U.S. Department of Transportation

Planning Intermodal and Operations Facilities for Rural and Small Urban Transit Systems: Workshop Manual

October 1995

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Prepared by
CGA Consulting Services, Inc.

WORKSHOP MANUAL: PLANNING INTERMODAL AND OPERATIONS FACILITIES FOR RURAL AND SMALL URBAN TRANSIT SYSTEMS

12TH NATIONAL CONFERENCE

RURAL PUBLIC AND INTERCITY BUS TRANSPORTATION

DES MOINES, IOWA
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PREFACE

This manual was first developed for a half-day training workshop at the Technology Sharing Program of the 14th National Conference On Accessibility and Mobility held in Tampa, Florida, October 1994. It was subsequently used in half-day workshops at the 7th International Conference On Mobility and Transport for Elderly and Disabled People: Technology Sharing Programme, Reading, England, July 1995 and the 12th National Conference On Rural Public and Intercity Bus Transportation in Des Moines, Iowa, October 1995. Each subsequent version has been modified slightly to include some additional material.

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Planning Intermodal and Operations Facilities for Rural and Small Urban Transit Systems

Workshop Introduction and Overview

The idea of developing an "intermodal passenger facility" in a rural or developing area may seem questionable, especially for those of us more accustomed to transit service being primarily associated with city life and conditions. In some ways, however, the concept may be even more germane to low density areas, especially when considering how much more difficult mobility can be in the countryside than in the City. When the added disadvantages faced every day by the elderly and disabled are considered one could argue that such facilities should in fact be prioritized for rural and low density areas. Small intermodal terminals can:

1. Improve commuting conditions
2. Improve mobility for the elderly and disabled
3. Increase transit's attractiveness to its owners and local government
4. Become a support factor for area growth and/or redevelopment

The question of their feasibility then is not the primary issue but rather how can they best be developed to suit the scale and conditions of rural and small urban areas. That is the focus of this manual and accompanying workshop session. While the experience of the author in developing such facilities is within the U.S. many of the principals and general methodologies discussed could also be useful in other countries. Some of the standards and requirements reviewed herein which are associated with environmental and accessibility needs are based on U.S. laws but in a generic way may be of some value to other countries as well.

This Manual and Workshop review a sequence of steps, methods and technical analyses which can be used by persons responsible for attempting to develop an intermodal passenger facility in rural or developing areas. Inherently it is based on the author's personal experience over the past 24 years as a transit systems and facilities planning consultant in the U.S. Thus it should not be seen as the only correct approach but rather one that may be useful in whole or in-part depending on one's local or regional circumstances.

In scope it provides a general overview of the total spectrum of technical analysis and work from feasibility study through design and construction in the context of the special conditions associated with intermodal facilities in rural and small urban areas. In this regard it is intended for persons with an overall project development responsibility, not just studies, transit operations, design or construction, but all aspects of the project.

It can help the transit system manager, generalist planner, architect, or engineer who has been charged with developing a new facility to understand some of the special conditions which they may face and what it takes to make such a facility feasible. While the focus is on small intermodal facilities, much of the process is also applicable to other transit facilities such as maintenance garages and administrative headquarters.

Sequence of the Manual and Workshop

I. **Examples -** The manual and workshop begin with some background and examples of small intermodal terminals. Examples from the participant's or reader's own local situation and experiences should also be examined for comparison. Even in rural areas the variety of intermodal service options can vary widely from a very simple bus/van/auto facility to a complex situation that adds several modes and various related retail customer support services. Small intermodal facilities can and have included any or all or the following functions:

- local transit bus
- van paratransit
- autos and their parking
- intercity/interstate bus or coach
- charter tour buses
- taxis
- commuter rail
- intercity or regional rail
- seasonal tourist service
- trackless vintage trolleys
- bicycles
- food service
- newsstand
- travel agency
- branch post office
- auto rental agency
- local transit/paratransit administrative offices
- transit maintenance facility

- training/classroom space
- local justice of the peace or clerk of court
- automated banking
- luggage storage
- shipping/package express
- vending machines

In fact the only urban modes not likely to be found in rural or small urban areas would be subway/heavy rail, rapid rail or light rail systems. In one form or another all of the functions or services on the preceding list have been included in small intermodal terminals.

II. **Feasibility Analysis -** The second section focuses on the steps or tasks that can be useful (or some cases required by government funding sources), especially if there is question or dissent (usually an American problem) about the feasibility of an intermodal facility in a rural or small urban area. What does it take to confirm that substantial public funds should be spent on such a facility, that it is more than just a nice idea? A specific case study from Wells, Maine, U.S. is included at the end of this outline.

III. **Design and Construction -** The third section reviews the steps and tasks from design through construction. General examples as well as regulatory requirements for accessibility by the disabled and environmental impact assessments are reviewed. A summary of some accessibility and environmental regulations common to the U.S. are included in the appendix.

I

BACKGROUND, SPECIAL CONSIDERATIONS AND EXAMPLES

I. BACKGROUND, SPECIAL CONSIDERATIONS AND EXAMPLES

What are small intermodal transit terminals like, what is your interest in them for your constituents or clients, and what are some of the special planning issues or concerns for which governments tend to require some focused attention if not mandatory regulations?

A. Personal Introductions -- Why are you interested in intermodal terminals and what key questions do you want this workshop to answer?

B. Accessibility - What are some of the special concerns which planning for intermodal facilities should address to be accessible to the disabled (Appendixes 1 and 2 include examples of U.S. Standards)?

1. Provision of *accessible connections* to an *accessible route of access* which will enable disabled persons to successfully use all needed parts of the facility, both for riders and employees.

2. *Reasonable accommodation* of persons with *any type of disability* which would otherwise prevent their use of the facility

3. *Critical design and construction elements* which must be given careful attention in order to provide *reasonable accommodation* of persons with disabilities include:

   - Slopes and gradients
   - Surface traction and stability under all weather conditions
   - Widths and turning radius of travel pathways
   - Connectivity of accessible lines of travel
   - Elevator size and accessibility
   - Signage and communication devices
   - Interior size of small rooms
   - Clearance dimensions for two wheelchairs travelling opposed
   - Tactile sensitivity of accessible pathways at hazardous areas

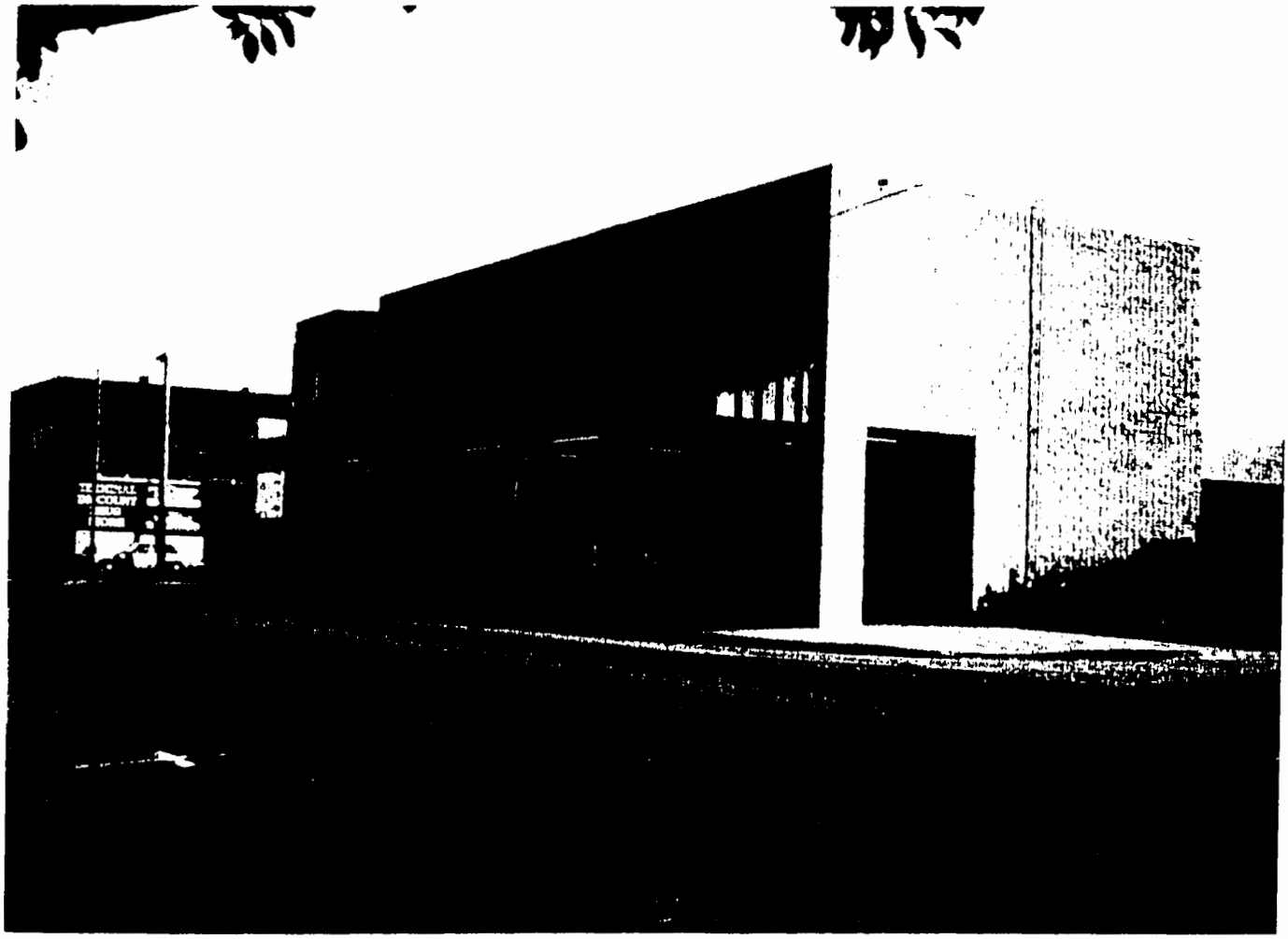
4. *Coordination with local planning and public works agencies* is essential to help assure that the obligation to link the facility to an *accessible pathway* is met.

C. **Environmental and Safety Considerations -** What are some of the key environmental and safety issues and considerations which should be included in facility planning (Appendix 3 contains a summary from U.S. regulations and guidelines)?

D. **Project Examples -** On the following pages several examples of small intermodal terminals are included along with a slide presentation.

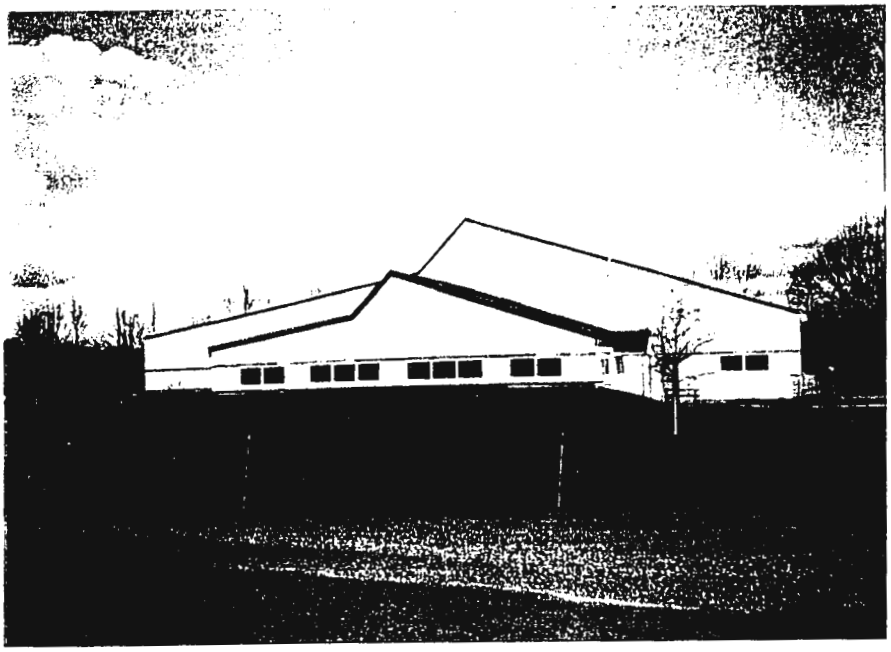
STAGECOACH HEADQUARTERS AND TRANSFER CENTER
Randolph, Vermont

WILSON TRANSPORTATION CENTER
Wilson, North Carolina



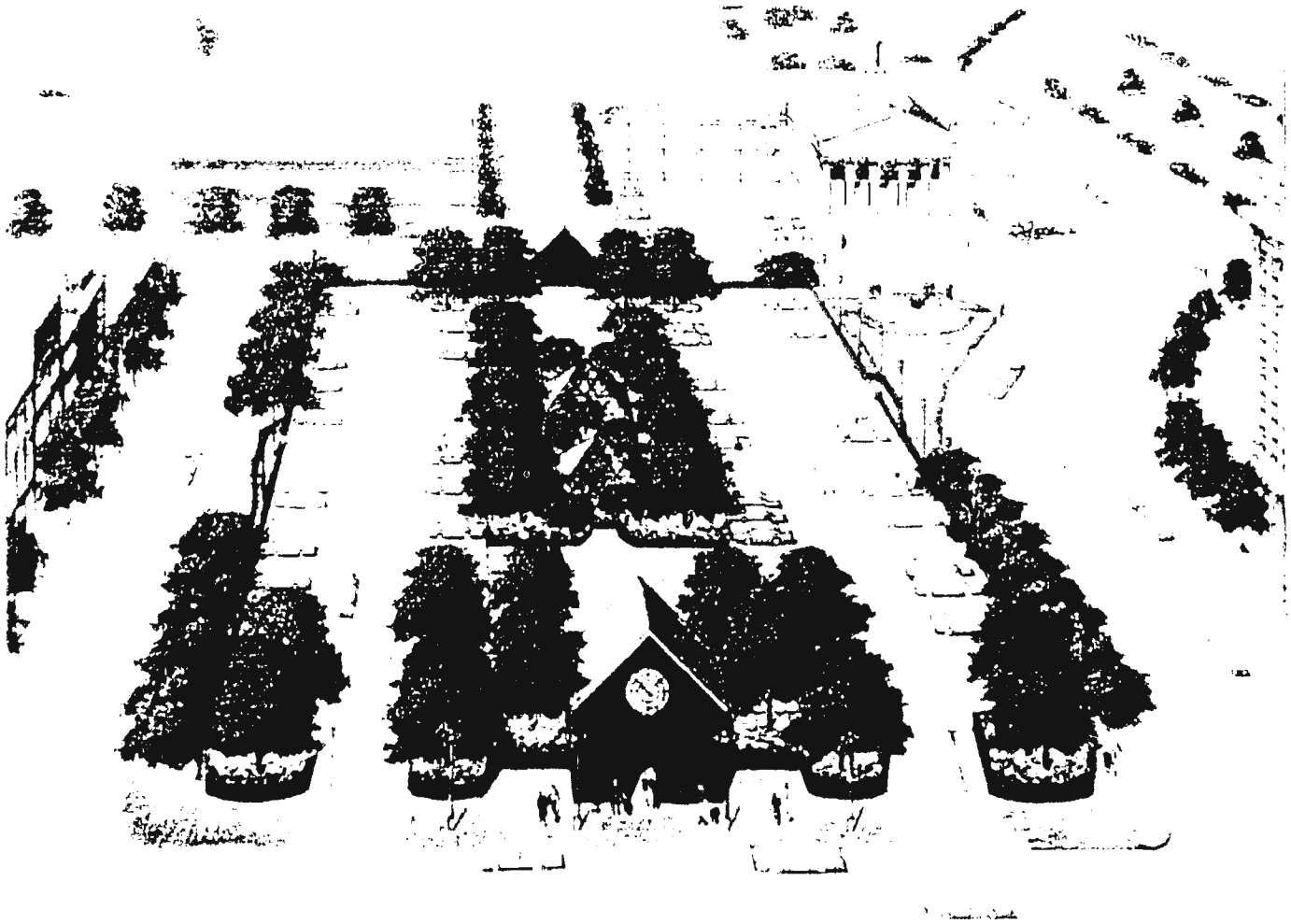
VOTRAN INTERMODAL TERMINAL
Daytona Beach, Florida

ADVANCE TRANSIT HEADQUARTERS AND MAINTENANCE CENTER
White River Junction, Vermont

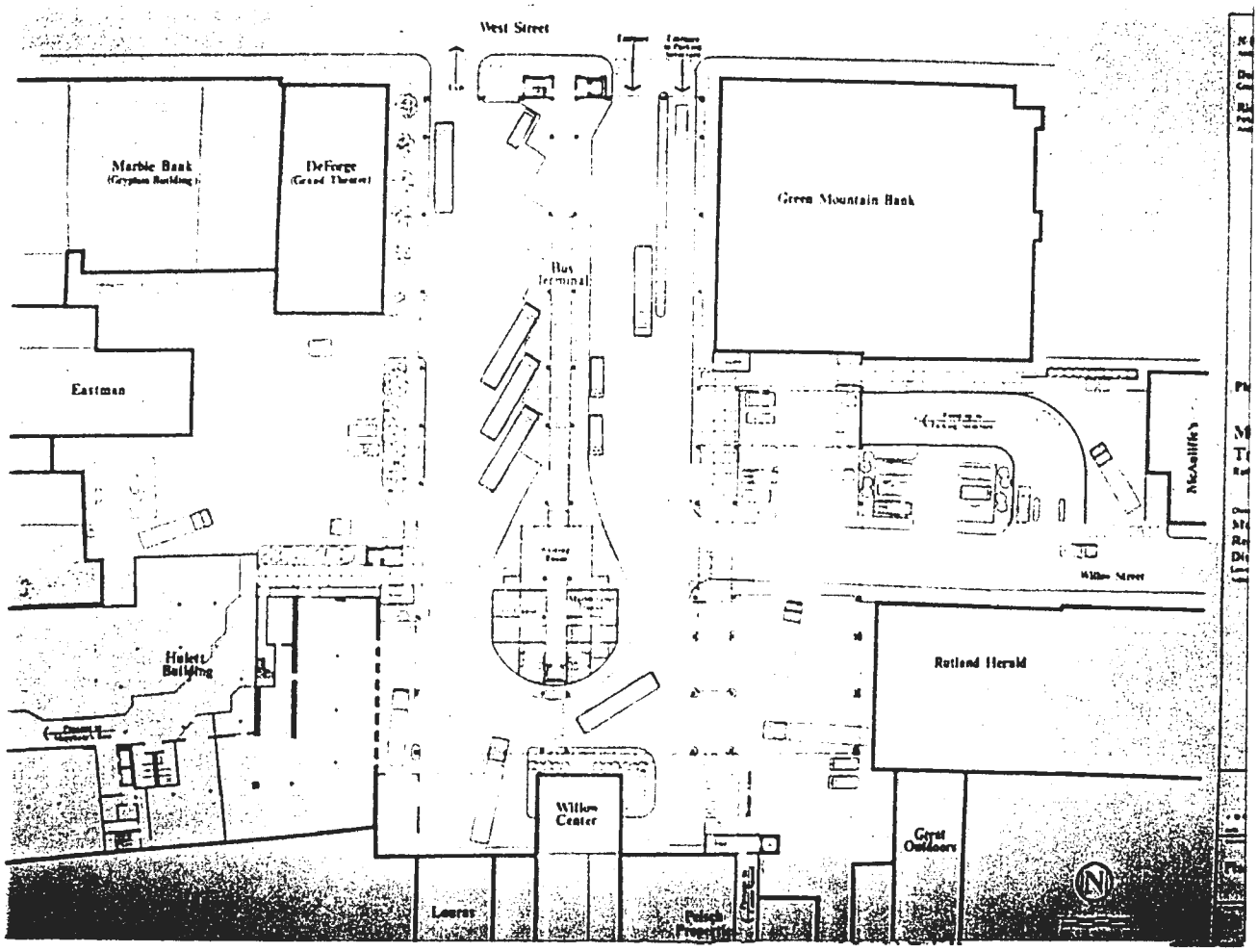


GREENVILLE TRANSIT AUTHORITY INTERMODAL TRANSFER CENTER

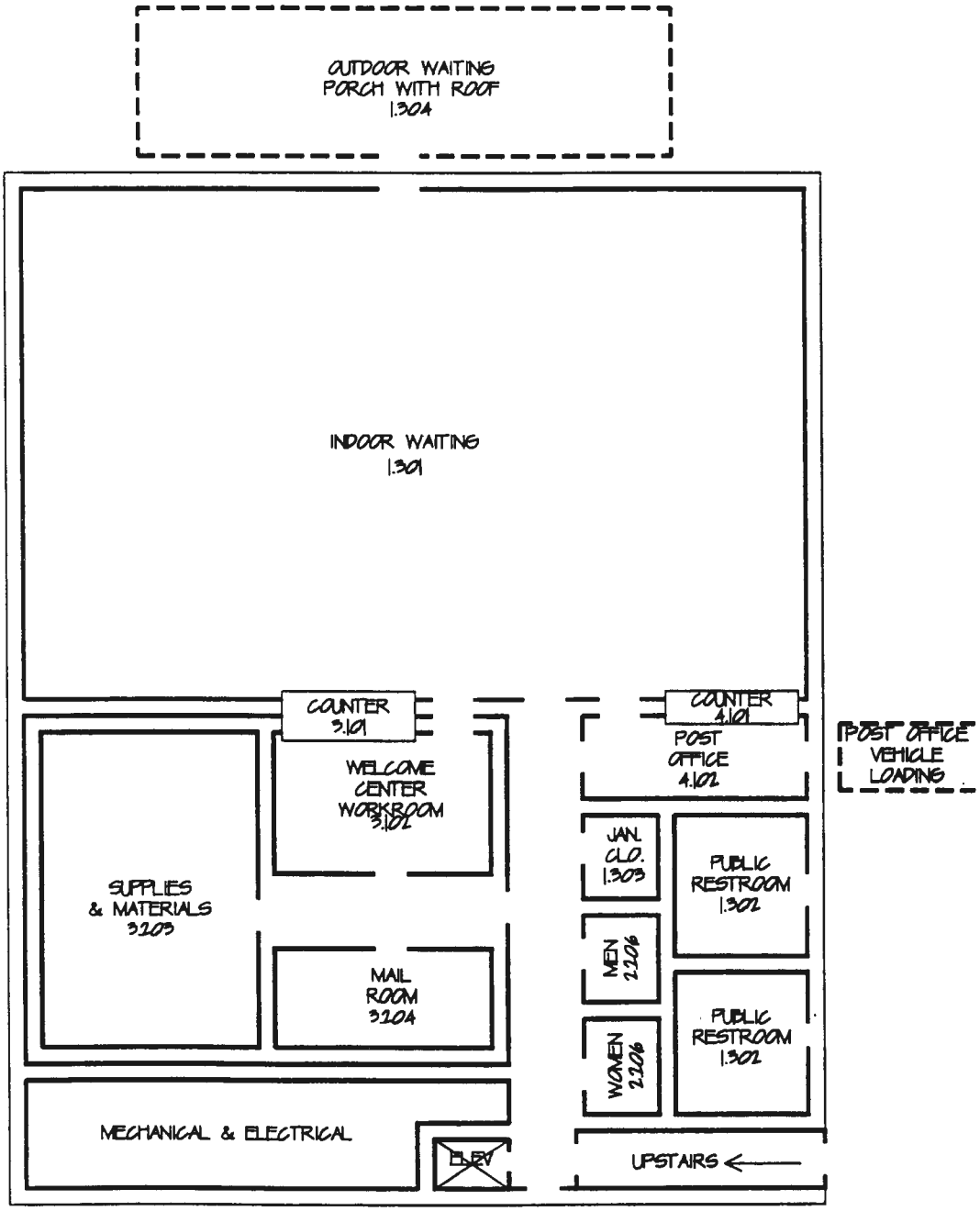
Greenville, South Carolina



MARBLE VALLEY TRANSIT HEADQUARTERS AND INTERMODAL TRANSFER CENTER
Rutland, Vermont



GATLINBURG TROLLEYS HEADQUARTERS AND INTERMODAL TERMINAL
Gatlinburg, Tennessee



GROUND FLOOR **FIGURE 3-1A**

PASSENGER WAITING, WELCOME CENTER & POST OFFICE

II

NEED(S), FEASIBILITY AND JUSTIFICATION

II. NEED(S), FEASIBILITY AND JUSTIFICATION

When there is question or dissent about the value, need or feasibility of building an intermodal terminal (or other transit facility) for a rural, small urban or developing area, what are the technical analyses that should be undertaken and in what sequence? After documenting current space needs and forecasting future space needs, a pre-architectural operational and space program should be developed as a part of the feasibility analysis and used as the basis for preparing realistic preliminary project cost estimates.

If a needs or feasibility analysis is deemed to not be needed, then the first step will be the preparation of the architectural program plan as a basis for preliminary cost estimation and guiding the project architect. The program provides the designer with a clear specification of all of the functional elements, their relationship to each other, and amount of space that will be needed.

In the U.S. an environmental impact assessment or clearance is usually needed before national and state government officials can commit government funds for the project. Consequently, the architectural program and a site selection analysis (in the case of new construction versus remodeling) is needed before the environmental assessment can be made.

This section of the manual summarizes the steps and tasks that usually need to be undertaken to complete a needs study and to establish the financial feasibility for a specific type and size facility. The results become the technical justification for appropriating government funds and proceeding with the architectural design of a new or remodeled facility. *The steps and tasks outlined will provide the full scope of work coverage needed for an intermodal passenger facility which exceed the requirements for an administrative, maintenance or other operations facility. Those items related to a passenger facility would simply be eliminated for any other type of facility.* In the case of a maintenance facility, for example, justification would normally be based on estimates of annual operating expense savings due to implementing in-house maintenance.

Note that examples of the methods and techniques used in one case are included at the end of the Section II outline starting on page 2-2.

A. Purposes - Why are intermodal terminals developed and why are feasibility or needs studies done?

1. The need(s) for such a facility are yet to be verified

2. Justification for spending government funds is required

3. Feasibility from a financial investment standpoint may be questionable in regard to how annual operating expenses will compare with operating income

4. A programmatic space and operational/functional guide for architectural design is needed

B. Functional Justification and Feasibility - What is the functional desire or need for an Intermodal Facility and what makes it more appropriate than a single mode terminal?

1. Local transit and/or paratransit system operational design needs a facility primarily for passengers but may also support other functions as well as other modes such as:

   a) *Passenger needs/convenience/transfers* related to the local service design and linkage potentials with other modes also serving the area.

   b) The local system needs an *administrative headquarters*

   c) Local service has an *obsolete facility*

   d) The local system needs a *maintenance facility*. Other mode companies may be interested in participation.

   e) System *growth space* is needed

   f) *Several operators of various modes may have a growth* in business and be interested in a joint/shared facility.

2. Some communities see passenger facilities as an element of an overall economic or area development and growth strategy. In urbanized areas it may also relate to a "downtown" development strategy or a suburban land conversion plan for overall area growth strategy.

3. There may be an entrepreneurial impetus from the private sector or the local government which simply sees the opportunity for another improvement.

C. **Organizing and Getting Started -** How will the technical work be done; who is in charge; who all will oversee the work; who will monitor the schedule and engage technical specialists to complete the work; and how will the work be paid for and payment approvals made?

1. Who will take on the official sponsoring responsibility and how will various interested parties be involved? Is a formal advisory committee useful? Several organizations, companies and authorities are normally involved in an intermodal project. Therefore, a formal coordinating mechanism is usually needed to develop the unified conditions needed to help assure useful mode interchange as well as the participation of other potential support services and related enterprises. A clear and accepted organization needs to be agreed upon at the outset.

2. Who specifically will do the work and make the project happen?

3. How much and what type of work can local staff do ? (time/talent/ availability)

4. Hiring technical specialists/consultants - what kind ? Depends on where you are in the evolution of the project and how much support exists.

   a) *Architect/Engineer* versus a *facility planner/economist*

   b) *Expectations and understandings* - establishing a sound client/ consultant relationship - initial meetings

   c) Fix a final *detailed scope of services, schedule and budget*

D. **Data Collection and Analyses -** After clearly and officially establishing approved project goals, person(s) responsible for the feasibility study should establish a plan and schedule of the specific types and frequency of data and information that will be needed to develop an analytic basis for the study.

1. Specify and clarify project goals and objectives - This should be a participatory process which involves as many key participants as needed to clarify the owner's intentions.

2. Identify and analyze data about those functions to be accommodated in the facility - Information and data collected will vary depending on the scope of the particular project.

   a) *Transport operations* by each mode:

      - Ridership
      - Staffing
      - # and size vehicles @ peak
      - Staff autos
      - System vehicle hours, mileage and other relevant operating statistics

   b) *Functional areas of operation that impact intermodalism feasibility and attractiveness such as:*

      - Fare integration
      - Fare structures
      - Fare media
      - Schedule coordination
      - Ability to transfer
      - Available information services
      - Formal and informal service planning coordination

   c) *Transport administration* - staff, equipment and space needs

   d) *Vehicle maintenance* - # and size vehicles, staff, equipment and space needs

   e) *Vehicle storage* - # and size vehicles

   f) *Fueling* - gas, diesel, alternate fuels, # and size vehicles @ peak

   g) *Passenger waiting and transfers* - # and space needs

   h) *Non-transport functions and activities* - # of people, functions, type and size of space needs (auto rentals, food service, banking, travel agency, etc.)

   i) *Building support systems* and components space needs

3. Develop forecasting methods and future space needs - Data needed should have been collected or requested at the beginning of subpart D. The specific statistical methods used can vary substantially depending on capability and data availability. Linear and non-linear projections of

historic data are most common but more sophisticated commercially available software packages may be used such as ARIMA or Forecast Plus. Generally, the growth indices which may be useful to forecast include

a) Transport system(s) size by *ridership* and thereby *vehicles*

b) *Future staffing* and related *parking* needs at facility

c) *Passengers* using facility

d) *Non-transport users* - employees and customers and their associated vehicles

e) *Area population* historic growth and official projections

f) *Visitors/tourists*, if tourism and recreation is a major attraction

E. Feasibility Findings, Architectural Program and Concept Plan - Once the forecasts of the number of people and vehicles are fixed the planner is then ready to prepare the architectural program plan which will result in a detailed specification of the facility. The program will describe: (1) all of the functions and activities to be accommodated in and around the facility and how they will interrelate to each other; (2) the amount of net interior and gross building space in square footage or square meters to accommodate all needed spaces; (3) special equipment needed; and (4) a conceptual layout to guide the architect in designing the facility.

A concept layout of the program on a preferred site will allow preliminary project capital and operating cost estimates to be made as the final elements in the feasibility study. A proposed overall project implementation schedule should be adopted at the end of the study to guide subsequent actions through design and construction phases.

1. Develop facility operational and architectural space program

a) *Operational and organizational concepts* - Prepare written and diagrammatic descriptions of all proposed functional elements of the facility. Are there modal and/or support service functional interrelationships to plan for?

b) *Spatial relationship diagrams* - Flow or functional adjacency diagrams can be used to show the overall relationship of all spaces to be included.

c) *Space standards and tables* - Using whatever official or generally accepted space standards are applicable, a table which shows the total net interior, departmental gross and building gross square footage or square meters is prepared. These tables will serve both as the basis for the initial capital cost estimates and eventually as the project architect's guide to designing the facility.

d) *Special equipment needs* - If the facility will need any special equipment besides normal furnishings, fixtures and equipment they should be specified as they may be a major cost element. If, for example, a vehicle maintenance component is to be included the specific types of equipment will need to be planned in order to develop a preliminary cost estimate.

e) *Parking and vehicle storage* - The ground space and vehicle access space needed for all vehicle parking and storage will need to be estimated in order to estimate the total site size requirements.

2. Analyze site options and site development concept plan(s) - Once the total building and groundspace requirements are known the planner can then analyze optional sites, if options are to be considered, and develop a conceptual site layout in order to test the project's fit and help make a final site selection or confirmation. Some of the factors to consider in selecting an appropriate site include:

a) *Local priorities, criteria and community relations* - The owner or local government may have specific concerns and policy in the form of official local comprehensive land use plans or other land use regulations which must be consulted in selecting a site or optional sites.

b) *Technical criteria* - A variety of technical, operational, environmental and engineering related factors should be used in making a comparative analysis of the desirability and feasibility of each optional site being considered. Such an analysis can help maximize objectivity in selecting the best site for the project. A copy of a matrix analysis form which examines 18 different technical criteria and results in a comparative ranking of alternate sites is included in Appendix 5.

c) *Environmental impacts* - Depending on the results of the above technical criteria analysis a focused assessment of key environmental impact factors should be made to compare the relative pros and cons of each optional site. This type of analysis can be critical to make sure that there are no "fatal" flaws with a site in terms of environmental impact. Enough of this type of analysis should be done at this time to be sure that site(s) being seriously considered are likely to be useable. In the U.S. an environmental assessment is usually required and is usually completed after project cost estimates and an implementation schedule are drafted. (see following step 5)

3. Prepare preliminary cost estimates - Using the results of the architectural space program and the site concept plan from steps 1 and 2 above, preliminary project capital cost estimates can be made. In some cases the owner or funding agency will also want an annual operating cost estimate which would be included in this subsection of the study. It is critical that everyone understands that these cost estimates are only preliminary in nature for the purpose of establishing project feasibility and are not to be fixed and firm until design phase estimates are made. Design phase estimates will always be more precise than estimates based on the space program. Never the less, some owners or governments may insist on the overall project budget being set based on the feasibility study results. If this is the case then the estimates at this stage should be very liberal on the high side with a substantial contingency factor. The general categories of cost estimation should include:

   a) *Building construction cost* by major or total building space

   b) *Site improvements and paving*

   c) *Utilities* on- and off-site as applicable

   d) *Outdoor lighting*

   e) *Site fencing* if appropriate - usually appropriate if vehicles are to be stored over night on-site

   f) Architect's, construction manager's and attorney's fees, constructor's general conditions/profit, inflation to mid-point of construction, design and construction contingency and *any other project costs*

   g) *Land cost* if applicable

h) *Relocation costs if applicable* - In the U.S., for example, a federal law known as the Uniform Relocation Assistance and Land Acquisition Act of 1970 requires that government funded projects compensate and assist any persons who may be displaced by the project. It essentially requires that: (1) all property owners be treated the same; (2) that "just compensation" is paid based on an independent appraisal; (3) the relocation advice, moving costs, and replacement housing be furnished when applicable; and (4) that property condemnation by government be used only as a last resort.

4. Implementation plan, schedule and financing plan - This plan should serve as a guide to the owner in specifying the actions to be taken, by whom, in what sequence and over what total time period in order to bring about the completion of the facility by an officially agreed on target date. The plan should include:

   a) A narrative which describes the general types and sequence of actions needed.

   b) A specification as to who will be responsible for each implementation action.

   c) The estimated start and completion target dates for each critical implementation action.

   d) A proposal as to how the project will be financed.

5. Prepare environmental assessment - This may or may not be a required step as it is in the U.S. where it is mandated by some states and for all federally-funded projects. The intent is to assure that neither the construction process nor its end result will create an unacceptable level of adverse environmental impact which can neither be avoided nor mitigated.

   a) *Meet legal environmental regulations* - For small facilities in the U.S. a 19-item assessment is usually the minimum requirement whenever federal transit funding is being proposed. An example of an environmental impact assessment under U.S. DOT's regulation FTA Circular C 5620.1 is included along with a summary of other applicable safety regulations in Appendix 3.

      In the U.S. in addition to the environmental assessment a much more detailed "impact statement" can be required which involves an increasing level of stringency (depending on the findings of the first

level of assessment). Impact Statements tend to be very involved and expensive studies using several environmental and biological specialists. For small urban and rural facilities, however, the environmental assessment level of analysis is usually deemed adequate. Chances are that when a full Impact Statement is required, initial data about the site has revealed that major irreversible impacts are likely to occur and the site should probably not have been selected for further consideration in the first place.

FEASIBILITY CASE STUDY EXAMPLE

Intermodal Transport Center
Wells, Maine, U.S.A.

POTENTIAL TRANSPORTATION CENTER OCCUPANTS

PRELIMINARY PLANNING ESTIMATED SCHEDULE

Portland to Boston Leave Wells:	Boston to Portland Leave Wells:
6:02 AM	10:11 AM
7:02 AM	12:31 PM
10:12 AM	2:11 PM
12:02 PM	5:11 PM
2:12 PM	7:11 PM
4:12 PM	9:56 PM
5:47 PM	11:11 PM

The ridership forecasting model used by the State's consultant VHB Inc. and their forecasting specialist Transportation Management Systems, Inc. assigns 20% of the boardings and alightings as business trips, 13.5% as commuters and 66.5% as other. The results of the model for the Wells station yielded the following:

TOTAL BOARDINGS AND ALIGHTINGS AT WELLS

Year	1994	2000	2010
Annual	47,013	61,041	99,602
Daily	151	196	319

The vast majority of trips are estimated to be toward Boston. Also, the first two AM stops, the last two Boston-bound stops and the 5:11 PM and 7:11 PM Portland-bound stops are expected to carry the vast majority of commuter and business travellers or 33.5% of all boardings and alightings. Trains are assumed to depart two minutes after arrival. For the feasibility analysis herein the daily forecast for the year 2010 will be used as a basis for estimating the indoor waiting space need at the Wells Center.

York County Community Action Corporation (YCCAC)

The York County Community Action Corporation (YCCAC) is the primary provider of local transit service in York County. The agency's transportation program, funded in part under the Federal Transit Administration's Section 18 program and various contract revenue sources, operates a variety of transit services.

Table 2.2
YCCAC System Vehicle Miles, 1987 - 1992

Service Mode	Service Year					
	1987	1988	1989	1990	1991	1992
Sanford Transit	34,023	34,023	33,278	33,322	33,250	33,379
County Vans and Buses	367,222	347,326	339,182	345,058	366,803	376,253
Total	401,245	381,349	372,460	378,380	400,053	409,632

Source: York County Community Action Corporation, March 1993.

Staffing/Organization. YCCAC operates the transportation program as a department of the agency. There is a full-time department director, supported by administrative and operations staff. The transportation program director is responsible for all elements of the operation. Administrative/operations staff includes:

- Maintenance Manager (1.0 FTE)
- Office Manager (1.0 FTE)
- Transportation Coordinator (0.75 FTE)
- Special Services Coordinator (0.75 FTE)
- Dispatcher/Data Processor (1.0 FTE)
- Clerk (1.0 FTE)
- Data Processing Clerk (0.5 FTE - Seasonal)
- Bus Drivers (13 Full-time, 3 Part-time, 1 Back-up/On-call)
- Volunteers

All staff are currently housed at the YCCAC headquarters office in Sanford. With the exception of the Transportation Program Director's private office, the staff all works together in one large room, resulting in some mixing of job responsibilities among office staff. This mix of functions was viewed by management as functional given the small staff size, although some difficulties have arisen in the past with staff handling information requests from the public on topics outside their designated job functions.

YCCAC staff reported that principal visitor traffic to the office was generated by volunteers reporting to the Special Services Coordinator. YCCAC noted that staff contact with the volunteers was crucial to performance and retention. The majority of these volunteers reside in the Sanford vicinity, so this routine contact is facilitated by geographic proximity.

The drivers are scattered throughout the County with one living in New Hampshire and one other in Cumberland County. As noted, this common practice helps to reduce deadhead mileage in conjunction with all except two of the drivers taking their vehicles home at night. This practice can be especially advantageous by maximizing the number of drivers who reside close to the start of their route or service zone.

Table 2.3
Preliminary Rail/Bus Schedule: Boston - Portland

Southbound		Northbound	
Mode	Time	Mode	Northbound
Rail	6:02 A	Rail	10:11 A
Rail	7:02 A	Rail	12:31 P
Bus	10:12 A	Bus	2:11 P
Rail	12:02 P	Bus	5:11 P
Bus	2:12 P	Rail	7:11 P
Bus	4:12 P	Rail	9:56 P
Rail	5:47 P	Rail	11:11 P

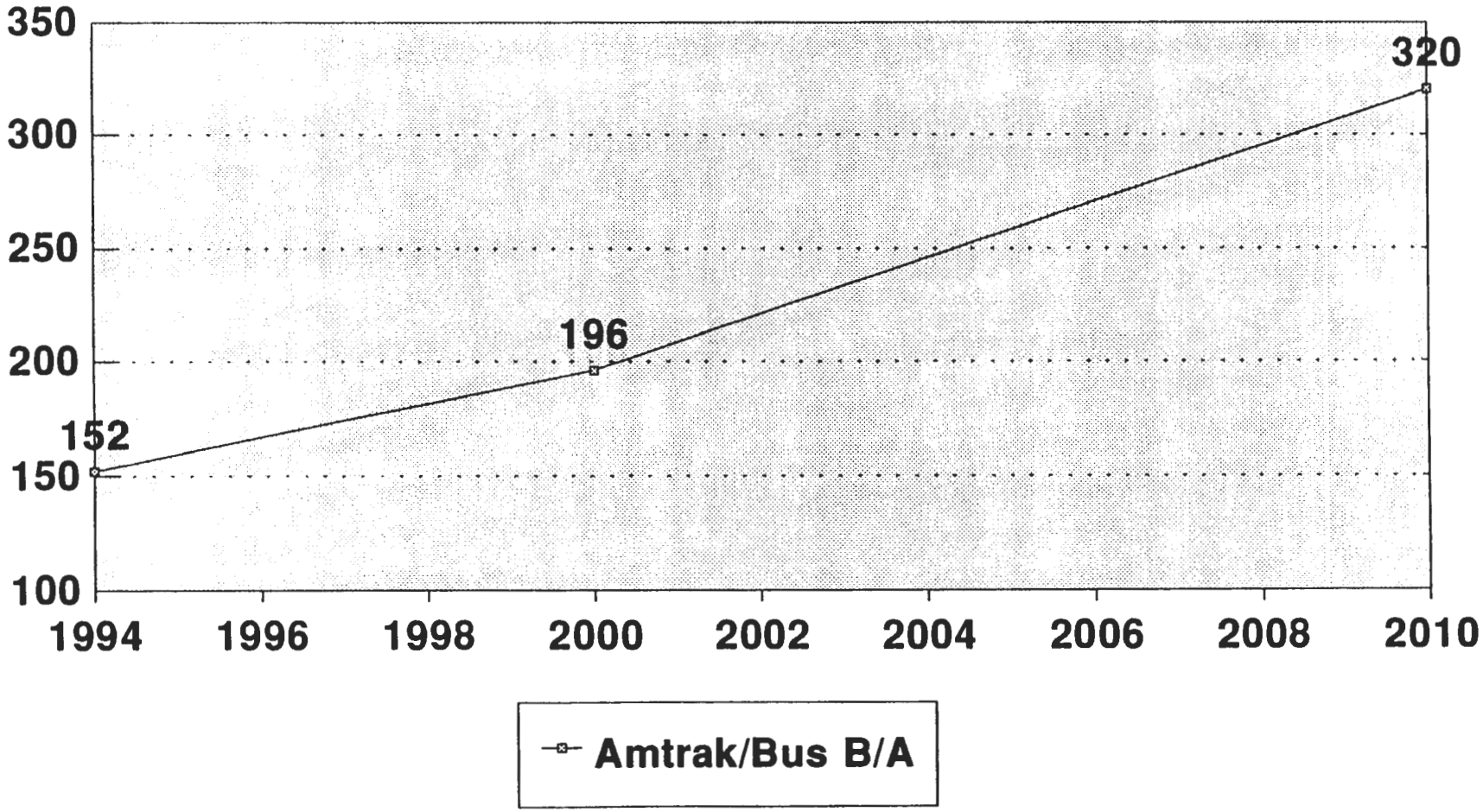
Source: VHB, Inc., February, 1993. Note that the preliminary studies indicate that a combination of rail and bus service would be appropriate for the Wells stop rather than train only.

Figure 2.2 depicts the projected passenger activities at the Wells station. Projections were developed by VHB, Inc. for the years 1994, 2000 and 2010. Figures reflect daily passenger activity for the total passengers on and off trains/buses at the Wells station. Initial forecasts suggest daily activity of 152 boardings and alightings. This volume grows to 197 daily boardings and alightings in the year 2000 and continues to grow to 321 by 2010.

For space planning purposes the peak ridership waiting to board at one time must be estimated. Using the VHB, Inc. model assumption that 33.5% of all riders are business or commuter travel yields a daily total of 108 at the four peak AM and four peak PM stops. Assuming that 65% of all riders are to and from Boston, the 7:02 AM southbound departure and 7:11 PM return stop would probably be the peaks for the day.

Assuming an equal distribution would mean that about 35 passengers may be the peak waiting group at one time. Also, assuming that as many as half of these travellers may be accompanied by greeters or well-wishers means that a high peak at the terminal could be as many as 50 persons. The figure based on the year 2010 forecast will thus be used for planning purposes for the peak terminal waiting area capacity and peak auto parking need. Using the same greeter/well-wisher assumption for the entire day would mean that as many as about 480 persons a day could pass through the terminal by 2010.

Figure 2.2
Passenger Boarding/Alighting Projections
Wells Station



Source: VHB, Inc., March 1993.

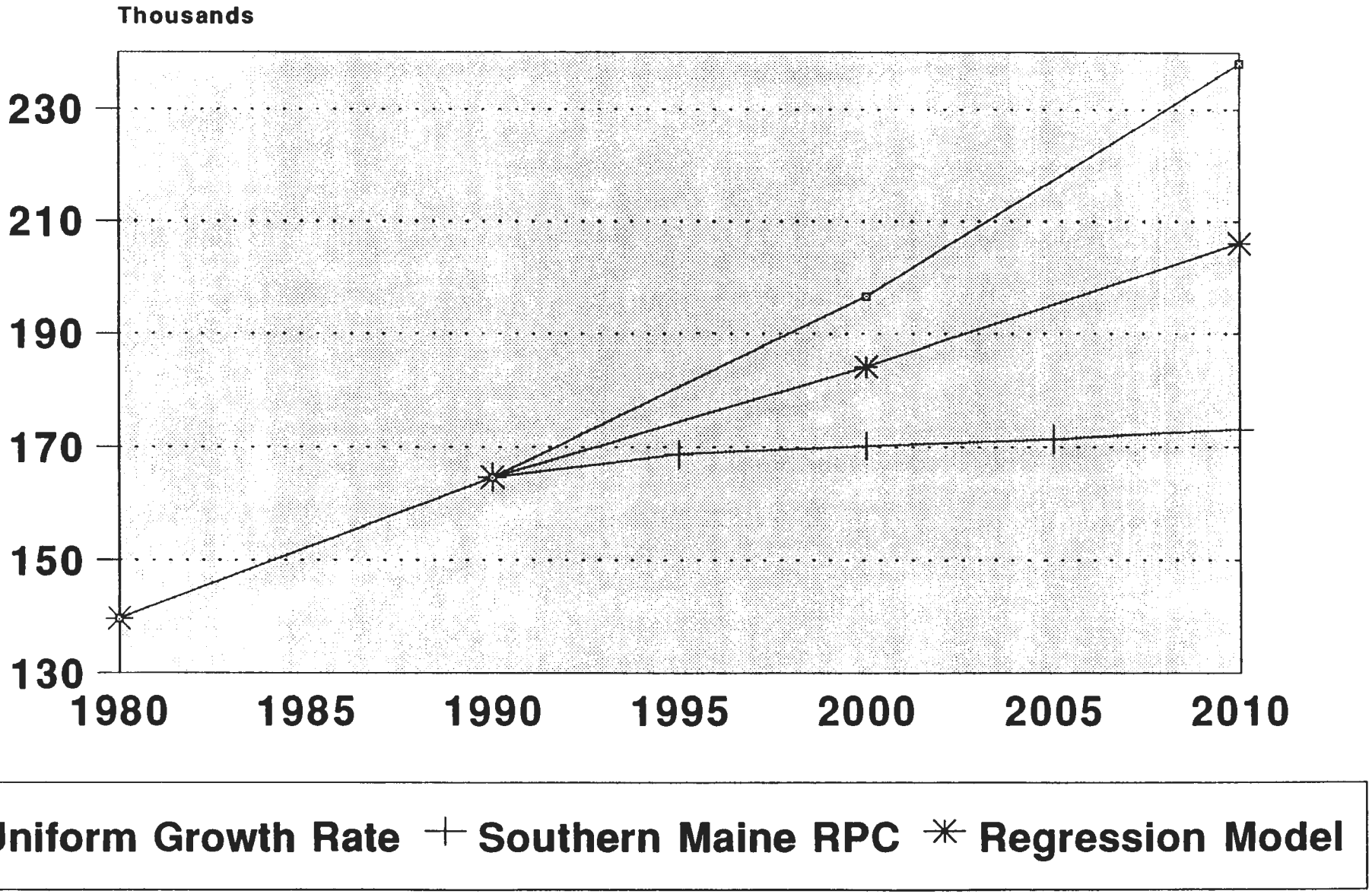
Table 2.4
Population Growth Forecasts, York County: 1990 - 2010

Place	1960 Population	1970 Population	1980 Population	1990 Population	Percent Change, 1980-90	Estimated Seasonal 1990 Population	Uniform Growth Rate Model (1990 - 1990 Base)		Southern Maine Regional Planning Commission Estimates				Regression Model	
							Estimated 2000 Population	Estimated 2010 Population	Estimated 1995 Population	Estimated 2000 Population	Estimated 2005 Population	Estimated 2010 Population	Estimated 2000 Population	Estimated 2010 Population
Acton	501	697	1228	1,727	40.64%	5,734	2,429	3,416	1,800	1,800	1,800	1,900	2,091	2,511
Alfred town	1201	1211	1890	2,238	18.41%	2,616	2,650	3,138	2,300	2,300	2,300	2,300	2,582	2,961
Arundel town	907	1322	2150	2,869	24.14%	3,191	3,313	4,113	2,800	2,900	2,900	3,000	3,291	3,902
Berwick town	2738	3156	4149	5,995	44.49%	6,311	8,682	12,516	6,100	6,100	6,200	6,200	6,701	7,777
Biddeford city	19225	19983	19638	20,710	5.46%	23,405	21,841	23,033	20,900	21,000	21,100	21,100	20,917	21,328
Buxton town	2339	3135	5775	6,494	12.45%	6,788	7,303	8,212	6,600	6,600	6,700	6,700	8,212	9,723
Cornish town	816	839	1047	1,178	12.51%	1,629	1,325	1,491	1,300	1,400	1,400	1,500	1,293	1,423
Dayton town	451	546	882	1,197	35.71%	1,208	1,625	2,205	1,300	1,300	1,300	1,300	1,412	1,670
Eliot town	3133	3497	4948	5,329	7.70%	5,682	5,739	6,181	5,400	5,400	5,400	5,400	6,237	7,040
Hollis town	1195	1560	2892	3,573	23.55%	3,698	4,414	5,454	3,600	3,600	3,800	3,700	4,421	5,268
Kennebunk town	4551	5646	6821	8,004	20.89%	12,051	9,876	11,697	8,300	8,400	8,500	8,500	9,039	10,172
Kennebunkport town	1651	2160	2952	3,356	13.69%	10,776	3,815	4,337	3,400	3,400	3,500	3,500	3,907	4,437
Kittery town	10689	11028	9314	9,372	0.62%	10,386	9,430	9,489	9,500	9,500	9,500	9,600	8,865	8,118
Lebanon town	1534	1983	3234	4,263	31.82%	9,136	5,619	7,407	4,300	4,300	4,300	4,300	5,113	6,057
Limerick town	907	963	1356	1,688	24.48%	2,810	2,101	2,616	1,800	1,900	1,900	1,900	1,912	2,186
Limington town	839	1066	2203	2,796	26.92%	3,237	3,549	4,504	2,900	2,900	3,000	3,000	3,478	4,179
Lyman town	529	864	2509	3,390	35.11%	5,276	4,580	6,189	3,500	3,600	3,600	3,700	4,380	5,403
Newfield town	319	458	644	1,042	61.80%	2,418	1,686	2,728	1,100	1,100	1,200	1,200	1,205	1,440
North Berwick town	1844	2224	2876	3,793	31.79%	4,105	4,999	6,588	3,900	3,900	4,000	4,000	4,310	4,960
Ogunquit town	---	---	1492	974	-34.72%	9,523	838	415	1,000	1,000	1,100	1,100	1,100	1,100
Old Orchard Beach town	4580	5404	6291	7,789	23.81%	35,070	9,644	11,940	7,900	7,900	7,900	7,900	8,845	9,696
Parsonsfield town	869	971	1089	1,472	35.17%	2,967	1,990	2,689	1,500	1,600	1,800	1,600	1,582	1,775
Saco town	10515	11678	12921	15,181	17.49%	18,704	17,836	20,956	15,500	15,600	15,700	15,800	18,384	17,908
Sanford town	14962	15812	18020	20,463	13.56%	22,995	23,237	26,388	21,000	21,200	21,400	21,800	21,992	23,863
Shapleigh town	515	559	1370	1,911	39.49%	4,993	2,666	3,716	2,000	2,000	2,000	2,000	2,339	2,838
South Berwick town	3112	3488	4046	5,877	45.25%	5,982	8,537	12,400	8,000	6,100	6,100	6,200	6,344	7,229
Waterboro town	1059	1208	2943	4,510	53.24%	6,831	6,911	10,591	5,000	5,200	5,300	5,500	5,452	8,661
Wells town	3528	4448	6719	7,778	15.78%	27,398	9,004	10,423	7,900	8,000	8,000	8,100	9,374	10,876
York town	4663	5690	6465	9,818	15.96%	25,183	11,387	13,207	10,100	10,200	10,300	10,400	11,719	13,543
York County Total	99,372	111,596	139,666	164,587	17.84%	280,103	196,605	236,042	168,700	170,200	171,600	173,000	184,116	206,044

Notes:
(1) Seasonal estimate developed based on housing units by Southern Maine Regional Planning Commission.
(2) Uniform Growth Method extends growth rate between 1980 - 1990 to the year 2010.
(3) Southern Maine Regional Planning Commission estimates based on (1) numerical growth; (2) percent growth; and (3) compounded rate of growth.
(4) Regression Model based on 1960 - 1990 actual data.

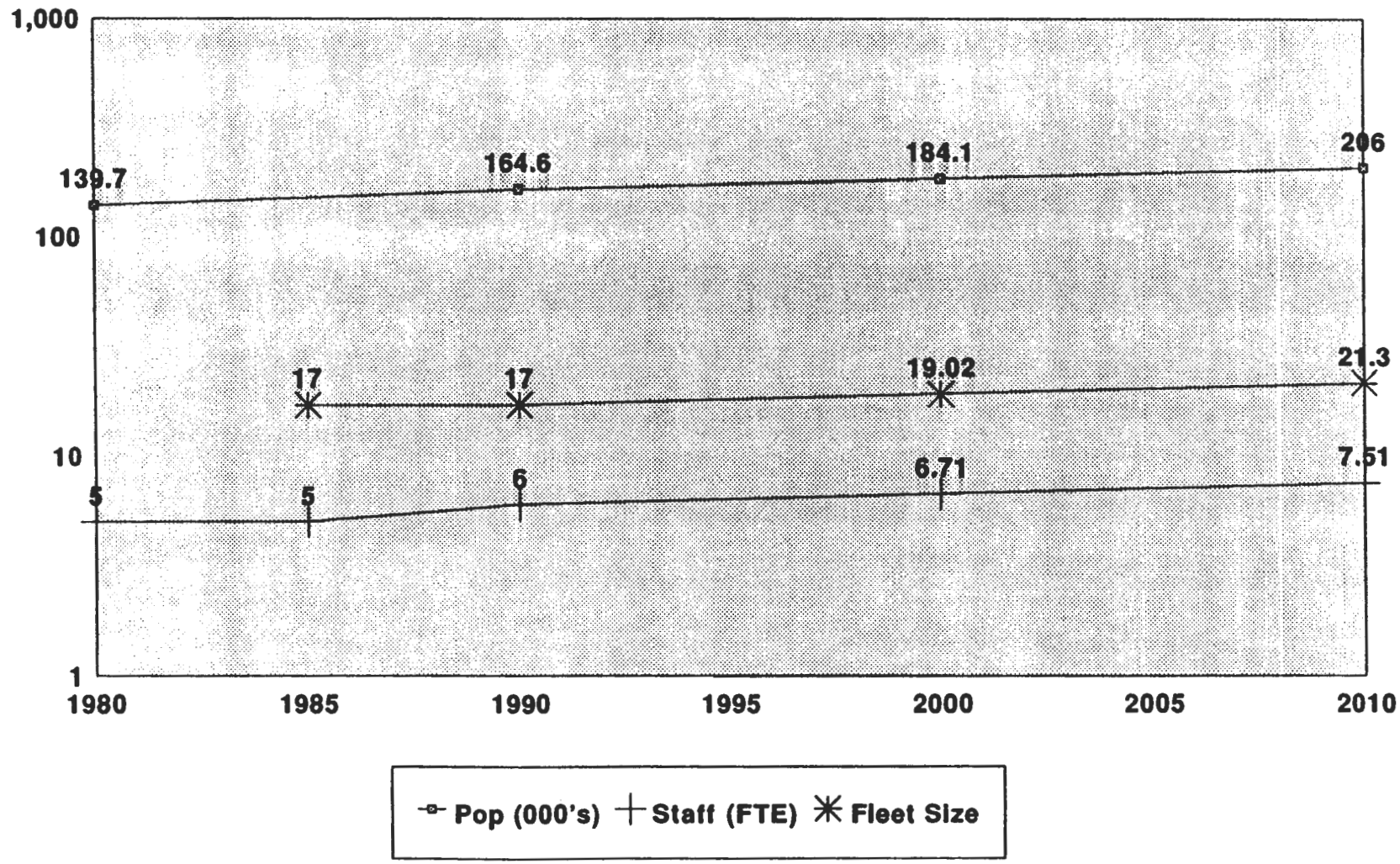
Source: Southern Maine Regional Planning Commission, June 10, 1992.

Figure 2.3
York County Population Growth Projections, 1980 - 2010



Source: Southern Maine Regional Planning Commission and CGA Consulting Services, Inc., March 1993.

Figure 2.4
Projected Population, YCCAC Staff and Fleet Growth, 1980 - 2010



Note: Scale is logarithmic.

Source: CGA Consulting Services, Inc., March 1993.

Table 2.7
Deadhead Mileage Comparison:
Sanford vs. Wells Location - Annual Miles and Projected Costs

Route Name	Service Mode		Estimated Number of Events			Sanford Facility	Wells Facility
	Sanford Transit	County Van and Bus Services	No. Annual PM Events	No. Annual Unscheduled Events (1)	Estimated No. Annual Events Serviced at Facility	Estimated Annual Deadhead Miles	Estimated Annual Deadhead Miles
1. Coastal CWS/CSS Loop	----	30,960.7	7	17.53	24.53	1,030.2	0.0
2. Biddeford/Saco/OOB Loop	----	30,960.7	7	17.53	24.53	1,030.2	883.0
3. North County	----	30,960.7	7	17.53	24.53	0.0	686.8
4. Sanford Transit	33,545.8	----	7	18.99	25.99	0.0	415.9
5. West County Loop	----	30,960.7	7	17.53	24.53	0.0	441.5
6. South County Loop	----	30,960.7	7	17.53	24.53	0.0	441.5
7. Coastal Waban Loop	----	30,960.7	7	17.53	24.53	1,030.2	0.0
8. Portland CWS/CSS Loop	----	30,960.7	7	17.53	24.53	0.0	883.0
9. East County	----	30,960.7	7	17.53	24.53	735.8	343.4
10. Medical Run	----	30,960.7	7	17.53	24.53	147.2	784.9
11. South County	----	30,960.7	7	17.53	24.53	686.8	0.0
12. Head Start I - Sanford	----	30,960.7	7	17.53	24.53	0.0	686.8
13. Head Start II - Sanford	----	30,960.7	7	17.53	24.53	0.0	686.8
Total	**33,545.8**	**371,528.0**	**91**	**229.33**	**320.33**	**4,660.3**	**6,253.5**

Note:
(1) Unscheduled maintenance events calculated on basis of 11.32 events per 20,000 vehicle miles.

Source: CGA Consulting Services, Inc., March 1993.

Table 2.8
Occupancy Potential and Facility Requirements - Transportation Related Services

Entity	Potential Transportation Related Occupants							
	Amtrak Rail/Bus Service		YCCAC	Munroe Limousine Service	Molly Trolley	Intercity Bus Corporation	Charter/Tour Bus	Area Taxicabs
	Amtrak	Bus						
Occupancy Potential 5=Absolute 4=Compatible Use, Good Potential 3=Compatible Use, Moderate Potential 2=Compatible Use, Low Potential 1=Incompatible, Low Potential 0=No Potential	5	5	4 (Loss of Agency Overhead Support Major Concern)	3 (Facility Lease Fees Largest Concern)	4 (Issue of Exclusive Franchise May Be Issue with Taxis)	2 (May Not Be Sufficient Traffic to Support Alternative Coastal Route Service Given Rail/Bus System)	3 (Would Require Municipal Enforcement)	2
Tenant?			X	X				
User?	X	X	See Note 1	X	X	X		X
Office Space?			X	X				
Operations Center?			X	X				
Vehicle Maintenance?			X					
Commission Agent?		X				X		
Staff Parking Yes or No Number	No N/A	No N/A	Yes 7/3 (Admin/Maintenance)	Yes 4	No N/A	No	No N/A	No N/A
Visitor/Customer Parking Yes or No Number	Yes 54	Yes Included w/Amtrak	Yes 3/2 (Admin/Maintenance)	Yes 0	No 0	Yes Included w/Amtrak	No 0	No 0
Vehicle Overnight Parking Yes or No Number	No N/A	No N/A	Yes 16 *	Yes 3	No N/A	No N/A	Yes Potential for Diversion of Charter Buses from Congested Beach Areas 10	No N/A
Passenger Loading Facilities? Yes or No Type Capacity/Design Considerations	Yes Trackside Platform 300 ft. Deck w/ Accessibility Features Designed to Train Configuration	Yes Two (2) Dedicated Bus Bays to accommodate 45 ft. over-the-road coaches	No	Yes Limousine Stand 20 linear ft. dedicated stand area to accommodate up to 8 passengers	Yes Limousine Stand 35 linear ft. dedicated stand area to accommodate 27 ft. or larger trolley vehicles	Yes Two (2) Dedicated Bus Bays to accommodate 45 ft. over-the-road coaches	No	Yes Two (2) Dedicated 25 linear ft. stand area w/ segregated staging area for additional vehicles

Notes:

(1) YCCAC does not currently have any services that involve passenger transfers, boardings, or alightings at Wells. These functions could be undertaken in the future, however, private sector transportation companies should be given first opportunity to meet this need.

* Initially includes six transit vehicles and 10 Headstart vehicles during summer.

Source: CGA Consulting Services, Inc., March 1993.

POTENTIAL ANCILLARY AND RELATED BUSINESS OCCUPANTS

Table 3.1
Occupancy Potential and Facility Requirements - Ancillary and Related Services

Entity	Travel Agency	Bank ATM	Newsstand/Gift Coffee Shop	Vending Machines	Travellers' Information	Storage and Package Handling	Conference/ Business Room
Occupancy Potential 5=Absolute 4=Compatible Use, Good Potential 3=Compatible Use, Moderate Potential 2=Compatible Use, Low Potential 1=Incompatible, Low Potential 0=No Potential	4	4	4	5	5	5	5
Tenant?	X	X	X				
Office Space?	X				X	X	X
Commission Agent?	X				X	X	
Staff Parking Yes or No Number	Yes 2	No	Yes 1	No	Yes 1 If Chamber Only	Yes 1	No
Visitor/Customer Parking Yes or No Number	Yes 5	Yes 2	Yes 5	No	Yes 5	Yes 2	Yes 20
Special Consideration	May also operate car rental, information and facilty management.	Machine in wall/ outdoors preferable.	Could also manage vending machines.		Chamber or any other tenant could operate.	Operated by any tenant willing, facility manager or package delivery vendor.	Managed by facility manager.

Source: CGA Consulting Services, Inc., March 1993.

TRANSPORTATION CENTER
SPACE NEEDS ESTIMATES AND DEVELOPMENT OPTIONS

SPACE PROGRAM

The results of the analyses and forecasts of the various transportation systems and related services and businesses in the preceding sections form the basis for the preparation of space programs and subsequent site development concept plans. The development of these space program and development options will give the client a basis upon which decisions can be made about what should be developed and a preliminary gross cost estimate of what it should cost.

This subsection includes a space program with adjacency diagrams which specify what should be built and how the various components could come together in a unified architectural program.

YCCAC Transportation Department

Table 4.1 Section 1.000 presents a space program for the YCCAC Transportation Department Administrative and Operational Headquarters. Each component required to support the forecast space needs of the Department to the year 2010 are specified in terms of the net interior square footage of each space and the total departmental gross square footage needed to account for internal circulation, wall thickness, partitions, etc.

As noted in the remarks column of Table 4.1 an important shared feature of the Department is its conference/training room which is proposed to be a shared space made available to other occupants. This room is also intended to fulfill the conference/business center function discussed in Chapter 3 which would be made available to other groups on a scheduled basis. This joint use concept avoids having to pay for the same kind of space twice, the demand for which would be questionable anyway.

Figure 4.1 shows the proposed adjacency layout for the Department. As noted it can connect to the transportation center's common waiting area on the same floor level. The YCCAC could serve as the facility manager. Figure 4.3 shows the relationship of the Department office to the entire center layout.

YCCAC Maintenance Center

Table 4.1 Section 2.000 gives the space program for the YCCAC vehicle maintenance center. If it is located on the same site as the transportation center it would still be a separate structure with sufficient distance from the center to avoid functional and aesthetic/design conflicts. Figure 4.2 gives the proposed adjacency layout concept for the center. As discussed in Chapter 4 it would include sufficient outdoor parking for the system's fleet in the year 2010.

Table 4.1
TRANSPORTATION CENTER BUILDING SPACE NEEDS

1.000 York County Community Action Council (YCCAC) Transportation Department - Administration/Operations

SPACE CODE	COMPONENT	Space Standard	Persons or Items	Quantity	Total NSF	Remarks
1.001	Transportation Program Director	--	1	1	180	Private, enclosed office w/workstation
1.002	Assistant Director (future)	--	1	1	150	Private, enclosed office w/workstation.
1.003	Office Manager	--	1	1	120	Private, enclosed office w/workstation.
1.004	Special Services Coordinator	--	1	1	120	Private, enclosed office w/workstation.
1.005	Radio Room - Dispatcher Clerk - Transportation Coordinator	90	2	1	180	Enclosed glass wall work area with desktop radio console
1.006	Data Processing Clerk	--	1	1	90	Currently seasonal, built to expand to 1.0 FTE, w/workstation
1.007	YCCAC Reception/Waiting - Transportation Clerk	15	--	3	45	Reception for up to 3 visitors - could be on 1st level if a 2-story building and serve as info booth.
1.008	Counter	--	--	1	30	
1.009	Server/Printer/FAX/Xerox/Work Room	--	--	1	90	Computer and office machines work area
1.010	Counting Room	--	--	1	90	Secure area with money counting machine/safe/night deposit area
1.011	Office Supply Closet	--	--	1	40	
1.012	File Room	--	--	1	100	Active/Dead Files.
1.013	Conference/Training Room	15	20	1	300	Management/Driver Training/Shared with Center and other users.
1.014	Lavatory	--	--	1	50	Private Staff Lavatory
1.015	Janitor's Closet	--	--	1	30	
1.016	Growth Space	80	1	2	160	
TOTAL – 1.000		--	--	--	**1,775**	
TOTAL DEPARTMENTAL GROSS SQ. FT. @ 1.25					**2,219**	

NOTES:

(1) Special Services Coordinator recommended to remain at Agency Headquarters in Sanford.
(2) If separate facility (admin/op vs. maintenance) project new position to serve as 2nd in command and Transportation Center Manager.
(3) Current Dispatcher Clerk: Transportation Clerk assigned to workstation in radio room.
(4) Data Processing area to be sufficient for future 2 workstations (current 0.5 FTE).
(5) YCCAC Reception could be located in public area of the facility thereby also providing year-round traveller information service.
(6) Population growth projections given virtually constant staff level regardless of population growth in agency's history.
(7) There may be some ADA elevator concerns if the facility is designed with two stories.

FIGURE 4.1
1.000 YCCAC TRANSPORTATION DEPARTMENT

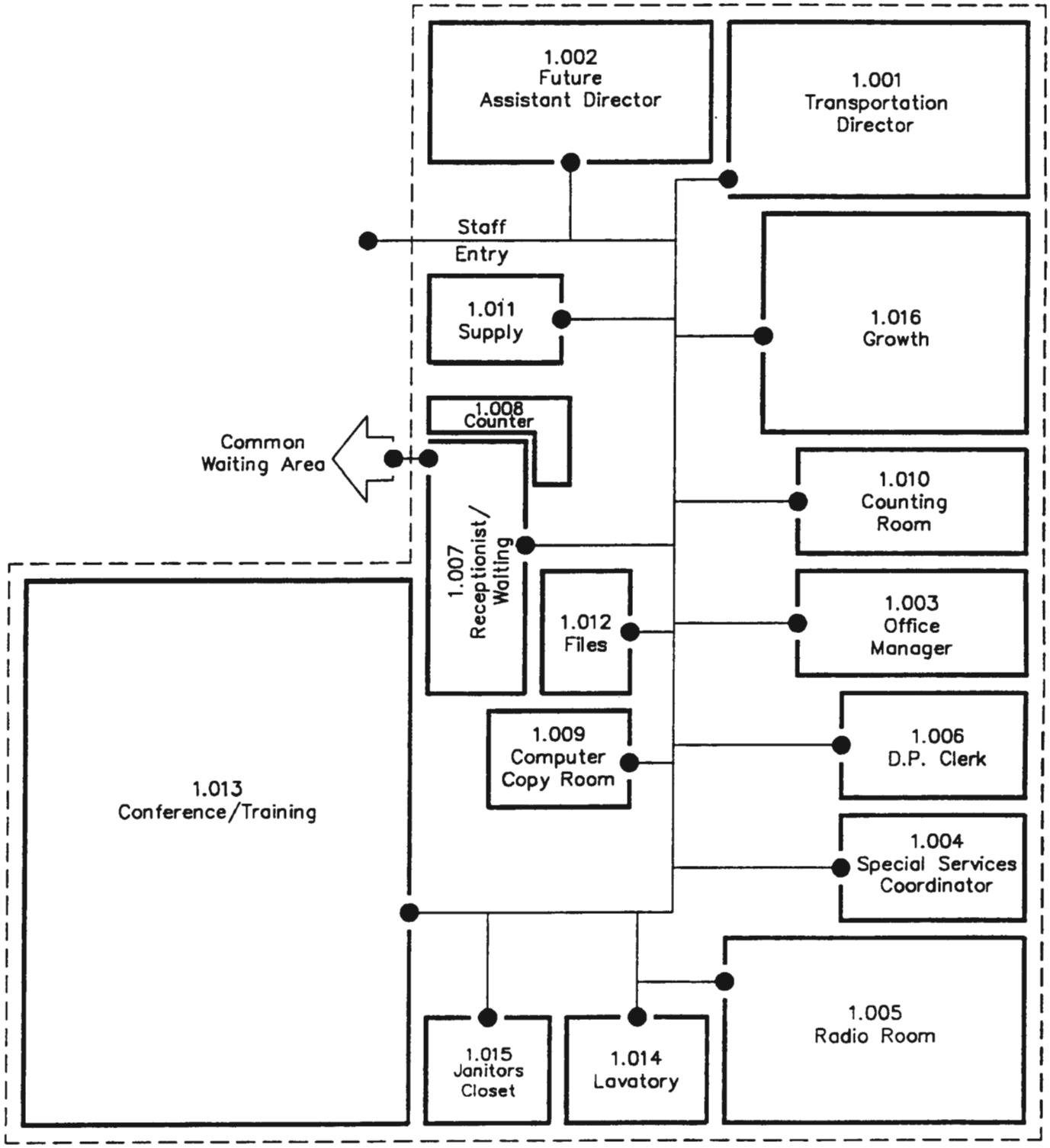
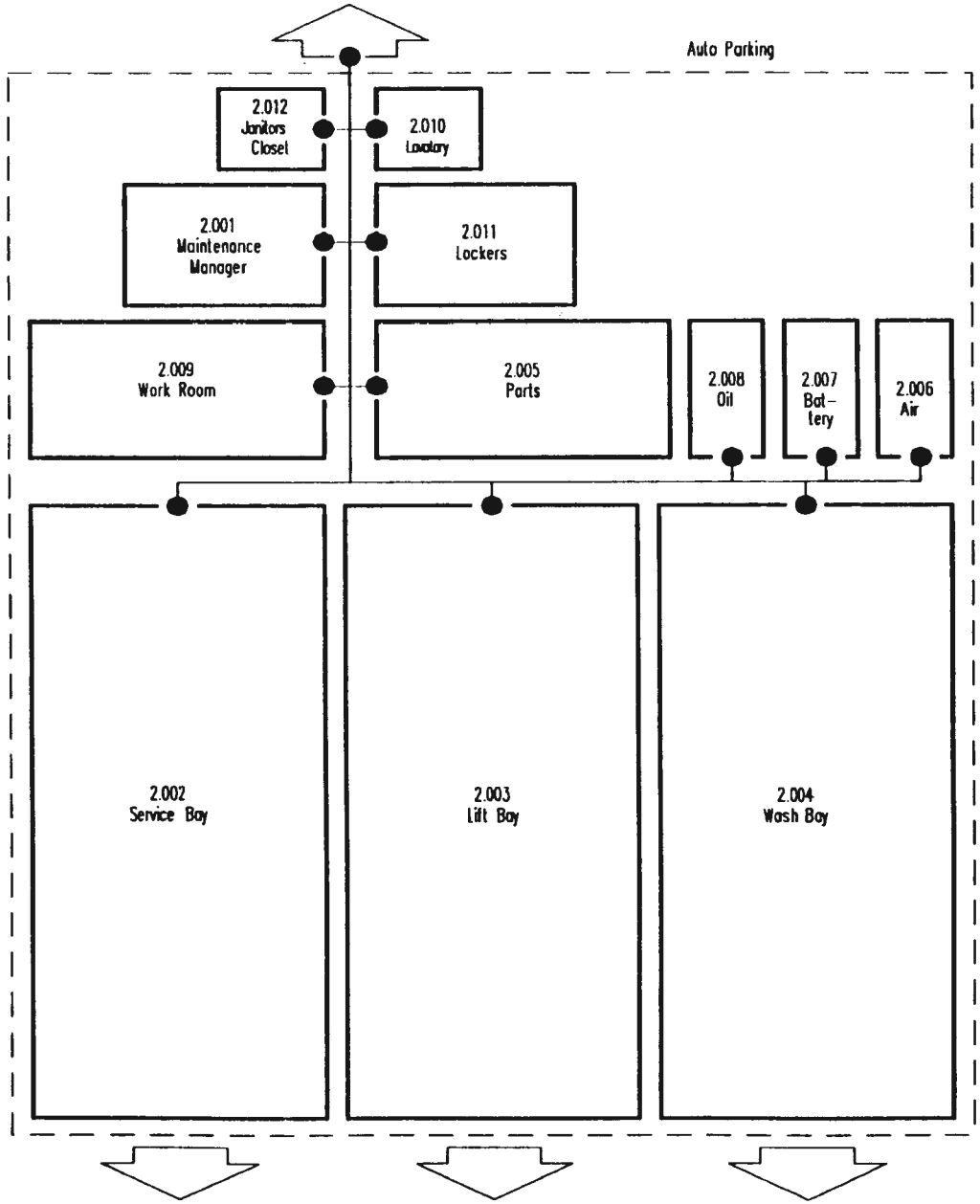


Table 4.1 (Continued)
TRANSPORTATION CENTER BUILDING SPACE NEEDS

2.000 York County Community Action Council (YCCAC) Transportation Department - Vehicle Maintenance

SPACE CODE	COMPONENT	Space Standard	Persons or Items	Quantity	Total NSF	Remarks
2.001	Maintenance Manager	--	1	1	150	Private, enclosed office w/workstation/fax/desktop radio
2.002	Service Bay	1,080	1	1	1,080	18' x 60' work bay with work bench and pit.
2.003	Lift Bay	1,080	1	1	1,080	18' x 60' bay.
2.004	Wash/Clean Bay	1,080	--	1	1,080	18' x 60' bay.
2.005	Parts Storage	--	--	1	300	Secure area w/ counter.
2.006	Air Compressor Room	--	--	1	40	Secure area w/ counter.
2.007	Battery Room	--	--	1	40	Fire Rated Walls per Building Code.
2.008	Used Oil Room	--	--	1	40	Fire Rated Room.
2.009	Work Room	--	--	1	200	Maintenance bench/utility area.
2.010	Toilet	--	--	1	50	
2.011	Men's Locker Area/Lounge Area	--	--	1	150	Drivers may use occasionally.
2.012	Janitor's Closet	--	--	1	30	
TOTAL -- 2.000		--	--	--	**4,240**	
TOTAL DEPARTMENTAL GROSS SQ. FT. @ 1.20					**5,088**	

Wells Transportation Center
Wells, Maine



Although most transit system maintenance facilities include a fueling station one has not been proposed because of the system's dispersed operational patterns and because drivers take most of the vehicles home at night throughout the County. YCCAC may want to examine the possibility of cost savings on fuel purchases if they had their own pumps which could always be added at a future date.

Other Center Support Components

Table 4.1 Section 3.000 contains the space program for the balance of the components that would make-up the center. Although specific businesses have been identified as having definite interest in renting space in the center, the designations in the space table have been left generic since others may also be interested. Several food service vendors, for example, have expressed interest in the center. Since the volume of forecast patronage for the center is relatively modest it is likely that only one coffee shop/restaurant will be feasible which could require competitive bidding for renting the space.

As shown in the adjacency diagram in Figure 4.3 the center is envisioned as a single story structure. When architectural design begins the client could have a two story concept tested as well. Given the total size of space need and the increased cost of a two-story structure versus one story (especially with ADA accessibility requirements) a one story facility is recommended.

The center concept proposed will allow two entrances with one oriented towards the rail platform and the other towards the parking and bus, trolley, taxi, limousine side. The layout for both YCCAC and the travel agency have been situated so that either could act as a building manager and/or a travel information office. The operator of the news/gift/coffee shop could also be a facility manager but would require separate staff to handle the traveller information function. Finally, the Chamber of Commerce is also a potential candidate for the information center function if none of the other enterprises would accept.

Vehicle Parking, Access and Train Platform

Table 4.2 summarizes the total vehicle parking needs for both the Transportation Center and the YCCAC maintenance facility to the year 2010. These needs are translated into ground space needs in Table 4.3. As noted, the train platform size has already been specified by VHB Inc. in its site location study for the Maine DOT. All other elements in the table have been sized to meet the overall forecast needs for the center.

The site access/circulation roadway estimated in Table 4.3 is based on the possible use of the originally-proposed site as drawn by the Maine Turnpike Authority and their consultant's HNTB. If an alternate site is used this amount of paving will probably change.

Table 4.1 (Continued)
TRANSPORTATION CENTER BUILDING SPACE NEEDS

3.000 Transportation Center Ancillary/Related Services and Businesses

SPACE CODE	COMPONENT	Space Standard	Persons or Items	Quantity	Total NSF	Remarks
3.100	**Limousine**					
3.101	Counter	--	1	1	60	Walk-up service counter.
3.102	Business Office	--	2-4	1	220	Secure room behind counter.
3.100	**Subtotal**	--	--	--	**280**	
3.200	**Travel Agency**					
3.201	Counter	--	1-2	1	60	Walk-up service and information.
3.202	Work Stations	80	4-8	4	320	2 agents initially with space for customers to sit at desks.
3.203	Business Office	--	1-2	1	150	Behind counter.
3.204	Locked Storage Closet	--	0	1	40	Vault inside.
3.200	**Subtotal**	--	--	--	**570**	
3.300	**Bank ATM**	--	1	1	**40**	
3.400	**Newsstand/Gifts/Coffee Shop**					
3.401	Front Counter/Cashier	--	1	1	80	
3.402	Newsstand and Gift Shop	--	1	1	200	
3.403	Coffee Shop Counter and Seating Area	20	10	1	200	
3.404	Storage Room	--	--	--	150	
3.400	**Subtotal**	--	--	--	**630**	

Table 4.1 (Continued)
TRANSPORTATION CENTER BUILDING SPACE NEEDS

3.000 Transportation Center Ancillary/Related Services and Businesses

SPACE CODE	COMPONENT	Space Standard	Persons or Items	Quantity	Total NSF	Remarks
3.500	**Facility Support**					
3.501	Vending Machines	20	10	1	200	Food, beverage, candy machines with counter seating/standing area.
3.502	Baggage Storage/Pkg. Shipping Office	--	1-2	1	300	
3.503	Common Waiting Area with Seating	18	50	1	900	Open central area for all visitors/passengers, greeters and and well-wishers.
3.504	Public Telephones	10	4	1	40	Wall-mounted phones.
3.505	Public Restrooms	150	4-6	2	300	One male and one female sized for about 4 persons.
3.506	Storage Lockers	--	--	1	45	Along wall by waiting area.
3.507	Janitor's Closet	35	--	1	35	
3.508	Travellers' Inform. Counter/Kiosk	80	1	1	80	Staffed by facility manager or other tenants or Chamber of Commerce
3.500	**Subtotal**	**--**	**--**	**--**	**1,900**	
TOTAL -- 3.000		**--**	**--**	**--**	**3,420**	
TOTAL DEPARTMENTAL GROSS SQ. FT. @ 1.25					**4,275**	

Source: CGA Consulting Services, Inc., March, 1993.

Wells Transportation Center
Wells, Maine

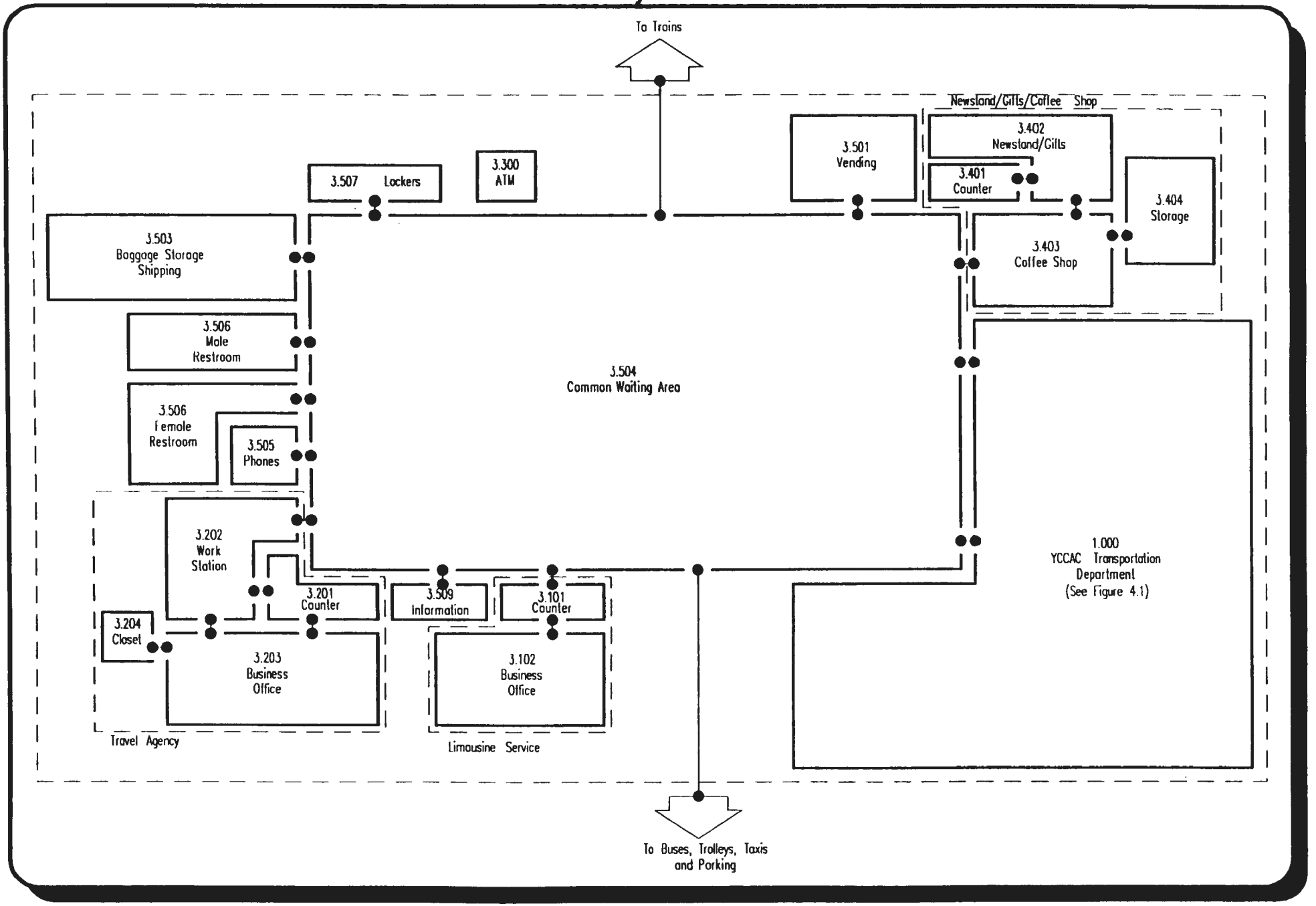


Table 4.2
PROJECTED VEHICLE PARKING NEEDS -YEAR 2010

User	Autos Vans	Campers	Small Bus	Large Coach	Taxi Stand	Taxi Staging
1. YCCAC Adm. Hq.	10					
2. YCCAC Maint. Center	5		16			
3. Limousine Operator	16					
4. Seasonal Trolley			4			
5. Intercity Bus				4		
6. Tour Bus				10		
7. Taxi					3	6
8. AMTRAK	50					
9. Park and Ride Lot and Kiss and Ride Lot	200					
10. Travel Agency	6					
11. Newsstand/Gifts/Food	2					
12. Bank ATM	2					
13. Package/Bag Storage	2					
14. Deliveries	2					
15. Other		5				
TOTALS	**295**	**5**	**20**	**14**	**3**	**6**

Table 4.3
ESTIMATED PARKING/ACCESS AND PLATFORM REQUIREMENTS

ITEM			SQUARE FEET
1. Train Platform @ 300' x 20' (per VHB, Inc. plan)			6,000
2. Site Access/Circulation Roadway @ 350' in, 350' out and 250' across by 30' width			28,500
3. Parking Transportation Center			
a) Autos and vans for 290 @ 400 SF		(10' x 20' stall)	116,000
b) Campers for 5 @ 650 SF		(12' x 30' stall)	3,250
c) Small busses for 4 @ 1,080 SF		(12' x 40' stall)	4,320
d) Large Coaches for 14 @ 1,600 SF		(14' x 60' stall)	22,400
e) Taxi stands for 2 @ 200 SF		(10' x 20' stall)	400
f) Taxi staging area for 6 @ 400 SF		(10' x 20' stall)	2,400
Subtotal			**148,770**
4. Parking YCCAC Maintenance Facility			
a) Autos and vans for 5 @ 400 SF			2,000
b) Small busses for 16 @ 1,080 SF			17,280
c) Access roadway and maneuvering @ 900' x 30'			27,000
Subtotal			**46,280**
5. GRAND TOTAL PAVING AND PLATFORM			**229,550**

Table 4.4 presents an overall summary of the total building and ground paving space needs. These figures will be used for both testing preliminary site concept layouts and gross preliminary cost estimates in the following subsection.

SITE DEVELOPMENT OPTIONS

Figure 4.4 shows the location of three alternate sites adjacent to the turnpike exit which have been considered for the transportation center. Site A is the one originally proposed by the client in conjunction with the Turnpike Authority and the DOT. As shown this site approximates the additional land that would be added with the proposed realignment of Spencer Drive which would bring it to over six acres.

Site A1 is a portion of a tract that has been identified as a possible location for the YCCAC maintenance facility. This site was considered due to the probability that Site A would not be large enough to hold both the transportation center and the maintenance facility. Testing site development concepts bore out this assumption.

Site B on the other side of the Turnpike was identified as an alternative that would be large enough to hold both facilities and in case wetland limitations on Site A rendered it too small even for the transportation center alone. Site B consists of three separately owned tracts which would need to be purchased with the structures that already exist on tract 13B. Not all of tract 20 would be needed to provide sufficient acreage for the project. Perhaps a portion could be subdivided to add to tract 13B.

Site A

Figure 4.5 presents a conceptual layout for the transportation center utilizing the entire site. Even assuming that most all the wetlands on this site could be filled, however, it was found that the total architectural program would still not readily fit on the site.

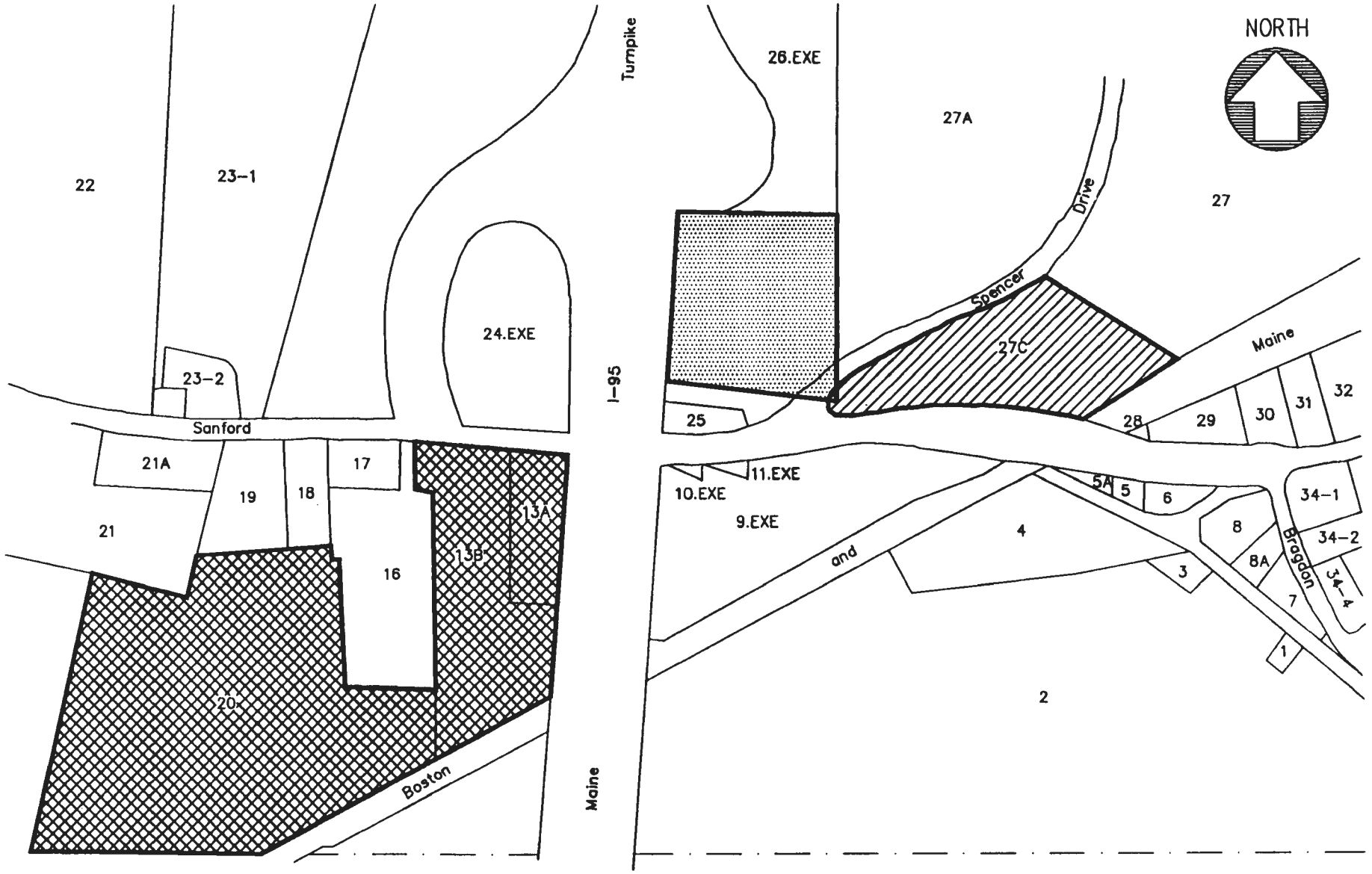
As drawn there are 164 auto parking spaces as compared to the 295 called for in the program. Also, it was not readily possible to fit the 10 tour coach spaces nor the 5 camper spaces called for by the program. A total of 7 large spaces for coaches and campers overnight parking are at the west end of the site. One of the other limitations with the site is that the west end exit is closer to the intersection of Spencer and Route 109 than desirable.

All other elements of the program were able to be accommodated by site A. Also, it should be noted that if site A were selected that detailed design could achieve some refinements to the limitations noted and perhaps further mitigate some of the wetland impacts.

Table 4.4
SUMMARY SPACE NEEDS

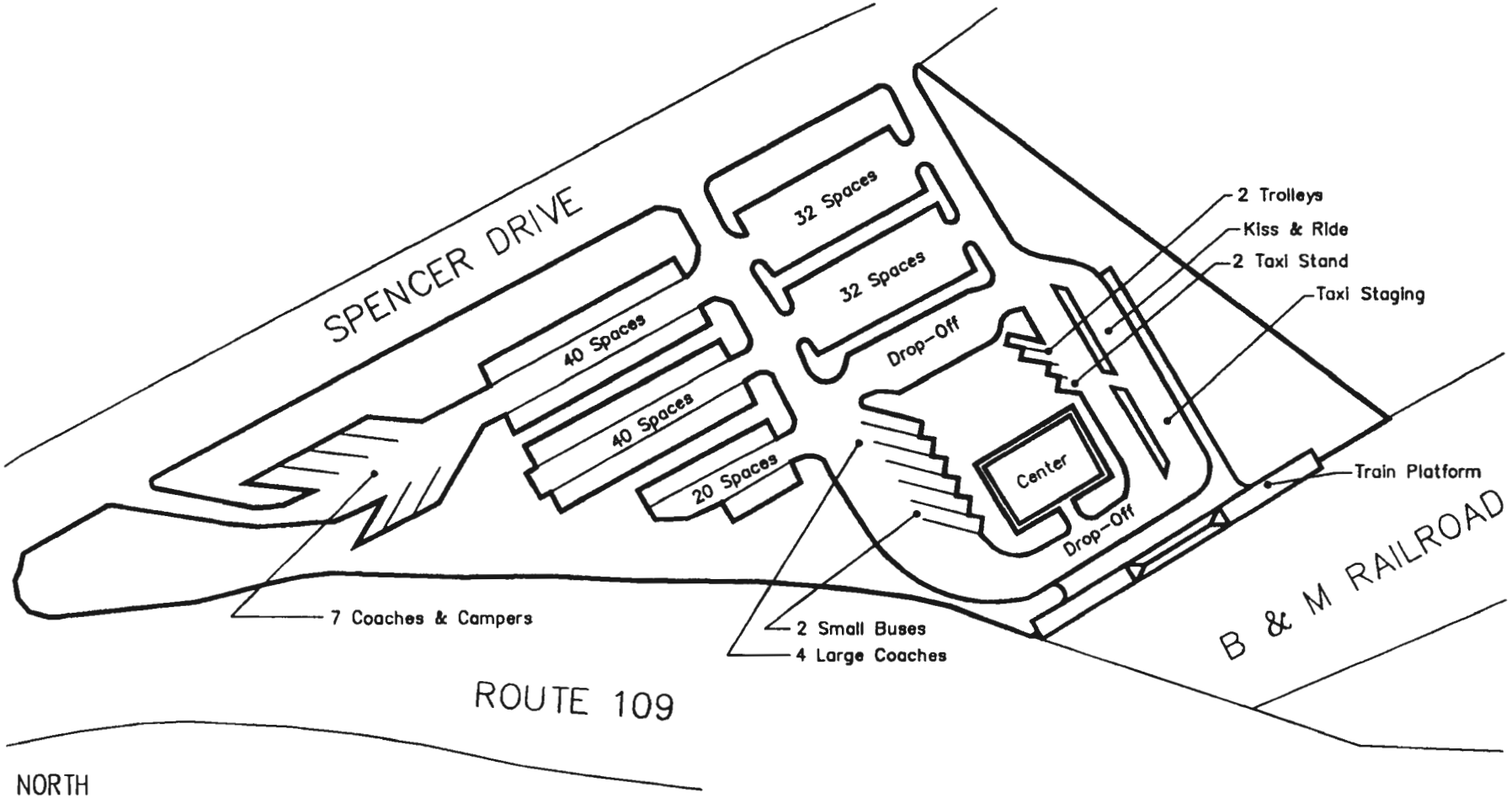
COMPONENT	GROSS S.F.
A. TRANSPORTATION CENTER BUILDING	
1. YCCAC Transportation Department	2,219
2. Ancillary/Related Services	4,275
3. Building Gross @ 10%	650
Subtotal – Building	**7,144**
B. TRANSPORTATION CENTER PAVING	
1. Train Platform	6,000
2. Site Access/Circulation Roadway	28,500
3. Parking	148,770
Subtotal – Paving	**183,270**
C. YCCAC MAINTENANCE FACILITY	
1. All Interior Space	5,088
2. Building Gross @ 10%	509
Subtotal – Building	**5,597**
D. YCCAC MAINTENANCE FACILITY PAVING	**46,280**
TOTAL PROJECT	
1. Buildings	12,741
2. Paving	229,550
3. Total Ground Consumption Assuming One-Story Structure	**242,291 (5.6 acres)**

FIGURE 4.4
TRANSPORTATION CENTER OPTIONAL SITES



SITE A SITE A1 SITE B

FIGURE 4.5
OPTIONAL SITE A DEVELOPMENT CONCEPT TRANSPORTATION CENTER



NORTH

NOTE: Concept Plan Has Wetland Intrusion

SCALE: 0 50 100 200 400

Site A1

Site A1 across the Drive from Site A would be a convenient location for the YCCAC maintenance facility. As shown on Figure 4.6 in the concept plan a relatively small tract of 5 to 9 acres could be subdivided from the tract (if agreed by the owner). The larger amount as shown would allow substantial buffering of the facility. The building itself has a footprint of about 5600 square feet and paving consumes just over an acre. The service road as shown would require an easement across the adjacent tract in order to have access to Spencer Drive.

At the time of this analysis the consultant was only able to use Town property tax maps to define the site. Other information such as topography and wetland status was not available at this time.

Site B

Figure 4.7 shows a concept layout for both the transportation center and the YCCAC maintenance facility on Site B. This site as proposed has sufficient acreage for both facilities and will meet all elements of the architectural program without any deficiencies or limitations.

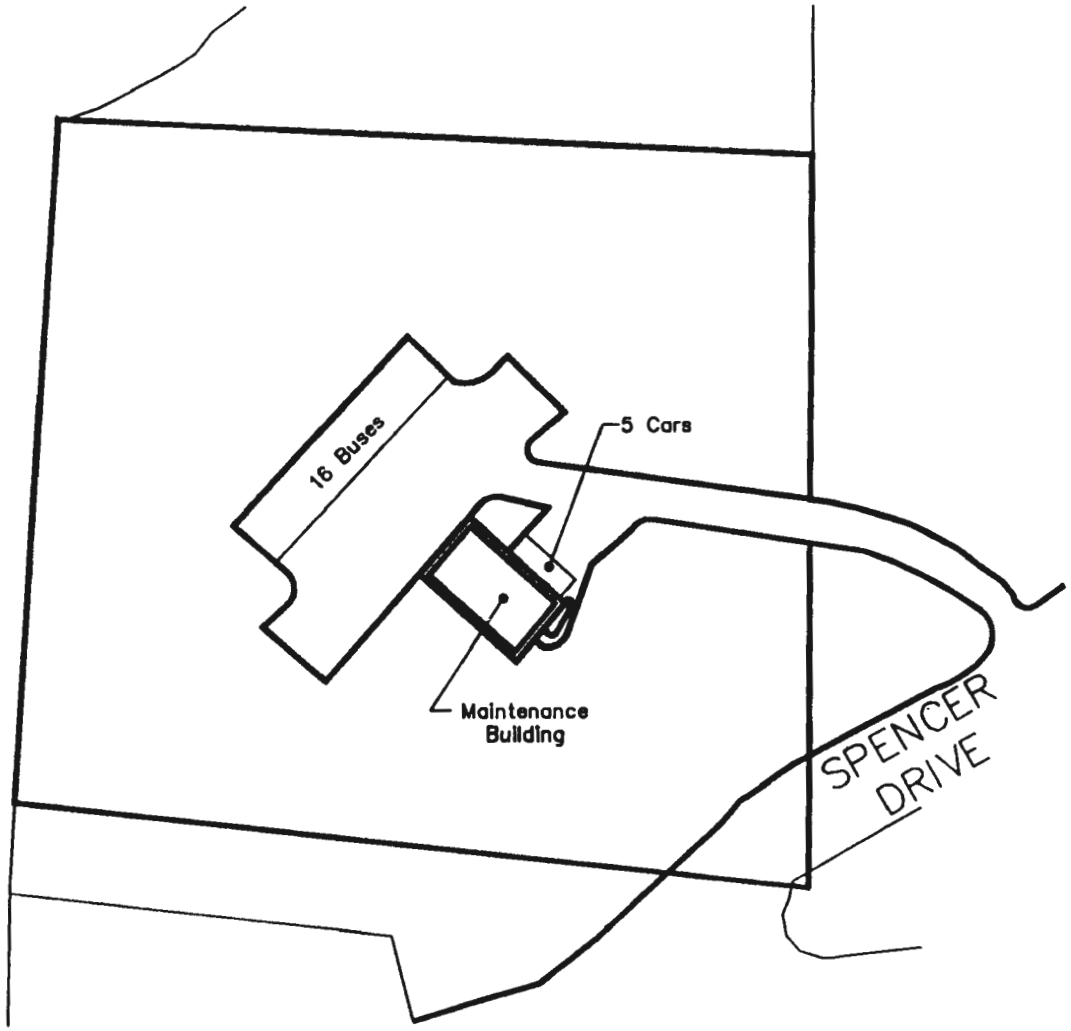
Here again the consultant only had Town property tax maps available at this time so wetland designations and topographic limitations are not included. The consultant has, however, examined this as well as the other sites, in person, and all sites appear to be developable. Also, the Turnpike Authority"s consultant has prepared a preliminary analysis of these sites and confirms that they appear to be developable. Final planning and engineering of course should confirm the suitability of all site conditions.

Site B appears to be superior in both size and its orientation to the Turnpike Exit compared to Site A. As shown this site has the capacity to expand even beyond the needs called for by the architectural program. Thus from a long-range standpoint it offers the client greater flexibility than site A. The orientation to the Turnpike exit and the need for only one site entrance are conditions not available at site A.

Preliminary Capital Cost Estimates

Table 4.5 presents a preliminary gross cost estimate for each site option. As can be seen in the summary at the end of the table, there is about a $169,000 difference between the two options. This extra cost for option B is due to the fact that it is a larger site and can accommodate the total architectural program; and because Site A is much closer to the nearest sewer system collector line than Site B. Estimates for land costs are preliminary estimates based on talks with local officials and real estate companies. While some difference is shown for this analysis, the actual price could vary substantially depending on negotiations with the land owners.

FIGURE 4.6
OPTIONAL SITE A1
DEVELOPMENT CONCEPT
YCCAC MAINTENANCE FACILITY



NORTH

NOTE: Concept Plan Done From Property Tax Maps Only. Site Contours and Wetland Data Was Not Available.

SCALE: 0 50 100 200 400

Wells Transportation Center
Wells, Maine

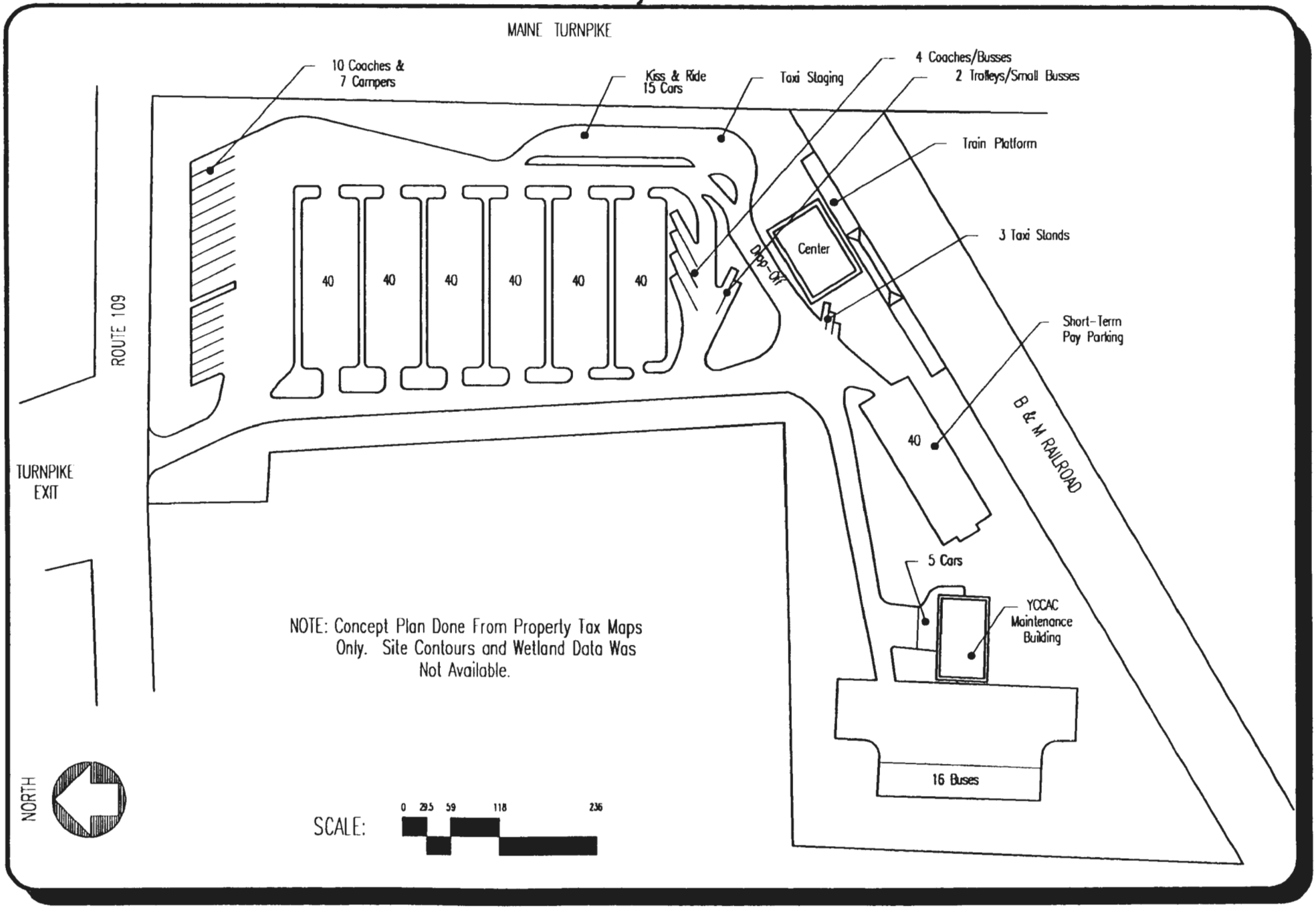


Table 4.5
PRELIMINARY GROSS COST COMPARISONS

ITEM	COST
A. SITE A - TRANSPORTATION CENTER	
1. Transportation Center Building for 7,144 GSF @ $80/SF	$572,000
2. Train Platform - 6,000 SF plus canopy @ $45/SF	270,000
3. Paving, Curbing and Gutters for all Parking and Circulation for 137,000 SF @ $1.75/SF	240,000
4. Outdoor lighting for 10-35' standards @ $4,000 each.	40,000
5. Sewage System Extension (1)	43,000
Subtotal Construction	**$1,165,000**
6. Project Costs for Site Preparation, Landscaping, Utility Hook-ups, Fees, FF&E, Contractors General Conditions, Inflation and Construction Contingency @ 35% of Construction	408,000
7. Conceptual Land Cost Estimates (2)	$600,000
TOTAL PROJECT COST	**$2,173,000**
B. SITE A1 - YCCAC MAINTENANCE FACILITY	
1. Maintenance Building for 5,597 GSF @ $65/SF	$364,000
2. Paving, Curbing and Gutters for 46,300 GSF @ $1.75/SF	81,000
3. Outdoor lighting for 4-35' standards @ $4,000 each.	16,000
Subtotal Construction	**$461,000**
4. Project Costs for Site Preparation, Landscaping, Utility Hook-ups, Fees, FF&E, Contractors General Conditions, Inflation and Construction Contingency @ 30% of Construction plus lump sum for special equipment and tools @ $240,000. (3)	378,000
5. Conceptual Land Cost Estimates (2)	250,000
TOTAL MAINTENANCE FACILITY PROJECT COST	**$1,089,000**

Table 4.5 (Continued)
PRELIMINARY GROSS COST COMPARISONS

ITEM	COST
C. OPTIONAL SITE B - TRANSPORTATION CENTER AND MAINTENANCE FACILITY	
1. Transportation Center Building for 7,144 GSF @ $80/SF	$572,000
2. Train Platform for 6,000 SF plus canopy @ $45/SF	270,000
3. Paving, Curbing and Gutters for all Parking and Circulation @ Center for 183,300 SF @ $1.75/SF	321,000
4. Outdoor lighting for 12-35' standards @ $4,000 each.	48,000
5. Sewage system extension. (1)	128,000
Subtotal Construction	**$1,339,000**
6. Project Costs @ 35%	469,000
7. Conceptual Land Cost Estimates (2)	745,000
TOTAL TRANSPORTATION CENTER PROJECT COST	**$2,553,000**
1. YCCAC Maintenance Building for 5,597 GSF @ $65/SF	$364,000
2. Paving, Curbing and Gutters for 43,000 SF @ $1.75/SF	76,000
3. Outdoor lighting for 4-35' standards @ $4,000 each.	16,000
Subtotal Construction	**$456,000**
4. Project Costs @ 30% plus special equipment and tools @ $240,000. (3)	377,000
5. Conceptual Land Cost Estimates (2)	45,000
TOTAL MAINTENANCE FACILITY PROJECT COST	**$878,000**

Table 4.5 (Continued)
PRELIMINARY GROSS COST COMPARISONS

ITEM	COST
OPTION A / A1*	
1. Transportation Center	$2,173,000
2. Maintenance Facility (4)	1,089,000
TOTAL	**$3,262,000**
OPTION B*	
1. Transportation Center	$2,553,000
2. Maintenance Facility (4)	878,000
TOTAL	**$3,431,000**

Source: Preliminary Estimates by CGA Consulting Services, Inc., April, 1993.

(1) This preliminary estimate is for connection to the 8 inch collector line located in the industrial park. Engineering studies would be needed to confirm the cost.
(2) Land costs could vary up or down substantially depending on market condition and the owner's position.
(3) Recommended special equipment and tools in Appendix (Table A-1).
(4) Approximately $1,545 of special equipment would not qualify for FTA capital funding due to each item costing less than $300. These items would qualify as operating expenses.

It is important to remember that these cost estimates are preliminary only and should not be considered as the same as design phase estimates which would not be done until design work is begun. These estimates are solely for the purpose of helping the client determine feasibility and whether or not to pursue implementation of the project.

SUMMARY AND RECOMMENDATION

Table 4.6 presents a summary comparative rating of the two site development options. As shown site B achieved a clear advantage over site A/A1. Once definitive information about site acquisition costs, Site B topographic and subsurface conditions (grading or building foundation difficulty or benefit) and the cost of sanitary sewer service extension to each site is known, the rating could change.

Table 4.6
SITE COMPARISON MATRIX

FACTOR	SITE A & A1	SITE B
1. Site Size Versus Program	3	10
2. Contiguity	5	10
3. Topography/Slope	10	7
4. Subsurface Conditions*	5	5
5. Orientation	3	10
6. Wetland Limitation	1	7
7. Availability	7	5
8. Purchase Price Range	7	5
9. Sewer System Proximity	5	3
TOTAL SCORE	**46**	**62**

* Subsurface data needed for confirmation.

SCALE

10	=	Outstanding
7	=	Above Average
5	=	Average/Suitable
3	=	Just Acceptable/Questionable
1	=	Poor

However, it is the consultant's opinion that Site B presents a superior option for the client. While it may result in somewhat more capital cost, the size and orientation to the Turnpike offer the chance to not only fully meet the proposed program but also allow long-range future flexibility should forecasts be exceeded. It also offers a much more visible condition than site A which is not nearly as prominent to the Turnpike.

When comparing the total project costs for each site option to include both the transportation center and the maintenance facility, Site B is about $169,000 more than Site A/A1. Considering, however, that Site B gives the client substantially more acreage on contiguous tracts and the opportunity for future growth beyond the proposed program makes Site B particularly attractive. The extra cost in-part is also attributable to the fact that Site B accommodates the entire program and Site A/A1 does not, thus resulting in more paving in Site B.

Wetlands impact on Site A/A1 is likely to be substantial since wetlands mapping by the state shows considerable wetlands on Site A. While Site B is reported to have some wetlands the amount is reportedly far less than on Site A. Discussions with HNTB, the Turnpike Authority's consulting engineers, indicate that site planning adjustments would minimize wetland intrusion and that it would probably be less than one acre. Before a final decision is made on which site to use and the total cost to budget for the project, detailed wetlands analyses, environmental and historical/ archeological impact analyses and geotechnical investigations should be completed.

Regarding the issue of YCCAC being in Wells versus Sanford, we believe that the advantages to the overall project and its potential economic develop as well as transportation development impact for the County as a whole, outweigh the relatively minor deadhead mileage penalty to the system. The presence of YCCAC as a tenant of the transportation center is a major factor in the potential for success as well as the ability to sustain the center's prominence during the winter months and off-season. Also, the benefit of having the Department's headquarters with the maintenance facility at the same location makes good management sense.

RECOMMENDED CONCEPT PLAN, FUNDING STRATEGY AND IMPLEMENTATION SCHEDULE

RECOMMENDED PLAN

The original analyses of optional Sites A/A1 and B and certain programming elements were refined as a result of a draft review meeting with the Study Advisory Committee. These refinements were made to the various tables and figures in Chapter 4 which thus now constitute the recommended site and facility concept plans and capital cost estimates. Changes and refinements included:

1. **Park and Ride** - Park and ride space was increased from 100 to 200 spaces to reflect the Turnpike Authority's most recent planning. Originally the second 100 spaces would have been deferred to future expansion beyond the initial construction. This increased total auto and van parking on Optional Site B to about 295. Optional Site A had no space for expansion. We concur with the Turnpike Authority that since the park and ride demand is expected to grow significantly that it would be preferable to pave the rest of the lot initially.

2. **Taxi Stands** - One taxi stand was added to ensure adequate accommodation of all local and nearby cab operators including one local cab company not included in the initial inventory.

3. **YCCAC Special Services Coordinator** - This staff position will be included at the Transportation Center rather than remaining in Sanford. Consequently, all YCCAC Transportation Department staff, except drivers, will be located at the Wells Center.

4. **YCCAC Transportation Department Layout** - Shifts were made with certain spaces to provide better functional adjacencies between related spaces and offices.

5. **Limousine Office** - The business office behind the counter was consolidated from two spaces to one with the same square footage for greater space flexibility.

6. **Site Utilization Needs** - As a result of added parking the total square footage of paving needed including the access/circulation roadway estimate was increased from about 163,000 square feet to about 229,000 square feet. When adding the estimated building footprint needs, the Transportation Center program consumes about 4.4 acres and the maintenance facility about 1.2 acres, excluding setbacks, buffering, landscaping, etc.

7. **Transportation Center Building Location and Train Platform** - In discussions with the Director of Station Planning for AMTRAK it was agreed that irrespective of site considerations, the building should be immediately adjacent to the train platform without any intervening roadway or other separation. AMTRAK has a strong preference for this adjacency as a matter of convenience to the train customers.

8. **Sewage System** - The cost for extending sewage service to each site assumes extensions to an 8 inch collector line located near Spencer Press in the Industrial Park.

Table 5.1
FACILITY ANNUAL OPERATING COST PRELIMINARY ESTIMATES - FIRST YEAR

ITEM	TRANSPORTATION CENTER	MAINTENANCE FACILITY	TOTALS
1. Utilities @ $2.00/sf	$14,288	$11,194	$25,482
2. Prop. Ins. @ $1.60/$100 val. Tran. Ctr. & $1.25 Maint. Gen. Liabil. @ $9000. Trans. Ctr/$1500. Maint.	$33,240	$11,988	$45,228
3. Common area cleaning @ $.15/sf/mo. for 1605 nsf	$2,889	$0	$2,889
4. Grounds maintenance @ $200/wk. for Trans. Ctr., and $50/wk. Maint. Facil. + plowing @ $20,000. Trans. Ctr. & $5,000. Maint. Ctr. lump sum estimate	$30,400	$7,600	$38,000
5. Trans. Ctr. Management @ 7% of ops. expenses	$5,657	$0	$5,657
TOTALS	**$86,474**	**$30,782**	**$117,256**

Source: Preliminary estimates in 1993 dollars by CGA Consulting Services, Inc., March 1993.

NSF - net square feet

Table 5.2
POTENTIAL RENTAL REVENUE ESTIMATES/ALLOCATIONS - FIRST YEAR

SPACE	BASE RENT	OPERATING SHARE	TOTAL ANNUAL RENT
1. Limousine Office - 280 nsf @ $6/sf plus 7% Ops. Share	$1,680	$6,053	$7,733
2. Travel Agency - 570 nsf @ $6/sf plus 15% Ops. Share	$3,420	$12,971	$16,391
3. Bank ATM - 40 nsf @ $5/sf plus 1% Ops.Share	$200	$865	$1,065
4. Newstand/Gift/Food - 630 nsf @ $6/sf plus 17% Ops.Share	$3,780	$14,701	$18,481
5. Vending - 200 nsf @ $6/sf plus 5% Ops. Share	$1,200	$4,324	$5,524
6. Baggage Storage/Package Ship. 300 nsf @ $6/sf plus 8% Ops.Share	$1,800	$6,918	$8,718
7. YCCAC Tran.Dept. - 1775 nsf @ 47% Ops. Share	$0	$40,643	$40,643
TOTALS	**$12,080**	**$86,474**	**$98,554**

Source: Preliminary estimates in 1993 dollars by CGA Consulting Services, Inc., March 1993.

Table 5.3
Wells Transportation Center
Facility Funding Potential Federal/Non-Federal Grant Allocations

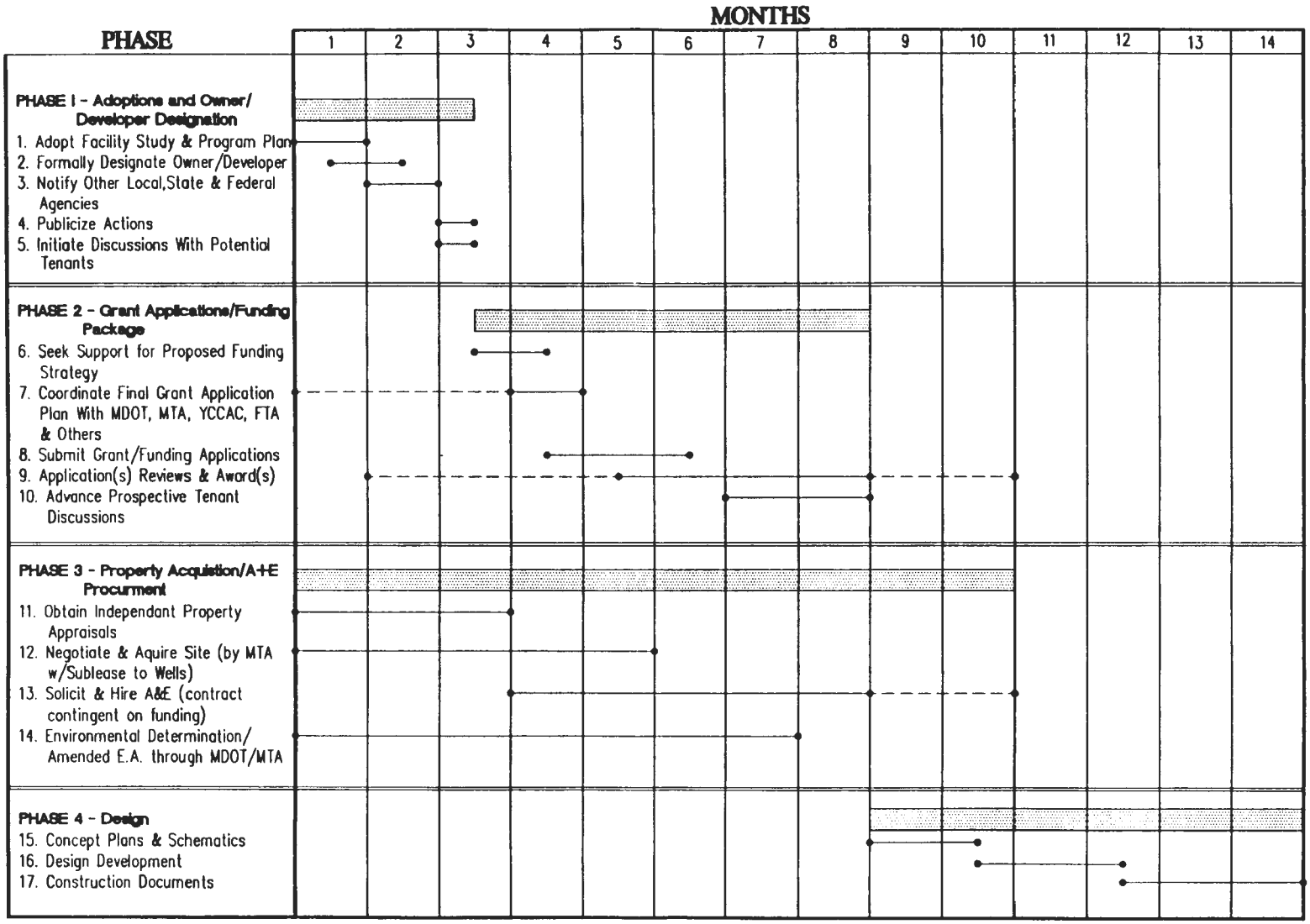
Program Element	Recommended Plan: Site B		
	Total Projected Expense	Assumed 80% Federal	Assumed 20% Non-Federal
Projected Expenses			
Wells Transportation Center			
1. Transportation Center Building	$572,000	$457,600	$114,400
2. Train Passenger Platform	$270,000	$216,000	$54,000
3. Paving, Curbing, Gutters	$321,000	$256,800	$64,200
4. Sewage Extension	$128,000	$102,400	$25,600
5. Outdoor Lighting	$48,000	$38,400	$9,600
Subtotal Construction	$1,339,000	$1,071,200	$267,800
6. Project Costs (Site Preparation, Landscaping, Utility Hook-Ups, Fees, Design, Contingency)	$469,000	$375,200	$93,800
7. Land Costs	$745,000	$596,000	$149,000
Subtotal - Transportation Center	**$2,553,000**	**$2,042,400**	**$510,600**
YCCAC Maintenance Facility			
1. Maintenance Building	$364,000	$291,200	$72,800
2. Paving, Curbing, Gutters	$76,000	$60,800	$15,200
3. Outdoor Lighting	$16,000	$12,800	$3,200
Subtotal Construction	$456,000	$364,800	$91,200
4. Project Costs (Site Preparation, Landscaping, Utility Hook-Ups, Fees, Design, Contingency)	$137,000	$109,600	$27,400
5. Shop Equipment	$240,000	$192,000	$48,000
6. Land Costs	$45,000	$36,000	$9,000
Subtotal - YCCAC Maintenance Facility	**$878,000**	**$702,400**	**$175,600**
Total Facility and Program Expenses	**$3,431,000**	**$2,744,800**	**$686,200**

Source: Preliminary estimates in 1993 dollars by CGA Consulting Services, Inc., April 1993.

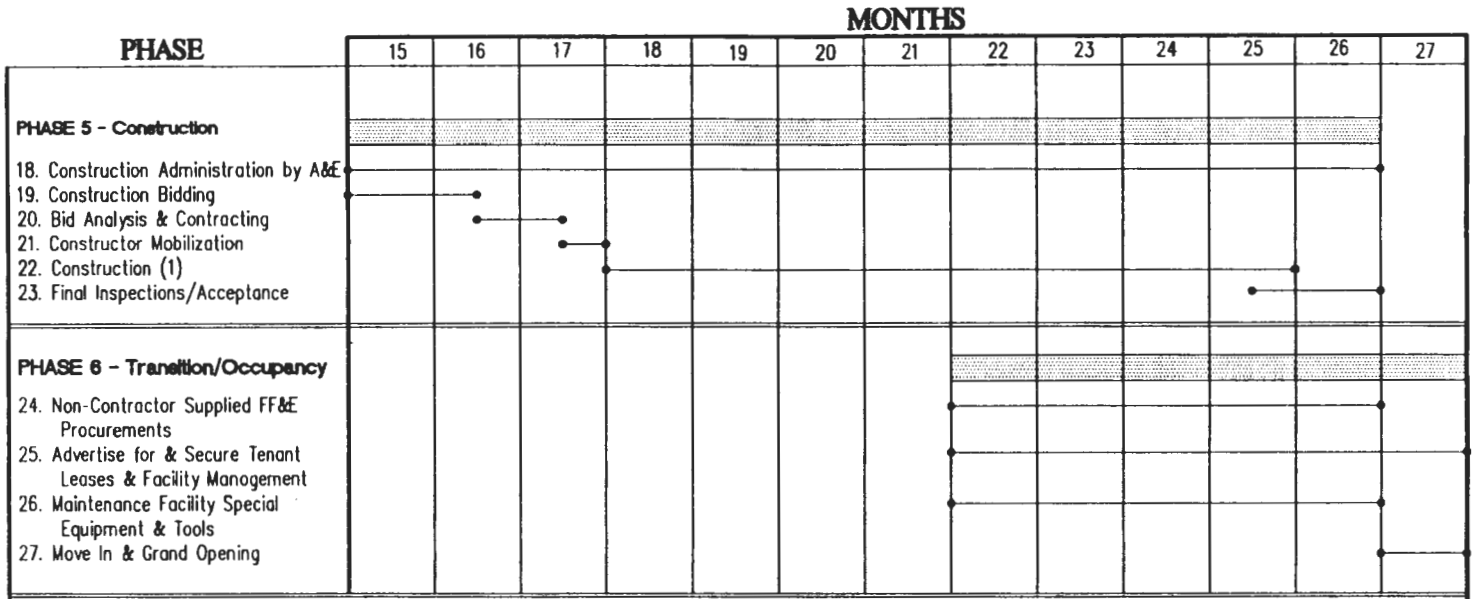
Note: As proposed on page 5-12, the entire 20% non-federal share could be secured either through local/state purchase of land or local/state funding of paving for the Park and Ride lot.

FIGURE 5.1

WELLS TRANSPORTATION CENTER
IMPLEMENTATION SCHEDULE



WELLS TRANSPORTATION CENTER
IMPLEMENTATION SCHEDULE



SOURCE: Recommendation by CGA Consulting Services, Inc., March 1993. Note that at the conclustion of Phase I the designated Owner/Developer's Project Director becomes responsible for all subsequent actions.

(1) Could be longer depending on the timing of construction start and the severity of winter conditions. Also, as explained in the narrative under "Implementation Phases" the construction of the rail platform and park and ride lot by MDOT and MTA could proceed as early as 1994 provided that an overall site master plan for all project elements was completed.

Table A-1
ESTIMATED MAINTENANCE CENTER EQUIPMENT

ITEM	ESTIMATED PRICE	
1 set of assorted large equip-hand tools	$1,000	
1 set of tap and die	$85	*
2 large and 2 medium vices (metal)	$360	
2 lawn mowers	$600	
2 mechanics tool sets	$3,000	
6 air wrenches	$900	
8 jack stands	$160	*
air compressor	$2,000	
amp meter	$75	*
battery cart	$100	*
brake lathe	$6,000	
indoor bus washer with water recovery system	$64,000	
engine diagnostic machine	$25,000	
engine stand	$150	*
exhaust gas extractor	$1,200	
headlight tester	$250	*
jib crane/hydro lift	$500	
lubrication center	$10,000	
mobile jack/lift (10,000lb. capacity)	$21,500	
ohm meter	$75	*
parts cleaning tank	$375	
diesel injection cleaners	$1,000	
power washer	$2,500	
radiator leak detection tank	$800	
service truck	$30,000	
shop//vac	$150	*
snow blower	$500	
stationary in-floor hydraulic bus lift (20,000lb. capacity)	$18,000	
timing instruments	$200	*
tire changer	$4,000	
tire changing cage	$125	*
transmission jack (3,300 lbs)	$2,150	
transmission stand	$175	*
welding/cutting outfit	$300	
wheel alignment machine	$35,000	
wheel balancer	$4,000	
wheel lathe	$3,200	
TOTAL	**$239,430**	

Source: Various vendors, March 1993.

* Not capital grant eligible due to value under $300.

III

DESIGN AND CONSTRUCTION

III. DESIGN AND CONSTRUCTION

Once the feasibility of the facility has been established and an architectural program completed, the project is ready to move into the architectural design phase and subsequently construction. To do so an official approval of the results of the study and adoption of the program as a guide for architectural work is normally needed first. This also usually means that a preliminary project maximum budget amount may be required depending on the policy and procedure of the government. Sometimes budgets are not set until preliminary/concept or schematic design work is completed so that a more accurate budget than is possible with just the space program can be established. Nonetheless some governments require that a budget be fixed firmly before any design work is done. If possible the best choice is to wait until schematic design is complete before a firm budget is fixed. In this case the preliminary budget based on the program is then viewed as just that, a preliminary guide yet to be finalized.

Designing a terminal, garage and/or headquarters building can take anywhere from 6 months to a year to complete to the point of being approved and ready to solicit construction contract bids or tenders. For relatively small projects an experienced designer can actually complete all design work in about three months. Government projects, however, usually require substantial extra time for reviews and approvals and to build consensus with various constituents whose approval may be needed, depending on local socio-political conditions and customary procedures. The construction phase can take anywhere from a year to two years depending on the complexity of the project, weather and the speed of governmental approvals. If substantial environmental impact mitigation procedures are required the length of construction will tend to be longer.

There are different methods of delivering a project which requires some technical knowledge and thus involvement usually by a public works, architecture or engineering staff of the local government in order to decide which methods to use. Some of these methods may not be permitted by governmental construction laws, as is the case in some U.S. cities and states. Thus someone knowledgeable in the legal aspects of design and construction procurement must be at least consulted at this stage. Steps in the process which a planner may need to become involved in include the following.

A. **Determine Project Delivery Method -** Once approval to proceed with design is obtained the planner needs to help determine what method of project delivery is preferred including:

1. Conventional Architectural/Engineering Contract - In the most traditional approach the owner hires an architect (unless design is done in-house by a large public works agency) who will be given full responsibility for the design and engineering of the facility and the provision of limited construction administration/monitoring services. In this approach the architect is responsible for having or hiring all design and engineering disciplines that may be needed (e.g. civil engineering, mechanical and electrical engineering, landscape architecture, interior design, etc.). When design is completed and accepted the owner solicits bids from constructors who will be responsible for building the facility to the design specifications.

2. Design/Build or Design/Build Finance - In this option the owner hires a firm or joint venture company which can both design and build the facility under a single contract. As an option the company or joint venture may also provide the financing of the project which can be done by a variety of financial approaches as allowable in the local jurisdiction.

   Some states in the U.S. do not allow design/build and instead require conventional separated design and construction contracts. Some states require that the construction contract be subdivided into a minimum number of different disciplines or packages (e.g. structural, mechanical, electrical, etc.) which works against the concept of a single design/build contract. The principal benefit of design/build strategies over conventional procurement is speed and perhaps some cost savings.

   In recent years the addition of private sector financing as part of the overall development contract has become more popular with some governments as a way of avoiding public referendums on increasing bonded indebtedness or taxes. A lease-purchase arrangement may be structured with complicated financial mechanisms which allow the owner to obtain the new building by making lease payments from their annual operating budget instead of having to obtain a large capital fund, grants and/or a mortgage.

3. Program or Construction Management - In this option the owner hires a company that will control and manage the entire project on behalf of the client. In particular this method provides the owner with a much greater level of construction phase on-site as well as off-site analysis, supervision and cost control. While this method is most common to large projects it can also be used for some small projects ($2-5 million U.S.). The difference between program and construction management is that the program manager is engaged much earlier sometimes in the

pre-design phase to also handle the feasibility study, and the PM also exercises a strong control over the design on behalf of the client.

This method's primary benefit is one of cost control from beginning to end plus the PM/CM can eliminate the general constructor and either contract directly with or have the owner contract directly with the various subcontractors. This strategy eliminates the general contractor's customary 5% to 10% fee which is replaced by a lower fee range of 3% to 6% by the PM/CM. Often the PM/CM will claim to be able to more than offset the cost of their fee through cost savings that they achieve through close control of design and/or close construction control.

B. Solicit, Select and Negotiate Design Services or Alternate Project Delivery Contract - Once the project delivery/implementation method is decided on a tender or request for proposals is the next step to be taken in order to engage either an architect, design builder or program manager. If the program management method is selected then the program manager would generally be hired before the architect. Some governments with a large public works department may decide to handle program management in-house.

Alternate Methods of Project Delivery/Implementation - If program management is not chosen the owner will still need at least one staff member to serve as its overall project or program manager to be responsible for implementing the project. In some cases this could be an architect, engineer or construction specialist, if available from within government. Alternately it could be a planner or an appropriate member of the transit agency who has the time and ability to devote to the effort. For most small systems this is usually either the transit manager or a public works staff person.

The architect who will design the facility will be engaged either by a separate direct contract or as part of a design/build team if that method is used. If a construction or program management company is hired to have overall design and construction control then the architect is still hired under separate contract to the owner. Although not common, the architect may be hired by the program manager which could also be combined with the design/build or design/build finance method.

Methods of Procurement - All methods of delivery usually require that the government advertise publicly for tenders or proposals from companies qualified to provide the specific type of service delivery being sought. Customarily once written proposals are received the owner

reviews the background and qualifications of each proposer and comparatively assess the quality of their proposed methods or approach, and schedule (and sometimes a budget proposal) to narrow down to a selection of the top three to five firms judged to be the best and capable of doing the job. Sometimes a selection of the one firm judged best to do the job may be selected based on the written submittals. Normally, however, it is advantageous to select the top few proposers and call them in for an interview. Interview and reference checks are very useful in being sure that the firm selected and contracted with is also a "comfortable fit" with the local staff who will be working with the architect and/or program manager over an extended period time.

In many governments the price of the professional services is not considered in selecting the firm and a price bid is thus not included as a part of the procurement. Instead the two parties attempt to negotiate a price and contract after selection of the preferred firm. If negotiations fail the owner then goes to the second ranked proposer to attempt to negotiate a contract. In the U.S. today the majority of such professional services procurements do require a price proposal be submitted with the technical proposal. This is normally the case with small rural governments. In many governments the price is used as a significant factor of selection and in some cases it is secondary to technical qualifications and proposal quality.

In any of the delivery methods used the first step after the completion of the architectural program as described in Part I and contracting for the services will be to have the architect begin the design phase.

C. **Conduct Project Design and Design Reviews** - Before the architect starts design and usually as a requirement of their contract, a provision needs to be made for close coordination and a formal review and approval process at each evolutionary step of design. This involves having a design services schedule and target dates for the completion of the various stages of the design whereby the owner's project manager (or construction manager/program management firm) and perhaps a design review committee is appointed by the government to review and make recommendations as the design is developed.

Again, in large-scale urban projects this process becomes very involved and usually involves at least a construction manager (either in-house or by contract) and in some cases a specialist employed temporarily by the government to act as the owners representative to carefully control the design phase services. In small rural projects this amount of professional services is usually not financially practical nor necessary. The basic

functions of design review and approvals no matter how small the project, however, must still be done by someone representing the interests of the owner. At the very least the owner needs its own project manager to oversee and coordinate the reviews and approvals of the architect's design work.

Phases of Design - Although the terminology varies somewhat between countries (and sometimes even within the U.S.) the design process is usually subdivided into three phases of work. In the case in which an architect is hired to also prepare the architectural program as reviewed in Part I (and as is done for many small projects), the design contract will usually include another preliminary step known as pre-design phase services which can include conducting the needs/justification studies as well as the architectural space program development. In this case the architect selected will usually include a planning/programming consultant on their team to do it or may have that talent within their own firm, especially if they have designed transit terminals previously.

Once the architect's contract, design schedule and methods of project coordination, reviews and approvals are agreed upon the work can proceed with the three or four phases: (1) pre-design optional services, (2) Schematic or preliminary concept design/master planning, (3) design development, and (4) construction documents or working drawings as follows:

1. Pre-design Phase Services - Architect's services will begin here only if they are hired to also complete the needs/feasibility justification study and\or the architectural space program as described in Part I of this manual. The work is done either by a specialist consultant provided as a subcontractor by the architect or by the architect's own staff if qualified staff are available in-house. Sometimes pre-design phase services may also include other special services such as preliminary site studies, special engineering analysis such as subsurface investigations or environmental impact studies. In either case such services are in addition to the architect's customary basic design services and will either be included as pre-design or just additional services.

   A formal review and approvals process and schedule would be established for any pre-design phase work just as would be done with a separate consultant hired to perform the tasks as described in Part I of the Manual.

2. Schematic/Preliminary or Concept Design - In the U.S. the start of design is called the schematic or preliminary phase. In the United Kingdom and former colonies it is called concept design and/or master planning.

Some architects will provide space programming, site master planning and special site studies as a part of the schematic phase or concept stage. If this is done the owner should be careful that the scope of services and work tasks negotiated provide for a clear and objective separation of this work from design work. As long as there is a clear separation and the general scope of tasks as described in Part I are provided for this may offer a simpler but acceptable method of contracting for a small project.

Care must be taken in this case to assure that both the feasibility analysis and the space program are done in a totally objective fashion that will withstand close public scrutiny. Some may be concerned that the same company that will be paid for design will also be paid to establish the justification, size and scope of the space program to be designed. Total objectivity should be assured whether the studies are done as pre-design or under the schematic phase if the architect has ultimate control.

Schematic or concept design is when the overall concept of the building is set and will result in the kind of drawings and even preliminary study models most often seen publicly. Schematic design begins with the interpretation of the architectural space program into a design response or solution. Design at this level consists of conceptual and sketch drawings from the design team's first brainstorming and conceptualizing of the building. Floor plan drawings may initially be only in single line and not show wall thickness until the client approves the conceptual layout.

Whatever the country, schematics or preliminary/sketch design is the beginning of the design work and is the most critical stage for the owner and architect to agree on the overall concept, layout and appearance of the building on a specific site and may include some or all of the following items (depending on the country):

a. *Concept or Preliminary Design Report* - In the U.K. and Commonwealth countries a concept and/or master plan report may be done to formalize, record and communicate the architect's approach to the architectural brief or program The report will typically include written descriptions, diagrams, sketches and other graphics to fully explain the proposes

concept and approach to evolving the space program into a design. This report may include:

* *Site analyses diagrams* to fully describe the solutions to using the selected site in response to its environmental conditions and limitations, adjacent structures and the areas design character, utilities, codes and regulations, pedestrian and vehicular access, parking, soil, orientation related to energy conservation, etc.

* *Floor plan sketches* which may be single line without wall thickness

* *Section sketches* to illustrate vertical organization and relationships

* *Elevation and perspective sketches* to illustrate the mass and form or the building and relation to its surrounds

* *Program conformance analysis* both for space amounts and functions

* *Cost estimate* to compare the design concept to the original budget if one had been set before design

* *Scheduled completion* estimate in relation to the owner's original schedule

* *Any other charts, sketches, diagrams, etc.* that may be needed to clearly and fully describe the conceptual proposal and its impacts. Some architects may develop a model or 3D AutoCadd video tape to help translate and explain their ideas.

b. *Schematic Design Elements* - In the U.S. approach the type of concept or preliminary sketches and diagrams that are done under the U.K.'s concept design/master planning is also done at the beginning and is then further refined into a more formalized and detailed design as a continuing part of the schematic design phase. At this stage the design concept is expanded into a more formal design proposal which fully analyzes all aspects of the project. Large or small the schematic phase work needs to result in a fully developed solution which lacks nothing but the finishing detail and final construction documents. All the building's systems are selected and outline specifications are developed. All materials, assemblies and construction

techniques should also be fully explained. Schematic design normally includes:

* *Site master plan* with utility locations, access ways, parking, plantings, major outdoor features, finished site topography, and general civil engineering, etc.

* *Floor plans* that show wall thickness and all door openings with complete design of interior and exterior wall systems

* Elevations showing massing, fenestration and materials

* Foundation/structural plans

* Section drawings

* Roof plan

* Electrical and communications systems plan

* Lighting plan

* Plumbing, mechanical and HVAC plans

* Interior finishes and acoustical treatments

* Special equipment selections

* Exterior perspective drawings

* Building/site models

* Outline specifications for all building systems

* Cost estimate

As the architect progresses with the schematic work, design reviews should be held with the client to assure that the architect's ideas are both consistent with the program that was prepared earlier and that the client agrees with the overall design and functional conditions created. Two or three reviews may be needed during schematics depending on the complexity of the project. A logical review schedule might include:

Review #1 - After initial concept drawings are ready

Review #2 - At about 50% to 70% completion of schematics
Review #3 - At 100% completion of schematics

The architect should included a report to clearly convey information which does not lend itself to graphic communications including the preliminary specifications. The report should also address compliance with government building codes, relevant laws, energy conservation techniques, interiors descriptions and space program compliance.

3. Design development - Once the client has approved the schematic design the architect may proceed with the design development phase. In this stage the design will be developed in more detail so as to allow final decisions about the types of materials and systems used inside and outside on all building elements. Also, the designs completed in the schematic or preliminary phase will be refined and detailed. Once all design is completed in this phase only the final construction documents and final specifications remain. The site design will be complete and thus the specific location of the building all site elements, finished grading and utilities will have been completely analyzed. All building systems will be finalized in complete designs and specifications; all architectural elements fully analyzed and designs complete; all interior areas completely designed and specified so that all room layouts are known, furnishings, finishes, fixtures and equipment are specified with any cabinet/carpentry work and colors have been finalized.

Similar to the schematic phase the client should also agree on a design review schedule which could be very similar to the one noted above for the schematic phase. In addition to the work completed under the schematic phase the architect's design development work should include both a report with drawings and specifications ready for final review and approval to begin preparation of construction documents. The submittals should at least include:

a. *Site Plan Drawings*

* Building locations
* Utility locations
* Land use and circulation
* Existing and proposed plantings
* Existing and proposed surface treatments
* Major outdoor spaces and features
* Proposed grading and finished elevations
* All civil engineering work needed

b. *Architectural Drawings*

* Detailed floor and roof exterior plans
* Building sections
* Elevation drawings with exterior materials shown
* Detailed wall sections
* Door and finish schedules
* Layout of equipment and furniture

c. *Structural Drawings*

* Basement and foundation plans
* Floor and roof framing plans
* Special conditions

d. *HVAC Drawings*

* Distribution plans and equipment locations
* Details of systems and riser diagrams

e. *Plumbing Drawings*

* Distribution plans and equipment locations
* Details of systems and riser diagrams

f. *Electrical Drawings*

* Distribution plans and equipment locations
* Details of systems and riser diagrams

g. *Equipment Layouts*

* Location and special conditions plans

4. Construction documents and specifications - The completion of the architect's design phase work involves the preparation of construction documents, sometimes called working drawings. All specifications, furnishings, fixtures and equipment are finalized and specified at this time so that once this phase is completed the project is ready to be tendered or bid for the construction contract. Construction documents are the greatest level of detail which is the finalization of the design already developed and should provide the constructor a complete guide which leaves nothing unanswered as far as what is to be built. It is a "production" phase rather than a design decision phase as are all previous phases The client and

architect should also have a schedule for design reviews during the CD phase and to eventually gain final approval before the project can be tendered.

Construction documents will include:

a. *A "check set"* of drawings, specifications and a cost estimate at about the 60% completion stage for review with the owner.

b. *Final drawings*, master specifications, bidding documents and a cost estimate submitted for a final review and approval by the owner.

c. *Final cost estimate*

d. *Statement of compliance* with all codes, laws and applicable regulations

e. *Energy conservation* final calculations and life cycle cost estimate

f. *Area and Volumes* final analysis

g. *Construction schedule* final review

Once the architect completes all work with approval of the owner the final design documents are usually turned over to the local public works project manager or construction manager ready for tendering/bidding. In very small projects the owner may have the architect handle the construction bidding if no construction manager or appropriate government staff are available to handle the process.

D. Construction Bidding and Contracting - As noted above the architect's contract may or may not provide for the architect to tender or bid the project on behalf of the owner. Whoever handles this process will need to have possession of the completed approved design construction documents.

A pre-bid conference may be held to both be sure that all prospective bidders clearly understand the design concepts and the conditions of the bidding process. If a program manager/construction manager is involved they would normally handle this process for the owner. Most all governments have very detailed procedures as to how construction bidding and contract award is to be done and a purchasing or procurement staff would normally be involved. Usually, contracts are either fixed price, cost plus fixed fee or cost reimbursable plus profit.

E. **Monitor and Inspect Construction Progress** - During the construction phase the owner, owner's architect and program/construction manager if used should all be providing various degrees of on-site inspection and supervision in the case of a program/construction manager. At a minimum the project architect should provide standard construction administration services to include a specified number of job site inspections and reports to the owner. To the extent feasible and with appropriate staff available, the owner should also make periodic site inspections.

When program/construction manager is used the company (or individual) will normally provide on-site inspection and supervision throughout the entire construction period. The amount and depth of PM/CM services will depend on how much and what type of services are contracted. Such methods as value engineering, periodic cost estimation, schedule analysis, materials testing and constructability analysis are some of the types of technical support that can be provided. If a general contractor is used without a PM/CM then daily job site supervision is their responsibility.

Benefit of a Construction Manager - One of the advantages of having a full-time construction manager (whether in-house or by contract) is that changes to the way building elements can occur very easily during construction whenever the constructor or any subcontractors claim that something can't be executed exactly as designed or specified. This can easily result in a dispute between the architect and constructor which will ultimately require the approval of the owner for an agreed on solution. A full-time construction manager can act in the owner's best interests (not the architect's or constructor's) and help to achieve an optimum solution.

The other big benefit of having the CM is just in dealing with requested "change orders" and keeping them at a minimum since every change during construction is usually expensive. A construction manager, whether on-staff or by contract, can typically handle the following which would otherwise need to be done by the owner or by an extended architect's contract for additional services:

* Construction bidding
* Alternate use of general contractor versus multiple prime contractors
* Pre-construction conference
* Trade activity coordination
* Resolve work conflicts
* Work directives resolutions
* Resolution of drawing and specification errors
* Daily field communications and correspondence

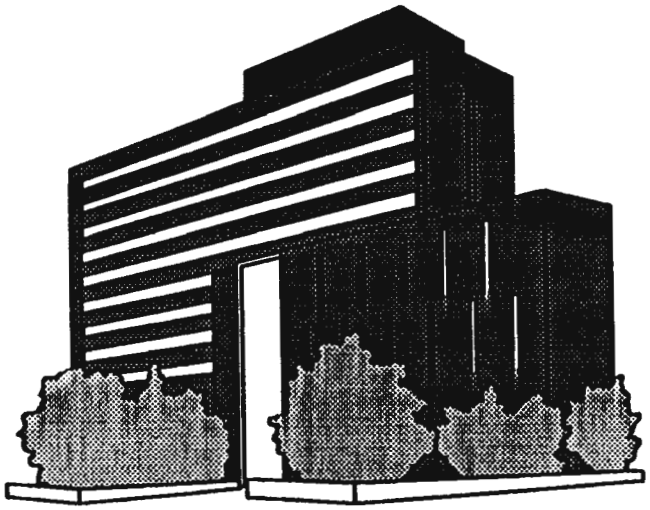
* Shop drawing control process
* Plan distribution and clarifications
* Applications for payment, reviews and approvals
* Change order resolutions
* Daily visual inspections, documentation and follow-up
* Non-destructive testing and sampling
* Project schedule management

APPENDICES

Appendix 1

FACILITY AND BUS STOP ACCESSIBILITY BY CGA

Facility Accessibility



Construction or Alteration of Transportation Facilities

- Construction or Alteration of Facilities by Public Entities Governed by USDOT Regulations
- Construction or Alteration of Facilities by Private Entities Governed by USDOJ Regulations
- Title III of the ADA Contemplates a High Degree of Degree of Convenient Access
- Implementation Geared Towards Achievement of Goals Over Time

Construction or Alteration of Facilities
New Transportation Facilities - Public Entities

- ALL New Facilities Must Be Readily Accessible to and Useable By Individuals with Disabilities
- Facility is New if Notice to Proceed is Issued After January 25, 1992
- For Intercity or Commuter Rail Stations, Effective Date is October 7, 1991.
- Facilities Must Be Constructed According to ADAAG Standards

Typical Transportation Facilities

- Transit Stations
- Transit Bus Stops, Pads and Shelters
- Transit Terminals, Buildings, or Other Facilities

Bus Stops, Shelters and Terminals
New Construction/Siting

- **Where New Bus Stop Pads are Constructed, They Shall:**

  - **A Firm, Stable Surface**
  - **Minimum Clear Length of 96"**
  - **Minimum Clear Width of 60"**

  ...And Be Connected to Streets, Sidewalks, Etc. By Accessible Route

- **Slope of Pad Should, To the Extent Possible, Be the Same as Roadway for Proper Lift Operation**

Bus Stops and Terminals
New Construction/Siting
(Continued)

- **Where New Bus Stop Locations are Chosen, To the Maximum Extent Possible, They Must Permit Adherance**
  - **To Surface, Size, and Accessible Path Requirements**
- **Signage Must Adhere to ADAAG Guidelines**
- **Shelters Must Permit Access to Mobility Aid Users with Minimum Clear Floor Area of 30" x 48"**

To obtain a copy of the

Accessibility Handbook For Transit Facilities

Contact:

National Technical Information Service
Springfield, Virginia

Telephone Number: (804) 487-4600

Ask for Agency document Number FTA-MA-06-0200-92-1.

Appendix **2**

U.S. Department of Transportation Excepts from "Transportation for Individuals with Disabilities"

federal register

Friday
September 6, 1991

Part IV

Department of Transportation

49 CFR Parts 27, 37 and 38

Transportation for Individuals With Disabilities; Final Rule

Appendix A to Part 37—Standards for Accessible Transportation Facilities

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APPENDIX A1

Appendix 3

SUMMARY OF U.S. ENVIRONMENTAL AND SAFETY REGULATIONS RELEVANT TO TRANSPORTATION FACILITIES AND EXAMPLE ENVIRONMENTAL ASSESSMENT

Environmental and Safety Regulations and Considerations
FOR TRANSPORTATION FACILITIES CONSTRUCTION

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Columbia, S. C.
February 17, 1995

The following is a list of environmental protection and safety-related federal regulations which must be complied with in construction projects which use federal funds from the Federal Transit Administration. Some examples of the types of procedures and practices that are customarily used to comply with some federal requirements are also included.

I. APPLICABLE REGULATIONS

1. **Air and Water Acts and EPA Regulations** - The Clean Air Act as amended, the Federal Water Pollution Control Act, as amended, and the regulations of the Environmental Protection Agency must be complied with.

Compliance with the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, Section 508 sets limits on pollutants discharged in waterways and requires safeguard against spills from oil storage facilities. The Clean Air Act Amendments of 1990 have substantial impacts which affect the design of transit maintenance facilities and fueling systems, especially where alternate fuels are used.

EPA-related citations include: the National Policy Act of 1969, as amended; 49 USC app. Subsection 1610; Council on Environmental Quality regulations, 40 CFR Part 1500 et seq.; and the joint FHWA/FTA regulations, "Environmental Impact and Related Procedures," at 23 CFR Part 771 and 49 CFR Part 622. EPA regulations (40 CFR, Part 15) which prohibit the use of EPA violating facilities must be complied with.

a. **Atmospheric Emissions** - All FTA funded facilities must be designed to limit air pollution in conformance with the Clean Air Act, as amended, FTA directives and any other applicable local standards. The 1990 Amendments also required significant reductions in the emissions of transit busses beginning in 1994 until 2000 which has the practical effect or conversion to alternate fuel busses at least in the rest of the decade which will effect transit maintenance and fueling station space design and special and safety equipment.

(1) Recycling/Recovery - In 1992 Section 608 of The Clean Air Act as amended, 40 CFR, Part 82 implemented regulations prohibiting the release of atmospheric pollutants which are ozone-depleting and requires their recapture and/or recycling. Typically, HVAC and refrigeration equipment that use refrigerants must now be captured and recycled rather than released. For a transit maintenance facility this means that air conditioned vehicles, paint spraying and anti-freeze will all require the installation of a material recapture/containment and/or recycling systems.

(2) Exhaust Systems - Special exhaust venting systems are now required in fueling

and repair areas where vehicle engines may be run to both protect the atmosphere and workers in the area. For alternate fuel vehicles the systems are even more complex due to the special safety detection devices needed.

(3) Alternate Fuel Systems - Where alternate fuel systems are installed the requirements for maintaining a safe condition require a substantially different fueling station design than traditional gas or diesel stations. Separate conditions are needed, for example for CNG or LNG "fast" and "slow" fill stations. Hazardous vapor detection and venting, explosion-proof fixtures, special sensing devices, and other automatic early warning controls must be provided. Essentially the use of an alternate fuel station will require more ground space than usual for conventional fueling.

(The 1992 amendments also include substantial requirements that relate to vehicle emission reductions that impact the operation of transit and the use of conventional fuels and alternate fuels in air quality "non-attainment" areas. This portion of the Act, however, related more directly to operations than construction.)

b. **Water Protection -** The Clean Water Act, as amended, established standards for water quality which includes limits of acceptable discharge and spill prevention and remediation. Essentially, under an EPA permitting, transit facilities must not produce discharges that adversely affect water quality in its surrounding area.

(1) Washing and Maintenance Discharges - Where bus washing occurs and either sanitary sewer discharges or site runoffs could be effected by contaminants from maintenance operations as well, the agency must now treat its discharge before it can runoff or enter the sewer. Also, many of the typical fluids handled in a transit operation are now considered hazardous materials and thus subject to containment and special disposal or recycling.

The site and floor drainage systems in maintenance, washing , fueling and storage areas will need to have special drainage systems that can improve the quality of the discharge.

c. **Environmental Impact -** An environmental assessment or impact statement must be made for all FTA Section 3 funded projects. In most cases a "finding of no significant impact" (FONSI) can be made for small facilities which avoids an expensive impact statement from having to be prepared. The Environmental Assessment is a relatively limited analysis which will be used to determine whether or not an impact statement is needed.

If adverse environmental impacts will be caused the grantee must take all "reasonable" steps to minimize or mitigate the effects of such impacts. The grantee agrees to undertake all mitigating measures as may be identified in applicable environmental documents (i.e. environmental assessments, impact statements, memoranda of agreements, etc.) and with any conditions imposed by government as a part of a FONSI or a record of decision. Such mitigation measures may only be modified or removed by approval of the Government.

d. **Non-Violating Facilities List -** All contractors and subcontractors must stipulate that any facility used in the performance of the project must not be on EPA's list of violating facilities.

Prompt notification is required if an EPA notice is received that any facility used or to be used in the project is under consideration to be listed as an EPA violating facility.

e. **Use of Public Lands** - No publicly-owned land from a park, recreation area, historic site, or wildlife or waterfowl refuge of national, state or local significance, as may be determined by federal, state or local officials having jurisdiction, may be used for a federally-funded project unless certain specific findings are made by the U.S. DOT.

f. **Historic Preservation** - Projects must comply with Section 106 of the National Historic Preservation Act by consulting the State Historic Preservation Officer to identify properties and resources listed in or eligible for inclusion in the National Register of Historic Places which may be affected by the project. Grantees must comply with all requirements established by the Government to avoid or mitigate adverse effects on such properties.

g. **Construction Inspections** - Contractors agreement to comply with Clean Air Act and Federal Water Pollution Control Act as related to inspection, monitoring, entry, reports and information as well as all other Act guidelines.

h. **Above and Underground Storage Tanks** - EPA regulation under 40 CFR, Part 280 requires that any underground storage tanks containing regulated substances must comply with technical requirements for leak detection, leak prevention, financial responsibility and corrective action as may be necessary to protect human health and the environment. Essentially, old tanks must be removed from construction sites as well as existing locations where non-compliance is found.

Some transit agencies have converted to above ground fuel storage tanks due to the more stringent requirements for underground storage which is more expensive.

2. **Energy Conservation and Efficiency** - Contractors shall comply with State Energy Conservation Plan regulations promulgated pursuant to the national Energy Policy and Conservation Act - P.L. 94-163 (USC 6321 et seq.). Such requirements are usually adopted in local building codes and relate to the various standards that must be taken concerning thermal loss and gain.

3. **Hazards, Safety Standards, and Accident Prevention** - Regulations of the DOT/FTA, HUD, Federal Labor Standards Provisions, Flood Disaster Prevention Act and state and local codes promulgated pursuant to these national acts affect the design and construction of transit facilities. While most projects follow OSHA standards for safety they are not legally required to be applied to publically owned transit facilities, only private ones.

a. **Hazard of Death or Injury** - Under the 1992 FTA Act, Section 22 Safety Authority, the Secretary may investigate any condition which it believes to create a serious hazard of death or injury and require the local public body to correct the condition and may withhold further federal funds until a plan is approved and implemented to correct the condition.

b. **Lead-based Paints** - Lead-based paints cannot be used in any residential project by HUD regulation and should not be used in other projects.

c. **Use of Explosives** - When the use of explosives is necessary contractors must observe

all local, state and federal laws regarding the purchase of such material. Generally, contractors should be required to take all necessary precaution to protect completed work, neighboring property, water lines, or other underground structures. Where there is possible danger to other structures or property from blasting, charges should be reduced and the material should be covered with suitable timber, steel or rope mats. The local public utility should be notified well ahead of time if any utility property is nearby.

d. **Federal Occupational Safety and Health Act of 1970 -** Contractors must take all necessary precautions to guard against damages to property and injury to persons. Sufficient red warning lights should be maintained at night and suitable barricades and easily visible markers should be used as needed around potentially hazardous conditions at all times. Eye wash sink provided near battery storage and charging areas; chaining around pits when they are not in use; shields around certain machinery; flameproof paint cabinets; marked walkways; and safety stands underneath raised busses are all typical provisions in response to OSHA standards.

Technically, OSHA regulations still do not apply to publically-owned transit facilities, however most newer facilities do comply due to the common sense value of the provisions, especially with the "law suit" prone nature of the U.S. today.

e. **Federal Labor Standards Provisions -** Contained within HUD 4010 (2-94) are three health and safety requirements which apply to FTA construction contracts as follows:

1. No laborer shall be required to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

2. Comply with all regulations issued by the Secretary of Labor pursuant to the Contract Work Hours and Safety Standards Act - Public Law 91-54, 83 Stat. 96.

3. Provisions 1 and 2 above shall be binding on all subcontractors. The contractor shall take whatever actions as may be directed by the Secretaries of HUD or Labor to enforce provisions.

4. **Seismic Standards -** Construction must meet seismic standards as approved by the U.S. DOT and defined in 49 CFR part 41. Between 1991 and 1994 the AASHTO Specifications, Uniform Building Code, National Building Code, Standard Building Code and Southern Building Code implemented new seismic codes which affect all new building construction and renovations where the project cost exceeds 50% of the existing building's value. South Carolina is split in 2 seismic zones which have extra construction requirements.

5. **Flood Disaster Protection Act of 1973 -** Grantees must comply with the flood insurance purchase requirements of the Flood Disaster Protection Act of 1973 when the project is in a flood prone area. Essentially, sites within the 100 year flood plane should be avoided.

II. EXAMPLE CONSTRUCTION COMPLIANCE PROVISIONS

1. Temporary Controls During Construction

a. **Pollution Abatement** - Conduct operations in a manner to minimize pollution of the environment surrounding the area of work by every means possible. Apply specific controls as follows:

* Material transport - Clean trucks/clean spills/ cover truck beds
* Waste materials - Prevent waste and erosion material from entering waterways or sewage systems
* No burning
* Dust control - watering/interior partitions
* Pest control - prevent influx and eliminate infestations

b. **Safety**

* Temporary light and power provided under OSHA requirements
* Appropriate ventilation of enclosed areas to prevent accumulations of dust, fumes, vapors and gasses
* Temporary fire protection
* Temporary sanitary facilities
* Temporary barricades
* Maintenance and control of traffic with control and protective devices, markings, flagmen with florescent protective clothing and signs as needed
* Protection and covering of open excavation, work spaces and roadways (decking, plates, signs, barricades, barriers, flashing lights, etc.
* Temporary parking
* Protective coverings at walls, projections, stairs, jambs, sills, and soffits of openings
* Maintain areas free of waste material and debris with progressive cleaning
* Maintain adequate drainage
* Provide sheltered and secured storage of products and materials

c. **Site Clearing & Preparation**

* Obtain permits for legal removal and disposal any materials
* Use only fill material that has been sampled, tested and certified
* Protect bench marks, existing streets, sidewalks and adjacent properties and structures throughout the project
* Protect all excavation with shoring, bracing, underpinning or other methods as appropriate
* Identify and protect all known underground utilities with stakes and flags and coordinate work with local utility
* Chemicals are not to be used on subareas of areas to be seeded or planted
* Erect silt fences as needed either prefabricated or with posts, fences and filter cloth to local codes and remove bulges that occur
* Stabilize the construction entrance with geotextile material to at least 8 inches depth and provide periodic maintenance as needed

d. **Steel joists, roof and floor decking**

* Handle all materials safely and use erection procedures that assure the health and safety of all workmen in compliance with any local applicable codes
* Proceed with work only under satisfactory weather, temperature and light conditions

2. **Finished Construction Elements**

a. **Duct-mounted smoke detectors** - Furnish duct-mounted smoke detectors as specified and located on drawings.

b. **Fire dampers** - Furnish fire dampers as provided for on shop drawings and in specifications of an interlocking blade or expanding curtain type constructed and mounted to be U.L. rated and re-settable from either upstream or downstream sides.

c. **Emergency lighting and power** - Emergency power and lighting shall be provided by a diesel standby generator which shall be controlled by an automatic load transfer or shedding device which shall distribute power as required by local code to certain electrical equipment or apparatus when normal power fails.

d. **Fuel storage system** - Underground fuel storage tanks must be a double-walled tank, have a leak detection system and an impervious containment barrier as a secondary leak prevention measure. Underground fuel pipes may also be double-walled with the outer pipe draining to a sump pump with a leak detector. This latter measure while not required is used by some transit systems due to the substantial financial penalties plus and high cost of clean-up now required in the event of a spill.

e. **Other Fluid Storage** - Leak detection systems are required for any underground storage tanks for other fluids such as oil, grease, antifreeze or recycled fluids. Smaller systems tend to use 55-gallon drums for above ground storage of such fluids which should also have a containment barrier underneath to hold any spills.

f. **Automatic Bus Washers** - Bus washing systems need to have a water recycling system, typically for about 80% of the wash water in order to avoid high fees required to be imposed by the Clean Water Act on waste water discharges that exceed permitted levels of metal, soap and other man-made materials being released into sanitary sewer systems.

g. **Site Drainage Systems** - The Clean Water Act permits now issued by local sewer agencies limit the amount of contaminants allowed to be discharged into a stream or surface water system even more stringently than the amounts for sanitary sewer discharge. As a result some systems with a large number of vehicles and facilities install oil/water separators and/or detention ponds so as to avoid a penalty for illegal discharges.

h. **Floor Drainage Systems** - Grease traps in floor drains are the traditional method used to separate contaminants from draining water inside facilities, but the Clean Water Act discharge limits now result in many facilities installing an industrial waste system, detention ponds, an oil/water separator, or a combination for treatment prior to discharge. Some agencies also construct a dike or pit or have absorbent pads or booms installed around fluid storage areas to contain a spill.

i. **Exhaust Systems -** Roof and ceiling mounted fans which make about 4 complete air changes and hour are required by most local codes of vehicle repair facilities. In central repair bays hoses are also hooked to the tail pipe of vehicles to vent the exhaust directly into the central exhaust system. Pits need an exhaust/air change system as well in addition to the central system and can usually be done either with exhaust vents located at the floor level near the pit or by a blower system that changes the air in the pit.

j. **Refrigerant Recovery System -** For systems with air conditioned vehicles, the freon used must be contained and not released into the atmosphere. Thus for maintenance and repair on such systems a freon recovery system is used which contains the freon for recycling.

Example

ENVIRONMENTAL ASSESSMENT REVIEW

FEDERAL REQUIREMENTS

Federal Transit Administration Circular C 5620.1 "Guidelines for Preparing Environmental Assessments" describes requirements and guidelines for the preparation of environmental assessments to evaluate the significance of the potential impacts of proposed capital development projects. This regulation is in support of the National Environmental Policy Act (NEPA) of 1969, as amended and responds directly to the Act's implementation regulations issued in 1978 by the Council on Environmental Quality.

The assessment is the first level of review and is intended to provide enough information about the proposed project to enable the FTA to make a decision about the "environmental significance" of the proposal. This process provides FTA with an objective basis to decide whether or not any further or more in-depth environmental analysis should be required before a project proceeds into full design and construction.

FTA regulations identify three classes of action which require different levels of analysis. By definition the Transportation Center project is a "Class 3" action. Class 3 actions are ones "in which the significance of the impacts on the environment is not clearly established and for which an Environmental Assessment is prepared to determine the probable impacts." If significant impacts are discovered an Environmental Impact Statement will be required by FTA. If no significant impacts are identified the FTA should be able to issue a "Finding of No Significant Impact."

The following subsections address each of the various potential impact categories as required under FTA Circular C 5620.1 with respect to Gatlinburg's proposed project. The assessment found no significant impacts.

1. NEED FOR AND DESCRIPTION OF PROPOSED ACTION

The City of Gatlinburg's Transit Department does not have a headquarters/operations center. The Department has been moved around to various small offices over several years since its beginning. The current space in use temporarily is a small office at the City's oldest Welcome Center in the downtown. The Department occupies about 1184 net square feet in this building which allows office operations for the director, a secretary and service supervisors. There is no room for the drivers for lockers, meetings/conferences, training, customer services, indoor passenger waiting, marketing staff, secure money counting, nor adequate storage.

The Feasibility Study and architectural space program just completed for the creation of a permanent transit center/headquarters found that the Department needs over 4500 net square feet of office space to meet current needs and allow for modest growth over the next 10 to 15 years. This is about three times the space that is available to the Department in the current temporary space.

The Feasibility Study also documented the fact that the site of the temporary office is an ideal site for both the Transit Department and the original Welcome Center. Assessments of the

from a traffic and operations standpoint to demolish the existing structure and build a new larger structure. The new building would support the needs of both the Transit Department, Parking Department and the Welcome Center plus allow the addition of a small branch post office. Re-siting the structure will also allow for off-street stops of the Trolleys and tour coaches for rider transfers and short-term waiting which is now done at curbside on the downtown's busiest street and intersection. The Transit Center project will not be a component of a larger project. A new theme park is currently under construction on an adjacent tract.

The 1.9 acre site is totally owned by the City of Gatlinburg and was originally built as a Welcome Center with off-street parking in the 1960's. A site diagram is included in Section 1 page 1-3 of the Feasibility Study. Also Section 3 of this review on Environmental Impacts contains a plat map and the City's official zoning map of the site with photos of the surrounding land uses. Section 3 of the Feasibility Study provides detail space and design concepts and parking space proposals which include: (1) New Building Construction = 6881 gross square feet; and (2) Parking Spaces Provided = 6 tour coaches, 6 Trolleys, 117 autos/campers.

This project will actually have a mitigating effect of traffic congestion and traffic operations adjacent to the site. Trolleys and tour coaches which currently use the curbside transit stop in front of the Welcome Center will now be able to pull onto the site for transfers and short-term waiting due to the redesign of the site. This will have a positive effect on the flow of traffic at the City's busiest intersection on its busiest street.

2. ALTERNATIVES TO THE PROPOSED ACTION

The City considered various alternatives for locating a new transit center but none are nearly as effective nor ideally sited as this one as described in sections 1 and 3 of the Feasibility Study. The site offers the City the opportunity to have a Transit center at the beginning edge if its downtown tourist district. The location will be convenient to tourists and enable them to leave their car at any of the City's several parking lots and utilize Trolleys plus make convenient transfers between various routes. Moreover, the use of this already-developed site will not require the use of new or unaltered land away from the central business district.

The joint use of this site and facility for the Welcome Center function, branch post office, Parking Department and some off-street parking is an efficient mutually beneficial use of limited land resources in the City's central area. The option of expanding and remodeling the existing structure was also examined in the Feasibility Study and found to be not nearly as cost effective nor able to meet the total space needs as building the new structure. Also the new structure will be sited more centrally on the tract to allow the tour coaches and Trolleys to stop and transfer off-street. Without this re-siting this positive impact on traffic operations and congestion would not be possible.

The City was able to test the proposed project by moving the Transit Department temporarily into the Welcome Center over the past year. The site has proven to be a strategic location not only for the Department's headquarters but also for the system's central passenger transfer function. The system's route and schedule structure functions efficiently with the main passenger transfer being at this location.

3. ENVIRONMENTAL IMPACTS

A. **Land Acquisition and Displacements** - The City of Gatlinburg owns the proposed site and will contribute it as a part of the total project. No displacements will result.

B. **Land Use and Zoning** - The City's Land Use Plan and Zoning Ordinance already classify the site in a conforming designation, the C-1 Tourist Commercial District. A tract map of the site, the City's Zoning map and photos of surrounding land uses are included hereafter.

C. **Air Quality** - Traffic will not increase as a result of the proposed project. If anything there could be a slight decrease in the central business district traffic if more visitors use transit due to increased convenience factors related to the new indoor waiting and transfer facility. The only change to traffic patterns will be a flow improvement at the intersection in front of the center. Since the Trolleys and tour coaches will no longer have to stop at curbside at the City's busiest intersection, traffic operations, flow and safety would be improved. The transit routes and schedules will not change due to this project.

D. **Noise** - The project will not increase noise conditions since no schedule nor level of service change nor increase in the number of transit vehicles nor tour coaches will occur. The same passenger transfer functions which now take place at curbside will simply be moved onto the site. The site is not adjacent to any residential or motel developments, parks, schools nor auditoriums/amphitheaters. There are no noise-sensitive sites that are a part of or adjacent to the project site.

E. **Water Quality** - Water quality will not be impacted by the project. Surface water drainage will not be affected since the proposed site is already paved and paving will be maintained to the same extent that already exists. There are no surface bodies of water on or adjacent to the site.

F. **Wetlands** - The project is not located in or near a wetland. There will be no structure, excavation, nor discharge of dredged or fill material in any waters as a result of the project.

G. **Flooding** - The project is not located within the 100-year nor the 500-year floodplain and will not change the existing pattern of surface water runoff. The City participated in the floodway mapping project completed by the TVA in September 1982. The resulting document entitled the Flood Report contains all floodway maps and delineation of the 100 and 500 year floodplains for Gatlinburg and is maintained in the City Planning Office.

H. **Navigable Waterways and Coastal Zones** - The project is not within nor affecting a coastal zone or navigation.

I. **Ecologically Sensitive Areas** - The project is not within nor adjacent to an ecologically sensitive area. The town's southern boundary is adjacent to the Great Smoky Mountains National Park. The project site is in the geographic center of the Town and is about 3/4 mile direct line distance from the southern Town boundary. The Supervisory Biologist for the Great Smoky Mountains National Park confirms that there are no "ecologically sensitive" areas in or near the project that would be affected by the project.

J. **Endangered Species** - There are no known endangered species in or adjacent to the site or Town which would be affected by the project. The Supervisory Biologist of the Great Smoky Mountains National Park, who also serves as the Inventory and Monitoring Coordinator, confirmed this finding. He also confirmed that there are no endangered species on the Department of Interior's list of endangered species as published in the Federal Register which would be affected by the project. Mr. Bill Yambert of the Tennessee Wildlife Resources Agency concurred with this finding.

K. **Traffic and Parking** - The project will result in overall improvements to traffic conditions, safety and parking in the immediate vicinity. The project will maintain parking which is already on-site and, depending on the site design, should result in a reduction of less than 10 or no parking spaces. The moving of the building footprint from its current location to a more centered location will allow trolleys and tour coaches to enter the site to transfer passengers instead of the current curbside transfer at the front of the site. This will also allow a significant improvement in traffic operations and safety at the intersection of Highways 441 and 321 in front of the site. Busses must currently use a traffic signal preempt device to be able to enter traffic from the curbside stop.

This project will also be supportive of the City's long-range traffic improvement plan which calls for the addition of a third traffic lane on Parkway and the improvement of the 441/321 intersection. By removing the transit transfer location from the immediate intersection, space needed for the long-range plan improvements will be available.

Regarding traffic impacts, the center will actually help traffic flows on the busiest street in Gatlinburg since the curbside stops will be eliminated. Under current conditions, both tour coaches and local trolleys do not have adequate space to us the curbside stop at the same time. The redesigned site will allow for up to six tour coaches and six local trolleys. Table 3.2 in the Feasibility Study specifies the allocation of the 129 parking spaces which will be provided on the site. This site is currently operated as one of the City Parking Department's pay parking lots and will continue to be so as part of the proposed project.

L. **Energy Requirements and Potential for Conservation** - The new transit and welcome center will provide a greater level of convenience plus indoor and outdoor sheltered waiting space for riders. As such some level of increased transit ridership can be expected. Trolleys and tour coaches will now be able to park short-term on the site and not have to wait with engines idling at curbside.

The new building will replace a structure which is not nearly as energy efficient as possible with contemporary design and construction methods. The existing structure has been added to and modified several times since its original construction in the 1960's. The existing building HVAC and electrical systems are of questionable efficiency in their current state having been modified several times with expansions. The roof has been repaired several times but still has substantial leaks and significant subterranean termite damage.

M. **Historic Properties and Parklands** - A National Historic Preservation Act Section 106 review has been prepared by the State Historic Preservation Officer (Tennessee Historical Commission) and the project was found to have no historic impact concerns. Neither the subject site nor its adjacent developments have any conditions or structures of historic concern. The SHPO's letter of approval is included at the end of this review. The project will not involve the use of parklands.

N. **Construction** - The proposed construction project is fully described in Sections 3 and 4 of the Feasibility Study. The City's desires to start construction during late 1994. The project phasing schedule in Section 4 of the Feasibility Study gives an approximate 20 month implementation period from the time the City Council adopts the results and recommendations of the feasibility study. Phase I Adoptions and Commitments is estimated to require about 1.5 to 2 months; Phase II Grant Application about 3 months; Phase III Design about 6 months; and Phase IV Construction about 12 months. Construction Impacts are assessed for the following areas:

1. Noise - The construction will not impact a noise sensitive land use.

2. Disruption of Utilities - The project will not disrupt utility service.

3. Disposal of Debris and Spoil - The project will involve the demolition of the existing Welcome Center and repaving on-site. The City will require its constructor to utilize the Sevier County Solid Waste Demolition Landfill to dispose of debris and any soil that may need to be removed. The disposal site is about 10 miles from Gatlinburg. The structure to be demolished is a stick-built frame structure of about 3600 square feet and will not generate an unusual amount of debris for the landfill. The site is within the City and is City-owned and necessary permits will thus be coordinated by the City Administration. The Director of Sevier County Solid Waste is familiar with the structure to be demolished and indicated that no special permit would be needed.

4. Water Quality and Runoff - Construction will be controlled to avoid any excessive erosion or runoff into nearby bodies of water.

5. Access and Distribution of Traffic - Construction will not cause access to any land use to be disrupted nor any street to be closed nor disrupted.

6. Air Quality and Dust Control - During demolition and debris removal the contractor will be required to use mitigating measures to minimize the release of dust into the atmosphere. Such methods as sprinkling and the use of tarpaulins on loaded trucks will be required.

7. Safety and Security - The City will require the contractor to follow all local safety requirements and provide security of the construction site and materials. Construction barriers will be required and flagmen will be used whenever needed for truck deliveries or removals.

8. Disruption of Business - Nearby business will not be disrupted during construction due to access restriction or inconveniences.

O. **Aesthetics** - The project will not disrupt important views. The proposed facility size is similar in scale and orientation with structures of the surrounding area. It will not be adjacent to any other major public building. Also, the City views the project as an opportunity to create a structure which is more compatible with its surroundings than the existing structure. For example, signage and landscaping treatment of the site is proposed to be improved with the redesign the entire site. The City's Planning and Zoning Director and Chamber of Commerce Director have been involved in the project along with several other City staff and will serve as part of the City's design review team with the architect selected to design the facility.

P. **Community Disruption** - The local Planning and Zoning Director has been involved throughout this project and has indicated that it is compatible with the City's plans and growth strategy for the central business district. Also, as indicated earlier, the project is compatible with the City's official Land Use Plan and Zoning Ordinance. The project will not displace, disrupt, alter, divide nor create any barriers in the community, any neighborhoods nor circulation patterns. Access to community facilities will not be reduced and in fact will be improved by the addition of the branch post office in the new center.

Q. **Safety and Security** - The project will provide an improvement to traffic and pedestrian safety via the removal of the current transit and tour bus stop from curbside to the site. Traffic safety will also benefit from the removal of the transfer site from its immediate adjacency to the Highway 441/321 intersection. The facility will be operated by the City staff and will include staff from three different Departments in addition to the U.S. Post Office. The Transit Department will be the primary tenant of the building and as such will coordinate all building security and safety procedures. The City Police Department will also provide routine patrols by the Center. Outdoor night lighting will be provided to give adequate illumination to all parts of the site.

R. **Secondary Development** - The project will in all likelihood not be able to induce any secondary development since all adjacent land is developed land. While some older properties may eventually change ownership and function the attribution of such change to the new transit center is not very predictable. The City's Planning and Zoning Director has been involved in the project and confirms that current development conditions and trends are not likely to induce any predictable secondary developments. The project does, however, include three related or secondary functions within the proposed building: branch post office, Parking Department Headquarters and Welcome Center. The relationship of these functions and customer convenience factors were part of the reason for the City's original concept of the proposed project.

S. **Consistency With Local Plans** - As already noted the proposed project has involved all related City Departments including the Director of Planning and Zoning and the proposal is compatible and consistent with all official City plans, ordinances and growth strategies. It conforms to the City's official Land Use Plan and Zoning Ordinance. It will not require any modification to the City's plans or regulatory ordinances and the Planning and Zoning Director has personally indicated that the project is compatible with the City's plans and policies and general growth strategy. The C-1 Tourist Commercial Zoning District classification, which the project is within, is intended to "establish an area for concentrated general business development that the general public requires." Among the several specified allowed uses public buildings and parking lots are included.

4. LIST OF AGENCIES AND PERSONS CONSULTED

1. Bill Bernhardt, Tennessee DOT
2. Gary Cole, Gatlinburg Director of Parking
3. Steve Crump, Tennessee District U.S. Postal Service
4. Kim DeLozier, Biologist, Great Smoky Mountains National Park
5. John DeMoll, Director Sevier County Solid Waste
6. Anthony Dittmeier, Region IV FTA
7. Randy Fiveash, Executive Director Chamber of Commerce
8. Jack Flynt, Flynt Engineering and City Engineer
9. Joe Garrison, Tennessee Historical Commission
10. Joe Keener, County Clerk of Court
11. Keith Langdon, Supervisory Biologist and Inventory and Monitoring Coordinator, Great Smoky Mountains National Park
12. Jerry Loveday, Post Master
13. Jim Ladieu, Tennessee DOT
14. Bill Nichols, Welcome Center Director
15. Cindy Cameron-Ogle, City Administrator
16. Jeff Omby, Planning and Zoning Director
17. Buddy Parton, Director of Mass Transit
18. Bill Yambert, Tennessee Wildlife Resources Agency

TENNESSEE HISTORICAL COMMISSION
701 BROADWAY, B-30
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0442
(615) 532-1550

February 24, 1994

Mr. Robert T. Goble
CGA Consulting Services Incorporated
1201 Main Street/2080
Columbia, South Carolina 29201

Re: FTA, TRANSPORTATION CENTER, GATLINBURG, SEVIER COUNTY.

Dear Mr. Goble:

The above-referenced undertaking has been reviewed pursuant to Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (51 FR 31115, September 2, 1986).

Based on the documentation submitted, it is our opinion that due to the location, scope and/or nature of the undertaking, and/or the size of the area of project impact, the undertaking will have no effect on National Register of Historic Places listed or eligible properties either because none exist in the area of project impact or because the undertaking will not alter any characteristics of an identified eligible or listed property which qualify the property for listing in the National Register, or alter such property's location, setting or use. Therefore, this office has no objections to proceeding with the project.

If you are applying for federal funds, license or permit, you should submit this letter as evidence of compliance with Section 106 to the appropriate federal agency, which, in turn, should contact this office as required by 36 CFR 800. If you represent a federal agency, you should submit a formal determination to this office for comment. Questions or comments should be directed to Joe Garrison (615)532-1559. Your cooperation is appreciated.

Your cooperation is appreciated.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jyg

CGA Consulting Services, Inc.
1201 Main Street, Suite 2080
Columbia, South Carolina 29201
(803) 765-2833 - (803) 779-8518 - FAX

February 14, 1994

Mr. Joe Garrison
Tennessee Historical Commission
701 Broadway
Nashville, Tennessee 37243-0442

Re: Gatlinburg Transportation Center Section
Section 106 Historic Preservation Review

Dear Mr. Garrison:

In follow-up to our discussion on January 31 regarding the proposed transportation center construction project in Gatlinburg, please find the information and materials enclosed which you requested.

You indicated that upon receipt of this data that you would be able to conduct a Section 106 review of the proposed project for compliance with the National Historic Preservation Act as well as any other State of Tennessee Historic Preservation requirements that might apply. Five color photos of the subject structure and immediate surrounds are enclosed along with a copy of the Gatlinburg Quadrangle USGS sheet with the subject site marked in red (as close as I could get it at that scale). I've also enclosed a copy of the City's official plat map which shows the subject site more accurately, also marked in red.

Project Narrative: The City of Gatlinburg is considering demolishing the existing downtown welcome center structure located at the intersection of U.S. Highways 441 and 321. The reason for this proposed action is to clear the existing site for the construction of a new larger transportation center. This center is intended to accommodate the welcome center function but also provide adequate space for the City's Mass Transit Department and Parking Department plus additional space for a small branch post office and perhaps a County license desk. Expanded indoor and outdoor waiting space is also proposed for transit customers. The location of the new structure will be sited so that trolleys and large tour coaches can pull off the street for boardings, alightings and short layovers instead of causing traffic operations delays and conflicts on Gatlinburg's busiest street. The existing structure was constructed in the 1960's and is simply too small to accommodate all of the City's existing and future space needs.

The City proposes to fund this project with a combination of local government revenues, Tennessee DOT, and Federal Transit Administration grants.

I hope this provides all the information that you will need for the review. When it is complete I would appreciate it if you could notify Cindy Cameron-Ogle, City Manager directly with a copy to me. In the meantime if I can answer any questions please do not hesitate to call.

Sincerely,

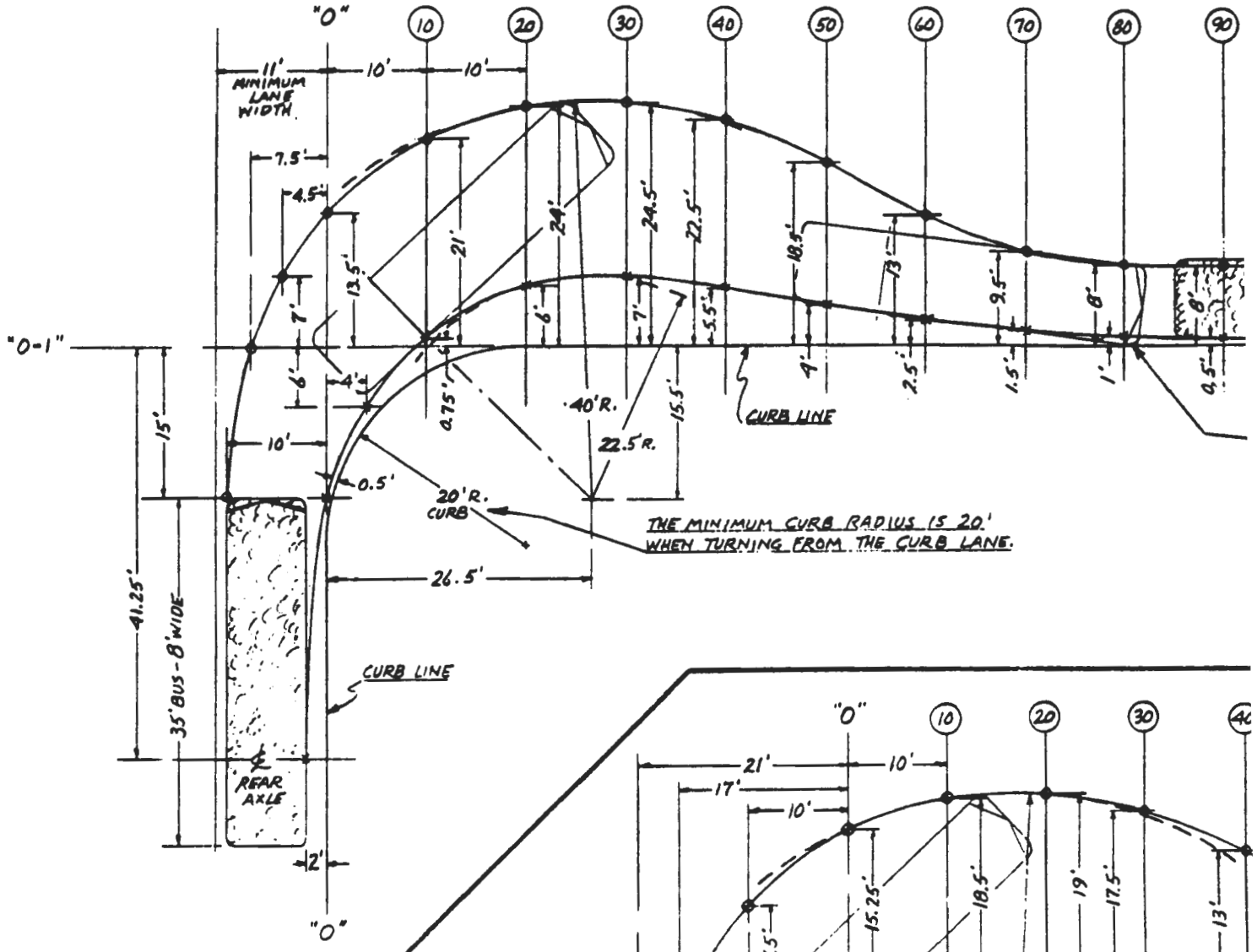
Robert T. Goble

Robert T. Goble, AICP
Principal

cc: Cindy Cameron-Ogle, City Manager
Buddy Parton, Transit Manager
Jim Ladieu, Tennessee DOT

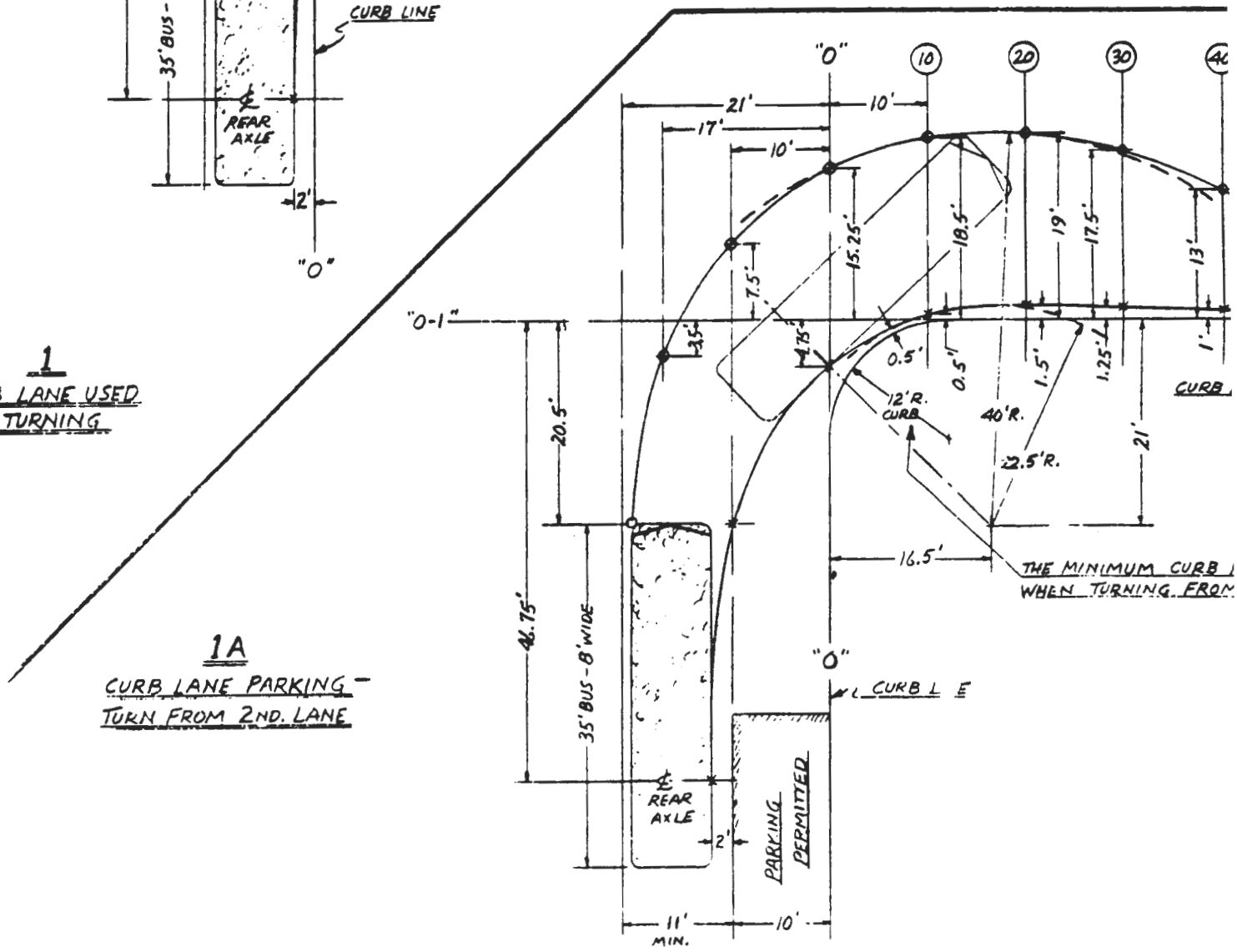
Appendix **4**

TRANSIT FACILITY OPERATIONAL CRITERIA, FLORIDA DOT, 1983



1

CURB LANE USED FOR TURNING.



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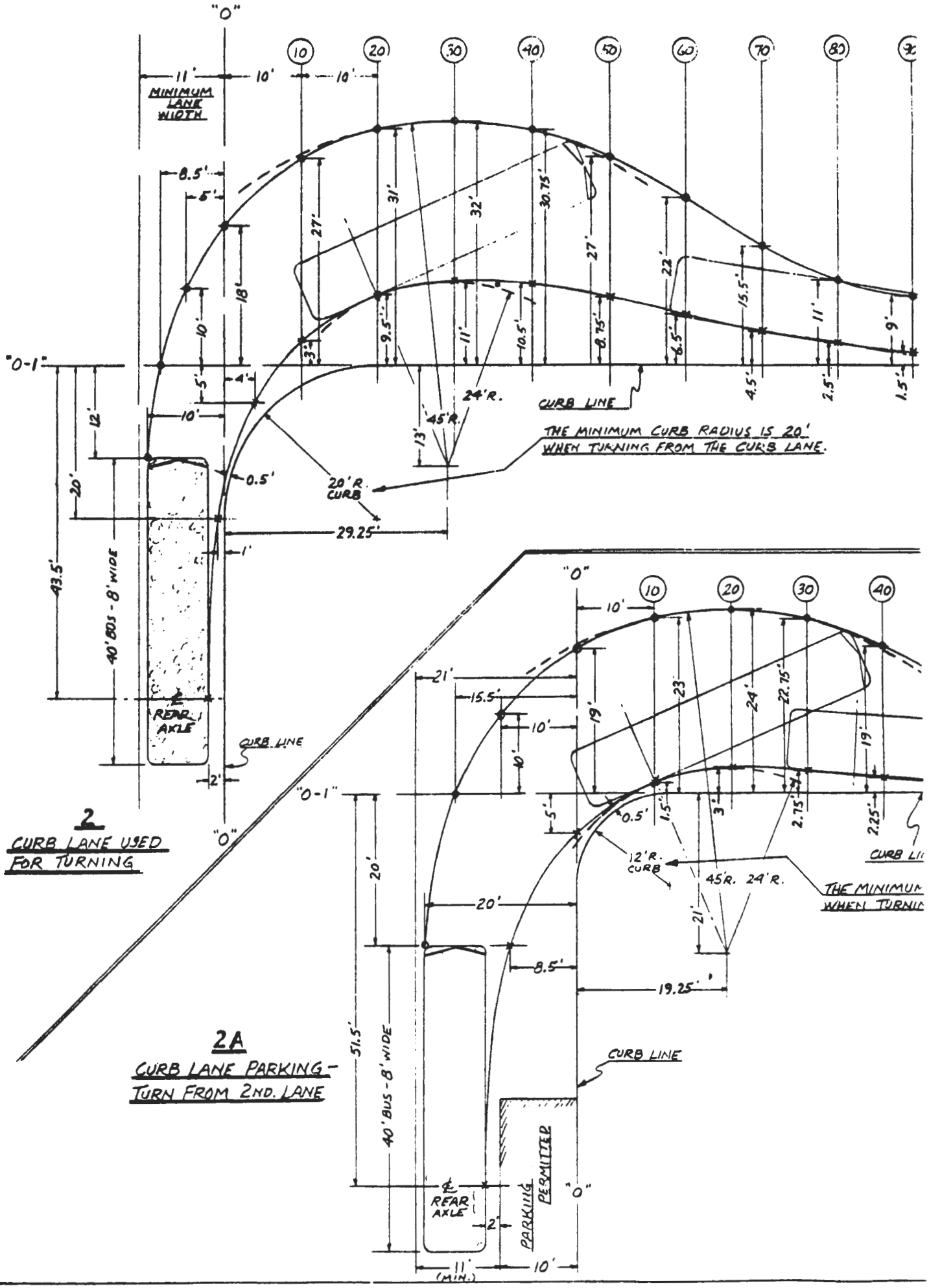
CURB LANE PARKING - TURN FROM 2ND. LANE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32'
30.75'
27'
22'
15.5'
11'
9'
18'
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9.5'
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10.5'
8.75'
6.5'
4.5'
2.5'
1.5'
"0-1"
5'
4'
10'
12'
24'R.
45'R.
13'
CURB LINE
THE MINIMUM CURB RADIUS IS 20' WHEN TURNING FROM THE CURB LANE.
20'R CURB
0.5'
20'
29.25'
1'
43.5'
40' BUS - 8' WIDE
℄ REAR AXLE
CURB LINE
2'
"0"
2
CURB LANE USED FOR TURNING
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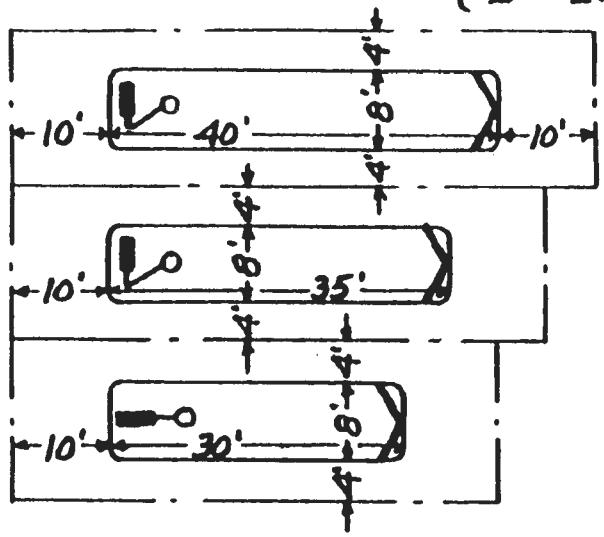
10
20
30
40
10'
21'
15.5'
10'
19'
23'
24'
22.75'
19'
10'
"0-1"
5'
0.5'
1.5'
3'
2.75'
2.25'
12'R. CURB
45'R. 24'R.
20'
20'
21'
8.5'
19.25'
51.5'
40' BUS - 8' WIDE
CURB LINE
℄ REAR AXLE
2'
PARKING PERMITTED
"0"
11' (MIN.)
10'
2A
CURB LANE PARKING - TURN FROM 2ND. LANE

HOW TO DETERMINE "E" AREA
(E = ENVELOPE SIZE)



16'x60' = 960 SQ.FT.

16'x55' = 880 SQ.FT.

16'x50' = 800 SQ.FT.

14'x48' = 672 SQ.FT.

DUE TO LESS OR NO SIDE MOUNTED EQUIPMENT TO MAINTAIN AS ON A BUS.

10.5'x27' = 283 SQ.FT.

(B) MINIMUM BUS BAY SPACING IS FIGURED AS 16' TO GIVE ADEQUATE WORKING SPACE AROUND THE BUSES. IF THE BAY SPACING IS A MORE ADEQUATE 20', THE ADDITIONAL 4' BETWEEN BUSES IS INCLUDED IN THE OVERALL SHOP AREA SINCE IT WILL PROVIDE FOR PERMANENT POSITIONING OF SUPPORT EQUIPMENT, TOOLS, WORK BENCHES, ETC. WHILE THE CLEAR WORK ENVELOPE REMAINS 16' AS SHOWN, ("E" AREA).

▬ INDICATES THE ENGINE AND IT'S LOCATION IN THE VEHICLE.

R. J. Sleator 11-12-74

REVISED 6-3-76

PARKING LOT SIZE
FIGURES INCLUDE DRIVEWAY AREAS

40' Bus	First 33	Require 1 Acre
	Next 33	Require .75 Acre*
35' Bus	First 37	Require 1 Acre
	Next 37	Require .75 Acre*
30' Bus	First 42	Require 1 Acre
	Next 42	Require .75 Acre*

Parking for Employee Cars - - 100-110 Per Acre

Note: For easy maneuvering of buses in and out of the garage building a clear apron width of two times the bus length must be provided between the building door area and any structure or parked vehicles.

*Due to certain driveways becoming common see drawing MTO-1029 attached.

Appendix 5

SITE SELECTION MATRIX EXCERPTS

Table 7.1
Spartanburg City Transportation Center and Maintenance Facility
Site Selection and Evaluation Criteria

Rating Scale

Good	6
Acceptable	4
Poor	2
Unacceptable	0

	Criteria	First Baptist Site #1	County Land Site #5	Southern Railway Co. Site #7	Cultural Center Site #8
	ACCESS				
1.	**Highways/Roads/Streets**	6	6	2	6
	6 = Adjacent to very good highway, road or street 4 = Accessible only by marginally improved road 2 = Access requires minor upgrade of secondary roads or is otherwise limited. 0 = Access requires upgrade and/or construction of new seconday roads				
2.	**Congestion/Traffic**	4	6	6	6
	6 = No congestion or competing development 4 = Limited congestion or nearby development 2 = Access improvements needed due to congestion and/or development 0 = Substantial current or near-term congestion				
3.	**Parking**	4	4	4	6
	6 = Parking or land avaliable and no conflicts 4 = Some parking conflicts 2 = Parking conflicts somewhat difficult to solve 0 = Parking problems extensive to solve				
	PHYSICAL CONSTRAINTS				
4.	**Parcel Size/Buildable Land**	0	4	0	0
	6 = Site has at least 5.75 acres of readily buildable space 4 = Site has at least 4.0 acres of readily buildable land if additional adjacent properties are acquired. 0 = Site has less than 4.0 acres of readily buildable land				

Table 7.1
Spartanburg City Transportation Center and Maintenance Facility
Site Selection and Evaluation Criteria
(Continued)

PHYSICAL CONSTRAINTS (CONTINUED)				
Criteria	**First Baptist Site #1**	**County Land Site #5**	**Southern Railway Co. Site #7**	**Cultural Center Site #8**
5. **Configuration**	6	6	6	6
6 = 2:1 (or less) ratio of length to width 4 = 3:1 (but greater than 2:1) ratio of length to width 2 = 4:1 ratio of length to width 0 = 5:1 or more ratio of length to width				
6. **Contiguity**	6	4	6	0
6 = All areas required are in a single parcel 4 = 1 or 2 parcels with immediate adjacency 2 = 3 parcels with immediate adjacency 0 = 4 or more parcels and/or parcels without total immediate adjacency				
7. **Slope**	6	6	6	6
6 = < 2% over 80% of buildable area 4 = 2-6% 2 = 6-8% 0 = > 8%				
8. **Orientation**	6	6	6	6
6 = Site does not limit orientation for functional access 4 = Moderate on-site regrading required 2 = Moderate work required on and off site 0 = Extensive regrading and structures required on and off site				
9. **Flood Plain**	6	6	6	6
6 = Site is not in nor affected by flood plain 4 = Site is outside of the flood plain 2 = Building area is outside of the flood plain 0 = Flooding could affect operations				

Table 7.1
Spartanburg City Transportation Center and Maintenance Facility
Site Selection and Evaluation Criteria
(Continued)

PHYSICAL CONSTRAINTS (CONTINUED)				
Criteria	**First Baptist Site #1**	**County Land Site #5**	**Southern Railway Co. Site #7**	**Cultural Center Site #8**
10. **Wetlands**	6	6	6	6
6 = Site is not in nor affected by wetlands 4 = Site is outside wetlands 2 = Building area is outside wetlands 0 = Area is totally within designated wetland				
11. **Zoning and Land Use**	2	2	6	2
6 = Complex allowed without zoning variance - no forseeable land use conflicts 4 = Complex appears to be allowed without zoning variance, but future trends could conflict 2 = Zoning possible conflict, but resolution and variance not likely to be a problem 0 = Incompatible adjacent uses and zoning conflict				
12. **Hazardous Waste**	0	0	0	0
-8 = Site is affected by any hazardous waste				
UTILITIES				
13. **Electricity**	6	6	6	6
6 = Electric service at site 4 = Electric service within 1 mile 2 = Electric service over 1 mile 0 = Electric service not available				
14. **Water**	6	6	6	6
6 = Adequate sized main at site 4 = Upgradable water line at site 2 = Substantial cost to link water or upgrade 0 = Service not available at or near site				

Table 7.1
Spartanburg City Transportation Center and Maintenance Facility
Site Selection and Evaluation Criteria
(Continued)

UTILITIES (CONTINUED)				
Criteria	**First Baptist Site #1**	**County Land Site #5**	**Southern Railway Co. Site #7**	**Cultural Center Site #8**
15. **Sewer**	6	6	6	6
6 = Adequate sized main at site 4 = Upgradable sewer at site 2 = Substantial cost to link sewer or upgrade 0 = Service not available at or near site				
LOCATION				
16. **Proximity to Route Structure**	4	4	2	4
6 = No changes in current routing patterns would be required 4 = Some minor routing patterns changes would be required 2 = Fairly significant changes in routing patterns would be required 0 = Major changes in routing patterns would be required				
17. **Impact on Route Operations**	4	4	0	4
6 = Site will improve routing patterns and patron convenience 4 = Site will have comparable routing patterns and patron convenience 2 = Site will adversely impact routing patterns and patron convenience 0 = Site will significantly impact routing patterns and patron convenience				
AVAILABILITY				
18. **Availability**	0	4	4	6
6 = Site is currently on the commercial market 4 = Site is not currently on market, but is likely to be available 2 = Site could be made available, but acquisition process could be lengthy 0 = Not acquirable without lengthy condemnation				

Table 7.1
Spartanburg City Transportation Center and Maintenance Facility
Site Selection and Evaluation Criteria
(Continued)

Criteria Rating	SITE RANKINGS			
	First Baptist Site #1	County Land Site #5	Southern Railway Co. Site #7	Cultural Center Site #8
TOTALS	78	86	78	82

Source: CGA Consulting Services, Inc., September, 1993.

Note: This evaluation does not include procuring additional adjacent land and/or building the different facility components at two or more different locations.