Overview of Flexible Transit Services

Roughly 50 transit agencies around the country operate some form of "flexible" services, which are usually defined as those that (1) are more demand-responsive than conventional fixed-route, fixed-stop services, but (2) do not provide the kind of door-to-door service associated with taxis and paratransit.[1] These services are often well-suited to rural and suburban areas where lower population density, dispersed origin-destination patterns, and/or pedestrian-unfriendly street layouts make conventional bus services less effective. In each case, the transit agency has taken account of local factors to create services that balance passenger needs, operational requirements, and cost-effectiveness. The result is a number of different types of service, each with its own characteristics. Many are still evolving as the agencies gain more experience with these flexible services. Although the term "flexible transit" is often used as a catchall, there are several major recognized service types:

- **Route deviation**: The bus operates along a predefined route with a regular schedule, but can also deviate from the route to accommodate requests for "off-route" drop-offs or pick-ups. Typically, the number of deviations per run is limited and advance reservations are required. Some services allow deviations anywhere within the city limits or other defined zone, while others permit deviations only with a given distance of the route (often ¾ mile). The "flex" route on the outer portion of Cape Cod is an example of this service type.
- **Flexible-route segments**: As above, except the "flex" capability is in place only for limited portions of the route.
- **Demand-responsive connector**: The bus serves as a feeder to a conventional transit system (e.g. rail station). It accommodates service requests within its service area, but only going to or from this transfer point. There are no other defined stops. In a typical situation, the service is designed to connect a residential neighborhood with a nearby transit stop in situations where conventional service is not cost-effective or practical. The Cedar Mill shuttle in Portland, Oregon, is an example of this service concept. It connects a spread-out suburban community with a nearby light-rail station.
- **Point deviation**: The bus operates within a defined geographic zone and accommodates requests for service within the zone, while also making a limited number of fixed stops. However, there is no defined route between the stops.
- **Request stops**: The bus operates as a conventional service, but also stops at a certain number of predefined off-route locations upon request. A more common variant is "flag" or "hail" stops, where passengers can ask to be dropped off or picked up at any safe point along a fixed route.
- **Zone route**: The bus accommodates service requests along a corridor, but also has fixed arrival and departure times for each zone along the corridor.

[1] Most of the material in this brief is drawn from the federally sponsored Transit Cooperative Research Program (particularly Koffman, D., *Operational Experiences with Flexible Transit Services*, TCRP Synthesis of Practice No. 53, Washington, D.C.: Transportation Research Board, 2004) and the Volpe Center's experience with the Cape Cod "flex" bus route.

Of these, *route deviation* and *demand-responsive connector* services are the most common approaches in North America. TCRP identified the following major findings from experience to date with flexible transit:

- Most services limit the number and length of deviations in order to maintain operational efficiency. About a third of the agencies also impose a fare surcharge (often around $1) on non-disabled riders who request an off-route stop, both to recoup the associated costs and to encourage able-bodied riders to use the designated stops.
- Initially, most agencies required reservations for pickup requests to be made at least one day in advance, but increasingly are able to reduce this time window. For example, the OmniLink service in suburban Virginia accepts reservations up to 2 hours before the scheduled time, as does the Cape Cod Flex. Most requests are made through a dispatcher, though a small number of agencies use communication directly to the bus driver.
- There are some examples of flexible transit service (when operated over the full geographic service area) being able to significantly reduce the expense associated with conventional paratransit. OmniLink, for example, operates without any separate paratransit service because of its ¾-mile route deviation with accessible vehicles. More commonly, however, paratransit continues to operate, with varying degrees of coordination with the flexible transit (e.g. shared dispatching and vehicles). The Cape Cod RTA continues to run its Capewide "b-bus" door-to-door service.
- Flexible services are most typically run on infrequent schedules, with headways of 1 hour or more, though transit station connectors can be more frequent. The Cape Cod flex service runs every 60 minutes during July and August and approximately every 2 hours during the shoulder seasons. Passenger volumes are also generally low, though this is a reflection more of the characteristics of the service area (e.g. low density) than of the flexible service.
- Vans and smaller buses are most commonly used for flexible services due to their lower passenger loads and the need to navigate neighborhood streets. At the larger end, the Cape Cod Flex and OmniLink both use 29- to 30-foot buses.
- Flexible systems benefit greatly both from technology (Automatic Vehicle Location / Computer Assisted Dispatching) and from additional operator training on passenger communication. However, many smaller, rural systems use more informal systems that are not as technology-intensive.
- Flexible services have an element of complexity that can make them hard to describe in promotional materials and difficult to explain to prospective riders.
- Flexible services can be used to gauge demand for transit in areas that have been more automobile-oriented. In many cases, agencies have switched over to fixed-route service once demand grows to a level that is better served by conventional service. While flexible service opens the door to additional ridership by those who cannot use conventional services, it also imposes extra travel time that makes the service less attractive compared to driving. Portland's Cedar Mill shuttle sometimes has to decline pick-up requests not because the vehicle is full, but because the additional travel time needed to reach that rider would create excessive delays for the other passengers already onboard.

Some points to consider for the East End:

- Most flexible services in other parts of the U.S. are not coordinated with fixed railroad schedules. The buffer time that must be built into the bus schedule for potential route deviations makes it operationally difficult to ensure highly coordinated RR transfers. Portland's Cedar Mill shuttle connects to a light rail system, but the bus runs only during peak periods, and connections are ensured by the fact that rail service operates every 5-15 minutes during those periods.
- The proposed bus routes for the coordinated rail-bus network are largely RR station feeder services, though some link multiple modes and activity centers (e.g. Orient Point to Greenport via hospital). It is worth considering whether the "route deviation" model or the "demand-responsive connector" model is more appropriate for each of these routes, or whether conventional fixed service might be able to offer better travel times and service levels.
- The East End has a number of paratransit services (SCAT and Town-sponsored services, plus those of various nonprofit groups) and in combination, their service areas exceed the statutory minimum under ADA. Service expectations are also generally higher in the East End than in other rural areas in the U.S. The nature of the rail-bus network concept is such that one or more rail-bus transfers may be needed for typical trips, which may limit its ability to serve the paratransit market effectively.

Conceptual Options for the Bus Components of the Rail-Bus Network:

- Fixed-route, fixed-stop service
- Fixed-route, fixed-stop service that can also be hailed at any safe point along the route
- Fixed-route, fixed-stop service, with a few predefined request/flag stops that are not far from the route (e.g. supermarket or senior housing that is two blocks from main road)
- "Flex" bus routes with ¾-mile (or other) deviation band
- Station shuttles that operate to and from the RR stations and will take customers anywhere within a defined radius / service zone