METHODOLOGY

Survey of Transit Managers

In October 2005 Iowa transit managers were surveyed to determine baseline facility conditions, functional space available, fleet composition, and expected fleet growth. A copy of the survey instrument is included in Appendix 1. The information assembled includes:

- As-built plans for facilities (or best available)
- Age of facilities
- Site plan
- Fleet size by category now and through 2025
  - Articulated buses
  - 12-year buses
  - 7-year buses
  - 5-year buses
  - Other revenue vehicles (paratransit vans, carpool vans, etc.)
  - Supervisory, maintenance, and staff vehicles
- Equipment: Fleet maintenance and facility maintenance
- Photographs
- Managers' statements of known inadequacies
- Other support material

Using the building plans and site plans, space allocation by function was determined. Judgment was applied to categorize general-purpose maintenance areas. This analysis was supplemented with space allocation estimates form each system's manager's survey response. The major space allocations categories are:

- Operations
- Maintenance
- Number of repair bays and square feet allocated
- Number of special-purpose bays and square feet allocated
- Number of lifts
- Shop space
- Fuel and service lanes
- Wash bays
- Interior parking (revenue vehicle)
- Exterior parking (revenue vehicle)
- Employee/visitor parking

The space allocation by function for each system was entered into a spreadsheet and compared to calculated needs.

Site Visits

A team of architects and engineers visited each federally-funded facility to inspect and assess critical architectural needs. The team identified structural, safety, health, and operations- related issues. The team provided a prioritized cost estimate for repairs and a 20-year maintenance cost estimate. Results of the architectural assessment are contained in Volume II.

Future Fleet Size

Anticipated fleet growth is the primary determinant of future space needs. The consultant team reviewed US Census population forecasts for 2005, 2010, 2015, and 2025 and estimated future fleet needs for those years based on the projected population growth.

Population growth is projected to be small, and so is fleet growth. The large urban fleet is currently comprised of 664 vehicles and is projected to grow to 775 by 2025 – 17% growth. The majority of the large urban growth affects Des Moines MTA and Five Seasons Transit in Cedar Rapids. These two systems require special consideration for future years. The small urban fleet is comprised of 94 vehicles and minimal growth is projected. The regional fleet is comprised of 825 vehicles and is projected to grow to 847 vehicles – 2.6%.

Since growth is projected to be minor, the comparison of current facility space to the estimated 2005 space needs for the current fleet is the most significant analysis. For most systems, addressing current needs will be satisfactory for the next 20 years.

Facility Space Allocation Prototypes

In November 2005 a prototype facility design workshop was held with the consultant team, Iowa DOT staff, and a steering committee of representatives from each category of Iowa's transit agencies to agree on standards for space allocation. Typical per-bus space allocation standards used in the transit industry served as the starting point for Iowa's draft space-allocation standards. The consultant team then worked with Iowa's transit 2005 managers to customize standards for large urban, small urban, and regional systems as well as satellite buildings. Prototype space allocations were determined for each class of transit system. Then, actual facility space allocations were compared to calculated space needs using the prototype standards and discrepancies were identified. The appropriate prototype space allocation is included for comparison with each system's space availability in the 2005 spreadsheet.

The comparison of prototype space allocation to actual provides a rough indicator of need based on typical space usage practice. However, most transit systems are not "typical' because their space usage has evolved through necessity and opportunity. The management structures also vary. Therefore, any space allocation that varies more that 25% from the prototype suggests that a further review of specific needs may be warranted to address the deficiencies identified at a particular facility.

The prototype analysis performed provides an indication that certain of Iowa's transit facilities are considerably, and in a few instances seriously, undersized in a particular functional area. If a

facility is undersized that probably causes operational inefficiencies and could possibly result in safety problems. For example, if indoor fleet parking is not adequate, managers may park buses in the maintenance bays at night, at least in the winter. This may cause inefficiencies for the morning shift; but that has to be weighed against the cost of adding space. Similarly, maintenance bay allocation assumes one maintenance shift. A space problem may be addressed through shift work or some contracting out if vendors are available. The cost of extra personnel or contracts must be weighed against the capital available and costs of facility expansion alternatives.

This project could not resolve all of these options, but it does highlight systems where space problems are likely causing operational inefficiencies. These are noted in the text summaries for each system.

GENERAL CONCLUSIONS

Space Allocation

Reviewing space needs estimates for each class of transit system reveals patterns that hold for most systems in that class. In this section, some general observations are made regarding each class of transit system and the specific systems that appear to have the greatest space needs are noted.

Large Urban Systems

Large urban transit systems account for 664 vehicles in 2005, project to grow 17% to 775 by 2025. For large urban systems, comparing calculated **maintenance space** needs for 2005 against actual space available based on survey results indicates a need for 65,000 square feet – a 43% shortfall. This is significantly greater than the 25% range used in identifying critical shortfalls, indicating that this class of system is short of maintenance space compared to typical practice. Review of individual agencies confirms this general pattern. Individual agencies indicate a need for specialized repair bays to improve efficiency. Space for improvements to fueling and washing vehicles were needed at most large urban facilities.

The other noticeable space shortfall for Large Urban systems is area for indoor bus parking. The calculated shortfall is 80,000 square feet for the category – 31%. This is only slightly above the 25% criterion, but does indicate a pattern. In general, operations space is within the 25% guideline range for the Large Urban Category.

The large urban systems that demonstrate the greatest need are Des Moines MTA, Five-Seasons Transit in Cedar Rapids, Cambus in Iowa City, and Coralville Transit in Coralville. Each of these systems is well below the 25% standard guideline for one or more functional areas and should warrant further evaluation of facility expansion alternatives and funding options.

Some agencies share facilities. Sioux City obtains heavy repair service from its municipal Department of Public works. Council Bluffs is operated by MAT from Omaha. Davenport shares space with Rock Island Transit. The combined operation in Davenport/Rock Island was not

analyzed as part of this project, but the manager's survey indicates some space problems when considering the combined fleet.

Small Urban Systems

The small urban systems account for the smallest fleet group, 94 vehicles at present and no projected growth. Small urban systems show no systematic shortfall of operations space**,** but like large urban agencies the small urbans show a 43% shortfall in maintenance space for 2005. This is about 10,000 square feet and the shortfall exceeds the 25% guideline. The pattern of need in this category is the same as for large urbans.

Small urbans show a surplus of enclosed vehicle parking, but that is probably due to the fact that many are shared-use facilities, so parking space is not all allocated to the small urban transit operation. Five out of the seven small urban systems operate out of shared facilities. Ft. Dodge, Mason City, Marshalltown, and Ottumwa share with the regional system in their area. Muscatine also operates out of a shared facility. Burlington is part of a public works facility. Clinton is the only small urban jurisdiction to operate its transit system out of free standing facility and appears to have adequate space for each function on comparison with space guidelines developed for this analysis.

Regional Systems

The sixteen regional systems account for the largest transit fleet in Iowa, 825 vehicles. Very little growth is projected by 2025. However, the regional systems show a collective shortfall of 16,000 square feet of operations space, 20% on average in 2005. This is within the 25% guideline range statewide, but indicates that several systems are tight on operations space.

Maintenance space shows a huge calculated shortfall of 129,000 square feet, almost a six-fold shortfall. Similarly, indoor vehicle storage shows a three-fold shortfall of 225,000 square feet. Because regional systems have many satellite facilities and often operate out of multiple locations or shared locations, it is very difficult to apply standards to this class. As was noted in the architectural review, there is very little that is standard about the operating structure, buildings, number of buildings, or extent of contracted maintenance. Each system is a unique operation that developed out of local opportunities and conditions. The standards analysis suggests serious space shortfalls; but each system's facility needs must be reviewed in their entirety before assuming that existing facilities are inadequate it they do not compare favorably with the prototype standards.

Five regional systems operate out of leased facilities, 5 operate out of shared facilities, one is brokered and operating out of several independent facilities, and five are free-standing operations. Region 4, 7, 8, 10, 11, 14, and 16, accounting for 203 vehicles, operate out of leased facilities, not necessarily designed for transit operations. Region 7's parent organization has recently purchased a building and will soon transition into operations directed from offices retrofitted to accommodate its needs. The policy board of several of the six other regional transit agencies has expressed support for efforts to assess whether improvements are warranted to meeting their agency's need for operations and other space. And it may be some time before

certain policy boards direct their staff to undertake a more thorough analysis of capital and operating finances, operations, maintenance, and parking policies, and a thorough functional analysis of how space is used. As such, it is difficult to arrive at hard and fast conclusions about the space needs of Iowa's regional transit agencies. However, regional transit agencies exhibit operational similarities that make it possible to describe their needs in enough detail to fulfill the basic objectives of this analysis.

Region 1 in Decorah (44 vehicles) operates out of a shared facility. Region 2 (84 vehicles) shares facilities with Mason City Municipal Transit. Region 5 (65 vehicles) operates across the street from Ft. Dodge DART. The two facilities share parking, maintenance, fueling, and wash facilities. Region 6 (18 vehicles) shares facilities with Marshalltown Municipal Transit and the Marshalltown Public Works Department. Region 7 shares facilities with an NGO that performs a substantial part of its maintenance. Region 15 (15 vehicles) shares facilities with the Ottumwa Transit Authority. These systems are no doubt operating very efficiently with respect to space and workforce utilization. They are also part of a larger management structure which provides greater support staff and oversight.

HIRTA (Region 11) is a brokered system with a different contract service provider (operator) in each county. The independent operators that make up HIRTA were not assessed individually.

The five free-standing regional systems have one or more satellite facilities and seem to rely heavily on contracted maintenance. For instance, Region 8 (30 vehicles) reports almost no operations or maintenance space in its primary facility but has a satellite facility. Region 9 (67 vehicles) is 3-fold short on maintenance space compared to the standard and has no enclosed parking on site, but manages to operate. Region 12 (37 vehicles) is 3-fold short on maintenance space compared to the standard and has storage space in 2 satellite garages. Region 13 (56 vehicles) is 3-fold short on maintenance space and four-fold short on operations space compared to the standard and has virtually no enclosed parking. Region 3 is 50% short on operations space and is considering satellite parking. These operating arrangements are probably economical and efficient; presumably all necessary functions are carried out. However, to properly analyze space needs the operating policies, maintenance practices, off-site parking arrangements, and functions at each system's satellite facilities needs to be analyzed on comparison with a long range vision (perhaps twenty year) or perspective of what that system's policy board, management, stakeholders and residents expect it to become.

Security

Security equipment and procedures were not a part of this study, but must be considered as part of future facility upgrades. Basic security measure should be considered part of an overall safety and security program. Priorities for funding are suggested here.

The most fundamental security feature is controlled access. This implies a fenced perimeter, controlled gate access for revenue vehicles, controlled access for employee parking, controlled access to administrative areas, and controlled access to operations and maintenance areas. The degree of control needed is related to local conditions. Gate access can be handled with personnel or with electronic systems and automated opening/closing.

Storage areas for fuel and combustible materials need special control. The methods will vary depending on facility design, but access restriction should be at a higher level than general facility access.

Exterior lighting is an important security feature. Outdoor vehicle storage areas and the building exterior should be lighted to discourage intruders.

Security cameras provide an additional level of security, but someone must monitor the cameras. Motion detectors can be used in lieu of night security staffing depending on the perceived degree of threat.

While not a facility feature, staff training in security awareness must accompany physical measures. The eyes of employees are the basis for security during operating hours.

Environmental Compliance

Both for legal reasons and for the public welfare, transit facilities must adhere to high environmental standards. The critical areas are:

- Fuel storage
- Oil and grease handling in the shop
- Oil and grease traps in drains, both interior shops and exterior bus parking lots
- Recycling of bus wash water

Priority should be given to upgrading facilities that are deficient in these areas and not scheduled for replacement in the near future.

Energy Conservation

Heating and cooling energy is a major cost item for transit agencies. Routine steps to control heat loss should be part of building design or upgrades. The most basic elements are zoned HVAC systems, insulation, tight-fitting doors and windows, and shades on the south side.

In some cases, opportunities exist to buy steam heat from central facilities serving nearby institutions. If this is an option, the capacity of the prime facility and the cost must be assessed to determine if purchasing steam heat is economical.

For years, some maintenance shops have burned waste oil for heat. This is economical on the surface, but furnaces must meet air quality standards. The saving on heating fuel must be compared to the capital cost of installing an environmentally acceptable system and the cost of disposing waste oil.

Conservation of electricity saves money. For older facilities with inefficient lighting and no foreseeable replacement date, upgrades to shop lighting should receive priority.

Iowa DOT Transit Facility Administration Principles

Managing public transit in Iowa is a partnership between the Iowa DOT, transit operators, and in the case of shared facilities, municipalities or counties. Many parties are involved in decision-making regarding the structure and financing of public transit. As a result, the types of facilities and nature of operations varies widely. This raises the question of what strategy the Iowa DOT should follow to best serve the partnership. Based on this study, the consultant team recommends five principles for determining facility funding priorities.

1. The first principle is safety. On the structural side, this includes HVAC systems that maintain interior air quality, electrical systems, and the structural integrity of building. On the operations side, safety includes indoor vehicle parking and fueling. Buses can be so tightly packed that sprinklers do not work properly, creating a fire hazard. In this case an operational inefficiency is elevated to a critical safety problem that should receive priority. Similarly, an unsafe fueling facility should receive priority as a safety issue. Determining the nature of a hazard must be a joint decision by the Iowa DOT and the operating agency.

2. The second principle should be ensuring necessary facilities to preserve the fleet investment, which means providing for proper maintenance and storage. Since most transit vehicles and facilities are funded jointly by federal funds (administered by the Iowa DOT) matched by local funds, determining the best way to preserve fleet life is inherently a joint decision. There are multiple paths to this end, including in-house maintenance, sharing with other public fleets, using vendors or combinations. The consultant team recommends using space guidelines developed by the Iowa DOT in conjunction with fleet operators as a very general measure of adequacy, but everyone must recognize that there is a broad distribution of space allocation in practice. A 25% range was used in this study. The guidelines highlight potential problems that should be reviewed with the operating agency.

3. Indoor parking is preferable to outdoor parking to preserve the life of revenue vehicles. However, it is simply not financially feasible in all cases. Indoor parking is the dominant practice for urban fleets in the United States. A decision to provide indoor parking for systems that do not now have it should include evaluation of safety issues as described in principal number 1. When there is a funding opportunity, solving safety problems should prevail.

4. The fourth principal is that environmental and security deficiencies should always receive high priority.

5. The final principal is that joint facilities should be encouraged for transit operations that are comparable in size or smaller than other municipal fleets in the area. Joint facilities provide more funding partners, joint use of expensive equipment like fueling and wash facilities, and better management. Essentially, economies of scale can be achieved. There are cultural differences between transit operating agencies and municipal fleets composed of service trucks, construction equipment, etc. These can be overcome with facility design, good management, and a clear memorandum of understanding between participating agencies.