Chapter IX

CHAPTER IX

Service Alternatives

INTRODUCTION

The basis for any transit plan is the careful consideration of realistic transit service alternatives. Capital requirements, financial plans, and management options can then be developed to support the planned transit services. Each transit service alternative must be evaluated using the locally-established goals and objectives. Only the alternatives that support the mission statement of public transportation and the corresponding goals and objectives should be considered for implementation. In order to evaluate the alternatives, a review of the different types of transit services needs to be conducted. The following sections detail the different types of transit services that could be implemented in the study area.

TYPES OF TRANSIT SERVICE

The term "transit service" encompasses a wide range of alternatives. Traditionally, people think of transit service as buses operating on a strict schedule. A number of other transit service alternatives exist, such as demand-response service and commuter transportation.

Fixed-Route Service

Fixed-route transit service fits the popular description of a bus system, with transit vehicles operating on specified routes and following set schedules. Specific transit stops are typically identified for locations where passengers will be picked up and dropped off. Routes are usually laid out in either a radial or grid pattern.

Fixed-Route Service

Radial Route Structure

In a radial route structure, all of the routes originate from a common point and extend to outlying areas. The central location serves as a transfer point and is frequently located at a destination with high transit activity. In many communities, this is the central business district or downtown area.

Grid Route Structure

In a grid route structure, all of the routes function along a two-way direction (either north/south or east/west). The routes are normally spaced at equal distances if the roadway structure permits. This structure has no center transfer location. The transfers are conducted at the intersections of the routes. This type of service is mainly used in urban areas where the population density is greater and equally distributed across the area.

Suburban Service Route Structure

In suburban areas, fixed-route service may be provided between major communities with connections to local services that operate within the communities. In many urban and suburban areas, this type of service will be either express or limited express routes. In rural areas, commuter service will be used to link rural communities together or link rural areas with urban areas.

Summary

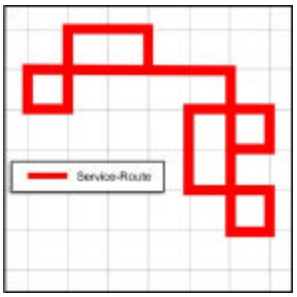
Fixed-route service is particularly convenient for passengers without disabilities. Research has shown that fixed-route passengers are willing to walk up to one-quarter mile to reach the bus stop. Therefore, a fixed-route service pattern may be efficiently laid out with the routes having one-half mile spacing. However, those individuals with mobility impairments may have difficulty in accessing the fixed-route system.

The advantages of fixed-route service are that it can be provided at a relatively low cost on a per-passenger-trip basis, schedule reliability is high since the buses do not deviate from their routes, service does not require advance reservations, and service is easy to understand.

Fixed-route transit service is seldom attractive for people with automobiles in smaller communities and rural areas. A private automobile offers flexibility compared to the rigid schedule of a fixed-route system. The need to walk even a few hundred feet to a transit stop, wait for a vehicle, and the comparatively slow travel time can discourage people from using a transit system. Where there are significant congestion issues or limited parking availability, fixed-route service becomes a more attractive alternative. The low cost of transit can also be attractive, as compared to owning and operating a private automobile, especially for working couples who may be able to use the bus rather than own two vehicles.

However, fixed-route operations lack the flexibility to meet the needs of passengers with any special requirements in low density areas. The Americans with Disabilities Act (ADA) requires that communities with fixed-route transit service also provide complementary paratransit service that operates, at a minimum, in a three-quarter mile radius from each fixed route. Paratransit service is typically much more costly to operate than fixed-route service because of the characteristics of the service. Fixed routes are established to meet the highest demand travel patterns, while paratransit service must serve many origins and destinations in a dispersed pattern.

Service Routes



Service Route

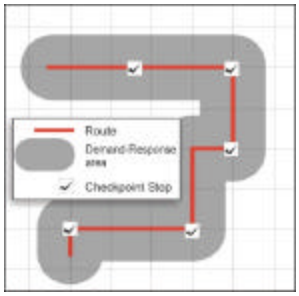
One concept which is being implemented in some communities as an alternative to traditional fixed-route or demand-response service is the service route. A service route is essentially a fixed route specifically designed to serve the elderly and disabled. Typically, a service route winds through residential neighborhoods that have high concentrations of elderly and disabled persons in a pattern that passes within a block or two of all houses. It also directly serves important destinations, such as senior centers and commercial areas. The service provides a higher in-vehicle travel time and a longer wait for the bus than would normally be acceptable to the general public. The Bus (operating in Butte, Montana) and MET (in Billings, Montana) provide successful service routes to their local residents.

Flexible-Route Service

Another alternative is flexible routes such as route deviation, flex routes, or checkpoint service. With flexible routes, vehicle dispatching and scheduling must be done carefully to ensure that vehicles are available to serve the designated stops at the scheduled times. To provide a reasonable amount of flexibility, a lenient definition of on-time performance is typically used. A reasonable policy for flexible-route service is a 10- to 15-minute window at each designated stop. Flexible-route service is used to expand the potential service area and is commonly used in low density areas. The following sections detail the different types of flexible-route service that are commonly used.

Route Deviation

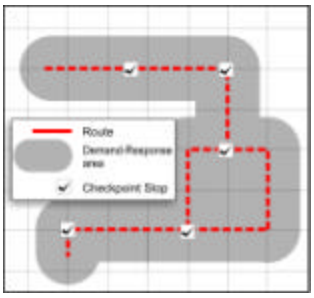
With route deviation, transit vehicles follow a specific route, but leave the route to serve demand-response origins and destinations. The vehicles are required to return to the designated route within one block of the point of deviation to ensure that all of the intersections along the route are served. The passengers on the bus may have a longer travel time than for fixed-route service and the service reliability is lower. However, the ADA-mandated complementary paratransit service is not necessary since the bus can deviate from the route to pick up disabled passengers. Passengers who need the bus to deviate are required to make an advance reservation with the transit service up to 24 hours ahead of time. Advance reservations are needed so that the vehicles can be scheduled for pick up and drop off along the scheduled run.



Route Deviation

Flex Route

Flex route is very similar to deviation service in that the transit vehicle follows a specific route, but leaves the route to serve demand-response origins and destinations. The difference is that in the flex-route service, the vehicle must only return to the route before the next transit stop. The distance between transit stops deter-

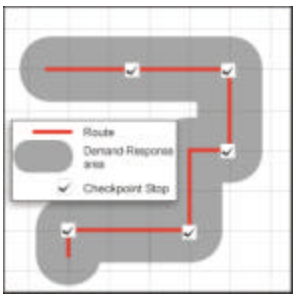


Flex-Route Service

mines the size of the deviation that the vehicle can make. For flex-route service, the demand-response rider must make advance reservations. The ADA-mandated complementary paratransit service is not necessary since the bus can deviate from the route to pick up disabled passengers.

Checkpoint Service

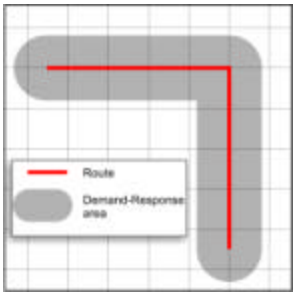
Under checkpoint service, vehicles make periodic scheduled stops at centers of activity (such as program sites, shopping areas, or residential communities). The specific routes are not established between checkpoints, thereby allowing the vehicles to provide demand-response service and alleviate the need for the ADA-complementary paratransit service. Riders are picked up at the checkpoints, typically at a reduced fare, and are taken either to another checkpoint or to a demand-response specific destination. Service between the checkpoints does not require advance reservations. However, service from any other location on a demand-response basis requires advance reservations so that the vehicles can be scheduled for pick up and drop off. Checkpoint service offers an advantage over route deviation because there is no specified route for the vehicles. Checkpoint service requires only that the vehicle arrive at the next checkpoint within the designated time window.



Checkpoint Service

Demand-Response Service

Demand-response service, frequently termed dial-a-ride, is characterized as curb-to-curb transit service scheduled by a dispatcher. With demand-response service, advance reservations are typically required although some immediate requests may be filled if time permits and if the service is particularly needed.



Demand-Response Service

The concept of demand-response service was originally developed in the early 1970s as an alternate form of public transportation for the general public. The original efforts proved to be more expensive than envisioned and did not attract the ridership that was forecast. As a result, demand-response service has been used in the

United States almost exclusively for elderly and disabled passengers. However, many communities are beginning to recognize the advantages of demand-response service for low-density areas with low levels of transit demand. Improved technology has led to improvements in dispatching and scheduling, which has increased the efficiency of demand-response service and allows for real-time dispatching.

TRANSIT ALTERNATIVES

Base Assumptions

In our analysis of 2006 RTS transit data, the Planning Team observed that the transit system had an inordinate amount of non-revenue driver hours (4,501 hours) and very high administrative costs ($191,436 for administrative salaries, wages, and benefits and $89,346 for office expenses for a two-employee administrative staff). Since the high non-revenue hours cause inefficiencies of the existing service, LSC has estimated a new cost per revenue-hour based on the existing service operating at full capacity. Based on information from Chapter III, there was a total of 5,899 revenue-hours. With five full-time drivers, this equates to about 1,180 revenue-hours per driver. Each driver should have at least 2,000 revenue-hours per year. If the RTS system was operating at full capacity, the total number of revenue-hours should be approximately 10,000. This would equate to $41.80 per revenue-hour. To make the fixed cost more attuned to a transit system the size of RTS, the Planning Team assigned the dollar amount of the fixed cost ($280,000) from the RTS 2006 budget to each alternative rather than assigning the fixed cost factor of 1.50 that was developed in the cost allocation model. If we had used the 1.50 cost factor, each alternative would have been $200,000 to $300,000 higher than what is shown in this chapter.

Since the City of Ridgecrest has never operated a fixed-route service, LSC assumed the trip rate for the fixed-route model based on the calibrated model for Butte, Montana which has fixed-route operations. The size of the population of Butte, Montana is similar to the population of the Ridgecrest study area. LSC used a trip rate of .20 for households with no vehicles and .02 for households with one vehicle.

In order to estimate the number of trips needed for the complementary paratransit service, the LSC Planning Team developed a paratransit model presented in Table IX-1. This model estimates the number of disabled individuals that could request demand-response/paratransit services. Based on the Certified Population Annual Trips (low range), LSC used 39 daily trips less the trips from the calibrated TCRP model in Chapter V for the demand-response service areas defined in each alternative to determine the daily paratransit trips in the fixed-route/flex-route service areas. For Alternative II, LSC used 31 daily trips, 24 daily trips for Alternative III, and for Alternative IV the amount used was 26 daily trips. Along with this analysis, the LSC team included the daily trip demand from Chapter V from the TCRP model for the areas that would have demand-response service/rural demand-response service.

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Table IX-1

2006 Estimated Paratransit Demand - Ridgecrest

Census Tract	Census Block Group	Total 2006 Population	% of Mobility Limited Population 2005 Est.	Mobility-Limited Population	ADA Eligibility Factor	Estimate of ADA Eligible Population	Certification Factor	Estimate of Certified Population	Trip Rates [1] per Eligible Person Per Month		Eligible Population Annual Trips		Certified Population Annual Trips	
									Low	High	Low	High	Low	High
53	1	729	0.00%	0	60.00%	0	0.2825	0	1.61	4.40	0	0	0	0
53	2	0	0.00%	0	60.00%	0	0.2825	0	1.61	4.40	0	0	0	0
53	3	1,159	5.23%	61	60.00%	36	0.2825	17	1.61	4.40	703	1,921	331	904
54.01	1	727	7.02%	51	60.00%	31	0.2825	14	1.61	4.40	592	1,618	279	762
54.01	2	1,551	4.80%	74	60.00%	45	0.2825	21	1.61	4.40	863	2,359	406	1,111
54.01	3	902	1.18%	11	60.00%	6	0.2825	3	1.61	4.40	123	337	58	159
54.01	4	1,445	1.33%	19	60.00%	11	0.2825	5	1.61	4.40	222	607	105	286
54.01	5	1,216	11.46%	139	60.00%	84	0.2825	39	1.61	4.40	1,615	4,414	761	2,078
54.02	1	1,577	4.32%	68	60.00%	41	0.2825	19	1.61	4.40	789	2,157	372	1,015
54.02	2	1,754	4.18%	73	60.00%	44	0.2825	21	1.61	4.40	851	2,325	401	1,095
54.02	3	1,850	4.20%	78	60.00%	47	0.2825	22	1.61	4.40	900	2,460	424	1,158
54.03	1	1,522	9.99%	152	60.00%	91	0.2825	43	1.61	4.40	1,763	4,819	830	2,269
54.03	2	2,369	5.25%	124	60.00%	75	0.2825	35	1.61	4.40	1,443	3,943	679	1,856
54.03	3	998	4.16%	41	60.00%	25	0.2825	12	1.61	4.40	481	1,314	226	619
54.03	4	1,323	4.58%	61	60.00%	36	0.2825	17	1.61	4.40	703	1,921	331	904
54.03	5	992	9.43%	94	60.00%	56	0.2825	26	1.61	4.40	1,085	2,965	511	1,396
54.04	1	1,325	3.77%	50	60.00%	30	0.2825	14	1.61	4.40	580	1,584	273	746
54.04	2	2,565	5.93%	152	60.00%	91	0.2825	43	1.61	4.40	1,763	4,819	830	2,269
54.04	3	2,483	4.75%	118	60.00%	71	0.2825	33	1.61	4.40	1,369	3,741	644	1,761
54.04	4	711	9.27%	66	60.00%	40	0.2825	19	1.61	4.40	764	2,089	360	984
55.01	1	940	10.64%	100	60.00%	60	0.2825	28	1.61	4.40	1,159	3,168	546	1,491
55.01	2	1,882	1.13%	21	60.00%	13	0.2825	6	1.61	4.40	247	674	116	317
55.01	3	345	10.48%	36	60.00%	22	0.2825	10	1.61	4.40	419	1,146	197	539
55.01	4	1,045	8.45%	88	60.00%	53	0.2825	25	1.61	4.40	1,023	2,797	482	1,317
55.01	5	806	1.72%	14	60.00%	8	0.2825	4	1.61	4.40	160	438	75	206
55.01	6	946	5.62%	53	60.00%	32	0.2825	15	1.61	4.40	617	1,685	290	793
55.03	1	556	17.03%	95	60.00%	57	0.2825	27	1.61	4.40	1,097	2,999	517	1,412
Total		***33,718***	***0***	***1,840***		***1,104***		***520***			***21,332***	***58,298***	***10,044***	***27,449***
												Daily	**39**	**108**
												Annual Average		**18,746**

(1) Source: Survey of seven "exemplary" paratransit operators. Crain, et al. "Working Paper 6: Service Needs Analysis, San Francisco Bay Area Regional Paratransit Plan," Jan. 1990.

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Maintain Status Quo

A good starting point for the evaluation of service alternatives is the consideration of the status quo. The status quo alternative involves no change in the service that is provided by RTS. The status quo alternative is a viable option that may be appropriate when the current service meets the community's needs and satisfies the goals and objectives for public transportation services.

The existing demand-response service operates up to five vehicles per day. The annual cost is estimated at $840,000 for 5,900 total revenue-hours, which equates to an average revenue-hour cost of $142. The estimated total number of annual passengers is 33,000, equating to a $25 cost per passenger.

The number of trips served by RTS has continued to decrease over the past four years. This trip decrease has created a situation of increasing inefficiency. Demand-response service does not create an economy of scale. As the number of trips decrease, the overall cost remains the same but the performance of the system degrades. As demand-response vehicles operate fewer revenue-hours, they are seen less in the community. This creates a downward spiraling public relations situation.

Table IX-2 presents the level of service for the existing service. Table IX-2 shows that there is a very low level of service, with 33,400 annual trips. The largest single factor that could be expected to impact the City of Ridgecrest over the next 10-year planning period is population growth, which will result in an increase in the demand for transit service.

Based on the information in Chapter VII, the status quo alternative would not meet the needs, goals, and objectives of the community. Further, the status quo alternative may not aid RTS in the development of a secure funding source. The existing service is very expensive and inefficient when compared to other transit systems.

Table IX-2
Level of Service - Status Quo

Options		# of Veh.	Total Daily		Total Annual		Operating Days	Annual Ridership	Pass. per Hour	Operating Cost Annual	Cost per Passenger
			Vehicle-Miles	Vehicle-Hours	Vehicle-Miles	Vehicle-Hours					
Status Quo	6:00 am - 6:00 pm Mon.-Sat.	4	259	19	80,870	5,928	312	33,400	5.6	$840,739	**$25.17**

Note: Costs based on LSC analysis, 2007.

Alternative I: Checkpoint Service

Alternative I would alter the transit system from demand-response service to checkpoint and demand-response service. The checkpoint service of Alternative I would improve service to those areas of greatest transit demand within the existing budget. Checkpoint service is meant to increase the efficiency and effectiveness of the existing service with as little additional cost as possible. The objective of Alternative I is to improve the service by linking the major origins and destinations. Table IX-3 presents the details of Alternative I. Figure IX-1 presents the proposed route structure and demand-response service areas of Alternative I.

Alternative I would include two general public demand-response zones with one zone in the northern portion of the study area and one zone in the southern portion of the study area. Each of the zones would have one vehicle.

Alternative I would also include one checkpoint route serving the Cerro Coso College, two Albertsons stores, Wal-Mart, the Ridgecrest Medical Center, Kmart, and the community of Inyokern. The length of the route would be 17 miles one-way and 34 miles round-trip. Each of the checkpoints in the service would be served every two hours. Two vehicles would operate the checkpoint service. Between the times that the vehicles are at the checkpoints, the vehicles would operate standard demand-response service in the City of Ridgecrest.

The weekend service would operate two demand-response vehicles for eight hours per day, for a total of 16 revenue-hours per day. The estimated cost of the weekend service is $47,600. The estimated annual ridership for the weekend service is 3,800 passengers. This equates to a $12.37 cost per passenger.

Paratransit Service

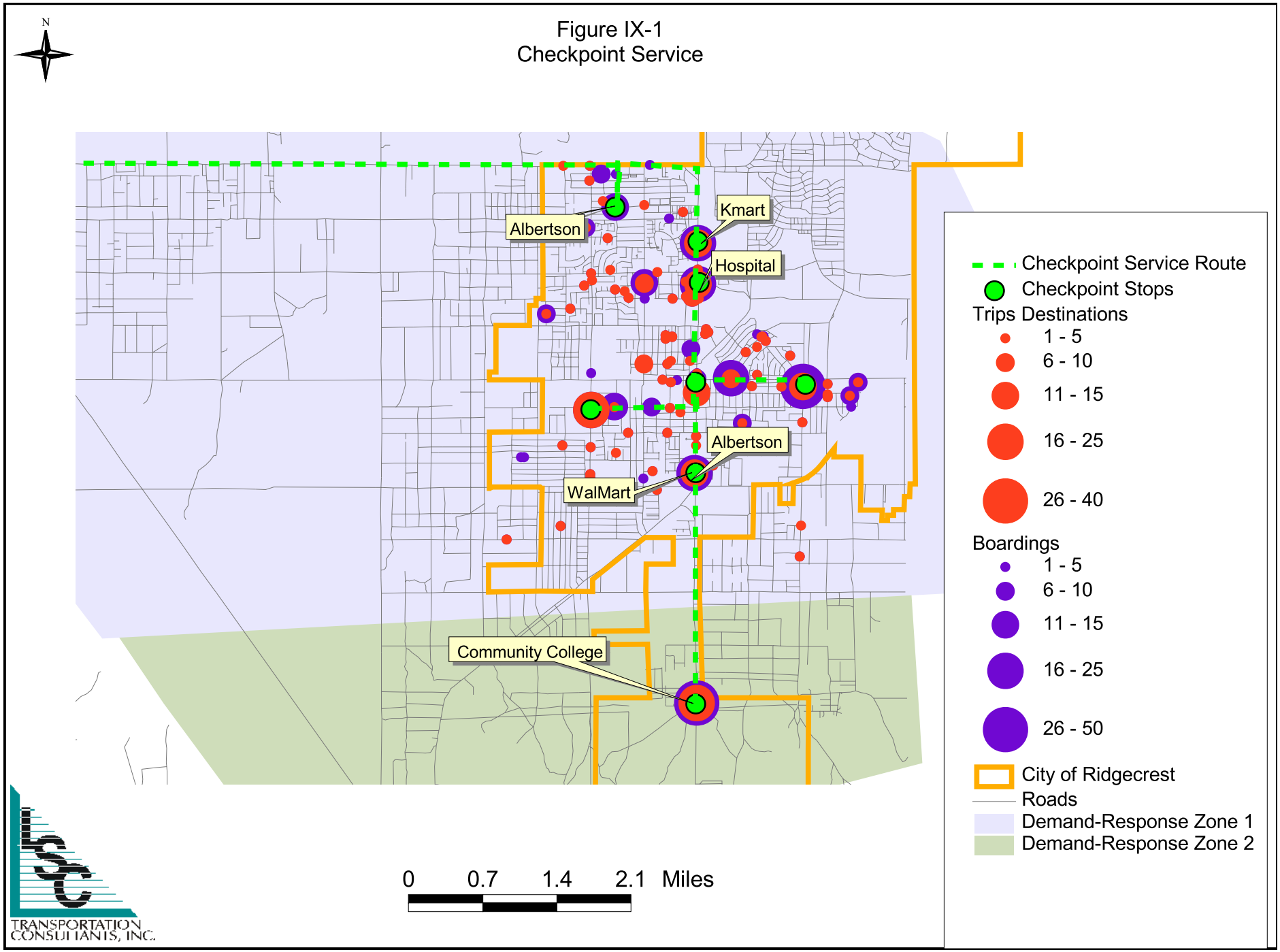
Since demand-response service is already included, there would be no need for additional paratransit service to cover the requirements of the Americans with Disabilities Act (ADA).

Table IX-3
Level of Service - Alternative I

Options		# of Veh.	Total Daily		Total Annual		Operating Days	Annual Ridership	Pass. per Hour	Operating Cost Annual	Cost per Passenger
			Vehicle-Miles	Vehicle-Hours	Vehicle-Miles	Vehicle-Hours					
Demand-Response Service	6:00 am - 6:00 pm M-F	4	672	48	171,360	12,240	255	70,990	5.8	$805,025	$11.34
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	144	16	7,488	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Average			**816**	**64**	**178,848**	**13,072**		**74,838**	**5.73**	**$1,133,332**	**$15.14**

Note: Costs based on LSC analysis, 2007.

Figure IX-1
Checkpoint Service



Level of Service and Evaluation

Table IX-3 presents the level of service used to evaluate Alternative I. There would be four vehicles operating 40 revenue-hours per day, for a total of 12,240 revenue-hours per year. This would be an increase of about 6,000 revenue-hours. The total vehicle-miles would increase to 178,800 from the existing 80,000 vehicle-miles. Based on the existing 5.7 trips per hour, Alternative I would increase the annual ridership to 74,800 passengers (including 3,800 weekend trips). The estimated ridership was based on the TCRP model presented in Chapter V.

The operational or variable costs for Alternative I would increase to $853,000. With the $280,800 fixed cost, the annual cost for Alternative I is estimated at $1.13 million. This equates to a $15.14 cost per passenger, which is a significant decrease from the present $25.17 cost per passenger. Note that Alternative I includes two vehicles to operate the weekend service. While Alternative I improves the productivity of the transit system, it does not match the estimated level of service and productivity of the other alternatives.

Capital Needs

The first infrastructure required to implement Alternative I would be the installation of transit stops at the 10 estimated checkpoints. Each stop would need to have a shelter, lighting, signage, and improved sidewalks, curbs, and gutters. Based on an average $12,000 cost per stop, the total cost is estimated at $120,000. Since Alternative I uses the existing number of vehicles, there would be no need to expand the fleet size.

Advantages and Disadvantages

The major advantage of Alternative I is that the checkpoint service would be similar to the existing service. Therefore, it would take less time to implement the new service and educate the transit users about the new service compared to the other alternatives. Alternative I would decrease many of the physical and perceived barriers to using the transit service by creating checkpoint service, installing transit stations, and increasing the level of service in terms of revenue-hours.

The major disadvantage of Alternative I is that a limited economy of scale would be created. This is due to the fact that, at its heart, the service is still general public demand-response. Therefore, as the number of trips increases to over 10 trips per revenue-hour, the cost would also increase. Once the service has a trip rate of over 10 passengers per revenue-hour, the transit system should be altered to a fixed-route system.

As summarized in Table IX-10 (at the end of Chapter IX), Alternative I would result in the following estimates:

- $14.65 cost per passenger
- $1.3 million annual cost (including the $280,800 fixed cost)
- 5.6 passengers per hour
- 92,000 annual passengers

Alternative II: Fixed-Route Hub-and-Spoke Service

Alternative II includes a fixed-route hub-and-spoke system with complementary paratransit and general public demand-response service, which would improve service to those areas with the greatest transit demand. The objective of Alternative II is to improve the transit system and service by linking the routes at central locations and regulated times (60-minute headways). The routes would be aligned to function in conjunction with each other in order to increase mobility and access throughout the service area. Table IX-4 presents the details of Alternative II. Figure IX-2 presents the proposed route structure and demand-response service areas of Alternative II.

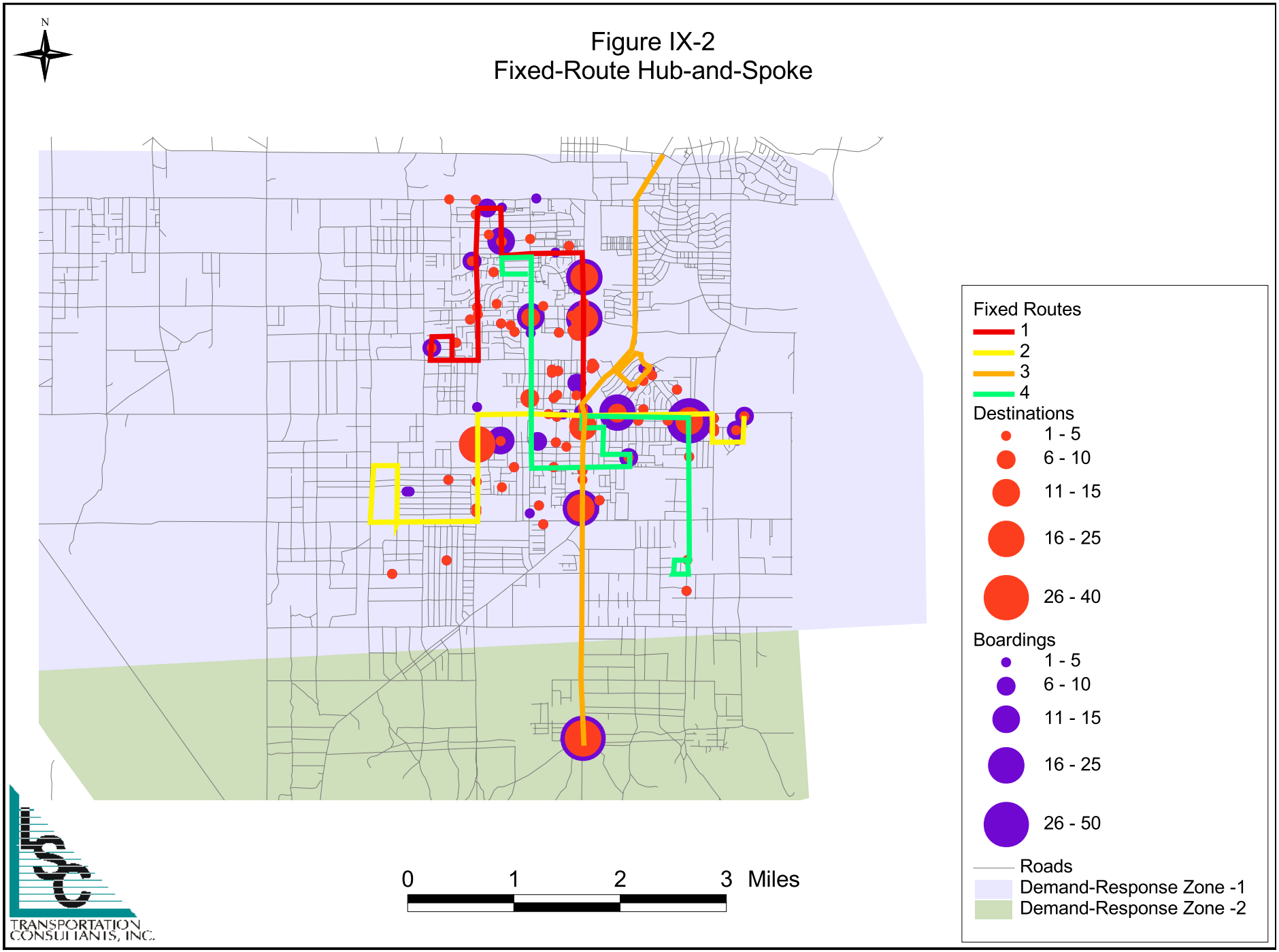
Alternative II moves the existing system from demand-response service to a more urban transit system with fixed routes and a central hub to transfer from route to route. The hub would be located in the downtown area. Four routes in the system would link at the hub and then travel outward through the city to connect with major transit destinations. Paratransit service would operate three-quarters of a mile from the routes for those individuals who are ADA-eligible.

Table IX-4
Level of Service - Alternative II

Options		# of Veh.	Total Daily		Total Annual		Operating Days	Annual Ridership	Pass. per Hour	Operating Cost Annual	Cost per Passenger
			Vehicle-Miles	Vehicle-Hours	Vehicle-Miles	Vehicle-Hours					
Fixed Routes	6:00 am - 6:00 pm M-F	4	624	48	159,120	12,240	255	74,905	6.1	$700,372.80	$9.35
Demand-Response/Paratransit	6:00 am - 6:00 pm M-F	3	324	36	82,620	9,180	255	18,870	2.1	$525,279.60	$27.84
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	144	16	7,488	832	52	3,848	4.6	$47,607.04	$12.37
Fixed Costs										*$280,700.00*	
Total/Average			**1,092**	**100**	**249,228**	**22,252**		**97,623**	**4.39**	**$1,553,959.44**	**$15.92**

Note: Costs based on LSC analysis, 2007.

Figure IX-2
Fixed-Route Hub-and-Spoke



The system would operate 12 hours per day. The fixed-route service would operate four vehicles for 48 revenue-hours per day for a total of about 12,240 annual revenue-hours. Based on the fixed-route model presented in Table IX-5, the estimated annual ridership is 75,000 passengers. The cost of the four fixed routes is estimated at $700,400 plus $154,300 for fixed costs for a total of $854,700. This equates to an average $9.35 cost per passenger. These costs were based on $41.83 per revenue-hour and $1.71 per vehicle-mile.

Paratransit and Demand-Response Service

The paratransit service would cover three-quarters of a mile from all routes for ADA-eligible people. Alternative II would include two general public demand-response zones with one zone in the northern section of the study area and one zone in the southern section of the study area. The demand-response service would provide service for all people, but priority would be given to ADA-eligible people.

The total demand-response and paratransit service would include three vehicles operating 36 revenue-hours per day for a total of 9,180 revenue-hours per year. The total annual cost is estimated at $525,300 plus $126,200 for fixed costs for a total of $651,550. Based on the model presented in Table IX-5, the total annual ridership is estimated at 18,900 passengers. This equates to a cost per passenger of $27.84.

The demand-response service would operate on the weekend to replace the fixed-route service. The weekend service would operate two vehicles for eight hours per day for a total of 16 revenue-hours per day. The estimated cost of the weekend service is $47,600. The estimated annual ridership for the weekend service is 3,800 passengers. This equates to a $12.37 cost per passenger.

Estimated Demand and Evaluation

Table IX-5 presents the transit demand model used to estimate the level of service and number of trips that could be served with Alternative II. On an average weekday, Alternative II would generate 383 trips. This equates to 97,600 trips per year, based on 255 days of service. Compared to the other alternatives,

Alternative Ⅱ has the highest trip production. However, Alternative Ⅱ has the highest cost per passenger.

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Table IX-5

Alternative II - Fixed-Route Demand Model

Census Tract	Block Group	Total # of Hhlds 2000	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Route Daily Trip # of	Daily Demand-Response Trips (TRCP Model)	Total Daily Trips
53	1	147																	0	0
53	2	0	0	0	50%	0	0	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	0.0	0.0	0	0	0
53	3	395	119	276	75%	89	207	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	10.1	3.7	14	0	14
54.01	1	423	71	352	100%	71	352	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	8.1	6.3	14	0	14
54.01	2	744	79	665	100%	79	665	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	8.9	11.9	21	0	21
54.01	3	370	29	341	100%	29	341	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	3.3	6.1	9	0	9
54.01	4	499	27	472	100%	27	472	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	3.1	8.4	12	0	12
54.01	5	569	17	552	100%	17	552	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	1.9	9.9	12	0	12
54.02	1	700	100	600	100%	100	600	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	11.3	10.7	22	0	22
54.02	2	702	43	659	100%	43	659	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	4.9	11.8	17	0	17
54.02	3	664	22	642	80%	18	513	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	2.0	9.2	11	0	11
54.03	1	606	9	597	60%	6	358	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	0.6	6.4	7	0	7
54.03	2	925	62	864	90%	56	777	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	6.3	13.9	20	0	20
54.03	3	385	0	385	30%	0	116	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	0.0	2.1	2	0	2
54.03	4	561	33	528	60%	20	317	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	2.2	5.7	8	0	8
54.03	5	430	117	312	100%	117	312	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	13.3	5.6	19	0	19
54.04	1	516	0	516	80%	0	413	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	0.0	7.4	7	0	7
54.04	2	1,079	Rural Demand-Response Area (TCRP Model)																9	9
54.04	3	871	26	845	90%	24	760	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	2.7	13.6	16	0	16
54.04	4	303	51	252	90%	46	227	0.21	0.02	1,200	0.90	1.1	60	0.6	0.85	5.2	4.0	9	0	9
55.01	1	360	Rural Demand-Response Area (TCRP Model)																6	6
55.01	2	749	Rural Demand-Response Area (TCRP Model)																6	6
55.01	3	171	Rural Demand-Response Area (TCRP Model)																3	3
55.01	4	451	Rural Demand-Response Area (TCRP Model)																5	5
55.01	5	319	Rural Demand-Response Area (TCRP Model)																3	3
55.01	6	394	Rural Demand-Response Area (TCRP Model)																6	6
55.03	1	285	Rural Demand-Response Area (TCRP Model)																5	5
																	Estimated Weekday Ridership		**220**	**43**	**263**
																	ADA Trips		**31**		**31**
																	Estimated Annual Ridership		**56,205**		**74,905**

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Capital Needs

The first infrastructure required to implement Alternative II would be the installation of transit stops throughout the community. The number and spacing of transit stops would vary based on density. In more dense areas, the spacing between the transit stops would be 800 to 1,200 feet. In less dense urban areas, the transit stops would be spaced up to 2,500 feet apart. Based on the linear miles of the fixed routes and an average of 2,500 feet between the transit stops, the estimated number of total transit stops is about 110 for the urban area (with 55 outbound and 55 inbound transit stops). Based on an estimated $1,000 per transit stop (not including the cost of a shelter), the total cost of the transit stops would be $110,000.

A transfer station would need to be developed in the downtown area and would need to hold six buses at one time. The transfer station would also need to have a shelter, lighting, signage, and improved sidewalks, curbs, and gutters. The estimated cost of a transfer station can vary widely from $100,000 to over $1 million depending on amenities and whether or not property needs to be acquired. At this time, LSC is estimating a cost of $250,000.

Since Alternative II uses seven buses on a daily basis, the fleet size would need to be expanded. Three additional transit vehicles would be needed for the implementation of Alternative II. Based on the cutaway type vehicle, the estimated cost is $65,000 per vehicle, with a total estimated cost of $195,000 for the three vehicles. If small transit vehicles are purchased, the total estimated cost would be $360,000.

Advantages and Disadvantages

The major advantage of Alternative II is that the route structure would be based on service routes. This increases the access of the riders to the major transit destinations. Alternative II would also decrease many of the physical and perceived barriers to using the transit service by creating fixed routes, installing transit stops, and increasing the service area.

The major disadvantage of Alternative II is that in order to cross the community, transit users would need to transfer at the downtown transit station.

This increases the amount of time that the users have to travel and decreases the mobility of the transit users. Another disadvantage is that additional revenue-hours and vehicles would be needed to implement the transit service, which would increase the overall cost of the transit service over the existing levels.

As summarized in Table IX-10, Alternative II would result in the following estimates:

- $15.92 cost per passenger
- $1.5 million annual cost (including the $280,800 fixed cost)
- 4.39 passengers per hour (average for entire system)
- 97,600 annual passengers

Alternative III: Flex-Route Hub-and-Spoke System

Alternative III would include a flex-route hub-and-spoke system and demand-response service, which would improve service to those areas with the greatest transit demand. Table IX-6 presents details of Alternative III. Figure IX-3 presents the proposed route structure and demand-response service areas for Alternative III. The objective of Alternative III is to improve the transit system and service by linking the flex routes at central locations and regulated times (60-minute headways). The routes would be aligned to function in conjunction with each other in order to increase mobility and access throughout the service area.

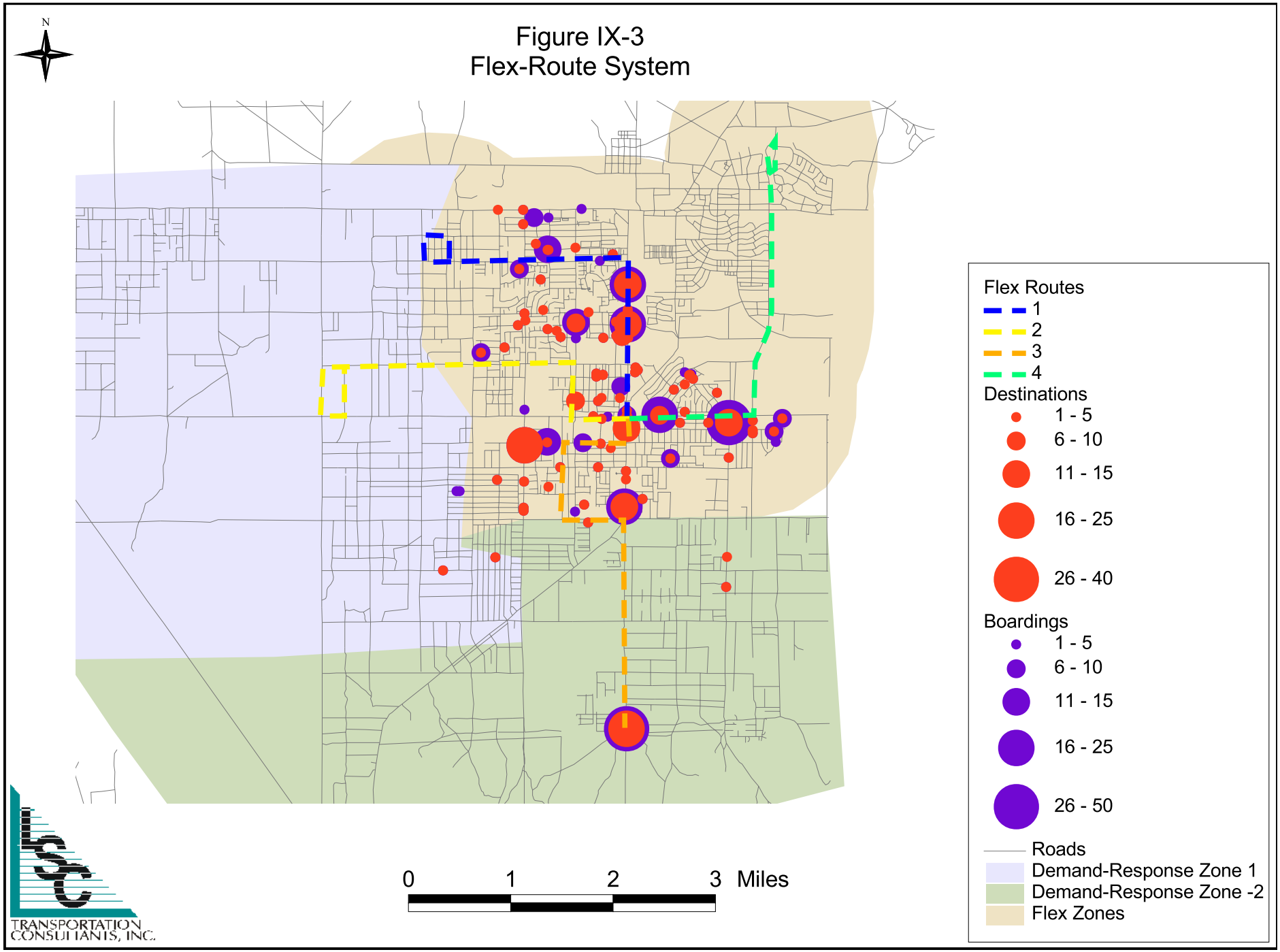
Alternative III moves the existing system from general public demand-response service to a more urban transit system with flex routes and a central hub to transfer from route to route. The hub would be located in the downtown area. Four flex routes in the system would link at the hub and then travel outward through the city to connect with the major transit destinations.

Table IX-6
Level of Service - Alternative III

Options		# of Veh.	Total Daily		Total Annual		Operating Days	Annual Ridership	Pass. per Hour	Operating Cost Annual	Cost per Passenger
			Vehicle-Miles	Vehicle-Hours	Vehicle-Miles	Vehicle-Hours					
Flex Routes	6:00 am - 6:00 pm M-F	4	432	48	110,160	12,240	255	78,609	6.4	$700,373	$8.91
Demand-Response/Paratransit	6:00 am - 6:00 pm M-F	2	216	24	55,080	6,120	255	13,065	2.1	$350,186	$26.80
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	144	16	7,488	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Average			**792**	**88**	**172,728**	**19,192**		**95,522**	**4.98**	**$1,378,866**	**$14.44**

Note: Costs based on LSC analysis, 2007.

Figure IX-3
Flex-Route System



The system would operate 12 hours per day. The flex-route service would operate four vehicles for 48 revenue-hours per day, with the annual revenue-hours estimated at 12,240. Based on the model presented in Table IX-7 and the estimated 10 passengers per revenue-hour, the estimated annual ridership is 78,600 passengers. The cost of the four flexible fixed routes is estimated at $700,400 plus fixed costs of $179,000 for a total of $879,000. This equates to an average cost of $8.91 per passenger. These costs were based on $41.83 per revenue-hour and $1.71 per vehicle-mile.

Demand-Response Service

Alternative III would include two general public demand-response zones, with one zone in the northern section of the study area and one zone in the southern section of the study area. The demand-response service would provide service for all people, but priority would be given to ADA-eligible people. Since the flex routes are able to leave the route to service trips, there is no need to have complementary paratransit service.

The total demand-response service would include two vehicles operating 24 revenue-hours per day, for a total of 6,120 revenue-hours per year. The total annual cost is estimated at $350,200 plus fixed costs of $101,700 for a total of $451,900. Based on the model presented in Table IX-7, the total annual ridership is estimated at 13,000 passengers. This equates to a cost of $26.80 per passenger.

The demand-response service would operate on the weekend to replace the flex-route service. The weekend service would operate two vehicles for eight hours per day, for a total of 16 revenue-hours per day. The estimated cost of the weekend service is $47,600. The estimated annual ridership for the weekend service is 3,800 passengers. This equates to a cost of $12.37 per passenger.

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Table IX-7
Alternative III - Flex-Route Demand Model

Census Tract	Block Group	Total # of Hhlds 2000	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of	Daily Demand-Response Trips (TRCP Model)	Total Daily Trips
53	1	147	7	139	20%	1	28	0.21	0.02	500	1.25	1.2	60	0.6	0.85	0.2	0.6	1	0	**1**
53	2	0	0	0	50%	0	0	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.0	0.0	0	0	**0**
53	3	395	119	276	75%	89	207	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	11.2	3.9	15	0	**15**
54.01	1	423	71	352	100%	71	352	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	9.0	6.6	16	0	**16**
54.01	2	744	79	665	100%	79	665	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	9.9	12.4	22	0	**22**
54.01	3	370	29	341	100%	29	341	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	3.7	6.4	10	0	**10**
54.01	4	499	27	472	100%	27	472	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	3.4	8.8	12	0	**12**
54.01	5	569	17	552	100%	17	552	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	2.1	10.3	12	0	**12**
54.02	1	700	100	600	100%	100	600	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	12.6	11.2	24	0	**24**
54.02	2	702	43	659	100%	43	659	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	5.4	12.3	18	0	**18**
54.02	3	664	22	642	80%	18	513	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	2.2	9.6	12	0	**12**
54.03	1	606	9	597	60%	6	358	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.7	6.7	7	0	**7**
54.03	2	925	62	864	90%	56	777	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	7.0	14.5	22	0	**22**
54.03	3	385	0	385	30%	0	116	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.0	2.2	2	0	**2**
54.03	4	561	Rural Demand-Response Area (TCRP Model)																5	**5**
54.03	5	430	117	312	100%	117	312	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	14.8	5.8	21	0	**21**
54.04	1	516	Rural Demand-Response Area (TCRP Model)																5	**5**
54.04	2	1,079	60	1,019	100%	60	1019	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	7.5	19.1	27	0	**27**
54.04	3	871	26	845	90%	24	760	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	3.0	14.2	17	0	**17**
54.04	4	303	51	252	90%	46	227	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	5.8	4.2	10	0	**10**
55.01	1	360	Rural Demand-Response Area (TCRP Model)																6	**6**
55.01	2	749	Rural Demand-Response Area (TCRP Model)																0	**0**
55.01	3	171	Rural Demand-Response Area (TCRP Model)																3	**3**
55.01	4	451	Rural Demand-Response Area (TCRP Model)																5	**5**
55.01	5	319	Rural Demand-Response Area (TCRP Model)																3	**3**
55.01	6	394	Rural Demand-Response Area (TCRP Model)																6	**6**
55.03	1	285	Rural Demand-Response Area (TCRP Model)																5	**5**
																		Estimated Weekday Ridership	**248**	**37**	**284**
																		ADA Trip			**24**
																		Estimated Annual Ridership	**63,119**		**78,609**

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Estimated Demand and Evaluation

Table IX-7 presents the transit demand model used to estimate the level of service and number of trips that could be served with Alternative III. On an average weekday, Alternative III would generate 524 trips. This equates to 95,500 trips per year, based on 255 days of service. Compared to the other alternatives, Alternative III has the highest trip production on the route structure. Alternative III would generate a higher level of service than the existing service at the lowest cost per passenger.

Capital Needs

The first infrastructure required to implement Alternative III would be the installation of transit stops throughout the community. The number and spacing of transit stops would vary based on density. In more dense areas, the spacing between the transit stops would be 800 to 1,200 feet. In less dense urban areas, the transit stops would be spaced up to 2,500 feet apart. Based on the linear miles of the fixed routes and an average of 2,500 feet between the transit stops, the estimated number of total transit stops is about 75 for the urban area (with 38 outbound and 37 inbound transit stops). Based on an estimated $1,000 per transit stop (not including the cost of a shelter), the total cost of the transit stops would be $75,000.

A transfer station would need to be developed in the downtown area and would need to hold six buses at one time. The transfer station would also need to have a shelter, lighting, signage, and improved sidewalks, curbs, and gutters. The estimated cost of a transfer station can vary widely from $100,000 to over $1 million, depending on amenities and whether or not property needs to be acquired. At this time, LSC is estimating a cost of $250,000.

Since Alternative III uses six buses on a daily basis, there would be a need to expand the fleet size. Two additional transit vehicles would be needed for the implementation of Alternative III. Based on the cutaway type vehicle, the estimated cost is $65,000 per vehicle, with a total estimated cost of $130,000 for the two vehicles. If small transit vehicles are purchased, the total estimated cost would be $240,000.

Advantages and Disadvantages

The major advantage of Alternative III is that the flex routes would increase the service area. The second advantage is that there would be no need for additional paratransit service. This would reduce the overall operational cost of the transit system. Also, since the flex routes would function like the existing demand-response system, riders would learn the new system easily. Alternative III would also decrease many of the physical and perceived barriers to using the transit service by creating routes, transit stops, and increasing the service area.

The major disadvantage of Alternative III is that in order to cross the community, transit users would need to transfer at the downtown transit station. This increases the amount of time that transit users have to travel and decreases the mobility of transit users. Another disadvantage is that additional revenue-hours and vehicles would be needed to implement the transit service, which would increase the overall cost of the transit service over the existing levels. Also, if the route flexes more than five times per hour, the vehicle on the route may no longer maintain the 60-minute headway and would not meet the other vehicles at the hub. This could cause system delays in service operations.

As summarized in Table IX-10, Alternative III would result in the following estimates:

- $14.40 cost per passenger
- $1.38 million annual cost (including the $280,800 fixed cost)
- 4.98 passengers per hour (average for entire system)
- 95,500 annual passengers

Alternative IV: Hybrid System

The hybrid system and demand-response service would improve service to those areas with the greatest transit demand. Table IX-8 presents the details of Alternative IV. Figure IX-4 presents the proposed route structure and demand-response service areas of Alternative IV. The objective of Alternative IV is to improve the transit system and service by linking the loop routes at central locations and regulated times (60-minute headways). The routes would be

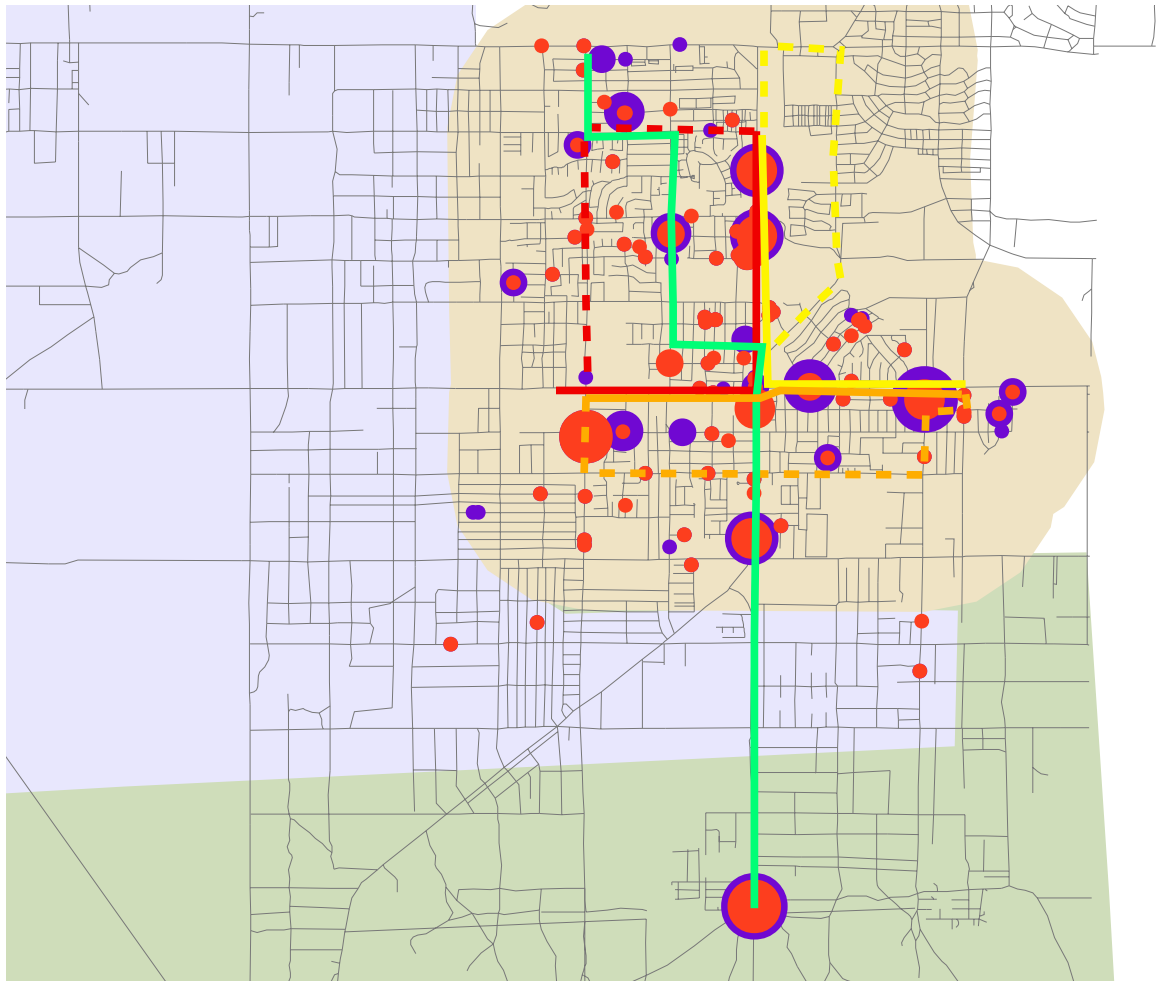
aligned to function in conjunction with each other in order to increase mobility and access throughout the service area.

Table IX-8
Level of Service - Alternative IV

Options		# of Veh.	Total Daily		Total Annual		Operating Days	Annual Ridership	Pass. per Hour	Operating Cost Annual	Cost per Passenger
			Vehicle-Miles	Vehicle-Hours	Vehicle-Miles	Vehicle-Hours					
Hybrid Routes	6:00 am - 6:00 pm M-F	4	528	48	134,640	12,240	255	77,935	6.4	$700,373	$8.99
Demand-Response/Paratransit	6:00 am - 6:00 pm M-F	2	216	24	55,080	6,120	255	13,495	2.2	$350,186	$25.95
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	216	16	11,232	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Average			**960**	**88**	**200,952**	**19,192**		**95,278**	**4.96**	**$1,378,866**	**$14.47**

Note: Costs based on LSC analysis, 2006.

Figure IX-4
Hybrid System



Hybrid Fixed Routes
- 1
- 2
- 3
- 4

Flex Routes
- 1
- 2
- 3

Destinations
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 40

Boardings
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 50

Roads
Flex Zone
Demand-Response Zone-1
Demand-Response Zone -2

0 1 2 3 Miles

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Alternative IV moves the existing system from demand-response service to a more urban transit system with hybrid loop routes and a central hub to transfer from route to route. The hub would be located in the downtown area. Three loop routes and one fixed route would link at the hub and then travel outward through the city to connect with the major transit destinations. Unlike the other alternatives, the loop routes function as fixed routes along the major corridors and flex routes once the vehicles turn off the major corridors. Figure IX-4 presents this as solid lines for the portion of the route that is fixed and dashed lines for the portion of the route that is flex. The loop routes operate in a clockwise direction. The routes are inter-connected along two major corridors, thereby creating a bi-directional route structure.

The system would operate 12 hours per day. The hybrid service would operate four vehicles for 48 revenue-hours per day, for a total of 12,240 annual revenue-hours. Based on the model presented in Table IX-8 and the estimated 6.4 passengers per revenue-hour, the estimated annual ridership is 79,000 passengers. The cost of the four routes is estimated at $700,400 plus fixed costs of $179,000 for a total cost of $879,400. This equates to an average cost of $8.99 per passenger. These costs are based on $41.83 per revenue-hour and $1.71 per vehicle-mile.

Demand-Response Service

Alternative IV would include two general public demand-response zones, with one zone in the northern section of the study area and one zone in the southern section of the study area. The demand-response service would provide service for all people, but priority would be given to ADA-eligible people. Since the hybrid loop routes are able to leave the route to service trips, there is no need for additional paratransit service.

The total demand-response service would include two vehicles operating 24 revenue-hours per day, for a total of 6,120 revenue-hours per year. The total annual cost is estimated at $350,200 plus fixed costs of $101,700 for a total cost of $451,900. Based on the model presented in Table IX-9, the total annual ridership is estimated at 13,500 passengers. This equates to a cost per passenger of $25.95.

The demand-response service would operate on the weekend to replace the flex-route service. The weekend service would operate two vehicles for eight hours per day, for a total of 16 revenue-hours per day. The estimated cost of the weekend service is $47,600. The estimated annual ridership for the weekend service is 3,800 passengers. This equates to a $12.37 cost per passenger.

Estimated Demand and Evaluation

Table IX-9 presents the transit demand model used to estimate the level of service and number of trips that could be served with Alternative IV. On an average weekday, Alternative IV would generate 370 trips. This equates to 95,300 trips per year, based on 255 days of service. Compared to the other alternatives, Alternative IV has the third highest trip production. Alternative IV would generate a higher level of service than the existing service, at the second lowest cost per passenger.

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Table IX-9

Alternative IV - Hybrid Demand Model

Census Tract	Block Group	Total # of Hhlds 2000	# of Hhlds with 0 Auto	# of Hhlds with 1 Auto	% of Hhlds with Transit Access	Hhlds Served by Transit 0 Auto	Hhlds Served by Transit 1 Auto	Basic Transit Trip Rates 0 Auto	Basic Transit Trip Rates 1 Auto	Walk Distance (ft)	Walk Factor 0 Auto	Walk Factor 1 Auto	Headway (min)	Headway Factor 0 Auto	Headway Factor 1 Auto	Daily Transit Trips 0 Auto	Daily Transit Trips 1 Auto	Daily Trip # of	Daily Demand-Response Trips (TRCP Model)	Total Daily Trips
53	1	147																	0	**0**
53	2	0	0	0	80%	0	0	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.0	0.0	0	0	**0**
53	3	395	119	276	100%	119	276	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	14.9	5.2	20	0	**20**
54.01	1	423	71	352	100%	71	352	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	9.0	6.6	16	0	**16**
54.01	2	744	79	665	100%	79	665	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	9.9	12.4	22	0	**22**
54.01	3	370	29	341	100%	29	341	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	3.7	6.4	10	0	**10**
54.01	4	499	27	472	100%	27	472	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	3.4	8.8	12	0	**12**
54.01	5	569	17	552	100%	17	552	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	2.1	10.3	12	0	**12**
54.02	1	700	100	600	100%	100	600	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	12.6	11.2	24	0	**24**
54.02	2	702	43	659	100%	43	659	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	5.4	12.3	18	0	**18**
54.02	3	664	22	642	80%	18	513	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	2.2	9.6	12	0	**12**
54.03	1	606	9	597	60%	6	358	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.7	6.7	7	0	**7**
54.03	2	925	62	864	90%	56	777	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	7.0	14.5	22	0	**22**
54.03	3	385	0	385	30%	0	116	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.0	2.2	2	0	**2**
54.03	4	561	Rural Demand-Response Area (TCRP Model)																5	**5**
54.03	5	430	117	312	100%	117	312	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	14.8	5.8	21	0	**21**
54.04	1	516	0	516	60%	0	310	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	0.0	5.8	6	5	**10**
54.04	2	1,079	60	1,019	100%	60	1019	0.21	0.02	1,000	1.00	1.1	60	0.6	0.85	7.5	19.1	27	0	**27**
54.04	3	871	Rural Demand-Response Area (TCRP Model)																0	**0**
54.04	4	303	Rural Demand-Response Area (TCRP Model)																0	**0**
55.01	1	360	Rural Demand-Response Area (TCRP Model)																6	**6**
55.01	2	749	0	749	90%	0	674	0.2	0.02	1,000	1.00	1.1	60	0.6	0.85	0.0	12.6	13	0	**13**
55.01	3	171	Rural Demand-Response Area (TCRP Model)																3	**3**
55.01	4	451	Rural Demand-Response Area (TCRP Model)																5	**5**
55.01	5	319	Rural Demand-Response Area (TCRP Model)																3	**3**
55.01	6	394	Rural Demand-Response Area (TCRP Model)																6	**6**
55.03	1	285	Rural Demand-Response Area (TCRP Model)																5	**5**
																		Estimated Weekday Ridership	**243**	**37**	**280**
																		ADA Trips			**26**
																		Estimated Annual Ridership	**61,935**		**77,935**

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Capital Needs

The first infrastructure required to implement Alternative IV would be the installation of transit stops throughout the community. The number and spacing of the transit stops would vary based on density. In more dense areas, the spacing between transit stops would be 800 to 1,200 feet. In less dense urban areas, transit stops would be spaced up to 2,500 feet apart. Based on the linear miles of the fixed routes and an average of 2,500 feet between the transit stops, the estimated number of total transit stops is about 60 for the urban area. Based on an estimated $1,000 per transit stop (not including the cost of a shelter), the total cost of the transit stops would be $60,000.

A transfer station would need to be developed in the downtown area and would need to hold six buses at one time. The transfer station would also need to have a shelter, lighting, signage, and improved sidewalks, curbs, and gutters. The estimated cost of a transfer station can vary widely from $100,000 to over $1 million, depending on amenities. At this time, LSC is estimating a cost of $250,000.

Since Alternative IV uses six buses on a daily basis, there would be a need to expand the fleet size. Two additional transit vehicles would be needed for the implementation of Alternative IV. Based on the cutaway type vehicle, the estimated cost is $65,000 per vehicle, with a total estimated cost of $130,000 for the two vehicles. If small transit vehicles are purchased, the total estimated cost would be $240,000.

Advantages and Disadvantages

The major advantage of Alternative IV is that the loop routes are able to flex, thereby increasing the service area. The second advantage is that there is no need for additional paratransit service. This reduces the overall operational cost of Alternative IV. Also, since the routes would function like the existing demand-response system, the riders would learn the new system easily. Alternative IV would also decrease many of the physical and perceived barriers to using the transit service by creating routes, transit stops, and increasing the service area. The hybrid system would increase the level of service in the areas of the community where there is significant trip demand and would allow for

the routes to be more like demand-response service in the areas of lower population density and fewer transit trips.

The major disadvantage of Alternative IV is that in order to cross the community, transit users may need to transfer at the downtown transit station. This increases the amount of time transit users have to travel and decreases the mobility of transit users. Another disadvantage is that additional revenue-hours and vehicles would be needed to implement the transit service, which would increase the overall cost of the transit service over the existing service. Also, if the vehicles flex more than five times per hour, the vehicle on the route may no longer maintain the 60-minute headway and would not meet the other vehicle at the hub. This would cause system delays in service operations.

A major disadvantage of this alternative is that the routes are loops. Loop routes result in short travel times in one direction and long travel times in the other direction for most passengers. As a result, the demand for this service is lower than would be expected for fixed-route service.

As summarized in Table IX-10, Alternative IV would result in the following estimates:

- $14.47 cost per passenger
- $1.38 million annual cost (including the $280,800 fixed cost)
- 4.96 passengers per hour (average for entire system)
- 95,300 annual passengers

SUMMARY

Chapter IX has provided information on various transit service alternatives for the Ridgecrest study area. The alternatives include the current system, check-point service, fixed-route service, flex-route service, and a hybrid system. Table IX-10 presents a summary of the alternatives' levels of service.

The information from Chapter IX was used in the selection of the preferred transit service alternative, which includes a detailed description of each route that includes turning movements and bus stop locations in Chapter X of this report.

Table IX-10
Service Alternatives - Cost Estimates

Options		# of Veh.	Total Daily		Total Annual		Operating Days	Annual Ridership	Pass. per Hour	Operating Cost Annual	Cost ($) per Pass.
			Vehicle-Miles	Vehicle-Hours	Vehicle-Miles	Vehicle-Hours					
Status Quo	6:00 am - 6:00 pm M-S	4	259	19	80,870	5,928	312	33,400	5.6	$840,739	**$25.17**
Alternative I - Checkpoint Services											
Demand-Response Service	6:00 am - 6:00 pm M-F	4	672	48	171,360	12,240	255	70,990	5.8	$805,025	$11.34
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	144	16	7,488	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Avg			**816**	**64**	**178,848**	**13,072**		**74,838**	**5.73**	**$1,133,332**	**$15.14**
Alternative II - Fixed Route											
Fixed Routes	6:00 am - 6:00 pm M-F	4	624	48	159,120	12,240	255	74,905	6.1	$700,373	$9.35
Demand-Response/Paratransit	6:00 am - 6:00 pm M-F	3	324	36	82,620	9,180	255	18,870	2.1	$525,280	$27.84
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	144	16	7,488	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Avg			**1,092**	**100**	**249,228**	**22,252**		**97,623**	**4.39**	**$1,553,959**	**$15.92**
Alternative III - Flex Route											
Flex Routes	6:00 am - 6:00 pm M-F	4	432	48	110,160	12,240	255	78,609	6.4	$700,373	$8.91
Demand-Response/Paratransit	6:00 am - 6:00 pm M-F	2	216	24	55,080	6,120	255	13,065	2.1	$350,186	$26.80
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	144	16	7,488	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Avg			**792**	**88**	**172,728**	**19,192**		**95,522**	**4.98**	**$1,378,866**	**$14.44**
Alternative IV - Hybrid											
Hybrid Routes	6:00 am - 6:00 pm M-F	4	528	48	134,640	12,240	255	77,935	6.4	$700,373	$8.99
Demand-Response/Paratransit	6:00 am - 6:00 pm M-F	2	216	24	55,080	6,120	255	13,495	2.2	$350,186	$25.95
Demand-Response (Weekend)	8:00 am - 4:00 pm	2	216	16	11,232	832	52	3,848	4.6	$47,607	$12.37
Fixed Costs										*$280,700*	
Total/Avg			**960**	**88**	**200,952**	**19,192**		**95,278**	**4.96**	**$1,378,866**	**$14.47**

Note: Costs based on LSC analysis, 2007.