MARITIME ECONOMICS PANEL OF THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS
TRANSPORTATION LAW SECTION OF THE FEDERAL BAR ASSOCIATION

WORKSHOP: LEGAL AND ECONOMIC ISSUES OF HIGH SPEED MARINE TRANSPORT

HELD JULY 11, 2002
IN WASHINGTON, DC

SUMMARY OF PROCEEDINGS

The Transportation Law Section of the Federal Bar Association and the Maritime Economics Panel of the Society of Naval Architects and Marine Engineers held a workshop on July 11, 2002 to explore issues affecting the development of high speed marine transport in the United States. The premise for developing the workshop was that, high speed marine vehicles enjoy wide market penetration in other areas of the world, yet are relatively rare in the United States. Through an examination three issue areas: (1) contracts and financing, (2) modal choice and intermodalism, and (3) operational and environmental factors, workshop participants explored the opportunities and impediments to the penetration of domestic high speed services.

ISSUE AREA 1 – CONTRACT AND FINANCING ISSUES

The first issue area, contracts and financing, began with a presentation on the different types of project financing available for maritime projects. Traditional bank financing was discussed, including a description of the credit analysis and requirements for obtaining financing. Financing through private placements, leasing, and public debt and equity are alternatives having some appealing features but which also have practical drawbacks. The soundness of the enterprise is a major consideration with bank financing, as with these other alternatives. An adequately capitalized enterprise will have many options, but the typical ferry operator starting an operation will have a difficult time obtaining financing.

The principal source of public sector financing for vessel construction in the United States is the Maritime Administration's Title XI loan guarantee program. The principal advantages of this form of financing are the very long project period (25 years), the comparatively low financing rate, and the ability to finance as much as 87.5 percent of the cost through the program. The principal hurdle in obtaining Title XI financing is the requirement to demonstrate the economic soundness of the operation. Specifically, Title XI program becomes a lender of last resort for projects that would not be able to obtain financing through the private sector. In other words, if these operations could demonstrate economic soundness on a macro (company) and micro (project) level, Title XI would not be needed.

Other public sector alternatives to Title XI were mentioned including capital construction funds, small business administration loans, municipal and industrial development bonds, government export credits, use of development banks and the Export-Import Bank of the

United States. All of these programs have applicability and appeal in certain limited circumstances.

The possibility of financing against charters is also possible. Borrowing funds or raising equity is then based on the terms of the charter and the creditworthiness of the charterer.

High speed operations, particularly ferry operations, generally are risky and not investment grade projects. They exhibit seasonality problems. Projecting load factors and demand side economics is problematic. Ferry operations have high working capital requirements beyond vessel purchase considerations. Shore side operating costs and facilities dwarf vessel acquisition costs. Furthermore, in high speed operations, vessels and their engines are worked hard. This may contribute to shortened project life, high maintenance costs, and significant vessel downtime – all affecting economics of the business. Rent and payroll costs are a significant driver in operating costs. The cost of three employees equates roughly to the cost of purchasing a $1.5 million vessel over 20 years.

The use of Ferry Boat Discretionary Funds in TEA 21 was discussed. The funds are given to public entities, typically state agencies, to fund shore side facilities. In practice, the funding available through this source is earmarked in the appropriations process and is literally not discretionary at the present time. Access to funds from this source is largely a function of lobbying power, which can be expensive. The bulk of the funds go to Washington State, Alaska, and New Jersey.

Participants discussed the sources and uses of funding. The consensus of participants was that fare box revenues typically do not offset operating costs. Urban systems typically require and receive a high level of public subsidy. In San Jose, only 13 cents of each dollar come from fare box revenues. The Bay Area Rapid Transit subway system was used as an example of other public transportation forms receiving significant subsidies. An analysis of transportation cost data suggests that in the San Francisco area, Berkeley ferry passengers could be given ten dollar bills upon boarding the ferry and still produce savings to the community of $10 per trip. New York Waterways received some $100 million for terminal upgrades from the federal government in addition to making use of the Title XI program for vessel financing.

The ability of a ferry or short haul cargo service to alleviate road congestion was discussed. On Interstate 95, driver time and cost spent waiting instead of moving is tangible. Truckers have been driving during peak periods rather than at night because road maintenance delays are more severe during off-peak periods. Lanes and even directions close for protracted periods.

Under the Congestion Mitigation and Air Quality ("CMAQ") program, the Federal Highway program gives block grants to the states to develop a comprehensive program. Use of these funds by the states for ferry operations is permissible but garnering them is highly politicized. The philosophical bias among many is for "moving cars" rather than "moving people" which may hurt ferry operations in their bid for these funds. Another

problem in obtaining CMAQ funds is the perception that the impact of removing a given number of vehicles from the roadway is insufficient to warrant the outlay. For example, in Stamford, CT – an extreme nonattainment area qualifying for $5 million in CMAQ funds – a service proposing to remove a significant number of sea containers (trucks) from Interstate 95 was thought to have an insufficient impact on the level of traffic to warrant funding through the program. Similarly, ferry operations may compete with other pet projects in a given jurisdiction. For example, establishing ferry service on the Potomac was thought by some Virginia officials to pose a threat to the success of the Virginia Rail Express, a regional commuter service which, at the time of application for funding by the ferry service, was struggling with low ridership and its own funding concerns. A ferry service's perceived competition with other funding objectives, such as carpool lanes, may cause similar concerns among state or local officials.

Sometimes funds made available for one purpose actually are used for other purposes. For example, it was noted that although TEA 21 funding is for capital rather than operations, it still amounts to an operating subsidy because it lowers the monetary requirements of the operator. Similarly, Washington State Ferries has used terminal money for renovations because of limits on funding for renovations.

Participants speculated that security costs (for example, providing marshals) will rise after 9-11, but that ferry transit was probably less susceptible to terrorist attacks than other forms of mass transportation.

In establishing new operations, one financial challenge is to find sufficient working capital to cover the start-up period. Ridership or cargo will probably take some time to reach expected levels, yet most of the ongoing costs of operation cannot be avoided while the operation phases in. A related problem is adequately sizing the service to accommodate all projected traffic. Turning passengers away is, in many senses, as detrimental to the success of the operation as running vessels empty, yet market size is difficult to project with accuracy. Models for predicting regional traffic flow which are designed to model traffic pattern changes associated with changes in route capacity never seem to include ferries as part of the transportation infrastructure. Sometimes a potential operator can access the relevant public sector model and modify it to project changing traffic patterns associated with the new service. Most often this would be at the operator's expense. One good source of information for traffic planning and management is the Victoria (British Columbia) Transportation Policy Institute (http://www.vtpi.org/).

ISSUE AREA 2 – MODE CHOICES AND INTERMODALISM

The second issue area, modal choices and intermodalism, looked at service-related factors influencing the success of an operation, the conduct of market studies to project demand and service parameters, and a variety of factors influencing shore side and water side economics.

Participants seemed to agree that in providing a level of service, reliability of the service was more important than trip time. When commuters are able to predict their commuting times with reasonable certainty, they are able to meet their professional obligations. In the case of the Staten Island ferry, the ferry and subway combination is very reliable. Even automobile commuters in congested traffic areas such as Washington, DC, are able to predict to within a matter of minutes how long their daily commute will be and when they will arrive at their destination. The fact that the length of the commute is atrocious apparently is of lesser importance.

In this same vein, participants expressed the opinion that it is important to provide a seamless transportation service. Participants stated that relying on public transportation links to move passengers to their destinations may not provide an adequate level of service. Dedicated shuttle bus services bundled into the ferry's ticket price are in many cases superior to relying on public bus services. Once again, reliability and predictability were believed to matter more than ticket price to the consumer.

In looking at markets, it is useful to conduct post mortems of failed services. New York fast ferry which offered a service from Staten Island to midtown for $10 per day was competing with the Staten Island ferry which ran for free. Further, the terminal location became important. The terminal was at 33d St. instead of the Battery, making the land side commute of the target market inefficient.

In cargo operations, the land side operating costs, not the water side costs, are problematic. The International Longshoremen Association ("ILA") charges $100 or $150 per lift. In employing a feeder service, multiple lifts are required and ILA work rules will result in the assessment of $350 per container. This affects the choice of a roll-on roll-off service over a lift-on lift-off service. In comparison, water side costs for a 60 container feeder barge would average less than $1 per mile.

Market studies for cargo services will very likely include analysis of the inland distribution network for the ports affected by the service. In studying the Port of New York and New Jersey, analysis showed that the port serves a 13 state network. Strategies for serving different portions of the network were different. Service to some markets is by double stack rail. Others would be best served by truck, still others by feeder barge.

Some participants opined that too much money is spent on studies and not enough on implementation. Studies are enormously expensive. Sometimes the same study is performed repeatedly or the same market is subjected to multiple studies. Although it would be imprudent to implement a service without any study at all, it might be in the best interest of the taxpayer to go forward to assess the results of a trial service based on much less comprehensive studies.

Participants discussed the new strategy of the Alaska Marine Highway System ("AMHS") to move from a slow speed ferry service to a high speed car ferries. Two routes will be using the four new ferries on order. AMHS expects to lower operating costs on these routes by raising throughput, dispensing with elaborate facilities and

providing fewer on-board services, thereby lowering the need for dining crews, hotel staff and the like. The structural fire protection needed for vessels providing overnight accommodations was also a cost-related factor.

Participants spent some time focusing on the proposed Potomac Riverjet project as a case study illustrating financing, market analysis and service considerations. Potomac Riverjet is a proposed service to operate along the Potomac River, serving the metropolitan area of Washington, DC. Potomac Riverjet saw three potential complementary markets: a commuter market focused around the peak rush hours; an inter-base water taxi loop service to operate mid day; and a special events service.

Potomac Riverjet identified four routes for potential commuter service. During the start-up phase, the service would be focused on only two of the routes. The project believed that it was more important to offer a frequent service at a particular location than to spread its ferries out among different routes. Speed factored in principally with regard to the number of runs that could be accommodated during the rush hour period by the available vessels in service. Using faster vessels, the service would be able to offer one more run than it could if slower vessels were in use. The rush hour in Washington is somewhat different than in other cities. It starts early and ends later than in most locations. Nonetheless, the number of runs that could be scheduled during a rush hour period was quite restricted given the trip length and number of vessels that would be in service.

Other revenue sources to supplement the commuter service would be a military shuttle or water taxi running during business hours between specific military base locations, and a tourist excursion venture. The water taxi service was based on the fact that distances between many local military installations are quite small over the water, road distances being much greater, particularly when congestion delays are considered.

The tourist excursion arrangement would be made with Spirit Cruises, the largest local cruise operator. The idea was to use the ferries in off periods to accommodate smaller groups than would be economical to place on Spirit Cruises' larger excursion boats boats. One potential drawback mentioned by participants is that the excursion service could face resistance or opposition from other local cruise operators which might lose business as a result. Existing tour operators could seek a "special public favor" to block the new service.

At the outset, Potomac Riverjet investigated a large number of high speed craft, focusing on proven designs. As the project progressed, speed was traded for other considerations such that the preferred craft was a somewhat slower, long non-planing hull which would operate between 28 and 30 knots. One significant concern limiting vessel speed was wake wash. Other concerns specific to the Potomac included debris, pleasure boats, and occasional ice. Speed was also sacrificed in favor of providing seamless transport with a minimal number of mode changes. Project personnel reasoned that saving 10 minutes in the water leg of the commute was meaningless if the overall trip time was increased by having to shuttle to an off-site parking lot, wait for a city bus, or wait for the subway.

The two biggest issues for Potomac Riverjet were financing and site acquisition. Many jurisdictions and agencies had jurisdiction respecting the proposed service routes and terminal sites including the governments of Virginia, Maryland and the District of Columbia, private land owners and communities, the National Park Service, the Pentagon, the Department of Transportation, and the Navy. In the case of the Navy, it took Potomac Riverjet 4 years to obtain permission for a service to the Washington Navy Yard, a period spanning the tenure of two officers in decisionmaking authority for the site.

Terminal financing was a complicated matter for Potomac Riverjet. In some cases, existing terminals were in place. The military controlled proposed terminal sites at the Pentagon and Washington Navy Yard, and landing at Georgetown Harbor was controlled by the National Park Service. The military typically could not lease a terminal to Potomac Riverjet, but deals were worked out whereby Potomac Riverjet would effect certain site improvements in lieu of lease payments. Cost for these government-controlled facilities was principally the time and the legal cost of obtaining landing permits.

In Virginia, terminals were to be located on private sites. One consideration was the ability to have parking at the terminal itself rather than an off-site location which would require shuttle bus service. Every link in the commuting chain adds time and reduces the potential market for the service. Potomac Riverjet encountered community opposition in some potential locations based on the increase of traffic on community streets, particularly during periods when school children would be walking along the streets or waiting for buses. Additional traffic through the communities was opposed as a safety issue rather than a nuisance issue. Potomac Riverjet concluded that satellite parking lots were inevitable.

Terminal selection was limited by the desire to avoid need for filing an Environmental Impact Statement ("EIS"), a lengthy and uncertain process. Changes in commuting patterns and road traffic could trigger an EIS. No new piers could be built because this would trigger an EIS. Curiously, new piles could be driven in existing piers without triggering an EIS, yet shore side structures having the potential to cast shadows onto the water had to be avoided because those would trigger an EIS.

The timing of a service may be better now than it was several years ago when Potomac Riverjet was active. For example, the Navy Yard now has huge transportation issues that could be mitigated somewhat by a water taxi service. Security for a water based operation would occur at the pier, which is well away from the buildings on the base. In contrast, security at the gates is quite close to the buildings. In the morning, persons seeking entry on the base typically face a 1.5 mile back up at the gates – clearing security takes about 20 minutes. Bases in other areas of the country may benefit from water-taxi services as well. Transit options between Hampton Virginia and the Naval Base was cite as an example.

The mid-day issue is an important one for commuters. Off-hours access may be an essential component of service for some riders. In event of an emergency at home, for instance, a rider may have to return home immediately and cannot wait for the afternoon commuter service to restart. This may cause some riders to use the service in the first place. Participants discussed providing other options for rides back, by van or bus, which would be cheaper for the operator than running an empty boat through mid-day.

A significant operational cost is associated with adopting the International Maritime Organization ("IMO") High Speed Craft Code. Certification by a classification society to that code, the additional operating costs, and the costs of training are very expensive. Participants speculated that this factored into the failure of the Pequot ferry operation. Other factors probably included the terminal location. The service was unable to get landing rights in the location on the lower East side where it wanted to establish a terminal. The mechanism for blocking the service was through the requirement to obtain a business license. One participant asked why the High Speed Craft Code was being used in Alaska when there is no strict requirement to do so. Apparently the High Speed Craft Code acts as a Safety of Life at Sea equivalent because the Alaska vessels must operate so far offshore. In considering purchasing ferries second hand, having the construction to IMO standards is an indication of the soundness of the vessel.

The use of union labor was discussed. Unionized labor rarely figures in to the decision of whether to implement a service or not. Operators may benefit because unions will handle recruitment and training functions which otherwise would be at the operator's expense. On the downside, union work rules and union pressure may affect the number of crew used: for example, are two licensed persons needed in the wheel house? Most companies used licensed crew by choice. But there are issues respecting deck hands on the boats and parking lot attendants.

In developing support for ferry transportation, political support may be garnered in unlikely places. In San Francisco Bay, ferries attracted support from dog owners, senior citizens, bicyclists, and disabled persons, all of whom were important politically. Favorable political pressure from these groups went far in offsetting opposition to the project by environmental groups.

ISSUE AREA 3 OPERATIONS AND ENVIRONMENTAL

In the operations and environmental issue area, participants considered a wide variety of issues including manning, use of alternative fuels, applicability of the Americans with Disabilities Act ("ADA"), and environmental wake wash.

There is no uniform national manning standard for small passenger vessels such as ferries. It is advisable to talk to the OCMI up front to avoid any surprises. Many of the uncertainties in manning rules for ferries have their origins in the way ferry services developed. Manning rules were developed using a "bottom up" approach (essentially okaying what operators were already doing) rather than a "top down" approach as was done with deep draft vessels. Most ferry operations were family-run businesses

historically and the rule flexibility reflects those origins. Indeed, prior to 1958, there were no manning rules to speak of for ferries.

Regulations for high speed craft are under development in conjunction with a working group of the Passenger Vessel Association. The referenced manning matrix is more of a "challenge" matrix." Manning is a function of bridge layout, route, and environmental factors such as weather. On the graphic, the number of decks required for a certain number of passengers is flexible depending on the actual configuration of the vessel. The manning used may depend on the number of passengers being carried at the time and where they are disbursed throughout the vessel. For example, depending on the configuration of the vessel, an operator may be able to close off certain areas if the passenger count is sufficiently low and reduce manning accordingly.

In studying the San Francisco Bay, analysis showed that maneuvering and tie ups can be fairly slow and the service can still compete favorably with BART. Terminal delays are more important than vessel speed in terms of their effect on trip time. Moreover, reducing terminal time is much cheaper than adding additional speed to the service. Doing a least squares fit to the cost of speed, increasing speed requires both adding horsepower ("HP") and added costs per horsepower, such that the cost per horsepower as speed increases is a quadratic function:

$$\text{Cost} = 5{,}500 + 45 * \text{HP} + 0.05\ \text{HP}^2 + 0.000005\ \text{HP}^3$$

This is only a rough approximation, since at any given horsepower rating there can be a two to one spread in price. Much of this variation can be explained by observing that a given power level can be achieved by either using the most powerful rating of a small (hence cheaper) basic block or the least powerful rating of a large (hence more expensive) basic block.

In considering the advisability of using alternate fuels, environmentalists should consider the entire product life cycle in performing an environmental analysis. Alternative fuels derived from agricultural products such as soybeans may produce pollutants as a side effect of the activities of growing, harvesting and processing. Runoff of fertilizers and soils may pollute water. Processing may release pollutants into the air, water, or ground. Use of fuel cells or solar power may involve heavy metals and solvents as a by-product of the manufacturing process. Ascertaining pollution effects of alternative fuels is a complex matter. However, some of the special aspects of ferry operations, such as short required ranges may allow ferries to be a demonstration ground for a wide variety of innovative alternatives.

The Americans with Disabilities Act was passed in 1990. Since that time, requirements for land side structures such as terminals have become very mature. The regulations for vessels, however, remain quite immature – the language "remove barriers to the extent readily achievable" being a fuzzy standard in the marine context. For instance, a vessel having two decks with different classes of service may be expected to provide access for disabled persons to both decks. This becomes very difficult on small passenger vessels

such as ferries where installation of elevators or ramps is not. For example, a ferry having an 8-foot height between decks would need to install a 96-foot ramp to provide access to a second deck. Access thus becomes a significant design issue. There is no comparable Safety of Life at Sea ("SOLAS") standard. Access issues are being addressed on cruise ships – foreign cruise ships are obligated to comply with ADA if they operate in U.S. waters – but in many ways the solutions are easier on those larger ships.

Participants considered wake wash both generally and in the context of a specific case study: Rich Passage transit for Washington State Ferries. With respect to the latter, the wake wash originally considered acceptable in design of the high speed vessels was established based on the energy level of the wash produced by a conventional roll on – roll off ferry on the same route. Shortly after the high speed vessel began operations, land owners sued and obtained a temporary injunction limiting the speed of the vessels to 11 knots through the passage. The lawsuit was based on property damage to the shoreline and bulkheads. The injunction was later lifted and the state settled the suit out of court. As part of the settlement, however, vessel speed will be limited to 11 knots. The San Francisco Water Transit Authority is now looking at wake based on the experience of Rich Passage.

The wash characteristics of different vessel designs are different and have differing impacts on the shoreline based on the route chosen and local bathymetry. Prior focus has been on wave height, but as height is reduced, longer period low height wakes are produced which can scour beaches. Furthermore, a combination of wave length and angle of incidence can create unsuitable periodicity in the waves.

One difficulty with regard to wake wash and property damage is ascertaining what damage has been caused by the vessel or vessels in question and what has been caused by other boats, weather and other factors. Sorting the effects out is difficult. It has been recommended that, before instituting a high speed service, the operator conduct a survey of existing shoreline conditions. This could prove useful if a dispute arises later.

While focus in the United States has largely been on the environmental impact of wake wash, i.e., property damage, concerns abroad have largely arisen from safety considerations. In Denmark's beaches on the North Sea, breakers caused by high speed ferries were knocking people down. Waves from high speed ferries were swamping small vessels. Part of the concern arises from the characteristically different nature of the waves from high speed craft. The vessel is essentially gone before the waves arrive, surprising people. In Scandinavia, a standard was established for breaking wave height. The typical fixes are to move routes further offshore or adjust speed. New Zealand has adopted a standard similar to Denmark's, focusing on route alteration and speed restrictions.

PIANC has established a working group considering the management of wake wash. The group intends to provide regulators and policy makers "good practice" guidelines with regard to wake wash. A draft document is scheduled to be completed this month, and to become available by year end. The group is focusing on providing a methodology to use

for evaluation and mitigation of wake wash. PIANC does not establish a performance standard – it recommends a process.

Participants next considered the question of which entities should govern the regulation of wake wash. Regulations for large vessels are established by 33 CFR 164, based on standards of negligence and hazard. These regulations are based on safety considerations rather than environmental concerns. Regulation of wake wash in displacement hull vessels is proportionate to speed and vessel size, whereas sometimes faster is better in considering the wake characteristics produced by non-displacement hull forms. The Coast Guard wants to address the impediment, not to regulate. Of course, speed zones and wake zones are set by 33 CFR 165. Since passage of the Ports and Waterways Safety Act, the Coast Guard is empowered to regulate the safety of operations. It is possible that the Coast Guard could become involved in the guise of environmental protection, but shoreline damage is not pollution per se. The Coast Guard would clearly have jurisdiction if safety were at issue, but environmental damage is less clear.

Other governmental entities have a role in the wake wash issue. The Army Corps of Engineers has responsibility for maintaining the waterways and controlling erosion is within their jurisdictional mandate. The National Oceanic and Atmospheric Administration's office of Coastal Zone Management and the states' Coastal Zone Management Acts suggest governance by the states as a matter of controlling erosion to shorelines and in waterfront areas. Local governments establish no wake zones that also play a role.

In the case of Potomac Riverjet, a variety of jurisdictions set criteria affecting wake wash including Alexandria, the District of Columbia Mayor's Office (concerns about safety of pleasure boaters due to speed rather than wake per se) and Occoquan (environmental concerns). It is clear that safety and environmental standards are very site specific, related to speed, wave characteristics including both height and length of period, and local conditions including water depth and bathymetry. Simply stated, there is no "safe harbor" for designers or operators of high speed marine vehicles.

SPEAKERS (IN ORDER OF PRESENTATION)

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