

## MEMORANDUM

Vessel: New Lummi Island Ferry  
Engineer: Eric Coleman, PE  
Reference: 17098.01-002-835-1-  
Date: 10/06/2020  
Subject: Preliminary Tonnage Assessment

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## PURPOSE

This memo documents the preliminary regulatory tonnage estimate for the New Lummi Island Ferry (LIF). The LIF is a 184 ft x 54 ft x 13.25 ft 34 car, 150 passenger, double-ended ferry with a maximum loaded draft of 7.50 ft. The vessel will be owned and operated by Whatcom County Public Works (WCPW).

The vessel must have a Gross Register Tonnage (GRT) of less than 100 tons in order to be regulated under 46 CFR Subchapter T.

## PROCEDURE

### Hull Tonnage

The GRT value for the hull is calculated using the methodology outlined in 46 CFR Section 69 (Reference [1]), and as further described in United States Coast Guard's Marine Technical Note (MTN) 01-99, CH-9 (Reference [2]). Simpson's Rule is used to determine the volume within the hull structure by integration of the hull sectional areas.

The estimated tonnage length is measured from 8 in. inboard of the ends of the vessel on centerline and is 182.67 ft. Based on the tonnage length, the hull is divided into 12 tonnage stations. The tonnage station locations are shown in Figure 1. The area of each station is calculated using Simpson's Rule. Each station is divided into four sections as the depth is less than 16 ft. It is assumed that the stem bar will be arranged in a manner to produce near zero area stations at both ends. A typical engine room tonnage station is shown in Figure 2. All under deck volume outside of the engine room is excluded from tonnage by using full breadth and depth tonnage frames.

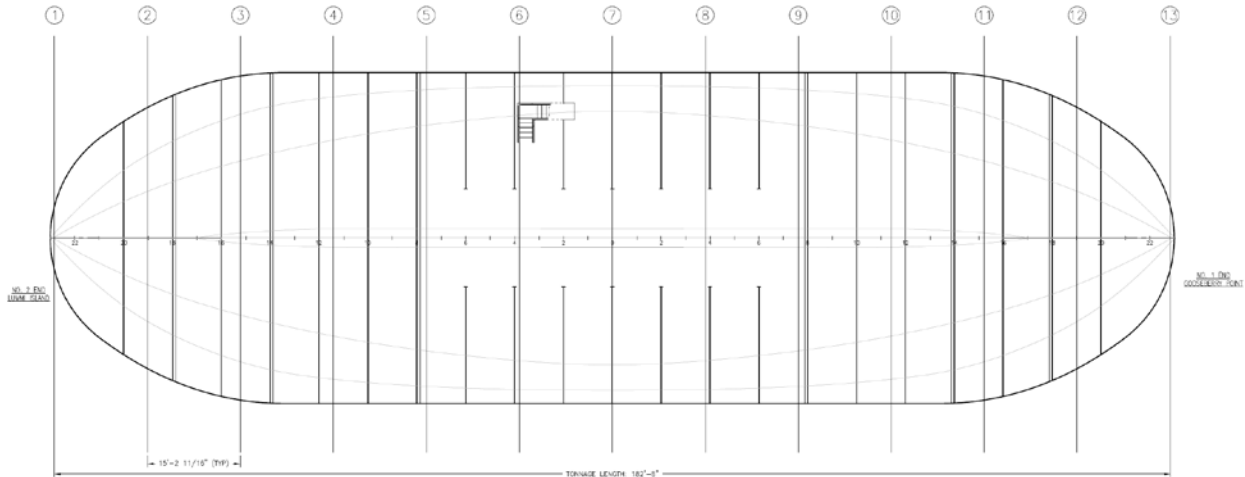


Figure 1: Tonnage stations (not to scale)

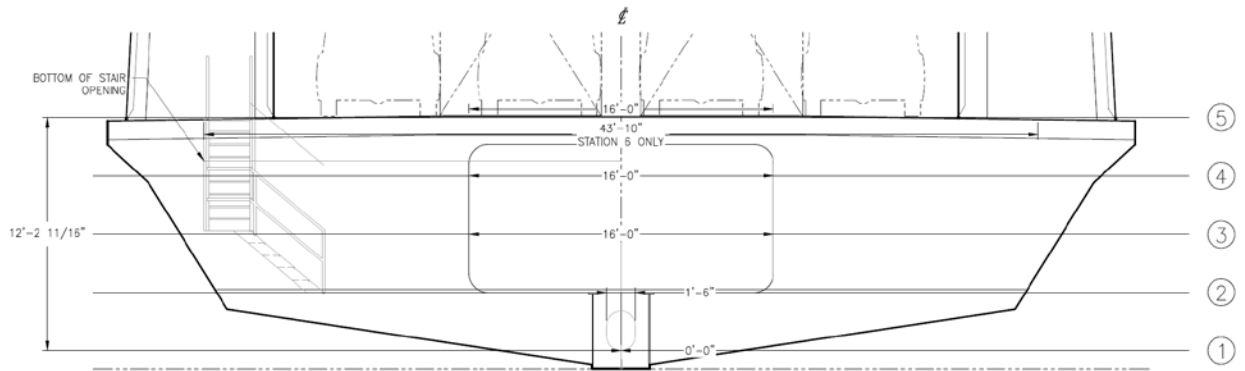


Figure 2: Engine room tonnage station (not to scale)

### Superstructure Tonnage

Tonnage volumes above the main deck are conservatively calculated using the dimensions to the bulkhead plate as shown in the vessel arrangements (Reference [4]). The Main Deck passenger and crew lounges are exempted from the tonnage volume with 4 ft. x 5 ft. tonnage openings. The main deck gear locker is similarly exempted from tonnage with a 4 ft. x 5 ft. tonnage opening. The heads, uptakes, and engine room access are exempted from tonnage admeasurement as described in References [1] and [2]. The entirety of the pilothouse has been considered necessary for controlling the vessel, and consequently exempted from inclusion in tonnage.

The cleaning gear locker on the main deck is included in the tonnage volume for the vessel.

### CONCLUSIONS

The GRT of the subject vessel is estimated to be 94.8 tons.

## REFERENCES

- [1] U.S. Government Publishing Office, Code of Federal Regulations; Title 46 - Shipping, Subchapter H, October 1, 2015.
- [2] United States Coast Guard, "Tonnage Technical Policy," MTN 01-99, CH-9, January 17, 2017.
- [3] Elliott Bay Design Group, "17098.01-100-0- Hullform.3dm," August, 2020.
- [4] Elliott Bay Design Group, "Profiles and Deck Arrangements," 17098.01-002-101-1, Rev. -, Seattle, WA, October, 2020.

**CALCULATIONS**

**TONNAGE CALCULATIONS**

Tonnage length:	182.67	Number of decks:	2.00	
Number of divisions of length:	12.00	Number of Masts:	1	
Common interval:	15.222	Stem	Plumb	182.67
1/3 common interval:	5.074	Stern:	Plumb	38.01
Tonnage depth:	12.22	Material:	Steel	
Number of divisions of depth:	4	Service:	Passenger	
<b>UNDER TONNAGE DECK VOLUME</b>		<b>TONNAGE</b>		
Section Number	Simpson's Multiplier	Section Area Square Feet	Product	
1	1	0.00	0.00	UNDER TONNAGE DECK: 91.1
2	4	0.00	0.00	Between Decks: 0.00
3	2	0.00	0.00	Forecastle: 0.00
4	4	0.00	0.00	Bridge: 0.00
5	2	120.16	240.33	Deck Houses: 0.00
6	4	148.51	594.03	Side Houses: 0.00
7	2	120.16	240.33	Mast Houses: 0.00
8	4	120.16	480.65	Trunks: 0.00
9	2	120.16	240.33	
10	4	0.00	0.00	
11	2	0.00	0.00	
12	4	0.00	0.00	
13	1	0.00	0.00	
Total:			1795.66	
1/3 common interval:			5.074	
Under Deck Volume:			9111.32	Excess Hatchways: 0.00
Ballast Tank Volume:			0.00	Light and Air: 0.00
Under Deck Volume w/ Ballast Exemption:			9111.32	Shelter Deck: 0.00
				Superstructures: (estimated) 3.67
<b>UNDER DECK TONNAGE AS MEASURED:</b>			91.1	<b>GROSS TONNAGE: 94.8</b>

UNDER TONNAGE DECK BREADTHS AND PRODUCTS												
Section No: 1			Section No: 2		Section No: 3		Section No: 4		Section No: 5		Section No: 6	
Depth: 0.00			Depth: 8.16		Depth: 12.22		Depth: 12.22		Depth: 12.22		9.00 12.22	
Interval: 0.00			Interval: 2.04		Interval: 3.06		Interval: 3.06		Interval: 3.06		Interval: 3.06	
Simpson's												
Multiplier	Breadth	Product	Breadth	Product	Breadth	Product	Breadth	Product	Breadth	Product	Breadth	Product
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.00	16.00	43.83	43.83
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.00	64.00	16.00	64.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.00	32.00	16.00	32.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	6.00	1.50	6.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:		0.00	0.00		0.00		0.00		118.00		145.83	
1/3 interval:		0.00	0.68		1.02		1.02		1.02		1.02	
Area in square feet:		0.00	0.00		0.00		0.00		120.16		148.51	
Section No: 7			Section No: 8		Section No: 9		Section No: 10		Section No: 11		Section No: 12	
Depth: 12.22			Depth: 12.22		Depth: 12.22		Depth: 12.22		Depth: 8.16		Depth: 0.00	
Interval: 3.06			Interval: 3.06		Interval: 3.06		Interval: 3.06		Interval: 2.04		Interval: 0.00	
Simpson's												
Multiplier	Breadth	Product	Breadth	Product	Breadth	Product	Breadth	Product	Breadth	Product	Breadth	Product
1	16.00	16.00	16.00	16.00	16.00	16.00	0.00	0.00	0.00	0.00	0.00	0.00
4	16.00	64.00	16.00	64.00	16.00	64.00	0.00	0.00	0.00	0.00	0.00	0.00
2	16.00	32.00	16.00	32.00	16.00	32.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.50	6.00	1.50	6.00	1.50	6.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total:		118.00	118.00		#####		0.00		0.00		0.00	
1/3 interval:		1.02	1.02		1.02		1.02		0.68		0.00	
Area in square feet:		120.16	120.16		#####		0.00		0.00		0.00	
Section No: 13												
Depth: 0.00												
Interval: 0.00												
Simpson's												
Multiplier	Breadth	Product										
1	0.00	0.00										
4	0.00	0.00										
2	0.00	0.00										
4	0.00	0.00										
1	0.00	0.00										
Total:		0.00										
1/3 interval:		0.00										
Area in square feet:		0.00										
Deckhouse/Superstructures:												
L	W	H	T									
Main Deck Cleaning Gear Locker	8.00	4.83	9.50	367.3								
				-----	<u>Note:</u>							
				-----	Assumed all of Pilothouse is out of tonnage							
Total Volume				367.3								
Total Gross Tons				3.67								