Bond Feasibility Study

for the Bald Head Island Transportation Authority

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December 2020 -- DRAFT

This Draft Report is Subject to Change. Any forecast is subject to uncertainties, which may be material. The Bond Feasibility Study should be read in its entirety for an understanding of any findings or forecasts and their underlying assumptions.

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Contents

Figures

Tables

1. Background

The community of Bald Head Island (BHI or the Island) is located on the southernmost of North Carolina's Barrier Islands, approximately 30 miles south of Wilmington, North Carolina. The Island is not connected to the mainland by bridge or tunnel. Bald Head Island Limited LLC (BHI Limited or BHIL) is the parent company that owns and operates three separate lines of business: (i) Bald Head Island Transportation Inc. (BHI Transportation), (ii) parking operations at the Deep Point terminal, and (iii) the tug and freight barge service.

BHI Transportation owns and operates the ferry services to and from the Island as well as the on-island tram service. The mainland facilities and Island side facilities used for the ferry operations are owned by BHI Limited and leased to BHI Transportation. Parking operations are owned by BHI Limited and include more than 35 acres of parking lots that are used by the passengers of the ferry system. The tug and freight barge service is also owned by BHI Limited and it operates the roll-on roll-off (RoRo) tug and freight barge services that transport all cargo and vehicles moving to and from BHI.[1]

In 2017, the Bald Head Island Transportation Authority (BHITA, or the Authority) was created by the North Carolina legislature with the mandate to purchase the transportation, parking, and tug and freight barge operations, as well as the mainland and island transportation and terminal infrastructure assets, from BHI Limited and BHI Transportation. Employing the existing management and staff to ensure continuity, the Authority intends to operate these assets and provide reliable transportation services to visitors and residents of BHI.

As part of this process, the Authority is now seeking to secure financing to complete the purchase of these assets through a public bond offering. It is the intention of the Authority that this document along with the other bond offering documents will provide the necessary information that potential investors need concerning the issuer and the bond. This document addresses the general outlook for the businesses currently owned and operated by BHI Limited, the condition of the critical transportation infrastructure, the performance of the operations, the expected demand for the services to be provided by BHITA, and the expected earnings and cash flows for the Authority.

1.1 Objective

The objective of this study is to review the main operations that are to be acquired by the Authority; to develop volume, revenue, cost, earnings and capital expense forecasts for those activities; and to thereby assess the ability of the Authority to repay the bonds which it would issue to complete the purchase of the assets and operations of BHI Limited.

1.2 Structure of the report

Section 2 presents the assessment of the BHI Transportation activities, which include the passenger ferry and on-island tram services. *Section 3* describes the parking activities and tug and freight barge activities. For each activity area, we review the operations and capacity and provide an evaluation of associated

[1] In a Roll-on / Roll-off shipping system, the seagoing vessel is docked and joined to land by a ramp. Cargo carried with such a system (whether it be autos, trucks, or rolling machinery) is driven on and off the vessel using the ramp.

assets. *Section 4* analyzes the market demand, economic drivers, historical statistics, and long-term forecasts for the ferry and tram, parking, and tug and freight barge activities. *Section 5* presents the financial analysis including cash flow forecasts for the ferry and tram, parking, and tug and freight barge operations. *Section 6* presents the conclusions from our analysis.

2. Core passenger business: ferry and on-island tram

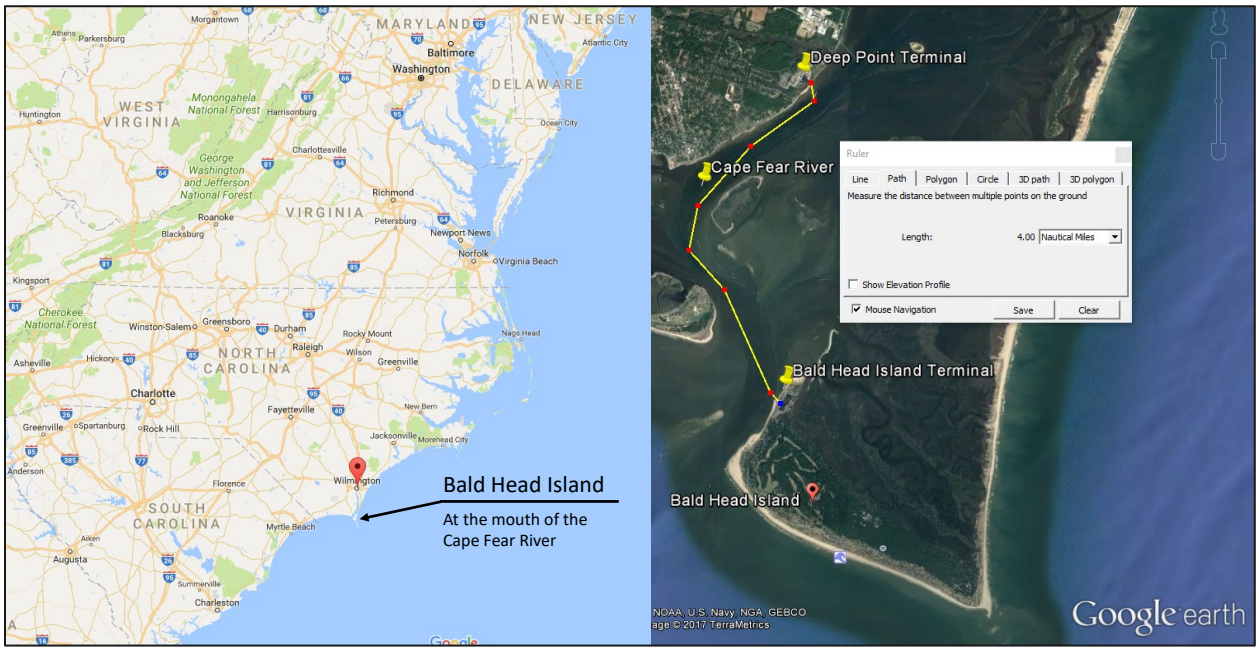
This section presents the analysis for BHI Transportation. Specifically, it discusses the analysis and findings for the passenger ferry and on-island tram business. First, a description and assessment of the ferry business is provided, followed by an assessment of the on-island tram operations. This section concludes with a summary of key takeaways.

2.1 Ferry service

2.1.1 Description of ferry business

BHI Transportation is the sole provider of passenger transportation service across the Cape Fear River to and from BHI, and as such provides an essential link between BHI and the main North Carolina landmass.[2] The one-way trip of approximately four nautical miles requires about 30 minutes, including loading and discharge time, allowing a ferry vessel to complete a round-trip voyage every hour. The location of Bald Head Island and the route of the ferry and the freight barge service across the Cape Fear River are illustrated in Figure 1.

Figure 1: Location and route of the ferry and freight barge services across the Cape Fear River



BHI is a community of about 1,300 residential housing units, along with a number of commercial and retail buildings, restaurants, clubs and a golf course that serve the residents and guests of the Island. Now a thriving residential and vacation destination, the Island was first occupied by non-native settlers in the late 1700s, but until about 1970, there was little developed infrastructure. The modern developments date from the 1980s when the pace of construction sharply increased. Regular ferry service using ferry terminals commenced in 1982. The ferry and on-island tram service became regulated by the North

[2] Other than using the BHI Transportation ferries, the only other way to access the Island is via private non-commercial boats.

Carolina Utilities Commission (NCUC) in 1993. Since that time, there has been only one rate increase which was implemented in 2011.

2.1.2 Ferry operations overview

BHI Transportation operates its ferry transportation service from the Deep Point Terminal in Southport, North Carolina to BHI across the Cape Fear River, also located in North Carolina. This ferry service provides the only commercial means of access to BHI.[3] Therefore, it carries all regular passenger traffic to and from the Island, including permanent residents, visitors/guests, and the workforce that is responsible for developing, maintaining, and operating all activities on the Island. Schedule frequency and service levels are vital to the total guest experience and the operation of the Island and are maintained and managed very efficiently by the current operating staff.

In 2019, BHI Transportation performed 8,127 round-trip (R-T) ferry sailings and carried about 357,000 passengers to (and from) the Island. Ferry service is provided every day, year-round, with two different schedules: *(i) Summer*, from April to October, and *(ii) Winter*, from November to March. During holiday peak periods the ferry provides additional sailings to meet demand. The high frequency ferry service makes a minimum of 24 round trip sailings per day during the summer season and a minimum of 16 round trip sailings per day during the winter season. Each crossing requires about 30 minutes, allowing a single ferry boat to provide crossings every hour from either side.

Ferry operations are conducted using four passenger ferries, each licensed by the US Coast Guard (USCG) to carry 150 passengers.[4] The normal summer schedule, with departures every hour throughout the day, and with additional departures on the half hour during periods of higher demand (such as weekday mornings and afternoons when the Island workforce arrives and departs, and on weekends) can be maintained with just two ferries operating on any given day. This allows time to cycle ferries in and out of service and provide the required off-duty time for routine maintenance and vessel repairs. The four-ferry fleet also allows the addition of a third ferry to meet peak demand during high volume periods such as holidays and peak-season weekends.

The ferry vessels have been maintained in good condition with regular service provided at designated intervals and repairs addressed as needed. This has ensured schedule integrity and long-term service life of the vessels. *Section 2.1.5* of this report provides further insight into the marine maintenance functions. The BHI Transportation ferry operation is well-managed and carefully run, resulting in a high level of schedule integrity and vessel safety.

2.1.3 Ferry system capacity and peak demand profiles

The average capacity utilization level of the ferry voyages completed during the 12 months of 2019 was about 29 percent—an increase of 4 percentage points from the 25 percent observed in 2016. Utilization during the three-month peak summer season increased from about 34 percent to 38 percent over the same period. However, because the overall demand is uneven across the seasons and the week, with varying levels of demand and a directional bias based on the time of day and day of the week, and because

[3] The only other way to reach Bald Head Island is via private boat.

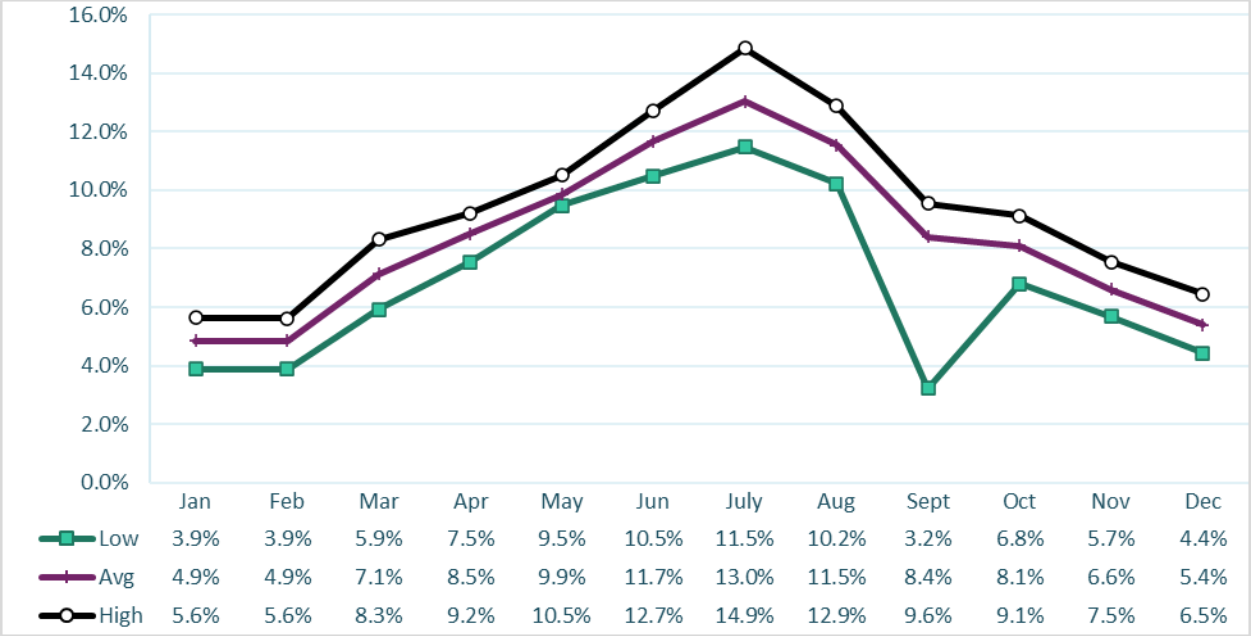
[4] During the current COVID-19 pandemic (as of July 2020), authorities have limited capacity per ferry to 75, or 50% of normal.

the operator has the flexibility to add capacity when needed, the average utilization does not give a complete picture of system capacity.

The annual capacity of the ferry system was estimated on the basis of satisfying the natural patterns of demand, including the seasonal, weekend, and holiday peaks, considering the ability of the system to increase the frequency of service to meet those peak demands.

Analysis of monthly ridership statistics from 1997 to 2019 showed a consistent pattern in which the peak month of ridership (July) accounted for between 11.5 and 14.9 percent of annual volumes, with an average of 13 percent of the total annual traffic. In low season months, ridership had a range from 3.9 to 7.5 percent with an average of about 6 percent of total annual traffic. The results of the ridership seasonality analysis are presented in Figure 2.

Figure 2: Percent of annual riders by month, 1997-2019

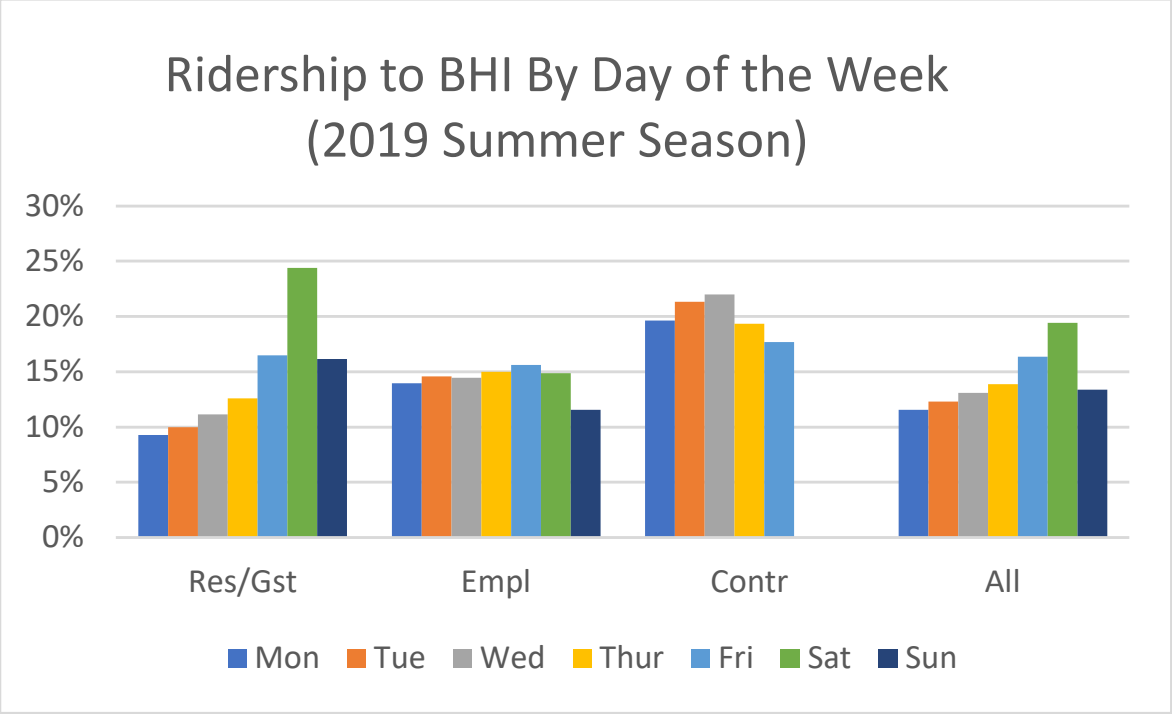


	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Low	3.9%	3.9%	5.9%	7.5%	9.5%	10.5%	11.5%	10.2%	3.2%	6.8%	5.7%	4.4%
Avg	4.9%	4.9%	7.1%	8.5%	9.9%	11.7%	13.0%	11.5%	8.4%	8.1%	6.6%	5.4%
High	5.6%	5.6%	8.3%	9.2%	10.5%	12.7%	14.9%	12.9%	9.6%	9.1%	7.5%	6.5%

* There was an abnormal drop in volume in September 2018 due to Hurricane Florence, which accounts for the anomaly in the chart

The capacity of the system to support increased overall ridership is dependent on the ability to continue handling peak demands, which vary both by season and by day of the week. Peak demand within a week was assessed based on the ridership distribution by day-of-week, as illustrated in Figure 3. Employee and contractor traffic is more evenly distributed across the week, while property owner and guest traffic is concentrated at the end of the week and during the weekend. This produces a traffic pattern with a peak in which just less than 20 percent of the weekly total traffic is moved on a single day (i.e. Saturdays).

Figure 3: Distribution of passenger departures from Deep Point by day of week and type: contractor, employee, residents/guests, and overall totals



Existing volume levels are satisfied with one sailing per hour throughout the day, with a second sailing operated as needed during high-traffic morning or evening periods when most workers arrive or depart the Island. The number of sailings per day is typically between 16 and 25, with the total number of 2019 sailings adding up to 8,127.

As traffic volumes rise and utilization increases, it will be necessary to extend the periods of twice-per-hour sailings, and eventually offer three sailings per hour on a routine basis during high demand periods.

The peak day passenger traffic was estimated for different levels of annual traffic. For this peak requirement analysis, it was estimated conservatively that traffic in the peak month is 15 percent of the annual traffic, and that 25 percent of the weekly traffic is carried on the peak day. In Table 1, peak day traffic and required number of voyages are computed for different levels of annual demand, assuming that the average utilization on peak days would be 60 percent, which is consistent with 2019 activity.

Table 1: Peak ferry capacity and frequency requirements at increasing levels of passenger traffic

Annual Traffic	**300,000**	**350,000**	**400,000**	**450,000**	**500,000**	**550,000**	**600,000**
% of Year in Peak Month	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Weeks Per Month	4	4	4	4	4	4	4
Traffic in Peak Week	**11,300**	**13,100**	**15,000**	**16,900**	**18,800**	**20,600**	**22,500**
Peak Day As % of the Peak Week	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Peak Day Traffic	2,825	3,275	3,750	4,225	4,700	5,150	5,625
Utilization on Peak Days	60%	60%	60%	60%	60%	60%	60%
Peak Day Sailings	**31**	**36**	**42**	**47**	**52**	**57**	**63**

Operating three ferry vessels, to provide three departures every hour between 5:30 am to 1:00 am (utilizing the two berths at each terminal), the peak day schedule could include up to about 55 sailings, which, on the basis of our conservative assumptions, would meet the estimated peak capacity requirement for a year in which the system carried 530,000 total ferry passengers to the Island.

This estimate that the system capacity could support a traffic level of 530,000 passengers per year is confirmed by the following straightforward assessment. Analysis of 2019 voyage records revealed that the 2019 volume was accommodated on nearly all days using at most two ferries with maximum sailing frequency of two per hour. We know, however, that the system can operate three sailings per hour, or even four if needed. We can be confident, therefore, that by increasing sailing frequencies as needed (from one to two or from two to three) the system can deliver a 50 percent increase in capacity. A 50 percent increase over 2019 traffic would be about 535,000 passengers, which corroborates the estimate described above.

Based on this peak capacity analysis, the approximate **annual capacity of the system**, using the two berths at each of the terminals and a four-boat ferry fleet with the current 150 passenger capacity, is estimated to be **535,000 passengers per year**.[5]

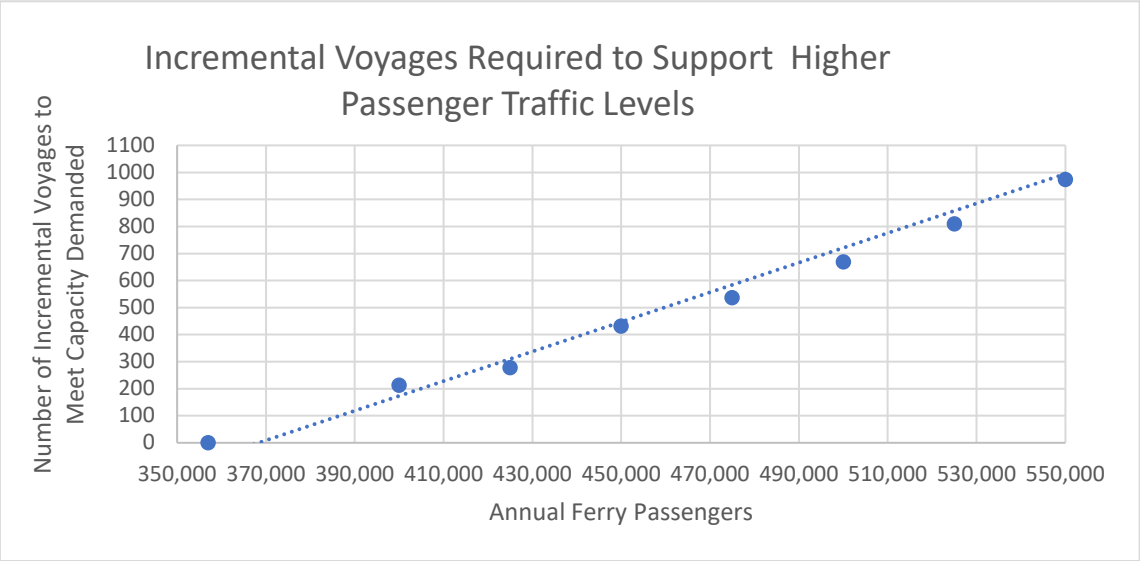
BHI Transportation operates three passenger ferries on a limited number of peak days, primarily on summer holiday periods. The analysis of peak day requirements suggests that three catamaran ferries will be increasingly required for peak periods once the annual traffic exceeds about 450,000 passengers, but this requirement will not come into play until well after one of the monohull ferries has been replaced with a catamaran ferry.[6]

[5] As a consequence of the COVID-19 pandemic, the maximum number of passengers carried per sailing was reduced in March 2020 from 150 to just 25, but has been increased in steps back up to 100, but still short of the standard 150 passenger level. This has increased passenger waiting times because of the reduction of available capacity on each sailing. Because the system operates at a low level of average utilization (29% overall during 2019, and 38% during the summer season), the reduced capacity per sailing principally only impacts waiting times during the high demand periods.

[6] The system generally operates with two ferry departures per hour across the two berths during "normal" high demand periods, and three departures per hour during certain holidays or other periods of exceptionally high demand. The "exceptional peak" level of operations could be increased to four sailings per hour if that was required. It is also noted that the peak periods are of limited duration, and that with the use of reservations or other load management techniques, the traffic could be more evenly distributed across a given day or week, thereby raising average utilization and raising annual capacity.

The required number of sailings in each year will depend on overall traffic levels and the distribution of traffic across the year. For much of the year and for certain times of the day, a 50 percent or even 100 percent increase in traffic could be accommodated without additional sailings, while additional sailings would be required far sooner during other parts of the calendar if traffic increased by 50 percent. Mercator examined traffic and utilization patterns to determine the number of additional sailings that would be required, at increased levels of annual traffic, to keep utilization levels during peak demand periods below 100 percent, assuming a distribution of passenger demand that is similar to the current distribution.[7] The results of this analysis are depicted in Figure 4.

Figure 4: Incremental annual voyages to support increased traffic levels



This result was used to determine the number of voyages that would need to be added to the schedule to meet the capacity requirement from Deep Point to BHI as traffic increased: an increase from about 357,000 to 530,000 passengers would require about 900 additional voyages – on average one voyage for each 190 additional passengers. However, because of the asymmetry of timing of traffic to and from the Island, a roughly equivalent number of additional voyages would need to be operated to provide the additional return capacity, such that in total, the system would need to operate one additional voyage for each 95 passenger increase in traffic.

In practice, the additional voyages cannot simply be added one-by-one, so to provide a conservative estimate of costs for added voyages and allow for the practical issues of scheduling, we assume the BHITA will be adding one additional voyage for each increase of 75 R-T passengers.

[7] Said another way, the objective of this analysis was to assess how many additional voyages would be required to avoid having passengers that could not board the next available ferry due to capacity limits.

2.1.4 Evaluation of marine assets

The BHI Transportation ferry fleet is composed of four ferries: (i) *Adventure*, (ii) *Sans Souci* (iii) *Patriot*, and (iv) *Ranger*, which are listed in Table 2 along with selected key facts. Each of the four vessels was individually inspected by a Mercator specialist in June 2017, which included entering and visually inspecting key areas such as: engine rooms, steering gear compartments, passenger areas, wheelhouses, open decks, etc. Mercator specialists also reviewed key documents such as past vessel surveys, U.S. Coast Guard (USCG) Certificates of Inspection (COI) and Stability Letters. To complement the physical inspections, Mercator reviewed additional documentation, such as the *2012 Survey Reports by The Marine Surveyor Group* out of Fort Lauderdale, Florida and the 2018-19 surveys by KOPCO Marine Services, Inc. In-person and detailed discussions with the management of BHI Transportation were held to gather information and understand its operations.

Table 2: Key facts of BHI Transportation fleet[8]

Vessel name	*Adventure*	*Sans Souci*	*Patriot*	*Ranger*
Year built	1987	1976	2003	2006
Builder	Breaux Brothers Enterprises, Inc.	Lapco Industries, Lafayette, LA	Island Boat, Jeanerette, LA	Island Boat, Jeanerette, LA
Length	65 ft.	72 ft	82 ft	82 ft
Beam	22 ft.	22.4 ft	28 ft	28 ft
Draft	3.75 ft fwd 4.25 ft aft	5 ft aft	3.5 ft fwd 5.25 ft aft	6 ft aft
USCG – COI	Subchapter T	Subchapter T	Subchapter T	Subchapter T
Hull	Monohull	Monohull	Catamaran	Catamaran
Horsepower (hp)	640 hp (each)	640 hp (each)	640 hp (each)	640 hp (each)
Main engine	Cummins KTA-19 M3	Cummins KTA-19 M3	Cummins KTA-19 M3	Cummins KTA-19 M4
Engine hours since new	41,025 hrs	22,257 hrs	53,358 hrs	49,832 hrs
Engine hours since last overhaul	2,563 hrs	3,026 hrs	13,314 hrs	7,884 hrs
COI expiration date	Apr 27, 2021	Apr 25, 2022	Sep 11, 2023	Mar 24, 2021
Dry docking due date	Jan 31, 2022	Jan 17, 2022	Jan 31, 2021	Mar 31, 2022

- ***Adventure*.** A monohull aluminum ferry certified for 150 passengers plus 13 baggage dollies built in 1987. The vessel was repowered to twin Cummins KTA19–M3 (640 hp) main engines in 2003. The *Adventure* was found to be in good seaworthy condition and well maintained. Monthly and weekly marine maintenance activity records show no outstanding compliance items. All

[8] All of the BHI ferries and freight operation vessels have also been recently inspected (during 2018 - 2019) by KOPCO Marine Services, Inc., which found them to be in satisfactory condition. Engine hours and inspection status as of June 2020.

equipment was reported to be running well. The vessel appeared structurally sound and vital equipment such as main engines were overhauled in 2018 and are well within their maximum operating hours limit. Main and auxiliary engines are run on Ultra-Low Sulphur Diesel (ULSD).

- ***Sans Souci*.** A monohull aluminum ferry certified for 150 passengers plus 11 baggage dollies built in 1976. The vessel, the oldest vessel of the fleet, was repowered to twin *Cummins KTA19–M3 (640 hp)* in 2002. The *Sans Souci* was found to be in good seaworthy condition and well maintained. Monthly and weekly marine maintenance activity records show no outstanding compliance items. All equipment was reported to be running well. The vessel appeared to be structurally sound, and vital equipment such as main engines are well within maximum operating hours limit. Main and auxiliary engines are run on ULSD. The main engines were last overhauled in 2018 (replaced with factory re-conditioned units), and BHI Transportation operating personnel find the vessel to be a very good performer. During her 2014 drydocking, some hull plating was replaced to correct the effects of localized corrosion. This is typical for aluminum hulls that start to show localized corrosion. Despite her good performance and the possibility that she could effectively continue in service beyond 2024, Mercator has assumed she will be replaced by 2024, with the cost for the replacement reflected in Mercator's Capex forecast for FY 2023 and 2024.

- ***Patriot*.** A catamaran aluminum ferry certified for 150 passengers plus 22 baggage dollies built in 2003. This vessel is powered with twin *Cummins KTA19–M3 (640 hp)* main engines. The *Patriot* was found to be in good seaworthy condition and well maintained. Monthly and weekly marine maintenance activity records show no outstanding compliance items. All equipment was reported to be running well. The vessel looked to be structurally sound and all vital equipment, such as main engines which were overhauled in 2016, are well within maximum operating hours limit. Main and auxiliary engines are run on ULSD.

- ***Ranger*.** A catamaran aluminum ferry certified for 150 passengers plus 22 baggage dollies built in 2006. This vessel is powered with twin *Cummins KTA19–M4 (640hp)* main engines. The *Ranger* was found to be in good seaworthy condition and well maintained. Monthly and weekly marine maintenance activity records show no outstanding compliance items. All equipment was reported to be running well. The *Ranger* looked structurally sound and vital equipment, such as main engines which were overhauled in 2017/2019, are well within maximum operating hours limit. Main and auxiliary engines are run on ULSD.

Ferry vessel replacement

- ***Sans Souci*** is the oldest vessel in the fleet and continues to perform well, with an estimated three to five years or more of remaining service life. Due to the light duty and good maintenance, and despite her age, maintenance costs for the ferry have not shown an upward trend, and so prompt replacement may not be required. For the purpose of the bond feasibility analysis, however, it is assumed that San Souci will be replaced in 2023 (FY 2024) with a catamaran ferry similar to *Patriot* and *Ranger* (at a current 2020 cost of about $4.5 million). The current market value of *San Souci was estimated by KOPCO to* be about $410,000.
- ***Adventure*** is in very good condition and likely has another 13 to 17 years of remaining service life. After surveying the vessel in 2018, KOPCO estimated her fair market value at about $590,000. For the purpose of the bond feasibility analysis, it is assumed that *Adventure* will be replaced in 2033 with a catamaran ferry similar to *Patriot* and *Ranger*.
- ***Patriot*** and ***Ranger*** are fairly new vessels (17 yrs and 14 years old, respectively) and their remaining service life is estimated to be **at least 30 years**. Estimated new ferry vessel replacement cost in the current market is about $4-4.5 million.

2.1.5 Evaluation of marine maintenance operations

The marine maintenance and repair (M&R) department of BHI Transportation supports both the passenger ferry operation and the tug and freight barge operation. This department operates out of a dedicated maintenance facility located immediately adjacent to the Deep Point Marina terminal, where the ferries and the tug and freight barge are kept when not actively in service, enabling easy and direct access to undertake repair and maintenance activities. A photo of the Marine Maintenance Facility is provided in Figure 5. The marine M&R operations were evaluated based on discussions with the Marine Manager and a physical inspection of the marine M&R dedicated facility, a review of M&R records as well as a review of the *BHI Transportation Marine Operations Manual*.

Figure 5: The Marine Maintenance Facility at Deep Point

BHI Transportation management has made operational reliability and safety paramount priorities in order to deliver a high-quality experience to the property owners, guests and workers that it transports to the Island, and to ensure the reliable delivery of critical freight to the Island. A well-staffed and equipped maintenance department exists to achieve this objective. The maintenance facilities themselves were found to be in excellent condition and well suited to the requirements of the operation.

The four ferries are dry-docked every two years, normally in a nearby shipyard. These are regulatory dry-dockings as required by the USCG. Apart from dry-docking, there is a very diligent M&R program carried out by BHI Transportation's competent staff in the marine M&R department for completing routine maintenance and promptly addressing the vessel repair requests (VRR) filled out by vessel captains. Each Captain has a hand-held device on which to record a problem or an issue, which transmits the problem report to the marine M&R team.

Depending on the severity of the issue, the vessel may be taken off-line if needed, replaced by a different vessel, or more commonly, the VRR will be logged and the problem will be evaluated and solved during the next scheduled off-service time of the vessel. Every vessel has off-service time during each day and a full day off-service on alternate days. In general, two out of the four vessels are in service during peak periods and only one during off-peak periods of the day.

The marine M&R department takes care of all main engine overhauls and rebuilds them in-house. BHI Transportation follows the overhaul and re-power schedule for the ferries shown in Table 3 with some adjustments made if indicated by changes in fuel consumption. The marine M&R department of BHI

Transportation is a well-managed and competent group that has demonstrated its ability to efficiently take care of the current M&R activity required to run the ferries safely and on schedule.

Table 3: Overhaul and re-power schedule for ferries

Scheduled time	Type of M&R service	Total engine-life hours	Overhaul, rebuild, or repower
2nd year	6,000 hrs service	6,000 hrs	maintenance service
4th year	6,000 hrs service	12,000 hrs	maintenance service
6th year	18,000 hrs service	18,000 hrs	overhaul
8th year	6,000 hrs service	24,000 hrs	maintenance service
10th year	6,000 hrs service	30,000 hrs	maintenance service
12th year	18,000 hrs service	36,000 hrs	overhaul or rebuild
14th year	6,000 hrs service	42,000 hrs	maintenance service
16th year	6,000 hrs service	48,000 hrs	maintenance service
18th year	18,000 hrs service	54,000 hrs	rebuild or repower

Over the last six years, the average annual M&R cost per vessel has been approximately $82,000 per year, which includes both the periodic major repair and overhaul costs that are capitalized, as well as the ongoing routine M&R costs that are expensed, but excludes the salary and other costs of the full-time maintenance department. Future M&R costs are projected on the basis of this historical spending and expected overhaul schedules.

2.1.6 Evaluation of landside ferry assets at Deep Point Marina

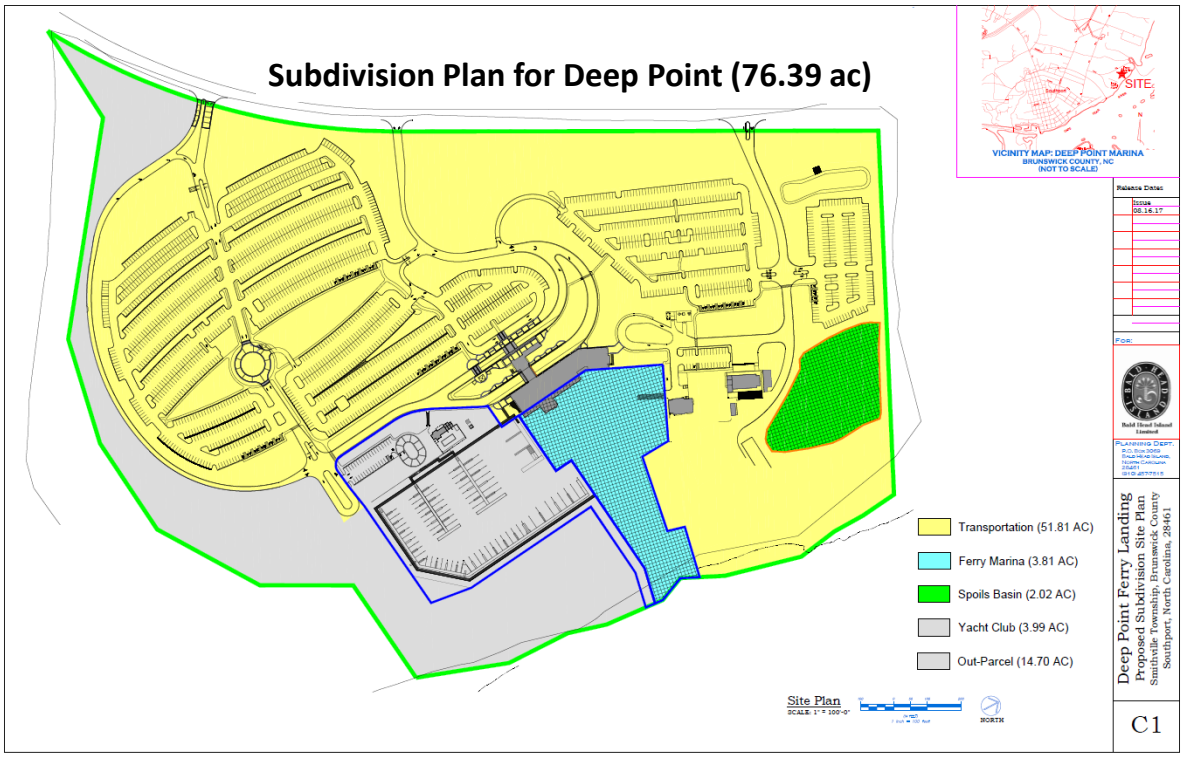
Passenger ferry operations at the Deep Point Marina campus began in June 2009.[9] The campus has a total area of approximately 76 acres. The transportation and parking portion of the property cover about 51.8 acres, which includes the ferry facility and administrative offices, parking lots, the marine M&R facility, and tug and freight barge areas, as shown in Figure 6.

The ferry terminal is built partially on land and over water. The landside structure is a two-story building which supports the administration offices, passenger drop off and pick up areas, the ferry ticket office, and other small support offices and areas. The waterside structure, built on twenty-inch by twenty-inch (20” x 20”) concrete piles, supports both the passenger waiting area and the ferry vessel passenger and cargo loading and discharge areas.

An all concrete sheet pile bulkhead is approximately 2,800 ft in length. This bulkhead forms the boundary around the small boat marina, the main passenger ferry terminal, the contractor terminal, the vessel maintenance piers, and the freight barge loading area. Two jetties, also constructed with concrete sheet pile bulkheads, extend approximately 600 ft into the Cape Fear River and form the protected entrance way into the ferry terminal and marina basin.

[9] Deep Point terminal construction started in 2007 and the facility opened in June 2009. However, the contractor ferry began using the site prior to construction of the main passenger terminal.

Figure 6: Deep Point Marine Terminal—subdivision site map



General condition assessment

In 2017, as part of a previous engagement with BHI Limited, Mercator conducted a condition assessment inspection of the bulkhead in the area of the ferry terminal, the vessel maintenance area, the freight barge area, and the two jetties that form the entrance.[10] As part of the 2017 condition assessment inspection, Mercator provided a series of observation highlights and recommendations. Following the 2017 condition assessment inspection, BHI undertook a number of repairs to the facility, and then commissioned further assessments to confirm the adequacy of the repairs. The first follow-up assessment was done in June 2018, led by the engineering firm Ausenco. Subsequently, a third condition assessment was commissioned by the BHITA in March 2019, which was led by the engineering firm Moffatt & Nichol.

Mercator relied upon the engineering reports prepared by Ausenco and by Moffat & Nichol for the expected future costs for maintenance and repair of landside facilities to be acquired and operated by the Authority.

Mercator's 2017 Condition Assessment Report for Deep Point Marina

Based on our 2017 condition assessment inspection, Mercator concluded that the *main passenger terminal and office building*, *sidewalks and flatwork*, and the *concrete bulkhead* were well maintained as part of routine maintenance, in good condition, with no significant issues noted. Although generally not used for regular operations, the Siemens airport-style baggage conveyor system is maintained and periodically operated to confirm functionality.

[10] That inspection considered about 2050 ft of bulkhead; the bulkhead surrounding the small boat marina was not inspected and was not within the scope of 2017 report.

The *concrete bulkhead pile caps* were showing signs of movement at a number of expansion joints, most significantly near the freight barge docking berth. The inspection team identified two main reasons: (i) the pressure exerted by the freight barge during docking and (ii) an incident in which a construction crane barge hit the wall in 2014. Furthermore, the 2017 inspection team identified 15 concrete bulkhead panels out of 341 showing signs of cracking, spalling, and deterioration. The concrete pile cap expansion joints showed signs of movement with some separation between the concrete piles in the Northern Jetty. Excessive marine growth was visible on the concrete piles at Deep Point Marine Terminal.

2017 Recommendations addressed

- Maintenance should continue to monitor expansion joint movement and, if required, make necessary repairs to prevent further deterioration or wash out of the land area behind the bulkhead.
- Repair of the damaged concrete bulkhead and pile cap at the freight barge jetty was recommended to BHIL after inspections were made in July 2017. BHIL made repairs to address these issues with the jetty bulkhead.
- Concrete bulkhead panels and bulkhead concrete cap expansion joints should be monitored to determine the rate of deterioration and expansion. Make necessary repairs to prevent further deterioration or potential failure of the structure along its length.

The 2017 recommendations became the basis for repair work undertaken by BHI Limited in 2018.

Ausenco 2018 Condition Assessment Report for Deep Point Marina

Ausenco's 2018 Condition Assessment consisted of an above and below water inspection of the piles and underside of the superstructure to identify any defects. This included a detailed assessment of the BHI's Deep Point Passenger Dock, Contractor Dock, Layby Pier, and Layby Dock. Ausenco's *2018 Condition Assessment Report* stated that the Deep Point Marina marine structures were found to be in a serviceable condition. The report recommended several repairs with an estimated total cost of about $110,000:

- ***Passenger Dock*.** The recommended repairs for the passenger dock included implementing pile wrap repairs on concrete Pile No. 10B east. The useful life estimate for the concrete piles was 10 to 15 years and 10 years for the dolphins, which could be extended further with ongoing repairs.
- ***Contractor Dock*.** The recommended repairs for the contractor dock include replacing four safety chains for the pedestrian gangway , replacing three piles, and implementing open bolt hole patch / dowel repairs, among the main ones. The assessment reported an estimated useful life estimate of eight to ten years, which could be extended further with ongoing repairs.
- ***Vessel Layby Pier*.** The recommended repairs include implementing open bolt hole patch / dowel repairs for the piles. The assessment reported an estimated useful life estimate of eight to ten years, which could be extended further with ongoing repairs.

- ***Vessel Layby Dock.*** The recommended repairs include replacing one pile. The assessment reported an estimated useful life estimate of eight to ten years, which could be extended further with ongoing repairs.

Mercator understands from Management that the 2018 Ausenco repair recommendations for Deep Point facilities were completed in 2018.

Moffatt & Nichol 2019 Condition Assessment Report for Deep Point Marina

The Moffatt & Nichol inspection team conducted an above and below water assessment of each structure using diving equipment. The report presented the findings of the inspection for each structure, including overall condition, repair priorities, and recommendations. The short-term priority (low-medium-high) is based on severity and urgency of the repairs needed. The long-term recommendations are based on the overall lifecycle of each structure.

A total of 11 structures were inspected at the Deep Point Marina and BHI including sections of the bulkhead wall at Deep Point Marina. The scope of work included above and below water inspection of support piles, below deck substructure framing and deck undersides, and freight barge ramp concrete substructure and steel structural elements. No critical structural issues necessitating a high repair priority were found in any of the 11 facilities inspected. The following three waterfront ferry terminal facilities at Deep Point Marina were determined to have a medium repair priority:

- ***B-Gate Contractor Landing.*** The structure was found to be in satisfactory overall condition with minor decay in the timber piles and framing—typical for timber structures of this age. There are split and broken timber joists in two locations and steel tie straps between the under-deck joists and the timber stringers below are severely corroded throughout the structure and should be replaced. Repairs were estimated at $11,000 according to the Moffatt & Nichol as shown in the table below.

- ***Concrete Bulkhead Wall.*** The bulkhead is in overall good condition with isolated spalls and cracks. The bulkhead, including an area that had been previously repaired was inspected above and below water and found to be in satisfactory condition (with the exception of the section adjacent to the freight barge ramp). The sheets were found to be intact with no voids or signs of recent movement.

- ***Freight Barge Ramp.*** Above and below water inspection found the structure to be in satisfactory condition with a crack in the concrete substructure wall corresponding to the adjacent bulkhead repair area as well as minor to moderate corrosion affecting the ramp steel framing, cylinder bases, and other weldments.[11]

The remaining waterfront ferry terminal facilities assessed were in good to satisfactory condition with minimal recommended repair costs.

[11]The scope of the Moffatt &Nichol assessment included only the structural components of the ramp and not any hydraulic systems required for operation. Total cost is estimated at $150,000 for the ramp considers demolition / removal, a steel ramp, mob/contingency, and concrete spall repairs.

As part of the recommended routine inspections and maintenance for all of the structural components of the waterfront facilities, routine inspections should be conducted once every five years. The estimated cost to complete each routine inspection is $65,000, equivalent to $130,000 total over a ten-year program. The total estimated cost of recommended replacements and repairs over the next ten years, based on the observations made during this investigation, is $1,353,000, of which $313,000 relates to the eight facilities located at the Deep Point Marina (see Table 4) and the balance to the three facilities in BHI (described in the next section). Additional structural component maintenance repairs discovered during these inspections can typically be expected on the order of $100,000 - $150,000 over the next 10 years.

Table 4: Summary of infrastructure condition assessment and required repair work at Deep Point Marina as determined by Moffatt & Nichol in 2019

Facility	ASCE Condition Rating	Due Diligence Rating	Repair Priority Ranking	Recommended Repair Cost Estimate
A-Gate Passenger Landing	Good	Good	Low	$0
B-Gate Contractor Landing	Satisfactory	Good	Medium	$11,000
Maintenance Fixed Pier	Good	Good	Low	$1,000
Maintenance Finger Dock	Satisfactory	Good	Low	$10,000
"G" Berthing Platform	Good	Good	Low	$0
"H" Berthing Platform	Good	Good	Low	$0
Bulkhead Wall	Satisfactory	Good	Medium	$137,000
DPM Freight Barge Ramp	Satisfactory	Good	Medium	$154,000
Subtotal Deep Point Marina				**$313,000**

Source: Moffat & Nichol 2019.

2.1.7 Evaluation of shore side ferry assets at Bald Head Island

Within the Bald Head Island Marina basin is the island terminal for passenger and contractor ferry service. Initially constructed in 1982 and expanded thereafter, the BHI facility has a total land area of approximately 2.25 acres, which supports the passenger terminal, the passenger drop-off and pick-up area, a parking lot for equipment, the freight barge landing, and access roadways serving the ferry and freight barge landing areas, as illustrated in Figure 7. In addition to all the area that is developed and used for ferry and tram operations, the area to be acquired by the Authority includes additional land between the ferry terminal and the river, as shown on this drawing.

General condition assessment

The BHI Passenger and Contractor Ferry Docks are constructed of timber, consisting of handrails, guardrails, decking, stringers, pile caps, piles and pile bracing. There is a covered open-air waiting structure at each of the docks and two aluminum gangways per dock (four in total) provide access from the vessels to the docks.

The passenger terminal is built partially on land and over water. The landside structure supports the passenger drop-off, pick-up, and the security check-in areas. The waterside structure, built on timber piles with wooden plank decking and wooden superstructure, supports both the passenger waiting area and the passenger and cargo loading and discharge ramps.

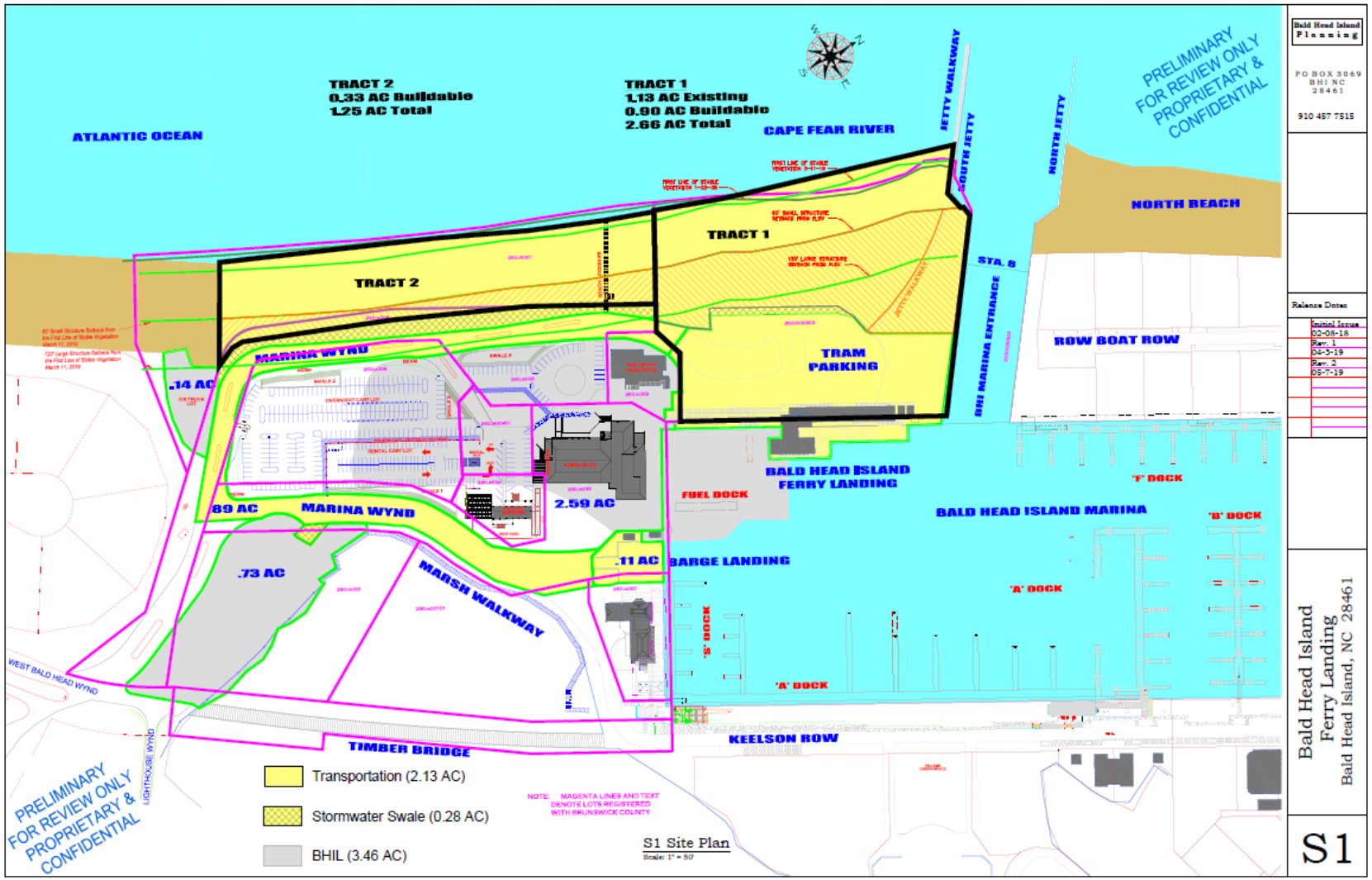
An aluminum bulkhead was installed during a three-year program ending in July 2005 as replacement for the original bulkhead, which was initially built in 1982 and expanded as the marina expanded to its present size. The bulkhead is approximately 2,000 ft in length and has a height above mean low water (MLW) of +/- 7.88 ft. The new aluminum sheets were driven down to an elevation of -13.12 ft below MLW, to suit a water depth of approximately -8.00 ft at MLW. The new bulkhead is tied back through the original wall with threaded tie back rods to Manta Ray anchors.

Mercator's 2017 Condition Assessment Report for Bald Head Island

The on-island parking lot area is used primarily to park the BHI Transportation tram trucks, which are used to transport passengers and their baggage between the ferry landing and points throughout the Island. The pavement was observed to be in good condition. No significant signs of damage or deterioration were observed or reported in 2017. Observation highlights from the 2017 condition assessment relating to specific areas are as follows:

- ***Land area and facility superstructure***. Good to very good. The property area and superstructure looked well maintained as part of routine maintenance program.
- ***Wood timber piles and substructure***. When first inspected in mid-2017, condition was Poor to Fair, with signs of heavy marine growth and infestation. A total of 15 out of 59 piles were no longer providing structural support to the deck. The piles in unsatisfactory condition were replaced by BHIL as of end December, 2017.
- ***Aluminum sheet pile bulkhead***. Heavy marine growth was noted in 2017. In 2003, a portion of the bulkhead to the south in the area of yacht club marina started to collapse causing the embankment behind it to slip into the water. To repair and also secure the remaining portion of the bulkhead, BHI installed a new aluminum sheet pile bulkhead in 2005, outboard of the original bulkhead. This bulkhead provides good corrosion resistance and has an expected useful life of approximately 30 years.

Figure 7: Bald Head Island Terminal—proposed subdivision of ferry landing and freight barge landing areas



2017 Recommendations Addressed and Completed

- A recommendation to encapsulate or replace damaged timber piles was provided to BHIL at the time of the July 2017 inspection. Subsequent to that inspection, BHIL completed the recommended replacement and repair work.
- Aluminum sheet pile bulkhead was cleaned of growth and sections at the waterline cleaned to prevent deterioration and pitting.

Ausenco 2018 Condition Assessment Report for Bald Head Island

On completion of Ausenco's 2018 Condition Assessment, BHI marine structures were found to be in a serviceable condition. This report recommended a couple of additional repairs with a total cost of $73,000 as outlined below:

- ***Contractor Dock.*** The recommended repairs for the contractor dock include replacing one pile, implementing an open bolt hole patch / dowel repairs, and replacing one brace. The useful life estimate for the concrete pile and the bracing was of four to eight years, extendable with normal maintenance and repair.
- ***Passenger Dock.*** The recommended repairs for the passenger dock include replacing one pile, reinstating upper bolted connections along Row B, implementing open bolt hole patch / dowel repairs, and replacing two braces. The useful life estimate for the concrete pile, the bracing, and the dolphins was four to eight years, extendable with normal maintenance and repair.

Mercator understands that the 2018 Ausenco repair recommendations were completed in 2018.

Moffatt & Nichol 2019 Condition Assessment Report for Bald Head Island

The estimated cost of recommended replacements and repairs over the next ten years, based on the observations made during the 2019 investigation for BHI was $1,040,000, as described in Table 5. Two waterfront ferry terminal facilities at BHI were determined to have a medium repair priority, as noted below:

- ***Freight Barge Ramp.*** The steel barge ramps at BHI are in satisfactory condition, however, they may require refurbishment or replacement within the 10-year planning horizon due to corrosion. BHIL has periodically done such work on the barge ramps, most recently in 2016. Capital for replacement on a 10-year schedule has been included in the plan.[12]
- ***Passenger Landing.*** The BHI Passenger Landing was found to be in fair overall condition and replacement within the 10-year planning horizon was recommended. Noting that repair work was recently done to in 2018 to address all of the structural issues observed at that time, and that Moffatt and Nichol did not assign a high priority to this work, we assume the replacement will be undertaken at the end of the 10 year period suggested, starting in 2027. The Moffatt and Nicholl

[12]Total cost of $130,000 for the ramp considers demolition / removal, a steel ramp, and mob/contingency.

budget, which Mercator has adopted, was based on full removal and replacement, although a lower cost repair approach as taken by Ausenco may turn out to be possible.[13]

Table 5: Summary of infrastructure condition assessment and required repair work at BHI as determined by Moffatt & Nichol in 2019

Facility	ASCE Condition Rating	Due Diligence Rating	Repair Priority Ranking	Recommended Repair Cost Estimate
BHI Freight Barge Ramp	Satisfactory	Good	Medium	$130,000
BHI Contractor Landing	Good	Good	Low	$10,000
BHI Passenger Landing	Fair	Good	Medium	$900,000
Subtotal Bald Head Island				**$1,040,000**

Source: Moffat & Nichol 2019.

2.1.8 Dredging Requirements

The Bald Head Island ferry and barge operations share the use of mainland and island marina facilities and, therefore, share in the cost of dredging at each location. By agreement, BHI Transportation is responsible for 33% of the cost of dredging the Deep Point Marina and channel, and 23% of the cost of dredging within the Bald Head Island marina, with no responsibility for the Bald Head Island Channel.[14]

Dredging requirements at Deep Point fall into two categories – the removal of about 3000 cubic yards (CY) of sand on a roughly 1-3 year cycle (with a cost of about $50,000 each time), and more substantial dredging and sand relocation work that is undertaken every 8-10 years, at a cost that could be as much as $600,000 per occurrence. This cost includes both the dredging and an allowance for moving sand from the spoils basin to adjacent land, as was just done in 2020. The Authority is responsible for 33% of the Deep Point dredging, and so to reflect this we have included in our analysis model a) operating expense of $15k per year (which is conservative given that the work is not actually done every year) and b) a large capital expenditure every 9 years, with the next outlay ($246k) coming in FY 2027.

Marina dredging at BHI was last undertaken in 2015, when about 9,000 CY was removed from the marina and placed in the re-established spoils island, at a total cost of $302,850. It is expected the marina will next need to be dredged in the 2025-2027 timeframe. We have assumed conservatively that the Authority will incur a BHI marina capital dredging expenditure in FY 2025, and every nine years thereafter, equal to 23% of the inflated 2015 cost. The cost of re-establishing the spoils island is included in these historic and forecast capex amounts.

[13] Total cost of $900,000 for the passenger landing considers demolition / removal, covered timber dock, and mob/contingency.

[14] Responsibility for dredging the Bald Head Island entrance channel is shared by the State of NC and the Village of Bald Head Island.

2.2 On-Island Tram and passenger service

2.2.1 Description of passenger and baggage tram service

BHI is almost entirely automobile-free. Residents and guests rely upon plug-in electric "golf cart" style vehicles which are kept at each residence or which can be rented once on the Island. BHIT provides a tram service to carry property owners and guests between the ferry landing and their on-island destination, and a shuttle is provided for employees and contractors to / and from the contractor / employee center.

Tram service is included with all standard resident and guest tickets, although on average no more than about 55 percent of property owner and guest passengers use the tram service, which reduces the tram service capacity that is required. Trams operate on a one-hour cycle, which allows time to pick up incoming passengers at the ferry landing, deliver them to their respective destinations, and pick up outgoing passengers and deliver them to the ferry landing. The number of tram and trailer units operated at any point in time is adjusted based on demand.

2.2.2 Tram and passenger trailer operations overview

BHI Transportation provides transportation services to ferry passengers to homes throughout the Island on a pre-reserved basis, which enables efficient planning and routing of the trams. Upon arrival, passengers check in with the transportation coordinator to receive their tram truck number. Passengers then proceed to their respective tram truck with their bags. Bags are loaded in the back of the tram truck, as illustrated in Figure 8, while passengers get aboard the passenger trailer directly behind the tram truck. Each passenger trailer holds 12 passengers. Tram truck / trailer units make one round trip in under an hour dropping and picking up passengers along the way. Departing passengers are picked up on the round trip and taken to the ferry drop off zone, where baggage is delivered and tagged. Passengers then proceed to the passenger waiting area where they wait for the next ferry to depart. Passengers present their tickets at the ticket scanning area at which time they are allowed to embark the ferry. Passenger baggage is loaded into baggage dollies, and then loaded on the aft deck of the ferry for transportation to the mainland.

Figure 8: BHI tram truck and passenger trailer

2.2.4 Evaluation of tram truck and passenger trailer assets

The passenger trailer and tram truck fleet and related equipment is composed of the following asset types: (i) tram trucks, (ii) passenger trailers, and (iii) luggage dollies, which are listed in Table 6 along with selected key facts. Mercator specialists and subcontractors conducted visual inspections on samples of each of the asset types and asked related questions to management and the actual equipment operators in the field. These inspections and interviews were conducted during Mercator's field trip in June 2017. Mercator also reviewed additional documentation provided by management including M&R records and expenses.

Table 6: Baggage Dolly, Tram Truck and Passenger Trailer asset list and condition assessment

Asset	Quantity	Condition assessment
▪ Tram trucks	24	Good
▪ Passenger trailers	20	Fair to good
▪ Baggage dollies	82	Good

General condition assessment

The BHI tram fleet consists of 24 tram trucks and 20 passenger trailers. In addition, the ferry operation is supported by a fleet of 82 baggage dollies that are rolled on and off the ferries with passenger luggage.

- ***Tram trucks***. Good.

- ***Passenger trailers***. Fair to good. The passenger trailer fleet is showing signs of wear and tear. Passenger seat cushions are showing normal signs of wear which is addressed through routine M&R programs.
- ***Baggage dollies***. Good.

Observation highlights

- ***Tram trucks***. No significant issues noted or reported. Some damage to fenders and rust were noted, but this does not impact the safety or reliability of the equipment.
- ***Passenger trailers***. No significant issues noted or reported. Some damage to fenders and rust were noted, but this does not impact the safety or reliability of the equipment.

  Baggage dollies. None.

Conclusions

- No physical deficiencies / deferred maintenance or immediate / short-term needs were noted.

2.2.3 Tram truck and passenger trailer capacity and peak demand profiles

For the capacity analysis, two scenarios were analyzed. The first scenario assumes tram truck and passenger trailer services to support peak day operations with two ferries. The second scenario assumes tram services support peak day operations with three ferries.

Tram truck capacity analysis to support peak day operations with two ferries

BHI Transportation currently has a fleet of 24 tram truck units. Because of maintenance and repair requirements and normal operational breakdowns, tram truck availability for operations is normally about 85 percent of the fleet, or 20 units. Historically, about 55 percent of all property owners and guests arriving to the Island require tram transportation.

- The following assumptions were developed for the capacity analysis, which were then summarized in

Table 7:

- Both vessels are assumed to sail at maximum capacity: 300 passengers would be arriving at the Island every hour (2 x 150).
- All 300 passengers are assumed to be entitled to a tram ride included with their full fare ferry ticket: 55 percent of these passengers choose to use the tram transportation, equivalent to 165 passengers.
- Tram passenger utilization is typically 90 percent, equivalent to 11 passengers/tram: a total of 15 tram truck and trailer units would thus be required for the 165 passengers.

- Based on an availability of 85 percent for tram trucks, the total fleet size required would be 18 units. BHI Transportation has 24 tram truck units, so there is now enough equipment to meet the requirements of peak day two-ferry operations.[15]

Table 7: Analysis of tram truck capacity required to support peak day two-ferry operations

Capacity analysis assumption or fact	Value and units
Peak hourly ferry traffic (2 sailings x 150 each)	300 pax
Percent of riders that are entitled to a tram ride	100 percent
Percent of riders using tram	55 percent
Required tram capacity per hour	165 pax
Maximum passengers per tram	12 pax
Average percent utilization of tram	90 percent
Average passengers per tram trip	11 pax
Round trip time per tram (in hrs)	1.0 hrs
Average passengers per hour per tram	11 pax/hrs
Required tram truck and trailer units operating	15 trams
Tram truck availability at peak demand	85 percent
Required tram truck fleet	18 tram trucks 15 tram trailers

Tram truck capacity analysis to support peak day operations with three ferries

For peak day three-ferry operation under the same analysis criteria, a total of 24 tram truck and trailer units would be operated. Assuming 85 percent availability of the fleet, BHI Transportation would need to maintain a fleet of 28 tram trucks to meet a peak day three-ferry operation, as shown in Table 8.

Table 8: Analysis of tram truck capacity required to support peak day three-ferry operations

Capacity analysis assumption or fact	Value and units
Peak hourly ferry traffic (3 x 150)	450 pax
Percent of riders assumed entitled to a tram ride	100 percent
Percent of riders using tram	55 percent
Required tram capacity per hour	250 pax
Maximum passengers per tram	12 pax
Average percent utilization of tram	90 percent
Average passengers per tram trip	11 pax
Round trip time per tram (in hrs)	1.0 hrs
Average passengers per hour per tram	11 pax/hrs
Required tram truck and trailer units operating	23 trams
Tram truck availability at peak demand	85 percent

[15] The focus is on the powered tram truck units because they require maintenance and may be out of service. The non-powered passenger trailers are simple and rarely out of service, and so extra units are not required.

▪ Required tram truck fleet	28 tram trucks 24 passenger trailers

Conclusions on tram system capacity and required equipment

- Tram capacity will not be a limiting factor when evaluating system-wide capacity, provided sufficient equipment is available.
- BHI Transportation would need to increase the fleet to 28 tram trucks and 24 passenger trailer units to have the required units available to meet peak day three-ferry operations. This will require the purchase of four additional tram trucks and four additional passenger trailers.
- To support a 50 percent increase in system capacity with regular operation of three ferries, BHITA will also require an additional 35-40 baggage dollies, at about **$2,500 each.**

2.2.5 M&R quality and historic and future M&R costs

BHI Transportation has a good M&R process in place. Pre-operational equipment inspections are performed. Safety and mechanical issues are recorded and passed on to the maintenance provider. Equipment is repaired in a timely manner through an agreement with a 3rd party vendor located on the Island. Maintenance quality is good. Safety issues are addressed immediately with longer term maintenance issues scheduled based on availability. There is no need for changes to the tram truck system maintenance program that would increase costs beyond the historical trend.

2.2.6 Useful life and replacement costs

Tram trucks have an expected useful life of seven to ten years. The most recently purchased units had a cost of $26,000 in 2020. We included costs for continued replacement in the eighth year of service.

Passenger trailers have an expected useful life of about 25 years. We assume that fleet replacement will start in 2025, and be completed over a six year period.

3. Parking and tug and freight barge operations

This section presents Mercator's analysis of the Deep Point parking operation, the tug and freight barge operation, and the real property and terminals infrastructure assets. The parking operations and parking capacity, including an evaluation of the assets that comprise the parking operations, are addressed first. Next, a similar analysis and evaluation is presented for the tug and freight barge operation, followed by an analysis and evaluation of the freight handling facility. Each asset evaluation provides a general condition assessment, observation highlights, as well as conclusions or recommendations where applicable.

3.1 Parking operations

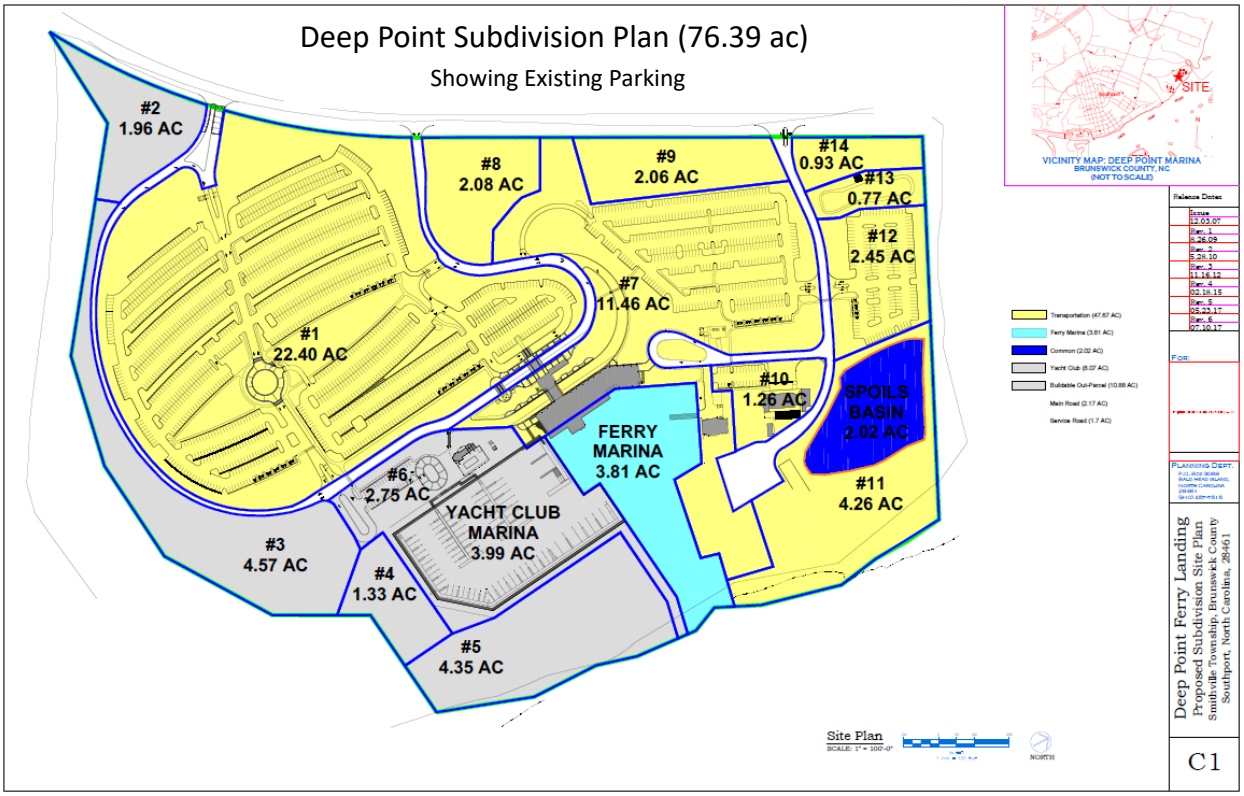
3.1.1 Description of parking business and services

Nearly all ferry passengers travel to and from the Deep Point Terminal (at Southport, on the North Carolina Mainland) by personal vehicle and park their vehicles in the BHI Limited parking facility. Therefore, the parking operation is tied to the ferry operation, with demand for parking very closely related to overall ferry traffic.

3.1.2 Parking operations and assessment of capacity

Approximately 36.3 acres of developed parking lots serve the customers of the ferry as of 2020. The layout of the parking lots is shown in the plan in Figure 9.

Figure 9: Deep Point Ferry landing terminal layout with developed parking lots



Parking is segregated into several lots for different groups of users and with different rate structures as summarized in Table 9.

Table 9: Existing parking facilities at Deep Point Marina (number of paved / striped stalls)

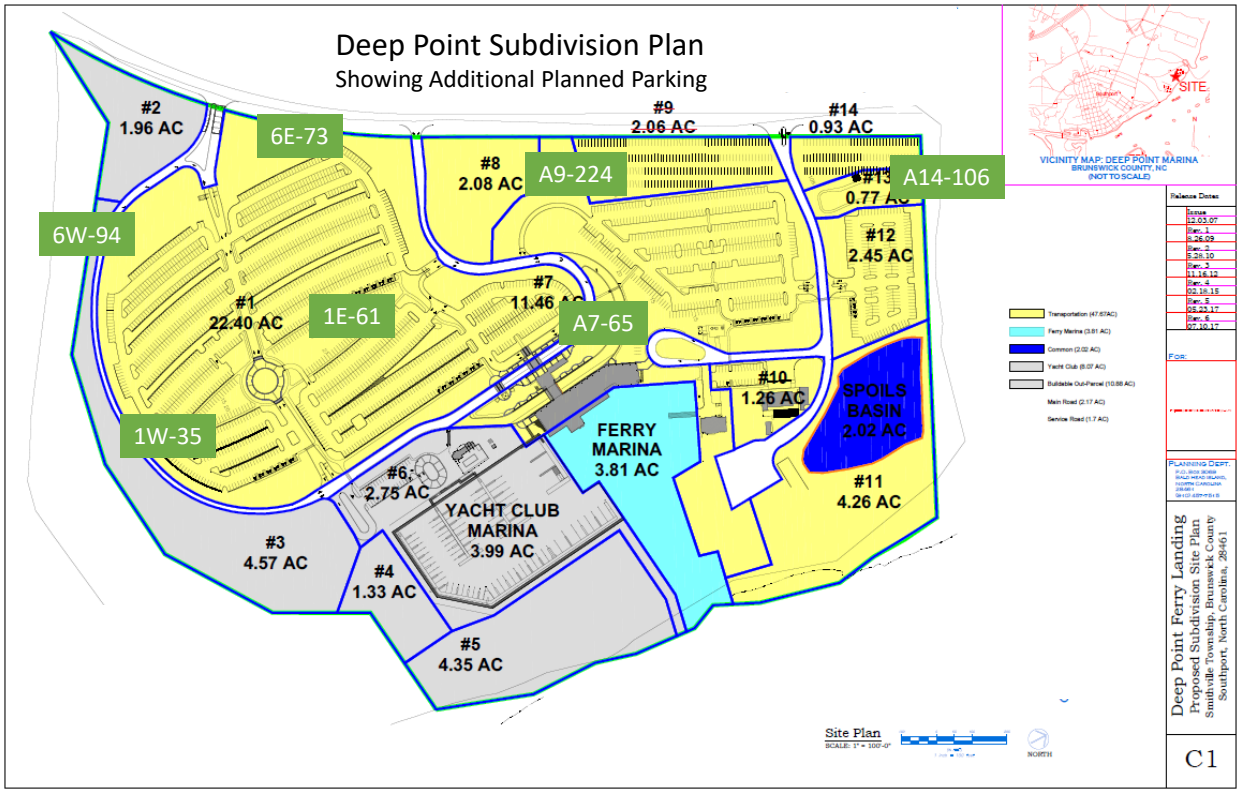
General Lot	1,021
Premium Lot	396
Contractor Lot	366
Employee Lot	172
Total Stalls	**1,955**

Utilization rates are generally less than 50 percent throughout most of the year, but are significantly higher during the peak summer season, when utilization is at or above 100 percent.

The system's peak historical ridership was achieved in 2019, which resulted in parking lot utilization of about 61 percent across the year, and approximately 96 percent during the Jun-Jul-Aug peak period (104 percent during July). During certain peak periods, some cars are parked in un-striped or un-paved spaces, which allows reported utilization to exceed 100 percent.

If we assume the current system has latent capacity of just 5 percent, then parking lot capacity will have to be expanded in order to handle the annual ridership increases that are expected. Areas where additional parking is designed and approved are shown in Figure 10.

Figure 10: Deep Point Terminal expansion areas and number of stalls (area - # new stalls)



Assuming that the maximum effective annual capacity is just 5 percent more than the parking vehicle-days already achieved in 2019, the current parking lot capacity is about 460,000 vehicle days per year.[16] Considering the phased completion of the currently defined parking lot expansions that are illustrated in Figure 10, we can calculate the future parking capacity at the Deep Point Terminal after each succession parking lot expansion. Finally, assuming no significant change in the ratio of parking days to ferry traffic, then we can establish an effective capacity limit for the overall system, as outlined below in Table 10.

[16] Annual vehicle-day capacity depends on the distribution of activity across the year – the more evenly spread, the greater the utilization in off-peak periods and the greater the number of annual vehicle days that can be accommodated.

Table 10: Additional parking developments and supportable ferry capacity - with no additional land areas

	Additional Stalls Added	Total Number of Stalls	Max Vehicle-Days	Max Ferry Passengers Supported
2019 Actual		1,955	437,772	357,000
Max Current Capacity	5%	1,955	460,000	375,000
Area "6W" and "6E"	167	2,122	499,000	407,000
Area #1W	35	2,157	507,000	414,000
Area #1E	71	2,228	524,000	428,000
Area #7	65	2,293	539,000	440,000
Area #9	224	2,517	592,000	483,000
Area #14	108	2,625	617,000	503,000
Total	670			

If all land areas that are to be included in the transaction are developed, the number of parking stalls would be increased from the current total of 1,955 to a new figure of 2,625, an increase of 34 percent from current paved parking stall count. Assuming a similar seasonal demand pattern as in 2019, and a 2019 latent capacity of 5 percent, the annual vehicle-day capacity, when fully developed would reach 617,000. This level of parking capacity would support annual ferry traffic of about 500,000 passengers per year. At a cost of $2,000-2,500 per stall for developing paved / lighted parking areas[17], the addition of 670 stalls would cost $1.425 million. According to BHIL, yhe anticipated parking additions have been designed so as to stay within the permitted capacity of the existing stormwater systems.

To move beyond a traffic level of 500,000 passengers per year, BHITA would likely need some additional land for further parking lot development, or a change in passenger's inland traveling modes that reduced the number of cars parked at the Deep Point Terminal, or make a change to how the parking lots are operated. There is additional land totaling about 6.5 acres along the southern boundary of the site that could possibly be developed, labeled as areas #2 and #3 in Figure 9. This land would need to be acquired by the Authority when and if needed. The Authority will acquire as part of the transaction a 30-year option to purchase Area 2 at specified prices. It is estimated that if acquired and developed, this land could add another 400+ stalls, increasing stall count from about 2,625 to more than 3,000, as illustrated in Table 11.

[17] BHIL historic costs for developing parking spaces have been in the range of $1,500-$2,000 per stall. We assume $2,000/stall for projects of more than 100 stalls and $2,500/stall for smaller scale projects.

Table 11: Potential additional areas for parking – land that could be acquired if needed

		Additional Stalls Added	Total Number of Stalls	Max Vehicle-Days	Max Ferry Passengers Supported
Fully Built BHITA Land			2,625	617,000	503,000
Area #2	2.2	125	2,750	646,000	527,000
Area #3	4.4	300	3,050	716,000	584,000
Total		425			

With this additional land and parking development, there would be sufficient parking to support over 700,000 vehicle parking days per year, which provides parking capacity to support ferry passenger traffic up to about 570,000 passengers per year, which will allow parking to keep pace with the growth in ferry traffic for the 30 year analysis period.

To provide further capacity or as an alternative to acquiring additional land, changes could be made to the parking operation to increase peak parking density. For example, by offering a valet parking service, one or more lots could be converted from random-access self-parking to high-density block-stow parking, similar to the operations seen at large valet-served lots at airports. With a valet-parking arrangement, the capacity of selected lots could be approximately doubled. The extra cost of valet parking, which would only be required during the peak periods, could likely be recovered by charging higher prices for this premium, high convenience service. The business plan for such an operational model has not been defined, however, and would not need to be implemented for many years, and so it is not considered in this feasibility analysis.

3.1.3 Evaluation of parking assets

Topography assessment

The property is generally flat, with a gentle slope to the east, up from the level of the Cape Fear River. No unusual or problematic features were noted or reported when Mercator visited the site in 2017.

- ***Property drainage***. The runoff from the parking lots flows to catch basins, raceways, and drainage culverts which discharge to two detention ponds on the facility.
- ***Surface water bodies***. There are several areas on the site that have been designated as coastal wetlands. In addition, there are several stormwater basins that will also limit the extent of future development. These limitations have been accounted for in BHIL's estimates of developable parking spots within each area of the property.
- ***Flood plain designation***. The subject property is situated within Zone X which is defined as areas determined to be outside of the 0.2 percent annual chance floodplain.
- ***Seismic zone***. The property is located in Zone 1. Properties located in Seismic Zones 3 or 4 are considered potentially vulnerable to significant impacts from earthquake activity. The subject property is not located in one of these zones. The facility was built to a seismic design category D,

which corresponds to buildings and structures in areas expected to experience severe and destructive ground shaking but not located close to a major fault.

- ***General condition***. Very Good. The topography and drainage at the property are maintained as part of routine maintenance.

Parking areas assessment

The parking areas are designed using asphalt laid over a stabilized base.

- ***Curbs / swales / other.*** Poured concrete curbs are present on the approach to the main building and passenger drop off area, along the sidewalks and around the landscape medians.
- ***Ingress / egress.*** Primary ingress and egress for the subject property is provided via one main entrance roadway, off Ferry Road. Access to the parking areas and to the main passenger facility to the east is provided within the property boundaries. There is also a separate access from Ferry Road that serves the employee parking lot and the freight barge ramp / marine maintenance area.
- ***Lighting.*** BHIL recently completed the replacement of conventional parking lot lights with LED lights, and achieved an immediate reduction in electricity costs for lighting.
- ***General Condition.*** Good. Limited pavement repairs, sealing, and striping appear to have been conducted recently. No significant pavement issues were noted or reported.

Concrete and flatwork assessment

- ***Sidewalks.*** The sidewalks, located along the marina front and in front of the ferry terminal building, and over to the maintenance shop, consist of standard poured concrete slabs. One heavy duty concrete loading area is present in front of the maintenance shop and another immediately behind the freight barge loading ramp.
- ***Other.*** Concrete pads support the electrical transformers and switchboxes. Concrete raceways are present at pavement edges, which help to facilitate drainage to the detention / retention ponds. Concrete is also present at water meters / drainage lines located throughout the property.
- ***General condition.*** Good. Minor to moderate cracking was observed in flatwork throughout the property.

Conclusions

- No physical deficiencies / deferred maintenance or immediate / short-term needs were noted. The areas of minor erosion and movement of the curb and sidewalk can be addressed as part of routine maintenance.
- Asphalt parking areas were installed in 2009 and have an EUL of 25 years. With proper maintenance, the parking lots could exceed the 25-year period up to an additional 10 years with routine maintenance.
- Concrete flatwork, installed in 2009 and 2010, has a EUL of 25 years. It would be reasonable to anticipate extending the useful life of concrete flatwork an additional 10 years, assuming proper maintenance continues to be performed as required.

3.2 Tug and freight barge operation

3.2.1 Description of freight barge business and the services provided

BHI Limited operates a tug and freight barge service five days per week, year-round, on a regular schedule between the Deep Point Terminal and the BHI Marina. The roll-on/roll-off (RoRo) freight barge carries vehicles of all kinds and sizes, up to and including large highway trucks and construction vehicles. With the exception of passenger baggage moving on the ferries, the freight barge service provides the only means to transport supplies and equipment to and from the Island. Nearly all cargo is transported in a customer's vehicle, although loose "deck cargo" is occasionally accommodated.

3.2.2 Overview of operations and assessment of capacity

The freight barge service utilizes a single tug of 850 (2 x 425) horsepower[18] and a single 100 ft x 32 ft barge. Round trip voyages require about two hours. Demand is presently met by up to 20 sailings per week (four sailings per day, five days per week). While operations are conducted only during daylight hours, there is ample daylight during the peak season to expand the schedule to include up to six sailings per day.

In 2019, BHI Limited operated 1,021 freight barge round-trip voyages (a 24.1 percent increase from 2016), and sold 28,744 "freight barge tickets." One freight barge ticket is required for each six-lane-ft of cargo, meaning that the freight barge transported about 172,464 lane-ft of RoRo cargo. Each voyage can accommodate about 270 lane-ft of cargo (45 tickets), giving a calculated average utilization for 2019 of about 57 percent (7 percentage points more than in 2016). Effective July 22, 2019, freight barge ticket rates were increased for the first time since 2006, increasing by $5.00 from $50.00 to $55.00. The exceptionally high volume of 2019 freight barge traffic is attributed to the substantial amount of repair and rebuilding required after Hurricane Florence hit in September 2018.

There is significant capacity available to satisfy growth in freight traffic, which could be accomplished in at least three ways:

- Increasing tug and freight barge weekday sailing frequency would be the simplest approach. Sailings could be increased from the current level of 20 per week (four per day x five days) to 30 per week (six per day x five days), at least during the peak summer months when daylight hours allow up to two additional voyages each day, an increase of 50 percent.[19] A six sailing per day schedule was in place during 2006-2007 when construction activity was very high.
- Additional weekend sailings could also be added under special circumstances. Although the Village of Bald Head Island strongly prefers to avoid freight barge sailings and the associated traffic on the weekend, it seems logical that if critical freight demand required it, an accommodation could be reached.

[18] The tug *Captain Alex*, with twin 385 hp engines, was recently replaced by a new tug, the *Captain Cooper*, which entered service in Q3 2017. The *Captain Cooper* has about 10 percent more power (2x425 hp) and is slightly faster, but voyage round-trip time will be largely unchanged.

[19] While increasing the number of voyages may require a change to the scheduling of preventive maintenance activities, such a change should be feasible by, for example, doing maintenance on the overnight shift.

- Capacity management / reservation protocols could allow utilization to be increased substantially beyond the historic 50 percent level to a year-round average of perhaps 60 to 70 percent. At a utilization level of 65 percent, the tug and freight barge operation would be carrying 30 percent more cargo traffic.

Additional voyages could raise capacity to a level about 35 percent greater than the 2019 level (the freight barge completed over 1,300 round trips in 2006 and 2007). Increased utilization could further increase capacity if required, supporting annual freight ticket sales of at least 40,000 per year. Fuel consumption per voyage declined about 10 percent with the new tug in 2018 and this level of consumption per voyage is carried forward. As voyages are added, fuel and labor costs will increase in proportion to the increased number of voyages. For the sake of the feasibility analysis we assume (conservatively) that capacity is added through additional voyages, so these cost impacts have been reflected in the cash flow model.

3.2.3 Evaluation of tug and freight barge assets

Captain Cooper pusher tug

The *Captain Cooper* was delivered (new) to BHI Limited during the late summer of 2017. This new purpose-built tug should fully meet the service requirements of the tug and freight barge operation. It has a minimum service life of 40 years. The characteristics of the *Captain Cooper* are illustrated in Table 12. Based on reported pricing for a similar tug[20] and the valuation survey of KOPCO, the market value and replacement value of the newly delivered Captain Cooper is estimated to be about $2.1 million.

Table 12: Characteristics of the *Captain Cooper* pusher tug

Vessel characteristic	*Captain Cooper*
Year Built	2017
Length overall (LOA)	50 ft
Beam	24 ft
Draft	5.5 ft
Horsepower	2 x 425 = 850
Service speed	8 knots
Fuel consumption	Abt 27.5 gallons/voy

Barge Brandon Randall

The *Brandon Randall* is a 100 ft x 32 ft steel deck barge, built in 1999 in accordance with 46 CFR Subchapter I (Cargo) vessel for Lakes, Bays, and Sounds. The Barge has a draft of 1.5 ft and can carry 200 Tons of cargo. The vessel is dry-docked twice every five years as per Subchapter I requirements. The *Brandon Randall* was found to be in seaworthy condition; however, it is showing normal wear and deterioration consistent with her age. Her next dry-docking due date is Oct 18, 2022. The 2019 M&R cost of the *Brandon Randall* was $10,000, an allowance that is carried forward in the model. Additionally, every two to three years the Barge is drydocked and painted, and required structural repairs are made.

[20] Great Lakes Tugs recently delivered a 45-ft, 940 hp tug at a cost **$2.5 million**. The 2017 acquisition cost of the *Captain Cooper*, with lower installed power, was on the order of **$1.7 million**.

The last two barge dry-dockings averaged about $41,000 each, so an average cost of $20,500 per year is included in the Capex outlook.

Conclusions

- The barge *Brandon Randall* is seaworthy and has 10 or more years of service life remaining.
- Because, in general, steel vessels are hard to maintain once corrosion becomes extensive, the maintenance routine has included periodic grit-blasting and epoxy coating of internal spaces, which in her present service are kept dry.
- Given her age and condition, it should be expected that the M&R and dry-docking budget for this vessel will have to be steadily increased.
- The current **market value** of the Barge is estimated to be **$100,000** and the **replacement** cost for a similar US-built barge is estimated to be **$225-250,000, with $250,000 included in the CapEx forecast.**

3.3 Freight handling facility

3.3.1 Description of business and service

The transportation system serving BHI includes a small freight handling operation where small parcels of cargo are combined, palletized and loaded aboard trucks for transport to the Island. The freight handling operation has historically been undertaken by a department of BHI Limited, but with all revenue and costs of the cross-docking kept separate from the tug and freight barge operation. It is assumed that in the future, after BHITA owns the Deep Point campus, the cross-docking activity will be managed by a third-party contractor or a cooperative that leases space for the activity. In this analysis, it is assumed the cross-dock facility will generate a market-based lease revenue for the BHITA.

3.2.2 Overview of operations and facility

The Deep Point Shipping & Receiving and cross-dock facility was opened to operations in the fall of 2009. The 5,880 square foot facility has doors on both the western (x4) and eastern (x3) sides of the facility. The facility includes two 140 square foot cold storage areas, one for chilled cargo and the other for frozen cargo. A backup power generator is provided. Cargo is handled directly from inbound trucks, moved across the dock, and immediately loaded onto waiting outbound BHI trucks headed for the Island. A photo of the freight handling facility is provided in Figure 11.

Figure 11: The Freight handling facility at Deep Point

3.2.3 Evaluation of assets - Condition assessment

- ***Cargo bay doors***. No issues noted or reported. Bay doors were open and operational at the time of the assessment.
- ***Concrete cargo bay area.*** No significant defects in the concrete bay area were noted or reported. Cargo bay area is a 7-inch thick, 4,000 lb per square inch concrete slab.
- ***Drainage***. No drainage issues were identified or reported.
- ***Roof***. No roof leaks were observed or reported. The roof system is designed for wind speeds of up to 140 MPH.
- ***Parking area***. No damage or deterioration noted in the parking area.
- ***Discharge and loading bays***. No significant damage or deterioration to the truck discharge and loading ramp areas were observed or reported.
- ***Cold and frozen storage***. Units were in full operation at the time of observation. No issues were noted or reported.
- ***General condition***. Good. Warehouse is well maintained, kept clean, and is organized. Routine maintenance is performed and repairs made in a timely manner.

Conclusions

- No physical deficiencies / deferred maintenance or immediate / short-term needs of the freight handling facility exterior, roof, or interior were noted.
- All electrical and mechanical systems were observed to be in good working condition.

3.2.5 Useful life and replacement costs

The cross-dock freight handling facility is a relatively new structure, with an expected useful life of over 40 years. There are no major issues or significant expenditures foreseen in the next 10 to 15 years with this structure.

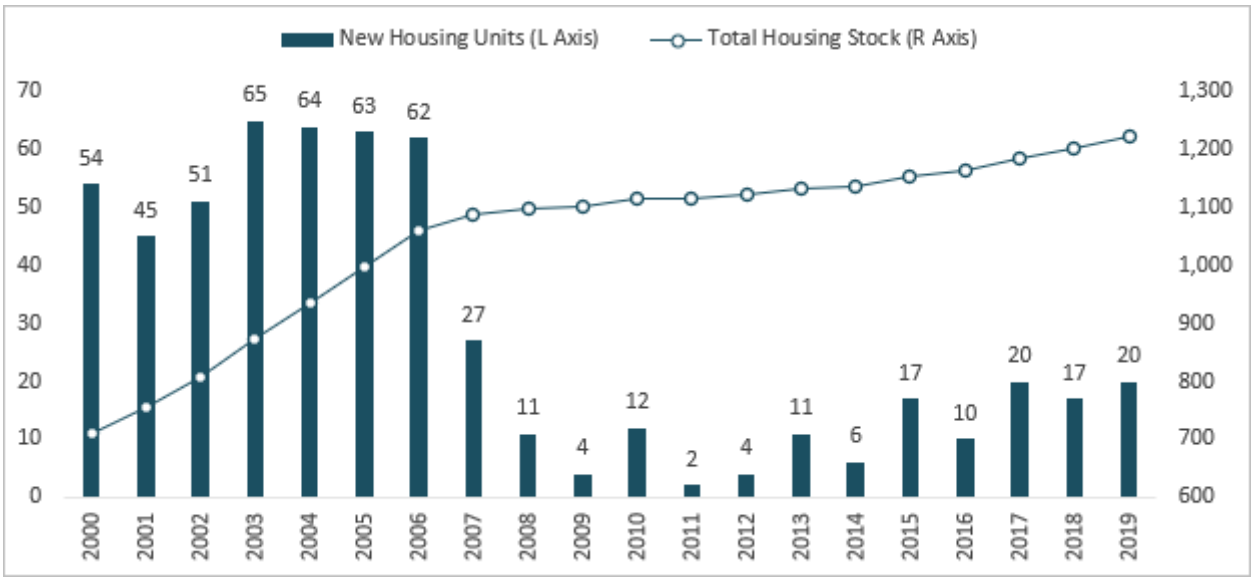
4. Demand analysis

4.1 Analysis of historical data

From 2000 to 2019, an average of approximately 150,000 people visited BHI per year, with around 60 percent of the visits taking place between May and September. Two thousand of the island's 12,000 acres are available for development, while the remaining 10,000 acres will remain undeveloped. BHI has approximately 1,300 private residential units and is home to approximately 250 year-round residents. The remainder are second residences / vacation homes.

As can be seen from Figure 12, which was derived by Mercator from property tax records, the number of residential units on the island grew quickly during the 2000 to 2006 period, but new home construction did not begin to rebound from the 2009 housing crash and global financial crisis until 2013. With building sites available for another 800 to 1,000 units, there is substantial room for additional housing growth at the recent rate of around 20 houses per year.

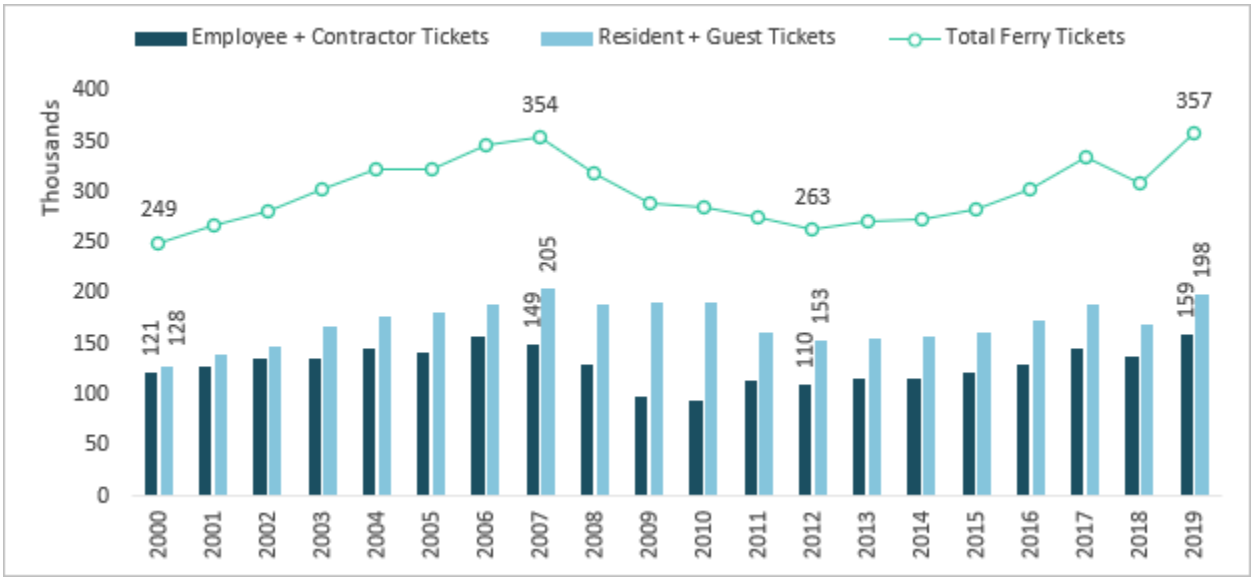
Figure 12: Residential units built per year and accumulated housing stock, 2000 to 2019



Ridership grew at a compound rate of 5.1 percent per year over the 2000 to 2006 period, and after contracting from 354,000 in 2007 to 263,000 in 2012, total ridership resumed growing at a rate of 4.5 percent on a compound annual basis over the 2012 to 2019 period (see Figure 13). The decline in total ridership from the 2007 peak to 2010 was driven by a massive decline in employee and contractor ticket sales that was precipitated by the collapse of new home construction. The continued decline in total ferry ridership from 2010 to 2012 was driven by a decline in resident and guest ticket sales, which appears to have been influenced by a 53 percent increase in resident and guest ticket price and a 40 percent increase in the less expensive employee and contractor ticket price in 2011. The jump in employee and contractor ridership in 2011 coincides with the dip in resident and guest ticket sales, thus suggesting that the increase in ticket prices caused some contractors who were paying for the convenience and additional service level

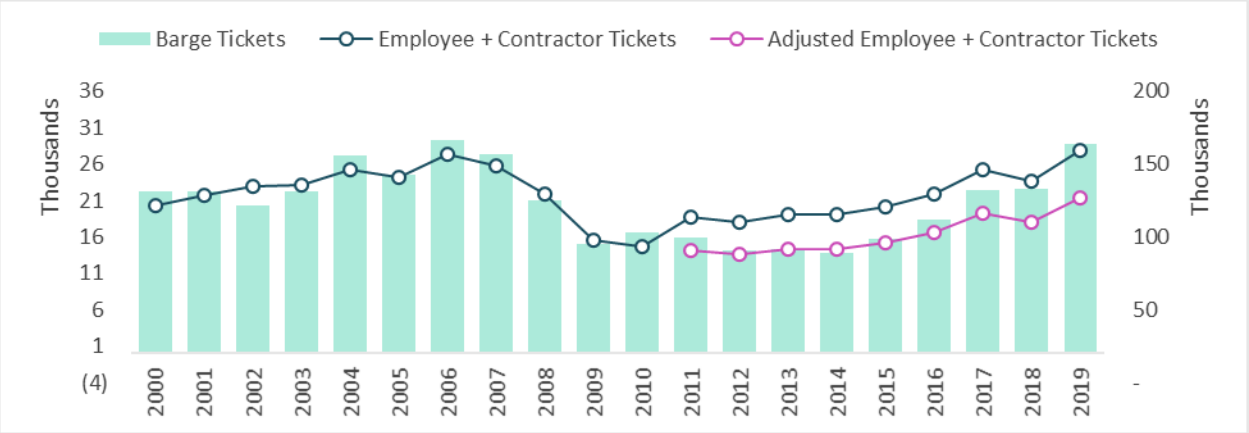
associated with the resident and guest tickets prior to the price increase were not willing to do so after the price increase in 2011.

Figure 13: BHI ferry ticket sales by major category, 2000 to 2019



In addition to operating the passenger ferry, a freight barge service is also operated by Bald Head Island Limited and is intended to become part of the BHITA operation. The freight barge delivers all the materials associated with residential and non-residential construction, and as such, the freight barge tickets should be highly correlated with contractor and employee ticket sales. In Figure 14, we see that there is indeed a strong correlation between these ticket categories through 2010, when the employee and contractor ticket sales jumped despite residential construction hitting a 20-year low, and despite a slight decline in freight barge ticket sales. When we adjust for the 2011 ticket price increase – induced shift from resident and guest ticket sales to employee and contractor ticket sales, we see that the correlation between freight barge tickets and employee and contractor tickets remains tight until 2017. The data suggests that the approximate doubling of home construction in 2017 caused some of the contractors to shift back to buying the higher priced resident and guest tickets in recent years.

Figure 14: BHI freight barge ticket sales and employee and contractor ferry ticket sales, 2000 to 2019



The rise, fall, and rebound in ferry and freight barge ticket sales reflects shifts in home construction, and home construction, in turn, is influenced by the relative attractiveness of real estate as an investment class. The purchase of second residences / vacation homes should be compared against alternative investments in the stock market. As can be seen in Table 13, which compares the relative performance of real estate (as measured by the national Case Shiller Home Price Index) to the Nasdaq composite index and the Dow Jones industrial average, there are four distinct periods. These are described in the bullets below:

- **Period 1: Housing Bubble (January 2000 to March 2007)** – Over this period, home prices increased at a compound rate of growth of just over 10 percent per year while both stock price barometers declined. New home construction averaged 58 new units per year, and ferry tickets grew at a compound annual rate of 5.6 percent, while freight barge ticket sales grew at a compound rate of 4.4 percent per year.
- **Period 2: The Great Contraction (March 2007 to May 2009)** – Over this period, declines were significant across all investment classes.
- **Period 3: Early Recovery (May 2009 to May 2012)** – Over this period, home prices remained flat, while the Nasdaq composite index increased at a compound annual rate of just under 20 percent (nearly doubling in five years), and the DJI increased at a compound rate of over 10 percent per year. Over period 2 and period 3, new home construction on BHI averaged just over six units per year, and in 2012, passenger ferry ticket sales were around 25 percent lower than in 2007, and freight barge ticket sales had fallen by half.
- **Period 4: Late Recovery (May 2012 to December 2019)** – Over this period, all asset categories produced attractive annual returns, and we see that new home construction grew from just four units in 2012 to 20 units in 2019. In turn, ferry ticket sales grew at a compound rate of 4.5 percent per year over this period and freight barge tickets doubled.[21]

[21] It should be noted that freight barge traffic in 2019 was unusually high due to recovery efforts following Hurricane Florence. Between 2012 and 2018, freight barge ticket sales grew at a compound rate of 9.5 percent per year.

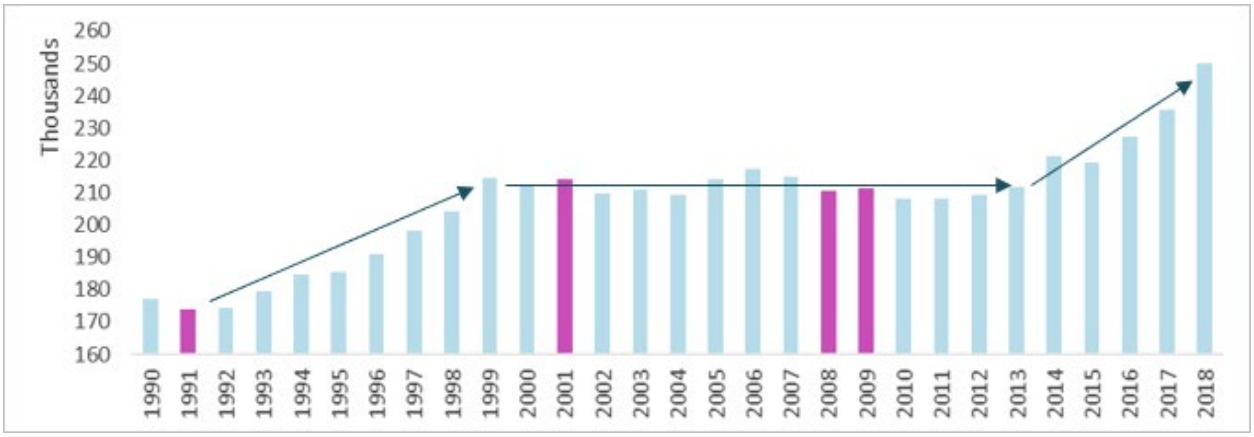
Table 13: Four major periods impacting real estate development in the US, 2000 to 2019

	Case Shiller Home Prices		Nasdaq Composite		Dow Jones Industrial Av.	
	Index	Measure	Index	Measure	Index	Measure
Period 1: Housing Bubble						
Jan-00	100	100.0	100	4,131.2	100	16,618.7
Mar-07	204	204.0	59	2,448.9	93	15,430.6
CAGR	10.3%		-7.0%		-1.0%	
Period 2: Great Contraction						
Mar-07	100	204.0	100	2,448.9	100	15,430.6
May-09	69	140.8	69	1,689.2	66	10,191.9
CAGR	-15.7%		-15.8%		-17.4%	
Period 3: Early Recovery						
May-09	100	140.8	100	1,689.2	100	10,191.9
May-12	99	139.5	172	2,902.6	136	13,831.1
CAGR	-0.3%		19.8%		10.7%	
Period 4: Late Recovery						
May-12	100	139.5	100	2,902.6	100	13,831.1
Dec-19	158	220.2	310	9,006.6	206	28,481.4
CAGR	6.2%		16.1%		10.0%	

Homes that are being built on BHI are primarily second residences, and more specifically, they are vacation homes. Nationally, it is estimated by the National Association of Home Builders that the total count of second homes was 7.4 million (2016) which equates to approximately 5.6 percent of the total housing stock. A significant, but unknown portion of this volume are comprised of what Mercator refers to as "cash flow real estate investments" – residential homes and condos that are purchased with the intent of renting units through long-term or short-term leases. Vacation homes, by contrast, typically remain vacant for most of the year, though it should be noted that vacation homes are now more frequently being rented out to vacationers on a daily or weekly basis as a consequence of the increased ease of doing so made possible through apps such as Airbnb. Mercator understands that 435 of BHI residential units fall into the category of vacation home rentals, generating about $18 million a year in rental revenue.

Vacation homes that do not generate cash flows are an asset class that is only accessible to the upper echelon of income earners. While Mercator does not believe that the COVID-19 pandemic will have any direct long-term impacts, the indirect impact on the economy could influence the outlook for new home construction on the Island. The trend shown in Figure 15 below, however, indicates that inflation-adjusted incomes of the top 5 percent of income earners have been quite resistant to recessionary pressures. Thus, it appears unlikely that the pandemic-caused recession will have an immediate or long-term impact on new home construction on BHI.

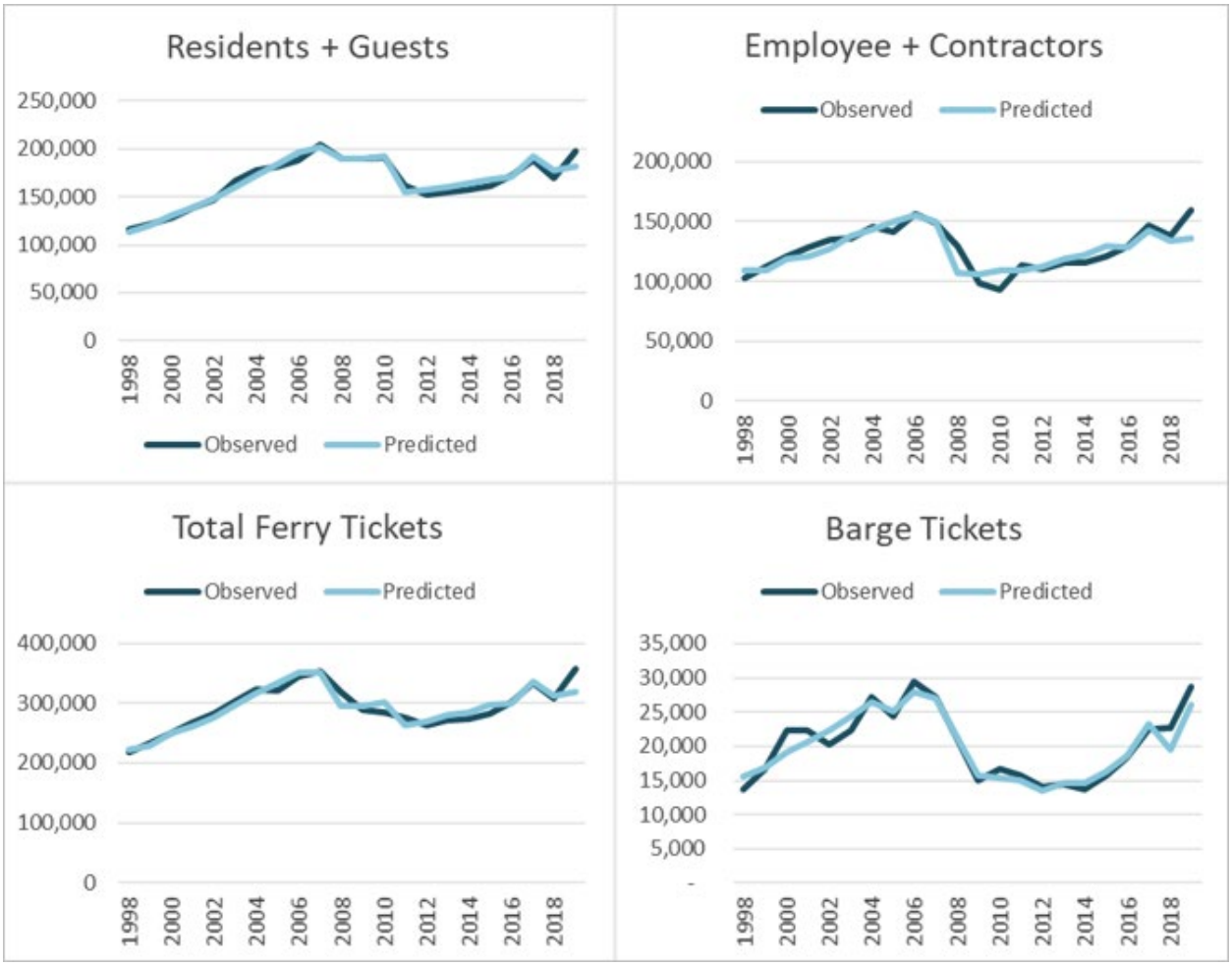
Figure 15: Inflation-adjusted average annual income of the lowest wage earners in the upper 5 percent income bracket, 1990 to 2018 (recessions highlighted in magenta) Source: US Census



4.2 BHI ferry ticket, freight barge ticket, and parking volume modeling

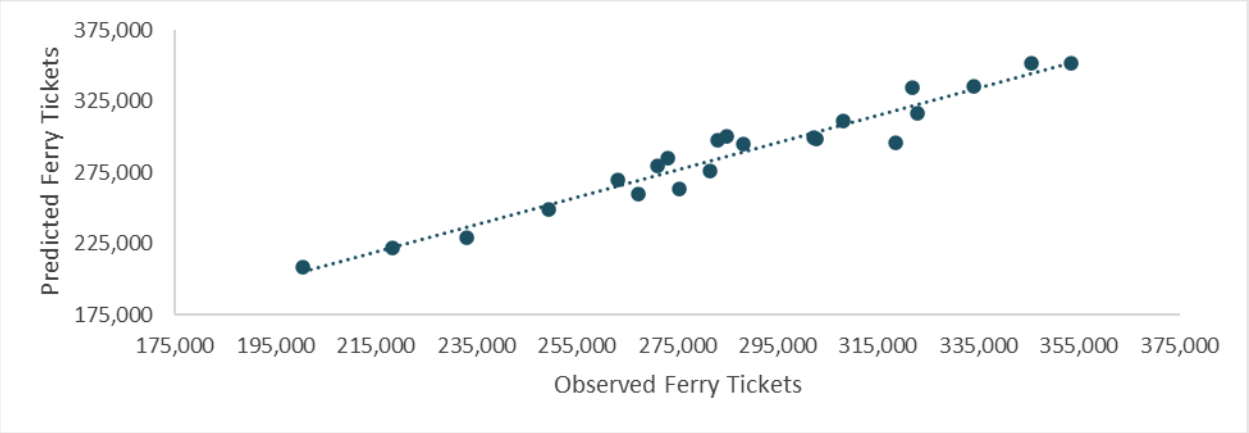
Through a stepwise multivariate regression analysis, Mercator derived an econometric model that accurately predicts historical barge and ferry ticket sales by major ticket class (guest / resident versus contractor / employee). Ferry and barge traffic to and from BHI are driven by total housing stock and the number of new houses built per year, though there are additional variables in the model to aid calibration. Ferry and barge traffic, in turn, drive demand for parking and other services. The historical accuracy of the model could be further improved by using dummy variables to account for one-off events such as hurricanes, but hurricanes are not accounted for in the model. It should be noted that in terms of ferry and barge traffic, the model will underpredict volumes associated with hurricane recovery efforts. This explains the underprediction in 2019, as the Island's residents and businesses recovered from Hurricane Florence, which touched down in late September 2018.

Figure 16: Observed and predicted BHI ferry and barge ticket volumes, 1997 to 2019



In the scatterplot below, we show that over the 1997 to 2018 period, variation in the independent variables driving the model are able to explain / predict just under 95 percent of the variation observed in total ferry ticket sales. Given the volatility in the BHI housing market, this an acceptable level of model determination.

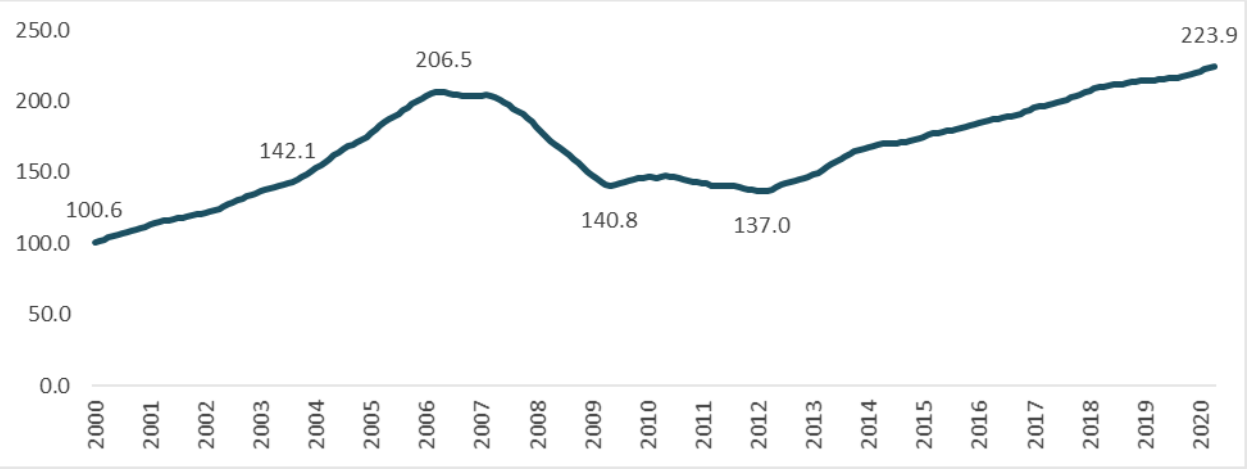
Figure 17: Scatterplot of observed and predicted ferry ticket sales, 1997 to 2018[22]



4.3 BHI ferry ticket, freight barge ticket, and parking volume forecast

Growth of BHI ticket sales and parking revenues are dependent on new home construction. As demonstrated in the overview section, new home construction has been extremely variable, with the rate of growth in residential housing stock ranging from as low as 0.2 percent (2011) to as high as 8.2 percent (2000). As a baseline assumption, Mercator assumes that the current recession is qualitatively different than the Great Recession of 2008 / 2009 in at least one critically important aspect – the Great Recession and global financial crisis were precipitated by a housing bubble that culminated with a mortgage crisis. Thus, those historically low new home construction rates should not be expected to return.

Figure 18: Case-Shiller Home Price Index, all cities, January 2000 to April 2020



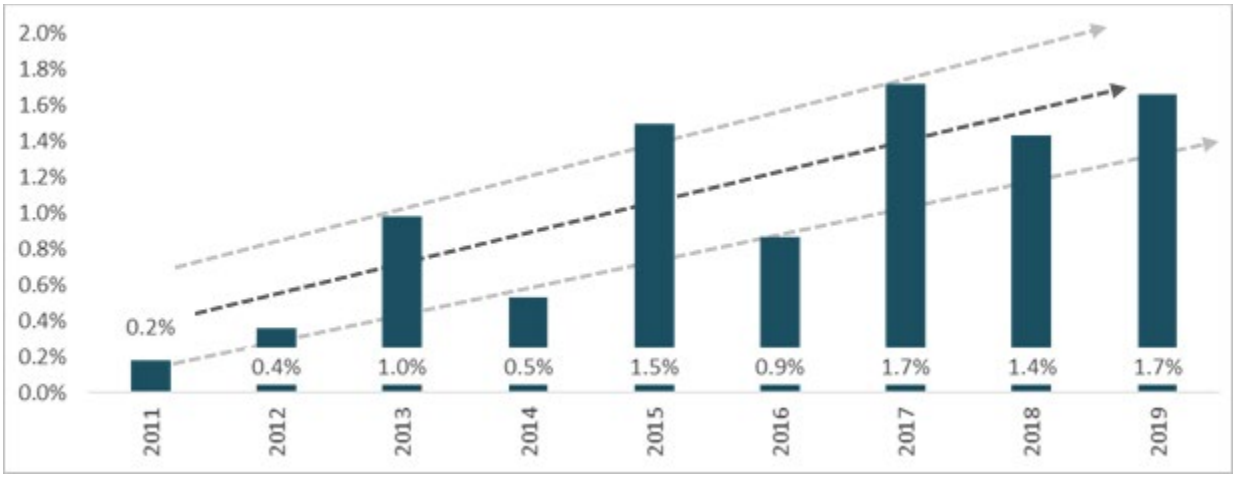
[22] 2019 was excluded because it is an outlier year due to the effects of Hurricane Florence.

While growth rates in BHI home construction will likely fall far short of the levels reached during 'bubble years', it is reasonable to expect the rate of housing stock additions to continue to increase or at least remain steady when the following are considered:

- To date, the great majority of businesses that have been hit by the pandemic-inspired economic lockdowns are restaurants, retail, and travel, but these businesses are not in industries that are responsible for employing any significant amount of top-five percent income earners.
- Incomes of earners in the top-5 percent have been increasing steadily in real terms, and they are now well above the static income level that this population segment experienced during the housing bubble.
- International travel will continue to be viewed as risky for years, and some portion of the population of upper income earners who may have previously been interested in purchasing a vacation home offshore will view the relative safety of a domestic vacation home in a more favorable light. This will likely be especially true for those over 60 who are more susceptible to severe health implications from contracting the COVID-19 coronavirus.
- Moreover, interest rates are likely to remain at historic lows, which will make real estate even more attractive. Unlike stocks, real estate can be a leveraged investment.
- In uncertain times, owning property in a safe and readily-accessible place like BHI, located outside yet near major population centers, would likely be attractive to many people.
- Finally, the ability to work remotely could add some gravitational pull to the Island.

It is difficult to attach a growth rate multiplier to any of the bullet points above, and as can be seen in Figure 19, there has been a strong upward trend in the growth rate of housing stock on BHI. That said, in order to be conservative, Mercator has opted to pin the average BHI housing stock growth rate at 1.7 percent per year. There will be periods where growth will be higher, and years when new home construction falls short of this figure, but over the long run, 1.7 percent annual growth appears to be reasonable.[23]

Figure 19: Growth rate of BHI housing stock, 2011 to 2019



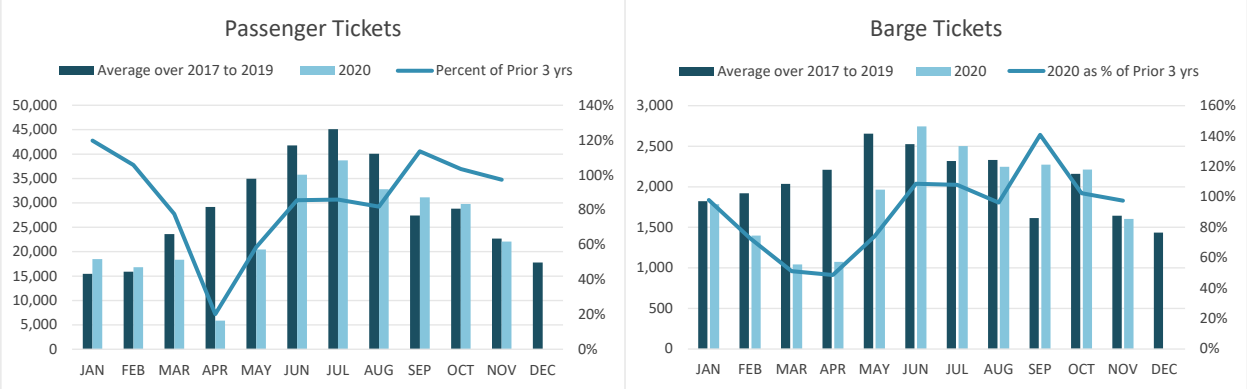
[23] The 1.7% p.a. rate of housing unit additions equates to 21 new units in 2022, and 25 units per year in 2030.

Year-to-date (through November) volumes by ticket class were used to estimate calendar year 2020 volumes. The COVID-19 crisis is expected to have knocked ferry ticket volumes down from 357,000 to about 290,000 and caused barge volumes to fall from around 29,000 barge tickets to about 23,000 barge tickets. It is worth noting, however, that even in the absence of the pandemic, modest volume declines would have been expected because 2019 was an outlier year in the sense that there was a significant bump in traffic associated with recovering from Hurricane Florence, which had caused many millions of dollars of property damage on BHI.

2020 Ferry and barge traffic as reported through November 2020 are plotted in Figure 20. Passenger traffic in the first two months of the year exceeded the prior 3 year average, but fell below the prior years' average in March, and reached a low point, both comparatively and absolutely in April, before making a strong recovery. Understanding the barge traffic behavior early in 2020 is a little more complicated due to the extraordinary volume carried in 2019, but a sharp decline in March was followed by a very strong recovery – to well above the 3 year average.

The following charts in Figure 20 show that barge traffic fully recovered before mid-year and has remained strong, and that ferry traffic recovered by September, despite the continuing restrictions on the capacity of each ferry sailing.

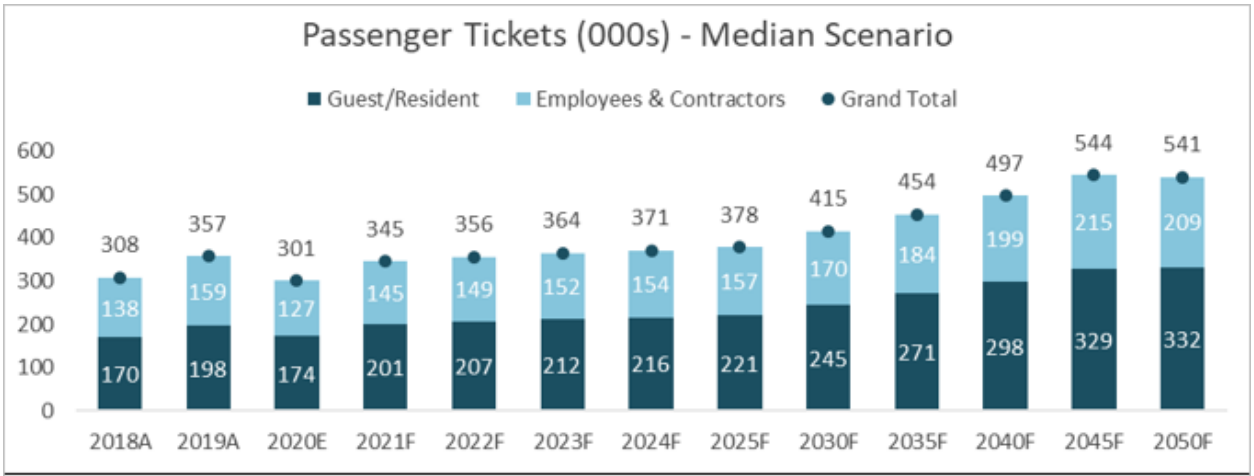
Figure 20 - 2020 Ferry and Barge Traffic as compared to Recent 3-year averages



Volumes in 2021 are expected to rebound to 345,000 ferry tickets and 23,000 barge tickets, and as can be seen in the graphic below, an annual growth in new home construction of 1.7 percent (21 units added in 2022, rising to 25 by 2030) should be expected to cause resident and guest ferry ticket sales to grow at a compound annual rate of 2.4 percent over the five-year period from 2021 to 2026, while contractor and employee tickets grow at a compound annual rate of 1.9 percent and barge tickets grow at compound rate of 3.3 percent per year. Over the ten-year period from 2021 to 2030, growth rates relax some, as total ferry ticket sales grow at a compound annual rate of 2.0 percent while barge tickets grow at a

compound rate of 2.9 percent per year. Parking volumes are expected to grow at least in line with the ferry passenger ticket levels.[24]

Figure 21: Ferry and barge ticket forecast, 2020E to 2050[25]



	CAGRs		
	5-Year (2021-2026)	10-Year (2021-2031)	Full Term (2021-2050)
Median Growth Rates			
Housing Stock Additions	1.7%	1.7%	1.6%
Passenger Tickets			
Guest/Resident	2.4%	2.2%	1.8%
Emp's & Contractors	1.9%	1.8%	1.3%
Grand Total	2.2%	2.0%	1.6%
Barge Tickets	3.3%	2.9%	1.8%

4.3 BHI ferry, freight barge, and parking forecasts under high, low and "stress" cases

In addition to modelling the expected development of demand for ferry, barge and parking services, Mercator developed alternate scenarios in order to examine how the financial performance of the Authority would be affected by changes in the underlying circumstances that drive demand for the authorities services.

The alternate scenarios were defined as follows:

[24] There has been a modest upward trend in the number of parking vehicle-days (from 1.01 vehicle days in 2011 to an average of 1.26 vehicle days over the last four years), but in keeping with our conservative approach, we have not increased the assumed number of vehicle parking days and associated parking revenue per ferry passenger.

[25] Volume forecasts were prepared (and are shown here) on a calendar year basis in line with reporting from BHIL. Calendar year forecasts were converted to fiscal years ending in June for the financial modeling.

High Case: new construction grows the housing stock at a rate of 2.25% per year, adding 28 units in 2022 and 34 units per year in 2030 - which is only slightly more than half the average annual additions over the 2001 to 2006 housing boom - and eventually reaching the total island build out limit in 2043.

Low Case: new construction grows the housing stock at a rate of only 0.75% per year, which results in only 9 additional units per year in 2022, increasing to 10 units per year by 2030. Over the 2021 to 2050 period (29 years), the total number of new units added would total to only 305, which is equal to the number that were built over the five years ending in 2006.

Moderate Case with Housing Recession: housing construction falls to 10 units in 2022, and then only 8 additional units are built during 2023-2025 (i.e. fewer than three per year), before annual housing growth returns to the base case rate. Whereas in the base case scenario, 88 units are built between now and 2025, under the moderate case with a housing recession scenario, the total falls to just 18.

Low Case with Housing Recession: housing construction over the 2022 to 2025 period amounts to just 17 new units, and after this period, new unit construction returns to the low case scenario. Hence, under this scenario, a slightly higher number of new units are constructed over the remaining 29 years of the forecast than were constructed between 2003 and 2006.

Figure 22 - Ferry and barge traffic forecasts under each scenario

Expected (Median Housing Growth) Scenario												Compound Annual Growth		
Passenger Tickets (000s) -	14mo 2020	Mar-Jun '21	FY '22	FY '23	FY '24	FY '25	FY '30	FY '35	FY '40	FY '45	FY '50	2022-2025	2025-2030	2030-2050
Guest/Resident	181	74	203	208	214	219	243	268	296	326	344	2.6%	2.1%	1.8%
Employees & Contractors	143	54	145	148	152	156	169	183	198	214	220	2.5%	1.6%	1.3%
Grand Total Ferry Tickets	323	128	348	356	366	375	412	451	494	540	565	2.5%	1.9%	1.6%
Barge Tickets (000s)	25.2	8.1	23.8	25.3	26.1	27.1	30.3	34.2	38.2	42.7	39.3	4.4%	2.3%	1.3%

High Housing Growth Scenario												Compound Annual Growth		
Passenger Tickets (000s) -	14mo 2020	Mar-Jun '21	FY '22	FY '23	FY '24	FY '25	FY '30	FY '35	FY '40	FY '45	FY '50	2022-2025	2025-2030	2030-2050
Guest/Resident	181	74	206	215	222	228	260	296	335	333	333	3.5%	2.7%	1.2%
Employees & Contractors	143	54	147	153	158	163	180	200	222	210	210	3.4%	2.1%	0.8%
Grand Total	323	128	353	367	380	391	440	496	556	542	542	3.5%	2.4%	1.0%
Barge Tickets (000s)	25.2	8.1	25.4	27.0	28.2	29.1	33.7	39.3	45.1	39.3	39.3	4.7%	3.0%	0.8%

Low Housing Growth Scenario												Compound Annual Growth		
Passenger Tickets (000s) -	14mo 2020	Mar-Jun '21	FY '22	FY '23	FY '24	FY '25	FY '30	FY '35	FY '40	FY '45	FY '50	2022-2025	2025-2030	2030-2050
Guest/Resident	181	74	195	191	194	196	206	216	227	237	249	0.2%	1.0%	1.0%
Employees & Contractors	143	54	139	135	139	141	146	151	157	163	169	0.4%	0.7%	0.7%
Grand Total	323	128	335	326	333	337	352	367	384	400	419	0.3%	0.9%	0.9%
Barge Tickets (000s)	25.2	8.1	19.7	20.8	21.4	21.8	22.8	24.4	26.1	27.5	29.4	3.4%	0.9%	1.3%

Median Housing Growth Scenario - with a Housing Recession												Compound Annual Growth		
Passenger Tickets (000s) -	14mo 2020	Mar-Jun '21	FY '22	FY '23	FY '24	FY '25	FY '30	FY '35	FY '40	FY '45	FY '50	2022-2025	2025-2030	2030-2050
Guest/Resident	181	74	196	190	190	191	227	252	278	306	337	-0.7%	3.5%	2.0%
Employees & Contractors	143	54	140	134	135	136	161	174	188	203	220	-0.8%	3.3%	1.6%
Grand Total	323	128	335	324	325	328	388	426	466	510	557	-0.8%	3.4%	1.8%
Barge Tickets (000s)	25.2	8.1	20.0	19.8	20.0	20.5	27.9	31.7	35.7	39.8	44.4	0.8%	6.4%	2.3%

Low Housing Growth Scenario - with a Housing Recession												Compound Annual Growth		
Passenger Tickets (000s) -	14mo 2020	Mar-Jun '21	FY '22	FY '23	FY '24	FY '25	FY '30	FY '35	FY '40	FY '45	FY '50	2022-2025	2025-2030	2030-2050
Guest/Resident	181	74	195	189	190	191	202	211	222	233	243	-0.7%	1.1%	0.9%
Employees & Contractors	143	54	139	134	135	136	144	149	155	160	166	-0.8%	1.1%	0.7%
Grand Total	323	128	335	323	325	327	346	360	377	393	409	-0.7%	1.1%	0.8%
Barge Tickets (000s)	25.2	8.1	19.7	19.8	20.0	20.4	22.3	23.8	25.5	26.9	28.3	1.2%	1.7%	1.2%

5. Financial analysis and cash flow forecasts

The section presents the financial analysis of the component activities of the BHITA, and forecasts the cash flows to be generated by each activity to be undertaken by the BHITA and by the Authority in aggregate.

5.1. Methodology

Using historical traffic and financial data provided by BHI Limited and the audited financial statements, Mercator has developed a forecast of volume, rates, operating expenses, and capital expenditures by line of business: (i) passenger ferry and on-island tram, (ii) parking, and (iii) tug and freight barge. Where appropriate, growth rates by line of business, and therefore revenue, were broken down and forecast by specific sub-categories. Operating expenses were forecast based on historic actual costs, carried forward to include and reflect a) the specific operating circumstances of the BHITA and the terms of the transaction, b) adjustments for inflation and c) increases to costs related to increased volumes and additional sailings that result from increasing volumes.

Capital expenditures were forecast considering a) the requirements to expand capacity to handle growing volumes with a level of service comparable to historical service levels, b) the need to replace existing assets at the end of their assumed useful life, c) on-going "sustaining" or "maintenance" capital expenditures in line with historical spending, and d) required additional maintenance and life-extension work identified by inspections carried out by engineers retained by BHIL and BHITA. Given that the BHITA will not be an income tax-paying entity, no consideration is given to income tax or depreciation of assets.

The three lines of business have limited working capital requirements. Much of the revenue is paid with credit cards, which do not take significant time to clear. Expenses are primarily wages and salaries and fuel, which are due and payable promptly. Mercator expects the working capital to consist of approximately one-month of total operating expenses.

As an escalator for operating costs, capital expenditures and ticket revenue, Mercator has assumed an inflation rate of 2 percent per year.

5.2 Capital Expenditure Forecast

Capital expenditures (CapEx) comprise an important use of operating cash flows and have been evaluated and forecast for each of the three BHITA lines of business.

The largest capital expenditures will be for replacement of each of the four ferry vessels when each vessel reaches the end of its expected useful life. Mercator has assumed replacement of ferries with catamaran type ferries (similar to the *Ranger* and *Patriot*) at defined intervals based on an approximate useful life of 45 years, with a current (2020) cost of approximately $4.5 million per unit, escalated by inflation.[26]

[26] Existing monohull ferries (*Sans Souci* and *Adventure*) are 42 and 31 years old, respectively, and in good condition. *Sans Souci* could be operable for another three to five years and *Adventure* for another 13-17 years, so a 45-year life for aluminum ferries is a reasonable assumption.

Routine day-to-day vessel M&R spending is included as a normal operating expense, while the capital forecast includes the costs for major programmed spending such as engine overhauls for the ferries and the tug.

Other programmable CapEx includes the replacement of tram trucks at defined intervals under an assumed useful life of about seven years, which is consistent with the historical trend, and replacement of the un-powered passenger trailers after 20+ years. A new ferry ticket system is also included.

As parking demand rises, new parking capacity will need to be added at Deep Point. We have modelled the timing of parking lot development, linking it to growth in ferry traffic, at a cost of $2,500/stall for small scale projects and $2,000/stall for larger projects (over 100 stalls). Included in the parking development plan is the addition of 167 stalls at the northwest corner of the campus that will be done no later than 2024, followed by additional stalls as demand dictates. Paid parking-days per stall number about 245 per year, allowing a fast recovery of parking investments and positive cash flow in roughly two years should demand grow faster than expected.

As discussed in Section 3, we have included capital for all of the repair and replacement work identified by Moffat & Nichol as being required within the next 10 years. This includes bulkhead and dock repairs, a ferry landing replacement, periodic barge ramp replacements, and recommended inspections.

In addition to programmable spending, we include additional "sustaining" CapEx amounts that are consistent with the average historical CapEx incurred over recent years, and increased going forward for inflation. CapEx requirements by year and category are summarized in Table 14. Estimated capital spending through FY 2030, excluding ferry vessel replacement, comes to $9.5 million.

Table 14: Capital Expenditure Forecast for BHITA

												Five Year Totals			
Capital Spending Forecast		**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**FY 2030**	**2031-'35**	**2036-'40**	**2041-'45**	**2045-'50**
Ferry and Tram System		Mar-Jun													
Docks/Piers/Bulkheads	$000s	0	107	74	155	0	0	527	538	188	0	0	0	0	0
Capital Dredging	$000s	0	0	0	0	93	0	246	0	0	0	112	295	486	0
Ferry Vessel Overhaul	$000s	80	80	0	166	0	172	0	183	187	187	404	651	966	805
Ferry Vessel Replacement (net)	$000s	0	0	2,435	2,153	0	0	0	0	0	0	5,484	0	0	7,166
Vehicles (Trucks and Trams)	$000s	27	55	56	86	236	152	246	220	412	164	792	454	706	649
Equipment - Luggage Dollies	$000s	0	0	0	0	0	0	0	0	122	0	0	0	0	0
IT - Ticketing System	$000s	0	250	0	0	0	0	0	0	0	0	0	0	0	0
Other / Sustaining	$000s	25	77	79	81	82	84	86	87	89	91	482	532	587	648
Subtotal Ferry and Tram	$000s	132	569	2,645	2,640	412	407	1,105	1,028	998	441	7,273	1,932	2,745	9,268
Freight Barge System															
Docks/Piers/Barge Ramps	$000s	0	0	0	0	0	320	0	0	0	0	0	390	0	475
Barge / Towboat Replacement	$000s	0	0	0	0	0	0	0	0	179	305	0	0	0	0
Other / Sustaining	$000s	9	27	27	28	28	29	29	30	30	31	165	182	201	222
Subtotal Freight Barge	$000s	9	27	27	28	28	349	29	30	210	336	165	572	201	697
Parking Operations															
Parking Lots: Land Acquisition	$000s	0	0	0	0	0	0	0	0	0	0	0	1,231	0	0
Parking Lots: Development	$000s	0	347	0	0	0	200	0	0	194	546	291	1,242	0	0
Other / Sustaining - Parking	$000s	4	12	12	12	12	13	13	13	13	14	73	80	88	98
Other / Sustaining - Landlord	$000s	43	133	135	138	141	144	146	149	152	155	825	911	1,006	1,110
Subtotal Parking	$000s	47	492	147	150	153	356	159	163	360	715	1,188	3,464	1,094	1,208
Grand Total Capital Spending		**188**	**1,088**	**2,819**	**2,818**	**593**	**1,112**	**1,294**	**1,220**	**1,568**	**1,492**	8,626	5,968	4,040	11,173
Vessel Replacement Capex (net)		-	-	**2,435**	**2,153**	-	-	-	-	-	-	5,484	-	-	7,166
Other than Vessel Replacement Capex		**188**	**1,088**	**384**	**665**	**593**	**1,112**	**1,294**	**1,220**	**1,568**	**1,492**	3,142	5,968	4,040	4,008

5.2 Passenger ferry and on-island tram services

Mercator forecasts aggregate passenger ferry volume in the median or expected case to grow from about 357,000 passengers in 2019, to about 480,000 in 2040, reflecting a CAGR of about 1.42 percent from the 2019 peak. In low case, traffic would reach 412,000 in 2040 (CAGR of 0.7 percent) and in the high case, 515,000 (a CAGR of 1.76 percent).

As discussed previously in this report, the system has an existing capacity for at least 535,000 passengers per year, based on being able to accommodate peak season demand at 2019 service levels. This capacity limit is a service-level driven limit, rather than a limit related to gross passenger carrying capacity constraints. If lower service levels, and correspondingly extended passenger waiting times, were deemed acceptable, or if passengers accepted the use of a reservation system to spread out demand during peak periods, then the system could deliver additional capacity without significant additional service delivery expenses or capital expenditures.

Ferry ticket prices and schedules for the ferry system have been regulated by the NCUC since 1993. The only increase in ferry ticket prices was implemented in January 2011, leaving significant "room" in the price structure for increases just to "catch up" with a decade of inflation. Mercator has assumed that standard ferry ticket prices (category I) would be increased by $4 per round-trip (from $23 to $27, about a 17 percent increase) in July 2021 (the start of FY 2022), approximately offsetting the prior 10 years that had passed without an increase. An increase of $2 in the category I ticket (to $29, or 7%) is assumed 5 years later for FY 2027, and then subsequently increased in line with inflation every 3 years. Other ferry ticket categories would also be increased in each instance by the same percentage. We assume that prices would be rounded-down to the nearest $0.50. Between 2019 and 2030, we assume the average annual increase (CAGR for ferry ticket prices) would be 2.6%.

It is important to note that the BHITA will not be regulated by the NCUC or any other entity, and will be free to set its prices without regulatory oversight. This flexibility will allow the BHITA to adjust prices if needed to recover unexpected cost increases or to respond to other financial events.

Costs are broken down into three subcategories as reported by BHIL: *Cost of Sales*, *Salaries & Wages*, and *Operating Expenses*. The *Cost of Sales* category is assumed to be volume variable. *Salaries and Wages* are a combination of fixed costs and volume variable costs. *Operating Expenses* which depend on the number of voyages or passengers, including fuel and M&R, are increased with volume, while other operating and management costs are assumed to be fixed.

Volume *Variable Costs* are assumed to grow at the volume growth rate plus the rate of inflation. Fixed costs are assumed to grow at inflation. On this basis, Mercator forecasts costs to grow from about $6.0 million in 2019, to about $9.1 million by 2040, a CAGR of 3.9 percent.

The regulated ferry company (BHI Transportation) has historically paid the parent company (BHI Limited) for the lease of certain facilities required for the operation of the ferry business (the lease rate, as dictated by the 2010 North Carolina Utilities Commission rate case is $1,252,708 per year). Given that the ownership of this land will be transferred to the BHITA, this lease payment will disappear, decreasing overall costs and increasing earnings as compared to previous operations. In addition, about $95k per

year of revenue for certain property at Deep Point that is leased to others and has historically paid to BHIL (and not reflected in the ferry operations results) will be received by BHITA.

There are four staff positions within BHI Limited (on the BHI Limited payroll, not the ferry transportation payroll) that support ferry operations. The costs for these personnel, who will move from BHI Limited to the BHITA, have been accounted for in the analysis, as well as the cost to add a new senior manager in FY 2023 as planned by the BHITA.

Ferry and tram EBITDA is expected to be about $1.6 million in FY2022, growing to 1.9 million in FY 2025 and $2.4 million in FY 2030. The reversal of the negative ferry EBITDA in FY 2021 is due primarily to the elimination of the Deep Point lease costs as mentioned above.

Table 15 summarizes Mercator's forecast of earnings and cash flows for the passenger ferry / on-island tram line of business (after 2025, figures are presented in five-year intervals).

Table 15: Financial summary for ferry / on-island tram business

	Median	14mo (Feb)	4mo (Jun)													
Passenger Ferry/On-Islan	*UOM*	**CY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**FY 2030**	**FY 2035**	**FY 2040**	**FY 2045**	**FY 2050**
Capacity	*Passengers*	625,000	180,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000
Volume (Total Tickets)	*Pass Tickets*	323,400	128,300	347,800	356,700	366,500	375,400	383,600	389,100	395,600	404,700	412,200	451,300	494,100	537,800	537,800
% of Max Capacity	*%*		*71%*	*65%*	*67%*	*69%*	*70%*	*72%*	*73%*	*74%*	*76%*	*77%*	*84%*	*92%*	*101%*	*101%*
Revenue	*USD (000s)*	5,713	2,383	7,281	7,450	7,644	7,823	7,994	8,663	8,811	9,014	9,692	11,265	13,760	16,901	17,986
Costs	*USD (000s)*	6,562	2,312	5,507	5,816	5,988	6,159	6,331	6,493	6,664	6,855	7,041	8,028	9,170	10,469	11,557
EBITDA	***USD (000s)***	**-849**	**71**	**1,774**	**1,633**	**1,656**	**1,664**	**1,662**	**2,171**	**2,147**	**2,159**	**2,651**	**3,237**	**4,591**	**6,431**	**6,429**
EBITDA Margin	***% of Rev***	***-14.9%***	***3.0%***	***24.4%***	***21.9%***	***21.7%***	***21.3%***	***20.8%***	***25.1%***	***24.4%***	***24.0%***	***27.4%***	***28.7%***	***33.4%***	***38.1%***	***35.7%***
Unit Rev	*USD/Tkt*	17.67	18.57	20.94	20.89	20.86	20.84	20.84	22.27	22.27	22.27	23.51	24.96	27.85	31.43	33.44
Unit Costs	*USD/Tkt*	20.29	18.02	15.83	16.31	16.34	16.41	16.50	16.69	16.85	16.94	17.08	17.79	18.56	19.47	21.49
Unit EBITDA	*USD/Tkt*	-2.62	0.56	5.10	4.58	4.52	4.43	4.33	5.58	5.43	5.34	6.43	7.17	9.29	11.96	11.95
YoY Growth Rates																
Volume	*%*				*2.6%*	*2.7%*	*2.4%*	*2.2%*	*1.4%*	*1.7%*	*2.3%*	*1.9%*	*1.9%*	*1.9%*	*1.2%*	*0.0%*
Revenue	*%*				*2.3%*	*2.6%*	*2.4%*	*2.2%*	*8.4%*	*1.7%*	*2.3%*	*7.5%*	*1.9%*	*1.9%*	*7.7%*	*0.1%*
Costs	*%*				*5.6%*	*2.9%*	*2.9%*	*2.8%*	*2.6%*	*2.6%*	*2.9%*	*2.7%*	*2.7%*	*2.7%*	*2.5%*	*2.0%*
EBITDA	*%*				*-7.9%*	*1.4%*	*0.5%*	*-0.1%*	*30.6%*	*-1.1%*	*0.6%*	*22.8%*	*-0.1%*	*0.3%*	*17.5%*	*-3.1%*

5.3 Parking services

Vehicle parking demand is derivative of passenger ferry traffic; thus, Mercator's growth rates for the passenger ferry business are utilized to grow vehicle parking days. Although paid vehicle parking days per ferry has been rising over the last decade, we conservatively assume a steady 1.26 parking days per ferry ticket based on the average of the four years through 2019.[27]

To accommodate future parking demand, additional capacity will be required. Mercator has assumed parking development within Areas 1, 7, 9 and 14, which are located on land to be sold to the new transportation entity. Mercator has further assumed the acquisition when needed of Areas 2 and 3 and their development (as needed) into parking lots. A 30-year purchase option has been negotiated between the Authority and BHIL for 2.2 acres (Area 2) with predetermined cost escalations that are below our expectations for inflation. This land purchase cost has been included in the capital expenditure model. Development of Area 3 is not expected to be required until near the end of the 30 year forecast period, and cost for this is based on the Area 2 cost, but with full inflation assumed.

Parking rates have seen limited increases since 2006 – a $1/day increase in 2011 and another $1/day increase in mid-2019, each applicable to the daily lots, which comprise about 70 percent of parking

[27] Parking demand during 2020 increased, but this increase in demand was not carried forward in our modelling of future years.

revenue. Mercator has assumed a 21% increase of parking rates at the start of FY 2022, and has assumed ticket prices would subsequently stay flat until 2027, and then grow at the rate of inflation thereafter. The assumed growth in parking rates between 2019 and 2030 (the CAGR in parking rates) is 2.3%. The combination of volume growth and price increases results in parking revenue growth from about $2.76 million in 2019 to about $3.8 million in 2025 and $4.4million in 2030.

As with the other lines of business, costs are modeled in three subcategories, *Cost of Sales*, *Salaries & Wages*, and *Operating Expenses*. *Cost of Sales* is treated as volume variable. In the case of parking, *Salaries and Wages* are assumed to be largely fixed (unless capacity utilization were to reach a point requiring additional variable costs such as valet services), and are quite limited in any case. *Operating Expenses* are also assumed to be fixed as well. Variable costs are assumed to grow at the volume growth rate plus 2 *percent* for assumed cost inflation. Fixed costs are assumed to grow at 2 percent for assumed cost inflation. On this basis, Mercator forecasts costs to grow from about $600,000 in 2019, to about $800,000 by 2030, a CAGR of about 2.6 percent.

Combining the revenue and cost forecasts, parking EBITDA is expected to grow from $2.16 million in 2019 to approximately $3.1 million in 2025 and $3.6 million by 2030, a CAGR of 4.8 percent.

Mercator has assumed considerable CapEx for the addition of parking capacity, first to complete a previously planned project by 2022 and subsequently as required based on demand. The first 670 new slots will be developed on land being transferred to the BHITA, with a further 425 slots eventually to be developed on adjacent land that would have to be purchased (the associated land acquisition cost is included where relevant). New parking capacity and CapEx spending is "triggered" in the model when parking volume hits 90 percent of then-current capacity. Other CapEx is forecast based on the average maintenance CapEx per annum based on historical data provided by BHI Limited. Table 16 summarizes Mercator's forecast of cash flows for the parking line of business (after 2025, figures are presented at five-year intervals).

Table 16: Financial summary for parking business

Parking	UOM	CY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2035	FY 2040	FY 2045	FY 2050
	Median	14mo (Feb)	4mo (Jun)													
Capacity	Vehicle Days	459,000	153,000	499,000	499,000	499,000	499,000	524,000	524,000	524,000	539,000	591,000	617,000	717,000	717,000	717,000
Parking Volume	Vehicle Days	406,557	161,290	437,231	448,420	460,740	471,928	482,237	489,151	497,322	508,762	518,191	567,345	621,150	676,087	676,087
Utilization	%	*89%*	*105%*	*88%*	*90%*	*92%*	*95%*	*92%*	*93%*	*95%*	*94%*	*88%*	*92%*	*87%*	*94%*	*94%*
Revenue	USD (000s)	2,686	1,066	3,498	3,587	3,686	3,775	3,858	4,158	4,227	4,324	4,405	5,390	6,522	7,775	8,451
Costs	USD (000s)	701	210	637	651	666	681	696	711	727	743	759	847	945	1,056	1,165
EBITDA	**USD (000s)**	**1,985**	**855**	**2,861**	**2,936**	**3,020**	**3,094**	**3,162**	**3,447**	**3,501**	**3,582**	**3,645**	**4,543**	**5,577**	**6,719**	**7,286**
EBITDA Margin	*% of Rev*	***73.9%***	***80.3%***	***81.8%***	***81.8%***	***81.9%***	***82.0%***	***82.0%***	***82.9%***	***82.8%***	***82.8%***	***82.8%***	***84.3%***	***85.5%***	***86.4%***	***86.2%***
Unit Rev	USD/Veh-Day	6.61	6.61	8.00	8.00	8.00	8.00	8.00	8.50	8.50	8.50	8.50	9.50	10.50	11.50	12.50
Unit Costs	USD/Veh-Day	1.72	1.30	1.46	1.45	1.45	1.44	1.44	1.45	1.46	1.46	1.47	1.49	1.52	1.56	1.72
Unit EBITDA	USD/Veh-Day	4.88	5.30	6.54	6.55	6.55	6.56	6.56	7.05	7.04	7.04	7.03	8.01	8.98	9.94	10.78
YoY Growth Rates																
Parking Volume	%				*2.6%*	*2.7%*	*2.4%*	*2.2%*	*1.4%*	*1.7%*	*2.3%*	*1.9%*	*1.9%*	*1.9%*	*1.2%*	*0.0%*
Revenue	%				*2.6%*	*2.7%*	*2.4%*	*2.2%*	*7.8%*	*1.7%*	*2.3%*	*1.9%*	*1.9%*	*1.9%*	*1.2%*	*0.0%*
Costs	%				*2.2%*	*2.3%*	*2.2%*	*2.2%*	*2.1%*	*2.2%*	*2.2%*	*2.2%*	*2.2%*	*2.2%*	*2.2%*	*2.0%*
EBITDA	%				*2.6%*	*2.9%*	*2.5%*	*2.2%*	*9.0%*	*1.6%*	*2.3%*	*1.8%*	*1.8%*	*1.8%*	*1.1%*	*-0.3%*

5.4 Tug and freight barge services

As discussed above, Mercator forecasts aggregate freight barge volume to decline from the exceptionally high 2019 level of 28,700 tickets[28] sold to about 24,300 tickets in FY2022, and then to increase to about 27,100 in FY 2025, 30,600 in FY 2030 and 38,200 tickets in FY 2040, representing a CAGR of 2.5 percent between 2021 and 2040.

Freight barge prices were last increased in mid-2019 (from $50 to $55/ticket), and before that had not been increased since 2006. Mercator has assumed freight barge ticket prices would be increased by $5 (about 9 percent) percent at the start of FY 2022, and then grow at the rate of inflation, with the adjustments implemented every three years. The assumed increases in barge ticket prices from the start of 2019 (prior to the last increase) through 2030 average 2.0%. This results in FY 2022 revenue of $1.44 million (just below the high mark set in 2019), which grows to about $1.64 million in 2025, $1.90 million in FY 2030.

As with the other lines of business, costs are broken down and modeled using three subcategories: *Cost of Sales*, *Salaries & Wages*, and *Operating Expenses*. Again, *Cost of Sales* is treated as volume variable (ticket sales). As with ferry business, *Salaries and Wages* are assumed to be variable based on the number of voyages completed. In the later years of the forecast period with higher volume demand, additional voyages will be required, thus driving increases in *Salaries & Wages*. *Operating Expenses,* other than for the variable (voyage-driven) fuel and R&M costs, are generally assumed to be fixed (but growing with inflation).

Variable costs are assumed to grow at the volume (voyage count) growth rate plus 2 percent for assumed cost inflation. Fixed costs are assumed to grow at 2 percent for assumed cost inflation. With fewer voyages than in 2019, Mercator forecasts freight barge costs to first decline from the CY 2019 level of $455,000 to $435,000 in FY 2022, and then to increase to about $600,000 in FY 2030 and $890,000 in FY 2040, a CAGR of about 4.1 percent. Combining the revenue and cost forecasts, EBITDA is expected to grow from about $1.0 million in FY 2022, to about $1.3 million in 2030 and approximately $2.1 million by 2040.

Future CapEx requirements for the freight barge service are modest, given that the tug was just replaced in 2017, with a service life on the order of 40 years. Mercator has, therefore, assumed that no replacement of the freight barge service tug would be required during the period of the analysis. The existing freight barge (now about 20 years old) is assumed to be replaced in 2030, with a current replacement cost of $250,000, and the freight barge ramps are assumed to be replaced every 10 years as recommended by Moffat & Nichol. Other barge-related CapEx is based on the average historical CapEx requirements. Table 17 summarizes Mercator's forecast of cash flows for the freight barge operation.

[28] A "freight barge ticket" is required for each 6 lane-feet of barge space occupied. 2019 freight barge traffic was exceptionally high due to the rebuilding related to recovery from Hurricane Florence.

Table 17: Financial summary for tug and freight barge business

Tug&Feight Barge	UOM	CY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2035	FY 2040	FY 2045	FY 2050
	Median	14mo (Feb)	4mo (Jun)													
Voyages Made	R-T Voyages	1,050	300	900	925	955	990	1,015	1,020	1,060	1,095	1,105	1,250	1,395	1,560	1,435
Barge Capacity	Tickets Available	35,910	10,260	30,780	31,635	32,661	33,858	34,713	34,884	36,252	37,449	37,791	42,750	47,709	53,352	49,077
Barge Volume	Tickets Sold	25,200	8,100	23,800	25,300	26,100	27,100	27,800	27,900	29,000	29,900	30,300	34,200	38,200	42,700	39,300
Utilization	%	*70%*	*79%*	*77%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*
Revenue	USD (000s)	1,395	448	1,437	1,527	1,576	1,636	1,678	1,754	1,823	1,880	1,905	2,408	2,978	3,650	3,755
Costs	USD (000s)	486	142	435	454	475	499	519	531	559	585	601	735	889	1,079	1,110
EBITDA	**USD (000s)**	**909**	**306**	**1,001**	**1,073**	**1,100**	**1,137**	**1,159**	**1,223**	**1,264**	**1,294**	**1,303**	**1,673**	**2,089**	**2,571**	**2,645**
EBITDA Margin	***% of Rev***	***65%***	***68%***	***70%***	***70%***	***70%***	***70%***	***69%***	***70%***	***69%***	***69%***	***68%***	***69%***	***70%***	***70%***	***70%***
Unit Rev/Ticket	USD / ticket	55	55	60	60	60	60	60	63	63	63	63	70	78	85	96
Unit Cost/Ticket	USD / ticket	19	18	18	18	18	18	19	19	19	20	20	21	23	25	28
Unit EBITDA/Ticket	**USD / ticket**	**36**	**38**	**42**	**42**	**42**	**42**	**42**	**44**	**44**	**43**	**43**	**49**	**55**	**60**	**67**
YoY Growth Rates																
Volume	%				*6.3%*	*3.2%*	*3.8%*	*2.6%*	*0.4%*	*3.9%*	*3.1%*	*1.3%*	*2.4%*	*1.9%*	*2.2%*	*-15.1%*
Revenue	%				*6.3%*	*3.2%*	*3.8%*	*2.6%*	*4.5%*	*3.9%*	*3.1%*	*1.3%*	*2.4%*	*1.9%*	*2.2%*	*-15.1%*
Costs	%				*4.4%*	*4.6%*	*4.9%*	*4.0%*	*2.4%*	*5.2%*	*4.7%*	*2.8%*	*4.1%*	*3.6%*	*3.7%*	*-11.3%*
EBITDA	%				*7.1%*	*2.6%*	*3.3%*	*1.9%*	*5.5%*	*3.4%*	*2.4%*	*0.7%*	*1.7%*	*1.2%*	*1.5%*	*-16.6%*

5.5 Aggregation of BHITA activities

On an aggregated basis, Mercator expects Authority revenue to grow to about $13.2 million by 2025, $16.0 million in 2030 and $23.1 million by 2040. Simultaneously, Mercator forecasts costs to grow from about $6.6 million in 2022, to about $10.75 million by 2040. Combining the revenue and cost forecasts, EBITDA is expected to grow from $5.6 million in 2022 to about $7.0 million in 2030 approximately $12.3 million by 2040, a CAGR of about 4.5 percent. Table 18 summarizes Mercator's cash flow forecast for the consolidated BHITA activities (as above, after 2030, the annual figures are presented at five-year intervals).

Table 18: Financial summary on a consolidated basis – Median Growth Case

		14 mo to Jan	4 mo to Jun	Fiscal Years Ending June 30:												
Consolidated BHITA	UOM	CY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2035	FY 2040	FY 2045	FY 2050
Ferry Tickets	Passengers	323,400	128,300	347,800	356,700	366,500	375,400	383,600	389,100	395,600	404,700	412,200	451,300	494,100	537,800	537,800
Barge Traffic	Barge Tickets	25,200	8,100	23,800	25,300	26,100	27,100	27,800	27,900	29,000	29,900	30,300	34,200	38,200	42,700	39,300
Parking Volume	Vehicle Days	406,557	161,290	437,231	448,420	460,740	471,928	482,237	489,151	497,322	508,762	518,191	567,345	621,150	676,087	676,087
Ferry Capacity	R-T Passengers	625,000	180,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000	535,000
Revenue- Ferry, Barge, Pa	USD (000s)	9,795	3,897	12,216	12,564	12,905	13,235	13,530	14,575	14,861	15,218	16,002	19,063	23,260	28,326	30,192
Costs	USD (000s)	7,749	2,664	6,579	6,922	7,129	7,339	7,546	7,735	7,950	8,183	8,402	9,609	11,004	12,604	13,832
EBITDA - BHITA	USD (000s)	2,046	1,233	5,637	5,642	5,776	5,895	5,983	6,840	6,912	7,035	7,600	9,453	12,256	15,722	16,360
EBITDA Margin	*% of Rev*	*20.9%*	*31.6%*	*46.1%*	*44.9%*	*44.8%*	*44.5%*	*44.2%*	*46.9%*	*46.5%*	*46.2%*	*47.5%*	*49.6%*	*52.7%*	*55.5%*	*54.2%*
Unit Rev	USD/Ferry Tkt	30.29	30.38	35.12	35.22	35.21	35.25	35.27	37.46	37.57	37.60	38.82	42.24	47.07	52.67	56.14
Unit Costs	USD/Ferry Tkt	23.96	20.77	18.92	19.41	19.45	19.55	19.67	19.88	20.10	20.22	20.38	21.29	22.27	23.44	25.72
Unit EBITDA	USD/Ferry Tkt	6.33	9.61	16.21	15.82	15.76	15.70	15.60	17.58	17.47	17.38	18.44	20.95	24.80	29.23	30.42
YoY Growth Rates																
BHITA Revenue	%				*2.9%*	*2.7%*	*2.6%*	*2.2%*	*7.7%*	*2.0%*	*2.4%*	*5.1%*	*1.9%*	*1.9%*	*5.1%*	*-2.1%*
BHITA Costs	%				*5.2%*	*3.0%*	*2.9%*	*2.8%*	*2.5%*	*2.8%*	*2.9%*	*2.7%*	*2.7%*	*2.8%*	*2.6%*	*0.8%*
BHITA EBITDA	%				*0.1%*	*2.4%*	*2.1%*	*1.5%*	*14.3%*	*1.1%*	*1.8%*	*8.0%*	*1.1%*	*1.1%*	*7.3%*	*-4.4%*
Cash Flow Summary - BHITA Overall																
EBITDA (Cash Flow from C	USD (000s)	2,046	1,233	5,637	5,642	5,776	5,895	5,983	6,840	6,912	7,035	7,600	9,453	12,256	15,722	16,360
Less CapEx - for Vsl Replc	USD (000s)		-	-	(2,435)	(2,153)	-	-	-	-	-	-	-	-	-	-
Less CapEx - other than-Vsl Replcmnt			(188)	(1,088)	(384)	(665)	(593)	(1,112)	(1,294)	(1,220)	(1,568)	(1,492)	(790)	(2,280)	(1,038)	(806)
Cash Flow - Net of CapEx	**USD (000s)**		**1,045**	**4,549**	**2,823**	**2,958**	**5,302**	**4,871**	**5,546**	**5,691**	**5,468**	**6,107**	**8,663**	**9,976**	**14,684**	**15,554**
Capex By Line of Business													'31-'35	'36-'40	'41-'45	'46-'50
Ferry&Tram			132	569	2,645	2,640	412	407	1,105	1,028	998	441	7,273	1,932	2,745	9,268
Parking			47	492	147	150	153	356	159	163	360	715	1,188	3,464	1,094	1,208
Tug&Freight Barge			9	27	27	28	28	349	29	30	210	336	165	572	201	697
Total CapEx			188	1,088	2,819	2,818	593	1,112	1,294	1,220	1,568	1,492	8,626	5,968	4,040	11,173

5.5 Alternate growth scenarios and housing construction stress cases

Model outputs for each of the 5 scenarios analyzed are provided in the appendix. The table below provides a summary of the BHITA EBITDA that is forecast for each scenario.

Figure 23 - Recap and comparison of EBITDA forecasts under each growth scenario

EBITDA Forecasts - Recap and Comparison of Scenarios	FY 2021 4mo to Jun	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2035	FY 2040	FY 2045	FY 2050
Median Scenario	1,233	5,637	5,642	5,776	5,895	5,983	6,840	6,912	7,035	7,600	9,453	12,256	15,722	16,360
Low Scenario	1,233	4,993	4,510	4,560	4,553	4,524	5,164	5,099	5,086	5,421	6,257	7,712	9,399	10,680
High Scenario	1,233	5,881	6,019	6,242	6,400	6,567	7,579	7,704	7,905	8,579	11,096	14,159	15,601	16,425
Median **with Housing Recession**	1,233	5,032	4,397	4,283	4,224	4,839	6,013	6,048	6,167	6,675	8,401	11,007	14,288	16,492
Low **with Housing Recession**	1,233	4,993	4,365	4,270	4,202	4,258	4,938	4,869	4,866	5,196	6,007	7,429	9,082	10,179
EBITDA CHANGE vs Median Scenario														
Low Scenario	0	-643	-1,132	-1,216	-1,343	-1,459	-1,676	-1,813	-1,950	-2,179	-3,196	-4,544	-6,323	-5,679
High Scenario	0	244	377	467	505	584	739	792	870	979	1,642	1,904	-122	65
Median **with Housing Recession**	0	-604	-1,245	-1,492	-1,671	-1,145	-827	-863	-868	-924	-1,053	-1,249	-1,434	132
Low **with Housing Recession**	0	-643	-1,277	-1,505	-1,694	-1,725	-1,901	-2,042	-2,170	-2,404	-3,447	-4,827	-6,640	-6,181

A few comments on these results:

The “Median Growth” scenario produces a little more than $5 million EBITDA per year, starting in FY 2022, and reaching more than $7 million by 2030.

The “High Growth” scenario produces about $300-500k of additional EBITDA (compared to the Median scenario) during each of the first five years, with the gap increasing to more than $1 million per year of additional EBITDA after 2030.

The “Low Growth” scenario EBITDA shortfall versus the Median case increases from about $550k in FY 2022 to about $2 million per year by 2030, but Low Growth EBITDA is in each year at least $4.5 million.

The “Median with Housing Recession” scenario initially produces somewhat lower EBITDA than the “Low Growth” scenario, but then moves higher due to a return to normal housing construction .

The “Low Growth with a Housing Recession” scenario is not significantly lower than the low growth case without a recession, given that the low growth case itself already includes very modest rates of new home construction.

6. Conclusions

Between 2021 and 2025, and with the exception of the year in which a new ferry is being purchased, the BHITA operation is expected to have cash flows available for debt service that exceed $5 million, increasing due to volume growth and rate adjustments to exceed $7 million by 2030.

In the Mercator low growth scenario, EBITDA grows more slowly, and by 2025 is about $1.3 million less than in the Median scenario, but in each full year would exceed $4.5 million. In each of the "housing recession" scenarios, slower development reduces near-term EBITDA to about $4.2 million at the low point in 2024. With Median growth after the downturn, EBITDA rises to $6 million by 2028, while in the low growth scenario, the $6 million EBITDA level is reached in 2033.

The system as conceived, equipped and operated should have adequate capacity to meet the traffic demand for approximately the next 25 years, at which point in time the cash flows would exceed $15 million per year.

Our inspections in 2017, and more recent inspections by Ausenco, Moffat & Nichol and KOPCO indicate that the ferry, freight barge and parking assets are in good condition, reflective of good maintenance and operating practices.

The Marine Maintenance department is competent and efficiently carries out the M&R to run the ferry, tug and freight barge operations safely and on schedule. *Adventure* is in good condition and likely has another 13 to 17 years of remaining service life. Both *Patriot* and *Ranger* are fairly new with very long remaining service lives that extend to the very end of or beyond our 30 year analysis period. Although *Sans Souci*, the oldest vessel in the fleet, is showing signs of age, the vessel remains a favorite of the fleet operators and with continued proper M&R and dry-docking cycles has an estimated three to five years, or more, of remaining life. Although we have assumed capital costs will be incurred for replacement in 2023, it is possible that the planned replacement in 2023 could in fact be postponed.

Parking at Deep Point Marina Terminal need not be a constraint for growth of the system. The Utilization rates are generally less than 40 percent throughout the year, except for the General parking lot during the peak of the season. The current 1,955 parking stalls and additional "informal" spots provide enough capacity to support annual parking volume of about 460,000 vehicle-days. If all land areas that are to be included in the transaction are developed, the number of parking stalls could be increased from 1,955 to 2,625, a 32 percent increase in stall count and capacity from current levels. Moreover, additional land could be acquired along the south/west boundary of the site, providing a further 16 percent increase in parking, for a total of 3,050 stalls, which would meet the capacity requirement that is foreseen through the end of our 30-year analysis period.

The assessment of the tug and freight barge operation revealed no major physical deficiencies, deferred M&R, or immediate short-term needs for repair or upgrade. The *Brandon Randall* freight barge has 10 or more years of service life remaining. The cross-dock facility (which will be leased to a 3rd party operator or cooperative) is in good condition with remaining service life in excess of 30 years. There is substantial capacity available to satisfy growth in freight traffic. Increasing tug and freight barge sailing frequency during peak season can provide at least 10 additional sailings per week, a 50 percent increase in peak

capacity. Subject to agreement with the Village of Bald Head Island, sailings could also be added on Saturdays if needed.

Overall, the ferry and on-island tram, parking, and tug and freight barge assets to be acquired by BHITA are in good condition, and with continued good management, maintenance and capital additions as outlined in this report, can be expected to satisfy the expected demand growth over the 30 year analysis period.

It is reasonable to expect that Bald Head Island will continue to be attractive to residents, day visitors and vacationers, which will continue to spur economic activity and property development. The demonstrated attractiveness of the island and the renewed focus on vacations spent close to home should ensure the continued growth in demand for the ferry and freight barge transportation and related parking services that are to be provided by the BHITA.

Appendix A

Climate change, sea-level rise and severe weather

Impacts on BHI development and the future operation of BHITA

Being a coastal community, some thought and analysis should be given to potential impacts on new home construction and development on Bald Head Island of climate change on rising sea levels and hurricane frequency and intensity. The North Carolina Coastal Resources Commission Science Panel prepared a report in 2015 that assesses and projects the local sea level impacts of increases in the global sea level under three scenarios. First, they evaluate the historical trend in sea level increases at five stations along the North Carolina coast, and extrapolate forward to create a projection that basically assumes that the historical trend simply carries forward through the 30-year forecast period. The second and third scenarios are built on the climate modeling work of the Intergovernmental Panel on Climate Change (IPCC), which projects the extent that global sea level will rise under a variety of carbon emissions scenarios.

For a variety of geological and hydrological reasons, relative sea level increases are expected to vary across the North Carolina coast, and these local characteristics are used to adjust each of the three sea level scenarios described above. In all cases, the lowest sea level increases are expected to be experienced in the geologic region called the Carolina Platform, because unlike other regions to the North that are experiencing subsidence, the Carolina Platform is experiencing some geographic uplift that will partially counteract the rising sea levels. Both the Wilmington weather station and the Southport weather station, which is located about one mile southwest from the Deep Point Marina, are part of the Carolina Platform, and these two stations are forecasted to experience the lowest rates of sea level rise under all three scenarios.

As can be seen in the graphic below, which was taken from the *North Carolina Sea Level Rise Assessment Report (2015)*, the mean projected relative sea level rise between 2015 and 2045 would be just 2.4 inches at the stations closes to Bald Head Island if historic trends persist into the future. Under the IPCC's low carbon emissions scenario (RCP 2.6) the expected rise would be 5.9 inches, and under the IPCC's high carbon emissions scenario, the expected rise in the relative sea level would be 6.9 inches. Increases of this magnitude alone are not sufficient to cause any flooding, but it is theoretically possible that a hurricane-induced tidal surge could be magnified enough by higher sea levels to cause additional damage.

Table 19: Three Projections of Sea Level Rise (source: North Carolina Sea Level Rise Assessment Report)

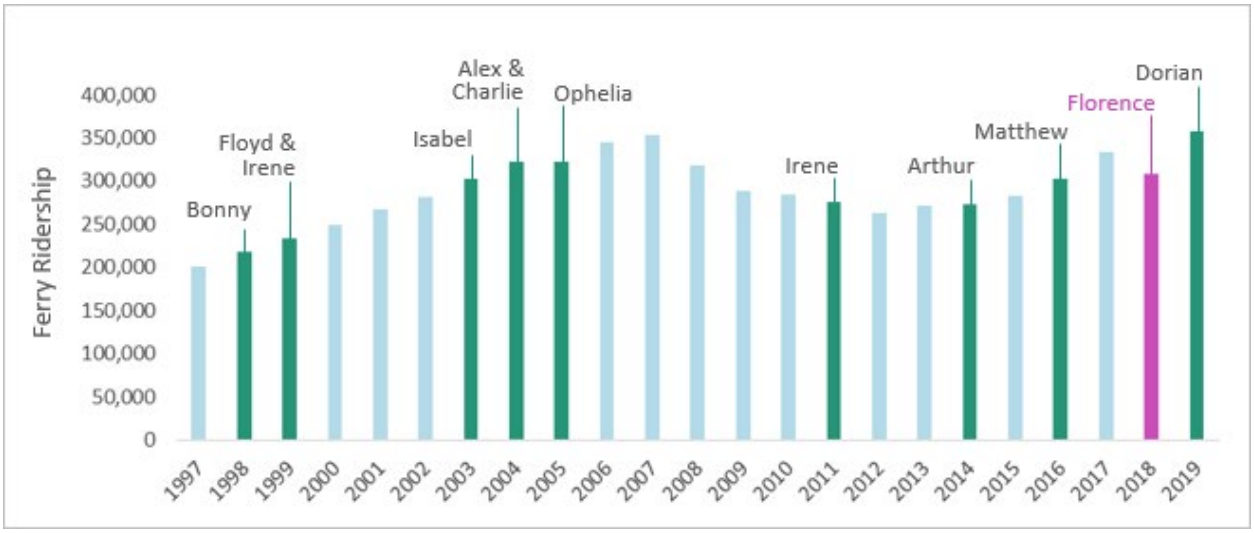
Table ES1. Three relative sea level rise (RSLR) scenarios by 2045 using published tide gauge rates (NOAA 2014a), and IPCC scenario projections RCP 2.6 and RCP 8.5 (Church et al. 2013) representing the lowest and highest greenhouse gas emission scenarios, combined with local vertical land movement (VLM) at each tide gauge.*

Station	Tide Gauge Projections		IPCC RCP 2.6 + VLM		IPCC RCP 8.5 + VLM	
	RSLR in 30 years (inches)		RSLR in 30 years (inches)		RSLR in 30 years (inches)	
	Mean	Range	Mean	Range	Mean	Range
Duck	5.4	4.4-6.4	7.1	4.8-9.4	8.1	5.5-10.6
Oregon Inlet	4.3	2.7-5.9	6.3	3.9-8.7	7.3	4.7-9.9
Beaufort	3.2	2.8-3.6	6.5	4.2-8.7	7.5	5.0-10.0
Wilmington	2.4	2.0-2.8	5.8	3.5-8.0	6.8	4.3-9.3
Southport	2.4	1.9-2.8	5.9	3.7-8.2	6.9	4.4-9.4

*Note: Projections were rounded to the nearest tenth of an inch.

Since 1997, a dozen hurricanes have landed on the North Carolina coast. The chart below demonstrates that with the clear exception of Hurricane Florence (2018) and the possible exception of Hurricane Ophelia (2005) which dumped 17.5 inches of rain on neighboring Oak Island, hurricanes have not had an impact on long-term trends in ferry ridership. Hurricane Florence caused the Cape Fear River to crest at 61.4 feet (35 feet above flood stage) in Fayetteville, NC (100 miles inland) and caused a storm surge that flooded much of Bald Head Island and caused significant beach erosion, which has subsequently been replenished using FEMA and state funds. Even with the extensive impacts from Hurricane Florence, ferry traffic quickly rebounded and there was no concomitant dip in new building permits in the following year (2019).

Figure 24: BHI Ferry Ridership and Hurricanes, 1997-2019



There is, of course, a possibility that another hurricane of a greater magnitude than Hurricane Florence could have a more lasting impact on ferry traffic, and potentially bring down the long-term growth in home construction, but a sea level rise measured in inches will not have much impact on storm surges and river flooding that is measured in dozens of feet.

Regarding the frequency and intensity of Atlantic hurricanes, the National Oceanic and Atmospheric Administration's (NOAA) research concludes that "the historical Atlantic hurricane frequency record does not provide compelling evidence for a substantial greenhouse warming-induced long-term increase [in Atlantic hurricane frequency]," and they also project "that the lifetime maximum intensity of Atlantic hurricanes will increase by about 5% during the 21st century."[29]

Mercator understands that the BHIL facility at Deep Point is used by government agencies such as the USCG as a secure command and control center during severe weather emergencies on the Cape Fear River due to its ability to continue operating under severe conditions. This reliance upon the facility during severe weather suggests that the infrastructure is well positioned to withstand changes in the environment described above.

Mercator concludes that the historical data show ferry ridership and new home construction demonstrate a great resilience to hurricanes. NOAA's research indicates that it is unlikely that climate change will cause the frequency of hurricanes to increase, and the intensity is expected to increase only slightly. For these reasons, climate change and rising sea levels are not expected to have a meaningful impact on long-term growth rates in new home construction, nor will they have a lasting impact on ferry ridership and barge demand, or the operation of the ferry and barge systems of BHITA,

[29] Source: https://www.gfdl.noaa.gov/global-warming-and-hurricanes/ (extracted on 7/24/2020)

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