Ferry System Report of the Frye Island Transportation Committee

September 2006
The Frye Island Transportation Committee

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Summary:

The ferry is our only way to get on and off Frye Island. What would a day, week, month, or whole season be like on Frye Island without the ferry system? There would be no island access unless you were fortunate enough to have a private boat with docking space on the mainland. The ferry landing and access road would not be available either for docking or parking, because that space would be needed for repairs to the ferry system. The value and enjoyment that we derive from our properties are completely dependent upon our ability to access them, and as things stand now we have only one means of access—the ferry system.

An alternative system for access to Frye Island should be evaluated. The main benefits of an alternative access system would be:

- We would be able to access our properties if the ferry system becomes partially or totally disabled.
- We would reduce the current and future demand on our ferry system
- We would decrease peak traffic (e.g. Sunday pm) demand

One alternative is a passenger ferry system supported by the appropriate infrastructure (parking lots on the mainland and island, public docks and possibly an island van). We would be able to park our cars on the mainland and still gain access the Island. We would be able to maintain access to our properties if the vehicular ferry system were to become disabled. In addition to providing back-up transport, a passenger ferry system could benefit us in a variety of other ways:

- It could prove to be more convenient transportation for some islanders than the current system
- It could reduce demand on the ferry system
- It could improve the quality of life on Frye Island because there would be fewer vehicles contributing to traffic on the island.

Island growth has put increased demand on the ferry service, especially on week-ends. This trend will only continue. It is prudent for us to compare the costs and benefits of attempting to improve the existing ferry system with the costs and benefits of developing alternative ways to access the island.

Introduction

The Transportation Committee had its first meeting in July of 2005. After hearing from the town manager Wayne Fournier what was expected of us, we developed the following mission statement:

> "The mission of the Frye Island Transportation Committee is to assess the current town infrastructure usage, predict the impact from continued community growth, and recommend strategies to cope with future demand."

We decided that our first task would be to assess the current utilization of the ferry system. That assessment is the principal subject of this report. This report also details the system improvement options and alternatives that we considered and which of them we recommend.

Our goals in analyzing the data for the Frye Island Ferry system were to:

- determine a potential sustainable rate of operation for the ferry system;
- determine the maximum monthly, daily and hourly capacities of the ferry system
- predict when, if ever, our demand for the ferry will exceed its various operational capacities

Section 1: Data

1.1 Projected Island Growth

Island growth, in terms of dwelling units, averaged 10 units per year from 1970 to 2000. (Town of Frye Island Comprehensive Plan, July 2002) In recent years, the Frye Island Growth Ordinance has limited the number of new housing starts to 15 units per year. If we assume the number of dwelling units on Frye Island now is 475, and the maximum number will be 750, then the island should reach its maximum development in 20 to 30 years if growth follows its historical path.

1.2 Definitions

run - a one way ferry trip, either to or from the Island

ferry system - a transport mechanism capable of moving people and/or vehicles across water

passenger ferry system - a transport mechanism capable of moving people and their belongings, but not vehicles, across water

demand - the number of vehicles that want to move onto or off the island

unidirectional - use of the ferry system in one direction

bidirectional - use of the ferry system in both directions

car equivalent - space on the ferry required to transport one car

1.3 Data Sources:

In an attempt to generate a mathematical model of current ferry utilization we used data from different sources:

- Past (pre-2004) data that had been collected for the ferry (ticket counts reported in the Comprehensive Plan);
- The run data recorded by the manager, ticket takers and mates in 2004
- A ferry survey that was distributed to ferry users for a short time in 2005

Run data for the ferry was collected in 2005 by the ferry crew and is available; however it has not been entered onto a computer at the time of this analysis, consequently the 2005 data were not used herein.

It is important to emphasize that the nature of the data collected pre-2004 differs from that collected in 2004, which differs again from that collected since 2004. This heterogeneity in the nature of the available information limited our ability to analyze trends from year to year. It was crucial to the present analysis that the Town invested consistent effort (employees such as managers, mates and ticket takers kept critical and complete records) during 2004 to obtain detailed data on ferry usage from which we could develop some useful conclusions.

After reviewing the data that were available, we found that the run data collected by the mates was the most helpful in creating a picture of the ferry utilization pattern run by run, hour by hour, and day by day. This detailed data collected for the entire 2004 season included a vehicle count by type of vehicle on a run by run basis in both directions (to and from the island). We judged this data to be more helpful than ticket sale data or number of runs, because we could analyze what types of vehicles were using the ferry and when they were using it.

2004 was the first complete season that the mates collected specific vehicle data for each individual run. We **recommend** that the Town of Frye Island resume collecting ferry run data with this level of detail because such data will assist with:

- optimizing efficiency in ferry operation

- responding to changes in customer demand
- setting ferry schedules cost effectively
- selecting among transportation options
- evaluating the impact of new transportation strategies
- setting fees
- budgeting for the future

Historically, decisions concerning ferry operations have often been made based on guesses, intuition, criticisms, and anecdotal information, with no objective data subsequently collected to evaluate the outcomes of those decisions.

Reliable data collected consistently, year over year, is needed to quantify ferry utilization increases or decreases. The only year to year data that exists is ferry revenue figures. However, we recognize that the use of ferry revenues has three major limitations:

- Ferry ticket sales in any year do not necessarily equate to ferry utilization, because ferry tickets purchased in a given year are not necessarily used in that year
- One cannot determine from ferry revenue the construction vehicle versus residential vehicle utilization changes from year to year
- Some usage of the ferry, such as that by the Town, the General Store, and utility trucks, is not apparent in the revenue figures.

Section 2: Analysis of Current Ferry System

2.1 Ferry System Operational Rate

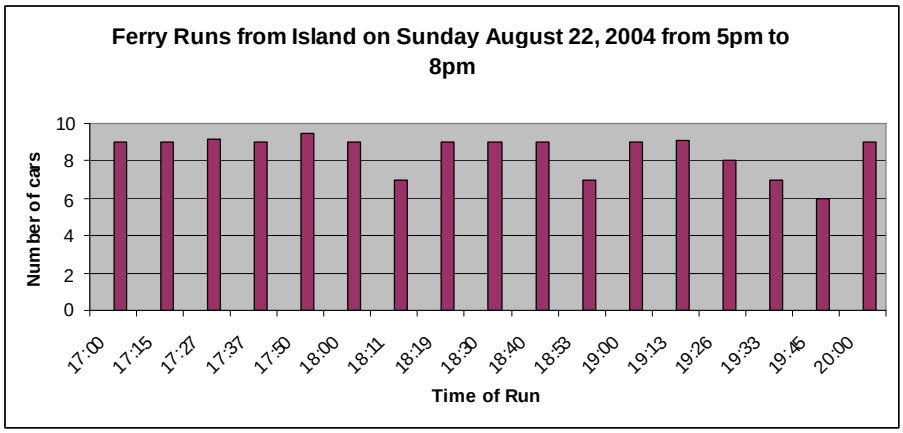
We used the 2004 ferry run data to estimate the sustainable unidirectional rates of ferry operation. This was done by identifying times of peak demand when either one or two ferries were in operation and counting the number of runs made in one direction for a particular time frame, then multiplying the number of runs by 9, the maximum number of cars that can be carried by a single ferry.

The data show that one ferry can move as many as 27 cars in one hour in one direction on a sustainable basis hour after hour. Two ferries can move as many as 45 cars in one hour in one direction on a sustainable basis hour after hour. For short intervals, the ferry system has moved up to 54 cars in one hour, but it was able to sustain that rate only for a one hour timeframe on one or two occasions a month. Thus, for practical purposes, the sustainable maximum unidirectional rate of ferry system operation is 45 cars per hour.

For an example consider the ferry runs on Sunday, 8/22/04, from 5 pm to 8 pm from the island (Figure 1 below). For the three hour period shown, the two ferries in operation were able to initiate at least 5 runs per hour in each of the three consecutive hours; at 9 cars per run the result is a sustainable maximum unidirectional rate of ferry system operation is 45 cars per hour. This assumes

that the additional loading time that would be required to achieve full loads on the 5 runs that were carrying 6 to 8 cars would not reduce the number of runs in those hours.

Figure 1:



The maximum unidirectional rate of ferry system operation was 36 cars per hour in periods when there was substantial bidirectional demand. The reason for this is probably that loading time at both sides reduces the number of initiated runs per unit time. When the demand is unidirectional (i.e., Fridays to the island and Sundays from the island), and the loading time is on one side only, the observed unidirectional rate is 45 cars per hour.

We feel it is important to state that we are reporting the rates of operation that we observed in the data. We are not suggesting that the ferry should operate at any particular rate. Appropriate consideration should be given to the safety of the ferry, its crew, its passengers and operating conditions when choosing a rate of operation, in addition to consideration for the wear and tear on the equipment for any particular operational strategy.

2.2 Ferry Capacity

Ferry capacity is the total number of car equivalents that can be moved by the ferry system over a finite measure of time. To calculate various ferry capacities, we used unidirectional and bidirectional rates of ferry operation and different periods of time. For daily ferry capacities, we assume that the ferry will operate for 16 hours per day and for the monthly capacity calculation we assume that there are 30 days per month. The three ferry capacity calculations that are relevant to the rest of our analysis are as follows:

- The calculated maximum daily bidirectional ferry capacity is 1152 cars per day.
- The calculated maximum daily unidirectional ferry capacity is 720 cars per day.
- The calculated maximum monthly bidirectional ferry capacity is 34560 cars per month.

Throughout the rest of our analysis, we will refer to these theoretical maximum ferry capacities as we consider current and predicted future ferry utilization.

We feel it is important to point out that these capacities are theoretical and to achieve these capacities, the operation of the ferry system would have to be flawless and MOST importantly ferry demand would have to be evenly distributed over the respective time frames. Perfect distribution of demand in any transportation system is not possible, thus as ferry demand approaches maximum theoretical daily capacity wait times will be substantial.

2.3 Current Ferry Utilization Pattern

In 2004, the ferry system moved 47% of all vehicles for the entire six month season in just the months of July and August. Please see Appendix A to view the total monthly usage by different types of vehicles. Note that in the off peak months of May, June, September, and October, total monthly ferry demand would have to more than triple in any given month before we would exceed the existing ferry capacity. Therefore we chose to focus the detailed daily and hourly analysis of ferry utilization on the peak months of July and August.

Figure 2 below shows a more detailed picture of demand for ferry use during high season—average number of car equivalents using the ferry is given for each day of the week. A “car equivalent” is defined as the space that a single car occupies on the ferry; an oversized vehicle will occupy more than one car equivalent. Thus, the data for the different types of vehicles are analyzed in car equivalents to take into account the fact that certain pieces of heavy equipment require as much space on the ferry as two or three cars, or that captains may decide to limit additional cars from the run. In keeping with everyone’s experience, the peak days of the week for unidirectional ferry transport of car equivalents during high season 2004 were Fridays to the island and Sundays from the island. In 2004, the peak day to the island was Friday July 2, with 474 and from the island was Monday July 5, with 481.

Total average ferry demand on Friday is greater than on Sunday. However Sunday demand is more concentrated because ferry users tend to want to leave the island at around the same time on Sundays, whereas Fridays typically have a more evenly distributed arrival pattern. Also, the ferry system carries construction traffic up to 2 pm on Fridays during high season, whereas on Sundays it carries essentially none. The conclusion from the data is that the ferry system exhibits greater utilization and shorter wait times on Fridays than on Sundays because of traffic distribution patterns.

Interestingly, while there are individual days (for example, Fridays and Mondays of holiday weekends) of extreme demand, on average the demand is spread out over the week in a fairly even manner. See the Average bidirectional utilization (Total Avg in Figure 3) from day to day ranges only from 478 to 598 car equivalents. This may be attributable to a variety of factors such as:

- the construction traffic demand being heavier on weekdays while resident demand being heavier on weekends
- the nature of the schedule design process
- the tendency of users to seek to minimize wait times
- the natural hourly maximum the ferry system can handle

We conclude that, currently, on an average daily basis, during the months of July and August, we use about 50% of the maximum daily bidirectional ferry capacity available when it operates 16 hours a day. Stated another way, if daily average bidirectional utilization levels double from what they are today then we will exceed the theoretical maximum bidirectional daily ferry capacity.

Figure 2

Weighted Daily Ferry Demand

(from Tues July 6, 2004 to Sun Aug 22, 2004)
(weighted into car equivalent units; see App B for Weighting Factors)

Demand to the Island

Day:	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
	128	238	243	243	328	349	295
	136	230	219	258	302	376	277
	177	269	268	224	263	405	309
	141	235	243	261	320	391	328
	127	215	225	244	280	386	313
	140	236	216	227	321	376	280
	152		215	236	305	339	
Avg:	143	237	233	242	303	374	300

Demand from the Island

Day:	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
	303	266	322	266	331	209	209
	330	304	229	265	264	196	208

	335	224	258	224	231	234	278
	339	255	253	263	267	264	255
	315	280	220	255	234	222	269
	321	260	220	227	283	250	235
	344		215	247	260	191	
Avg:	327	265	245	249	267	224	243
Total (To + From Demand) Avg:	469	502	478	491	570	598	543

2.4 Two Empty Ferries Pass

The Frye Island Ferry system has historically operated with two primary but conflicting goals:

- Operate as cost effectively as possible
- Minimizing the wait times for users of the ferry

These two goals are conflicting because the most cost effective way to run the ferry system is with 100% full ferries for every run, but the only way to guarantee 100% full ferries for every run is to always have people waiting in line to use the ferry.

When one sees two empty ferries pass, one can't help but think the ferry service is being mismanaged and the town is wasting money. One only needs to look at the ferry data and consider the ferry staffing requirements to understand why we may occasionally see two empty ferries pass from time to time. It is not rational to expect otherwise.

One reason for two empty ferries passing is the highly variable nature of ferry demand. The 2004 ferry run data shows that, even at peak times, demand is highly variable and can result in empty ferries passing as was the case for ferry traffic to the island on Friday August 20 from 5:30 pm to 7:45 pm. (shown in Figure 3 below), which shows that the ferry system was running every 15 minutes to the island and was nearly full for every run except for the 6:45 pm and 7 pm runs which were nearly empty. The overall demand during this time frame quite clearly justifies running two ferries, however, if one had been watching the ferry from 6:45 pm to 7 pm, one would have seen basically empty ferries passing (the 6:45 boat from the island carried 1 car and the 7pm boat from the island carried 0 cars) on successive runs.

The second reason for empty ferries passing has to do with ferry staffing requirements and short spikes in demand. There are times when two ferries are needed to handle two or three hours of demand, however when a second ferry is put into service that crew must have a minimum of 4 hours of work. As an example consider ferry traffic from the island on Tuesday August 17, 2004 (Figure 4 below). Between 4 pm and 6 pm on that afternoon, there were 53 cars

that traveled from the island to the mainland, however, between 6pm and 8pm there were only 23. The second boat was clearly justified to satisfy the hours between 4pm and 6pm and clearly wasn't needed from 6pm to 8pm. However, when we put the second boat into action, the crew must have at least a 4 hour shift.

Figure 3

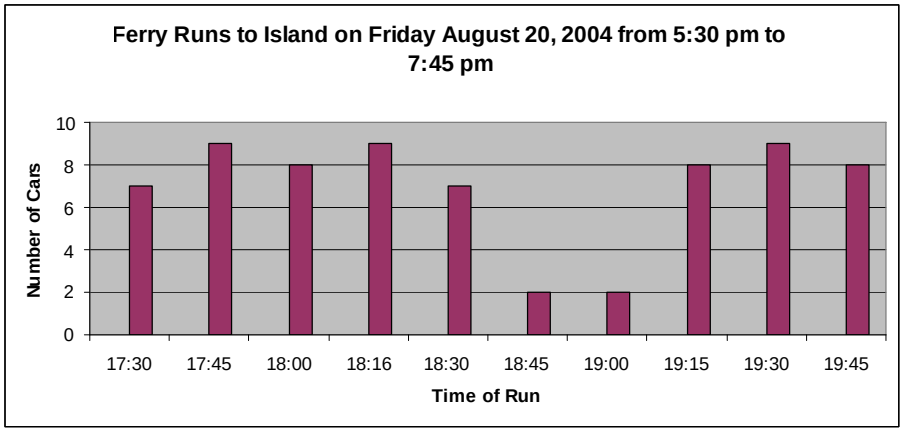
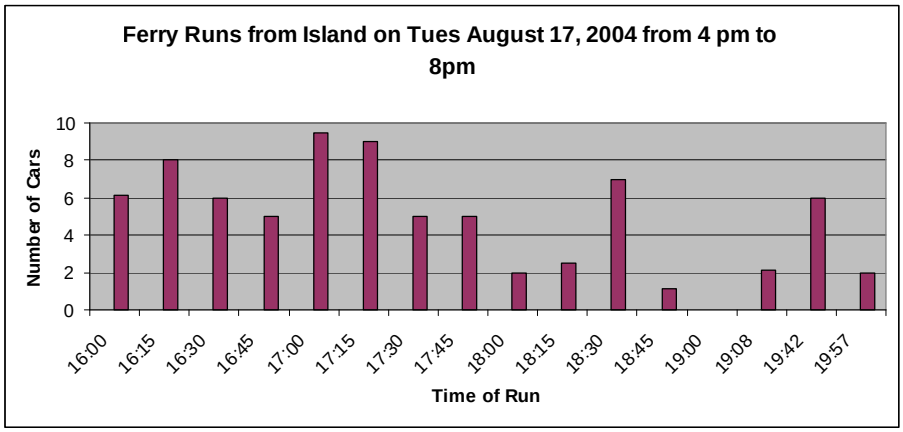


Figure 4



2.5 Projected Ferry Utilization

The largest data set that we have to represent long term ferry utilization patterns is the annual revenue figures as reported for the Frye Island ferry system compared with the number of cottages for the respective years. Within the data available to us, there was a stable subset of information from 1994 to 1997, when there was a 4.6% yearly increase in ferry revenues corresponding to a 4.3% yearly increase in total cottages. Considering that construction was steady over this time period and that ferry fees and pricing structure were constant, we conclude that the increased utilization of the ferry over this period of time resulted from the new cottages that were being occupied/built annually. If we assume that total revenue in such a period reflects total utilization; then it is a reasonable to assume that this trend will continue, increasing overall ferry utilization in step with occupancy of new cottages. However the increase may not be linear as other factors come into play both local and general.

Long term changes in population demographics could also influence long term ferry utilization patterns. Based on 2004 data and ferry observation, a substantial portion of resident ferry utilization occurs on the weekends. Historically, Frye Island has been a community with a substantial weekend and renter population. As property values on Frye Island have increased, we have seen a reduction in renters and it is possible that we will begin to see more weekenders turn into full time residents. These types of demographic changes might not only increase total ferry utilization and but could change the traffic distribution pattern (i.e., less peak demand Fridays and Sundays).

Based on the foregoing observation that growth in ferry utilization closely matches island growth in periods of steady construction, we expect overall future ferry utilization growth to parallel island growth. Based on the 750 cottage limit and current weekly traffic distribution, we calculate that resident ferry utilization should increase approximately 66% by the time the island is fully built out. Assuming the current utilization pattern is maintained, that would translate into average peak ferry demand of approximately 543 resident vehicles per day either on or off the island on peak days of the season (we are currently moving about 327 resident vehicles per day off the island on Sundays, the busiest resident day of the week). The current ferry system has the ability to move 543 vehicles, but in order to do that it would require 15.1 hours operating without interruption at 36 cars per hour. However, ferry demand is not spaced evenly over the hours of operation; therefore substantial wait times at peak periods would be expected.

2.6 Potential Ferry System Failures:

Because the ferry system is the only Town supplied means of access to the island, we felt it important to consider the vulnerability of the system by identifying potential causes of partial or total failure. A total ferry system failure occurs when the ferry system is unable to transport any vehicles to or from the

island. A partial system failure occurs when the ability of the ferry to move vehicles to and from the island is impaired.

Based on discussions with Town personnel, we agreed that the most likely cause of a total system failure would be a malfunction of the gantry system. If either the mainland or island gantry systems became unusable, the ferry system would be unable to transport vehicles until the malfunction was repaired. There is no back-up system for either gantry. Fortunately, the Town has never had to deal with a catastrophic malfunction in the gantry system, but there have been close calls and partial breakdowns.

A partial ferry system failure would result if any part of the system becomes partially or totally disabled. Potential partial system failures could be caused by weather, emergency, accident, access problems, extreme lake levels or mechanical problems to name a few. In the past, the ferry system has experienced many partial failures every year fortunately resulting in relatively mild inconvenience to islanders. However as we grow and ferry demand increases and our dependence on total efficient ferry operation grows, the impact of a partial system failure will result in greater inconvenience and delays.

(An outline of the failures that we considered can be found in Appendix C)

2.7 Estimated Impact from System Failures

A total ferry system failure would result in no vehicles being moved to or from the island. The Town of Frye Island has no plan in place to offer any access to the island or to provide mainland parking for Island residents. In most cases, the existing parking at the ferry landing would be needed for repairing the broken system.

As we have seen in the past, a partial ferry system failure results in inconvenience in the form of delays. For example, we estimate that with only one boat running, it will take approximately 16 hours to move the typical Friday and Sunday traffic on or off the island. Depending on the traffic patterns, wait times are estimated to be about 4 hours. With only one boat running on July 4th weekend 2004 it would have taken about 22 hours to move the cars on and off the island. As ferry demand grows over the years we will not be able to handle peak traffic in a 24 hour period with only one boat running. Delays will depend on the particular type and magnitude of the failure and could be compounded by restricted access to the ferry landing area to remediate a partial system failure. Also, with only one ferry in operation, the strain on the remaining ferry and crew could result in a further system compromise.

2.8 Comparison to Other Maine Ferry Systems

The Frye Island ferry pricing structure differs in some ways from that of the two other vehicular ferry systems in Maine that we investigated. The Casco Bay lines trip to Peaks Island is quite similar in duration to the trip to Frye Island, taking about 15 min; a ferry trip to Peaks costs more in peak season than in off-peak season, and more on weekends than on weekdays. Mid-April through Columbus Day prices for autos on Friday, Saturday, and Sunday are $70 per vehicle and driver round trip and $50 per vehicle and driver roundtrip the rest of the week (http://www.cascobaylines.com/vehicles.htm). Another difference between the Casco Bay line pricing and Frye Island ferry pricing is that each additional adult passenger in a vehicle must pay $6.25 and each child must pay $3.10 for a round trip (http://www.cascobaylines.com/passenger_fares.htm). The average commercial vehicle pays between $72 and $170 dollars plus $1 per hundred pounds of freight.

Ferry service to Swan's Island provided by The Maine State Ferry is a 6 mile trip that takes 40 min. The Maine State Ferry charges $38 per vehicle, $13.25 per adult, and $5.75 per child for a round trip ferry ride (http://www.state.me.us/mdot/opt/ferry/215-info.php).

Neither Casco Bay Lines nor The Maine State Ferry service offers any discount for the vehicles of the residents of the islands that it serves, however Casco Bay Lines does offer a discount to passengers in the form of a commuter pass. Both Casco and the Maine State Ferry System use a reservation system for which they charge a fee and also offer parking for a fee. The use of differential pricing at peak times encourages users of the ferry to schedule their trips at times when the ferry has excess capacity.

The frequency and hours of operation of Casco Bay Lines and the Maine State Ferry System are considerably less than the Frye Island Ferry, and mainland parking at some of the sites is several miles away from the terminal.

Section 3: Strategies to Improve the Ferry System

As island population continues to grow, the need for residents, guests, and service providers to access the community will increase. In off peak months this increased demand can probably be handled with increased ferry service (i.e. running two ferries more often). However in high season, if the current utilization pattern is maintained, we will not be able to efficiently and conveniently handle all the increased peak demand times that can be expected with 750 homes.

Accordingly, we considered various ways to increase the number of vehicles able to be moved on and off Frye Island such as larger ferries, a third ferry, and a bridge. Each of these options in theory could increase the total number of vehicles able to be moved on and off Frye Island; however each has limitations and considerations. A larger ferry or ferries would be limited by the depth and width of Rubbs cove and by the existing gantry system. A third ferry like the

ones that are in operation now won't effectively increase capacity much because the loading and unloading time of the current system is already essentially used up by the existing two boats. Consider that only one ferry can be operating in Rubbs Cove at a time and a ferry needs 10 minutes to: enter Rubbs Cove, dock the ferry, unload cars, load cars, turn around, and leave the cove. Whether we had two or three ferries, at best, the ferry system could make only 6 runs an hour because of this limitation. A bridge would require permission from the State, land acquisitions, and an extensive feasibility analysis. Most importantly, all of these options are very costly solutions to our future capacity problems when you consider that the current ferry system will effectively satisfy our needs except for the peak demand periods in the months of July and August.

Instead, we recommend considering how to improve the existing system through a two pronged approach that may offer a more cost effective solution to our potential capacity shortfall in peak periods. We could potentially meet our needs by changing the current utilization pattern and exploiting the excess capacity in our existing transport system through a strategy that includes:

- Shifting demand to times of excess capacity
- Using our limited peak capacity as efficiently as possible
- Providing an alternate method of access

A combination of differential pricing, structured utilization, mainland parking, and a passenger transfer system could serve to improve current peak transportation needs, and provide a foundation for the future needs of an increasing number of people to access Frye Island.

Differential pricing is already employed by the Frye Island Ferry and the Casco Bay Lines to help structure ferry demand. For example, we found in discussions with Town ferry personnel that the change in contractor pricing in 2004 resulted in substantial changes contractor utilization patterns in 2005. The 2004 price increase has resulted in more contractors carpooling onto the island and transporting building materials in smaller vehicles, thus reducing total contractor ferry demand through improved efficiency of the users. A differential pricing strategy at peak demand times of ferry operation should result in a similar reduction in demand. Differential pricing should incentivise ferry users to use the ferry when rates are more attractive, to consider other ways to access the island, and to make their usage at peak times more efficient through carpooling.

Structuring ferry utilization through a reservation system should make the ferry system more efficient, reduce wait times, and result in less wasted ferry capacity. The total ferry system capacity is a finite resource, and structuring the demand on that resource through reservations will help insure that we operate a more convenient and efficient ferry service in the future. Reservations will serve to reduce wait times in lines for users and result in more efficient use of our resources through planning.

Mainland parking is the most important component of the strategy for reducing ferry demand at peak times. The users of the ferry currently don't have any realistic option but to bring all their cars onto the island. Differential pricing without mainland parking will probably result in increased ferry revenue, but probably won't reduce total ferry utilization substantially. Providing a realistic alternative to bringing a vehicle onto Frye Island is the only way to realistically reduce ferry demand. As stated earlier, the other ferry systems in Maine that we examined all offer mainland parking to their users and charge substantially less for passenger traffic than vehicle traffic.

The Frye Island ferries are currently not conducive to transporting passengers; therefore, a system to move passengers who will be leaving cars on the mainland will be needed. The decision to access Frye Island by some means other than a personal vehicle will be influenced by the convenience of those means. For example, a passenger transporting system that would be exclusive of the ferry system and contributes substantially to reducing demand on the ferry system is: A separate watercraft that transports people and their goods; a fully loaded 10 passenger water craft could be transporting persons who had parked 5 cars (assuming 2 persons per car on average), a savings of 5 car equivalents of ferry utilization. A passenger transport system that employs the existing ferry system could be a bus or shuttle system that transports people and their goods from the parking lot to the island on the ferry and still reduce utilization; for example, an 8-passenger shuttle bus that occupies one car equivalent on a ferry could be transporting persons who had parked 4 cars (2 persons per car), a savings of 3 car equivalents.

(An outline of various strategies that we considered can be found in Appendix D)

Section 4: Recommendations:

1. The Town of Frye Island should collect detailed data on ferry utilization.

2. The Town of Frye Island should increase the available mainland parking because:

    a. A parking and staging area on the mainland would result in an improved traffic pattern for the ferry system that is safer than currently having waiting vehicles lined up on the Raymond Cape Road.

    b. Residents, guests, and contractors that use the parking area on the mainland will reduce the total traffic on the island. Less traffic on the island will result in less wear and tear on the roads and safer roads for all who use them.

    c. Residents and especially guests would have the option of not bringing their vehicles to the island, that when used would result in decreased ferry demand.

3. The Town of Frye Island should consider initiating an additional system to move people and goods to and from the island. The main benefits of an alternate access system to the island are the following:

    a. We can access our properties if the ferry system fails.

    b. We can reduce the current and future demand on our ferry system.

4. The Town of Frye Island should consider differential pricing, reservations, and other mechanisms to reduce vehicular traffic on the island and better manage the limited resource that is our existing ferry capacity.

5. The Town of Frye Island should consider developing an Emergency Plan to provide vehicle access to and from the island in the event of a major extended gantry or total ferry system failure. Considerations for such a plan are:

    a. Alternate loading and unloading sites on the island and mainland.

    b. Possible modifications of the existing ferries that make them usable for vehicle traffic at alternate loading sites.

    c. If the existing ferries are not suitable for use without the existing gantries, then consider other barge type landing crafts that could be used in the event of an emergency.

Today we are totally dependent on our ferry system for access to the island. An alternate island access system with parking on the mainland should prove to be more convenient than the current system, improve ferry utilization, facilitate island access in the event of a ferry system failure, and go a long way towards maintaining acceptable levels of access to Frye Island.

Appendix A

2004 Monthly Ferry Totals by Type of Vehicle

Month:	April	May	June	July	August	Sept	Oct	Nov	TOTALS
Walk On		251	447	1151	977	504	322	3	3655
Bicycle		7		56	17	17	6		103
Motorcycle		9	10	45	56	36	14		170
Car	94	1996	2675	4862	4527	2265	1706	13	18138
Mini Van	14	443	642	1312	1360	494	389	5	4659
Lg Van	22	362	449	575	359	313	354	18	2452
Sm. SUV	57	786	828	1803	1479	665	586	5	6209
Lg. SUV	31	520	652	1806	1736	899	854	17	6515
Sm. PU	34	291	316	390	288	222	235	7	1783
Reg PU	62	1040	1139	1308	979	947	1007	16	6498
X-Cab PU	62	1225	1406	1731	1767	1447	1494	43	9175
Dual PU	3	49	71	61	46	79	75	1	385
Sm. Dump	5	127	94	128	174	130	79	1	738
Lg. Dump	6	167	436	262	302	375	266		1814
Util Truck	11	106	98	75	71	60	31	2	454
Sm. Box Trk	3	56	42	94	66	44	25	1	331
Lg. Box Trk	5	69	72	125	110	50	23	2	456
Cement Trk		23	31	12	33	32	16		147
Trailer	17	260	224	407	322	245	326		1801
Other	8	189	251	279	250	232	170	1	1380
Total	434	7976	9883	16482	14919	9056	7978	135	66863

Appendix B: Car Equivalent Weighting Factors

(provided by Frye Island Ferry Service)

Weighting Factors

Descrip	Factor
Walk On	0.1
Bicycle	0.25
Motorcycle	0.5
Car	1
Mini Van	1
Lg Van	1

Sm. SUV	1
Lg. SUV	1
Sm. PU	1
Reg PU	1
X-Cab PU	1
Dual Wheel PU	1
Sm. Dump	1
Lg. Dump	3
Util Truck	2
Sm. Box Truck	1
Lg. Box Truck	3
Cement Truck	3
Trailer	1
Other	3

Appendix C

A. Potential Total System Failures

1. Gantry Malfunction
2. Unusually High Water
3. Unusually Low Water
4. Contaminated Fuel in both ferries
5. Accident involving both ferries that incapacitates both of them
6. Employee Strike
7. Shut down by State of ME Regulatory Agency
8. Unavailability of insurance.
9. Blockage of access roads
10. Hurricane or other severe weather
11. Fire

B. Potential Partial Failures

1. Mechanical failure of one ferry.
2. Partial Gantry failure that makes loading and unloading inefficient
3. Unavailability of employees
4. New legislation regulating ferry operation
5. Accident or emergency on one of the ferries
6. One ferry sinks
7. Restricted access to the gantry area because of accident, fallen trees, or other reasons

Appendix D

Outline of Considered Ferry Improvement Strategies

3.1 Increase ferry Service.

1. 24 hour ferry service.
2. Increased utilization of second ferry.
3. Structure utilization.

3.2 Decrease ferry Demand.

1. Vehicle limit per property on Frye Island
2. Differential pricing to control utilization. The island has seen this work with contractor use of the ferry. Increases in contractor pricing resulted in reduce contractor utilization over 2005 and 2006.
3. Pricing structure that includes per person charges.
4. Reservations required.
    a. Any time.
    b. Peak times.
5. No passenger vehicles. Golf carts on island only.
6. Preferential loading.
7. One way tickets.

3.3 Secondary ferry services.

1. Passenger moving system. This could take to from of a van and/or boat service to the island.
2. Cargo/goods ferry.
3. Alternative ferry sites.
4. Alternative docks.
5. Lease commercial dock space.
6. Alternate Barge type Landing Craft
7. A backup Gantry System carried on the Ferry

3.4 Secondary support areas.

1. Parking on the Willis property.
2. Other mainland parking areas.
3. On Island parking (Store area).
4. Delivery service
    a. Groceries.
    b. Other stores.
5. Freight terminal.
6. Provide an economic inducement to attract retail to the island to reduce the need to go off island.

3.5 Wishful thinking.

1. Bridge.
2. Larger ferries.
3. Third ferry.