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How We're Planning for the Future Ferry Fleet

Cape May – Lewes Ferry
Master Plan: Fleet Analysis Findings

Public Meeting 10/07/21

Welcome and General Meeting Procedures

- Please use the chat feature for any comments or questions.
- Please do not use the “raise hand” feature.
- Questions or comments will be placed in a queue. At appropriate times during the meeting, questions will be read aloud, and answers will then be provided.
- This meeting is being recorded, so we can capture all questions and feedback.
- The presentation will be available on the project website following the meeting.

Overview/ Agenda for this Presentation

- Introductions
- Project Overview
- Ridership and Schedules
  - Seasonal Overview
  - Right Sizing for Winter Service
  - Summer Peak Mid-Day Throughput
- Cost Analysis
  - Capital cost
  - Operational Costs
  - Lifecycle Costs
- Other Considerations
- Summary - Synthesis of Trade-offs, Opportunities & Challenges

Overview

Plan Process

PHASE 1

- DRBA's Goals & Values
- Existing Ferry Conditions
- Industry Knowledge & Experience

PHASE 2- SYSTEM ANALYSIS

- Assumptions
- Analysis
  - Fleet Configurations
    - Service Analysis
    - Port Fit Analysis
    - Cost Analysis
    - Transitional Assessment

WE ARE HERE

**Select Fleet Configuration

PHASE 3- DEFINITION OF VESSEL REQUIREMENTS

PHASE 4- FINAL REPORT

Plan Goals and Mission Statement

Marine Master Plan

Strengthened by the participation of stakeholders and the project technical team, this plan will identify capital investments and a fleet configuration that will serve customers now and into the future, while being mindful of costs, operational needs, and environmental considerations.

Priority Areas

- Safety
- Reliability
- Efficiency
- Sustainability
- Innovation
- Team Member Experience
- Customer Experience

Plan Goals

Meet the DRBA/ CMLF Mission

CONNECTIONS THAT MOVE YOU

- Be safe, efficient, and sustainable
- Promote tourism and goodwill
- Focus on customer and team member experiences

Take Lessons Learned from Previous Efforts

Endeavour to Improve Operational Financial Performance

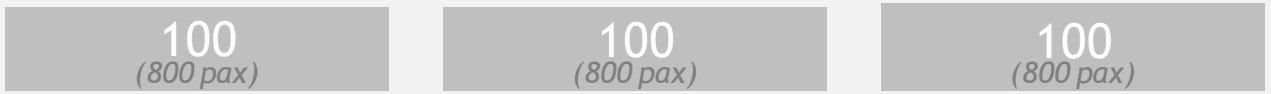
Work in Synergy with Current DRBA Planning and Development Efforts

Build upon Stakeholder Input & Technical Team Expertise

Strive for Enhanced Environmental Efficiencies while Maintaining High Service Reliability

Goals

Current Fleet
Three 100-car ferries



New Fleet Configuration Options

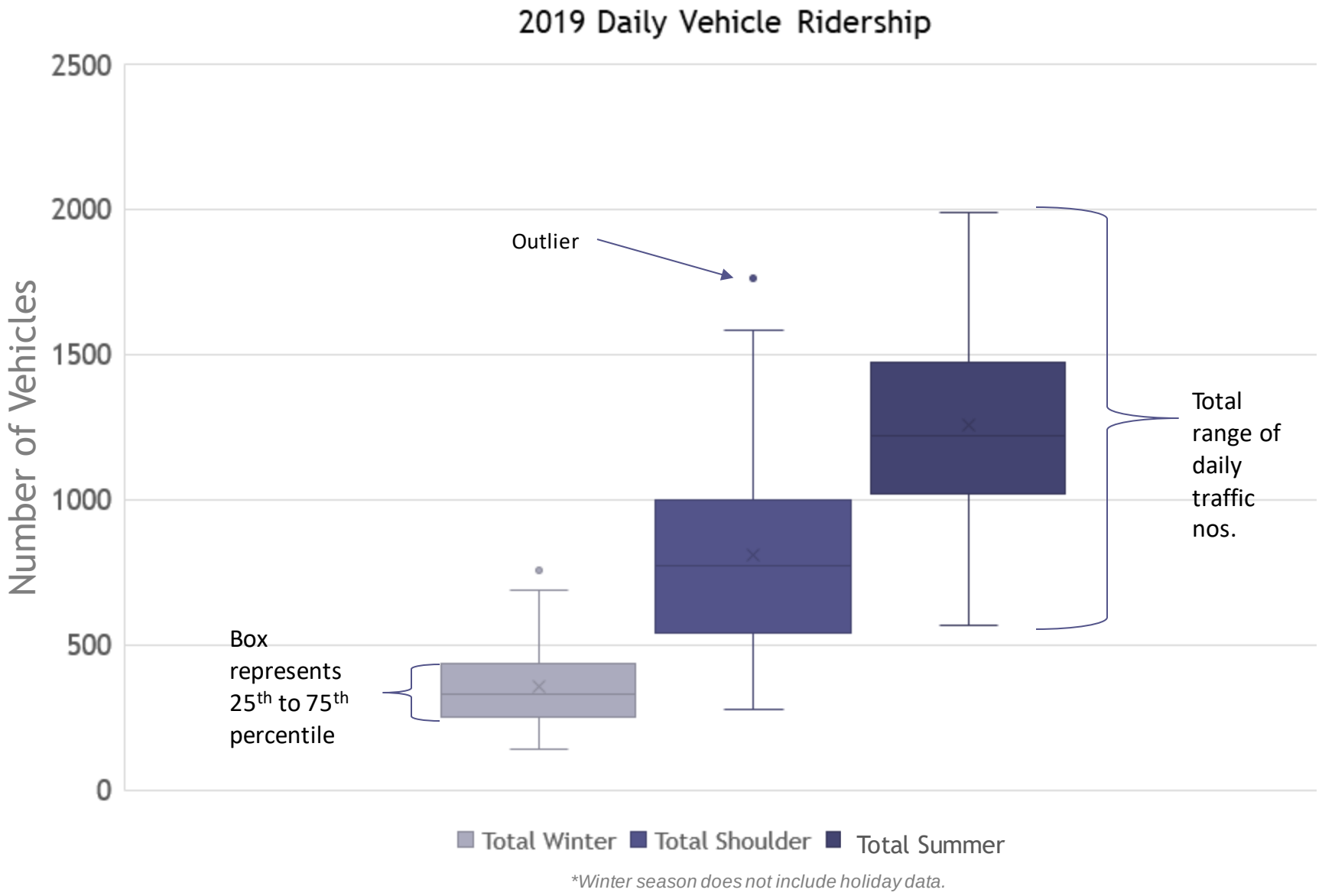
1 **Optimized Current Fleet**
Three 100-car ferries

2a/b **Mid-size Fleet**
Three or Four 75-car ferries

3 **Smaller Vessel Fleet**
Five 55-car ferries

Ridership and Schedules

Existing Ridership Trends



*Winter season does not include holiday data.

Seasons

Winter
Jan, Feb, Mar, Nov, Dec

Shoulder
April, May, Sep, Oct

Summer
Jun, Jul, Aug

Key Annual Findings

Max. daily ridership
1992 vehicles

Current maximum daily capacity
2400 vehicles

Most popular time to travel
Mid-day between 10:00 and 17:00

Peak mid-day throughput cap.
1300 vehicles

Schedule Modeling Introduction

- A model of the new fleet options and the existing fleet ("Calculated" option) was created.
- This study created 2 schedules (weekday and weekend) for 3 seasons (Summer, Shoulder and Winter) for each fleet option.
- All new fleet options provide more round trips (RTs) than the existing fleet.
  - This is because the new vessels can achieve a faster trip time.
- All winter weekdays modeled use one vessel.
- Option 2A and 2B only differ in summer weekends where they run 3 or 4 boats respectively.

Winter Summary

	ACTUAL (2019)	CALCULATED (2019)	OPTION 1 100 VEH	OPTION 2 75 VEH	OPTION 3 55 VEH
Weekday Schedule	1 Vessel	• 1 Vessel • 4 RTs	• 1 Vessel • 5 RTs	• 1 Vessel • 5 RTs	• 1 Vessel • 5 RTs
Weekend Schedule	varies			• 2 Vessels • 9 RTs	• 2 Vessels • 9 RTs

Findings:

- Running one vessel in Option 1 at the greater service tempo, provides excess capacity in the winter.
- Most ridership days that could not be met by one Option 3 vessel occur on weekends near the shoulder season.
- Option 2 could meet all ridership from 2019 for all but two days of the winter season.

Peak Period Throughput

CURRENT
100 VEH - 800 PASS

Peak
13 One-Way Trips
13 X 100= 1300

Daily
30 One-Way Trips
30 X 100= 3000

Peak is defined as departing between 10:00 and 17:00.

OPTION 1*
100 VEH - 438 PASS

	CM	LW
V2	6:10	7:30
V1	7:00	8:20
V3	8:00	9:20
V2	8:50	10:10
V1	9:40	11:00
V3	10:40	12:00
V2	11:30	12:50
V1	12:20	13:40
V3	13:20	14:40
V2	14:10	15:30
V1	15:00	16:20
V3	16:00	17:20
V2	16:50	18:10
V1	17:40	19:00
V3	18:40	20:00

OPTION 2*
75 VEH - 329 PASS

2A: 3 Boat

	CM	LW
V2	6:10	7:30
V1	7:00	8:20
V3	8:00	9:20
V2	8:50	10:10
V1	9:40	11:00
V3	10:40	12:00
V2	11:30	12:50
V1	12:20	13:40
V3	13:20	14:40
V2	14:10	15:30
V1	15:00	16:20
V3	16:00	17:20
V2	16:50	18:10
V1	17:40	19:00
V3	18:40	20:00

2B: 4 Boat

	CM	LW
V1	7:00	8:20
V2	7:40	9:00
V3	8:20	9:40
V4	9:00	10:20
V1	9:40	11:00
V2	10:20	11:40
V3	11:00	12:20
V4	11:40	13:00
V1	12:20	13:40
V2	13:00	14:20
V3	13:40	15:00
V4	14:20	15:40
V1	15:00	16:20
V2	15:40	17:00
V3	16:20	17:40
V4	17:00	18:20
V1	17:40	19:00
V2	18:20	19:40

OPTION 3*
55 VEH - 242 PASS

	CM	LW
V1	7:00	8:20
V5	7:20	8:40
V2	7:40	9:00
V3	8:20	9:40
V4	9:00	10:20
V1	9:40	11:00
V5	10:00	11:20
V2	10:20	11:40
V3	11:00	12:20
V4	11:40	13:00
V1	12:20	13:40
V5	12:40	14:00
V2	13:00	14:20
V3	13:40	15:00
V4	14:20	15:40
V1	15:00	16:20
V5	15:20	16:40
V2	15:40	17:00
V3	16:20	17:40
V4	17:00	18:20
V1	17:40	19:00
V5	18:00	19:20
V2	18:20	19:40

**Departure times are theoretical and subject to change.*

SUMMER VEHICLE THROUGHPUT [ONE-WAY TRIPS X VESSEL VEHICLE CAPACITY]

Peak Period	16 One-Way Trips **16 X 100= 1600**	16 One-Way Trips **16 X 75= 1200**	22 One-Way Trips **22 X 75= 1650**	28 One-Way Trips **28 X 55= 1540**
Compared to current	*+ 3 Trips* *+300 Vehicles*	*+ 3 Trips* *-100 Vehicles*	*+ 9 Trips* *+350 Vehicles*	*+ 15 Trips* *+240 Vehicles*
Daily	30 One-Way Trips **30 X 100= 3000**	30 One-Way Trips **30 X 75= 2250**	36 One-Way Trips **36 X 75= 2700**	46 One-Way Trips **46 X 55= 2530**

Key Fleet Capacity Findings

- All of the options meet the majority of 2019 winter ridership with one vessel.
- All of the options meet the ridership benchmark for all seasons.
- All of the options, (with exception of 2B) provides more peak season capacity and room for growth.

- **Option 1**
  - Provides the greatest ridership capacity by service day.
  - Provides second largest capacity during the summer peak period.
  - Has the least flexibility to meet low demand in winter and peak period.
- **Option 2A**
  - Represents a decrease in vehicle capacity during the summer peak period.
- **Option 2B**
  - Highest capacity during the peak mid-day summer throughput, when passengers most want to travel.
  - The 4th boat only needs to operate on the weekends in the summer.
- **Option 3**
  - Greatest number of trip options in the mid-day summer and shoulder, when passengers most want to travel.
  - Highest seasonal service level flexibility (ramp down and ramp up).

❖ Option 1 provides the most capacity overall, in every season, and some may argue too much capacity in the winter season.

❖ Option 3 provides the most flexibility to right-size the fleet by season.

Cost Analysis

Initial Capital Costs

CHARACTERISTIC	OPTION 1 100 VEH	OPTION 2 75 VEH		OPTION 3 55 VEH
Vessel Subchapter	H	H		K
Cost Per Vessel	$115M	$76M		$45M
Vessels in Fleet	3	3 or 4		5
Total Fleet Vessel Capital Costs	$345M	$228M	$304M	$225M
Potential Percent Savings of Bulk Build	1.7%	1.7%	3.7%	6.0%

- Diesel hybrid propulsion is considered for comparison.
- Clean diesel could be approximately 20% cheaper.

Terminal and 10-Year Shipyard Costs

Shipyard Maintenance Costs:

- Upcoming shipyard costs for existing fleet expected to be at least 2 times more than new fleet options

10-Year Shipyard Costs

	EXISTING FLEET	OPTION 1 100 VEH	OPTION 2A 75 VEH	OPTION 2B 75 VEH	OPTION 3 55 VEH
10 Year Estimate	$41.1M - $46.5M	$19.6M	$14.0M	$15.6M	$15.8M

Terminal & Total Capital Costs

	OPTION 1 100 VEH	OPTION 2A 75 VEH	OPTION 2B 75 VEH	OPTION 3 55 VEH
Total Fleet Costs	$345M	$228M	$304M	$225M
Estimated Terminal Improvements Needed	$20M	$21M	$21M	$24M
TOTAL ESTIMATED CAPTIAL	**$365M**	**$249M**	**$325M**	**$249M**

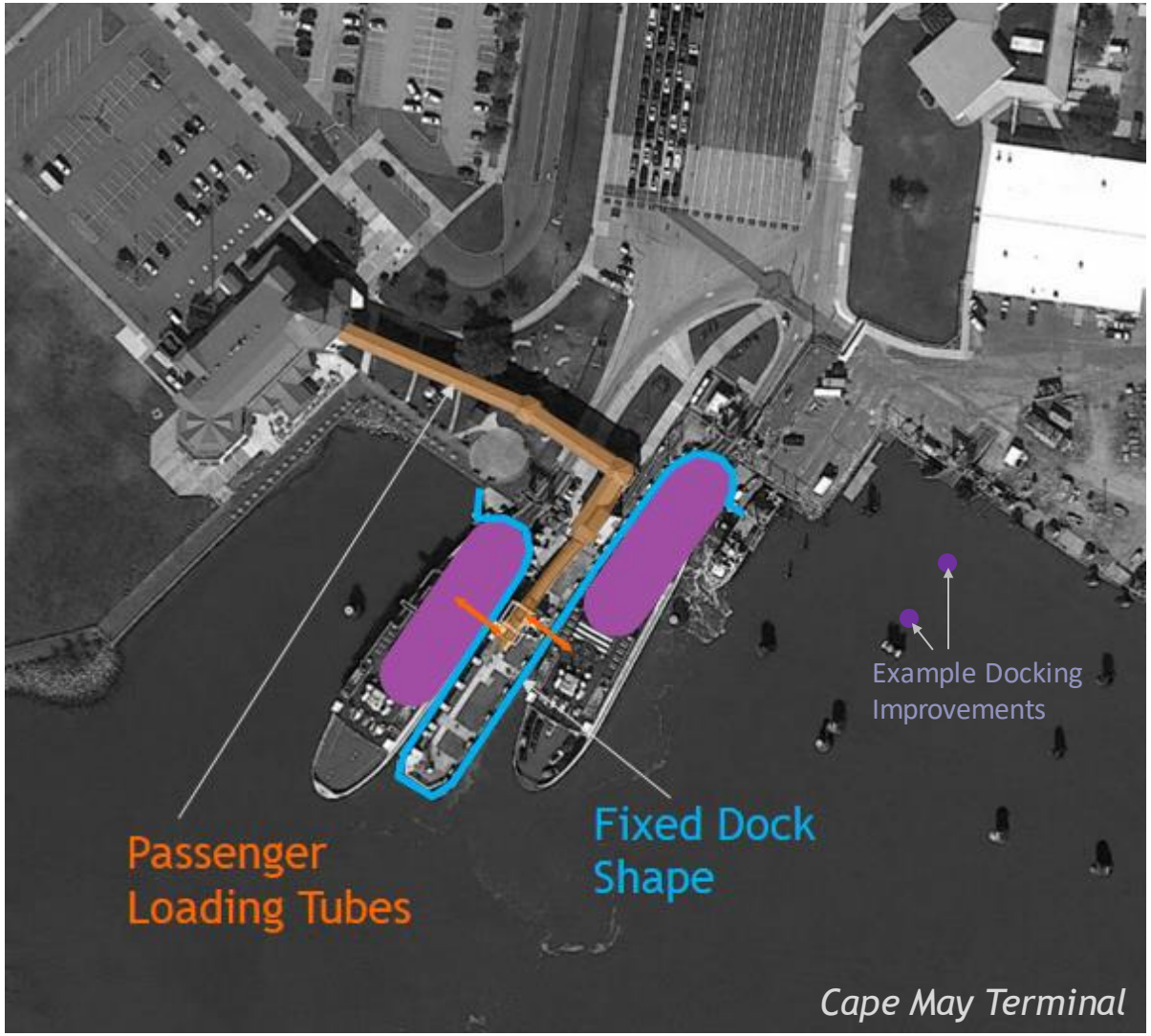
NOTE:

- *$20M for terminal improvements related to electrification, $1M for dolphin installation or movement, $3M for Option 3 passenger tube modification*
- *Includes one set of battery replacements for each vessel.*

Port Fit Overview

Existing conditions considerations:

- Fixed dock shape
  - All vessels maintain a fixed beam to match the current shape
- Single-lane loading due to fixed vehicle lanes
- Passenger loading tubes
  - Fixed location provides a challenge for vessels in **Option 3** at Cape May
  - Fixed range of motion
- Overnight docking
  - Additional improvements be needed for different vessel length



Key Capital Cost Findings

- All total fleet costs assume $20M in terminal improvements to support hybrid electric propulsion.
- All fleet options are at least 50% cheaper in 10-year shipyard cost savings, than projected for the current fleet.

- Option 1
  - Most expensive to build.
    - $100M more than Option 2A and Option 3.
    - Comparable in cost to Option 2B.
- Option 2A
  - Includes some additional docking improvements.
  - Cheapest 10-Year shipyard maintenance.
- Option 2B
  - Includes some additional docking improvements.
  - Comparable cost to Option 1 to build.
    - Less expensive if savings can be realized by a package build program.
- Option 3
  - Includes modification to passenger tube and docking improvements.
  - Lowest overall fleet cost.

❖ Option 3 is the least expensive fleet cost and requires the most terminal improvements.

❖ Option 2A is similar in total capital cost to Option 3 with minimal terminal improvements.

Operational Cost Model Overview

- Model developed to identify costs from service hour and crew hour estimates

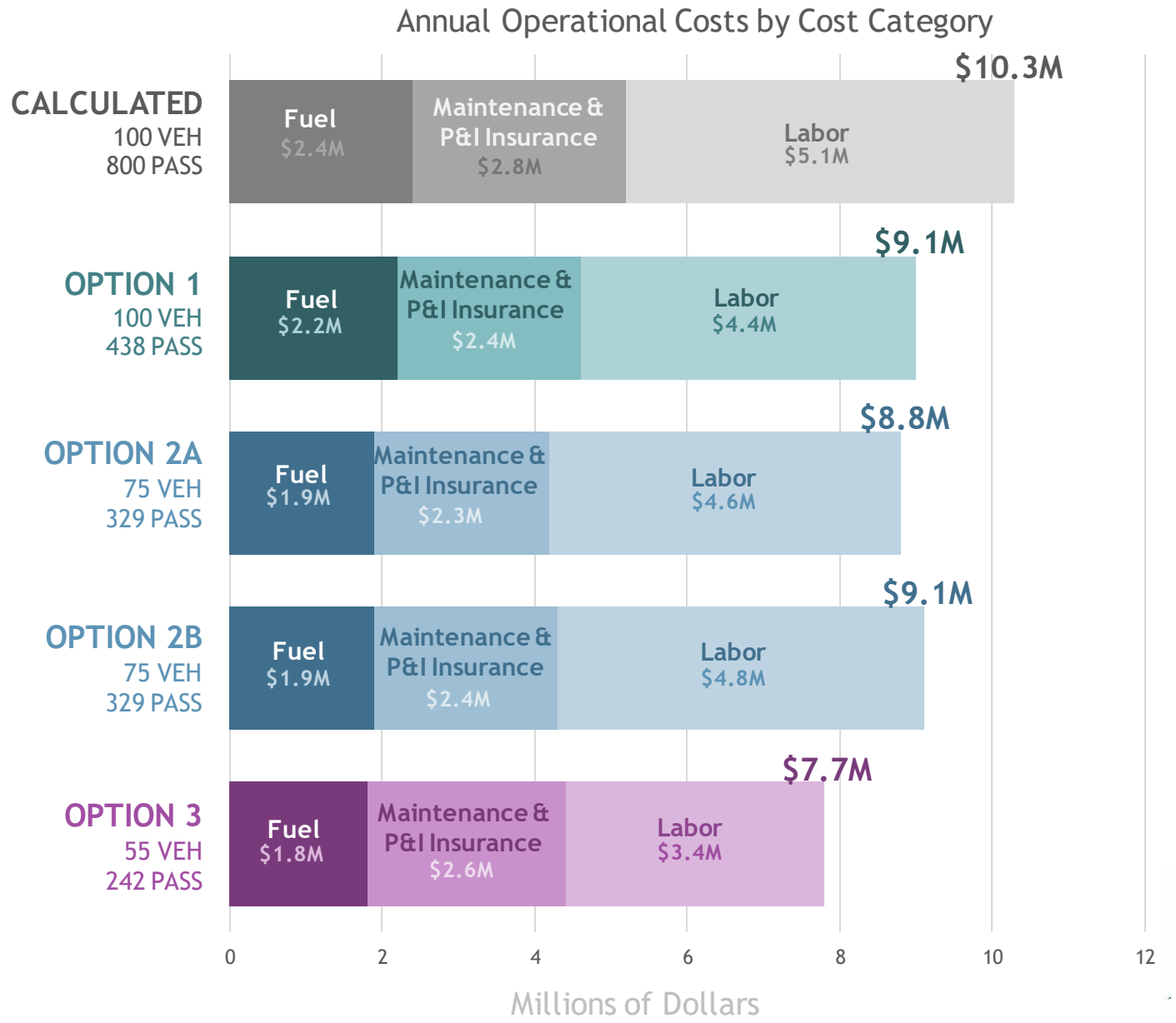
- Identified cost categories:
  - Vessel Labor
  - Fuel
  - Maintenance
  - Insurance
- Categories NOT included:
  - Office Labor
  - Terminal Labor
  - Managerial Labor

Definitions

- **Service hours/Vessel hours:** Hours that make up the service schedule
- **Crew hours:** Hours the crews are working to meet the service schedule (includes vessel start up, overlap for crew changes and tie up at night)
- **Person-hours:** Individual person hours to deliver service (number of crew per vessel X crew hours)

Annual Operational Costs by Category

Cost Analysis



Cost Analysis

Key Operational Cost Findings

- Option 1
  - Most expensive of new fleet options to operate – same as Option 2B
    - Highest fuel/energy costs
  - Highest Hull Insurance
- Option 2A-3 vessels running in summer on weekends
  - Has same operational costs as 2B except during summer.
  - Cheapest maintenance costs
- Option 2B- 4 vessels running in summer on weekends
  - Most expensive of new fleet options to operate – same as Option 1
- Option 3
  - Cheapest to operate
    - Highest savings in all seasons
    - Least # of required crew and overall labor cost
    - This includes maintenance cost, which is highest for this option
  - Lowest Hull Insurance

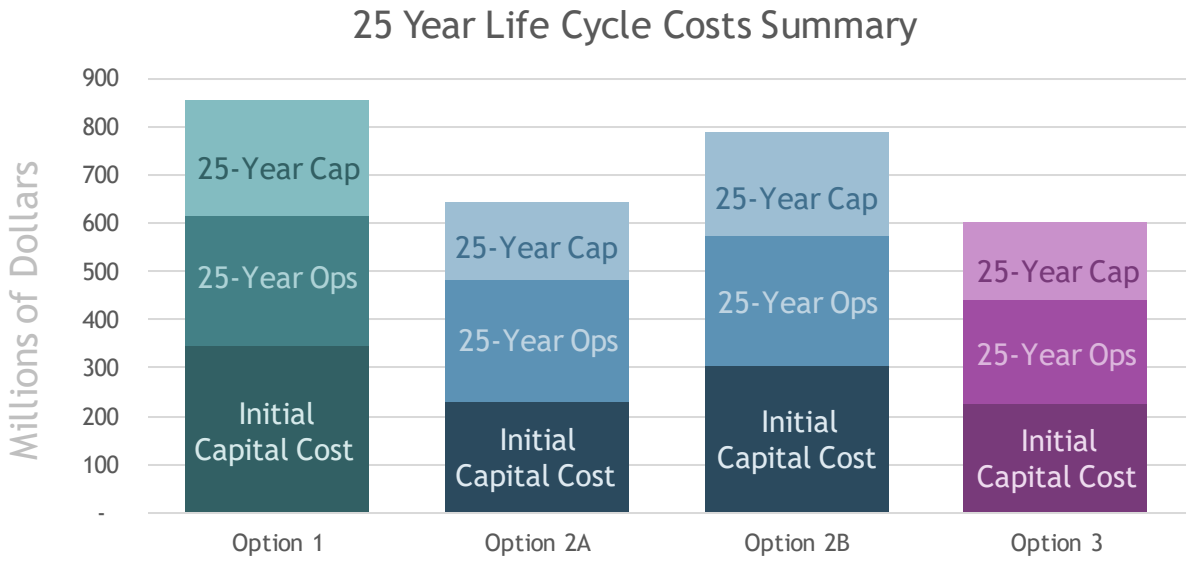
❖Option 3 presents the lowest operational cost.

Cost Analysis

25-Year Life Cycle Costs Summary

Findings/Key Cost Drivers:

- Initial fleet capital costs are the largest cost contributor for all fleets.
- 25-year Shipyard costs are a direct correlation to initial vessel costs.
- Option 3 has the lowest 25-year life cycle cost.



NOTE:

- *Does not include fleet savings for building fleet in quick succession*
- *Other non-vessel related costs are not included.*
- *Does not include inflation. Costs are in 2021 dollars.*
- *Does not include terminal investments needed.*

Other Considerations

Other Considerations

Seaworthiness and Comfort

- Smaller, lighter vessels will move more
  - Cancelations due to weather will increase in the winter
- DRBW will conduct site visits with operators that run smaller ferries
  - i.e. WOODS HOLE – SSA (55 cars, 235 ft LOA, 1924 LT)
    - Travel to Martha's Vineyard and Nantucket

Other Considerations

Fleet Transition

- The timing and amount of capital funding will have a direct impact on the timing of construction and delivery of vessels. Each fleet has a similar full build out timeframe.

	OPTION 1 100 VEH	OPTION 2A AND 2B 75 VEH	OPTION 3 55 VEH
Service Tempo	• Most similar to current service	• Moderate change to operating logistics and service tempo	• Biggest change to operating logistics and service tempo
Initial Vessel Replacement Ratio (to maintain capacity)	• Retire 1, replace w/1	• Retire 1, replace w/2	• Retire 1, replace w/2
Training	• New vessel, same subchapter	• New vessel, same subchapter	• New vessel, different subchapter
Terminal Modifications	• None	• Minimal	• Passenger tube modification needed

Summary

Preliminary Criterion Analysis

Summary

	OPTION 1 100 VEH	OPTION 2A 75 VEH/3 VESSELS	OPTION 2B 75 VEH/4 VESSELS	OPTION 3 55 VEH
Meets Daily *Ridership Demand* Benchmark	Yes	Yes	Yes	Yes
Meets Current Provided Daily Summer *Capacity*	Yes	Does not meet current	Most capacity provided	Yes
Peak Period Summer Service *Through-put*	High	Does not meet current	Highest	High
Ability to Accommodate 10% Ridership Growth	Yes, Highest	Yes, Lowest	Yes	Yes
Winter Service Efficiency	Status Quo	Better	Better	Best
Resiliency/Operational Flexibility	Status Quo	Status Quo	Better	Best
Seakeeping	High	Medium	Medium	Slight increase in winter cancellations
Fleet Transition Complexity	Lowest	Low	Low	Highest
Initial Fleet Capital Cost	Highest	Low	High	Lowest
Annual Operating Cost	Highest	Low	Highest	Lowest
Overall Lifecycle Cost	Highest	Low	High	Lowest

Fleet Analysis Summary

- All fleet options can meet the current vehicle demand.
- Options 2B and 3 allow more flexibility to adjust the level of service to meet the demand.
- Option 3 is the least expensive overall. It has lower capital costs and lower operating costs but will require more extensive terminal modifications.

	Per Vessel		Per Fleet					
	Vessel Class	Estimated COI Crewing	Annual Round Trips	Schedule Flexibility	Initial Capital Cost	10-yr Shipyard Cost	Estimated Annual Operating Cost	Estimated 25-yr Lifecycle Cost
Calculated Fleet Three 100-vehicle ferries	H	9	3,043	–	–	$45M	$10.3M	–
Optimized Current Fleet Three 100-vehicle ferries	H	8	3,231	Low	$345M	$19.6M	$9.1M	**$853M**
Mid-size Fleet 2A: Three 75-vehicle ferries	H	8	3,404	Low	$228M	$14.0M	$8.8M	**$643M**
2B: Four 75-vehicle ferries			3,522	Medium	$304M	$15.6M	$9.1M	**$787M**
Smaller Vessel Fleet Five 55-vehicle ferries	K	5	4,295	High	$225M	$15.8M	$7.7M	**$616M**

Additional Ways to Provide Comments and ask Questions

- Marine master plan email: marinemasterplan@drba.net
- Call and leave voice message: voicemail at x27280, 609-889-7280

Summary