NESTS Transit Planning Project

Technical Appendices to the Final Report

MULTISYSTEMS

· with ·

Creighton Manning Engineering

and

CAST of Cornell University

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Ithaca-Tompkins County Transportation Council

ITHACA-TOMPKINS COUNTY TRANSPORTATION COUNCIL

Technical Appendices to the NTPP Final Report

This volume contains three memoranda produced during the course of the NESTS Transit Planning Project. They are more technical in nature than the Final Report, and contain material that mostly serves as background to the findings of the study.

Appendix A describes the method used to create the three tiers of the preferred strategy and demonstrates how these tiers would achieve the desired mode shift goals of 3%, 5%, and 10%. It also contains an estimate of the current transit mode share in the NESTS area.

Appendix B contains a detailed discussion of potential technologies that Cornell could employ if it chose to move from its current annual permit program to a daily fee program. At the end of the memorandum are some unit costs for the recommended technologies.

Appendix C is a memorandum providing all of the information collected during the financial analysis portion of the study. The initial section of the memo describes TCAT's current funding in detail. That is followed by a discussion of new funding alternatives that were considered. The final section is the financial plan for the recommended strategy, which is also contained in the Final Report in essentially the same form.

Appendix A

Memorandum on Three Tiers of the Preferred Strategy

1 Introduction

This memorandum presents three proposed levels of the preferred strategy described in the Task 2 deliverable on service and facility strategies. These three levels are designed to attain a 3%, 5%, and 10% modal shift from private automobiles to transit in the NESTS area. The memorandum also contains estimates of the current transit mode share in the NESTS area for reference purposes.

2 Three Levels of Preferred Strategy

Background

The task 2 deliverable presented a new route structure for the NESTS area, including many revisions to existing routes and several new routes. The memo also described three service levels at which the proposed routes could be operated: Basic, Enhanced, and High. Table 1 from that deliverable, which is reproduced below, shows the hours and frequency of service for each of the routes in the proposed system for each service level. Two methods were used to estimate the ridership impacts of the proposed changes: an elasticity-based method which served as a lower bound, and a survey-based method which served as an upper bound.

An additional analysis was done for the two proposed express services, connecting a new transit hub at Pyramid Mall with Cornell and downtown, respectively. This analysis brought in data from the telephone survey, conducted by the Computer Assisted Survey Team at Cornell in task 1 of the study, concerning the impact of changes in parking fees at the respondents' destinations and the attractiveness of an express shuttle from a remote park-ride lot as an alternative to driving all the way to their destinations. The result of that analysis was not only a ridership estimate on the new routes, but also an estimate of the mode shift associated with that ridership. The figures for those two express routes are shown in Tables 2 and 3 below.

In order to develop three levels of the preferred strategy that would achieve modal shift of 3%, 5%, and 10% from automobiles to transit, it was necessary to translate the ridership estimates for routes other than the two expresses into mode shift estimates. For the purposes of this memorandum, this translation was done at the study-area-wide level rather than by neighborhood or individual route. Our understanding of the objective of this study was to reduce traffic throughout the NESTS area, rather than in one particular spot. During task 4, neighborhood-level or route-level mode shift estimates will be made to facilitate the analysis of traffic impacts on particular intersections and roadway segments.

As can be seen on Tables 2 and 3, there are a few combinations of service levels and parking fee increases that achieve the desired 3%, 5%, and 10% mode shifts for the two express routes. While looking at these figures limits the range of policy options to just parking fees, the conclusions of the task 3 deliverable on policy analysis pointed to parking charges as the single most effective policy lever available. While a UPASS program might increase ridership on buses, it would not have a significant effect on driving in the NESTS area; most of the new riders would otherwise walk. If an Eco-pass program were widely embraced by employers in Ithaca, it

Table 1: Proposed Service Hours and Frequencies

Route	Daily Hours of Service											
	Weekdays, Peak			Weekdays, Off-Peak			Saturdays			Sundays		
	Basic	Enhanced	High	Basic	Enhanced	High	Basic	Enhanced	High	Basic	Enhanced	High
Cayuga Heights Flexible	n/a	n/a	6	n/a	n/a	4	n/a	n/a	10	n/a	n/a	n/a
Express A	6	6	6	6	8	10	n/a	n/a	n/a	n/a	n/a	n/a
Express B	6	6	6	6	8	10	12	12	12	n/a	n/a	n/a
Downtown Circulator A	6	6	6	6	8	8	12	12	12	n/a	n/a	n/a
Downtown Circulator B	6	6	6	6	8	8	12	12	12	n/a	n/a	n/a
Long Mall Area Circulator	4	4	4	6	8	8	10	12	12	10	12	12
Short Mall Circulator	0	0	0	5	5	5	5	5	5	5	5	5
Route 15	4	4	6	10	10	10	14	14	16	9	9	9
Route 16	6	6	6	6	8	8	12	12	12	8	8	8
Route 30	6	6	6	8	8	11	17	17	17	8	8	10
Route 31	6	6	6	7	7	10	n/a	8	8	n/a	n/a	n/a
Route 32	6	6	6	10	10	10	8	8	8	n/a	n/a	8
Route 35	4	4	4	0	0	0	3	3	3	3	3	3
Route 36	2	2	4	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a
Route 37	5	5	5	1	1	6	3	3	3	3	3	3
Route 40	4 runs	4 runs	4 runs	1 run	1 run	1 run	n/a	n/a	n/a	n/a	n/a	n/a
Route 41	3 runs	3 runs	3 runs	2 runs	2 runs	2 runs	n/a	n/a	n/a	n/a	n/a	n/a
Route 43	5 runs	5 runs	5 runs	2 runs	2 runs	2 runs	n/a	n/a	n/a	n/a	n/a	n/a

Route	Headway (minutes)											
	Weekdays, Peak			Weekdays, Off-Peak			Saturdays			Sundays		
	Basic	Enhanced	High	Basic	Enhanced	High	Basic	Enhanced	High	Basic	Enhanced	High
Cayuga Heights Flexible	n/a	n/a	flex	n/a	n/a	flex	n/a	n/a	flex	n/a	n/a	n/a
Express A	30	15	10	60	30	30	n/a	n/a	n/a	n/a	n/a	n/a
Express B	30	20	10	60	30	30	30	30	30	n/a	n/a	n/a
Downtown Circulator A	60	30	20	60	30	20	60	30	30	n/a	n/a	n/a
Downtown Circulator B	60	30	20	60	30	20	60	30	30	n/a	n/a	n/a
Long Mall Area Circulator	30	30	15	30	30	15	30	30	15	30	30	15
Short Mall Circulator	n/a	n/a	n/a	15	15	15	15	15	15	15	15	15
Route 15	60	30	30	60	30	30	60	30	30	60	30	30
Route 16	60	30	20	60	30	20	60	30	30	60	60	60
Route 30	30	30	20	30	30	20	30	30	20	60	60	30
Route 31	40	30	20	60	60	30	n/a	90	90	n/a	n/a	n/a
Route 32	60	30	20	60	60	30	60	60	30	n/a	n/a	60
Route 35	60	60	60	n/a	n/a	n/a	3 runs	3 runs	3 runs	3 runs	3 runs	3 runs
Route 36	30	30	30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Route 37	60	60	30	1 run	1 run	60	3 runs	3 runs	3 runs	3 runs	3 runs	3 runs
Route 40	4 runs	4 runs	4 runs	1 run	1 run	1 run	n/a	n/a	n/a	n/a	n/a	n/a
Route 41	3 runs	3 runs	3 runs	2 runs	2 runs	2 runs	n/a	n/a	n/a	n/a	n/a	n/a
Route 43	5 runs	5 runs	5 runs	2 runs	2 runs	2 runs	n/a	n/a	n/a	n/a	n/a	n/a

Note: n/a indicates that the route does not operate on that day; 0 indicates that there is no service in that time period.

might have a noticeable impact. However, almost all employers contacted rejected the idea, while the largest employer in the area, Cornell University, already has the equivalent of an Eco-pass program in place. Reducing the available parking supply does not seem like a feasible option; in fact, the Ithaca City Council recently voted to increase the parking supply, and Cornell plans to maintain its current supply of roughly 10,000 spaces.

Table 2: Policy-based ridership forecast for Express A

Daily Parking Fee Increase	Basic		Enhanced		High	
	Shift	*Trips*	*Shift*	*Trips*	*Shift*	*Trips*
$0	0.7%	(62)	1.5%	(124)	3.0%	(248)
$1	1.4%	(120)	2.9%	(240)	5.8%	(481)
$3	2.9%	(241)	5.8%	(482)	11.5%	(964)

Table 3: Policy-based ridership forecast for Express B

Daily Parking Fee Increase	Basic		Enhanced		High	
	Shift	*Trips*	*Shift*	*Trips*	*Shift*	*Trips*
$0	0.7%	(75)	1.5%	(150)	3.0%	(301)
$1	1.3%	(133)	2.6%	(265)	5.2%	(531)
$3	2.5%	(252)	5.0%	(504)	10.0%	(1,009)

In order to achieve a 3% mode shift, it would be necessary either to implement the High service level combined with no parking fee increase, or to implement the Enhanced service level with a parking fee increase of $1 per day. From a fiscal perspective, the second option makes much more sense, because not only is it much less expensive to implement the Enhanced level compared to the High level, but the parking fee revenue would offset much of the increase cost of the new service. This level of mode shift could also be achieved with the Basic level of service combined with a $3 per day parking fee increase, but since this level of fee increase would effectively double the parking charges currently in place in downtown Ithaca and at Cornell, it was judged to be much less feasible than the other options.

A 5% mode shift would require either the Enhanced level combined with a $3 per day parking fee increase, or the High level combined with a $1 per day increase. From the standpoint of fiscal feasibility the former option is preferable, but the unlikelihood of a doubling of parking charges makes the latter option more politically feasible.

Finally, a 10% mode shift would require both the High level of service and a $3 per day increase in parking fees. While the increase in parking revenue would help to offset the cost of offering the High level of service, that great an increase in parking fees would likely make the plan politically infeasible.

Methodology

The next step in the analysis was to extrapolate from the results for the two express routes to the rest of the routes included in the preferred strategy. The ridership impact of parking fee increases could not be directly calculated for routes other than the two expresses because the question on the telephone survey concerning the effect of parking fees on mode choice related only to an express route from a remote park-ride lot. The exact wording of the question was as follows: “Assuming that you could park for free at a remote lot and have an express shuttle to your destination, how much would the daily charge for parking at your destination have to increase to get you to become a regular transit user?”

The critical assumption needed to extrapolate from the results for the express routes is that the marginal effect of increasing the parking fee would be the same for regular local transit routes as it would be for the express shuttles. That is not to say that the local routes would be assumed to be as attractive as the express shuttles, but rather that the ridership increase on the expresses as a result of going from no fee to a $1 fee, or from a $1 fee to a $3 fee, would apply proportionally to local routes. The critical difference is that we are assuming that more people would find the express shuttles to be attractive than regular local routes for any given destination parking fee, but that the proportional increase in ridership as parking fees increase would be the same for local routes as it is for the express shuttles.

In the process of extrapolating, it was also assumed that parking fee increases would only be relevant at Cornell, downtown Ithaca, and Ithaca College; everywhere else in the study area was assumed to have free parking and that parking fee increases would be essentially inconceivable there. The practical effect of this assumption is that the estimated ridership on the new and enhanced routes had to be split between those trips destined for the free parking areas and those destined for Cornell, downtown, or Ithaca College. This split was done by using segment-level boarding data on existing routes and assuming that new routes serving those areas would have proportions of riders similar to existing routes coming from the free parking and parking fee areas. For some routes, such as the Pyramid Mall circulators and routes serving only suburban areas, all ridership was assumed to be unaffected by increases in parking fees.

After developing ridership estimates for different parking fee scenarios, it was necessary to determine the denominator of the mode share ratio: the total number of person trips in automobiles in the study area. The best source for this figure is the ITCTC regional highway model. Creighton Manning Engineering extracted from the model the total number of trips produced in the study area and then the subset of these attracted to the NESTS area and the surrounding communities in the eastern portion of Tompkins County (excluding Ulysses, Enfield, and Newfield which are to the south and west of the study area). Trip productions (that is, trips that start out in the study area) were used because the figures available from the regional model were for the PM peak hour; thus these trips mainly represent trips back to home. We expanded those vehicle trips up to daily totals using the rule of thumb that the PM peak hour represents 10% of the daily total traffic in both directions. We then expanded the vehicle trips to person trips by using an average vehicle occupancy of 1.25.

The total productions expanded to the daily total represents all trips beginning in the study area, no matter where they end. The productions to the eastern two-thirds of Tompkins County more closely represent trips that might be captured by an enhanced transit system in the NESTS area. Both figures are used in this analysis, though the second one is the more relevant in the consideration of traffic volumes on streets in the heart of the NESTS area.

Results

In the task 2 deliverable, two sets of ridership estimates were provided: those derived from an elasticity-based method, which provided a lower bound; and those derived from a survey-based method, which provided an upper bound. As indicated in the previous paragraph, two different denominators are also being used here to calculate mode shifts, one representing the broadest area for trips to and from the NESTS area ("Total Area"), and the other representing a narrower

area surrounding the NESTS area ("Eastern TC"). All four sets of figures (two methods times two areas) are presented below for reference, but the discussion following the tables will narrow the focus down to the mode shift impacts of desired three levels of the preferred strategy.

Table 4: Elasticity-based ridership forecast for Total Area

Daily Parking	Basic		Enhanced		High	
Fee Increase	*Shift*	*Trips*	*Shift*	*Trips*	*Shift*	*Trips*
$0	0.3%	(493)	0.6%	(1,056)	1.3%	(2,307)
$1	0.6%	(966)	1.2%	(2,033)	2.5%	(4,260)
$3	0.9%	(1,528)	2.0%	(3,390)	4.1%	(7,070)

Table 5: Elasticity-based ridership forecast for Eastern TC

Daily Parking	Basic		Enhanced		High	
Fee Increase	*Shift*	*Trips*	*Shift*	*Trips*	*Shift*	*Trips*
$0	0.5%	(493)	1.1%	(1,056)	2.3%	(2,307)
$1	1.0%	(966)	2.1%	(2,033)	4.3%	(4,260)
$3	1.5%	(1,528)	3.4%	(3,390)	7.2%	(7,070)

Table 6: Survey-based ridership forecast for Total Area

Daily Parking	Basic		Enhanced		High	
Fee Increase	*Shift*	*Trips*	*Shift*	*Trips*	*Shift*	*Trips*
$0	0.5%	(902)	1.0%	(1,804)	2.1%	(3,608)
$1	0.8%	(1,397)	1.7%	(2,921)	3.3%	(5,726)
$3	1.4%	(2,424)	3.0%	(5,240)	5.9%	(10,120)

Table 7: Survey-based ridership forecast for Eastern TC

Daily Parking	Basic		Enhanced		High	
Fee Increase	*Shift*	*Trips*	*Shift*	*Trips*	*Shift*	*Trips*
$0	0.9%	(902)	1.8%	(1,804)	3.7%	(3,608)
$1	1.4%	(1,397)	3.0%	(2,921)	5.8%	(5,726)
$3	2.5%	(2,424)	5.3%	(5,240)	10.3%	(10,120)

As can be seen on the tables, there are many ways to reach the 3% mode shift goal, depending on which forecast method is used and whether the Total Area or Eastern TC is the area of interest. The 5% goal is more elusive, showing up only in the bottom, right corner cells in Tables 5 and 6 (highest service level and parking cost), and two cells in Table 7. The 10% goal only appears in the bottom, right corner of Table 7. Using the elasticity-based forecasts, a 10% mode shift would require a parking increase of $5 per day, and then would only apply to trips headed to the Eastern TC area. Using the survey-based forecast for the Total Area, parking fees would need to increase by $10 per day in order to reach a 10% mode shift.

Although a 3% mode shift may be attainable with the High level of service and no change in parking fees (according to Table 7 , the survey based method), a more financially feasible way of

achieving this shift would be to implement the Enhanced service level and increase parking fees downtown and at Cornell by at least $1 per day. Table 5 (the elasticity based method, shows that an increase approaching $3 per day would be necessary at the enhanced service level, but from a practical standpoint, a $1 per day increase is much more feasible than a $3 per day increase; this would require approaching the High level of service however.

From the tables, it does not appear that a 5% mode shift is achievable without an increase in parking fees of at least $3 per day, unless the survey-based method reflected in Table 7 turns out to be the most realistic estimate. In that case, the High level of service and a $1 per day increase would achieve the goal. Given the tremendous cost of implementing that level of service, it may be more feasible to implement the Enhanced level of service and increase parking fees by up to $3 per day.

Without completing the feasibility study, it is impossible to say whether a 10% mode shift is unattainable for the study area as a whole. The tables indicate that parking fees would need to increase by at least $3 per day, and service on the preferred strategy routes would have to be at the High level. As shown below, such a mode shift would more than triple the current transit ridership in the area. It does not seem likely that funding the increased service would be possible, nor that imposing that much additional burden on automobile drivers would be politically feasible.

The above discussion does not preclude the possibility that mode shifts of 3%, 5%, and 10% may be more easily achievable in certain parts of the NESTS area. As discussed in the task 2 deliverable, the favorable reception to a new transit hub at Pyramid Mall and new express shuttles from there to Cornell and downtown Ithaca suggests that there is a good chance of making a noticeable impact on the Triphammer Road /Pleasant Grove corridor through the Village of Lansing and Cayuga Heights. These impacts will be examined more closely during task 4 of the study.

One other important note is that the additional service planning referred to in the task 2 deliverable—examining new park-ride shuttle service from the Route 79 corridor, for example—will have a marginal effect on the numbers presented in Tables 4 through 7. It is not expected, however, that any of the conclusions stated above would change.

3 Comparison to Current Mode Shares

For the sake of reference and as an overall reality check, we attempted to calculate the current transit mode share in the study area. Using the data available from the telephone survey, the regional highway traffic model, and the TCAT farebox ridership database, we were able to calculate the transit mode share to Cornell, to downtown Ithaca, and within the study area as a whole. For each of these areas, we used two methods to calculate the share: one method relied primarily on the telephone survey results, augmented by TCAT ridership data; the second method considered only ridership data and the regional traffic model. The two methods are not directly comparable because the first method implicitly includes all travel modes (including walking, biking, etc.), while the second method considers only bus trips and automobile trips.

Of the 500 households included in the telephone survey, just over 300 provided work/school and home addresses that were able to be geo-coded (a number of others provided one or the other address). The home addresses for these households were coded to Census block groups in the study area. The work/school addresses were coded as either "Cornell", "Downtown Ithaca", or "Other". In order to estimate the travel market to Cornell and downtown, the percentage of survey records assigned to each block group going to each destination was calculated. This percentage was then multiplied by the 18-to-65 population in each block group (according to the 2000 Census). This segment of the population was selected because the survey was restricted to persons 18 years of age and over, and only people working or going to school would have provided work or school addresses, thus limiting the upper age at 65. This method does assume that everyone between 18 and 65 either works or goes to school, which is not true; however, it is likely that people in that age group who do not work or go to school are at least partly balanced by people over 65 who do work. These portions of the block group populations were then summed up to yield the total estimated travel market from the study area to each of the destination areas.

The results of this method produced a reasonable estimate for Cornell (see below), but appeared to produce a somewhat high estimate for downtown Ithaca. The most likely explanation for this difference is that there were significantly more records in the survey of people traveling to Cornell than people traveling to downtown, so that the statistical precision for the Cornell estimate is greater than that for the downtown estimate.

The second method involves two steps. The first step involved extracting productions from the ITCTC regional model for the area of interest. These were expanded to full day person-trips by the method described on page 4 of this memo. The transit mode share was calculated by adding transit trips (from TCAT ridership data) to person-in-private vehicle trips and then dividing that into the transit trips. This number is not the transit mode share of all trips, but rather the transit share of all transit and automobile trips.

Cornell

According to the Cornell University website, the Ithaca campus has a student population of 19,300, and approximately 9,300 faculty and staff members. On a daily basis, therefore, over 28,000 people go to work or school at Cornell, assuming 100% attendance. Using the method described above, we estimated that some 22,200 people *living in the study area* made work or school trips to Cornell. Staff members at the University's transportation office confirmed that this estimate, 83% of the population coming from the study area, was in a reasonable range.

Calculating the current mode share to Cornell was then a simple matter of dividing current transit ridership by this total travel market. It is important to define clearly what this mode share represents: it is the mode share of people coming from the study area using NESTS area bus routes to the Cornell campus. It does not include ridership on campus routes. The mode share also assumes that all ridership on the NESTS routes to and from the campus is work- or school-related; to the extent that riders on these buses are making non-work and non-school trips, the calculated mode share will be an overestimate.

As of March 2002, the weekday outbound ridership from stops on the Cornell campus on NESTS routes was 1,100 passengers. Dividing these people making outbound trips (who presumably also make inbound trips to Cornell) by the total travel market yields a ***Cornell work and school trip transit mode share of 5.0%***. Again, this is saying that of the people living in the study area who make work or school trips to Cornell, 5% use NESTS routes (13, 30, 31, 32, 36, 37, 40, 41, and 50) to reach the campus. Of course, this figure significantly understates the role that transit plays at Cornell, since the on-campus routes are not included in the calculation. Adding riders on the 80- and 90-series campus routes into the total yields a ***Cornell overall transit mode share of 17.1%***. This figure assumes that transit riders on the campus routes make an average of two transit trips per day.

The second method of calculating the mode share to Cornell took the PM peak hour vehicle trip productions for Cornell[1] from the model (2,507) and multiplied by 10 to yield full day productions (25,070). Using a vehicle occupancy of 1.25 persons per vehicle results in a total of 31,338 daily person trips produced at Cornell. While this figure is about 15% higher than the total number of people working or going to school at Cornell, it is reasonable to assume that many of these trips reflect people making more than one round trip per day between the campus and some other location. It is also the case that the destinations of these person trips originating at Cornell include areas beyond the NESTS area to the south and east.

From TCAT ridership data, the total number of outbound boardings at Cornell stops (for all non-campus routes, not just NESTS routes) is approximately 1,400. Thus, the total person trips via automobile and transit leaving Cornell each weekday is roughly 32,730. The transit share of that total is 4.3%. Though this figure is not directly comparable to the 5.0% given above, it is reasonable that this figure is lower because it includes all trip purposes, not just work and school; one would expect the transit share of non-work and non-school trips to be lower than that for work and school trips.

Downtown Ithaca

According to www.downtownithaca.com, the total number of employees in downtown Ithaca is currently 3,500. The website did not define the area that was included in this estimate, but based on other information from the City of Ithaca, we assume that the area includes the commercial district south of Court Street, east of Aurora Street, north of Sixmile Creek, and west of Fulton Street. Using the method described on page 7, we estimated that there are approximately 5,200 people making work trips to downtown Ithaca. Our definition of downtown is somewhat larger, including the area south of Lincoln Street, west of Aurora Street, north of Wood Street, and east of the Cayuga Inlet. As mentioned earlier, this may be an over-estimate due to the smaller number of survey records in the sample for people working downtown (as compared to the number working or going to school at Cornell).

To calculate the work trip mode share to downtown, we needed to divide the number of transit riders making work trips to downtown by the number of downtown employees. From the TCAT

[1] The definition of Cornell used in the extraction of trips from the model is the area to the south of Forest Home Drive and Thurston Avenue, east of Game Farm Road, north of Mitchell Street/Ellis Hollow Road, and west of Stewart Avenue, but not including College Town. The productions excluded those trips headed to Ulysses, Enfield, and Newfield.

farebox ridership database, we have total outbound boardings from downtown segments, but that includes all riders, not just those making work trips. From the telephone survey, we found that 43% of current users use the bus to make trips to work. This is not the same as saying that 43% of people on the bus are making work trips, because the same 43% who use the bus to make work trips may make many other kinds of trips during a typical day; if they do, the total number of people on the bus making work trips at any given time would be less than 43%. Without an on-board survey, it was impossible to say what portion of the ridership on any given day is making a work trip; thus, we used the 43% as a reasonable estimate of work trip share on the NESTS bus routes. This figure is likely too high, given the large number of people making school trips on TCAT buses. Therefore, the mode share shown below should be considered an upper bound for downtown work trips.

Taking 43% of the 743 daily outbound boardings from downtown bus stops, and then dividing by 5,200 yields a ***downtown work trip mode share of 6.1%***. This means that 6.1% of the people living in the study area and working in downtown Ithaca use TCAT routes to reach their jobs.

The downtown area used to extract trips from the regional model is roughly congruent with the city of Ithaca south of Lincoln Street and west of Stewart Avenue, an area much larger than either of the two definitions mentioned above. The total PM peak hour productions from this area (from the regional model) is 2,778 (again excluding trips headed to Ulysses, Enfield, and Newfield). Multiplying by 10 and then by 1.25 to expand to person trips yields a total daily productions of 34,725. This number is much higher than either the estimated downtown employment from the website or the work trips to downtown from the NESTS area; the main reasons are that the total from the model includes all trip purposes—not just work trips—and that the definition of downtown Ithaca used in the model analysis is signficantly broader than that used for the other estimates.

From TCAT ridership data, the total number of outbound boardings at downtown stops (for all routes, not just NESTS routes) is approximately 2,100. Thus, the total person trips leaving downtown each weekday via automobile and transit is roughly 36,830. The transit share of that total is 5.7%. As with the Cornell analysis, though this figure is not directly comparable to the 6.1% given above, it is reasonable that this figure is lower because it includes all trip purposes, not just work trips.

Study Area Overall

Although the telephone survey did not ask any questions that could produce an estimate of overall transit mode share for the study area, a number of responses can be combined to produce an estimate. All respondents were classified as either riders or non-riders. All non-riders were asked questions about how often they made work and/or school trips in the area. Riders were asked how many days per week they use transit. For non-riders, it was assumed that each day that they go to work or school, they make two trips (there and back). The next step was to add a factor to account for non-work trips. According to the 1995 Nationwide Personal Transportation Survey (NPTS), work trips account for 17.66% of total travel. Thus, for every work trip, the average person makes 4.66 non-work trips.

The respondents to the survey who work in the study area reported that they work just under 5 days per week on average. They therefore make just under 10 work trips per week. Adding in the factor for non-work trips yields a total number of trips per week of 56. It was assumed that the respondents classified as "riders" travel at the same rate as the non-riders. Therefore, multiplying 56 trips per week by the 500 respondents yields a total of 27,985 trips per week made by survey respondents.

Each rider in the survey was asked how many days per week he or she uses transit. The responses were summed up to yield a total of 499 weekly transit days of use among survey respondents. It was assumed that each rider makes 2 trips per day on average, resulting in 998 transit trips per week among survey respondents. Dividing 998 by 27,985 results in an ***overall transit mode share of 3.6% for the study area as a whole***. This figure is lower than those for trips to Cornell and downtown Ithaca, as would be expected; transit mode share is generally higher to areas where there is a concentration of service, as there is at Cornell and downtown. This figure, therefore, seems to be a reasonable estimate of overall transit use in the context of the other estimates from the telephone survey.

The second method of estimation, using the regional model, can also be applied to the study area overall. The total number of PM peak hour productions in the study area is 13,807, and the number of productions to areas within eastern Tompkins County (excluding Ulysses, Enfield, and Newfield) is 7,898. Multiplying by 10 and then by 1.25 to expand to daily person trips yields a total of 172,600 person-in-automobile trips to all areas, and 98,725 to the eastern two-thirds of the county. For the transit trips total, all outbound boardings on all routes serving the NESTS area were summed up to reach a total of 3,315. Adding this figure to the person-in-automobile trips and then dividing it by that sum yields an overall transit mode share of 1.9% including trips to everywhere, and a mode share of 3.2% within the eastern two-thirds of the county. This latter figure is the one more relevant to the study, and the fact that it is quite close to the figure calculated from the telephone survey lends credence to the validity of both methods. It seems reasonable to assume with some certainty that ***the current transit mode share in the NESTS area overall is between 3% and 4%.***

Appendix B

Memorandum on Alternatives for Parking Payment at Cornell University

Background

Current off-street parking facilities on the grounds of Cornell University include both garage structures and open lots; some of these off-street facilities also contain metered spaces. Parking on the University grounds involves paying an annual permit fee or using parking meters. The annual permit is affixed to a vehicle for visual verification by enforcement staff. Cornell University is seeking to promote transit use by students, faculty and staff. However, after the initial investment in the annual parking permit, the marginal parking cost for each individual trip is reduced to zero.

This brief report examines technology alternatives that would support modifying the parking payment structure to replace the annual permit fee with pay-per-use parking. Those who park less often would pay less than those who park frequently. This would remove a barrier to transit use for those who make fewer trips to the University or would be willing to make some trips by transit. An underlying assumption in this report is that it is not worthwhile to examine attended pay-per-use approaches (e.g., a cashier booth) since the required full-time staff for each facility would markedly increase staffing costs over the current permit inspection approach.

This report:

- Defines the various different types of payment methods, introducing the concept of account-based payment.
- Provides additional detail about prepaid stored value accounts, these being relatively new to parking, including how such accounts operate from the perspective of the University and account holders;
- Discusses different types of personal devices (e.g., cards) provided to account holders so that they can pay for parking using their account;
- Reviews various approaches to automated parking payment and the technology involved, including gated and open access;
- Identifies some alternative approaches to violation monitoring with open automated systems; and
- Lists rough unit costs.

Payment Methods

This section reviews the various types of payment methods that could be used with automated pay-per-use parking.

Conventional

Conventional payment methods are defined here as coin, bills and checks. Checks cannot be verified by automated equipment. Automated cash acceptance equipment – familiar to the general public through vending machines – can accept and verify all US coin and bill denominations, and reject Canadian currency.

Different devices are used for verifying coins and bills. Coin verification uses characteristics such as weight and size; most devices also use the magnetic signature of the correct metallic composition to help detect counterfeit and foreign coins. Bill verification uses optical sensors to accept only US currency and distinguish between different bill denominations. The manufacturers calibrate these devices to only accept coin and bills within certain ranges – known as the "acceptance band". As a result, these devices must sometimes reject valid currency, accept invalid currency or incorrectly identify the denomination. The optical characteristics of bills in circulation vary widely. Also, there are now various "state" versions of the quarter. In practice, the acceptance bands must be set broadly to avoid excessive rejection that causes patron frustration and delays. The necessary consequence is that a certain amount of currency will be accepted incorrectly by automated equipment.

Exact change can be required, but in most cases parking equipment would accept nickels, quarters, dollar coins, $1 bills, and $5 bills (depending on the payment amount) and provide the accepted coin types as change. Coins are recirculated to change hoppers. Bills are fed into a vault, and coins are fed into a separate vault (after the change hoppers are full). Personnel must frequently visit cash accepting equipment to retrieve these vaults, and to replenish change hoppers when needed.

Patrons often find using cash accepting equipment awkward from a vehicle, in particular in winter or windy conditions. This might be addressed by limiting cash acceptance to automatic coin baskets (familiar to many from their use in automated toll plaza lanes). Yet another concern with cash acceptance is the heavy maintenance requirements due to frequent coin jams and the frequent cleaning needed by internal optical sensors.

Financial Institution Cards

It is possible to accept credit or debit cards at automated equipment, and the public is now quite familiar with this concept from gas station pumps. The card is manually inserted and removed from a slot, and the magnetic stripe data is read. While accepting financial institution cards may be attractive to some patrons, and reduces the volume of cash that needs to be processed, there are several issues that interfere with their effective use for parking payments.

With a debit card, the device must be online with a financial institution clearing system, so there must be a phone line. After the customer uses the keypad to enter the required account identification and PIN number, the financial institution system confirms sufficient funds are available in the bank account and authorizes the transaction. Debit card payment would be awkward from the seated position in a vehicle and the required patron keypad entries make for long transaction times.

Using a credit card from a vehicle would also be awkward. The device must still be online to complete a guaranteed payment transaction, although the need for a PIN pad is eliminated. Transaction times can be further reduced by not requesting an online authorization. However, higher transaction charges apply.

The most fundamental problem is that, although the specific financial institution charges for such transactions vary, it is generally not considered economical to accept financial card payments for average transaction values less than about $5-$10.

Account-Based Payment

Account-based payments are an increasingly common alternative for use with automated equipment, if users can be pre-registered as is the case with University students, faculty and staff. Accounts avoid the need to accept cash at the parking equipment and the charges associated with accepting financial institution cards for low value payments. A parking payment account can be postpaid (like a credit card) or prepaid (like a debit card).

Either approach must provide account holders with some device to make payments from the account. A postpaid account holder would be invoiced – likely on a monthly basis, while a prepaid account holder would deposit funds with the university in advance. The postpaid approach has costs associated with invoicing and collections on delinquent accounts, while the prepaid approach must provide convenient ways for patrons to make prepayments. A prepaid account has the advantage of providing the University with the opportunity to earn revenue by investing the prepaid funds.

Prepaid Accounts

Given the disadvantages of accepting cash and financial cards at automated pay-per-use parking equipment, we suggest that the University focus on prepaid accounts. University visitors and those who choose not to register for a prepaid account could use the parking meters.

The payment device (more information about payment device alternatives is provided in the next section) used by the account holder identifies their account number, but automated payment equipment can be online or offline:

- **Online system:** The parking equipment communicates with a central system to confirm that there is a sufficient account balance. The central system reduces the account balance and maintains a database of payment transactions for reconciliation and accounting purposes.
- **Offline system:** The current account balance is securely recorded in the payment device, meaning that the transaction can be completed without any central systems communication. The parking equipment reduces the account balance stored on the payment device. The equipment also accumulates records for completed transactions and, typically at the end of each day, sends them in a batch to the central system. The central system maintains a database of payment transactions and keeps an independent record of account balances.

An offline system is usually necessary for a mobile system (e.g., bus fareboxes), where it would be more challenging to keep the payment accepting equipment continuously online. For fixed devices such as parking equipment, either approach could be used.

Any prepaid account system must provide convenient ways for patrons to make prepayments and increase their balance (often referred to as “revaluing”):

- **Attended locations:** Attended locations on the University grounds that accept payments could be equipped for revaluing transactions. Ideally, these locations would accept credit and debit cards in addition to cash and checks. In an online system, these locations need to be online with the central system – to send revaluing transactions immediately so the account balance can be updated. In an offline system, the revaluing transactions can be sent in a batch

at the end of the day but a device must be available to immediately increase the balance in the payment device.

- **Unattended locations:** Self-service kiosks can be set up to allow unattended revaluing. These machines would accept cash as well as perhaps financial cards. As discussed for attended locations, these devices could be used in an online or offline system.


Source: Stanford

- **Remote payment:** This refers to any revaluing method where the account holder does not physically present the payment during the transaction. This basically limits the possible payment methods to credit card transactions and checks. The main implication of this is for offline systems. While the central system balance can be updated immediately, the balance on the payment device can only be increased the next time the payment device is used i.e., at parking equipment or an attended sales location). Also, the ability to increase the balance on the payment device needs to be added to the parking equipment. The following are several remote payment alternatives:
  - **Mail-in:** Customers mail in a check or credit card authorization to a customer service center.
  - **Phone and Internet:** Customers call a customer service center and provide a authorize a credit card payment. A website could also be set up to support online payment by credit card.
  - **"Autoload":** Customers can pre-authorize specific ongoing credit card payments on a calendar basis or whenever the balance drops below a set minimum.

Payment Devices for Account-Based Payment

This section briefly describes alternative payment devices for automated pay-per-use parking:

- **Bar Code Card:** The account number is printed on the card as a bar code, and the card is typically laminated to help avoid smudging. The card is held near a laser scanning plate (as at a grocery checkout), which reads the code. This is only suited to online systems. The advantage is a low cost device with fairly good durability. The disadvantages are the awkward use from a vehicle and the problems with scanner obstruction from salt spray in winter conditions.
- **Magnetic Stripe Card:** The account number is recorded as data in the magnetic stripe. The card carrier would in this case likely use thick plastic (i.e., the same as a financial card), and the card would be read much like a financial card. The account number would be read from the stripe, and in an online system it could also store the account balance if read/write communications is used. These cards are very low cost, but awkward to use from a vehicle. The magnetic stripe is vulnerable to damage and the magnetic reading heads in the parking equipment need frequent cleaning. There is also some fraud risk through the magnetic stripe being duplicated on a fake card (known as "skimming"), since magnetic stripe encoders are commercially available. Balance discrepancies would not be noted by the central system until it had processed transaction records from multiple cards that use the same account number.

At this point, all parking equipment would be instructed to no longer accept payment from that account beginning the following day.

- **Contact Smart Card:** The account number is recorded as data in computer chip memory, embedded in a plastic card with the same dimensions as a financial card. The card is read by insertion into a slot. The account would be read from the chip, and in an online system it could also store the account balance if read/write communications is used. These cards are more expensive than magnetic stripe cards and are still awkward to use from a vehicle. The cards are less vulnerable to damage and the reader equipment needs less maintenance. The risk of fraud is reduced since the embedded chip can incorporate security measures to make the creation of a duplicate card more difficult. Another opportunity with a smart card is the increased data capacity. This additional capacity could be used to support additional applications for the University or organizations it partners with (e.g., access control for University facilities, a transit pass). The emergence of such partnering opportunities would be one of the main reasons to consider a smart card based system.

Source: SchlumberaerSema

- **Contactless Smart Card:** These are similar to contact smart cards, except that the card has a short range read-only or read/write wireless communications interface. Card dimensions remain the same as a financial card. Parking equipment can communicate with the card once it is brought within about four inches of a target area, even if the card remains inside a wallet or purse. These cards are less awkward to use from a vehicle, card durability increases and required reader maintenance decreases. However, the cards are even more expensive than contact smart cards.


Source: HID Corporation

- **Proximity Card:** A proximity card is a lot like a contactless smart card, but using a different type of read-only or read/write wireless communications interface that can extend the range to as far as a few feet. These devices use a larger internal antenna and as a result are usually a three or four times thicker than a standard financial card. These cards are a lot easier to use from a vehicle, but the cost increases still further. The longest read ranges are available from the "active" cards that have an internal battery, but these cards are also a few millimeters thicker and would need to be replaced when the battery wears out. Batteries usually last a couple years, although the actual life depends on how often the card is read. Many people are familiar with these cards as read-only employee identification badges for access control, and they would usually be worn around the neck or in a clip-on badge holder rather than be put in the wallet. It is also possible that a proximity card type device could be mounted externally on the vehicle in an unobtrusive location on the driver side.


Source: Keri Systems

- **Transponder:** These devices are similar to proximity cards and contactless smart cards, but incorporating a longer range read-only or read/write wireless communications interface that extends the range out to as far as ten to twenty feet. A transponder is also larger, with dimensions similar to a deck of playing cards. Typical mounting is on the upper windshield interior, with the antenna set up overhead to read the account

Source: Mark IV Technologies

identification as the vehicle passes through. Transponders usually contain a battery and will require replacement after several years. Transponders require virtually no effort on the part of the driver, but are the most expensive. The overhead installation for the antenna and the requirement for controller electronics in a separate enclosure make installation much more expensive than for the various card readers. Another concern with transponders is that they remain in the vehicle while it is unoccupied and patrons might be concerned that this would create a temptation for break-ins.

- **Bar Code Decal:** An alternative approach for "hands-free" access is a bar code decal. The very inexpensive decal is mounted on the driver side window and is read by a laser scanner when the vehicle pulls up. This approach is not likely to be suitable for Cornell because the scanner plate would tend to become obstructed from salt spray during winter conditions.
- **License Plate Recognition:** An integrated video camera and infrared illumination unit captures an image of the vehicle license plate and feeds it to the controller, when triggered by a loop vehicle detector. The controller software uses pattern recognition algorithms to recognize the license plate characters in the image. No payment device is needed, but the license plate recognition system is relatively expensive. If the gate arm fails to activate, security can view the plate image on a PC to confirm the plate number is valid.

Source: Hi-Tech Solutions

Automated Parking Payment Alternatives

This section reviews various approaches to operating automated pay-per-use parking. Some of these approaches use gated access, while others use open access:

- **Pay on Entry:** Parking entry and exit is restricted to a limited number of locations for each garage or lot. Each entrance and exit lane is equipped with a gate arm. The payment device reader activates an entry gate arm. A loop vehicle detector activates an exit gate arm for exiting vehicles, so vehicles can only enter by activating an entry gate arm. Each gate arm is also usually equipped with a downstream loop vehicle detector to ensure that the gate arm only lowers once the vehicle has cleared. There is also an intercom system, so that the patron can summon assistance if a gate arm will not activate. This is a closed access system suited to parking charges that do not vary with parking duration. One difficulty with gate arms is that they are commonly[1] broken or stolen, costing about $25-$50 for each replacement.

Source: Engineered Parking Systems

- **Pay on Exit:** Parking entry and exit is restricted to a limited number of locations for each garage or lot. Each entrance and exit lane is equipped with a gate arm. The payment device reader activates an entry gate arm. However, payment is not collected on entry. Rather, the system records the time of entry. The payment device also activates an exit gate arm, collecting payment based on the time since entry. Each gate arm is also usually equipped with a downstream loop vehicle detector to ensure that the gate arm only lowers once the vehicle has cleared. There is also an intercom system, so that the patron can summon

[1] For example, Emory University recently reported that it needs to replace about 300 gate arms each year. See http://www.emory.edu/WHEEL/Archive/00Sep22/arts1.html.

assistance if a gate arm will not activate. This is a closed access system suited to parking charges that vary with parking duration.

- **Pay on Foot:** Parking entry and exit is restricted to a limited number of locations for each garage or lot. Each entrance and exit lane is equipped with a gate arm. A payment device reader activates an entry gate arm. However, payment is not collected on entry. Rather, the system records the time of entry. Just before exiting, the patron uses the payment device with a pay on foot kiosk, with payment based on the time since entry. After payment at the kiosk, the payment device is then able to activate an exit gate arm. Each gate arm is also usually equipped with a downstream loop vehicle detector to ensure that the gate arm only lowers once the vehicle has cleared. There is also an intercom system, so that the patron can summon assistance if a gate arm will not activate. This is a closed access system suited to parking charges that are fixed or vary with parking duration. It is often used instead of the pay on entry or pay on exit approaches in high volume facilities to reduce queuing in the entry/exit lanes, but queuing will be less of an issue if only account-based payment is used. A disadvantage for Cornell is that patrons would tend to see using the kiosk as less convenient than the current permit system.
- **Pay and Display:** Entrance and exit lanes are not equipped with gate arms. After parking, the driver uses the payment device at a pay and display kiosk. The kiosk prints a ticket that indicates the time up to which the vehicle is permitted to park, which is left on the dashboard as evidence of parking payment. This is an open access system suited to parking charges that are fixed or vary with duration. Violation monitoring is required. A disadvantage for Cornell is that patrons would tend to see using the kiosk as less convenient than the current permit system.
- **Pay by Space:** Entrance and exit lanes are not equipped with gate arms. After parking, the driver uses the payment device at a pay by space kiosk. At the kiosk, the driver also enters the parking space number occupied and the vehicle license number. The patron receives a receipt that includes their license number, space occupied and parking time limit information. The kiosk records the parking time limit information for that space along with the license number. This is an open access system suited to parking charges that are fixed or vary with duration. Violation monitoring is required. A disadvantage for Cornell is that patrons would tend to see using the kiosk as less convenient than the current permit system.

Source: Secom International

Overall, the pay on entry (or pay on exit if the charge will vary with duration) approach seems best suited to the situation at Cornell University. Exclusive use of an account-based payment device, rather than supporting cash payment as well, will speed the transactions at the entry/exit gates and avoid the need to use pay on foot kiosks.

However, these closed access approaches would need to segregate – and provide separate ungated access to – any metered spaces, still needed to provide a cash alternative for patrons without an account. If separate ungated access were infeasible, an open access approach would be necessary even though it would be somewhat less convenient for patrons. Of the open access systems discussed, pay by space reduces the inconvenience by avoiding the need to return to the car to put the ticket on the dashboard.

Violation Monitoring

This section discusses various forms of violation monitoring associated with the different parking approaches.

Manual

Each open access approach (i.e., pay and display, pay by space) requires violation monitoring. As with the permit checking inspections, staff would routinely inspect open access facilities:

- For pay and display, inspection would be similar to the current permit checking. Each vehicle would be visually checked, and those without a valid pay and display ticket on the dashboard would receive a citation.
- For pay by space, the inspector first visits the kiosk to get the current printout showing the vehicle license plates valid to park in particular spots. Vehicles not authorized by this list would receive a citation.

Automated

Automated violation monitoring can enable a modified ungated approach for closed access parking systems:

- Even without gate arms, drivers could be expected to pay on entry. This would be enforced using a license plate recognition system. For any driver entering without using their payment device – or entering through an exit lane – their license plate image is retained. The license plate characters are recognized automatically, or if necessary staff would view the captured image of the license plate and manually determine the number. The vehicle owner would receive a citation by mail. This is a well-established violation monitoring approach that is used extensively with toll road lanes that have eliminated gate arms.
- In a pay on exit or pay on foot system, a similar approach can be used to eliminate the need for gate arms. In this case, the plate image is captured if a vehicle enters the lot without using the entry reader or exits the lot without paying first.

Rough Costs

The following tables provide rough information on the installed cost per unit, for technology we consider potentially suited to use at Cornell University based on this initial assessment. Actual costs will vary significantly based on factors such as the quantity ordered, selected features and the specific terms of the procurement.

Technology	Rough Cost Per Unit	
	Payment Device	Reader System
Contactless Smart Card	$4-$8	$500-$1,000
Proximity Device	$10-$40	$500-$1,000
Transponder	$30-$50	$15,000-$20,000

Table 1. Rough Costs for Payment Devices and Readers

Technology	Rough Cost Per Unit
Unattended Revaluing Kiosk	$40,000-$60,000
Authorized Entry Two Way Gate Arm System for Single Set of Entry/Exit Lanes	$20,000-$25,000
Pay by Space Kiosk (cashless)	$20,000-$30,000
License Plate Recognition System	$30,000-$50,000

Table 2. Rough Costs for Parking Equipment

Conclusions

A range of viable and well-established technology approaches could enable pay-per-use parking at the garages and surface lots of Cornell University. We suggest using prepaid accounts exclusively, with cash payments remaining available only at metered spaces. The following possible approaches to facilities access for account holders are suggested based on our initial assessment:

- With the emphasis on convenience for patrons relative to the current permit system, a system based on prepaid accounts and closed gate access is suggested for regular users. A potential alternative to gated access is a closed ungated access system, with violation monitoring using license plate recognition technology.

- If separate ungated access to the metered spaces is not feasible, an open access approach may be necessary, with pay by space kiosks suggested as the preferable alternative.

Appendix C

Memorandum on Financing the Recommended Improvements

MULTISYSTEMS

10 Fawcett Street
Cambridge, MA 02138

M E M O R A N D U M

DATE: December 19, 2002 (Revised January 22, 2003)

TO: Fernando de Aragon/ITCTC, Rod Ghearing, Dwight Mengel/TCAT

FROM: Larry Englisher

RE: FINANCING THE RECOMMENDED IMPROVEMENTS

JOB: 2213 NESTS TRANSIT PLANNING PROJECT

This memorandum addresses how service and facility improvements recommended as part of the NESTS study may be funded. Existing sources of funding are addressed first, followed by a discussion of potential additional sources. Finally, several funding scenarios are described.

1. EXISTING SOURCES OF TCAT FUNDING

Besides passenger revenues, there are currently several sources of government and institutional assistance for TCAT operating and capital funding as described below:

1.1 STATE OPERATING ASSISTANCE

New York State's State Transit Operating Assistance (STOA) program is the major source of operating funding. Currently, this source accounts for about 36% of the TCAT budget and is almost twice the combined City/County/Cornell funding. A portion of these funds requires a 100% local match.

There are several sources of the STOA funds. These include the state general fund and dedicated sources including the Mass Transportation Operating Assistance (MTOA) Fund and the Dedicated Mass Transportation Trust Fund (MTTF); upstate, the latter is generally used for capital funds only, although an exception was made in 2001 and 2002). There are also enhancements to the above funding from general funds deriving from the motor vehicle fee, motor fuel taxes and the suburban transportation fund (the latter has no relevance to upstate transit).

The upstate funds provided under MTOA and MTTF derive entirely from the Petroleum Business Tax.

Ithaca's share of STOA funds is part of the "Formula Bus" allocation. This derives largely (two-thirds) from the MTOA fund. Since most of the funds are not derived from Section 5311, no local match is necessary. The Formula Bus allocation is determined quarterly using an incentive-based formula: the

base formula approved for use in the state fiscal years[1] 2000-2001 and 2001-2002 was $0.405 per revenue passenger and $0.69 per revenue vehicle mile operated.

Additional formula funds for paratransit are based on $0.05 per revenue passenger and $0.30 per person in the total population. The formula is established within two to three months of passing the state budget. The formula does not usually change but adjustments are made in the form of discounts as needed. The state does not distribute any more funds than they expect to have and are not obligated to provide the amount that is requested. STOA funds are paid out by quarter.

For the period from April 2001 to March 2002, the amounts for Tompkins County were based on 2.699 million passengers and 1.718 million vehicle miles. This would result in a total of $2.279 million. For the state fiscal year 2000-2001, the total for Tompkins County was $2.189 million of which $1.787 million was non-Section 18b and did not require a match.

The 2002 TCAT budget show $2.714 million from traditional STOA funding sources, of which $2.017 million is based on TCAT service formula funds. The 2002 TCAT budget also shows $40,000 in other state funds, including $35,000 in matching funds for the federal preventive maintenance funding and $5,000 for bus rehabilitation and Rural Transit Assistance Program (RTAP).

1.2 State Capital Funds

The State offers a dedicated fund (SDF) that provides agencies other than the MTA with 100% state funding to address priority capital needs that exceed available federal resources, including the normal replacement of buses and facilities. During the State FY01-02, Ithaca-Tompkins received $0.738 million in SDF funds. The state dedicated fund amounts are based on fleet condition and are primarily used for replacement vehicles. Generally, the needs exceed the funding available.

1.3 State Demonstration Project Funds

New York State introduced the Innovative Mobility Demonstration (IMD) Program in the mid-nineties offering up to two years of additional operating funding for innovative services providing alternatives to the automobile. In 1994-1995, the State chose 13 projects for funding. CDTA in the Albany-Troy region funded its Shuttle Bug through IMD. Some of the projects continue in operation. Unfortunately, funding for this demonstration program was not renewed in subsequent years and it is our understanding that there is no opportunity for new state-sponsored demonstration projects. However, there are opportunities for grants under the Federal Jobs Access Reverse Commute Program discussed in Section 1.5 below.

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[1] Note that the fiscal years for TCAT and the state and federal governments are not the same; TCAT's fiscal year starts January 1, New York's starts April 1 and the federal government's starts October 1.

1.4 STATE MATCHING FUNDS

The State's Omnibus and Transit Purposes Program offers 50% of the non-federal match for federal transit fund programs and for flexible transfers of FHWA funding.

1.5 FEDERAL CAPITAL AND OPERATING FUNDS

Section 5311 funding for rural and small urban (population under 50,000) areas is distributed to states based on their non-urbanized area population. The states then distribute these funds. These funds provide an 80% federal share for capital projects and a 50% share for operating projects. The state will fund 50% of the non-federal share for capital projects. STOA funds may be used as a match for the federal funds for operating projects.

Section 5307, formerly known as Section 9, is the Urbanized Area Formula Grants Program. These funds are available for operating, preventive maintenance or capital expenditures for areas with populations between 50,000 and 200,000. Operating assistance under this program in FFY02 is not available to urbanized areas over 200,000 in population. Ithaca obtains 5307 funding under the governor's apportionment, which is based on population and population density (times population) for areas of less than 200,000 in population. For capital expenses, the federal share is 80% and the state will pay 50% of the non-federal share up to 10% of the total cost. For operating expenses, the federal share is 50% and the state operating assistance can be used as the local match. In FFY 03, Ithaca obtained $0.567 million under this program; in FFY02, Ithaca obtained $0.553 under this program. The 2002 TCAT budget shows $212,000 in urban funds and $280,000 in preventive maintenance funds plus $32,000 for grant administration, bringing the total federal urban funding to $0.524 million.

It may be possible to obtain a larger amount of 5307 funds in the future. FY2004 will be under the new TEA-3 legislation; some proposals include a larger share of funding for transit-intensive small cities. The FTA report to Congress in September 2000 entitled *The Urbanized Area Formula Program and the Needs of Small Transit Intensive Cities* investigated possible changes to the formula program to meet the needs of small transit intensive cities. Ithaca was classified as such under four of eight criteria, all four of these being per capita measures of service (vehicle revenue miles and vehicle revenue hours) and ridership (passengers and passenger-miles); these measures were examined against the average for larger urbanized areas (population between 200,000 and 1,000,000.). Ithaca appeared to rank about 19 of 77 cities based on this evaluation. The recommendations of the study were to consider changes in the 5307 program that would consider the existing needs of small transit-intensive cities based on the service they currently provide; the report was viewed by FTA as a starting point for a dialogue with Congress, the industry, and the public regarding the federal transit assistance program.

Section 5309, formerly known as Section 3, is the Discretionary Capital program. Such funds are for specific projects. This program limits expenditures for Bus and Bus Facilities to only 20% of the total program. The funds for bus programs under this program are totally earmarked. The federal share is

80% and the State will fund 50% of the non-federal share. In FFY 02, Ithaca received $0.618 million of the TCAT Center and $1.485 million for TCAT replacement buses. According to Rod Ghearing, TCAT has been fairly successful at obtaining Section 5309 funds. TCAT's capital needs include a large intermodal center (though recent developments put this project in jeopardy) and expansion of the TCAT operations base to have all enclosed bus storage and more office space, as well as the proposed transit center at the Pyramid Mall recommended in our study.

Another program that provides federal funding is the Jobs Access Reverse Commute (JARC) program, established through TEA-21; since TEA-21 ends in FY2003 (September 30, 2003), the continuation of the JARC program depends on the specifics of TEA-3. The JARC program uses a competitive grant application process. TCAT developed two FTA JARC proposals for $500,000 and $367,000. The 2002 budget shows a total of $124,000 in operating assistance from this program, the first year that this funding source has been used by TCAT. TCAT will have JARC funding in 2003 and is trying to extend it to 2004.

Besides the above federal transit funds, there is an opportunity to make flexible transfers from FHWA funds including STP, CMAQ and NHS funds. These transfers may be used to fund bus replacement, intermodal and park-and-ride facilities, bus facility rehabilitation, communications and fare collection systems, advanced technology, clean fuel buses, buses for innovative service and buses to meet ADA requirements.

1.6 City, County and Cornell University Funding

Under the current agreements, the city of Ithaca, Tompkins County and Cornell University[1] contribute equally to the local share of funding based on the deficit after revenues, and state and federal funding. The city and county shares are funded in part through the local sales tax. The local funding has increased in the past but is currently constrained by the financial problems being experienced at the city and county level. In the 2002 TCAT budget, each entity contributes about $491,000 and the total local share is $1.474 million or just under 20% of the budget. While state reserve funding has been able to address growing deficits, such funds cannot be used two years in a row and TCAT expects a fare increase to be needed in the coming year (CY 2003).

While Cornell is a partner in funding the local share, Ithaca College is not. The College does contribute to passenger revenue through an ID program, but the Ithaca College passenger revenue is only about 1.5% that of Cornell.

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[1] It should be noted that the local share that Cornell contributes does not constitute its total participation in funding TCAT. Cornell purchases the fares for its students, faculty and staff through a volume purchase. In FY 2002, this amounted to $1.42 million, which is more than twice the farebox and pass revenue generated by other riders and about three times the amount contributed by Cornell as its (one-third) share of the local funding. Cornell's total contribution including both fares and local share amounts to $1.91million or more than 25% of TCAT's total budget.

Table 1
TCAT Reported Funding

	Revenues	2000 Actual	2001 Budget	2002 Budget
1000	Passenger Revenue-Farebox, Passes	$ 583,944	$ 704,339	$ 674,000
1001	Passenger Revenue-Job Access	-	-	48,200
1002	Passenger Revenue-Drug Task Force	19,910	-	15,000
1003	Passenger Revenue-CU Vol Discount	968,534	1,281,001	1,421,000
1004	Passenger Revenue-Contracts	35,135	49,003	58,000
1005	Passenger Revenue-IC	-	-	22,000
1006	Special Services/Charters	68,973	99,000	97,000
1007	Gadabout Repair & Maint.	74,543	66,343	78,000
1008	Gadabout Rent	23,938	24,657	25,500
1009	Investment Income	34,621	5,000	7,000
1010	Other Revenues	8,594	-	4,500
1011	Gain on Sale of Equip.	1,000	-	-
1012	Other/TC Gadabout	75,005	-	-
1013	NYS STOA - TCAT Service	1,907,054	1,879,076	2,016,652
1014	NYS STOA - Tioga Transport	170,402	214,969	224,129
1015	NYS STOA - Swarthout	90,418	86,123	97,010
1016	NYS STOA - Gadabout	191,133	195,654	258,281
1017	NYS STOA - Job Access Mi. & Pass.	-	-	106,017
1019	NYS STOA - Tioga County Match	52,837	14,085	12,600
	"Traditional" STOA Sub-Total	**2,411,844**	**2,389,907**	**2,714,689**
1018	TC Job Access STOA Match	-	-	4,705
1020	NYS Other/Bus Rehab & RTAP	186,655	150,000	5,000
1021	NYS Prev. Maint Match	-	-	35,000
1022	Federal Operating Assistance - Urban	500,572	440,850	212,080
1023	Federal Op Assist. Grant Admin		39,375	32,625
1024	Federal Op Assist. Preventive Maint.		36,542	280,000
1025	Federal Op Assist. Job Access	-	-	123,667
1026	TOTAL Non Local Revenue	$ 4,993,269	$ 5,286,017	$5,857,966
1027	**2001 Surplus**	-	-	60,135
1028	CU Share	463,703	476,975	491,285
1029	County Share	463,703	476,975	491,285
1030	City Share	463,703	476,975	491,285
1031	**Total**	$ 6,384,378	$ 6,716,942	$7,391,956

2. POSSIBLE ADDITIONAL SOURCES OF FUNDING

2.1 COST SHARING/CONTRIBUTIONS FROM VILLAGES AND TOWNS

Because the recommended improvements are concentrated in the Lansing area and much of the benefit of reduced traffic accrues to Cayuga Heights, it is logical to consider whether direct contributions to TCAT from the Town and Village of Lansing and the Village of Cayuga Heights are a potential future funding source worth exploring. It is most likely that any contribution from these communities to the cost of operating TCAT would be at a fraction of the contribution made by Ithaca on a per capita basis.

In other cities, local community contributions have been employed as a way of funding improvements in particular communities. For example, in the Boston area, various communities including Lexington contribute the larger share of funding a community oriented bus service that is also supported in part by the regional transit authority. In St. Clair County, IL, various local communities provided contributions for stations and parking lots along the extended MetroLink (St. Louis area) light rail line.

There may be several hurdles to obtaining funding from these communities. One may be the opposition to duplicating County support -- Lansing is part of Tompkins County that is already funding one-third of the TCAT deficit. Another is the fear of opening a floodgate – funding operation is an annual event; they may be more receptive to a one time capital contribution or a small local match for a federal capital grant than opening the door to being an ongoing participant in funding operating deficits.

2.2 COST SHARING/CONTRIBUTIONS FROM EMPLOYERS/PRIVATE SECTOR BUSINESSES

Where there is a large employer who can directly benefit from the expansion of service, there would be opportunities for negotiating employer contributions. Cornell is by far the largest employer in Tompkins County and already contributes funds to cover one third of the operating deficit beyond its significant payment of fares for its students, faculty and staff. Since no single large private employer is likely to derive large benefits from the recommended improvements, garnering employer contributions seems improbable.

Ithaca College is another large employer in the area and is currently paying fares for faculty and staff. The Ithaca student pass that is offered is not a college funded pass like that provided for Cornell. Since the NESTS project does not have a large focus on Ithaca College, which is located south of downtown, the development of a larger contribution from Ithaca College does not seem to be an appropriate focus for this study.

A more likely source to be tapped for cost sharing is the Pyramid Mall and the other retail centers served by the proposed Mall Circulator. It might be possible to obtain some contribution toward the proposed Transit Hub at the Mall. A non-cash, in-kind contribution would be the most likely. (For example, LACMTA in Los Angeles negotiated an individual station maintenance and capital sharing

agreement for a proposed people mover.) These could include donating land for the Hub and providing snow removal and other maintenance at the site. These could be traded off for naming the transit hub and allowing information/advertising of Mall store events at the center. Another would be a one-time joint promotion of the transit hub and associated route changes. It might also be possible to obtain some contribution toward the operating costs of the Mall Circulator route.

2.3 Property and Property Transfer (Mortgage Recording) Taxes

Property taxes are used as a source of revenue by many transit authorities. In New York State, it is local governments (and not the state) that levy taxes on real property (land and any permanent structures attached to it); there is no other property tax. The State Constitution prohibits the imposition of taxes on intangible property. Separate property taxes generally apply for school districts and municipal/county government. A number of transit agencies around the country have been able to obtain dedicated revenue sources from the property tax. For example, in the Twin Cities, a 1.5-2 mil property tax provides 40% of the Metro Transit revenue. This mechanism for obtaining a dedicated revenue stream is not used at TCAT (nor to our knowledge anywhere else in New York State, most likely due to the state legislation that had created property transfer taxes as a revenue source for transit).

New York State legislation (Tax Law Article 11) established several mortgage recording taxes which generate revenue for both the state and localities.[1] The optional portion of the tax that provides local revenue is an important source of funding for both the MTA and the upstate transit authorities. In Erie County for example, NFTA obtains about 28% of a ¾% mortgage recording tax as well as an additional Erie County mortgage tax specifically enacted to support the rail system. In Syracuse, CNYRTA obtained about $2.54 million in dedicated mortgage recording tax revenues in FY99 (generated from ¼% in Onondaga, Oswego and Cayuga Counties), using it for both the local share of capital projects and for operating assistance. The mortgage recording tax provides almost 50% of the local share of operating assistance.

The mortgage recording tax is not currently used to generate funding for TCAT. Counties can opt out of the local part of the tax for specified periods of time, as is the case in Tompkins County. TCAT has estimated that if the tax were reinstated in Tompkins County, it could yield up to $750,000 per year. However the law stipulates that in counties without transit authorities, like Tompkins, a share of the mortgage recording tax is made available to capital projects for mass transportation, airports and aviation, sewage treatment, mental health and retardation facilities and municipal parks and historic sites that are already provided some state aid in proportion to the state aid. Therefore, without

[1] Besides the Mortgage Recording Tax, three local jurisdictions (Erie County, Broome County and certain towns in Suffolk County) as well as New York City impose real estate transfer taxes (Articles 31A, C and D) in addition to the State tax; in Erie County, this tax is 0.5%. The Erie tax revenue is dedicated to NFTA to be used for mass transportation services in the county as well as a reserve fund for repair of county roads and bridges.

additional legislation, TCAT would have to share this source of revenue with other eligible projects and might receive only a small share. With additional legislation, TCAT might be able to claim all of this revenue. Legislation to claim this revenue could be tied in with legislation to make TCAT as a transportation authority like NFTA, CDTA, RGRTA, CNYRTA and MTA. While legislative work and lobbying would be needed, this may be one of the most likely ways to obtain funding for transit improvements in Tompkins County and for the improvements recommended in this study.

2.3 DEDICATED COUNTY SALES TAX

Many transit agencies around the country have a dedicated source of revenue based on special sales taxes that were enacted in response to enabling legislation and local referenda. For example, 50% of MARTA's annual revenue in Atlanta comes from a 1% local option sales tax. Voters in Dade County (Miami, Florida) just approved a half-penny increase in the local sales tax, from 6.5 cents per dollar to 7 cents, to pay for extensive improvements in Metrobus service and construction and operation of a network of new rail lines that is to eventually reach every quadrant of Dade County. Santa Clara and San Mateo Counties in California have dedicated sales taxes as well. Erie County in New York (Buffalo) contributes funds from 1/8th of a 1% county share of the local option sales tax that accounts for 18% of NFTA's annual revenue. Since state law (Article 29) specifies that sales tax revenue is to be distributed to the counties and municipalities, NFTA had to make special arrangements with the County to gain access to this revenue and it is not truly a dedicated tax. Sales taxes in the downstate area of New York are one of the sources of revenue used for the Mass Transportation Operating Assistance Fund that in turn funds STOA in the 12-county metropolitan transportation commuter district. Sales taxed are not used in STOA funding update. Currently, there is no dedicated sales tax revenue source is available to TCAT, although sales tax revenues are used to cover part of the City and County share of local funding in a manner that is similar to the Erie County contribution to NFTA.

Article 29 of the New York State Tax Law authorizes counties, cites and some school districts to impose a local sales tax as complement to the statewide tax of 4%. The state handles administration of these local sales taxes that use the same base, and distributes the revenue. These taxes can range from ½% to 3% except where specific provisions allow an additional increment; Tompkins County is authorized to collect ½% or 1% additional tax. Thus the current rate in Tompkins County is 8% in total. The law requires that 25% of the revenue from the optional tax imposed by the County be distributed to towns and villages, while 75% can be retained by the County. Ithaca can impose a city tax which preempts the County tax and which the County must turn over to the city; if Ithaca does not impose an optional tax, it receives a proportional share of the county tax based on population.

As of December 2002, the sales tax in both Ithaca and Tompkins County will be 8%; this is the same rate as in effect in many upstate counties including Albany, Erie, Broome, Cattaraugus, Cayuga, Chemung, Chenango, Columbia, Cortland, Genesee, Greene, Herkimer, Monroe, Orleans, Oneida, Rensselaer, Schuyler, Seneca, Steuben, and Wyoming Counties. Only a few counties in the New York metropolitan area have higher sales tax rates – 8.5% in Nassau and Suffolk Counties and 8.25% in New York City, and the cities of Yonkers, Mount Vernon and New Rochelle.

Cities and counties may impose sales tax on certain items if they do not link to the overall State sales tax base. These include utility services, restaurant food and drink, hotel room occupancy and certain amusement charges. About 30 localities in the state have locally administered hotel occupancy taxes. Tompkins County already has a hotel/motel tax of up to 5% but this revenue is allocated to the General Fund of the County for the specific use for tourist and convention development. Cities and villages can impose selective gross receipts taxes on sales of utility services at a maximum rate of 1%; 57 cities other than New York City and 349 villages impose these taxes and three cities (Buffalo, Rochester and Yonkers) are authorized by the State to impose the tax at a 3% rate.

It is our judgment that obtaining revenue through additional sales tax would be difficult. It is likely to be much easier to un-suspend the optional mortgage recording tax, a source of revenue widely used by transit authorities in New York. (See Section 2.3 above.) Of course, the sales tax tool could result in a higher contribution to revenue depending on the size of the sales tax implemented. For comparison, note that in Erie County sales tax contributed $12.4 million in 1997 (60% of what it received from the farebox), while the regular mortgage recording tax generated $4.3 million for NFTA and the special recording tax generated $1.5 million.

2.4 MOTOR FUEL AND MOTOR VEHICLE EXCISE TAXES AND FEES

Federal taxes on motor fuel have been a source of funding for transportation since 1956 when Congress established the highway trust fund and for transit since the Surface Transportation Act of 1982 when the tax was raised and 20% was dedicated to the Mass Transit Account. Currently 2.86 of the 18.3 cents per gallon federal motor fuel tax goes to fund transit. Motor fuel taxes also contribute to funding transit at the local and state level. Taxes on motor fuel and motor vehicles are used to support transit in a number of metropolitan areas. For example, in Seattle, a 1% state motor vehicle excise tax provides 20% of Metro's total revenue. In Dade County, FL, besides the state tax of 13.9 cents a gallon, the County levies 15.5 cents and shares the revenue with municipalities; this revenue provides local assistance to the County's transit agency, Miami-Dade Transit.

In New York State, motor fuel is currently taxed as authorized by Article 12A (Tax on Gasoline and Similar Motor Fuel) and Article 13A (Petroleum Business Tax) of the New York State Tax Law. The law identifies the amount of the tax and how the revenue is to be distributed. The tax is made up of a few different taxes authorized by different sections of the law. Some funds from Article 12A are directed to particular accounts but by April 1, 2003, these provisions appear to expire and the funds revert to a distribution consistent with the Petroleum Business Tax. The latter directs 63% of revenue to the dedicated highway and bridge trust fund, 34% to the dedicated mass transportation trust fund for the metropolitan area and 3% to the dedicated mass transportation trust fund for other areas. The latter two are sources of STOA funds.

Besides the taxes in Article 12A and 13A, Article 21A authorizes a tax on fuel use. This article calls for a composite rate determined by adding together the taxes imposed by Article 12A and a sales tax component not exceeding 7%. The latter sales tax is the combined effect of sales and compensating use taxes (of Article 28) plus the local sales and compensating use taxes (of Article 29 Section 1210); this latter section authorizes up to 3% additional local sales tax administered by the state, except where special provisions in specific counties allows a higher tax --in Tompkins County a 4% local tax is authorized.).

Motor vehicle fees and motor fuel tax revenues are one source that is used to draw additional funds from the State General Fund to augment the STOA funding that derives from the dedicated sources (Petroleum Business Tax).

The total tax on gasoline as summarized by the Empire State Petroleum Association is $0.5354 per gallon, of which $0.3514 is due to state taxes and $0.184 is federal tax. The state tax is made up of $0.140 petroleum business tax, $0.128 sales tax at 8% based on $1.60 per gallon and $0.0834 excise tax and license and testing fees. These rates appear to be 2001 rates; in 2002, the petroleum business tax increased to $0.146 per gallon. Taxes on diesel fuel are slightly higher due to higher federal taxes (the state taxes are slightly lower).

Because the state has already dedicated the revenues from these taxes on gasoline to transportation, including transit, purposes, we do not consider gasoline taxes to be a likely source of additional revenue to fund TCAT transit improvements. Although Articles 12A and 13A do not refer to the ability of local jurisdictions (other than a city of one million or more which is authorized to levy a tax of one cent per gallon on *leaded* fuel) to levy further taxes on gasoline, Article 21A does and this tax is already in effect at the maximum allowed in Tompkins County.

It may also be useful to note the fact that besides opposition to imposition of new taxes and fees, there have been successful initiatives to repeal existing taxes and fees on motor vehicles. This November Washington State voters approved an initiative to strip a $15 local option vehicle license fee currently collected by four counties and the $3 motor vehicle excise tax filing fee collected by all counties in the state.

2.5 ADVERTISING REVENUE

Advertising can be a significant source of revenue for a transit agency, particularly in large metropolitan areas. Advertising can be placed inside and outside buses and on bus shelters. In recent years, wrapping the bus has been a popular way to provide for advertising. In some large urban areas, advertising on bus stop shelters provides for the shelter capital, installation and maintenance costs; a private firm constructs the shelters and maintains them for the purpose of advertising. In smaller communities, advertising may be less lucrative and some options for private sector roles in shelter programs may not be available.

Whether and how to use advertising can be controversial and many transit agencies have a policy regarding advertising. The TCAT Board has made a clear decision not to have advertising on the buses and the agency has determined that the revenues could not be expected to be higher than about $20,000 per year and that this would not justify the effort to engage advertisers and maintain the advertising.

2.6 Human Service Agency Cost-Sharing Agreements

Human service agency agreements enable transit operators to provide transportation of agency clients with human service participation in funding the subsidy. TCAT has had some discussions with local human service agencies but generally they are not currently providing a large amount of transportation and tend to rely on TCAT service as provided. While special contract arrangements have been implemented successfully in a variety of places, the service improvements recommended in this study do not focus on the clients of human service agency but on the work trip commuters and students who travel to downtown and Cornell. As a result, this alternative funding mechanism does not seem particularly appropriate to this study.

2.7 NY Works

This welfare to work program, introduced in 1997, was designed to help local agencies in the county-based social services system move welfare recipients to economic independence. The program makes use of funds from the federal Temporary Assistance to Needy Families Block Grant Program that the state Department of Temporary and Disability Assistance administers. The program created specific funding for transportation programs serving eligible recipients of federal (TANF) funds. The State Department of Labor and Department of Transportation partnered to administer these funds. The Private Industry Councils and alternate entities were to develop local plans that addressed transportation needs. The federal TANF program was due to be reauthorized this past September but thus far it has not been reauthorized. Obtaining welfare to work funding as a means of funding the recommended services would appear to be unlikely since the intent of the recommendations is not focused on welfare to work issues.

2.8 Municipal Parking Revenue

Linking parking revenue to transit is a way to have auto travelers cross subsidize transit. In some cases, the same agency or department handles transit and parking. The downtown parking facility in Ithaca is owned by the City of Ithaca. Parking fees are charged at this facility. However, based on our discussions with city officials, it appears that municipal parking revenue is going to be reinvested to fund parking facilities and will not be available to provide revenues for transit.

2.9 Private Parking Lot Tax

A special tax on private parking lots would require additional legislation. There are relatively few private parking facilities and this does not appear to be a strategy with a large payback for the effort involved. Any new tax would likely face strong political opposition.

2.10 Transportation Impact Fees for New Development

Another alternative funding source that has been used to fund transit improvements is impact fees on new development. This is particularly effective if large new developments are planned or if a transit project is being built in a new development area. Although the use of impact fees dates back to the 1920s, there has been a resurgence in the 1980s. Impacts fees are most likely applied in high growth areas where the political climate is very "progressive" and there is a strong "smart growth" movement. For example, San Francisco imposed a $5 per square foot fee for downtown office space as a condition for obtaining a certificate of occupancy. The Tri-Valley area of Alameda and Contra Costa Counties in California has impact fees on residential development of about $1,700 for each new single family home. California and Florida are the state where impact fees are most widespread but there is legislation in other states such as Illinois, New Jersey and Texas, authorizing local communities to impose impact fees. Impact fees are at the center of a controversy in many Florida counties, where opponents say the fees drive off development. The circumstances related to this study do not include major new developments and this strategy does not seem appropriate or feasible.

2.11 Benefit Assessment District

Where a transit project is designed to serve existing development, a benefit assessment district can be used as a tool to generate additional tax revenue within a specified benefit area. In Denver, the Downtown Mall Management District generates over $1.5 million annually to operate and maintain the downtown transit mall. In Miami, benefit assessments provided $20 million to repay bonds for the downtown Metromover. Special legislation to create a benefit assessment district would be required although existing state legislation may set the parameters surrounding such districts. It is our judgment that a much larger capital project than a transit center and bus route improvements would be required to make such a district politically feasible. Therefore, we do not recommend pursuing this strategy to support the recommendations of this study.

2.12 Sale-Leaseback / Certificates of Participation

These techniques are typically used for purchase of capital assets. Sale-leaseback enables private companies to buy and lease capital items back to a transit agency and enables the private companies to obtain tax benefits from the depreciation. These arrangements are typically for large capital purchases like rail cars and large bus fleet expansion; it may be hard to attract a private investor's interest in a small capital purchase. CTA saved over $35 million on 800 subway cars through a sale-leaseback arrangement. Certificates of participation enable transit agencies to obtain the capital for a large

purchase and to distribute the cost over many investors. For example, LACMTA in Los Angeles sold $29 million in 10-year equipment trust certificates (at 8% interest) for purchase of 1,000 buses in 1992.

2.13 JOINT DEVELOPMENT

Joint development enables transit agencies to benefit from private sector participation in a capital project development. This type of financing is particularly well suited to the development of a transit center. The two mechanisms for generating private sector funding are through joint use (e.g., leasing retail or office space) or by leasing or selling air rights. The proposed location of the transit hub at Pyramid Mall suggests that there would be limited possibilities for either of these options. The site is very small and is currently adjacent to the major retail center of the county. It is also not in an area of high-rise construction.

2.14 CONCLUSION

Based on the above review of funding options, we conclude that the following are the most likely sources of funding for the recommended transit improvements and have incorporated them in the funding analysis that follows.

1. Additional STOA funding based on increased passengers and revenue hours, subject to any limits or reductions on overall STOA funding at the state level
2. Local town and village contributions at a fraction of the City of Ithaca's per capita contribution
3. Mortgage recording tax revenue assuming un-suspending the tax and claiming all of it for transit
4. In-kind contributions from Pyramid Mall to cover a long-term lease of the land for the proposed transit center and ongoing cleaning and snow removal services.
5. Increased local shares split among the City, County and Cornell as needed

3. FUNDING SCENARIOS

This section discusses the funding of operating and capital costs associated with the recommendations of this study.

3.1 Operating Costs of Phases

The project recommendations are to be implemented by phase. The estimated additional gross annual operating costs (in constant 2002 dollars) in each of the five phases of the recommended service plan are shown in Table 2 below. The additional annual cost for each phase is the increment above the annual cost of operating the current service; the total operating cost in the 2002 TCAT budget for the current service is $7.39 million. (The costs in later phases reflect the cumulative effect of service enhancements in earlier phases.)

Table 2
Additional Annual Gross Operating Costs by Phase

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Immediate 1-2 years	Near Term 3-4 years	Mid Term 5-7 years	Long Term 8-10 years	Future 11 years and beyond
$242,290	$772,928	$1,150,251	$1,550,119	$1,995,744

3.2 Assumptions About Existing and Potential Operating Funding

STOA funding plays a large role in financing current TCAT services. Although STOA funding has increased over the years, the level of STOA funding in the future is less clear. Funding that derives from the Petroleum Business Tax fluctuates with the economy. Funding that derives from the State General Fund is subject to political and fiscal changes. To consider the possible impacts of changes in STOA funding, we created two STOA funding scenarios -- one scenario maintains STOA funding at the FY2002 level and another assumes that the portion of STOA funds that derive from the State General Fund would be eliminated; about 21% of upstate formula bus operating assistance derived from the State General Fund in SFY 2001-2002.

The optional mortgage recording tax in Tompkins County could contribute funds that could be used to increase the local contribution. We have assumed that the maximum that could be achieved through this source is $750,000 annually.

We have assumed that, based on the service improvements, local municipal contributions toward the operating deficit could be expected from the Town and the Village of Lansing, the Town of Ithaca and the Village of Cayuga Heights. These contributions have been assumed to begin in the Near Term

period and would be phased in (to a maximum of about $175,000); this assumes that the per capita contributions from the Towns and villages would be smaller than the per capita contributions made by the City of Ithaca given the fact that the bus service that is (and would be) provided in the Towns and villages is less intensive than in Ithaca. The per capita contributions for the Towns and villages were assumed to be 25% and 50%, respectively, of the per capita contribution from the City of Ithaca.

We also assumed that Cornell, the City and the County would remain equal partners. We understand that the City feels this is inequitable. Any change in the current arrangement would need to be mutually agreed upon by all parties. This study has no recommendations with respect to this arrangement among the primary partners.

3.3 Funding Scenarios For Operating Costs

Table 2 shows how each phase could be funded and what the impact on the local partner subsidies would be. This analysis was done in constant (2002) dollars, as instructed by the Client Committee, representing the simplified scenario where fare revenue and subsidies increase at the same inflationary rates as the costs of operation; thus, inflation can be ignored.[1]

We have attempted to show how additional funding could be used to keep the local partner operating subsidies at their current level for the first few years. Then, assuming limits on new sources such as the local town and village contributions and the mortgage recording tax, we have shown the impact on the local partner shares of the remaining deficit for the later years of the plan. The influence of varied levels of STOA funding is examined by comparing the two scenarios in Table 3. In the first scenario, we assume that STOA funding continues using the same formula and increases with ridership; this means that the STOA funding for the base service is unchanged and that additional STOA funds results from the service and ridership increases associated with the recommendations. In the second scenario, we assume that STOA funding is reduced; we have interpreted this to mean a reduction in the current level of funding associated with the base service and no additional funding as a result of service and ridership increases associated with the plan. Specifically, we have eliminated the more vulnerable portion of STOA funds that derive from general funds.

Figure 1 shows the results graphically.

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[1] In reality, this is rarely if ever the case. Fares typically increase only from time to time (rather than annually) and often do not keep up with inflation. Funding from the state and federal governments is subject to other influences.

Table 3
Funding the Operating Costs: Under Two Scenarios for STOA

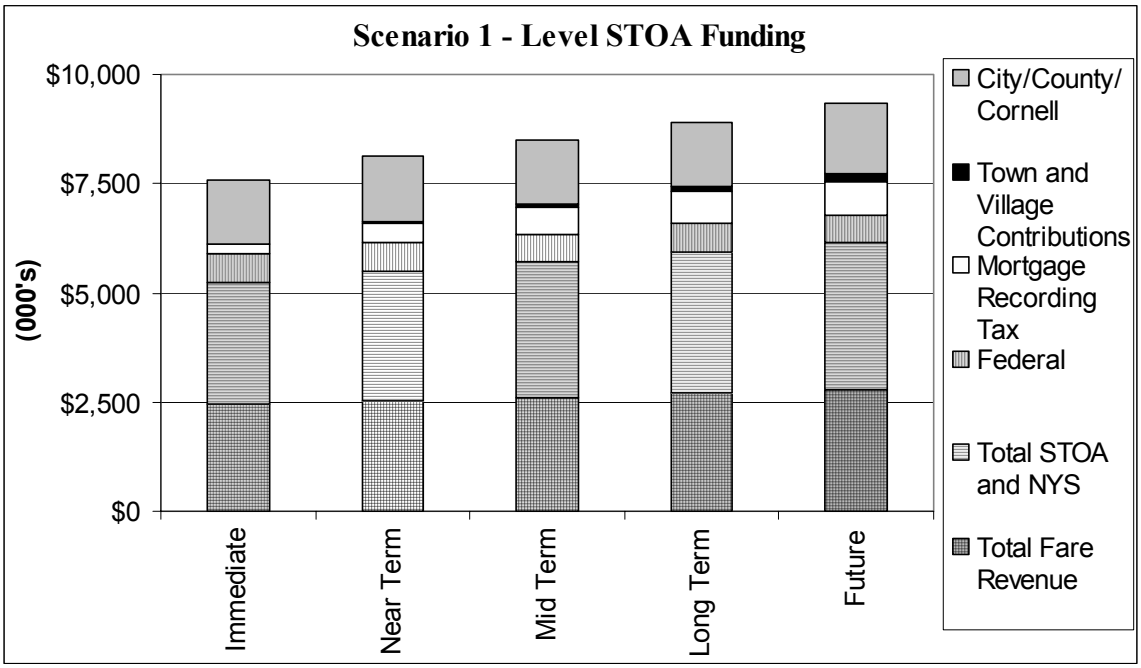
ANNUAL OPERATING COST AND FUNDING

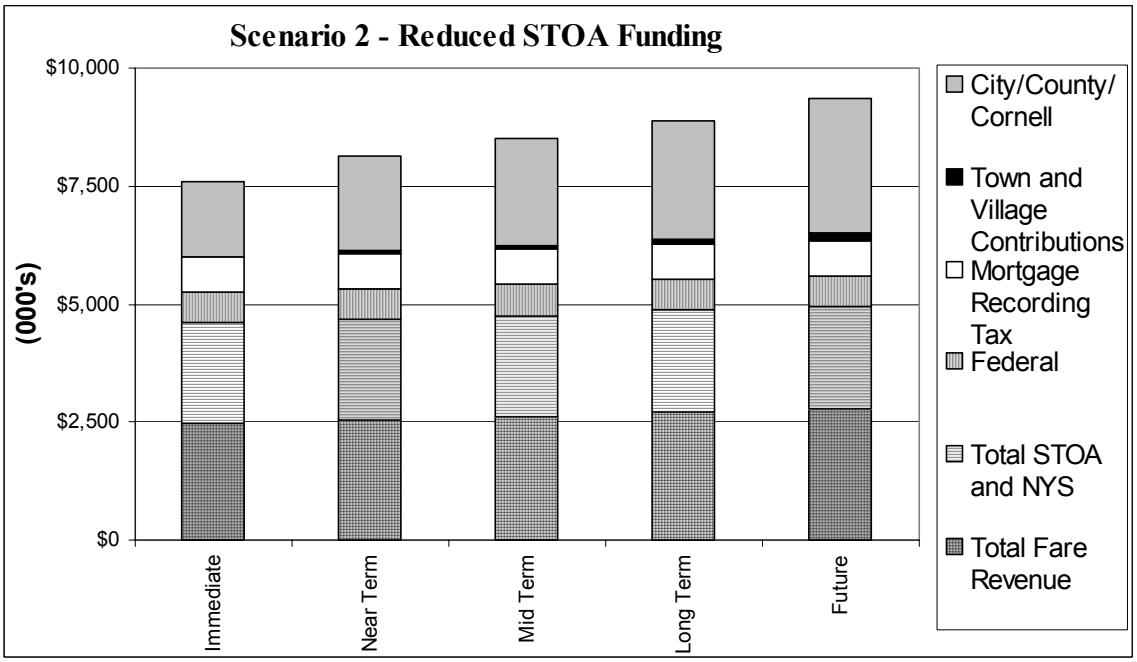
	Scenario I: Level STOA Funding					Scenario 2: Reduced STOA Funding				
Phase:	1	2	3	4	5	1	2	3	4	5
Years:	2	2	3	3	5	2	2	3	3	5
	Immediate	Near Term	Mid Term	Long Term	Future	Immediate	Near Term	Mid Term	Long Term	Future
TCAT BUDGET:										
Base Service Operating Cost	$7,391,956	$7,391,956	$7,391,956	$7,391,956	$7,391,956	$7,391,956	$7,391,956	$7,391,956	$7,391,956	$7,391,956
Base Service Fare Revenue	$2,450,200	$2,450,200	$2,450,200	$2,450,200	$2,450,200	$2,450,200	$2,450,200	$2,450,200	$2,450,200	$2,450,200
Federal Operating Assistance	$648,372	$648,372	$648,372	$648,372	$648,372	$648,372	$648,372	$648,372	$648,372	$648,372
STOA and Other NYS Funding	$2,759,394	$2,759,394	$2,759,394	$2,759,394	$2,759,394	$2,189,309	$2,189,309	$2,189,309	$2,189,309	$2,189,309
Net Local Operating Cost for Base Service (a)	$1,533,990	$1,533,990	$1,533,990	$1,533,990	$1,533,990	$2,104,075	$2,104,075	$2,104,075	$2,104,075	$2,104,075
STUDY RECOMMENDATIONS:										
Additional Operating Cost (b)	$242,290	$772,928	$1,150,251	$1,550,119	$1,995,744	$242,290	$772,928	$1,150,251	$1,550,119	$1,995,744
Additional Passenger Revenue (c)	$20,512	$91,202	$166,577	$278,464	$342,138	$20,512	$91,202	$166,577	$278,464	$342,138
Additional STOA (d)	$57,036	$236,224	$365,254	$484,595	$631,629	$0	$0	$0	$0	$0
Net Local Operating Cost of Recommendations (b-c-d)	$164,742	$445,502	$618,421	$787,060	$1,021,977	$221,777	$681,725	$983,675	$1,271,655	$1,653,606
Net Total Local Operating Cost (a+b-c-d)	$1,698,732	$1,979,492	$2,152,411	$2,321,050	$2,555,967	$2,325,852	$2,785,800	$3,087,749	$3,375,730	$3,757,680
Distribution of Local Shares:										
Mortgage Recording Tax Revenue Required*	$224,877	$455,638	$603,556	$747,195	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000
Town and Village Contributions	$0	$50,000	$75,000	$100,000	$175,000	$0	$50,000	$75,000	$100,000	$175,000
Cornell Share	$491,285	$491,285	$491,285	$491,285	$543,656	$525,284	$661,933	$754,250	$841,910	$944,227
City Share	$491,285	$491,285	$491,285	$491,285	$543,656	$525,284	$661,933	$754,250	$841,910	$944,227
County Share	$491,285	$491,285	$491,285	$491,285	$543,656	$525,284	$661,933	$754,250	$841,910	$944,227
Total Municipal/Cornell Share	**$1,473,855**	**$1,523,854**	**$1,548,855**	**$1,573,855**	**$1,805,967**	**$1,575,852**	**$2,035,800**	**$2,337,749**	**$2,625,730**	**$3,007,680**
Ratio of Town&Village Share to City Share		*10.2%*	*15.3%*	*20.4%*	*32.2%*		*7.6%*	*9.9%*	*11.9%*	*18.5%*

*Maximum Available Per Year Assumed to be $750,000

NOTE: City, County and Cornell Shares maintained at current level if possible

Figure 1
Operating Funding Scenarios





3.4 CAPITAL COSTS BY PHASE

Capital costs will be associated with the purchase of vehicles to operate additional service and new routes, construction of a transit hub at Pyramid Mall, and shelters and bicycle racks at various bus stops throughout the NESTS area. No land cost is included in the transit hub capital cost; an in-kind contribution from the Pyramid Mall consisting of a lease of the land for the transit center is assumed. There may be additional costs associated with automated vehicle location systems, transit signal priority, firehouse-type traffic signals for transit use at the one-lane bridges, automated fare collection systems and Cornell parking fee collection systems, but since these strategies are not explicitly incorporated in the proposed service plan and in some cases are more system-wide in nature, we have not included such costs in the capital costs of the recommended plan. Furthermore, we have not included any estimate for new vehicle storage capacity, but we understand that TCAT is already in the process of considering an expansion of its garage and maintenance facility.

Table 4 below shows the capital costs by phase. The unit costs and the assumptions regarding number of shelters and bicycle racks are shown in the table as well as the total costs of each item. The number of new buses shown in the table includes one spare small bus (in the Near Term) and one spare large bus (in the Long Term) in order to maintain an appropriate fleet-wide spare ratio.

Due to the fact that much of the recommended service increase occurs in the Near Term phase, the largest annual cost occurs in the Near Term period. (The costs shown are not annual but for the entire phase.) Despite the fact that the Immediate phase includes the Transit Hub at Pyramid Mall, the annual costs for this phase are lower than in the Near Term. (The structure envisioned for the Transit Hub is envisioned to be a low cost super-shelter design.)

Table 4
Capital Costs

Capital Item	Phase:	Immediate		Near Term		Mid Term		Long Term		Future	
	Years:	1 and 2		3 and 4		5 to 7		8 to 10		11 and beyond	
	Unit costs	*Number*	*Cost*	*Number*	*Cost*	*Number*	*Cost*	*Number*	*Cost*	*Number*	*Cost*
Small bus	$ 125,000	1	$ 125,000	6	$ 750,000	2	$ 250,000	0	$ -	2	$ 250,000
Large bus	$ 260,000	1	$ 260,000	1	$ 260,000	1	$ 260,000	4	$ 1,040,000	1	$ 260,000
Transit Hub	$ 150,000	1	$ 150,000								
Shelters*	$ 4,000	6	$ 24,000	6	$ 24,000	9	$ 36,000	9	$ 36,000	0	$ -
Bike racks*	$ 1,300	6	$ 7,800	6	$ 7,800	9	$ 11,700	9	$ 11,700	0	$ -
* assume 3 per year											
TOTAL			**$ 566,800**		**$ 1,041,800**		**$ 557,700**		**$ 1,087,700**		**$ 510,000**

Note that the above analysis does not consider the capital costs associated with other TCAT system needs. The Transportation Improvement Program (TIP) for 2001-2006 identifies the local, state and federal share associated with system-wide capital needs over this time frame. According to the TIP, the 5-year cost for **capital** expenditures that involve FTA grants amounts to $55 million including the following:

Discretionary Transit Program (FTA 5309)	$14.7M
Urban Transit Service Program (FTA 5307)	$39.8M
Gadabout Bus Program for Elderly/Disabled (FTA 5310)	$ 0.5M
Total*	**$55.0M**

*In addition, a contingency project was identified (Paratransit Operations Center Capital Acquisition) at a cost of $ 0.2M; funding for this program is not secured.

The capital program in the TIP includes 32 full buses, 1 30-foot trolley bus and 2 small buses as well as paratransit vans and support vehicles, passenger shelters. The local share of these capital costs is $1.3M; this is based on a 10% local share except for the purchase of 16 HEV low floor full-size buses for which the state is covering over 80% of the non-federal share. The costs are spread out somewhat unevenly over the six years with over 50% of the discretionary funds in the past fiscal year (2001/2002).

3.5 FUNDING CAPITAL COSTS

This section describes how the capital costs would be funded (see Table 5). The three most likely sources are federal, state and local funding. Although it might be possible to obtain private sector contributions, none have been assumed.

As discussed earlier, federal funding programs cover 80% of capital costs while the state will cover 50% of the local share up to 10% of the total costs. The primary question is whether federal funds will be available. The federal capital program is discretionary rather than formula based. TCAT has been successful at obtaining discretionary funds in the past. Reauthorization is now underway and we do not anticipate changes in the capital funding program approach. Nevertheless it is hard to predict whether specific capital projects will be approved for federal funding. To provide a range, we have examined three scenarios for federal funding. One scenario assumes all additional capital items for the recommended plan receive federal grants providing 80% of the cost. Another scenario assumes that only half the costs of capital items receive grants to cover 80% of those costs. The last scenario assumes that none of the capital items for the recommended plan receive federal grants. We have assumed that the state will pay 10% of the capital cost whether federal funding is available or not.

Local funding is assumed to make use of the mortgage recording tax that was also assumed in the earlier analysis of operating costs; only those funds not used to cover operating costs in a particular year are assumed available to cover capital costs for that year. (Note that the phases are multi-year so that any annual surplus from the mortgage recording tax for a given phase is multiplied by the number of years in that phase.) Because the operating scenarios affect the availability of mortgage recording tax funds to cover capital costs (since the use of the mortgage recording tax for operating funds varies with the availability of STOA funds), each of the three capital cost scenarios (based on availability of federal capital funds) must be examined under each operating cost scenario (based on the level of

STOA funds). Therefore, we have examined capital costs for six (three times two scenarios), as follows:

SCENARIOS	**Level STOA Funding**	**Reduced STOA Funding**
Federal 80% Capital Grants (for Additional Capital Items Required by Recommendations):		
For all capital items	Scenario 1	Scenario 2
For half of the capital items	Scenario 3	Scenario 4
For none of the capital items	Scenario 5	Scenario 6

We have also assumed that unexpended funds from the mortgage recording tax can be carried over to future years. We have used these excess funds to cover future year capital costs only.

The resulting shortfall in capital funding in certain scenarios and phases would need to be covered by either additional local funding or possibly by the State Dedicated Fund (SDF) if such funding can obtained (we understand that SDF is primarily used for replacement vehicles rather than additional vehicles).

As can be seen in Table 5, there is no shortfall in Scenario 1 (available federal capital funding and level STOA funding) or Scenario 3 (partial federal capital funding and level STOA funding) during the 15-year time period that was examined. A shortfall occurs in the four other scenarios during different years. A shortfall occurs in the Immediate Term (years 1 and 2) in all three scenarios (2, 4 and 6) with reduced STOA funding. In Scenario 2 (available federal capital funding but reduced STOA funding), this shortfall is less than $30,000 per year during the Immediate Term and averages over $25,000 per year over the 15-year period. In Scenario 4 (partial federal capital funding and reduced STOA funding), this shortfall is considerably larger -- over $140,000 per year during the Immediate Term and averages over $125,000 per year over the 15-year period. In Scenario 6 (no federal capital funding and reduced STOA funding), the shortfall is even larger – over $250,000 per year in the Immediate Term and averaging over $225,000 per year over the 15-year period. In Scenario 5 (no federal capital funding and level STOA funding), a shortfall occurs in the Long Term period (years 8 through-10). This shortfall is over $280,000 per year; the average shortfall over the entire 15-year period is almost $87,000 per year.

Of course, if SDF funds can be obtained, this shortfall would not affect the local share. If SDF funds cannot be obtained, the shortfall would presumably be the responsibility of the three local funding partners and any other municipalities that can be brought into the local funding formula.

A final caveat regarding the conclusions to be drawn from this analysis is that we have not incorporated inflation and have shown all dollar amounts in year of expenditure dollars; therefore the annual funds actually needed in any given future year would need to be adjusted to account for inflation effects.

Figure 2 shows the sources of the total capital funding over the 15-year time period for each scenario. The interactions between federal funding and either mortgage recording tax or other local sources can be easily seen in this figure.

3.6 TOTAL LOCAL FUNDING NEEDS FOR OPERATING AND CAPITAL COSTS

The total local funding commitment for each phase for both capital and operating would be determined by adding 1) additional operating funding needed per year for that phase from Table 3 and 2) any local capital funding for that phase to cover the shortfall after the mortgage recording tax surplus is used and after any SDF funds are assumed available from Table 5. Table 6 below summarizes the combined additional local share per year per partner for each phase and scenario, assuming that no SDF funds are available to cover project capital costs (at 100%) and that the additional local costs continue to be shared equally among the three original partners (the City, County and Cornell University). In Scenarios 1 and 3, there is no shortfall in capital funding until the Future Term (year 11) when the combined local share needs to increase by over $50,000 per partner (as shown in Table 6). In Scenario 5, the capital funding shows a shortfall in the Long Term and the operating funding in the Future Term (as described above). The result is an increase in the local share of about $93,000 per year per partner in the Long Term and about $83,000 in the Future Term. In Scenarios 2, 4 and 6, in which STOA funding is reduced, increases in local shares are needed throughout the 15-year study period and these increases are considerably larger. In the Immediate Term, these increases (per year per partner) range from about $43,000 in Scenario 2 to $119,000 in Scenario 6; by the Future Term, these increases range from $456,000 to $483,000, respectively. Figure 3 shows the same results graphically.

Table 5
Capital Costs* Under Six Funding Scenarios

CAPITAL FUNDING SCENARIOS

Phase:		1	2	3	4	5	1	2	3	4	5
		Immediate	Near Term	Mid Term	Long Term	Future	Immediate	Near Term	Mid Term	Long Term	Future
Years:		2	2	3	3	5	2	2	3	3	5
	Period:										
Capital Cost for Recommended Plan	Phase	**$566,800**	**$1,041,800**	**$557,700**	**$1,087,700**	**$510,000**	**$566,800**	**$1,041,800**	**$557,700**	**$1,087,700**	**$510,000**
WITH FEDERAL FUNDING		**Scenario I: Level STOA Funding**					**Scenario 2: Reduced STOA Funding**				
Federal Share (80%)	Phase	$453,440	$833,440	$446,160	$870,160	$408,000	$453,440	$833,440	$446,160	$870,160	$408,000
State Share (10%)	Phase	$56,680	$104,180	$55,770	$108,770	$51,000	$56,680	$104,180	$55,770	$108,770	$51,000
MRT Portion of Local Share	Phase	$56,680	$104,180	$55,770	$108,770	$51,000	$0	$0	$0	$0	$0
Other Local Funds or SDF	Phase	$0	$0	$0	$0	$0	$56,680	$104,180	$55,770	$108,770	$51,000
Other Local Funds or SDF	Annual	$0	$0	$0	$0	$0	$28,340	$52,090	$18,590	$36,257	$10,200
WITH PARTIAL FEDERAL FUNDING		**Scenario 3: Level STOA Funding**					**Scenario 4: Reduced STOA Funding**				
Federal Share (80% of Half)	Phase	$226,720	$416,720	$223,080	$435,080	$204,000	$226,720	$416,720	$223,080	$435,080	$204,000
State Share (10%)	Phase	$56,680	$104,180	$55,770	$108,770	$51,000	$56,680	$104,180	$55,770	$108,770	$51,000
MRT Portion of Local Share	Phase	$283,400	$520,900	$278,850	$543,850	$255,000	$0	$0	$0	$0	$0
Other Local Funds or SDF	Phase	$0	$0	$0	$0	$0	$283,400	$520,900	$278,850	$543,850	$255,000
Other Local Funds or SDF	Annual	$0	$0	$0	$0	$0	$141,700	$260,450	$92,950	$181,283	$51,000
WITHOUT FEDERAL FUNDING		**Scenario 5: Level STOA Funding**					**Scenario 6: Reduced STOA Funding**				
Federal Share (none)	Phase	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Share (10%)	Phase	$56,680	$104,180	$55,770	$108,770	$51,000	$56,680	$104,180	$55,770	$108,770	$51,000
MRT Portion of Local Share	Phase	$510,120	$937,620	$501,930	$137,047	$0	$0	$0	$0	$0	$0
Other Local Funds or SDF	Phase	$0	$0	$0	$841,883	$459,000	$510,120	$937,620	$501,930	$978,930	$459,000
Other Local Funds or SDF	Annual	$0	$0	$0	$280,628	$91,800	$255,060	$468,810	$167,310	$326,310	$91,800

*Note: Unless noted as annual, figures shown are for entire phase. MRT is the Mortgage Recording Tax. SDF is State Dedicated Fund.

Figure 2
Capital Costs by Source

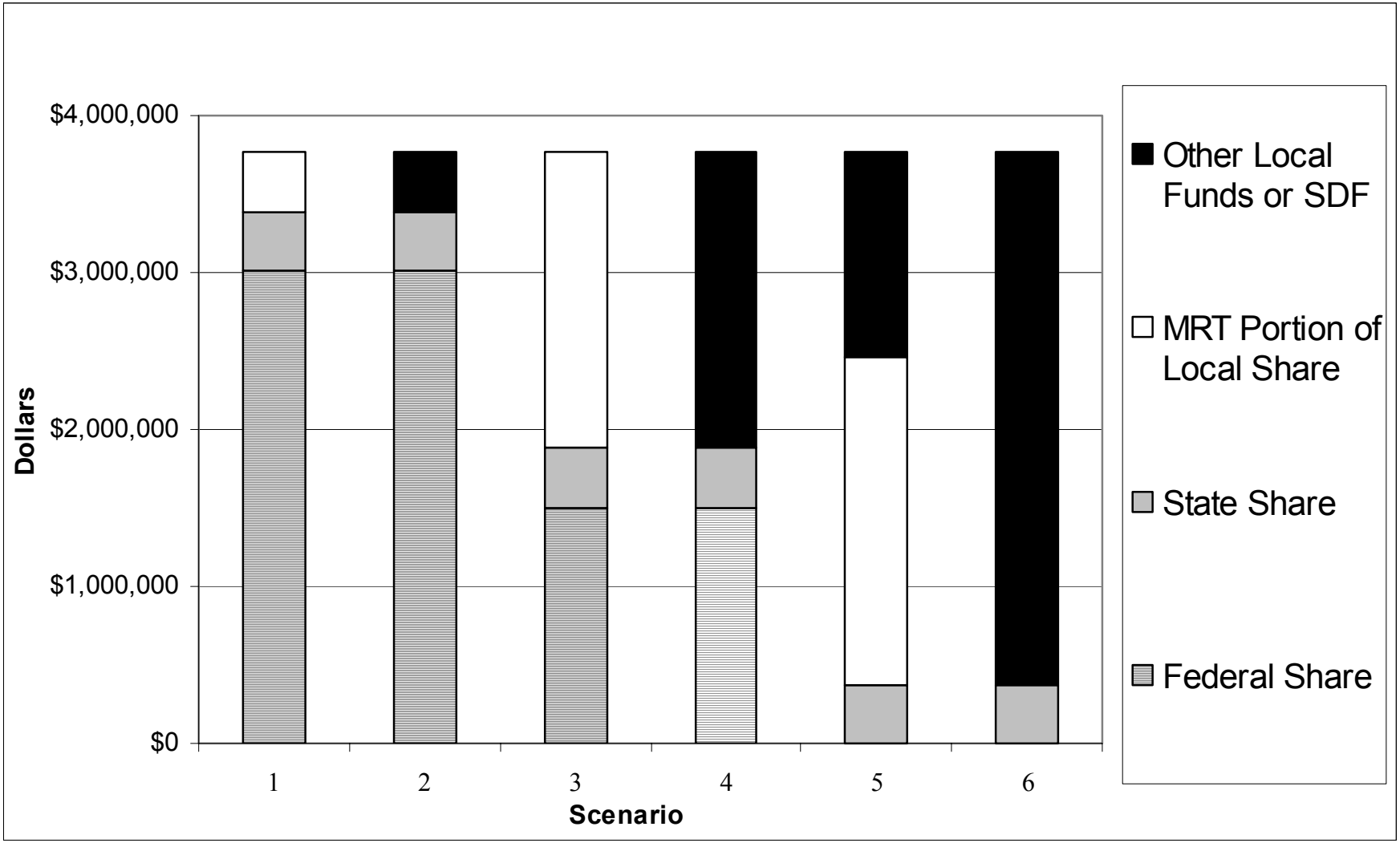
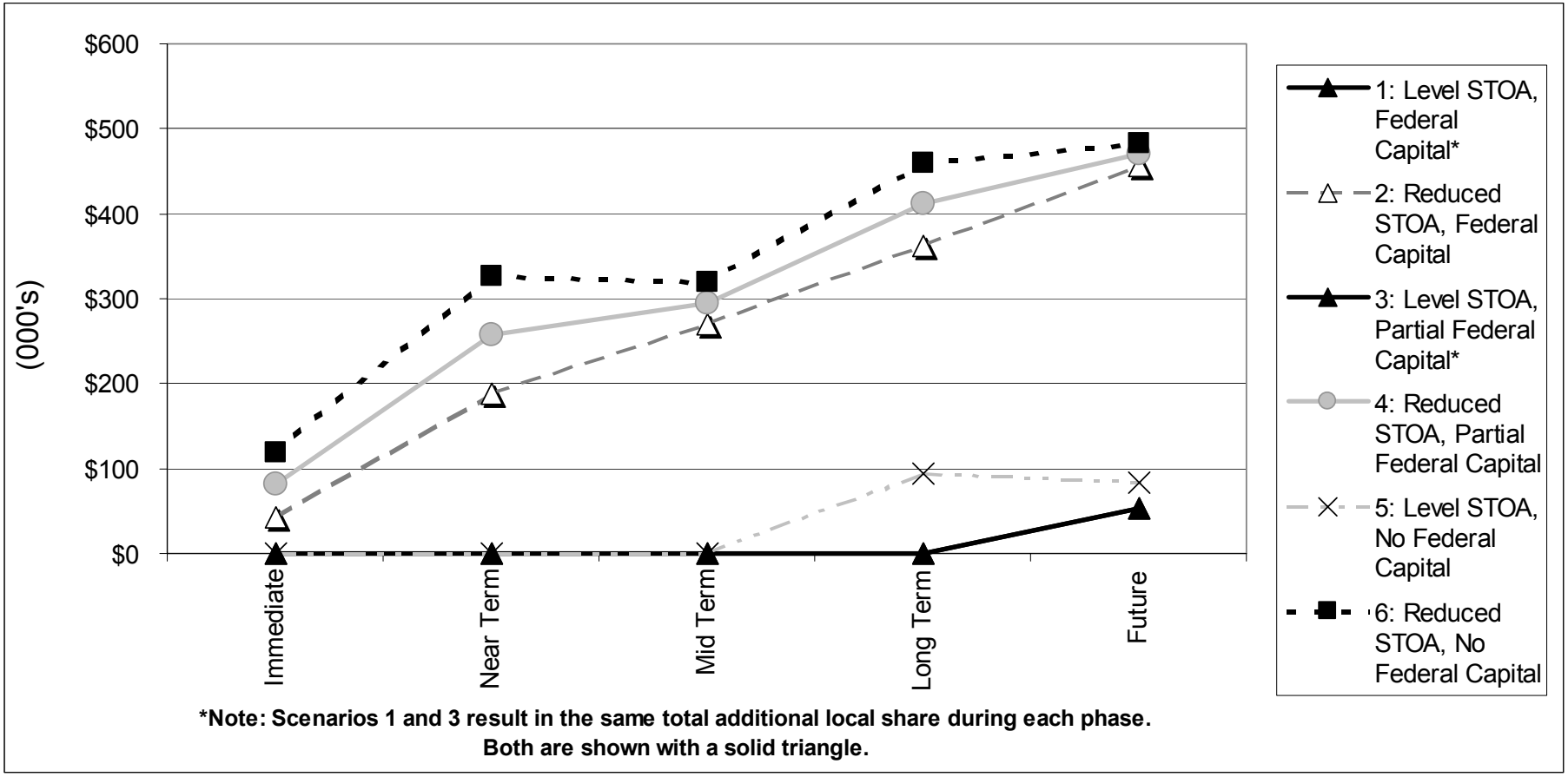


Figure 3
Growth in Total Additional Annual Local Partner Share by Scenario



***Note: Scenarios 1 and 3 result in the same total additional local share during each phase. Both are shown with a solid triangle.**

Table 6
Total Additional Annual Local Funding Requirements (versus 2001)

TOTAL ADDITIONAL **ANNUAL** FUNDING REQUIRED FROM LOCAL SOURCES
ASSUMING NO STATE DEDICATED FUNDS AVAILABLE

Phase:	1	2	3	4	5	1	2	3	4	5
	Immediate	Near Term	Mid Term	Long Term	Future	Immediate	Near Term	Mid Term	Long Term	Future
Years:	2	2	3	3	5	2	2	3	3	5
WITH FEDERAL FUNDING FOR ADDITIONAL CAPITAL COSTS (80%)	**Scenario I: Level STOA Funding**					**Scenario 2: Reduced STOA Funding**				
LOCAL ADDITIONAL OPERATING SHARE PER PARTNER	$0	$0	$0	$0	$52,371	$33,999	$170,648	$262,965	$350,625	$452,942
LOCAL ADDITIONAL CAPITAL SHARE PER PARTNER	$0	$0	$0	$0	$0	$9,447	$17,363	$6,197	$12,086	$3,400
TOTAL ADDITIONAL LOCAL SHARE PER PARTNER	$0	$0	$0	$0	$52,371	$43,446	$188,012	$269,161	$362,710	$456,342
TOTAL ADDITIONAL LOCAL SHARE FOR ALL 3 PARTNERS	$0	$0	$0	$0	$157,112	$130,337	$564,035	$807,484	$1,088,131	$1,369,025
WITH 80% FEDERAL FUNDING FOR HALF OF ADDITIONAL CAPITAL COSTS	**Scenario 3: Level STOA Funding**					**Scenario 4: Reduced STOA Funding**				
LOCAL ADDITIONAL OPERATING SHARE PER PARTNER	$0	$0	$0	$0	$52,371	$33,999	$170,648	$262,965	$350,625	$452,942
LOCAL ADDITIONAL CAPITAL SHARE PER PARTNER	$0	$0	$0	$0	$0	$47,233	$86,817	$30,983	$60,428	$17,000
TOTAL ADDITIONAL LOCAL SHARE PER PARTNER	$0	$0	$0	$0	$52,371	$81,232	$257,465	$293,948	$411,053	$469,942
TOTAL ADDITIONAL LOCAL SHARE FOR ALL 3 PARTNERS	$0	$0	$0	$0	$157,112	$243,697	$772,395	$881,844	$1,233,158	$1,409,825
WITHOUT FEDERAL FUNDING FOR ADDITIONAL CAPITAL COSTS	**Scenario 5: Level STOA Funding**					**Scenario 6: Reduced STOA Funding**				
LOCAL ADDITIONAL OPERATING SHARE PER PARTNER	$0	$0	$0	$0	$52,371	$33,999	$170,648	$262,965	$350,625	$452,942
LOCAL ADDITIONAL CAPITAL SHARE PER PARTNER	$0	$0	$0	$93,543	$30,600	$85,020	$156,270	$55,770	$108,770	$30,600
TOTAL ADDITIONAL LOCAL SHARE PER PARTNER	$0	$0	$0	$93,543	$82,971	$119,019	$326,918	$318,735	$459,395	$483,542
TOTAL ADDITIONAL LOCAL SHARE FOR ALL 3 PARTNERS	$0	$0	$0	$280,628	$248,912	$357,057	$980,755	$956,204	$1,378,185	$1,450,625