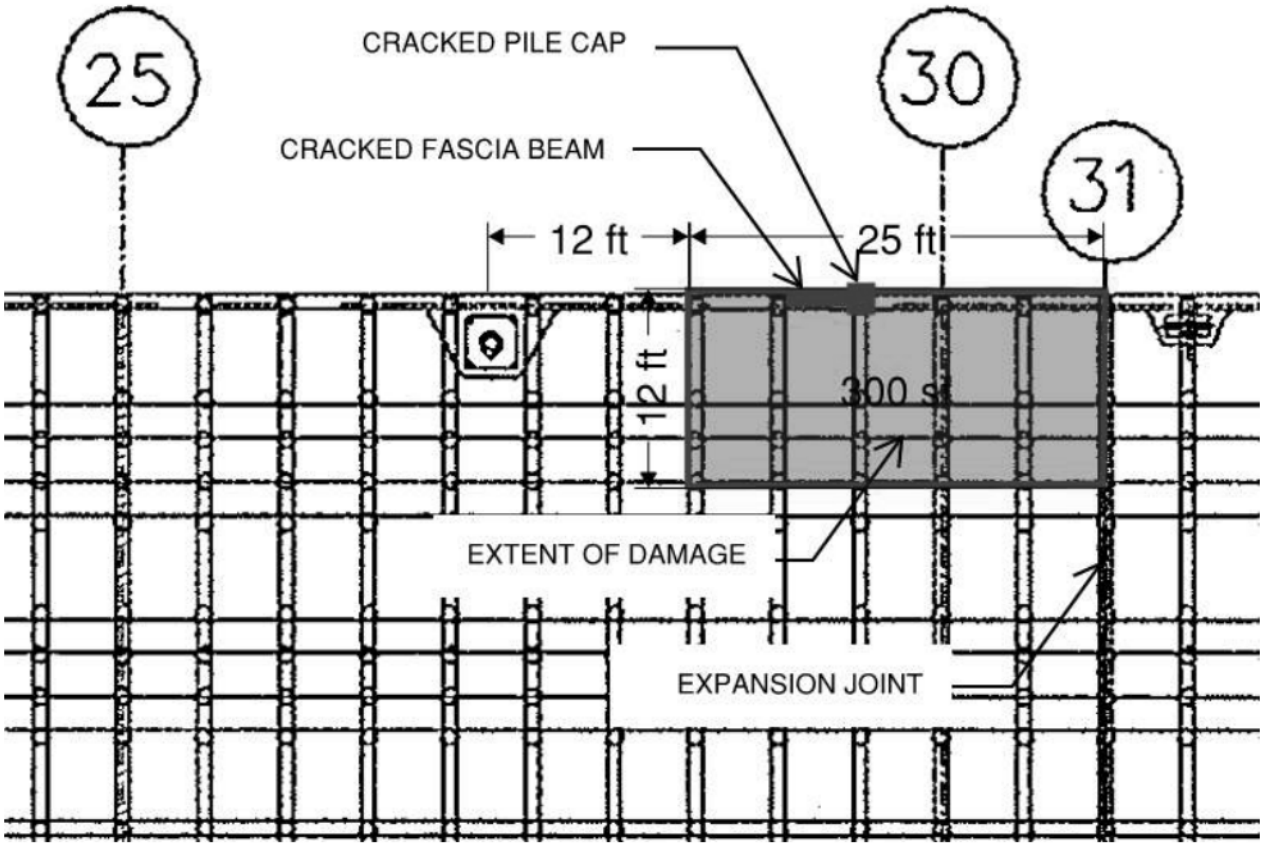


Figure 2: Extent of Damage

We greatly appreciate the opportunity to work with the Quonset Development Corporation and look forward providing follow-on engineering services for this project. Please contact me if you have any questions or need additional information.

Very Truly Yours,

Moffatt & Nichol

Joseph Choi, PE
Project Manager

Appendices: (1) M&N Emergency Inspection Memorandum
(2) NDT Corporation Nondestructive Testing Sonic/Ultrasonic and Ground Penetrating Radar for Damage Assessment of Quonset Pier 1

APPENDIX 1
M&N Initial Damage Inspection

moffatt & nichol

233 Needham Street, Suite 420
Newton, MA 02464

(617) 299-7330
www.moffattnichol.com

Memorandum

To:	Quonset Development Corp. Attn: Robert Blackburn, Port Director
From:	David Rosenberg, PE
Date:	Oct. 1, 2018
Subject:	Initial Damage Inspection
Project:	Pier 1 Vessel Ramp Damage Bollard 19
CC:	Joe Choi PE, Charles Balzarini PE

This memo reports observations from the Sept. 19, 2018 below deck inspection of damage to Pier 1 near Bollard 19, carried out at the request of Quonset Development Corp. following the damage event. An area of the deck slab approximately 12 ft. long x 5 ft. wide was visibly broken and deformed several inches out-of-plane with a depression in the middle of the area and raised perimeter edges (Figure 1).

Moffatt & Nichol engineer inspectors David Rosenberg, PE and Charles Balzarini, PE conducted the initial inspection from the water, including observations and photos of the damage.

The structure is a timber pile supported pier with reinforced concrete pile caps, fascia beam, crane rail beams, and deck slab. The area affected by the damage includes Pile Bents 28.5, 29, 29.5 and 30 from the North A to B row.

An open mechanical spall was found in the underside of the deck slab between Bents 28.5 and Bent 30 and pile rows A to B (see Figure 5 below), corresponding to the damage seen above deck. The separated concrete pieces were suspended and partially resting on the pile cap, creating an overhead hazard to the inspectors in the water below and obscuring the full extent of the spall.

Vertical cracks were also visible the concrete fascia beam between Bents 29 and 29.5 (see Figure 2) and on the concrete pile cap above Pile 29A.

Areas of pattern cracking are also present on the underside of the slab and adjacent fascia and crane rail beams with efflorescence throughout. These white crystalline deposits are typical of the long-term chemical reaction and migration processes in marine concrete.

These are the initial observations from our inspection; a closer look will be possible after the broken concrete is removed above and below deck and new information may come to light.

Because of the air gap between the bottom of the deck and water surface, scaffolding may be necessary for access to the work and to make repairs. Meanwhile, the damaged area of the deck should remain out of use.

David Rosenberg, PE



Figure 1 View of the damaged area above deck looking east from Bollard 19.



Figure 2 View of the north fascia (looking south). Pile Bents 29.5 and 29 are numbered in the photo.



Figure 3 Close up view of the fascia beam between Bents 29 and 29.5 where a vertical crack is visible (arrow).



Figure 4 Close up view of the reinforced concrete cap at pile 29.5-A.

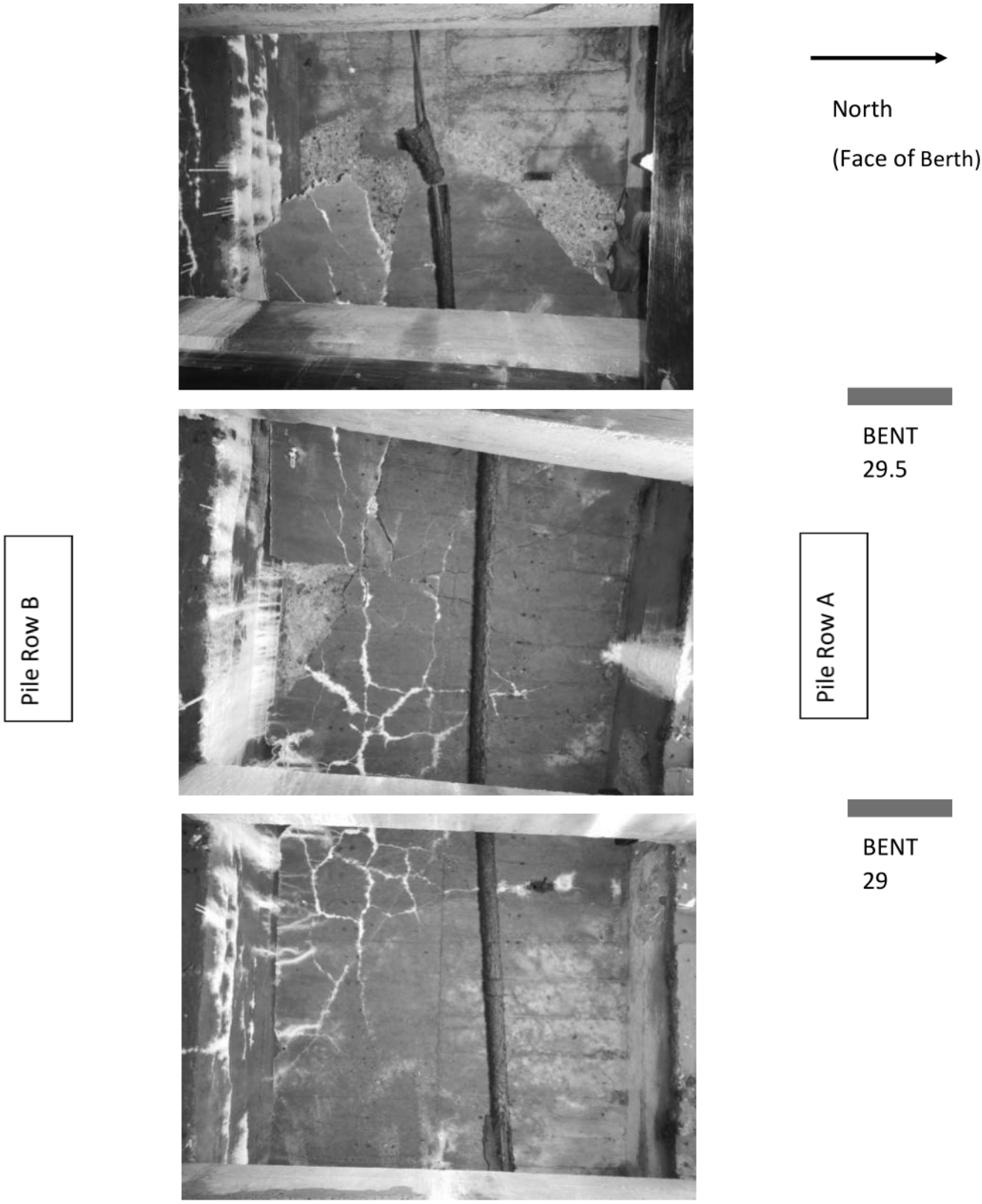


Figure 5 Composite view looking up at the underside of the damaged deck area between Bents 28.5 and 30/ pile rows A to B. The separated concrete is resting on the concrete pile cap below (visible in the top photo).

APPENDIX 2

NDT Corporation Nondestructive Testing Sonic/Ultrasonic and Ground Penetrating Radar for Damage Assessment of Quonset Pier 1

NONDESTRUCTIVE TESTING
SONIC/ ULTRASONIC
AND
GROUND PENTRATING RADAR
FOR
DAMAGE ASSESSMENT OF
QUONSET PIER 1
PORT DAVISVILLE, RHODE ISLAND



Prepared for
MOFFATT & NICHOL

SEPTEMBER, 2018

NDT CORPORATION
Concrete & Geophysical Testing

NDT CORPORATION
153 Clinton Road, Sterling, MA 01564
Main: 978-563-1327 | Fax: 978-563-1340
eMail: Info@NDTCorporation.com

October 1, 2018

Mr. Joseph Choi, PE
Moffatt & Nichol
180 Wells Avenue #302
Newton, MA 02459

Subject: Nondestructive assessment of a damaged area on Quonset Pier 1, Port Davisville, Rhode Island

Dear Mr. Choi:

In accordance with our contract agreement, NDT Corporation conducted sonic/ultrasonic and ground penetrating radar measurements of the deck slab at Quonset Pier 1 at Port Davisville in North Kingstown, Rhode Island on September 24, 2018. The objective of this investigation was to evaluate an area the extent of damage done to the concrete deck.

This report presents the results and findings of this investigation for your review and comment. If you have any questions or comments, please contact the undersigned at 978-563-1327.

Sincerely,

NDT Corporation



Ben Armitage

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1.0 Summary

The objective of this investigation was to evaluate concrete conditions and identify areas with internal (not visible on the outside) damage. Approximately 40 sonic/ultrasonic impact-echo measurements were collected on a 5' by 5' grid. Additionally twenty GPR lines were collected along the similar 5' by 5' grid pattern over a 50' by 24' area. A visual inspection with bar sounding and photo documentation of the underside was performed by NDT and confirmed the conditions documented by Moffatt and Nichol dive inspection team. Sonic/ultrasonic results indicate a well-defined section of the deck that exhibits weak concrete, cracking and sections that are debonded and visibly broken. The visible surface damage on and near the visible patches on the concrete correlate with the visible damage on the underside of the deck in the accessible bays (Bay 29.5, 29, and 28.5). The numbered bent is to the west of the same numbered bay (See Figure 1).

2.0 Introduction and Purpose

A nondestructive sonic/ultrasonic /impact echo and ground penetrating radar investigation assessed a recently damaged portion of the deck slab at Quonset Pier 1, Davisville Port, North Kingstown, Rhode Island. NDT Corporation conducted the sonic/ultrasonic investigation on September 24th, 2018. The objective of this investigation was to determine the extent of damage to the deck slab for repair purposes.

Plans and support crew (with a small john boat) provided by Moffatt and Nichol aided in assessing the damage for both the topside and underside. Figure 1 is a sketch plan identifying the area of the investigation. The sonic/ ultrasonic data and GPR data was collected in a five (5) foot grid.

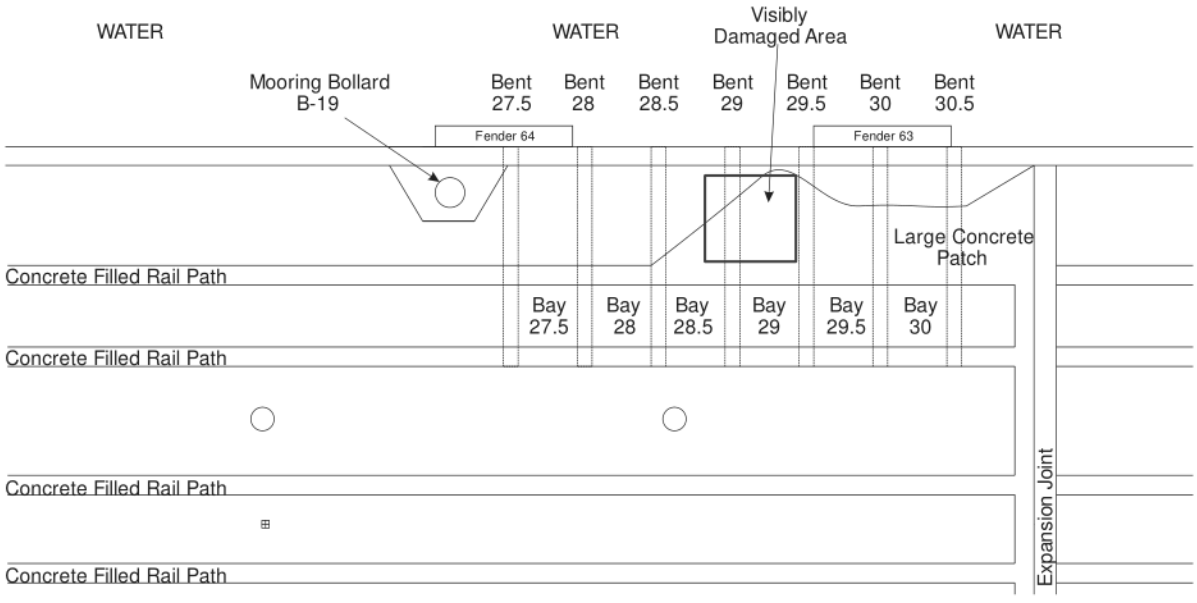


Figure 1: Sketch plan map-The location in red is where visible damage can be seen.

3.0 Investigation Methods

The deck slab tested by NDT is a reinforced concrete cast in place construction. For the sonic testing, energy input with a projectile impact creates a compressional wave that propagates through the concrete in the thickness direction and is reflected through the concrete from the back surface of the slab.

This energy is trapped between the two surfaces and resonates at a frequency that is a function of the compressional wave velocity and the concrete thickness. The resonant frequency is expected to be approximately 8 kHz for the 10-inch thick slab. Any delamination or internal damage would cause a thickness resonant frequency to be missing due to the signal being dispersed.

The principal criterion for evaluating the data is the resonant frequency value of the concrete element. The resonant frequency of a free-free faced element (wall face to wall face) in its simplest form is given by:

$$f = \frac{V}{2T}$$

Where f is the thickness resonant frequency, V is the velocity of the sonic/ultrasonic wave in concrete (typically about 12,500+ ft. /sec). T is the thickness of the element for the slab which is approximately 10 inches in this area (10 inches is based off of both the GPR and Sonic data).

3.1 Nondestructive Testing Measurements

Ground Penetrating Radar (GPR) - Appendix 1

GPR data were acquired using a digital 1600 MHz antenna. The GPR method uses a pulsed electromagnetic signal that is transmitted to, and reflected by, a target (in this case rebar or cracks in the deck) back to the point of transmission. The electromagnetic wave transmission and reflection is dependent on the electrical properties (dielectric constant and electrical conductivity) of the material(s) being investigated. These electrical properties determine the velocity and reflection characteristics of the electromagnetic waves used to locate and determine the approximate depth of the reinforcing bars or air voids if moisture is present.

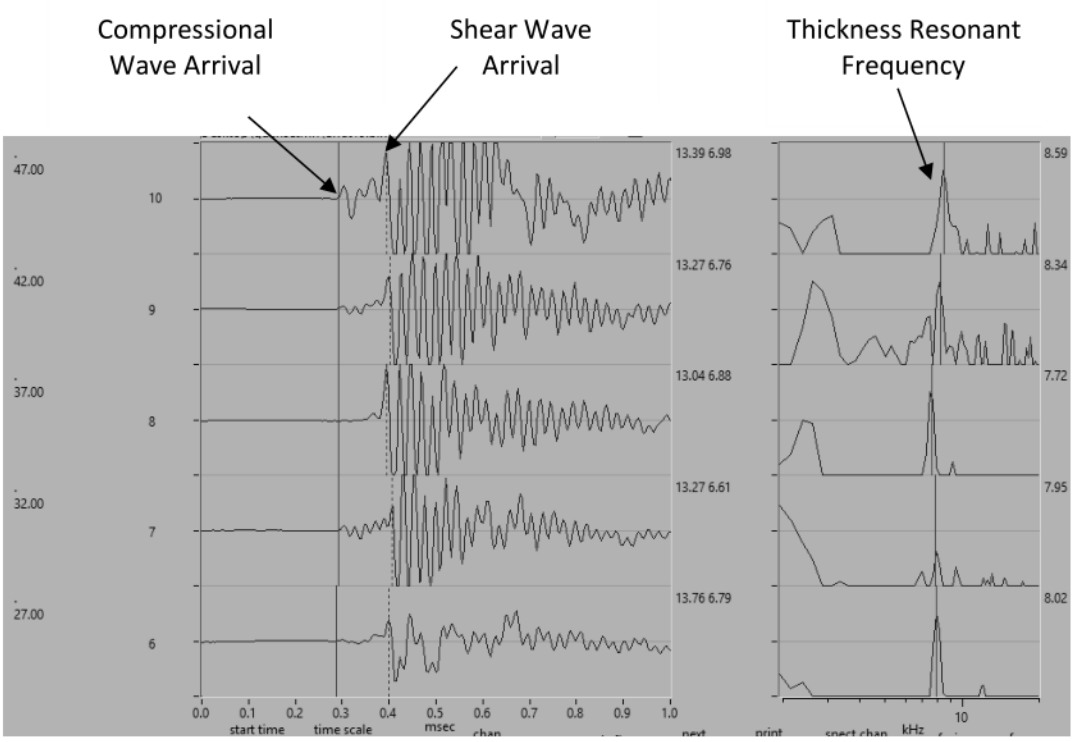
Sonic/ultrasonic Measurements- Appendix 2

Sonic/ultrasonic and impact echo/resonant (multiple reflections) frequency measurements were obtained using a projectile impact energy source, a hand-held four-sensor array and a portable computer to archive and provide a quality control field display of data (Photograph 1). Sensors were spaced 2, 8, 20 and 32 inches from the energy impact point for all testing. Continuous sonic/ultrasonic data were obtained for each line by positioning the energy source at one end of the array and incrementing the array every 5 feet. A discussion of the sonic/ultrasonic survey method is included in Appendix 2.



PHOTOGRAPH 1: Impact Echo Testing Equipment

A PC (personal computer) is used to process, display and archive the data. A compressed inert gas supply system provides a consistent energy source for a hand-held impact projectile energy source. The projectile impact produces stress waves that are detected by an array of 4 sensors, spaced 6", 12", and 12" apart. Each sensor measures the amplitude of the stress wave in time (time-domain plot). The sensor array and projectile source are placed on the face of the concrete and a record is taken. Time domain data are used to measure the compressional and shear wave velocity values (strength of concrete) and the frequency domain data is the resonant frequency (thickness) of the concrete elements being tested.



Time Trace Plot

Thickness Frequency Plot

3.2 Survey Control

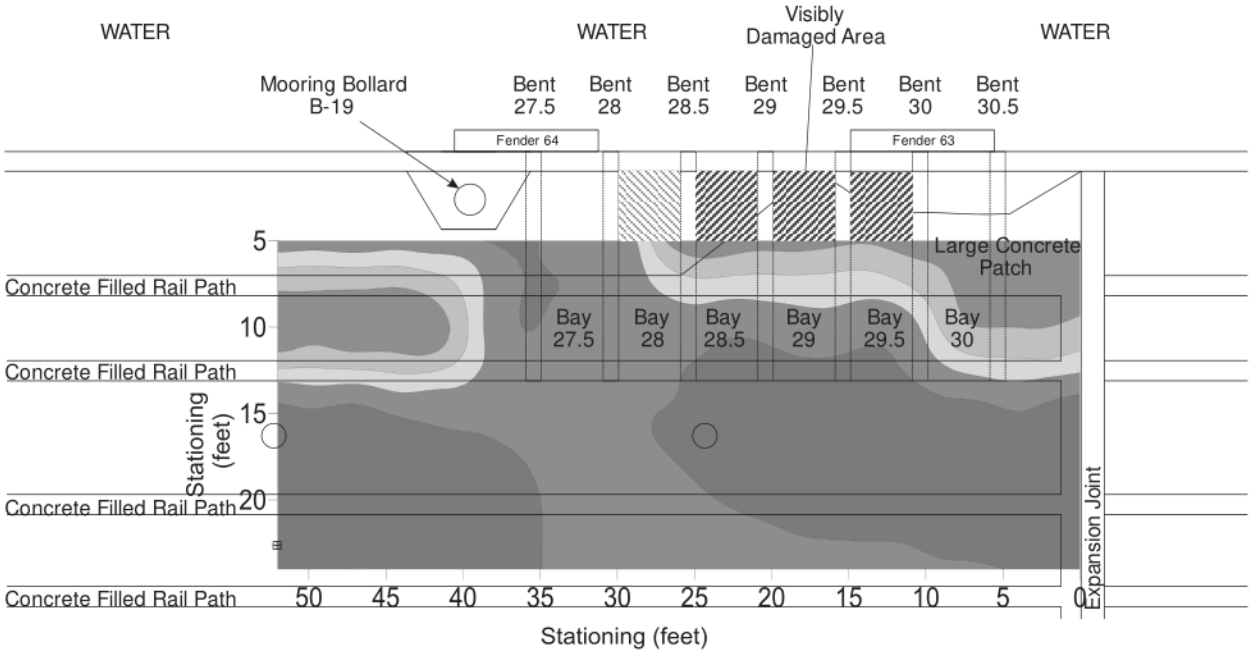
The northeast corner where the outer curb meets expansion joint 1 was designated as 0+00 for both east - west stationing and north - south stationing. A 5 foot grid was laid out from that corner south to 24 feet toward center of the pier and west 50 feet along the curb. The sonic/ impact-echo measurements were collected at each of the 5 foot grid points (some data points were moved slightly to get the measurement off of the transverse concrete beam and on the slab thickness). The GPR data was collected along the set 5 foot grid lines in both directions.

The bents and bays in the area of investigation were labelled by Moffatt and Nichol on the pier face to aid in compiling the underside visual observations and the topside testing.

4.0 Discussion of Results:

4.1 Topside Sonic Impact Echo Results

NDT's analysis of sonic data is based on thickness resonant frequency values, loss of frequencies, and spurious frequencies. Areas where frequencies are missing seem to coincide with observable damage or previous repair patching. Below are the findings placed on a sketch plan of the site. Areas that are blue have a thickness frequency assumed to be full thickness approximately 10 inches. Areas that are red have missing or no full thickness frequencies. The orange and green areas provided for the color contours and visual representation of the data represent the transitional areas and are still considered to be not full concrete deck thicknesses. These transitional areas are thought to be the outside boundary of the damage. No sonic data was collected on the stations that are less than 5 feet toward the curb (water side) due to the known conditions but based on visual observation from the underside of the deck appears to exhibit damage.



-Bar and visual inspection "not hollow"

- Visually cracked and spalled, Bar sounding "hollow"

4.2 Underside Visual Observations: NDT personnel did visual and/or bar sounding inspections of the underside of Bent 28, 28.5, 29, and in Bays 28, 29, 29.5, 30, 30.5. All 5 exhibit significant cracking. Boat access into bay 30.5 and 30 was not feasible due to the fender system with additional timber piles. The cracking continues into Bay 28.5 and bar sounding indicated hollow concrete in bay 28.5. Bay 28 did not sound hollow, did not exhibit deck cracking or look to be delaminated/spalled. This bay also corresponds to the limit of damage based on the topside NDT information. Similar to what Moffatt & Nichol documented, small structural cracks were

confirmed on the concrete transverse beam over bent 29.5 and in Bay 29 through the concrete deck and the soffit area. (see photos 2 and 3)



Photo 2: Bents 29.5, 29 & 28.5 corresponding to open bays 29, 28.5 & 28. (see close up below)



Photo 3 close up of crack over bent 29.5 roughly 8” from the end of the transverse concrete beam also small vertical crack is visible through the deck and top soffit right of mid-span in Bay 29.



Photo 4 Deck cracking evident in bay 28.5. Bar sounding indicated hollow sounding concrete.

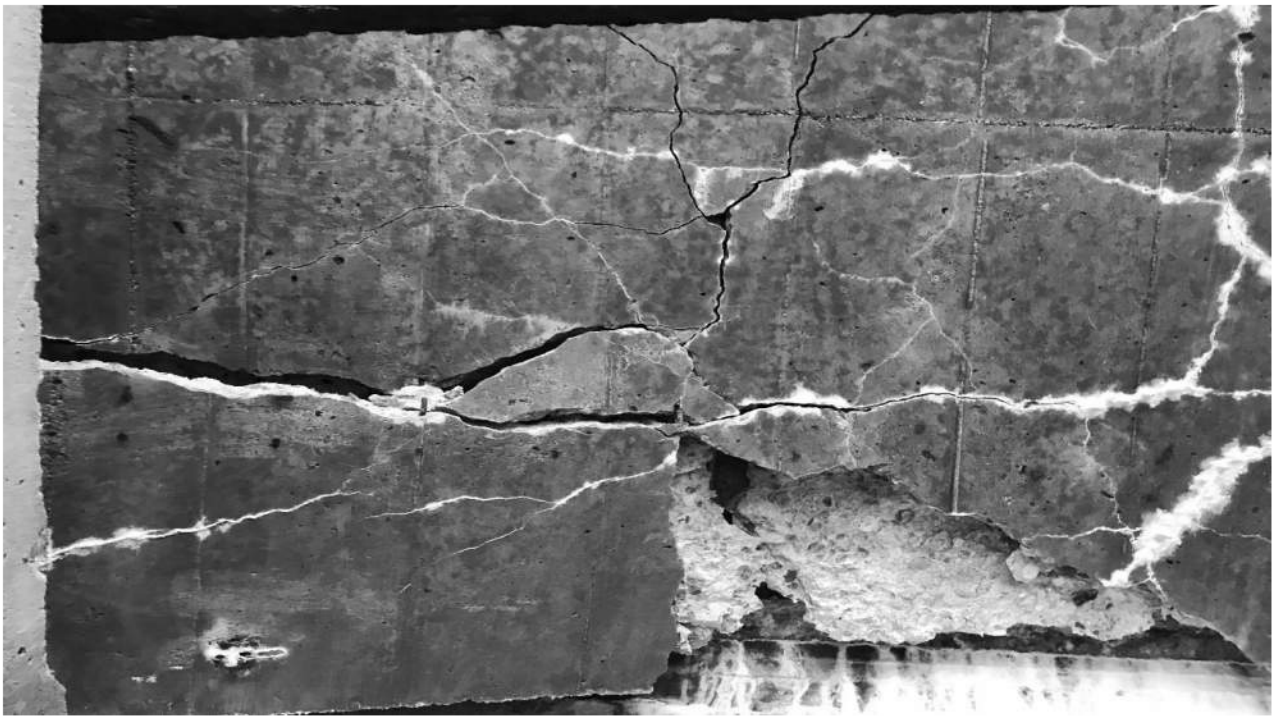


Photo 5: Underside of the deck showing severe cracking, spalling and displacement in Bay 29

4.3 Ground Penetrating Radar Results

NDT performed continuous GPR measurements along the sonic grid lines. The GPR data indicates a deck thickness of approximately 10 inches. The GPR did not verify the concrete damage with clear results/resolution except for right over the impacted area. The GPR was able to get the typical cover and spacing characteristics of the reinforcing. There is 1 layer of reinforcing with a 12 inch spacing in both directions. The depth of cover, from the top of deck, for the transverse (north-south) bars varies from 4 to 5 inches and the longitudinal (east-west) bars cover varies from 5 to 6 inches.

5.0 Conclusions

NDT Corporation is a material testing firm and provides results to engineering firms for design and rehabilitation decisions/strategies to be made. At pier 1, the visual damage is evident on the topside and underside of the concrete deck. Cracks do exist on the transverse beams (Bent 29.5) and soffit beams (Bay 29). These cracks were also documented by the dive inspection team from Moffatt and Nichol. Nondestructive testing was only completed on the concrete deck due to access limitations. The nondestructive testing results for the deck area indicate where the delineation between weakened/damaged concrete and non-damaged concrete exists. These results should be considered when determining the removal limits of damaged concrete deck.

APPENDIX 1

GPR METHOD OF INVESTIGATION

APPENDIX: GROUND PENETRATING RADAR

Ground Penetrating Radar (GPR) is an electrical geophysical method for evaluating subsurface conditions by transmitting high frequency electromagnetic waves into the ground and detecting the energy reflected back to the surface. Electromagnetic signals are transmitted from the antenna (transmitter and receiver) at ground surface and reflected back to the antenna from interfaces with differing electrical (dielectric constant and conductivity) properties. The greater the contrast in the electrical properties between two materials, the more energy that is reflected to the surface and the more defined results are.

GPR SYSTEM:

GPR systems consist of: Control unit (pulse transmitter, digital recorder, data storage, monitor); and an antenna(s) and survey wheel.



The GPR control unit is a computer which controls data acquisition parameters, such as sampling rate, range, gain control, filtering, etc. The Control Unit also visually displays the data, digitally archives the data, and allows for play back of the data.

Coaxial cable connects the control unit to the antenna. The antenna(s) are sealed and shielded in fiberglass housing.. Selection of the antenna is dictated by the requirements of the survey. For high resolution, near-surface data, a high frequency antenna is used; for deeper penetration investigation, a lower frequency antenna is used. Typically the 100 to 400 MHz antennas are used for geologic surveys; 400 to 900MHz are used for utility, near surface voiding settlement, foundation, etc surveys while the 900 to 1500 MHz are used for concrete reinforcing assessment.

APPLICATIONS

Ground Penetrating Radar (GPR) can be used to locate underground pipes, buried drums, foundations, voids in rock and concrete, soil settlement, determine stratigraphy, depth to water table, buried artifacts, filled excavations, and locate voids/settlement behind walls and under floor slabs, etc. GPR is also a good tool for evaluating concrete structures such as

bridges, walls, beams, ceilings, etc where the GPR can locate rebar and conduits, quantify rebar spacing, cover variability over reinforcing, and concrete thickness.

GPR reflections typically occur at subsurface discontinuities such as:

- Buried metal objects (utilities, tanks, reinforcing)
- Open and water filled voids
- Water table
- Soil stratification
- Seepage paths
- Bedrock fractures

DETPH OF PENETRATION AND LIMITATIONS

The depth of penetration of GPR is site specific, limited by the attenuation of the electromagnetic energy. Signal attenuation is controlled by four different mechanisms:

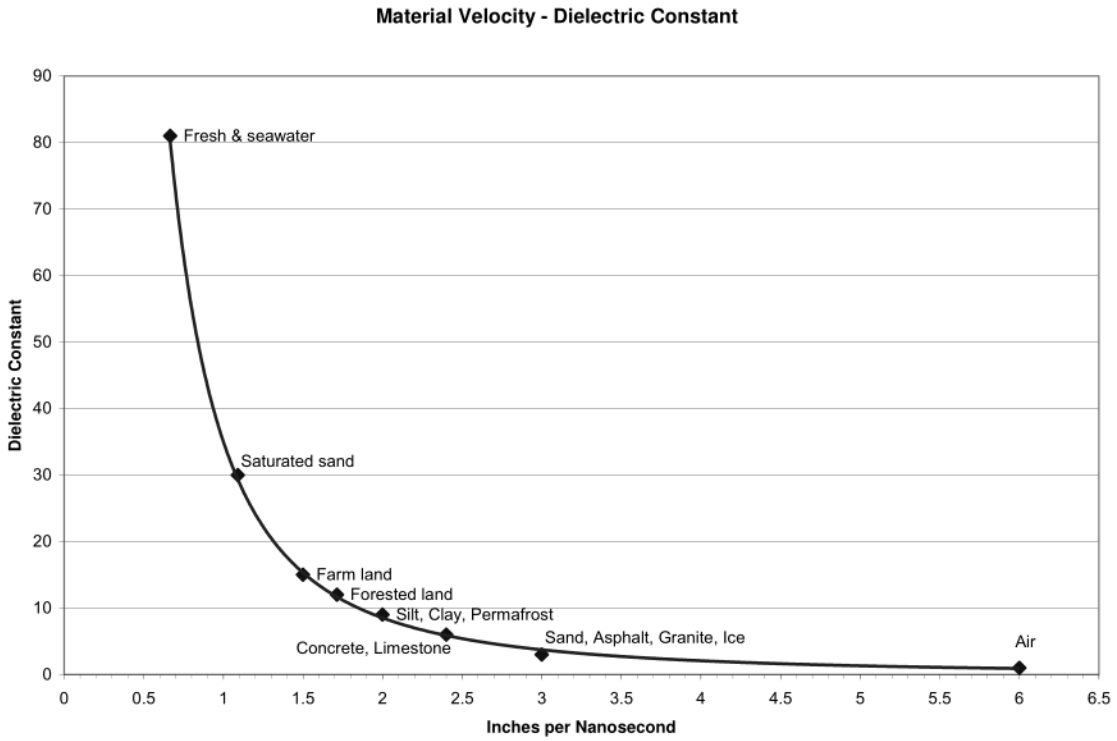
- Scattering: energy losses due to scattering occur when signals are dispersed in random directions, away from the receiving antenna, by closely spaced rebar or large irregular shaped objects, such as boulders or tree stumps.
- High conductivity layers: the greater the conductivity values of materials at a site, the more signal attenuation or less penetration. (Mineral content, high moisture content, water table, metal plates, etc.)

Signal penetration is also dependent on the frequency of the antenna. High frequency antennas have shallow penetration and high resolution. Low frequency antennas have greater depths of penetration, but the resolution of small and near surface targets is reduced. Listed below are antenna frequency, approximate depths of penetration and typical application. (Depths of penetration are in ideal conditions if a highly conductive layer, such as a brackish water table, steel plate, etc., is present all antennas will be limited to the depth of this layer.)

1500 and 1600 MHz	+/-2 feet	Asphalt/Concrete thickness Wire mesh/rebar/conduit location Voiding within and behind structures
900 MHz	3-5 feet	Concrete thickness Rebar and utility location Voiding within and behind structures
400 MHz	10-15 feet	Concrete/Masonry thickness Utility location Soil settlement/sinkhole development Geologic and Environmental mapping Archaeological Surveys
200 MHz	25-30	Soil settlement/sinkhole development

		Geologic and Environmental mapping Archaeological Surveys
100 MHz	+/-50	Soil settlement/sinkhole development Geologic and Environmental mapping Archaeological Surveys

Depth of investigation can be estimated using material dielectric constants and the diagram shown below. Typically 2 inches per nanosecond can be used as an average signal velocity for most materials and sites. When available an onsite depth calibration can be conducted to determine the electrical properties (speed of the signal) of the materials at the site. Depth calibrations typically consist of collecting GPR data over a metal target with a known depth. Known utilities, and buried metal plates are good targets for calibrations. GPR surveys can be very effective when coupled with other geophysical surveys and/or ground truth methods to verify, correlate and extrapolate GPR results. GPR surveys are a fast and cost effective method to collect data over large or obstructed sites, and isolate anomalies and areas where borings or other methods can be focused for the best interest of a project.

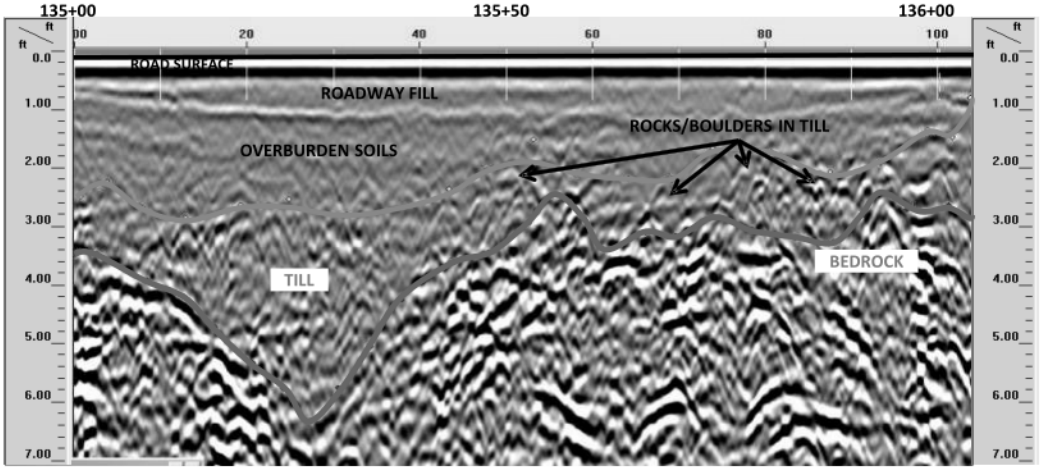


ACQUISITION AND INTERPRETATION:

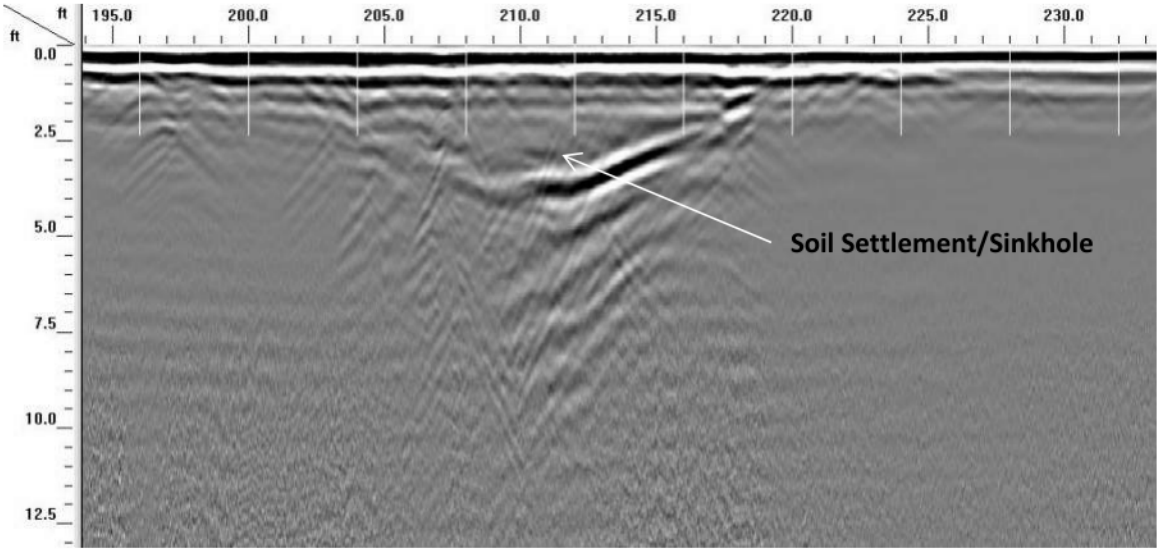
Radar data are typically acquired at a slow walking speed along a grid pattern of survey lines or a series of parallel lines. Data is displayed on LCD screen for field verification and quality control of results and digitally saved. Calibrated measuring wheels are used to automatically added footage/station markers to the digital data. The saved data can be printed or post processed.

Interpretation of GPR data is subjective. GPR results should be verified with borings or test pits. GPR lines indicate a cross-section in time/depth along a survey line.

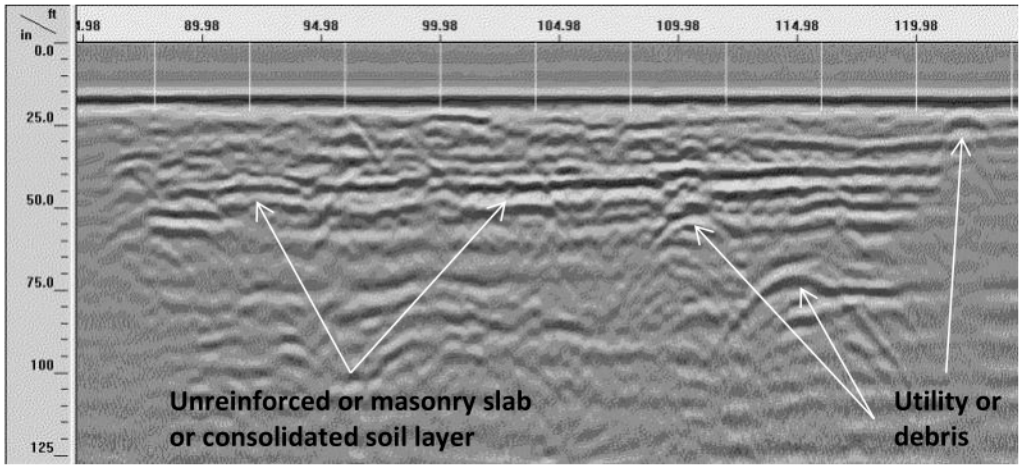
Natural soils or fill placed in lifts during construction retain moisture between material interfaces and typically have horizontal or near horizontal bedding planes. These conditions cause a change in conductivity which shows as continuous reflective layers on GPR data. The strength of a reflected signal and/or the continuity of the reflector across the record may be indicative of a stratigraphic contact, water table, top of rock, back of wall/slab.

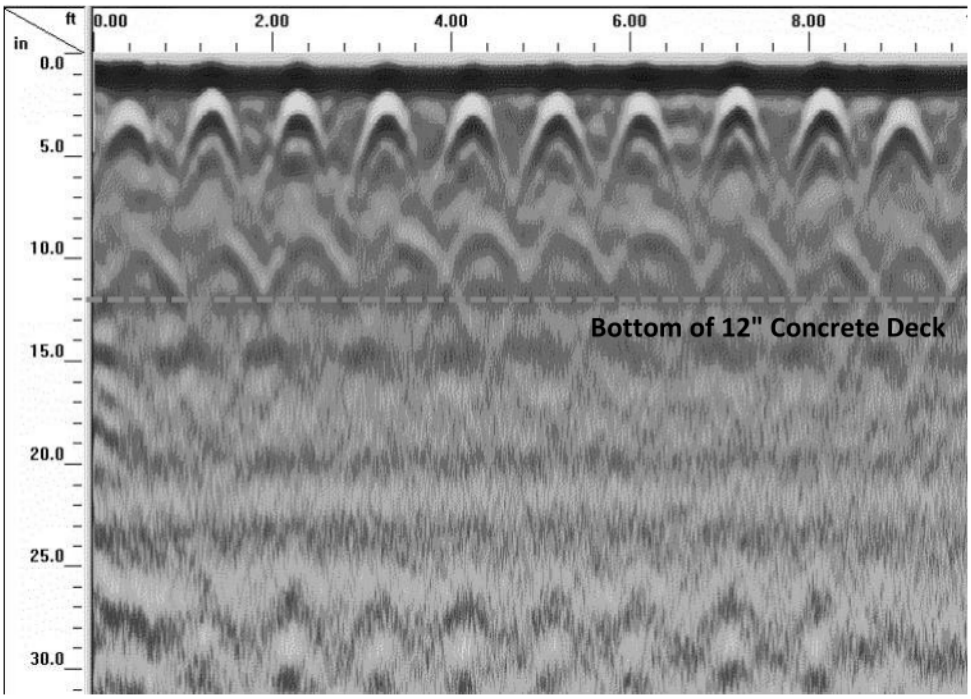


Locations where GPR data indicate theses horizontal bedding planes/layers are sloping, draped or disturbed can be indication of soil settlement, trenching and/or voiding. Areas where GPR data is less reflective, indicating fine soil materials (clays and silts) have been washed or eroded away or areas that are more reflective, indicating loose soil conditions where moisture has accumulated are also indicative of and associated with settlement, sinkholes, and voiding.



Often point targets, such as reinforcing, buried utilities, boulders, create a distinctive parabolic feature on GPR records. Point targets trending perpendicular to the direction of the line of coverage are detected, therefore to detect longitudinal reinforcing a transverse line of data would be collected and to detect transverse reinforcing, a longitudinal line of data would be collected. Plotting point targets of similar signal strength, depth, and shape located along the grid of GPR lines give the trend and location of individual utilities and/or reinforcing.





Top Reinforcing
12" spacing
2+/- inches cover

Bottom Reinforcing
12" spacing
8-9 inches cover

APPENDIX 2

SONIC/ULTRASONIC MEASUREMENTS

APPENDIX
SONIC/ULTRASONIC NONDESTRUCTIVE TESTING OF CONCRETE

The sonic/ultrasonic measurements made to determine the characteristics of concrete (or rock) are generated by a relatively low energy source as a single discrete wide band impulse with a pulsed transducer, projectile, mechanical hammer, etc. Practical problems and the condition of the concrete surface largely determine the source(s) to be used. A rough concrete surface that has deposits of organic materials or mineral deposits generally requires a more powerful energy source whereas a relatively new or wet concrete may be inspected by the use of a pulsed transducer or other higher frequency source. In general high frequency sources that may work well in the laboratory may be unusable for field conditions. High frequency sources have the advantage of high resolution but the disadvantage of low penetration. While metals can be tested in the megahertz range, such signals in concrete will not have measurable signals for more than an inch in thickness. The energy source should be sufficient to maximize the resolution, have sufficient penetration to examine the concrete being tested and enough energy to excite the fundamental frequencies being sought.

The transmitted energy is in the form of three principal wave types: compressional (contraction/expansion, spring-like particle motion), shear (traction-sliding motion), and surface waves (combination of motions). Each boundary that has density and or velocity contrast will reflect and/or refract these waves. Compressional and shear wave velocity values are determined by the Young's, shear and bulk moduli values as well as the density and Poisson's Ratio. In turn the velocity can be used to determine the moduli values and Poisson's Ratio given that the density is known or can be assumed. The moduli values measured are the dynamic moduli values at low strain. In general, the difference between the dynamic values and the static values is almost entirely controlled by the crack densities of the concrete. Using the modulus values, a reasonable estimate of the unconfined compressive strength can be determined. The strength is largely dependent on the crack density of the concrete and for static tests, the orientation of the cracks. For static testing, cracks perpendicular to the axis of the core and perpendicular to the directed stress will produce a strength (static) that is not greatly different from uncracked concrete. The applied stress closes or compresses the cracks. Cracks that are near 45º to the direction of stress will result in lowest static strength. The approximate orientation of the cracks can be determined with dynamic measurements of the velocity values in different directions.

NDT Corporation makes several determinations from one energy impact. The velocity is measured directly from the energy point of impact to a linear array(s) of sensors on the surface. The array length is usually in excess of the thickness of the concrete being tested. In addition to the velocity measurements, reflections are measured individually or determined from a frequency analysis of the time domain recordings. Each reflecting surface (change of density and/or velocity) produces a multi-path reflection in the layer it bounds. A generated wave will travel to a delamination surface and reflect back to the surface of the concrete where it is reflected back to the delamination, resulting in multi-reflections that are apparent in the frequency domain. These reverberations (echoes) are particularly diagnostic of delaminations and thickness of the concrete. They will readily distinguish the presence of local delaminations, cracked or decomposed inclusions by the particular frequency band generated at the mechanical discontinuity. If a delamination is

severe or large in area, the reflected signals are strong resulting in a low frequency, high amplitude, and long duration "ringing" signal or a drum head effect that is usually quite distinguishable. This is the basis of the 'chain drag" using the human ear as the sensor to recognize frequency differences. The ear however is limited in its perception and will only distinguish within the hearing range.

DIRECT AND REFRACTED ENERGY

One of the advantages of the sonic/ultrasonic method is its ability to "look through" overlying materials coatings, particularly decomposed "softer layers" when the array(s) is configured properly. This is done using refracted waves associated with the different layer velocities or by careful examination of the resonant frequencies associated with such layering.

The diagram below shows the wave path for refracted energy generated for a softer (1) lower velocity layer over a harder (2) higher velocity layer. For example asphalt (1) over good concrete (2). The wave is bent (similar to the appearance of a stick in water) and travels along the boundary between the lower velocity layer and the higher velocity layer and radiates back to the surface. The higher velocity of the good concrete allows the refracted wave to overtake the direct wave in layer 1 at some distance designated as $D_{1|2}$. To the left of this point the lower velocity of layer 1 will be measured and beyond it the velocity of the deeper layer 2 is measured.

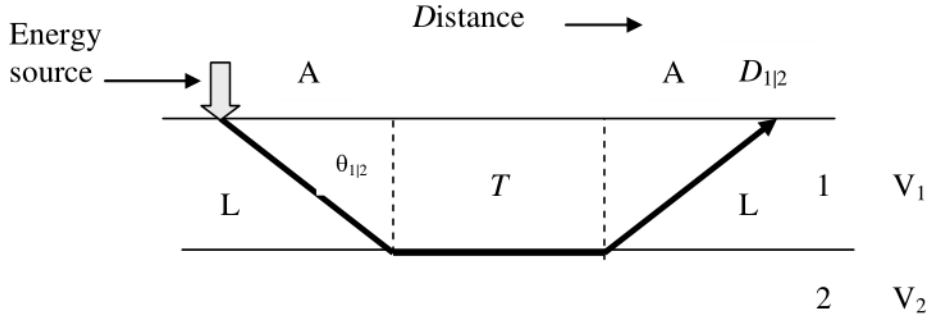


Figure A1

The time for the direct path is D/V_1, the refracted path time is $2L/V_1+(D_{1|2}-2A)/V_2$.
The array of sensors is placed in the distance direction and the time elapsed (travel time) from the time of energy impact to the sensor distance is measured. The velocity is determined from this time-distance measurement(s). The angle θ is the angle between the perpendicular to the layer and the incident wave that is critically refracted. The sine of this angle is the velocity of the first layer divided by that of the second layer (Snell's Law). The distance shown $D_{1|2}$ is the point on the surface where the refracted time arrival equals that of the direct wave (the refracted wave travels at a higher velocity than the direct wave).

$$\frac{D}{T} = \frac{D - 2\tan\Theta}{V_2} + \frac{2T}{V_1 \cos\Theta}$$

The thickness is expressed as:

$$T = \frac{D_{1|2}}{2}\sqrt{\frac{V_2 - V_1}{V_2 + V_1}}$$

D is the distance and *T* is the thickness. Since the times as well as the distances are measured, then V_1 and V_2 are determined. If a plot of distance versus time is made then the resulting graph will look like Figure A2.

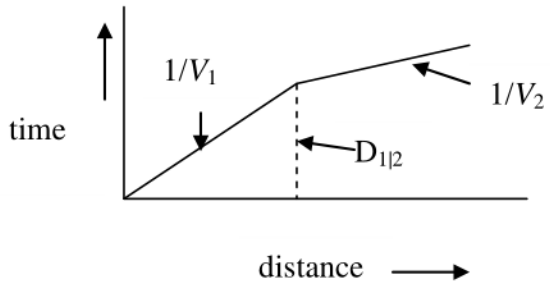


Figure A2

If the concrete has no overlay then the concrete velocity is simply *D*/*T*.

The resonant frequencies are determined by the thickness and velocity of the material. Since the velocity is measured as above, then the thickness can be determined directly.

The resonance of a simple beam is given by:

$$f = \frac{nV}{2L} \qquad (fixed - fixed, \quad free - free) \quad where\ n = 1,2,3---$$

$$f = \frac{nV}{4L} \quad (open - fixed), \quad where \quad n = 1,3,5,7---$$

Since the frequency and velocity are measured, the thickness is determined. This thickness can be the thickness of the concrete floor, deck slabs, or column being measured or it can be the thickness of concrete overlying a delamination.

While the refracted wave is dependent only on a contrast in velocity, a reflection can take place where there is a change in velocity or density or both. The impedance (RF reflection coefficient) which causes a wave to be reflected is given by:

$$RF = \frac{\rho_2 V_2 - \rho_1 V_1}{\rho_2 V_2 + \rho V_{11}}$$

Where ρ is the density and V is the velocity of the material. The impedence determines the strength of the reflection. The contrast between an air filled void at the back of or within the concrete is significant; the velocity in air is 1,000ft/sec. and the velocity of good concrete is 13,000ft/sec. The density differences are of course very large between the concrete and air. A similar difference exists for a water filled void where the velocity in water is 5,000ft/sec. and concrete is nearly a factor of 2.5 denser. Voiding behind a liner or under a slab is usually well distinguished by a distinct " ringing" resonant frequency, reffered to above as a drum head effect..

MODULI VALUES AND STRENGTH

The moduli values as stated above are determined from the velocity values using an assumed or measured density. The density is usually the best known or best estimated value for the concrete, its variance generally does not affect the calculations significantly.

The relationships for Young's modulus versus the compressional velocity are shown in Figure A4; shear modulus versus the shear velocity Figure A5; Poisson's Ratio versus the compressional and shear wave velocities Figure A6; and finally a relationship between the velocity values (compressional and shear) and the unconfined compressiive strength of concrete, Figure A7.

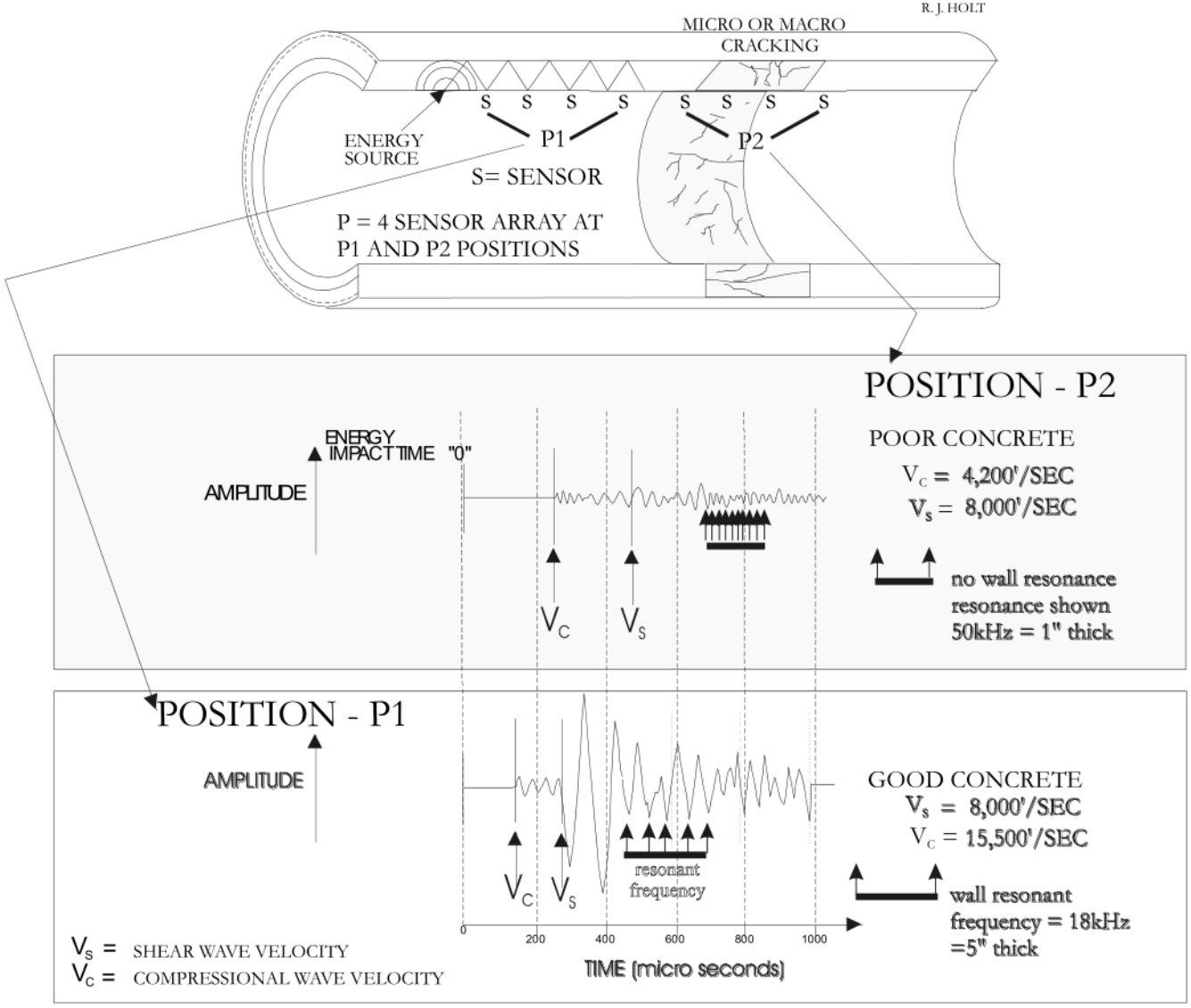
Figure A3 is illustrative of a tunnel liner or pipe investigation where there has been circumferential damage, perhaps at a construction joint or an outside zone of weakness (rock shear or fault, soil washout etc.) that has affected the integrity of the liner. The damage need not be visible; there can be a 20% reduction in the strength of the concrete from micro-cracking that is not visible to the naked eye. The process of deteroration of most concrete starts at the micro level and with continued stress the micro cracks coalesce into macro cracks and finally to spalling. The ability to measure at the micro level well in advance of future needed repairs provides a management tool for establishing proirities for repair, projected budgets, and asset valuation

SONIC/ULTRASONIC TUNNEL & PIPE LINE TESTING

Circumferential (face to back) Cracking

NDT ENGINEERING, INC.

R. J. HOLT



SONIC/ULTRASONIC TIME AMPLITUDE RECORDS
FOR FOURTH SENSOR - POOR AND GOOD CONCRETE

FIGURE A3

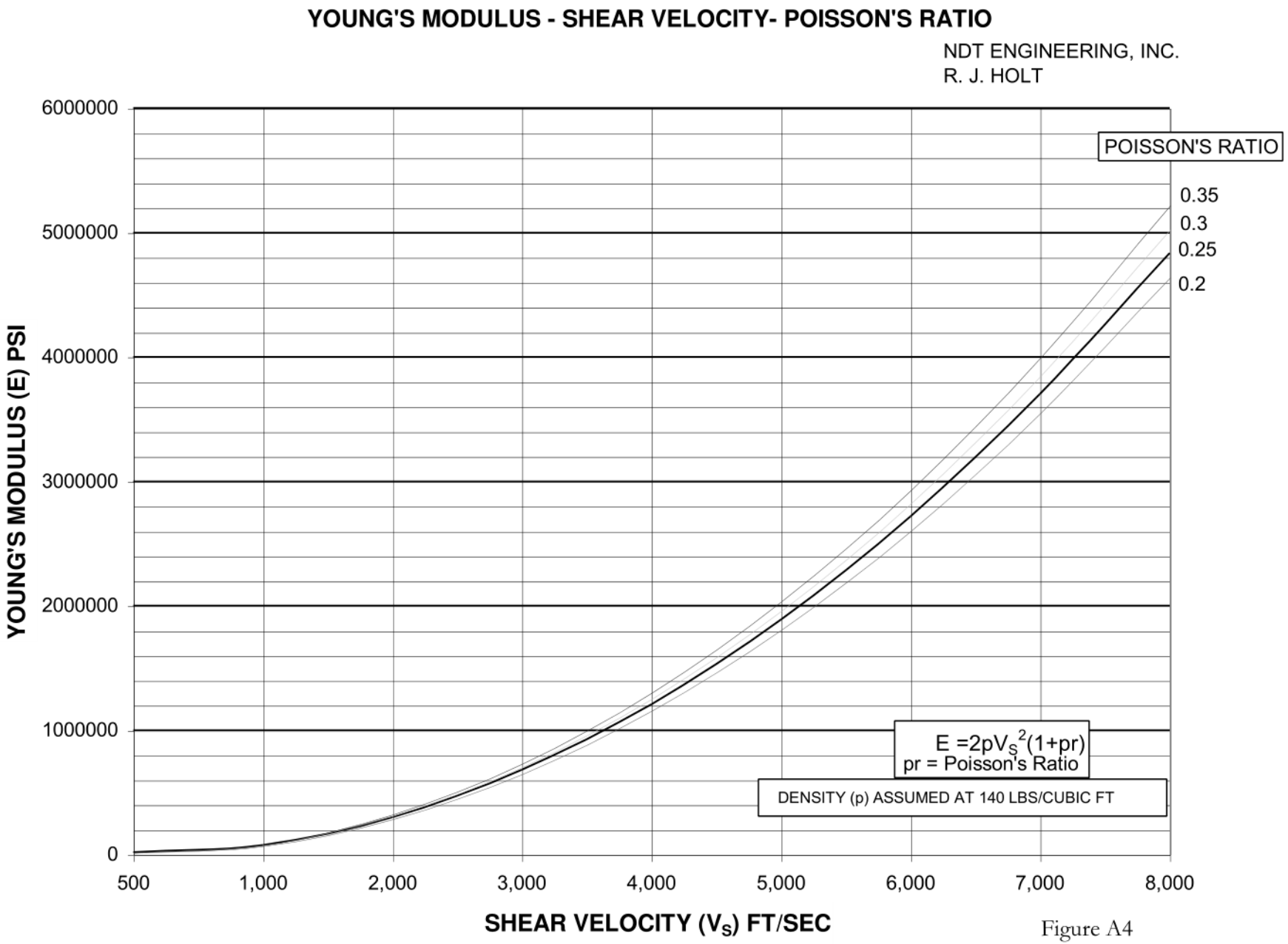

YOUNG'S MODULUS - SHEAR VELOCITY- POISSON'S RATIO
NDT ENGINEERING, INC.
R. J. HOLT
YOUNG'S MODULUS (E) PSI
6000000
5000000
4000000
3000000
2000000
1000000
0
500
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
SHEAR VELOCITY (V_S) FT/SEC
POISSON'S RATIO
0.35
0.3
0.25
0.2
$E = 2pV_S^2(1+pr)$
pr = Poisson's Ratio
DENSITY (p) ASSUMED AT 140 LBS/CUBIC FT

Figure A4

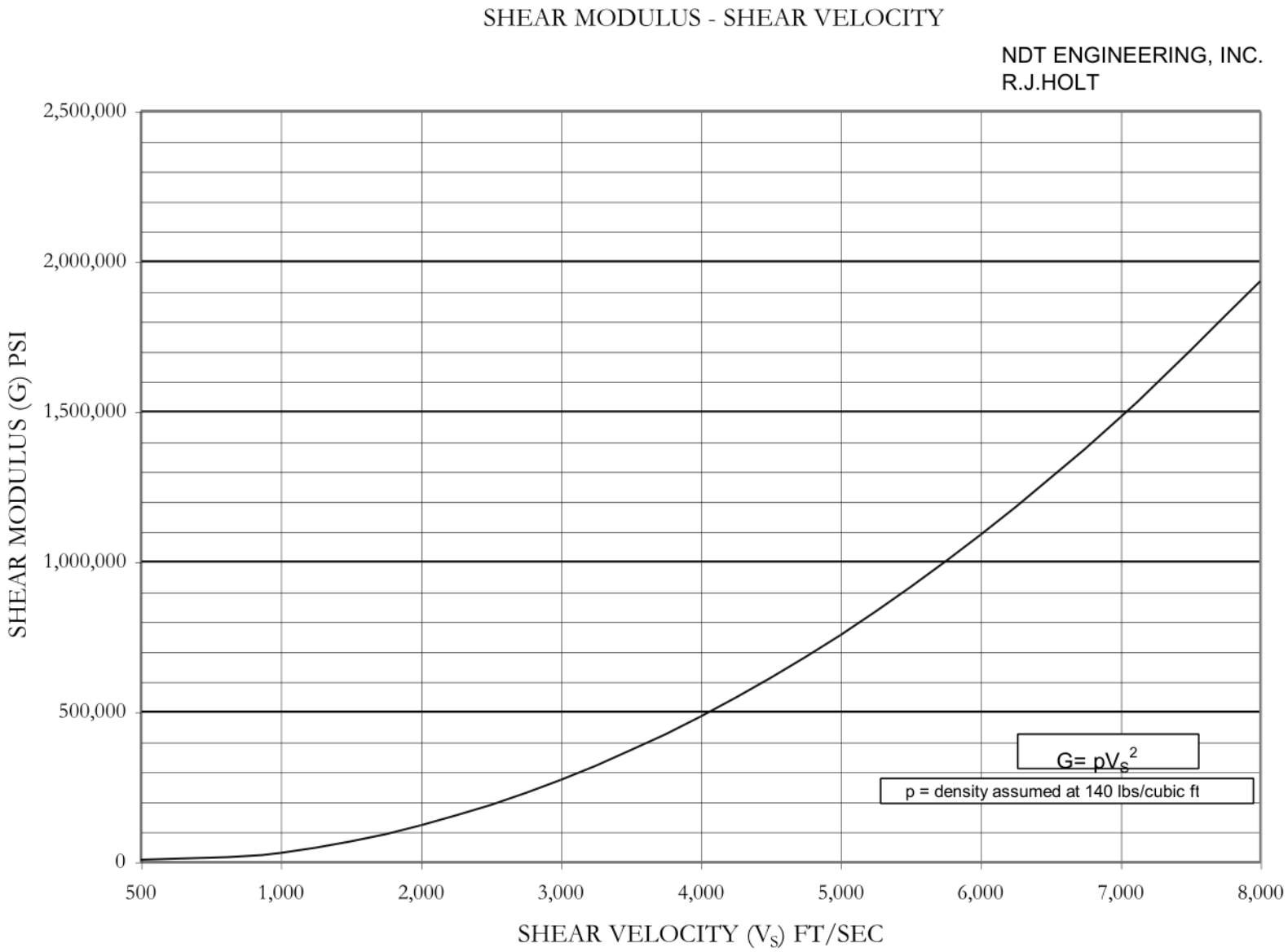

SHEAR MODULUS - SHEAR VELOCITY
NDT ENGINEERING, INC.
R.J.HOLT
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
SHEAR MODULUS (G) PSI
500
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
SHEAR VELOCITY (VS) FT/SEC
G= pVS2
p = density assumed at 140 lbs/cubic ft

Figure A5

COMPRESSIONAL VELOCITY - SHEAR VELOCITY - POISSON'S RATIO

NDT ENGINEERING, INC.
R J HOLT

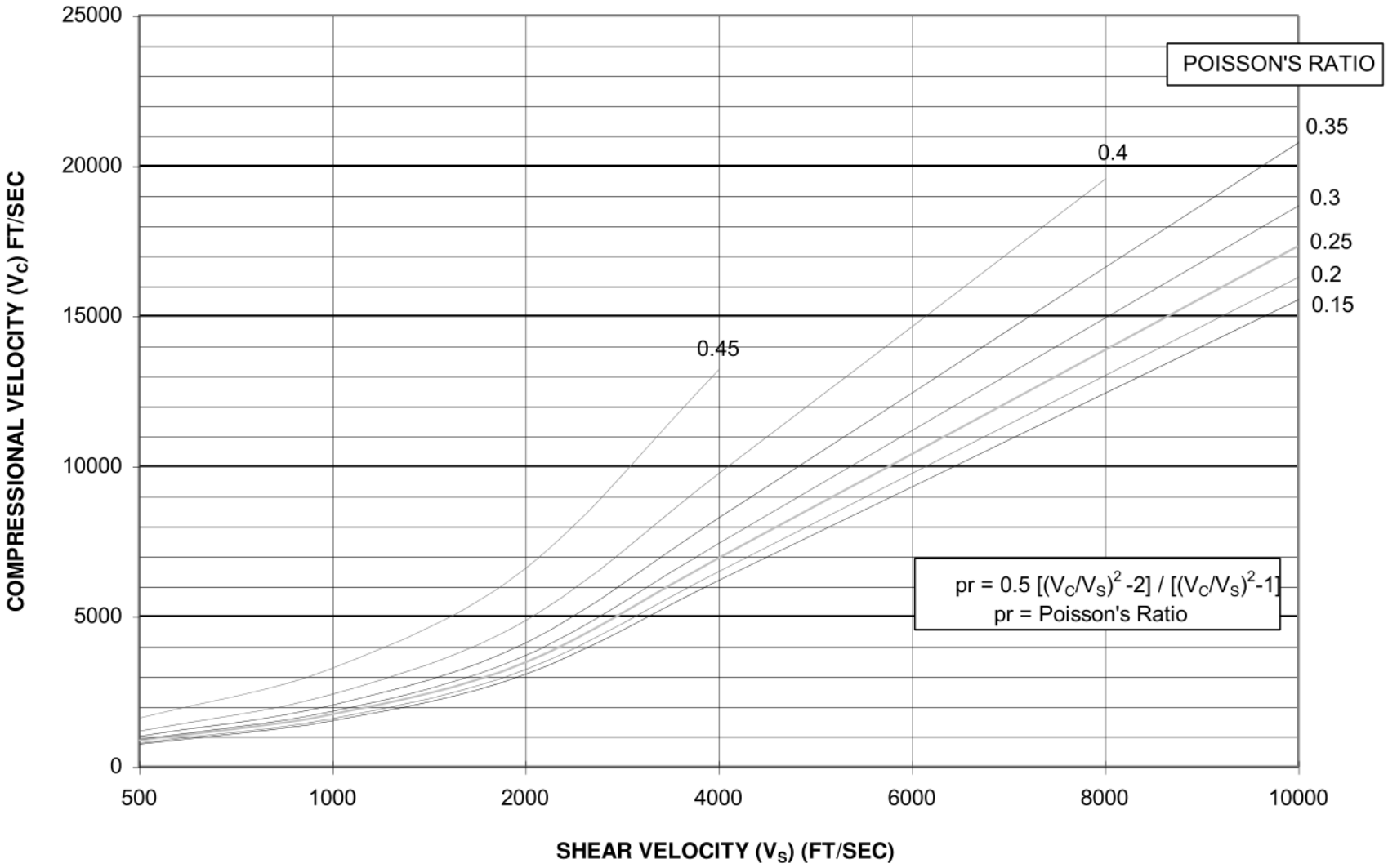
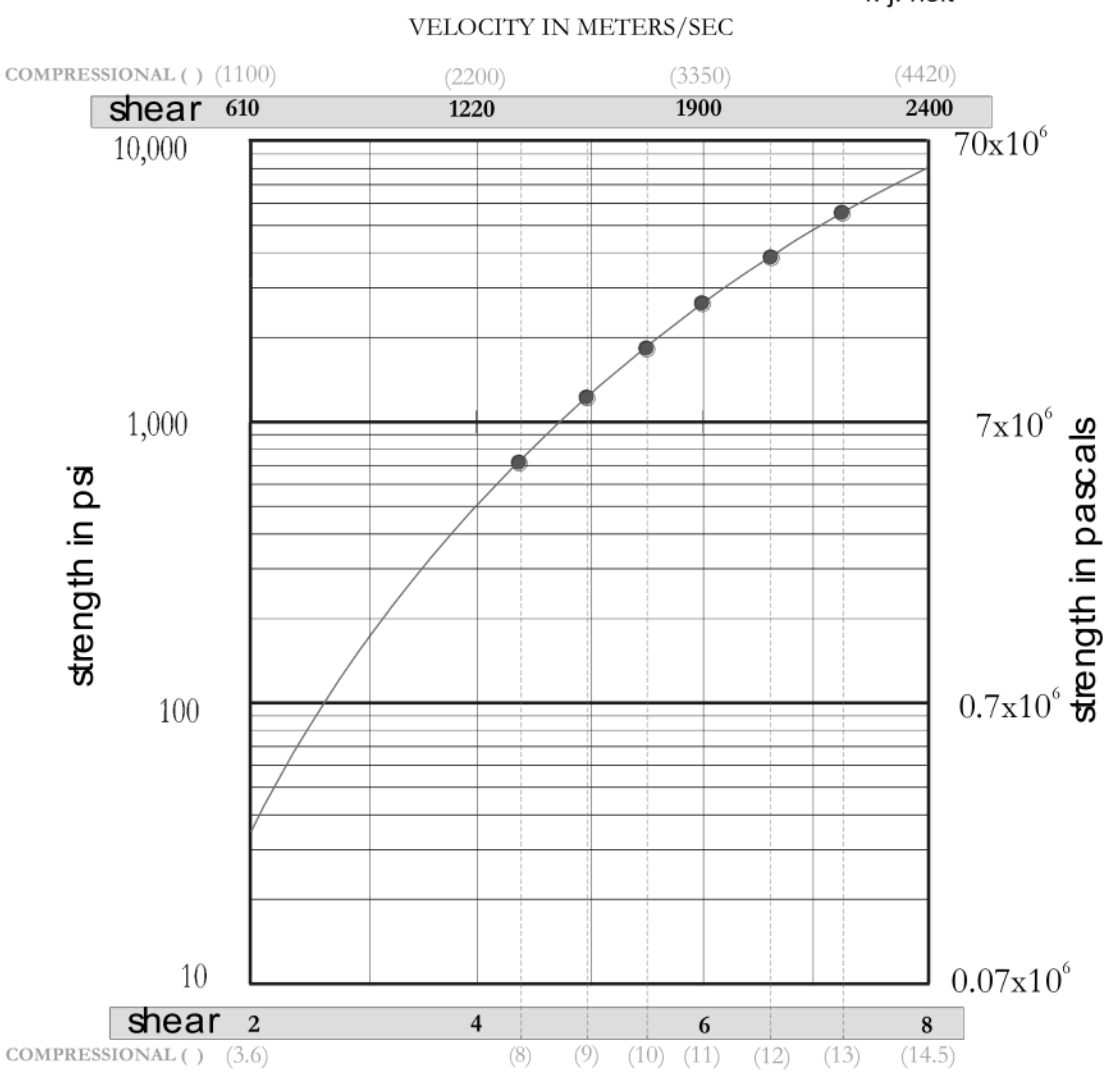
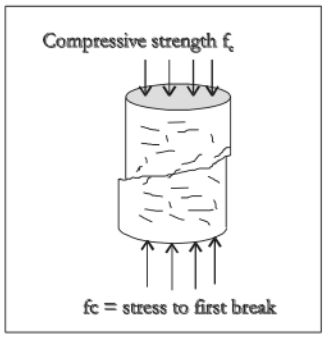


Figure A6

strength of concrete versus velocity

r. j. holt





VELOCITY IN FEET/SEC (X 1,000)

CURVE FOR RATIO: $V_{SHEAR} / V_{COMPRESSIONAL} = 0.55$
EQUALS POISSON'S RATIO OF 0.28

FIGURE A7

NDT ENGINEERING, INC.



moffatt & nichol

EQUAL OPPORTUNITY EMPLOYMENT REQUIREMENTS

00830

SECTION 00830

EQUAL EMPLOYMENT OPPORTUNITY

1.00 GENERAL

1.01 DESCRIPTION

A. Intent:

Insure compliance with Equal Employment Opportunity goals and regulations established by Federal and State of Rhode Island governments and the Owner.

B. Related Material Specified Elsewhere

1. Specification and Project Manual

a. Document affecting compliance with this Section include, but are not necessarily limited to, General Provisions, Supplementary Provisions; and

b. Invitation to Bid	Section 00020
c. Instructions to Bidders	Section 00200
d. Bid (Proposal)	Section 00410

2. Reference

The following documents are understood to be contained within these requirements by reference:

- Federal Executive Order No. 11246, as amended
- State of Rhode Island Executive Order, 85-11

1.02 QUALITY ASSURANCE

The Contractor will attend such meetings as may be requested and will furnish all information and reports, required by Federal Executive Order No. 11246, as amended, State of Rhode Island Executive Order 85-11, and other regulations as issued by the Quonset Development Corporation, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his/her books, records, and accounts by the State Equal Opportunity Office and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

2.00 BID AND AWARD PROCEDURE

Not withstanding such other requirements as may be set forth in these Specifications, the following procedures shall generally be implemented to insure compliance with this Section.

2.01 PRE-BID PHASE	REFER TO:
A. Quonset Development Corporation issued bid notification package, inclusive of R.I. State Equal Opportunity Office (RI EOO) and the Quonset Development Corporation "Certificate of Compliance Agreement", along with bid specs.	*Invitation to Bid Section 00020 or *(Notice to Contractors) as advertised
B. A Representative from the State Equal Opportunity Office attends the pre-bid conference to let prospective contractors, their proposed subcontractors and/or other interested parties know of their responsibilities in regard to equal employment opportunity and affirmative action.	*Instructions to Bidders Section 00200
2.02 BID PHASE	
Bids for the job are submitted to the Quonset Development Corporation along with the Certificate of Compliance Agreement, signed by the Contractor.	*Bid Proposal - Section 00410
2.03 PRE-AWARD PHASE	
A. The Quonset Development Corporation tentatively selects the Contractor and simultaneously notifies the contractor and the State Equal Opportunity Office of the tentative award. (The bid notification from the Quonset Development Corporation has the following information: Bid Number, Dollar Amount of Contract, Purpose of Contract, Name and Address of Contractor.)	*Sample #1, Letter "Notice of Tentative Award" and the end of this Section.
B. The R.I State Equal Opportunity Office notifies the contractor by letter to either: 1. Make an appointment for a pre-award review, or 2. Complete a questionnaire and return by mail for a pre-award review.	*Sample #2, Letter "RI EOO Request for Meeting" at the end of this Section *Sample #3, Letter "EOO Notice to Complete Compliance Report" *Sample #4 "EOO Compliance Report Form: both samples of the above at the end of this Section.
C. The Contractor calls the RI State Equal Opportunity Office for an appointment or returns the pre-award compliance questionnaire by mail.	N/A
D. The RI State Equal Opportunity Office conducts the pre-award review with the	

contractor at the RI State Equal Opportunity Office.

E. The RI State Equal Opportunity Office notifies the Quonset Development Corporation by letter, that the contractor is:
   1) in compliance
   2) in compliance with stipulation
   3) non-compliance

*Sample #5, Letter "EOO Notification of Compliance Status" at the end of this Section

2.4 POST AWARD /PRE-CONSTRUCTION PHASE

A. Upon the Contractor successfully meeting the requirements set forth in the Quonset Development Corporation "Notice of Tentative Award" Letter, the Quonset Development Corporation issues a "Notice of Award" to the Contractor along with Contract Forms to be completed by the Contractor and sets a tentative date for the pre-construction conference.

*Sample #6, "Letter of Award" at the end of this Section

*Project Management and Coordination-Section 01310

NOTE: A failure of any prospective Contract Awardee to obtain "in compliance" status from the R.I State Equal Opportunity Office may cause the QDC to disqualify that party or parties from further consideration as to the award of this Contract.

B. The State Equal Opportunity Office is notified by the Quonset Development Corporation by phone or letter of the date that the pre-construction meeting is to be held.

*Sample #6, Letter "Notice of Award" at the end of this Section.

C. A representative from the State Equal Opportunity Office attends the pre-construction meeting to let the prime contractor and their sub-contractors know of their responsibilities in regard to equal employment and affirmative action.

*Project Management and Coordination-Section 01310

D. The Quonset Development Corporation issues a "Notice to Proceed" to the Contractor.

*Samples #7 - Notice to Proceed" at the end of this Section

2.05 CONSTRUCTION

An on-site monitoring review is conducted by the State Equal Opportunity Office and a report is submitted to the State Equal Opportunity Office, by the person performing the review, each and every time an on-site review takes place.

*Sample #8 - "EOO Monthly Employment Utilization Report" at the end of this Section.

PART 3.00 - EXECUTION

3.01 EQUAL OPPORTUNITY CLAUSE

During the performance of this Contract, the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex , or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer, setting forth the provisions of this non-discrimination clause.

B. The Contractor will, in all solicitations or advertisements or employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

C. The Contractor will send to each labor union or representative or workers with which he/she has collective bargaining agreement or other contract or understanding, a notice, advising the Labor union or worker's representative of the Contractor's commitments under Section 202 of State of Rhode Island Executive Order 85-11, and other regulations as issued by the Quonset Development Corporation, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Contractor will comply with all provisions of Federal Executive Order No. 11246, as amended, State of Rhode Island Executive Order 85-11, and other regulations, and relevant orders of the Secretary of Labor.

E. The Contractor will furnish all information and reports, required by Federal Executive Order No. 11246, as amended, State of Rhode Island Executive Order 85-11, and other regulations a issued by the Quonset Development Corporation, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his/her books, records, and accounts by the State Equal Opportunity Office and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

F. In the event of the Contractor's non-compliance with the non-discrimination clauses of this contract or with any such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or part and the contractor may be declared ineligible for further State contracts in accordance with procedures authorized in Federal Executive Order No. 11246, as amended, State of Rhode Island Executive Order 85-11, and other regulations as issued by the Quonset Development Corporation, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by Law, or the State of Rhode Island and Providence Plantations.

G. The Contractor will include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Federal Executive Order No. 11246, as amended, State of Rhode Island Executive Order 85-11, and other regulations as issued by the Quonset Development Corporation, so that such provisions will be binding upon each subcontractor or vendor. The

Contractor will take such action with respect to a means of enforcing such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to a means of enforcing such provisions including sanctions for non-compliance; provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the contractor may request the United States and the State of Rhode Island to enter into such litigation to protect the interest of the United States and the State of Rhode Island.

3.02 AGE DISCRIMINATION

Pursuant to Federal Executive Order No. 11246, as amended, the Contractor will not, in connection with the terms, conditions, or privileges of their employment, discriminate against persons because of their age except upon the basis of bona fide occupational qualification, retirement plan or statutory requirement, nor will the Contractor specify, in solicitations or advertisements for employees, a maximum age limit for employment unless the specified maximum age limit is based upon a bona fide occupational qualification, retirement plan or statutory requirement.

3.03 EMPLOYMENT OF THE HANDICAPPED

A. General

1. Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

2. Contractor agrees that, if a handicapped individual files a complaint to him that he/she is not complying with the requirements of the Rehabilitation Act of 1973, he/she will (1) investigate the complaint and take appropriate action consistent with requirements of 20 CFR 741.29 and (2) maintain on file for three years, the record regarding the complaint and the action taken.

3. Contractor agrees that, if a handicapped individual files a complaint with the Department of Labor that he/she has not complied with the requirements of the Act, (1) he/she will cooperate with the Department in its investigation of the complaint, and (2) he/she will provide all pertinent information regarding his/her employment practices with respect to the handicapped.
4. Contractor agrees to comply with the rules and regulations of the Secretary of Labor in 20 CFR DH VI, Part 741.

5. In the event of Contractor's non-compliance with the requirements of this clause, the contract may be terminated or suspended in whole or in part.

6. This clause shall be included in all subcontracts.

B. In the event that this contract exceeds $10,000 but is less than $500,000 and provides for performance in 90 days or more, Contractor further agrees as follows:

1. Contractor agrees (1) to establish an affirmative action program, including appropriate procedures consistent with the guidelines and the rules of the Secretary of Labor, which will provide the affirmative action regarding the employment and advancement of the handicapped required by P.L. 93-112, (2) to publish the program in the employees or personnel handbook or otherwise distribute a copy to all personnel, (3) to review the program each year and to make such changes as may be appropriate, and (4) to designate one of the principal officials to be responsible for the establishment and operation of the program.

2. Contractor agrees to permit examination by appropriate contracting agency officials or the Assistant Secretary for Employment Standards of the designee, of pertinent books, documents, papers and records concerning employment and advancement of the handicapped.

3. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Assistant Secretary for Employment Standards, provided by the contracting officer, stating contractor's obligation under the Law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment and the rights and remedies available.

4. Contractor will notify each Labor union or representative of workers with which he/she has a collective bargaining agreement or other contract understanding, that he/she is bound by the terms of Section 503 of the Rehabilitation Act, and is committed to take affirmative action to employ and advance in employment, physically and mentally handicapped individuals.

C. In the event this contract exceeds $100,000 and provides for performance in 90 days or more, Contractor further agrees as follows:

1. Contractor agrees to submit a copy of his/her affirmative action program to the State Equal Opportunity Office within 30 days after the award to him of a contract or subcontract.

2. Contractor agrees to submit a summary report to the State of Rhode Island and Providence Plantations Equal Opportunity Office by March 31 of each year during performance of the contract and by March 31 of the year following completion of the contract, in the form prescribed by the State Equal Opportunity Office, covering employment and complaint experience accommodations made and all steps taken to effectuate and carry out the commitments set forth in the affirmative action program.

3.04 CERTIFICATE OF NON-SEGREGATED FACILITIES

Contractor certifies that he/she does not maintain or provide for his/her employees any segregated facilities at any of his/her establishments, and that he/she does not permit his/her employees to perform their services at any such location, under his/her control, where segregated facilities are maintained. He/she certifies further that he/she will not permit his/her employees to perform their services at any location, under his/her control, where segregated facilities are maintained. Contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "Segregated Facilities" means any waiting rooms, work areas, rest rooms, and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment are segregated by explicit, directive, or are, in fact , segregated on the basis of race, creed, color or national origin, because of habit, local custom, or otherwise. He/she further agrees that (except where he/she has obtained identical certification form proposed subcontractors for specific time periods) he/she will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause; that he/she will forward the following notice to proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATION OF NON-SEGREGATED FACILITIES

A Certificate of Non-segregated Facilities must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause. This certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semi-annually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.A. 1001.

3.05 AFFIRMATIVE ACTION COMPLIANCE PROGRAM:

Contractor agrees to develop a written Affirmative Action Compliance Program for each of its establishments as required by Section 60-1.40 of Title 41 of the Code of Federal Regulations.

3.06 EMPLOYERS INFORMATION REPORT (EEO-1), Standard Form 100

Contractor agrees to file in duplicate, Standard Form 100, entitled "Equal Employment Opportunity Employer Information Report EEO-1" as required by Section 60-1.7 of Title 41 of the Code of Federal Regulations. Original copy to Federal authorities, duplicate copy to the State Equal Opportunity Office, 289 Promenade Street, Providence, Rhode Island 02908.

3.07 NOTICE TO ALL VENDORS

If it should be determined by the State Equal Opportunity Office that any company doing business with the State is guilty of non-compliance with the provisions of this document, said company will be given two written warnings. If the said company does not comply immediately after the second written notice, then the State Equal Opportunity Office will notify the Quonset Development Corporation, who shall have the authority to have the contract revoked and all contractual obligations of the State dealing with the contract in question will be null and void.

3.08 MEETINGS AND CONFERENCES

The Contractor (and, when required, subcontractors) will attend such pre- and post-award conferences as may be required to insure the effective implementation of Affirmative Action measures as set forth above.

3.09 COMPLIANCE AGREEMENT

The Contractor shall complete, sign and submit with his Bid Proposal, a copy of the "Quonset Development Corporation/Rhode Island State Equal Opportunity Office General Contract Compliance Certificate and Agreement" form. The failure of a Contractor to complete and submit the Agreement form may be cause for rejection of that Contractor's Bid Proposal. Not withstanding, this or such other requirements set forth in the Project Manual and Specifications, contract forms of agreement may not be signed unless a completed and signed "Quonset Development Corporation/Rhode Island State Equal Opportunity Office General Contract Compliance Certificate and Agreement" form has been submitted by the Contractor, unless that Contractor has been determined to be exempt from such "Equal Opportunity" requirements.

QUONSET DEVELOPMENT CORPORATION (QDC)

INVITATION TO BID

A BID is solicited for the following work:

Name of Project:	Crew Transfer Vessel (CTV) Harbor
Description of Work:	The Project is to make improvements to the existing infrastructure at Terminal 4/5 and Pier 1 for the shoreside operations of crew transfer vessels (CTVs). This includes the saw cutting and R&D of existing pavement types, outdated electrical equipment, and pneumatic fenders. The installation of new utilities and their corresponding receptacles. This is to include the addition of D-Fender to be added to existing timber pile fenders and the addition of lighting infrastructure. Work is to include the construction of security fencing around the area and the addition of the above fuel tanks and a fuel management system. In addition to the project described above, the Owner is undertaking another project. This other project will be happening simultaneously and will have the potential of requiring coordination between the two projects.
Contract Number:	2022-007

BIDDING INFORMATION

Where Received:	Quonset Development Corporation Quonset Business Park 95 Cripe Street North Kingstown, Rhode Island 02852
Closing Date:	June 21, 2022 at 2:00 PM (Local Time)
Bid Form and Specifications:	A Project Manual (consisting of Bid Form, Form of Contract, Contract General Provisions, Contract Supplementary Provisions, and Technical Specifications) and Drawings may be examined at the office where bids are to be received, Quonset Development Corporation (*Issuing Office)*. A copy of these documents may be obtained, upon request directed to Mr. Gregory J. Coren P.E., Manager of Engineer, Quonset Development Corporation, Quonset Business Park, 95 Cripe Street, North Kingstown, Rhode Island (Telephone No. 401-295-0044 ext. 238). Only electronic copies (PDF) of plans and specifications are available.
Public Copy - Bid:	Pursuant to RI General Law §37-2-18(b) each bidder must submit a "PUBLIC COPY" of their bid proposal to be available for public inspection upon opening of all bids. Therefore, an original bid proposal and a copy of the bid proposal shall be submitted.

SAMPLE

Bonding Requirements:	Bids shall be accompanied by a Bid Guarantee in the amount of Twenty Percent (20%) of the Base Bid Amount (section C-200 Article 8). The Contractor to whom the contract is awarded will be required to post performance and payment bonds in the amount of One Hundred Percent (100%) of the contract price. Bonds shall be executed on Engineer's Joint Contract Documents Committee format (EJCDC No. C-610, EJDC No. C-615 or on comparable format which is approved in advance by the Quonset Development Corporation). The bonds shall be issued by a company that is acceptable to the Quonset Development Corporation. A minimum requirement for acceptability shall be that the Surety Company is currently listed on U.S. Department of the Treasury Circular #570 as holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as holding a Surety License in the State of Rhode Island. An appropriate Certificate of Corporate Authority shall accompany the required performance and payment bonds.
Terminal Access Control	Pursuant to Section 01110 "Terminal Access Control Policy", the QDC requires that all persons who have a legitimate business need to enter upon property owned and controlled by the QDC at the Port of Davisville possess and display a properly issued and authorized identification card. The security objective is to provide for the safety and security of people, cargo and infrastructure assets, while facilitating the productive flow of commerce into, within, and out of the Port of Davisville. Any individual who works in the port area will be required to obtain a Port of Davisville identification card. Pier Access: Access to the piers, which are restricted areas, at the Port of Davisville will be controlled by Port Security Personnel. Only personnel who are authorized by the Facility Security Officer (FSO) or his designated representative, will be allowed access, and will be required to have a Transportation Worker Identification Credential (TWIC) and a Port of Davisville photo identification card.
Wage Requirements:	The attention of the bidder is particularly called to the requirements as to conditions of employment to be observed and wage rates to be paid under the contract. This includes payroll recording requirements in conformity with the provision of Chapter 13 of Title 37 of General Laws, Rhode Island 1956, and the Davis-Bacon Wages Rates as amended.
Equal Opportunity Requirements:	Unless otherwise exempt, bidders must certify that they are in compliance with applicable requirements of Federal Executive Order No. 11246, as amended, State of Rhode Island Executive Order 85-11 and other regulations issued by the Quonset Development Corporation or must agree to take steps to comply with such requirements prior to the award of a contract. This proposal is subject to Rhode Island General Law 37-14-1.
Apprenticeship Requirements:	Pursuant to Rhode Island General Laws 37-13-1 and 37-13-3.1, all general contractors and subcontractors who bid and/or perform work on state public works projects valued at One Million Dollars ($1,000,000) or more shall employ apprentices and shall be subject to the provisions in Exhibit G, Prevailing Wage & Apprenticeship

SAMPLE

Requirements, including but not limited to:
Pursuant to R.I. Gen. Law 37-13-2, any person, firm, or corporation Bidding on a state public works contract ("general contractor") valued at One Million Dollars ($1,000,000) or more shall certify their ability to perform the contract by meeting the apprenticeship requirements set forth in R.I. Gen. Laws 37-13-3.1.

Prior to bidding on a state public works contract valued at One Million Dollars ($1,000,000) or more, the general contractor shall certify compliance with apprenticeship requirements by fully executing a General Contractor Apprenticeship Certification Form. The general contractor shall meet one of the qualifications identified on said form. The general contractor shall attach said form to his/her application to bid and submit to the awarding authority.

No contract award for a state public works contract valued at One Million Dollars ($1,000,000) or more shall be made to any general contractor who fails to submit a fully executed and truthful General Contractor Apprenticeship Certification Form.

Pursuant to R.I. Gen. Laws 37-13-3.1, all general contractors who perform work on any public works contract awarded by the state and valued at One Million Dollars ($1000,000) or more shall certify their ability to perform the contract by meeting the apprenticeship requirements set forth in R.I. Gen. Laws 37-13-3.1.

Waiver and Acceptance: The Quonset Development Corporation reserves the right to reject any or all of the bidders and to waive any informalities in bids received and to accept that bid which, in its judgment, best serves the interest of the Corporation.

Information: Inquiries regarding this invitation should be addressed to Mr. Christian Jones, Project Manager, Special Port Projects at: Quonset Development Corporation, 95 Cripe Street, Quonset Business Park, North Kingstown, Rhode Island (Tel. No. 401-295-0044 ext. 288).

Inspection of Premises: Prospective bidders may examine the premises by calling Mr. Christian Jones, Project Manager, Special Port Projects at: Quonset Development Corporation, 95 Cripe Street, Quonset Business Park, North Kingstown, Rhode Island (Tel. No. 401-295-0044 ext. 288), during the hours **Monday through Friday, 8:30 AM to 4:00 PM.**

Pre-Bid Conference: May 24, 2022 at 0900 AM Local Time at the offices of the Quonset Development Corporation, 95 Cripe Street, Quonset Business Park, North Kingstown, Rhode Island 02852.

QUONSET DEVELOPMENT CORPORATION
Mr. Steven J. King, P.E. Managing Director

****

END OF SECTION

SAMPLE

ATTACHMENTS FORM

Instructions: On this form, you will attach the various files that make up your grant application. Please consult with the appropriate Agency Guidelines for more information about each needed file. Please remember that any files you attach must be in the document format and named as specified in the Guidelines.

Important: Please attach your files in the proper sequence. See the appropriate Agency Guidelines for details.

1) Please attach Attachment 1	1234-1 - Project Narrative.pd	Add Attachment	Delete Attachment	View Attachment
2) Please attach Attachment 2	1235-2A - BCA Narrative.pdf	Add Attachment	Delete Attachment	View Attachment
3) Please attach Attachment 3	1236-2B - BCA Spreadsheet Mod	Add Attachment	Delete Attachment	View Attachment
4) Please attach Attachment 4	1237-3 - Detailed Project Sch	Add Attachment	Delete Attachment	View Attachment
5) Please attach Attachment 5	1238-4 - QDC Matching Fund Co	Add Attachment	Delete Attachment	View Attachment
6) Please attach Attachment 6	1239-5 - EJ Screen Report and	Add Attachment	Delete Attachment	View Attachment
7) Please attach Attachment 7	1240-6 - Letters of Support.p	Add Attachment	Delete Attachment	View Attachment
8) Please attach Attachment 8	1241-7 - Port of Davisville E	Add Attachment	Delete Attachment	View Attachment
9) Please attach Attachment 9	1242-8 - Pier 1 Condition Ass	Add Attachment	Delete Attachment	View Attachment
10) Please attach Attachment 10	1243-9 - QDC Equal Opportunit	Add Attachment	Delete Attachment	View Attachment
11) Please attach Attachment 11	1244-10 - QDC Standard Invita	Add Attachment	Delete Attachment	View Attachment
12) Please attach Attachment 12		Add Attachment	Delete Attachment	View Attachment
13) Please attach Attachment 13		Add Attachment	Delete Attachment	View Attachment
14) Please attach Attachment 14		Add Attachment	Delete Attachment	View Attachment
15) Please attach Attachment 15		Add Attachment	Delete Attachment	View Attachment

OMB Number: 4040-0004
Expiration Date: 12/31/2022

Application for Federal Assistance SF-424

* 1. Type of Submission:
- [ ] Preapplication
- [x] Application
- [ ] Changed/Corrected Application

* 2. Type of Application:
- [x] New
- [ ] Continuation
- [ ] Revision

* If Revision, select appropriate letter(s):

* Other (Specify):

* 3. Date Received: 05/16/2022

4. Applicant Identifier:

5a. Federal Entity Identifier:

5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:

7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: Quonset Development Corporation

* b. Employer/Taxpayer Identification Number (EIN/TIN): (b)(4)

* c. UEI: (b)(4)

d. Address:

* Street1: 95 Cripe Street
Street2:
* City: North Kingstown
County/Parish:
* State: RI: Rhode Island
Province:
* Country: USA: UNITED STATES
* Zip / Postal Code: 02852-7534

e. Organizational Unit:

Department Name: Planning and Development

Division Name:

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: Ms.
* First Name: Chelsea
Middle Name:
* Last Name: Siefert
Suffix:

Title: Director of Planning and Development

Organizational Affiliation:

* Telephone Number: (401) 295-0044 x205
Fax Number:

* Email: csiefert@quonset.com

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

D: Special District Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

Maritime Administration

11. Catalog of Federal Domestic Assistance Number:

20.823

CFDA Title:

Port Infrastructure Development Program

*** 12. Funding Opportunity Number:**

MA-PID-22-001

* Title:

2022 Port Infrastructure Development Program Grants

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment | Delete Attachment | View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Reconstruction of the North Berth at Pier 1 at the Port of Davisville

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant: RI-002 * b. Program/Project: RI-all

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

17. Proposed Project:

* a. Start Date: 09/01/2024 * b. End Date: 11/30/2025

18. Estimated Funding ($):

* a. Federal	13,200,000.00
* b. Applicant	9,000,000.00
* c. State	0.00
* d. Local	0.00
* e. Other	0.00
* f. Program Income	0.00
* g. TOTAL	22,200,000.00

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on .

☐ b. Program is subject to E.O. 12372 but has not been selected by the State for review.

☒ c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

☐ Yes ☒ No

If "Yes", provide explanation and attach

Add Attachment | Delete Attachment | View Attachment

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

☒ ** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: Mr. * First Name: Steven

Middle Name: J.

* Last Name: King

Suffix:

* Title: Managing Director

* Telephone Number: (401) 295-0044 Fax Number:

* Email: sking@quonset.com

* Signature of Authorized Representative: Chelsea Siefert * Date Signed: 05/16/2022

OMB Number: 4040-0008
Expiration Date: 02/28/2025

BUDGET INFORMATION - Construction Programs

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	$	$	$
2. Land, structures, rights-of-way, appraisals, etc.	$	$	$
3. Relocation expenses and payments	$	$	$
4. Architectural and engineering fees	$	$	$
5. Other architectural and engineering fees	$	$	$
6. Project inspection fees	$	$	$
7. Site work	$ 20,200,000.00	$ 0.00	$ 20,200,000.00
8. Demolition and removal	$	$	$
9. Construction	$	$	$
10. Equipment	$	$	$
11. Miscellaneous	$	$	$
12. SUBTOTAL *(sum of lines 1-11)*	$ 20,200,000.00	$ 0.00	$ 20,200,000.00
13. Contingencies	$ 2,000,000.00	$ 0.00	$ 2,000,000.00
14. SUBTOTAL	$ 22,200,000.00	$ 0.00	$ 22,200,000.00
15. Project (program) income	$	$	$
16. TOTAL PROJECT COSTS *(subtract #15 from #14)*	$ 22,200,000.00	$ 0.00	$ 22,200,000.00

FEDERAL FUNDING

17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter the resulting Federal share.	Enter eligible costs from line 16c Multiply X 50 %	$ 11,100,000.00

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C.1352

OMB Number: 4040-0013
Expiration Date: 02/28/2025

1. * Type of Federal Action:
- [ ] a. contract
- [x] b. grant
- [ ] c. cooperative agreement
- [ ] d. loan
- [ ] e. loan guarantee
- [ ] f. loan insurance

2. * Status of Federal Action:
- [ ] a. bid/offer/application
- [x] b. initial award
- [ ] c. post-award

3. * Report Type:
- [x] a. initial filing
- [ ] b. material change

4. Name and Address of Reporting Entity:

[x] Prime [ ] SubAwardee

* Name: Quonset Development Corporation
* Street 1: 95 Cripe Street
Street 2:
* City: North Kingstown
State: RI: Rhode Island
Zip: 02852-7534
Congressional District, if known: RI-002

5. If Reporting Entity in No.4 is Subawardee, Enter Name and Address of Prime:

6. * Federal Department/Agency:
Maritime Administration

7. * Federal Program Name/Description:
Port Infrastructure Development Program
CFDA Number, *if applicable:* 20.823

8. Federal Action Number, *if known:*

9. Award Amount, *if known:*
$ 11,250,000.00

10. a. Name and Address of Lobbying Registrant:

Prefix: * First Name: N/A Middle Name:
* Last Name: N/A Suffix:
* Street 1: N/A Street 2:
* City: N/A State: RI: Rhode Island Zip:

b. Individual Performing Services (including address if different from No. 10a)

Prefix: * First Name: N/A Middle Name:
* Last Name: N/A Suffix:
* Street 1: N/A Street 2:
* City: N/A State: RI: Rhode Island Zip:

11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

*** Signature:** Chelsea Siefert

***Name:** Prefix: Mr. * First Name: Steven Middle Name: J.
* Last Name: King Suffix:

Title: Managing Director **Telephone No.:** (401) 295-0044 **Date:** 05/16/2022

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