



**Glosten**



INTRODUCTION  
SCHEDULE  
TRANSPORTATION SYSTEM ASSESSMENT  
VESSEL CAPACITY STUDY  
CONCEPT DESIGN  
Q&A



## INTRODUCTION

SCHEDULE

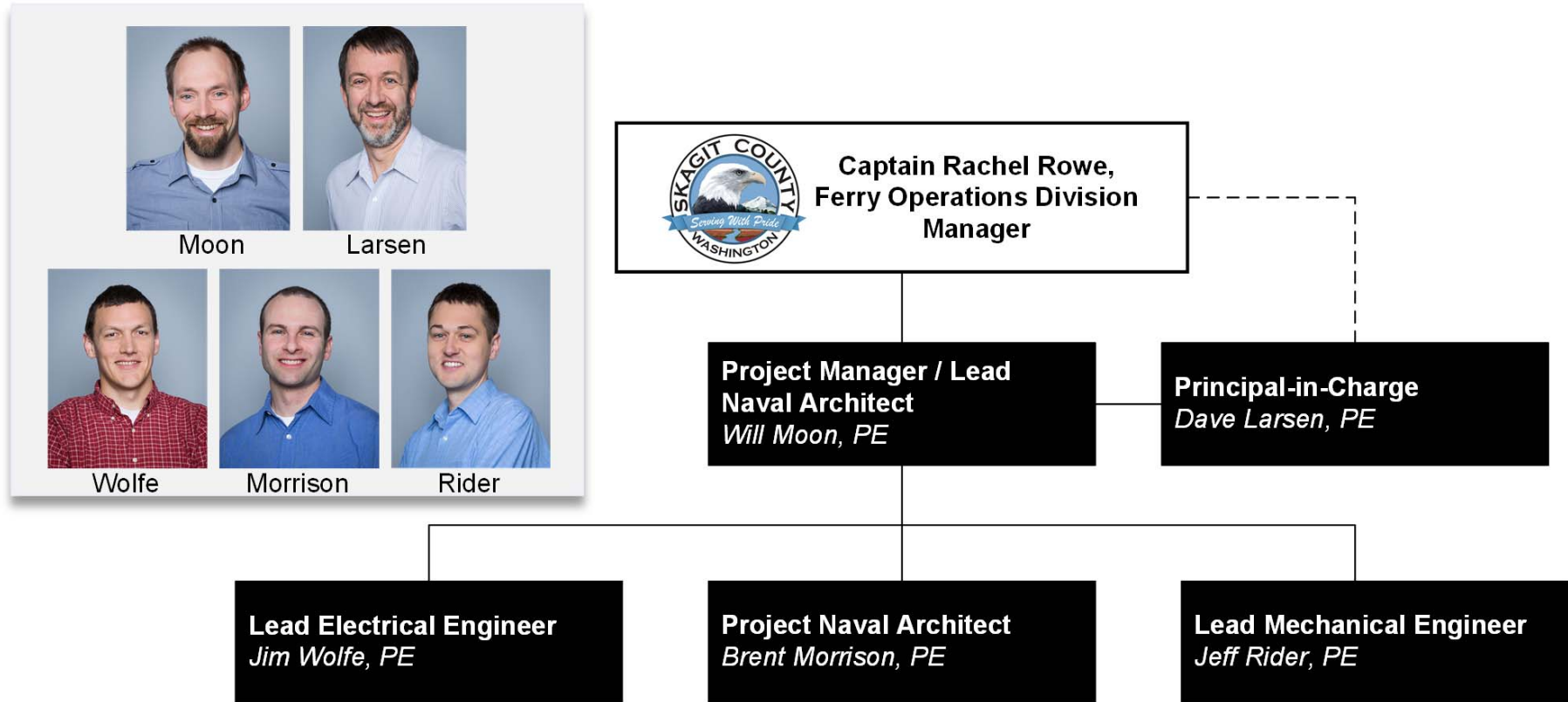
TRANSPORTATION SYSTEM ASSESSMENT

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# DESIGN TEAM





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# NEAR-TERM SCHEDULE

Tasks	September	October	November	December
Design Studies	[Task active]			
Forecasting	[Task active]			
Transportation System Analysis	[Task active]			
Concept Design Report		[Task active]		
Propulsion Trade-Off Study		[Task active]		
Design to 30%			[Task active]	
Engineers Cost Estimate			[Task active]	
Prepare for CFCIP Funding	[Task active]			





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# OPTIONS & ALTERNATIVES

Look at whole Transportation System

Single vs. Double ended

Monohull vs. Catamaran

Steel vs. Aluminum

- Steel hull for strength, exploring AL deckhouse for weight savings

One vs. Two Ferries

- Benefits to both systems
- Total lifecycle cost evaluated for both options
- 50% greater cost for a two ferry system



# TERMINALS



## PND Engineers

- Completed survey and preparing report
- Apron widening
  - Needed to allow concurrent passenger and vehicle loading
- Evaluating suitability of existing dolphins

## DN Traffic Consultants

- Completed survey conducting analysis
- Evaluating queuing and parking
- Exploring ticketing options

# THROUGHPUT ASSESSMENT

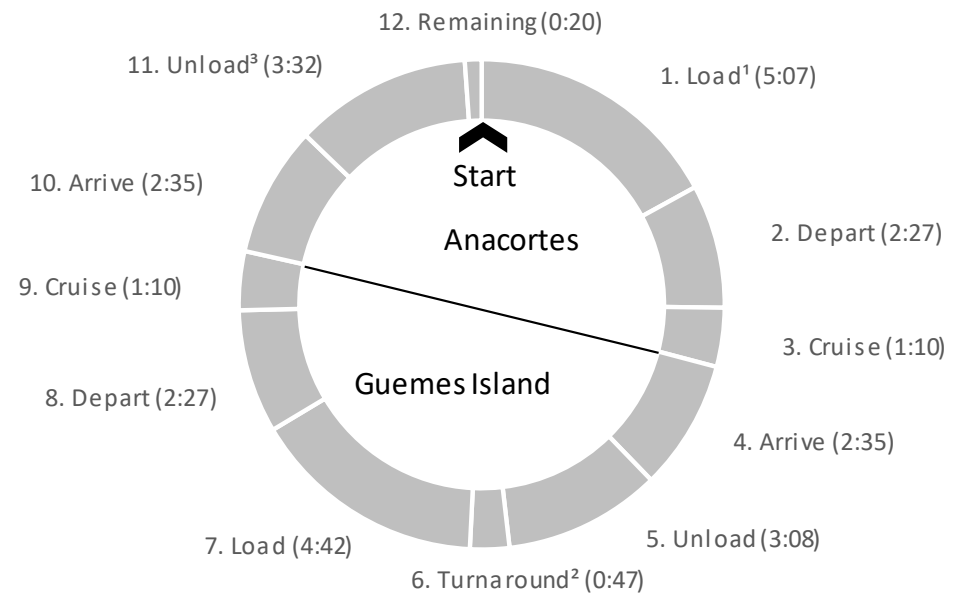
## Assumptions:

- 2 roundtrips per hour
- Full load in both directions
- Ticketing bottleneck removed

## Findings:

- Ramp clearing consumes time
- Concurrent vehicle / walk-on loading needed
- 33 vehicle limit to meet 2 roundtrips per hour

*How big can the new vessel be?*



*M/V Guemes operation*

# EMERGENCY & ENVIRONMENTAL

## Emergency response scenarios developed

- Range from MOB to marine evacuation with grid failure
- Each propulsion system evaluated against scenarios

**Airborne noise**

**Wake wash**

**Permitting**





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# RIDERSHIP HISTORY

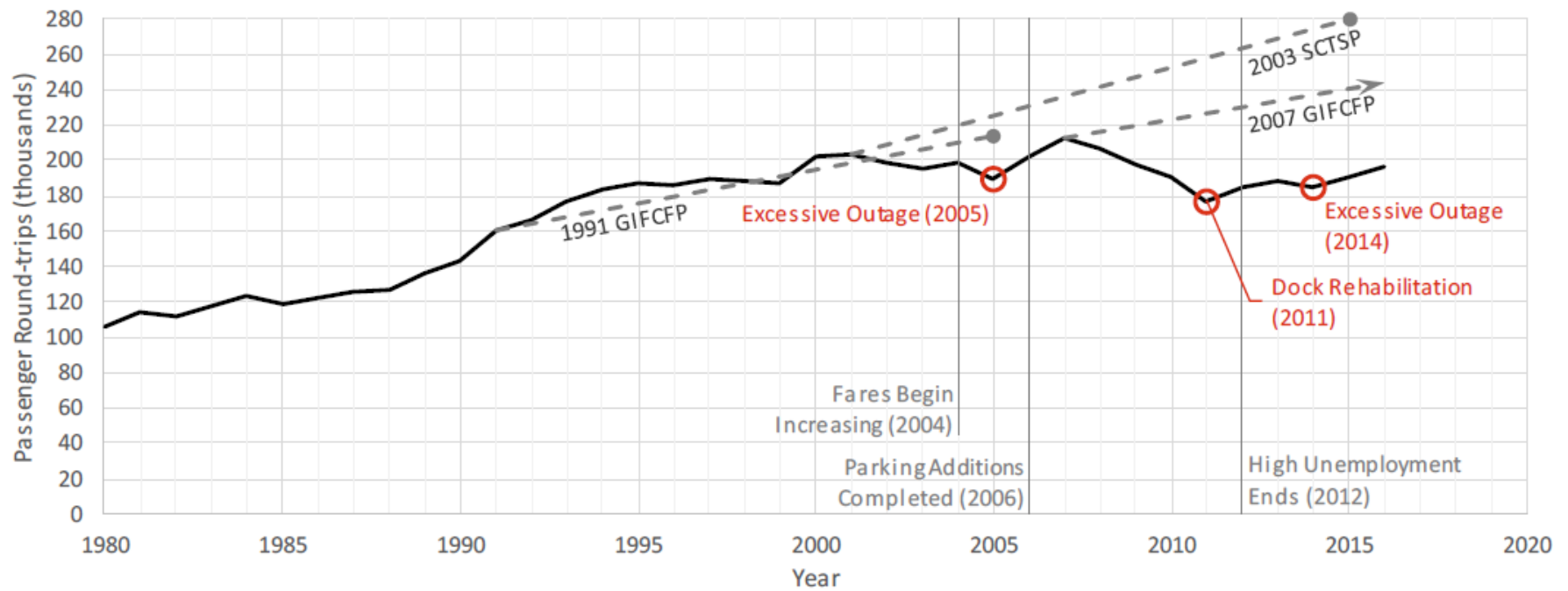
## Ridership data from 1980 to present

- Detailed data starts in 2001
- 1% of trips contain a full load of walk-on passengers
- 22% of trips contain a full load of vehicles (19 or more)
- 2002 had the highest vehicle traffic

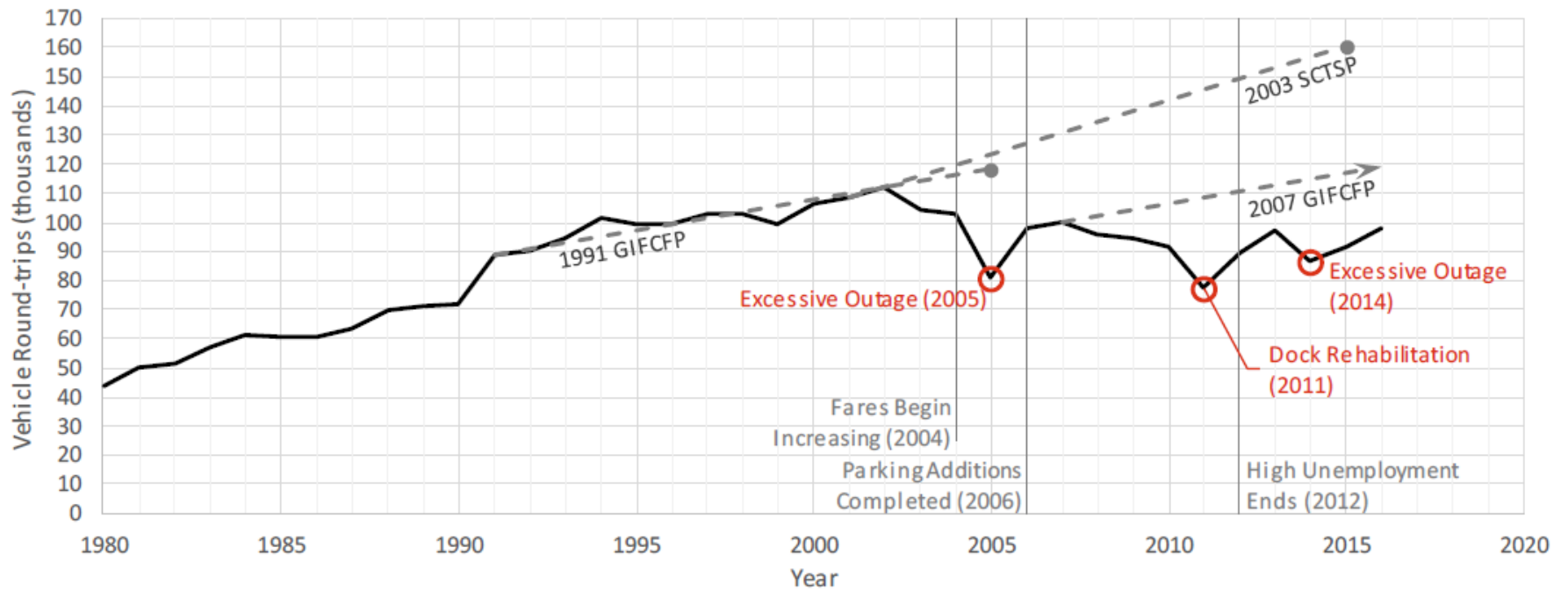
## 40 year design life used for replacement



# PASSENGERS



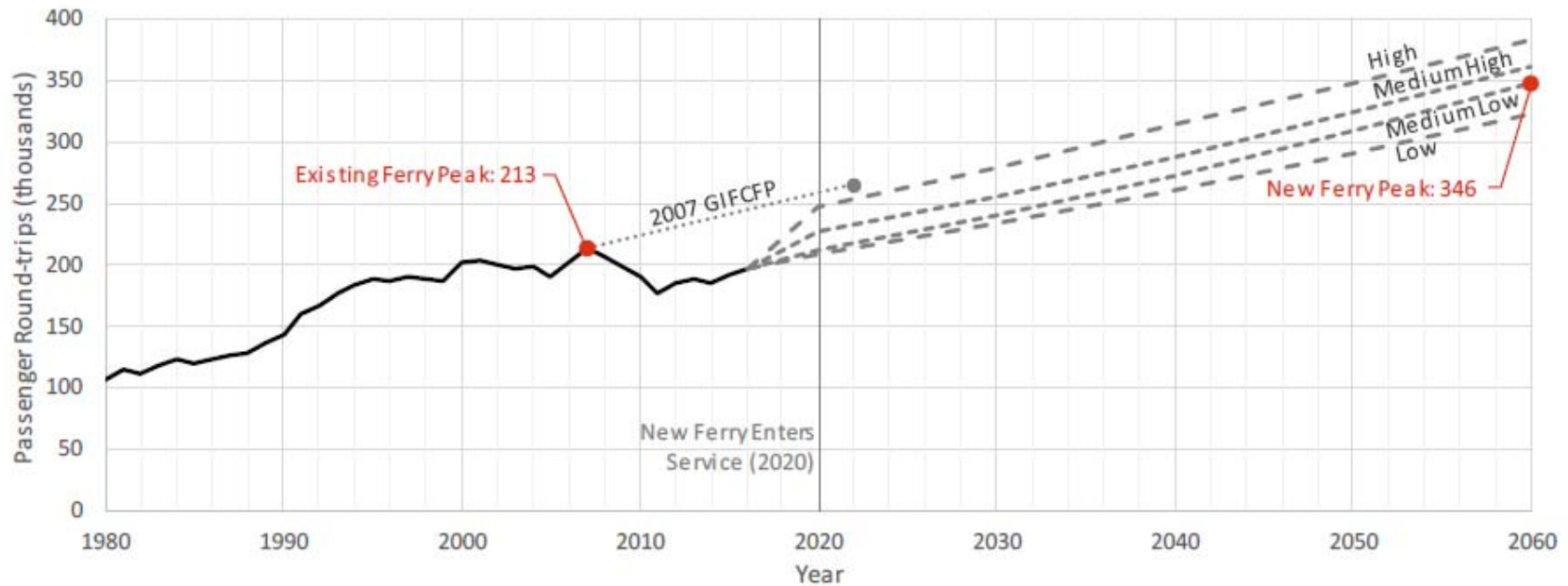
# VEHICLES





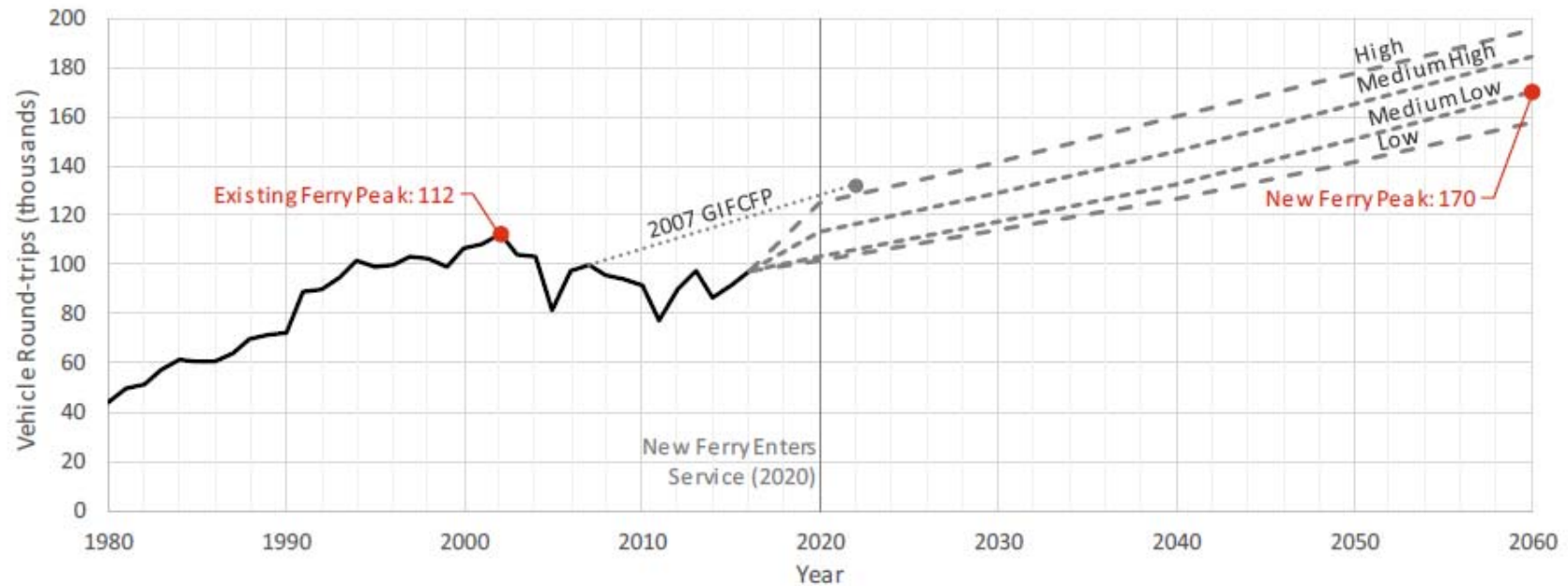
# PASSENGER FORECAST

- Forecast model considered Dwelling units, Population, Fares, Housing market, Unemployment, Parking, Schedule, Weather
- Passenger ridership forecasted to increase 77%



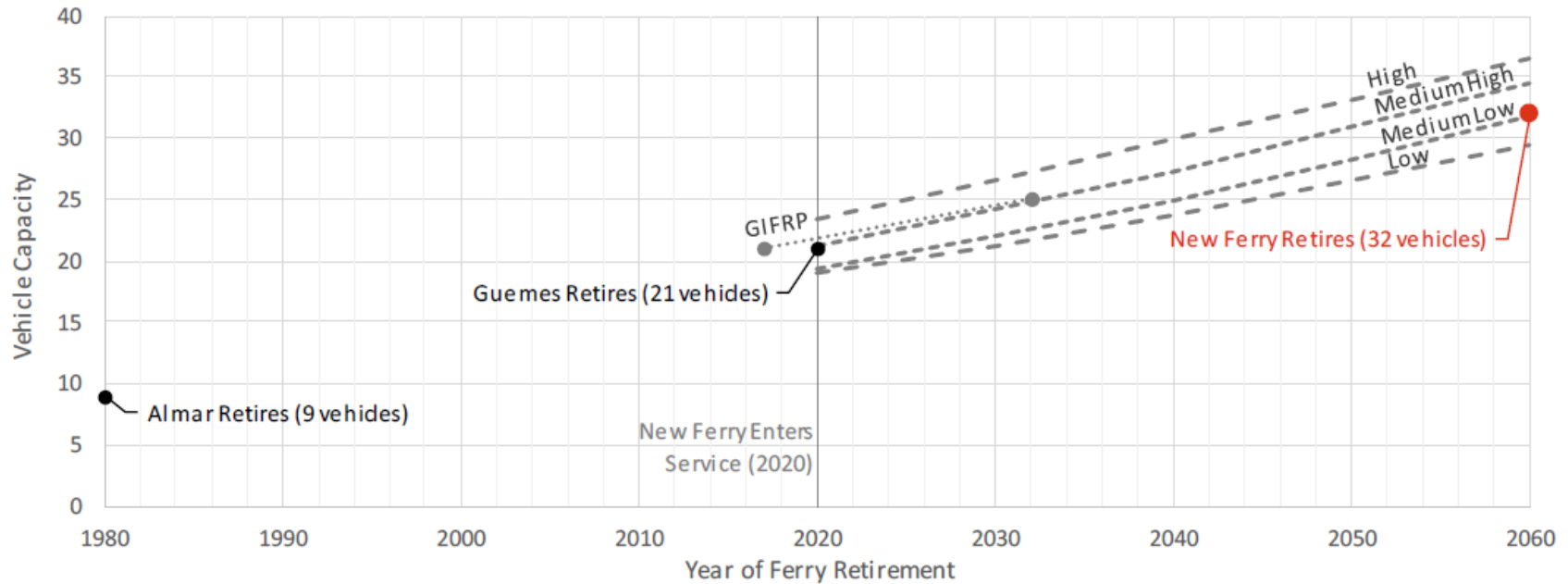
# VEHICLE FORECAST

- Forecast model considered Dwelling units, Population, Fares, Housing market, Unemployment, Parking, Schedule, Weather
- Vehicle ridership forecasted to increase 74%



# VEHICLE FORECAST

- Forecast model considered Dwelling units, Population, Fares, Housing market, Unemployment, Parking, Schedule, Weather
- Vehicle ridership forecasted to increase 74% over 2016 levels





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# DESIGN & REGULATORY REQUIREMENTS

Terminal interface

Operating environment

Passenger and vehicle count

Noise, speed, maneuvering

RAM – no backup vessel

USCG

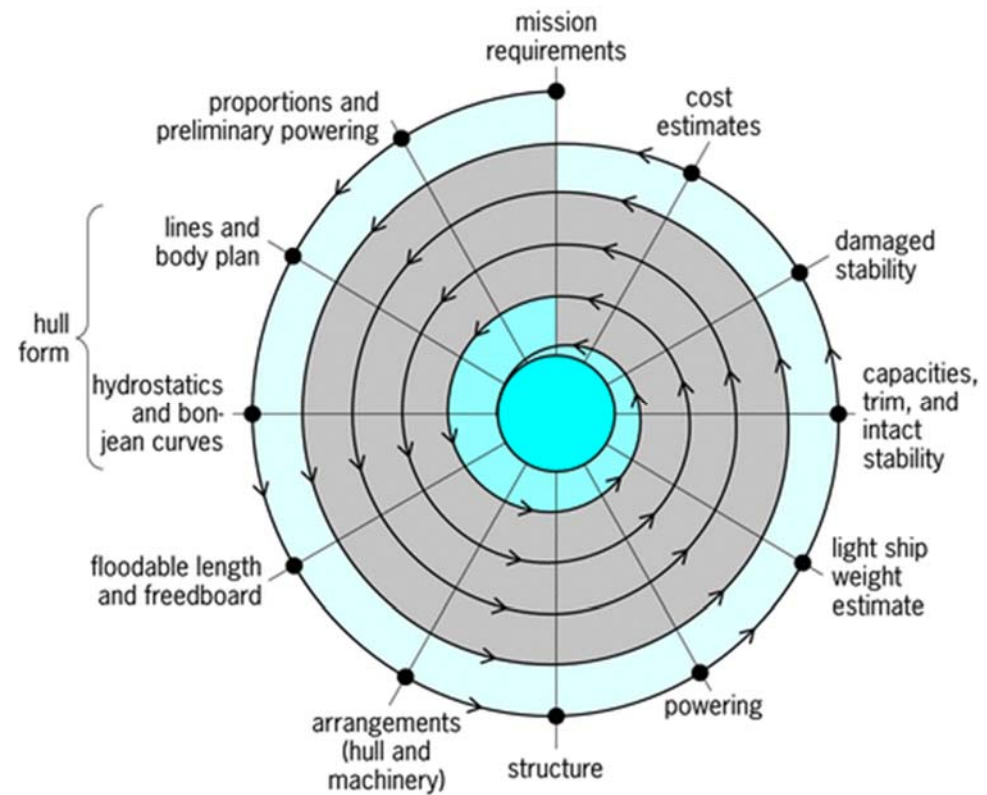
- Lifesaving and Stability
- Manning
- Batteries and Tonnage

ADA

- Passenger Vessel Guide

EPA

- Engine exhaust



# PROPULSION SYSTEM STUDY



## Five propulsion options

- Geared Diesel (baseline)
- Diesel Electric
- Series Hybrid
- All-Electric
- Plug-in Hybrid

## Operational profile is key

## Shore power infrastructure

- Charging Anacortes only
- Considering shore side batteries

# PROPULSION SYSTEM STUDY

## Sensitivity analysis

## Lifecycle cost

- Propulsion system only
- 40 year design life
- Includes battery and engine replacements

## Scoring system with owner-chosen weighting factors

- Capex, Opex, emissions, reliability, etc.

## Staying with Z-drive technology



# DESIGN PARTICULARS

32 Vehicles, 150 Passengers

Deckhouse to the West

- Complete vehicle and passenger segregation

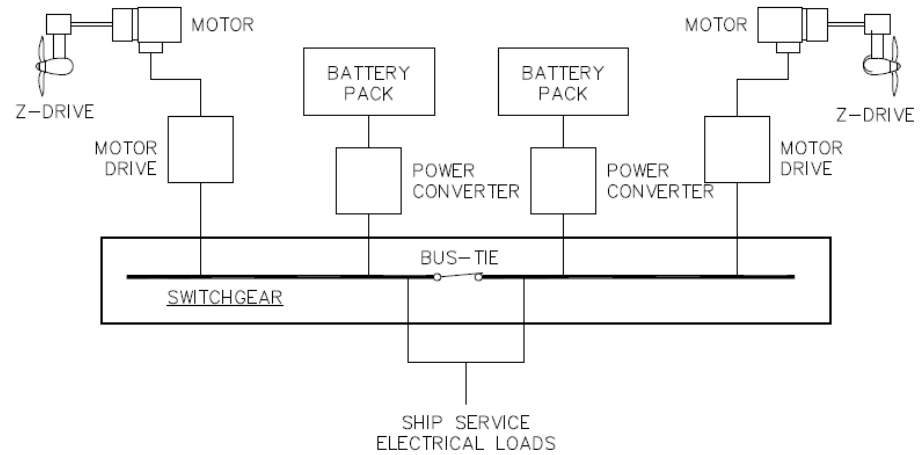
Steel hull

- Lightweight but robust framing

Considering AL deckhouse

2 x Z or L drive thrusters

- Removable through main deck







## CLOSING COMMENTS / Q&A



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