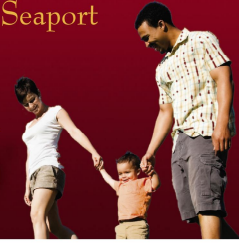




# Mystic Mobility Study



**Client:** Stonington and Groton, CT  
**Project Name:** Multi-Modal Transportation Study for the Mystic Seaport Area  
**Location:** Mystic, Connecticut  
**Project Number:** 36938369  
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**Revised Through:** February 23, 2011

## TECHNICAL MEMORANDUM

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### Task 9.2 – Mystic Trolley Service

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Based on our review of the previous Mystic trolleys, other trolley/shuttle systems, and accepted standards for service, we have prepared this recommendation for the operational characteristics of the Mystic trolley system, and have determined the order of magnitude costs associated with the operation of this system. A separate memorandum, prepared under Task 8 of the scope of services for the Mystic Mobility Study, discusses the governance structure and funding sources that may be available to operate the system.

### SEASONALITY

Because of the tourist oriented nature of Mystic, it is important to provide the service on a daily basis during the summer, which is the peak visitation period for the area. Generally, this peak visitation period is a 13 week period between Memorial Day and Labor Day. For the purposes of this calculation, we have assumed that a 15 week “peak” season will be utilized, with daily service provided. This season will encompass 16 weekends.

Beyond the peak season, service can be provided on the “shoulder” seasons before Memorial Day and after Labor Day. Observations of other services indicate that they often provide weekend service through Columbus Day. We have assumed that an additional five weeks of shoulder season service will be needed. Shoulder season service will be limited to weekends only.

Total service will therefore be available for 21 weekends, with daily service provided for the 15 week peak season during the summer.

### ROUTE LENGTH

The likely route has already been determined during the course of the study. The route has been examined, and it has been determined that it is possible to drive the route, with stops, in just under 34

minutes, with mid-day traffic. This is a reasonable amount of time for a 40 minute “turn-around” between runs for a single vehicle under a non-congestion situation.

With congestion, it is anticipated that a single vehicle could be delayed for between five and 15 minutes. This results in a “congestion” turn-around of 60 minutes. During congested periods, it will be necessary to run additional vehicles to maintain the preferred headway.

## **HOURS OF OPERATION**

Because the major attractions open at 9:00 AM, it is important for the trolley service to begin operation at 8:30 AM. This is consistent for all days of operation, regardless of season. Service could terminate at different hours, depending on the needs of the patrons. Initially, we would suggest that service end at 9:00 PM on Sunday through Thursday and 10:00 PM on Friday and Saturday during the peak season. This will allow patrons to access dining and entertainment venues and return to their hotels without the fear of being stranded after the termination of service.

During the shoulder season, it is recommended that service be provided until 8:00 PM.

## **HEADWAY AND NUMBER OF VEHICLES**

One of the most critical operational elements is that of vehicle headway – the time between vehicles at a trolley stop. Barring unforeseen circumstances, the headway establishes the maximum amount of time that a passenger should have to wait at a trolley stop.

Although short headways are critical to the operation of any transit system, they are most important to a tourist-oriented system because people (often families) on vacation are averse to “watching the clock” to conform to a trolley schedule. Long headways, however, leave the user who has just missed a vehicle with a long wait until the next one arrives. Short headways, conversely, present the user with a short wait time under all circumstances, and equate to a much more attractive transportation option.

Experience with other systems, such as the system in Newport, Rhode Island, has shown that headways must be kept below 20 minutes, with 15 minutes being preferred and 10 minutes being optimal. Earlier experience in Mystic has also shown that the shorter headways resulted in more system users.

The chosen headway, in conjunction with the route length, directly relate to the number of vehicles needed to operate the system.

The following table provides the results of the calculation of vehicles required to maintain the chosen headway for congestion and non-congestion situations. It provides an estimate of how many vehicles would have to be procured to operate this system.

We note that larger systems typically purchase some additional vehicles to account for vehicles that may be under repair at any given time. However, if the “congestion” number of vehicles is purchased for

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Mystic, then they will provide an adequate cushion. If a vehicle is out-of-service, then a minor reduction in lay-over times could be used to keep the system on or very close to schedule, even during the congested operation times.

Table 1: Headway and Number of Vehicles

<i>Headway (minutes)</i>	<i>Non-Congestion Vehicles Required</i>	<i>Congestion Vehicles Required</i>
<i>10</i>	4	6
<i>15</i>	3	4
<i>20</i>	2	3

The choice of operational headway will largely be based on the availability of operating revenue for the system. As noted above, a 20-minute headway is the maximum that will effectively encourage ridership. A 15-minute headway provides better service and a better incentive to ride the trolley, and a 10-minute headway is considered to be the optimal choice.

### **OPERATING COST**

Data on operating costs for this type of system are somewhat limited. As noted in technical memoranda, there are options for the way to operate the system, which include the separate purchase of specific vehicles to be operated by a contracting entity, or the contract purchase of a turnkey service which will include vehicles owned and maintained by the contract operator. Interestingly, the amortization of the vehicles over their relatively long lifespan produces a relatively small increase in the operational costs for a contract rate.

Based on the industry-wide information that is available, and the known expenses related to the operation of the heritage type of trolley vehicle, we estimate the cost of a contract service to be between \$50.00 and \$75.00 for a vehicle-hour of operation.

### **FAREBOX REVENUE**

It has been noted that the fare charged on the trolley is a major disincentive to the use of the service. Especially in cases where a tourist is making a relatively infrequent trip, there is little incentive to utilize the trolley when the automobile is already available.

Farebox recovery on comparable systems is quite low, and the costs associated with ticket sales and fare collection further erode the income from the fares that are collected.

A substantial portion of the maintenance and operational costs of the system will have to be collected from other means, regardless of the fare chosen for the system. Because of the relatively small benefit

to be accrued from the farebox, and the relatively high importance of using a low fare to attract riders, it is our recommendation that a free-fare system be established. This will provide the greatest encouragement to ride the system, with little impact on the need to raise operational revenues elsewhere.

## ESTIMATED OPERATING COST

Using the schedules, headways, unit operating cost, and route length described above, we have calculated the total annual operating cost as follows:

Table 2: Estimated Operating Cost

<i>Headway (minutes)</i>	<i>Operating Hours</i>	<i>Estimated Annual Operating Cost (Range from \$50 to \$75 per hour)</i>
<i>10</i>	6700	\$330,000 to \$500,000
<i>15</i>	4700	\$235,000 to \$350,000
<i>20</i>	3300	\$165,000 to \$250,000

*(Congestion computed at 4 hours per day Monday-Friday; 8 hours per day on weekends)*

## SUMMARY

The following summarizes the recommended parameters for the Mystic Trolley Shuttle:

- **Season** – 15-week (16-weekend) peak season with daily operation  
– 5-weekend shoulder season with weekend only operation
- **Hours of Operation** – 8:30 AM to 9:00 PM Sunday through Thursday  
– 8:30 AM to 10:00 PM Friday and Saturday  
– 8:30 AM to 8:00 PM during the shoulder season
- **Headway** – 10-minute preferred headway, which could be increased to 15 minutes if operation costs require. Maximum acceptable headway of 20 minutes should be avoided, if possible.
- **Anticipated route length** – 40 minutes for normal traffic, 60 minutes for congestion conditions.
- **Fare** – No Charge
- **Cost** – \$330,000 to 500,000 to provide 10-minute headway. Can be reduced to \$235,000 - 350,000 if headway is increased to 15 minutes. Further reduction of service to 20-minute headway results in \$165,000 to \$250,000 anticipated operating cost.