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FINAL REPORT FOR A MANPOWER PLANNING MODEL FOR LIGHT RAIL TRANSIT OPERATIONS FOR THE SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

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1. INTRODUCTION

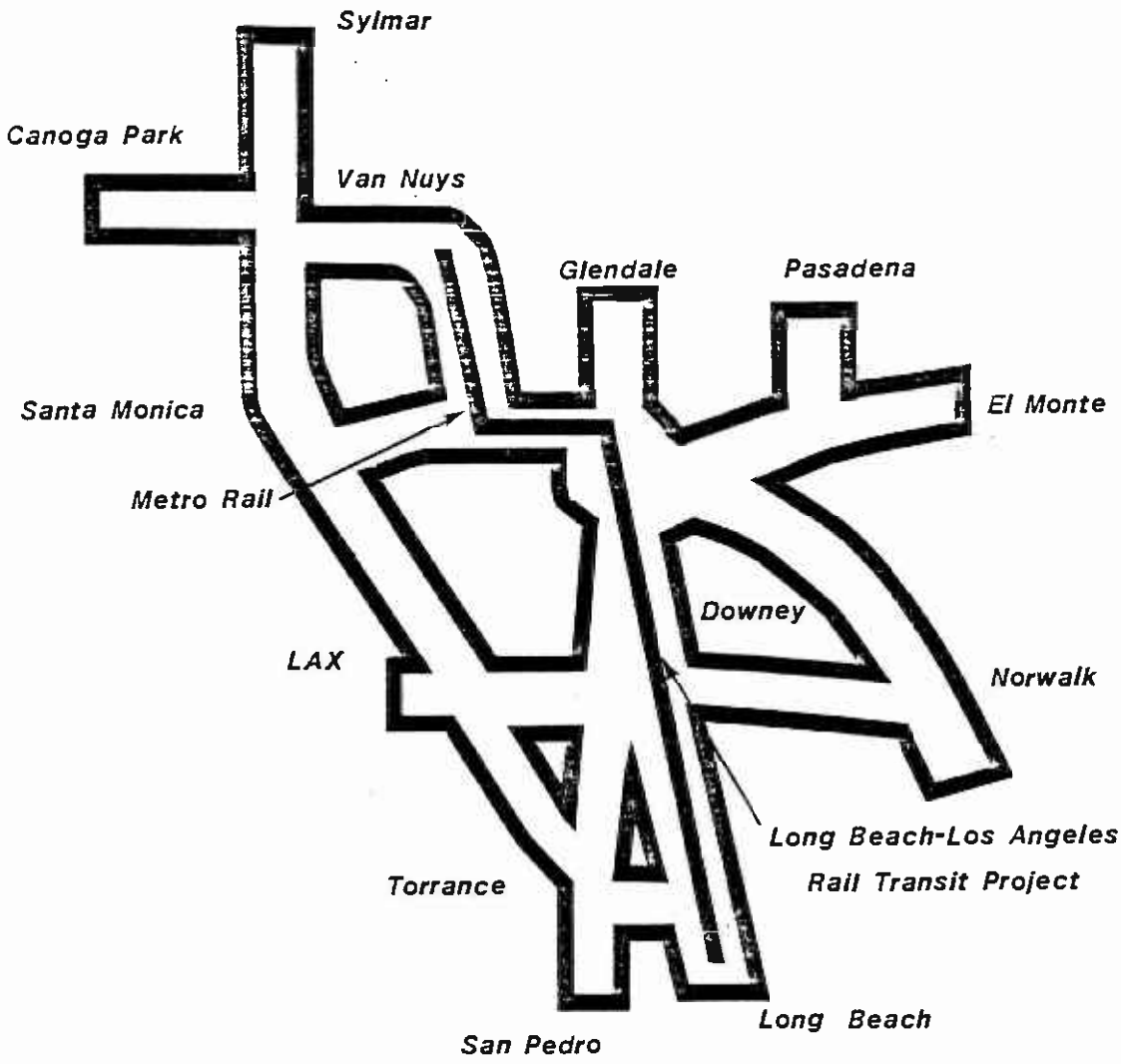
This project has been undertaken by the Southern California Rapid Transit District (RTD) to examine staffing requirements for the startup of light rail transit (LRT) operations by the RTD, and in particular, to develop a manpower planning model for LRT operations that could be effectively applied in the future by the District to update staffing requirements estimates.

1.1 REGIONAL RAIL TRANSIT DEVELOPMENT

In November of 1980, the voters of Los Angeles County approved Proposition A, which authorized the collection of a one-half percent sales tax in the County for the dual purpose of subsidizing bus transit fares and the construction of a regional rail transit system serving a number of corridors in the metropolitan area. Proposition A specified that a minimum of 13 rail transit corridors be implemented (see Figure 1-1), and it further specified that construction should proceed in an expeditious manner using available existing rights-of-way where possible. Legal challenges regarding the constitutionality of Proposition A were engaged and the issue was resolved in favor of the proposition in May, 1982. Collection of the sales tax revenues began on July 1, 1982. Beginning in July of 1985, 35 percent of the revenues collected (approximately $100 million per year) are required to be allocated for purposes of rail transit system construction.

High priority corridors were selected by the Los Angeles County Transportation Commission (LACTC) for system development, some with transit system projects already defined for them. The Metro Rail project already underway by the RTD would serve the regional core of the County and would constitute a central focus of the entire regional system. The El Monte Busway already in operation in the San Bernardino Freeway corridor by the RTD, would continue to function with its present bus-on-freeway configuration. The Century Freeway transitway is currently proceeding through engineering design, in conjunction with the design and construction of the freeway which has begun under the jurisdiction of the California Department of Transportation (Caltrans). Additionally, Caltrans is in the process of design and preliminary engineering analysis for an elevated transitway along the Harbor Freeway.

Of the remaining corridors identified for system development, the Long Beach to Los Angeles corridor was selected as the first rail transit project to be implemented by the Commission since the project could be built in a relatively short period of time and also could be funded solely through the use of local Proposition A revenues. Studies are currently being initiated for the development of the San Fernando Valley and East Los Angeles transit corridors. Transit projects for other regional corridors have not been defined or assigned priorities to date.



PROPOSITION A RAIL TRANSIT CORRIDORS

Figure 1-1

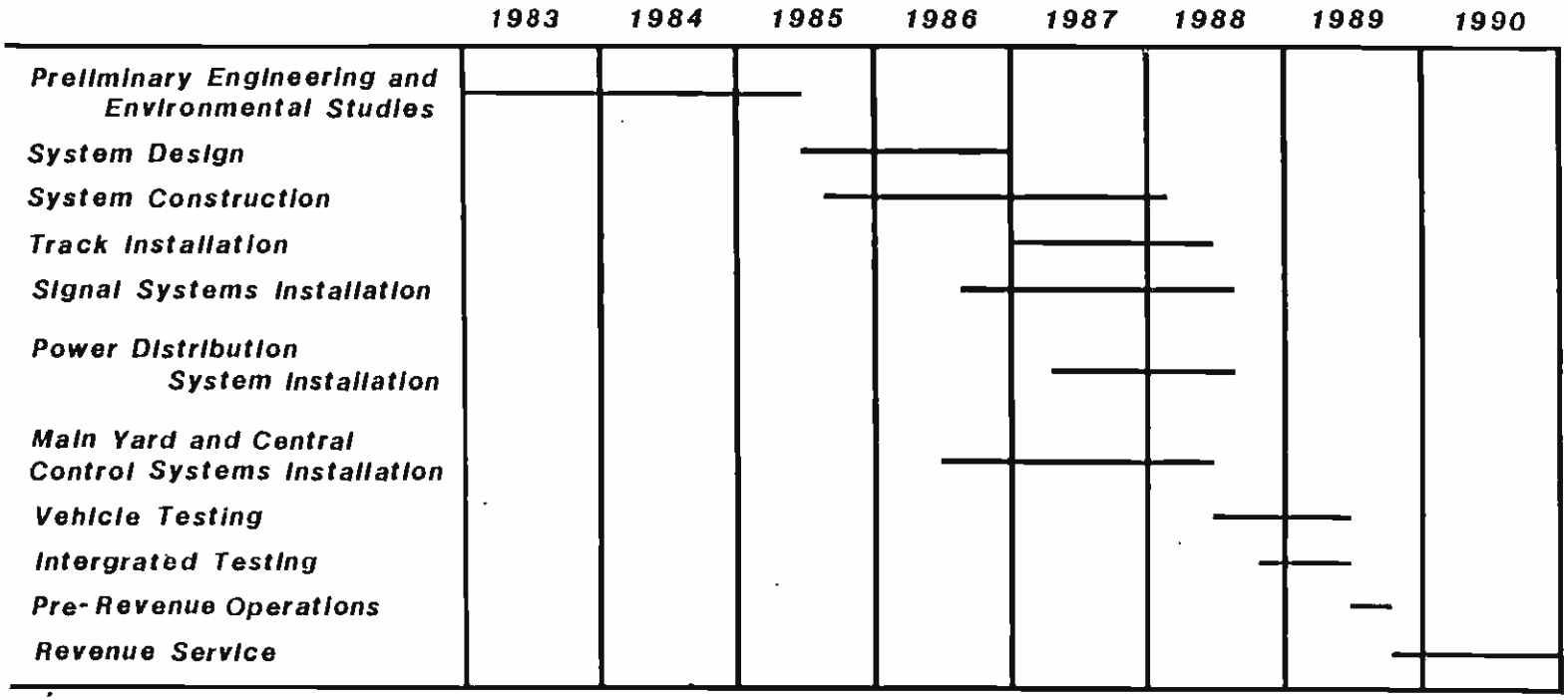
1.1.1 Long Beach-Los Angeles Rail Transit Project

In late 1982, the Commission began its planning process for the Long Beach-Los Angeles Rail Transit Project with the initiation of detailed route evaluation and environmental studies. The project was defined in three major segments -- downtown Los Angeles, mid corridor, and Long Beach -- and alternatives were analyzed for each of these three segments. A Draft Environmental Impact Report (DEIR) for the rail transit line was issued in May, 1984. A series of public hearings followed to obtain public review and comment. As a result of comments received at the Long Beach public hearing and at the request of the Long Beach City Council, a supplemental DEIR was prepared for the analysis of three additional routes in the Long Beach segment of the project.

Figure 1-2 summarizes the timetable for project development. In March of 1985, the Commission approved the startup of the entire project and detailed design work was commenced. It is planned that construction activities will begin in early 1986. Following the Commission's decision, the need for further route refinements in the mid-corridor segment of the project was identified responding to concerns centering on the impact of future freight rail traffic in the Compton area. Resolution of this route refinement issue is expected in early 1986 although this should have no impact on the overall project schedule. The Commission is responsible for the design and construction of the project, but when completed, responsibility for the operation of the system will be transferred to the District.

The total route will be approximately 22 miles in length, with about 18 miles of it following the existing Southern Pacific right-of-way (Wilmington and East Long Beach branches). Much of the project route will be essentially the same as the last line operated by the Pacific Electric Railway's "Red Cars," which ceased operation in 1962. Design and service characteristics, however, will be upgraded and modernized to meet current transit standards. The transit line will include 22 stations (see Figure 1-3), and incorporate conventional light rail vehicle technology. The two-track system will be powered from overhead electrical catenary wires. Vehicles will be 6-axle, articulated, approximately 90 feet in length, with a maximum capacity of 200 passengers each. It is planned that 32 vehicles be initially purchased. The vehicles will be similar in design, appearance, and performance characteristics to those being used on the San Diego trolley and San Francisco MUNI systems.

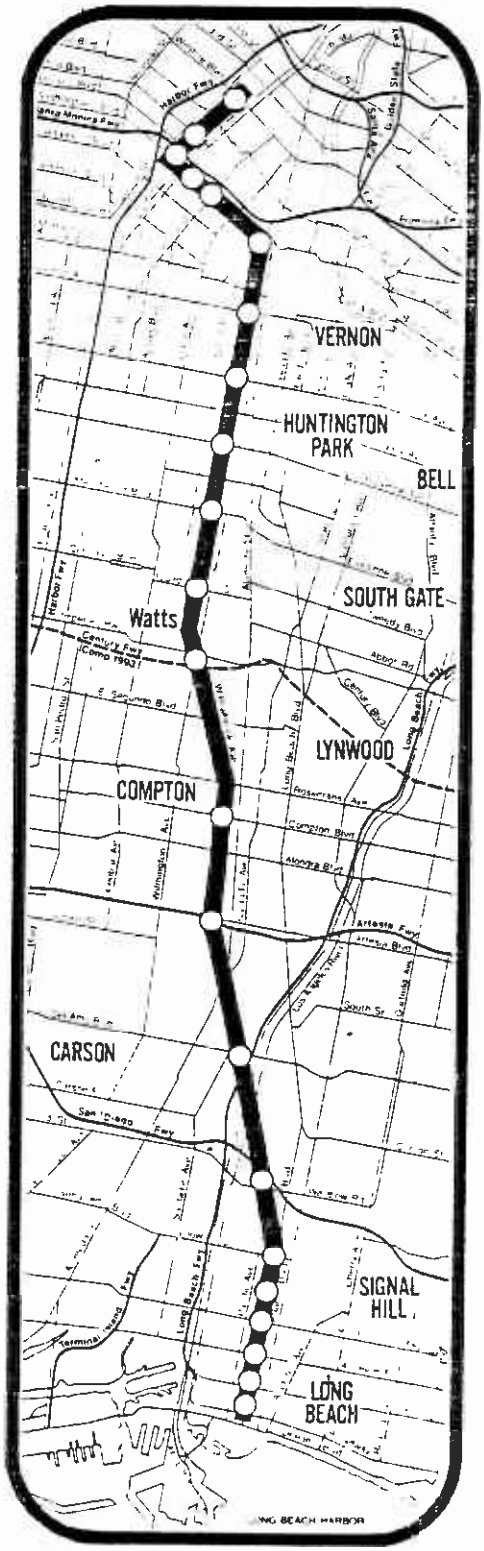
The system will operate in subway in downtown Los Angeles, under Flower Street, between 7th and 12th Streets. South of 12th Street, a reserved median will be provided, with stations located in the center of the street. In the mid-corridor, the proposed line will pass through the cities of Compton and Carson and through the unincorporated areas of Florence, Graham, Willowbrook, and Dominguez Hills in Los Angeles County. In Long Beach, the system will be located at-grade in a reserved lane next to a planted median on Long Beach Boulevard. Stations will be located in the median in the center of the street.



SOURCE: Los Angeles County Transportation Commission

LONG BEACH-LOS ANGELES RAIL TRANSIT PROJECT SCHEDULE

FIGURE 1-2



SOURCE: Los Angeles County Transportation Commission

LONG BEACH - LOS ANGELES LIGHT RAIL TRANSIT LINE

Figure 1-3

Preliminary staff requirements planning for the Long Beach-Los Angeles LRT line has been based on system design information supplied to the project team by the Commission. Specifically, information has been obtained from the following reports.

1. Draft Environmental Impact Report for the Long Beach-Los Angeles Rail Transit Project, prepared by the Commission and dated May, 1984.

2. Draft Operations and Maintenance Plan for the Long Beach-Los Angeles Rail Transit Project, prepared by Parsons Brinkerhoff/Kaiser Engineers for the Commission and dated November, 1983.

Additionally, selected information has been obtained directly from Commission management representatives, from site visits to the proposed main yard and selected station locations, and from reports describing the operation of the Pacific Electric Long Beach rail line discontinued in 1962. The Commission is currently updating its project description materials to reflect recent design and construction decisions, and this information may require that analysis results presented in this report be updated since staffing requirements for operations and maintenance functions for the Long Beach-Los Angeles LRT line are dependent on assumed system operating and design characteristics. In the following sections, operating and system design factors which may significantly affect operations and maintenance staffing requirements are discussed.

1.1.2 Level of Service Operated

For staff requirements planning, it has been assumed that the line will operate 24 hours daily, Sunday through Saturday for initial operations. The level of service operated will vary by time of day and day of the week as shown in Table 1-1. This operating plan may differ from preliminary plans developed by the Commission, but is believed to be consistent with the RTD's preliminary operations planning, particularly, with regard to 24 hour operations. It is planned that two-car trains will be operated at all times for initial operations although single cars might be employed during owl hours and at other times when justified by light ridership levels.

Train requirements are based on a round trip running time of between 101 and 108 minutes plus six minutes at each terminal for turnaround time. These times are based on the alternatives described in system description information provided by the Commission. If these assumed times require significant adjustment, either the calculated train requirements or the frequency of service will need to be changed from the values shown in Table 1-1. With the assumed operating characteristics, 12 two-car trains will be required to maintain peak period schedules. It is also planned that a gap train will be stored at each terminal to protect the scheduled service frequency and to replace trains requiring repair. Therefore, the maximum number of trains required is 14 and the maximum number of cars for peak period service is 28.

TABLE 1-1

LONG BEACH-LOS ANGELES LRT SYSTEM
OPERATING CHARACTERISTICS

Approximate Time Period	Headway (Minutes)	Number of Trains
Weekday		
6:00 a.m. - 9:00 a.m.	10	12
9:00 a.m. - 3:30 p.m.	15	8
3:30 p.m. - 6:30 p.m.	10	12
6:30 p.m. - 11:00 p.m.	20	6
11:00 p.m. - 6:00 a.m.	40	3
Saturday		
7:00 a.m. - 7:00 p.m.	15	8
7:00 p.m. - 11:00 p.m.	20	6
11:00 p.m. - 7:00 a.m.	40	3
Sunday		
7:00 a.m. - 11:00 p.m.	20	6
11:00 p.m. - 6:00 a.m.	40	3

1.1.3 Yard and Shop Facilities

The main yard for the Long Beach-Los Angeles LRT line is planned for a site adjacent to the line situated approximately 3.8 miles from the downtown Long Beach terminal of the line. The site is bounded to the north by Compton Creek, to the east by the Los Angeles River, to the west by the Long Beach Freeway, and on the south by Carson Street. The LRT mainline will run through the site on the former Pacific Electric Railway/Southern Pacific Railway right-of-way in a southeasterly to northwesterly direction. The yard will be split by the LRT mainline track. The elevations of the mainline tracks and of the yard and shop tracks are different with the mainline tracks at a higher elevation by roughly 20 feet.

It is also planned to provide a satellite yard for car storage and light maintenance near the downtown Los Angeles end of the rail line. The satellite yard has been proposed for a location approximately 3.1 miles south of the Los Angeles terminal at Seventh and Flower. This facility would be used for the storage of approximately 14 cars employed for peak period service only, so that deadheading to and from the main yard could be minimized. The project team strongly believes that the satellite yard is not required for the startup of Long Beach-Los Angeles LRT line and that, if built, will result in additional staffing and increased LRT operating costs.

1.1.3.1 Main Yard

The layout of the main yard can significantly impact LRT operating costs. In particular, the yard layout should provide for the efficient utilization of train operators in starting and ending their daily work assignments. In preliminary plans reviewed by the consultant team, line operators will pick up trains in a 'meet and greet' area adjacent to the proposed operations building in the western corner of the yard. Trains will be pulled out into service in either direction on the mainline from this area. For trains being taken out of service, the same procedure will be followed in reverse ending with yard operators moving the train to its storage location. This approach results in line operators being paid for train deadheading time which could be done by yard operators working on the clock. To relieve a line operator at the end of his or her work run, the proposed layout requires that (a) a train be pulled out of service at one of the terminals by the operator being relieved while a second train is pulled out into service at the same time by the relief operator, or that (b) a shuttle train or automobile be employed to transport both the that operator making the relief and the operator being relieved to and from the main yard. In either case, time is being paid to line operators for non-revenue work time

To avoid additional operating costs that might result from the proposed operations, a platform at the yard to be used only by line operators at the start and end of their work shifts is suggested. The platform would be provided adjacent to the mainline tracks. Relief operators would walk (or perhaps be shuttled) from the operations building to the platform on the mainline. Operators being relieved would be paid travel time to return to the operations building in a similar manner. This approach would avoid making more costly reliefs at the line terminals or at the Del Amo or Wardlow stations.

It might also be possible for the operations building to be superimposed on top of the shop structure at the elevation of the mainline tracks as illustrated in Figure 1-4. A platform area able to accommodate 1-2 trains would be constructed parallel to the face of the building, abutting a yard relay track from which access to the mainline both north and south would be readily attained. With the operations and maintenance functions combined in a single building, it would also be possible to house central control operations at this location. This would serve to consolidate both yard and mainline control at the same location which could provide significant economies for system administration, operations and maintenance supervision; and security functions for the Long Beach-Los Angeles LRT line. The feasibility of this approach needs further investigation. It may be necessary for the mainline tracks to be elevated in order to cross the Union Pacific line adjacent to the main yard site. In this case, there would be significant constraints for the development of the consolidated operations and maintenance building as described. At a minimum, this suggested approach does illustrate the nature of operational considerations to be taken into account for the main yard design.

1.1.3.2 Satellite Yard

For LRT operations in the near term future, the consultant team believes that the proposed satellite is not necessary and, more importantly, may result in increased operating costs for the District in the longer run. While it is planned that the yard will not require additional staffing, experience from other rail system operators in North America strongly suggests that this will not be the case. If the satellite yard should result in additional staffing, any cost savings due to reduced deadheading would be eliminated.

The satellite yard would result in reduced deadheading travel costs. Deadheading from the main yard to the Los Angeles terminal requires approximately 36 minutes running time plus time for pulling to the relay track from the main yard, say two minutes. Returning the train to the yard would require roughly the same time. With the satellite yard, time would be required to put a train into service as follows.

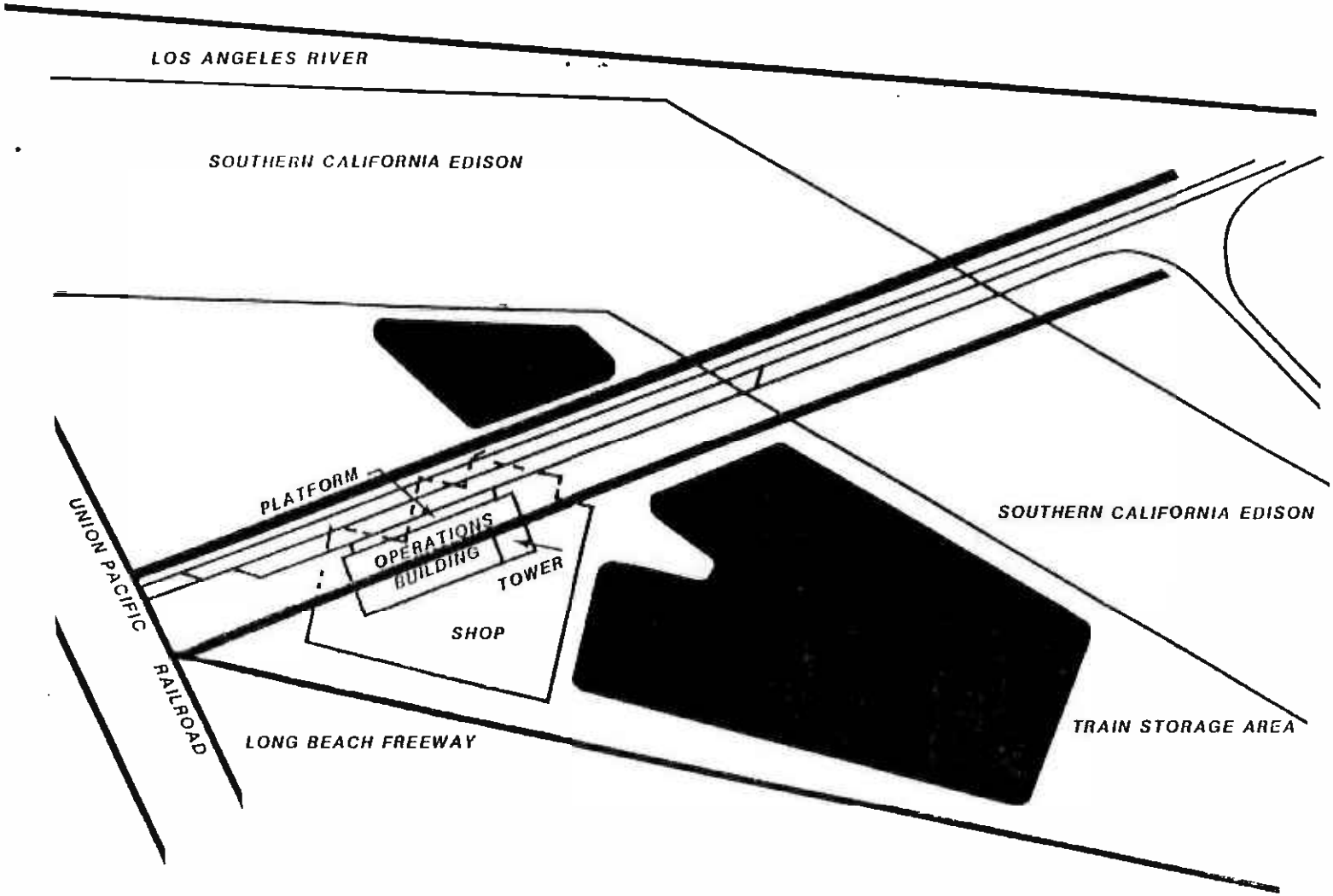
1. After signing on at the Los Angeles terminal with an assigned supervisor, the train operator would be paid to travel to the satellite yard. If this were done by train, the time would be one-half of the scheduled train headway plus the train running time to the storage yard which is estimated to be approximately 16.5 minutes. If this were done by auto, this would probably be shortened depending on the availability of parking at both locations.

2. At the yard, time would then be needed to locate and board the train, perform a safety check, establish contact with control for switching onto the mainline, and pull out of the yard onto the mainline. This time may be estimated as five minutes. Then, the train would be deadheaded to the Los Angeles terminal, requiring approximately 6.5 minutes, to begin revenue service.

3. The total time to retrieve a train from the satellite yard after reporting is 28 minutes, assuming that the estimated times are correct. Returning the train to the yard would require approximately the same time number of minutes.

Figure 1-4

POSSIBLE OPERATIONS BUILDING LAYOUT



Using the satellite yard for eight trains per day (four in the a.m. peak period, and four in the p.m. peak period) would result in operating cost savings of 128 minutes per day or 540 hours annually -- this amounts to approximately $8,100 per year. However, these cost savings could be eliminated by added costs for the following:

- o Security necessary for vehicles stored overnight at the yard.
- o Upkeep of the yard, including switches and signals.
- o Travel time for service and inspection maintainers to and from the satellite yard.
- o Travel time for moving trains to and from the satellite yard for vehicle maintenance activities other than S&I work service and inspection work.

Other operating strategies might be implemented that would change the magnitude of potential train operator cost savings. Regardless of the level of train operator cost savings, the use of this yard for the initial operation of the Long Beach os Angeles LRT line adds to the complexity of operations and will most likely result in higher overall operating costs. With expanded operations from this yard, increased train operator cost savings would result that could serve to make the use of the yard satellite preferred. For example, operator cost savings would increase to over $40,000 annually if 40 trains per day were operated from the yard. This would require storage space for 20 trains at the satellite yard.

It is currently planned to provide tail tracks beyond the 7th and Flower station with space for four cars on each of the two tracks. This track will be used to store a two-car gap train and may be used for the temporary storing of trains taken out of service needing 'emergency' repairs. It may also be necessary for trains changing direction to use the tail tracks depending on the frequency of service and track configuration. It is possible that the tail tracks could be employed for some of the uses planned for the satellite yard, including peak period train storage and light vehicle maintenance. To be cost effective, it would be necessary to extend the tail tracks to provide for increased vehicle storage. An extension of approximately 800 feet would provide storage for an additional 20 cars at this location. The cost of this extension could not be justified on the basis of reduced operating costs but, if considered together with future plans to extend the line to Pasadena, it may deserve further attention for development.

1.1.4 Operating Systems

The Long Beach-Los Angeles LRT line will incorporate operating systems for electrification, signaling and communications, security, and fare collection which must be maintained by District personnel. The level of effort required for inspection, preventative maintenance, and corrective repair activities depends on the specific design characteristics for each of these systems and its components. In some cases, these characteristics have not yet been finalized by the Commission. In other cases, actual experience following installation and initial operation will govern inspection and repair requirements. For the Long Beach-Los Angeles LRT line, the following design characteristics are among those

which need to be considered in examining operating systems maintenance requirements.

- Length of line. The line consists of approximately 22 miles of two-way track which needs to be maintained. Also, the distance will affect requirements for supervisory and repair personnel where 'emergency' response times are of concern.

- Block signal system. Train operators will be controlled by an automatic block signal system similar to systems typically employed for rail freight operations. With this type of system, each train's location on the line may be detected and train operations are controlled by the colored light aspect displayed on wayside signal masts. A number of modern LRT systems, including those for which comparative data was obtained as part of this study in San Diego, Edmonton, and Calgary, employ signal systems similar to those planned for the Long Beach-Los Angeles LRT line. Other rail systems for which comparative data was also obtained (Atlanta, Miami, and Washington) incorporate more sophisticated train control systems.

- Grade crossing signals and gates. Approximately 38 locations along the line will require crossing and gate systems. At some locations, it may be necessary to sychronize train control signalization with grade crossing signal systems.

- Fare ticketing and validation system. The line will be operated with barrier-free stations and utilize self-service fare ticketing and validation machines, similar to the approach used in San Diego.

- Power distribution. The vehicles will be propelled by electric traction motors with power supplied from eighteen substations along the mainline.

- Stations. Twenty-two stations are planned for the line. Of this total, nineteen stations will be at-grade with center platforms where passengers will wait for trains arriving from either direction. Parking will be provided at seven stations, but four of these stations will have 100 or fewer spaces.

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1.2 URBAN RAIL MANPOWER PLANNING SYSTEM (URAMPS)

A microcomputer-based modeling system, designated the Urban Rail Manpower Planning System or URAMPS, has been developed for estimation of staffing requirements for the Long Beach-Los Angeles LRT line. The model provides considerable flexibility for the specification of LRT operating characteristics so that it may be applied with confidence for manpower planning for other LRT lines to be developed in the Los Angeles metropolitan area. In applying the model for other lines, some recalibration may be necessary to account for significantly different operating and design characteristics.

URAMPS consists of two modules, the first for train scheduling and the second for organization and staffing (see Figure 1-5). The first module was developed under this project to provide estimates of the number of train hours and miles, number of car hours and miles, and number of peak trains and cars resulting from an operating schedule specification. As input to the module, the user must provide information regarding line running times, yard location, deadheading and turnaround times, hours of service, headways operated by time of day, and number of cars per train. Using this information, the module simulates actual train operations to produce train operating schedules (including any required deadheading trips). Statistics concerning the efficiency of the schedules resulting from the input schedule specifications are generated, and for manpower planning purposes, the module calculates system operating data which may be used for manpower estimation computations. For example, the number of car cleaners may be estimated from the number of peak cars required for an operating schedule. By applying URAMPS, peak car requirements may be estimated as input for determining car cleaner staffing needs.

The organization and staffing module represents the core of URAMPS. It permits the user to define organizational structures and relationships for the estimation of staffing levels based on operational characteristics and other relevant factors. With this module, the user has the complete freedom to define the following key variables which drive the calculations of operations and maintenance manpower requirements.

- Organization chart: definition of all departments and organizational units in the operating agency which will be employing personnel to operate the light rail system.

- System characteristics: definitions of relevant system characteristics which may be used to determine the manpower required to operate the system. System characteristics may include variables such as the number of stations, number of vehicles, and annual car miles traveled. The definition of system characteristic variables is completely up to the user's judgment, providing the ability to describe the system at various levels of detail. For the Long Beach-Los Angeles LRT line, the necessary set of system characteristics has been investigated and incorporated in the module. In the future, a user may add, delete, or modify any of the system characteristics as needed to reflect different operating and system design features.

- Position specification: definition of the different positions necessary to operate the LRT system. Each position may be described through the following attributes -- department, union or management

URBAN RAIL MANPOWER PLANNING SYSTEM (URAMPS) OVERVIEW

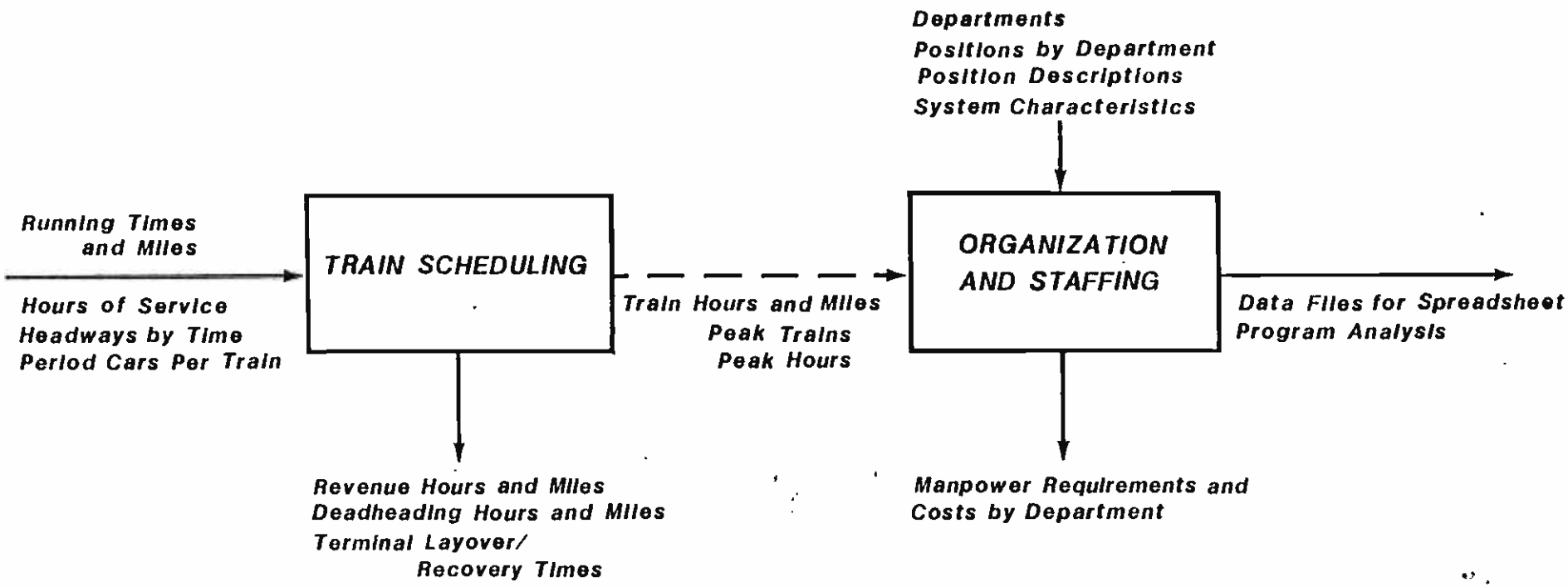


Figure 1-5

group affiliation, position title, and salary classification. To determine the number of employees for each position, each position is defined as being one of the following.

a. Fixed position -- the number of employees is determined outside the model and provided by the user to the program as a fixed number.

b. Variable position -- the number of employees is calculated by the model as a function of up to three relevant system characteristics. The number of employees may be calculated 'per shift' or as a total for all shifts.

c. Dependent position -- the number of employees for this position is determined by the model as a function of the number of other employees (e.g., one supervisor for each ten staff employees).

d. For variable and dependent positions, the user may input information concerning days not available for work so that relief and cover requirements may be calculated, or model relationships may be specified to include these requirements (such as for relationships based on comparative data).

The URAMPS organization and staffing module also provides output that may be directly used with the Lotus 1-2-3 and Multiplan spreadsheet packages. Output files containing position and department data may be read by these packages to relate the staffing requirements for operation of the line to the planned design and construction schedule. As part of this project, a model has been developed using Multiplan where the hiring for each position is related to key system development milestones. Using this model, modifications in the time schedule for system startup can be applied to determine any changes in hiring requirements. In a similar manner, any change in the proposed operating schedules or in anticipated staffing levels can be input from URAMPS and then reflected in the hiring requirements timetable. As an additional output, the organization and staffing module provides summaries of the number of personnel and personnel costs required for each department which are useful for cost analysis and budgeting purposes.

The URAMPS model is written in BASIC for processing on an IBM PC with 128K memory and at least one diskette drive. System documentation for URAMPS has been prepared as a separate project.

2. ALTERNATIVE ORGANIZATIONAL STRUCTURES

The anticipated addition of light rail transit (LRT) and eventually heavy rail transit (Metro Rail) service within the RTD service delivery area will result in substantial new administrative and operational functions. Consideration must be given to the manner in which these activities may be structured in order to achieve operational objectives efficiently and with minimum disruption to the existing service operations. This analysis examines ways in which a number of transit agencies in the United States and Canada have integrated bus and rail operations and recommends an approach suitable to meet RTD requirements.

2.1 REVIEW OF ORGANIZATIONAL APPROACHES

Information for this review was collected from transit operators in Atlanta, Calgary, Chicago, San Francisco, and Washington, D.C. These transit operators include both light rail or heavy rail transit combined with bus operations. The review also included the Port Authority Transit Corporation (PATCO) and the San Diego Metropolitan Transit Development Board (MTDB), both operators of one rail transit line.(a)

Two general models emerge from this review, as illustrated in Figure 2-1. The first model (at the top of Figure 2-1) portrays a system whose principal operational and maintenance functions are administratively organized by mode. Other systemwide functions such as security, finance, legal services, marketing and community relations, and construction and design are grouped separately from the bus and rail operating departments. The second model (lower half of Figure 2-1) portrays a system organized totally along functional divisions with separate departments for maintenance, transportation, and general administrative activities. In such cases, segregation of bus and rail transit operations (where applicable) occurs at a lower level in the organizational hierarchy, within each functional department.

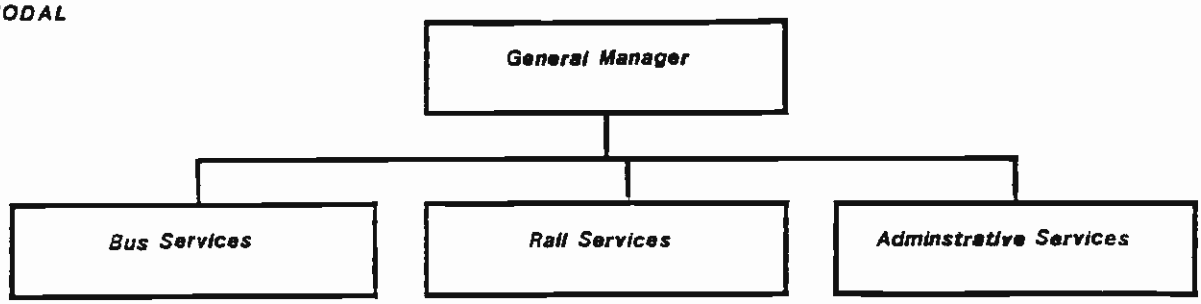
Figures 2-2 through 2-8 represent simplified schematic representations of the organizational structures for the seven transit operators examined as part of this study. The schematic representations present the elements of each system in a parallel fashion, thus minimizing differences in nomenclative and excessive detail that might otherwise obscures the basic organizational patterns.

From this group, the Washington Metropolitan Area Transit Authority (WMATA) stands in clear contrast due to its reliance on a segregation of responsibilities at the Assistant General Manager level, and the clear delineation of bus services, rail services, and support function responsibilities. Operations and maintenance activities are grouped together organizationally by transit mode, while other departments are segregated by function. The other operators with combined bus and rail services examined for

(a)The Metropolitan Transit Development Board assumed responsibility for the bus operations of the San Diego Transit Corporation on July 1, 1985.

GENERAL ORGANIZATIONAL MODELS

MODAL



FUNCTIONAL

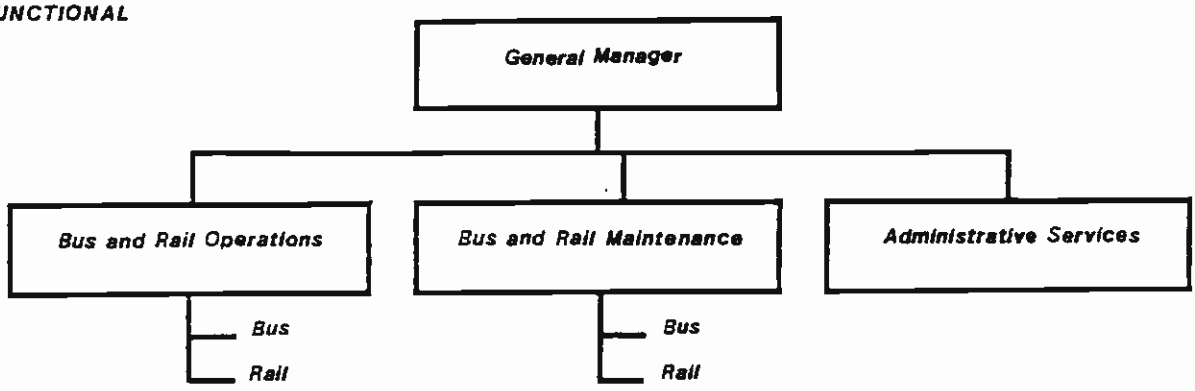


Figure 2-1

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY (WMATA)

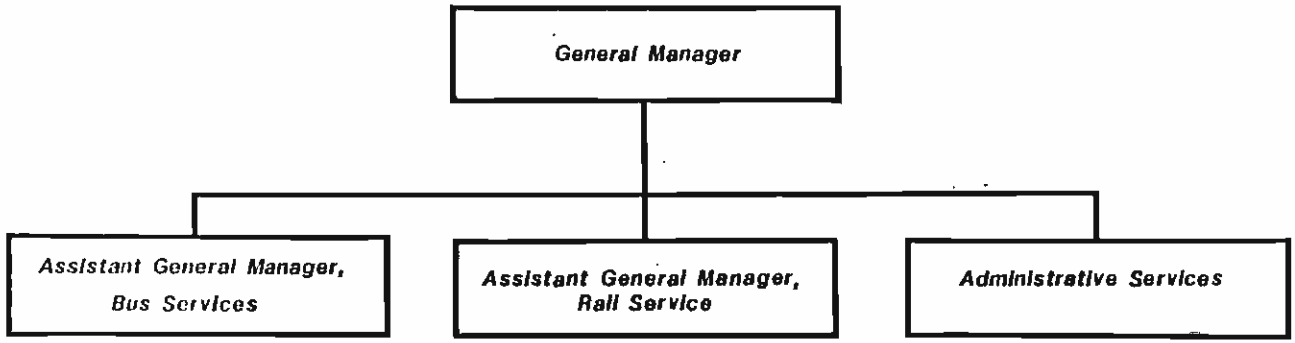


Figure 2-2

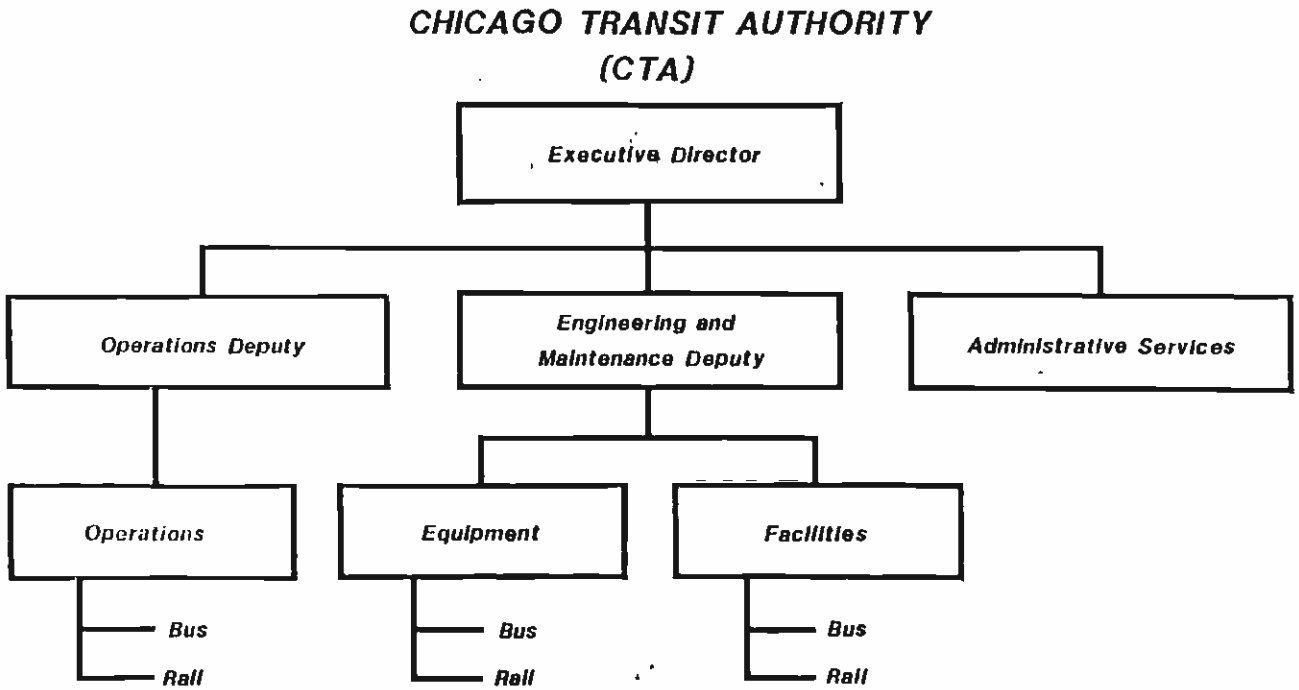

CHICAGO TRANSIT AUTHORITY
(CTA)
Executive Director
Operations Deputy
Engineering and
Maintenance Deputy
Administrative Services
Operations
Equipment
Facilities
Bus
Rail
Bus
Rail
Bus
Rail

Figure 2-3

METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY (MARTA)

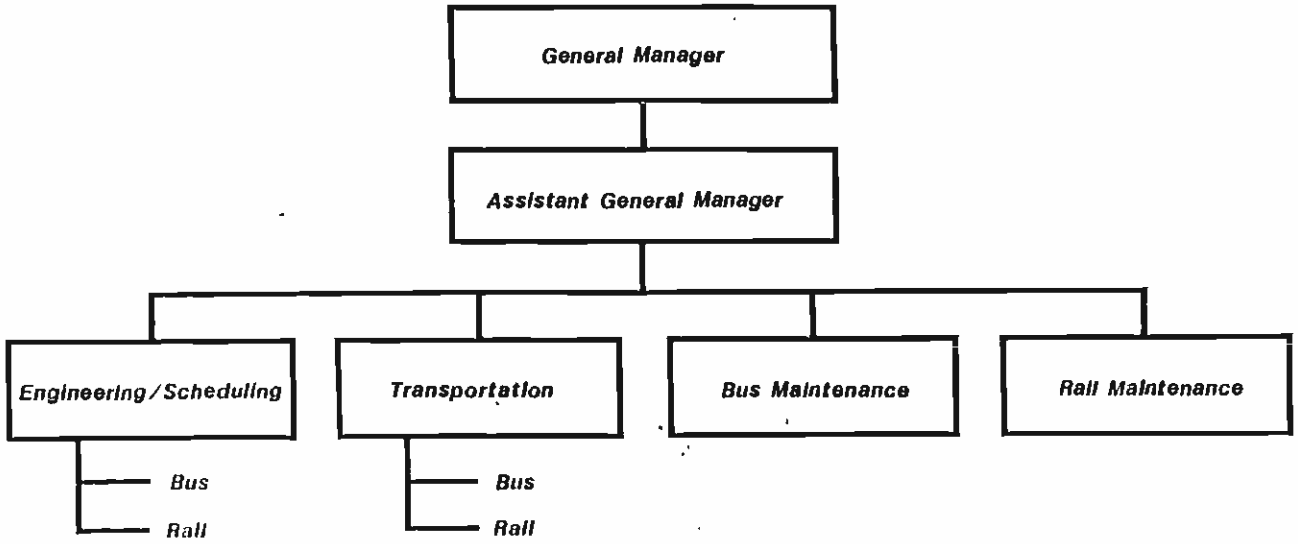


Figure 2-4

SAN FRANCISCO MUNICIPAL RAILWAY (MUNI)

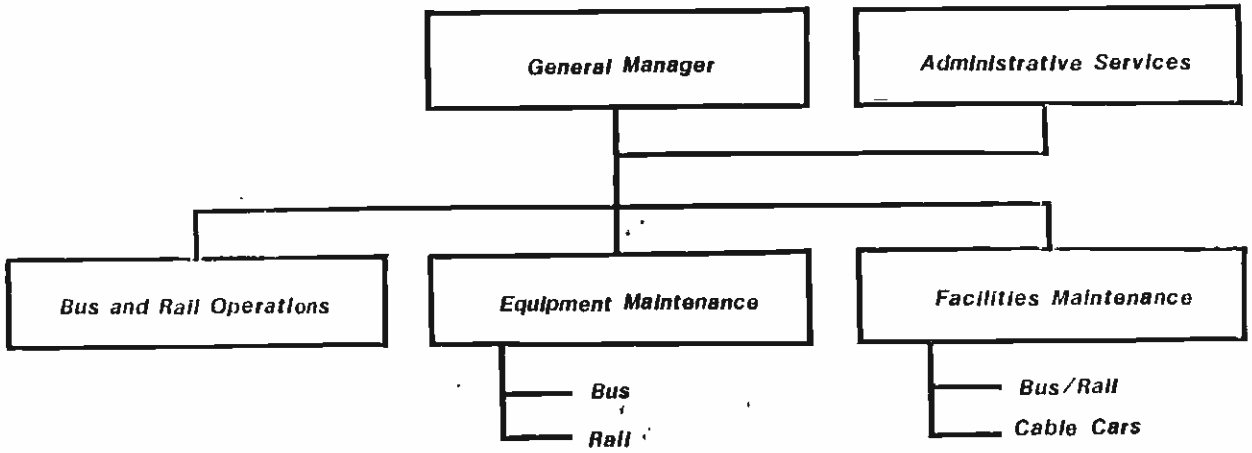


Figure 2-5

CITY OF CALGARY TRANSIT

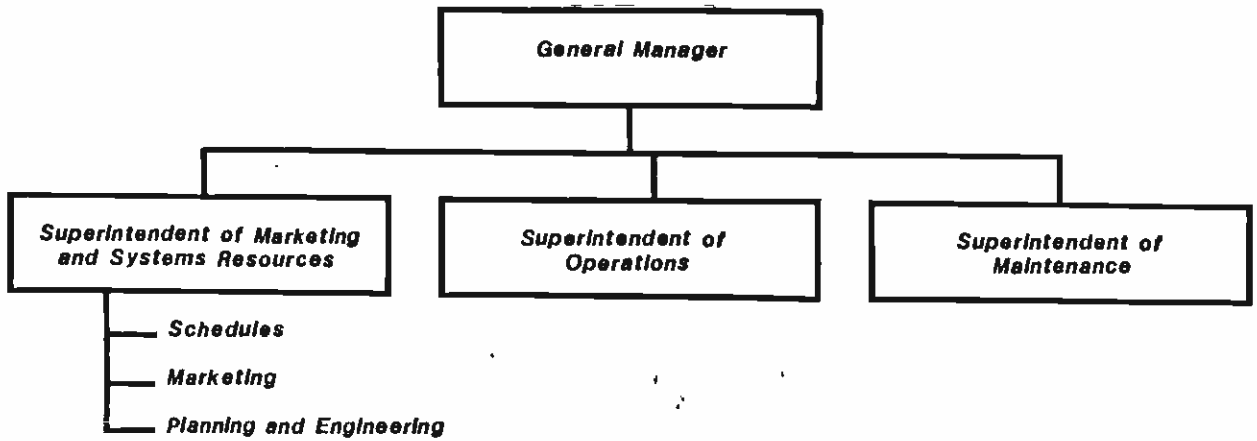


Figure 2-6

PORT AUTHORITY TRANSIT CORPORATION (PATCO)

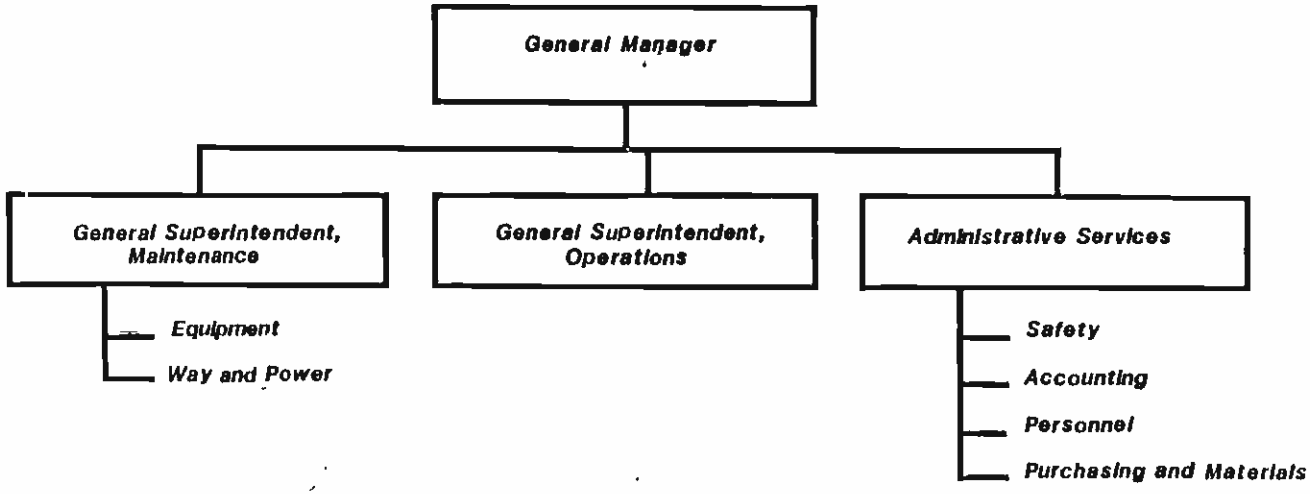


Figure 2-7

SAN DIEGO METROPOLITAN TRANSIT DEVELOPMENT BOARD

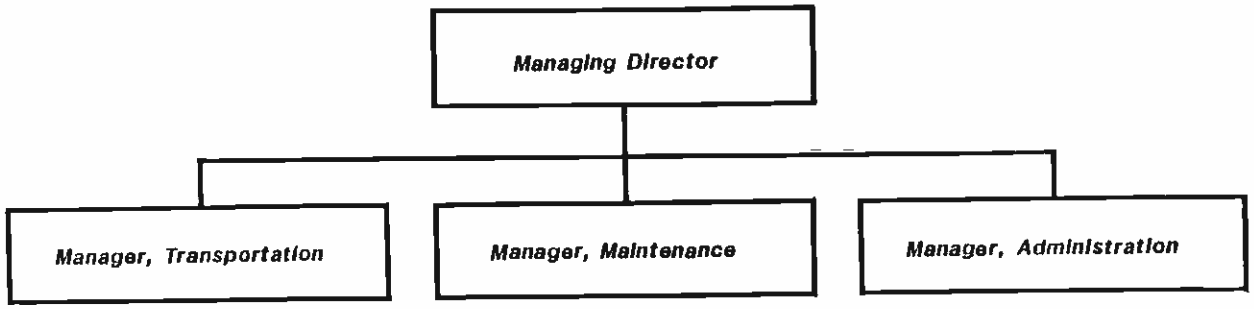


Figure 2-8

this study fall into a consistent pattern of functionally organized systems, with segregation of rail and bus operations occurring at various levels within separate operations and maintenance functional departments as appropriate. The City of Calgary is particularly noteworthy in this approach (see Figure 2-7), as both LRT vehicles and buses are housed in common garage facilities, and the segregation of many responsibilities occurs at the working level within the garage.

2.2 SUMMARY OF FINDINGS

The experience of transit operators reviewed by this study suggests that an organizational alignment based principally on basic operating functions is the most common and probably preferred approach. The technical expertise and allocation of resources required to perform by functions (such as for equipment maintenance, systems maintenance, and transit operations) are most effectively managed as a whole, with segregation of bus and rail transit operations and maintenance activities occurring at levels deeper within the line operations of the organizational structures.

In contrast to this consistent pattern of functional organization, it should be noted that the particulars of each organizational structure differ widely across the full set of transit operators examined. There appears to be as many approaches to organizational structure as there are individual operators. The existence or lack of an Assistant General Manager; the authority delegated to the Assistant General Manager where they exist; the allocation of staff roles throughout the organizational structure, and the level and manner in which bus and rail services are segregated are among the factors which vary widely from organization to organization. The effectiveness of these arrangements can be assumed to reflect legitimate differences in operating style and methodology, as well as differences in the size of the system and the type of rail services operated. No conclusion can be drawn from this level of analysis as to the preferred characteristics.

2.3 RECOMMENDED APPROACH

For operations and maintenance functions, the existing structure of the RTD is organized along functional divisions at the Director level, immediately reporting to the Assistant General Manager for Operations (see Figure 2-9). Based on the results of the preceding review and on input from District management representatives, it is recommended that future rail operations be integrated into the existing RTD bus operating structure. This approach will serve to take advantage of operational efficiencies and to minimize disruption to the existing operations.

LRT operations will require additional staffing primarily with four RTD departments -- Transportation Equipment Maintenance, Facilities Maintenance, and Transit Police. Some additional manpower may be necessary in selected departments for support services, such as in the Office of Contracts, Procurement, and Material for storekeeping personnel. For each of the four departments that are primarily impacted, it is proposed that additional staffing be added under supervision at the level of a Superintendent. For the initial operations of the Long Beach-Los Angeles LRT line, it is proposed that a 'new' Superintendent position be added only in the Transportation Department. Until LRT operations are commenced in 1989, this Superintendent would serve as the

SCRTD EXISTING OPERATIONS ORGANIZATION

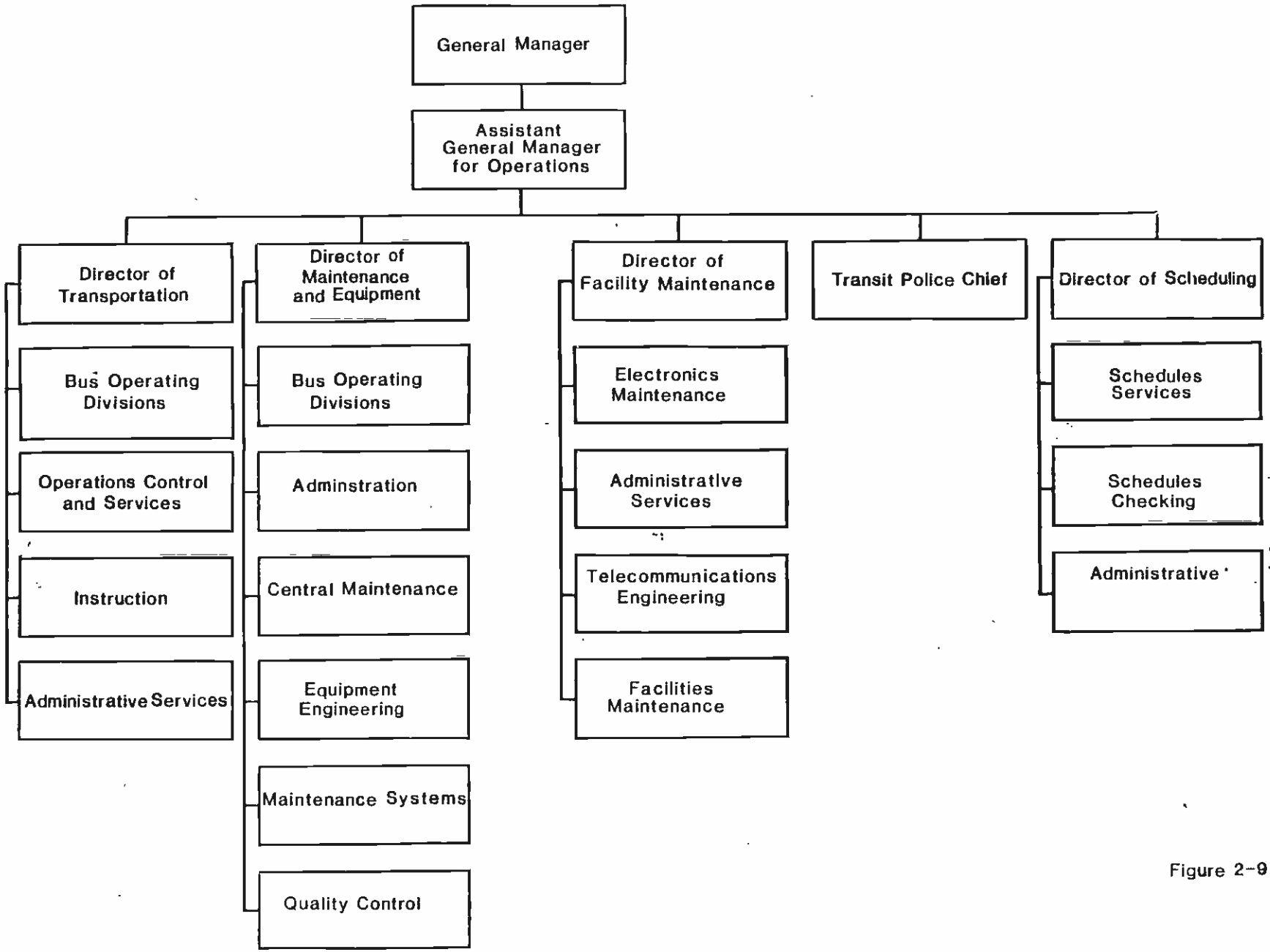


Figure 2-9

District's liaison with the Commission to ensure that the turnover for operations is accomplished with maximum efficiency and effectiveness. For the other departments, existing Superintendents will have responsibilities for initial LRT operations. In the longer run when Metro Rail and other LRT lines are introduced, Superintendent positions dedicated for rail operations will be added for other departments as necessary.

The RTD is presently recruiting nationally for a Rail Operations Superintendent position to be added in the Transportation Department. In addition, a new position of Assistant Director of Equipment Maintenance is being filled. This position will have responsibility for the RTD's rail-related equipment maintenance program, and upper-level management experience in rail maintenance is desired as a qualification for the position.

In the following next chapter, staffing requirements for the initial operation of the Los Angeles-Long Beach LRT lines are presented for selected District departments. These requirements are based on the organizational approach presented in this chapter.

3. STAFFING REQUIREMENTS

The recommended organizational approach for operating the Los Angeles-Long Beach LRT line has been outlined in the preceding chapter. The approach provides a sound foundation for Metro Rail and expanded LRT operations in the region that will maximize operating efficiencies and take full advantage of existing staff capabilities at the District. In this chapter, staffing requirements for the initial operations of the Long Beach-Los Angeles LRT line are examined for each of the four major RTD departments reporting to the RTD's Assistant General Manager for Operations which are affected by the startup of LRT operations -- Transportation, Equipment Maintenance, Facilities Maintenance, and Transit Police. Staffing requirements for other RTD departments providing support services are also examined, although these requirements are limited.

Staffing requirements for the Long Beach-Los Angeles LRT line have been estimated based on a detailed analysis of proposed operations, selected comparative data obtained from other rail transit operators in North America concerning staffing for rail transit operations and maintenance functions, and current RTD staffing levels for bus operations and maintenance functions. As part of this project, a questionnaire survey of 16 rail transit operators in the United States and Canada was undertaken to obtain information regarding staffing levels and related staff development matters. Responses were obtained from 12 operators including responses obtained by followup telephone contact, and the survey results are summarized in Appendix B of this report.

In using the information presented in this chapter, it should be recognized that the staffing requirements represent estimates that may require further refinement as system design and construction activities are finalized. Additionally, the use of comparative data (both data obtained from other rail transit operators and data concerning existing RTD bus operations) sometimes involves considerable interpretation of limited data where not all operating characteristics and factors can be fully addressed. While this does not invalidate study analysis results, these limitations should be noted where comparative data has been employed for estimating staffing requirements.

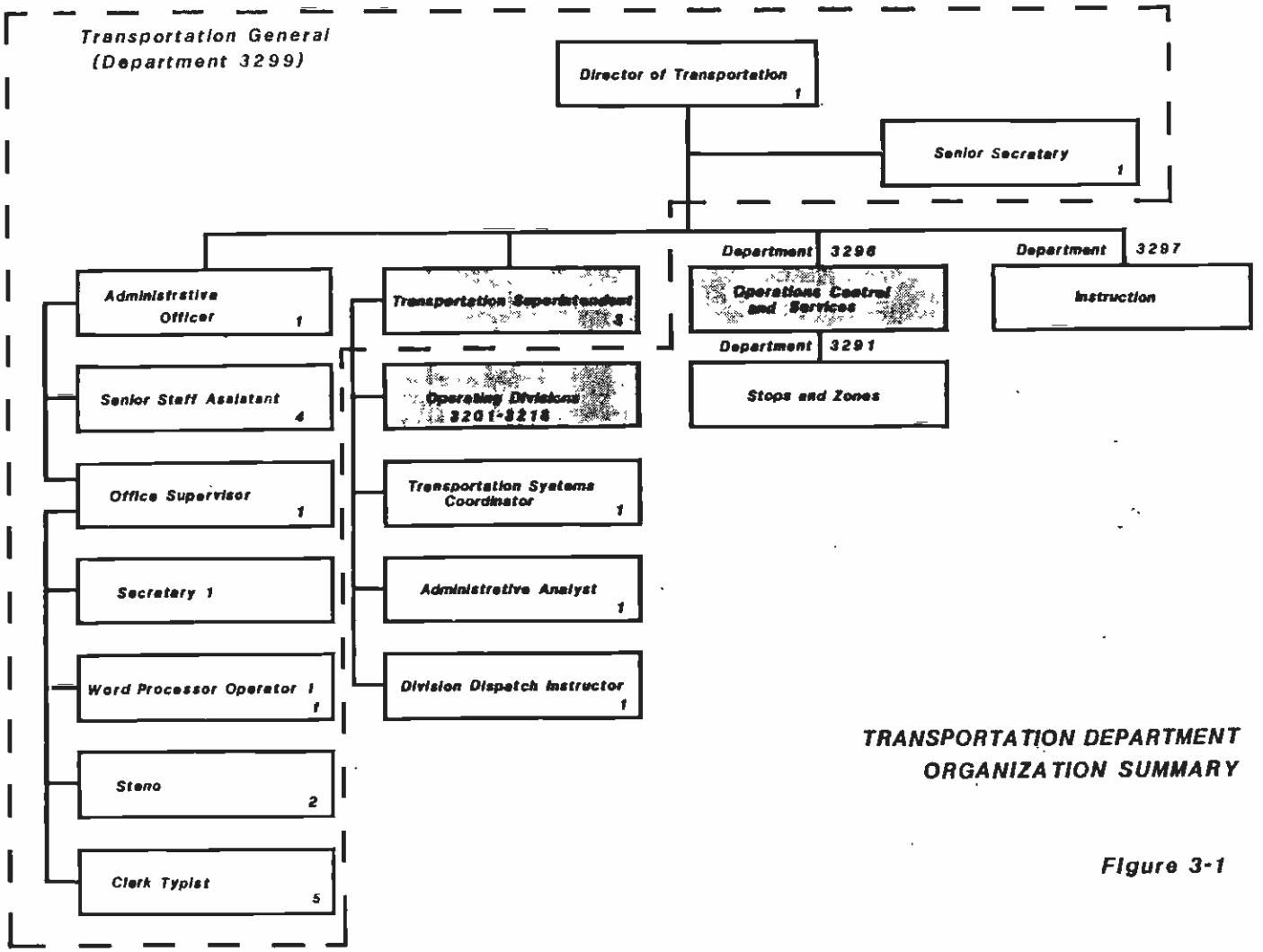
3.1 TRANSPORTATION

Figure 3-1 illustrates the organization within the RTD's Transportation Department, and shows by shading those groups for which LRT staffing requirements have been identified.

3.1.1 Transportation General (3299)(b)

Two positions are affected within this unit of the Transportation Department.

(b)The number '3299' is the RTD designation for Transportation General. Other departments have similar identifying numbers.



TRANSPORTATION DEPARTMENT
ORGANIZATION SUMMARY

Figure 3-1

3.1.1.1 Rail Transportation Superintendent

Currently, three Transportation Superintendents are responsible for management of the RTD's transportation operations at twelve operating divisions. For rail operations, an additional Transportation Superintendent position will be required with responsibility for both light rail and Metro Rail operations reporting directly to the RTD's Director of Transportation. Initially, this individual will be responsible for establishing rail operating procedures and work rules as well as for monitoring system design and construction activities. As vehicle and systems testing activities are undertaken, responsibilities will become more directed to operational management tasks. For rail transit systems development and operations planned for the rest of this century, only one Transportation Superintendent position will be necessary. Since the position is independent of the size of rail systems being operated, it has not been incorporated into the URAMPS model structure.

3.1.1.2 Typist Clerk (BRAC)(c)

It is possible that an additional Typist Clerk position will be required to support rail operations activities, reporting to the Transportation General's Administrative Services Officer. However, the need for this position depends on the workload of the existing office support staff and the degree to which this workload may be reduced in the near future due to the implementation of TRANSMIS transportation information systems. For modeling purposes, this position has not been included as being required for LRT operations.

3.1.2 Operations Control and Services (3296)

This department is presently responsible for on-the-street supervision of bus operations, stops and zones maintenance, and bus radio dispatching. With the introduction of LRT operations, this Department will assume added responsibilities for the centroid train control functions of the LRT operations. A summary of the new positions and staffing requirements is presented in Table 3-1, and an organization chart for the added positions is shown as Figure 3-2. The numbers shown for each position in Figure 3-2 correspond to position numbers used for URAMPS modeling.

3.1.2.1 Chief Central Control Supervisor

This position will be implemented to supervise central control personnel responsible for line and yard train monitoring, traction power, and communications. The position is proposed as reporting to the RTD's Radio Dispatch Manager. The position will be covered one shift per day, five days per week.

(c)This position, if required, would be represented by the Brotherhood of Railway, Airline, and Steamship Clerks (BRAC). In addition to BRAC, union affiliations for RTD positions required for LRT operations are the United Transportation Union (UTU), Amalgamated Transit Union (ATU), and the Teamsters Union (TU).

TABLE 3-1

STAFFING SUMMARY FOR OPERATIONS
CONTROL AND SERVICES DEPARTMENT (3296)

Position	Estimated Number Low	Estimated Number High
Central Control Manager	(a)	(a)
Chief Central Control Supervisor	1	1
Central Control Supervisor	4	7

Note: (a) Position not required for the Long Beach-Los Angeles LRT line, but should be added for additional LRT and Metro Rail Lines.

OPERATIONS CONTROL AND SERVICES DEPARTMENT ORGANIZATION CHART

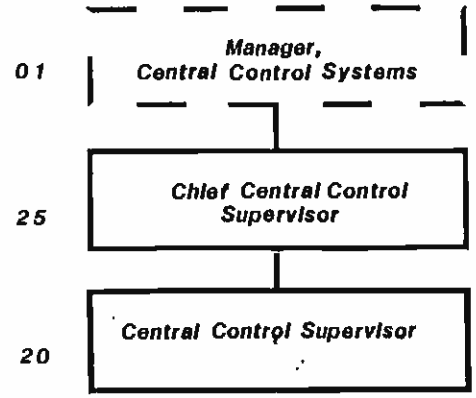


Figure 3-2

As RTD rail operations expand with additional LRT and Metro Rail lines, it is suggested that a Central Control Manager be added to this group. For startup of the Long Beach-Los Angeles line, this position should not be required.

3.1.2.2 Central Control Supervisor

This position will be responsible for monitoring systemwide train performance and operations from the central control facility. Coverage for this position will be for all shifts on seven days per week basis by at least one supervisor. More specifically, staffing requirements may be estimated as follows.

1. Train dispatching -- at least one person per shift for all shifts per day, seven days per week backed up by the Chief Central Control Supervisor for selected shift coverage, busy time periods, and emergencies. Depending on the complexity of line operations (for example, consist changes and use of the satellite yard), it may be advisable to provide for an additional supervisor working a split shift on weekdays to assist with peak period train operations.

2. Yard supervision -- if the central control facility is located at the main yard, the monitoring of train movements in the yard will require coverage for two shifts per weekday only. If the central control facility is located elsewhere as currently planned by the Commission, coverage will be necessary for all shifts per day, seven days per week. Also in this case, this position should be shifted to the responsibility of the Division Transportation Manager for the LRT operating division. For modeling purposes, it has been assumed that the central control facility will not be situated at the main yard (as planned by the Commission) and that yard supervision duties will be assigned to the Operating Division Department.

3. Traction power monitoring -- the staffing of this position might be provided on two shifts per weekday only. The monitoring of the power distribution system could be done by train control supervisors without the need for additional staffing even during the two shifts per weekday. To a large extent, the requirement for additional traction power monitoring personnel is based on providing for maximum system safety in view of the potential hazards associated with the train power distribution system.

3.1.3 Transportation Operating Divisions (3201-18)

Currently, the RTD runs twelve operating divisions throughout the metropolitan area with transportation operations at these divisions under the overall direction of the Transportation Department's Transportation Superintendents. A new operating division (designated division 3219 for this report) will be created for Long Beach-Los Angeles LRT operations. A summary of the new positions and staffing requirements is presented in Table 3-2, and an organization chart for the added positions is shown as Figure 3-3.

TABLE 3-2

STAFFING SUMMARY FOR TRANSPORTATION
OPERATING DIVISION (3219)

Position	Estimated Number Low	Estimated Number High
Division Transportation Manager	1	1
Transportation Operations Supervisor (Rail)	9	10
Yard Supervisor	4	5
Train Operator/Line Operations	40	50
Train Operator/Yard Operations	5	6
Division Steno	1	1

OPERATING DIVISION ORGANIZATION CHART

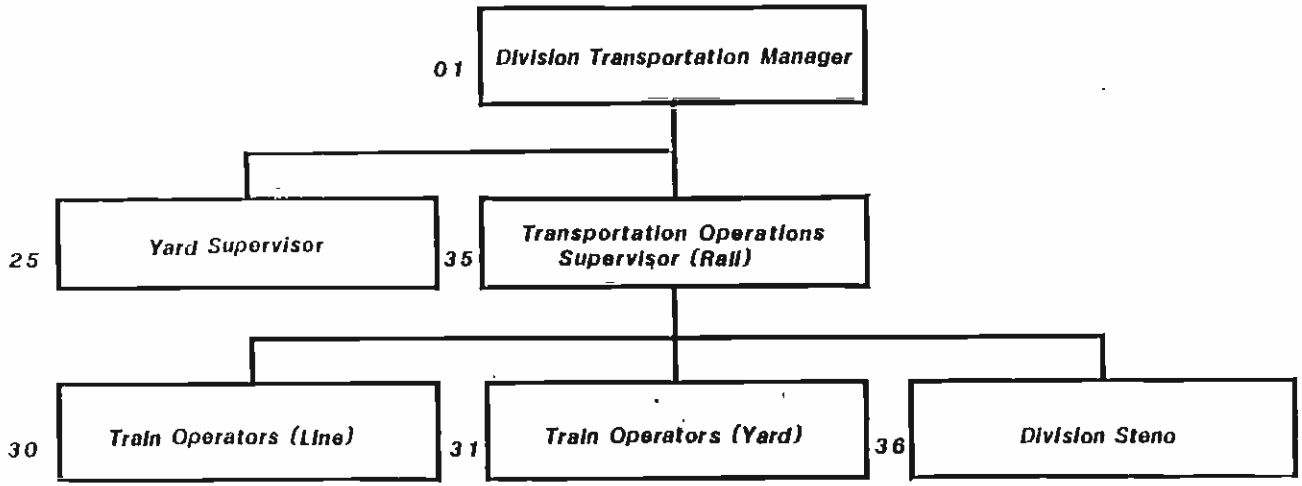


Figure 3-3

3.1.3 1 Division Transportation Manager

The Division Transportation Manager will be responsible for all train operating personnel, line operations supervision, crew dispatching, and yard operations. This position will report to the Rail Transportation Superintendent, and will be covered one shift per day, five days per week.

3.1.3.2 Transportation Operations Supervisor (Rail)

The Transportation Operations Supervisor will be responsible for the monitoring of line operations, crew dispatching at the main yard, and train operator instruction. For crew dispatching at the main yard, coverage is required for all shifts per day, seven days per week by one person. For line supervision, staffing requirements depend on the level of service operated, length of the line, use of the satellite yard, and complexity of operations (e.g., line junctions where trains may be turned back). For the Long Beach-Los Angeles LRT line, it is estimated that line supervision can be effectively accomplished using three supervisors for two weekday shifts and 1-2 supervisors working two weekend shifts (in addition to assistance from the supervisor responsible for main yard crew dispatching). The number of positions required to implement these work assignments is between 9 and 10, including 1-2 additional positions for relief and instruction work.

These positions have been assigned to the Operating Division Department for all supervisory functions in order to permit maximum flexibility in the scheduling of work assignments for crew dispatching, route supervision, and instruction. For bus operations, Transportation Operations Supervisors are assigned to separate departments responsible for line supervision, operator dispatching, and instruction duties. This approach is not recommended for the Long Beach-Los Angeles LRT operations, but might be implemented in the future with expanded LRT and Metro Rail operations.

3.1.3.3 Yard Supervisor

This position was already described in connection with central control staffing requirements. Since the main yard will be located separately from the central control facility, this position will be assigned to the Operating Divisions Department. Coverage is required for all work shifts per day or seven days per week by one Yard Supervisor.

3.1.3.4 Train Operator (UTU)

The number of train operators required is dependent on the number of train hours operated and work rules governing the use of train operators. The operating schedules assumed for Long Beach-Los Angeles LRT line operations result in the following estimated number of train hours:

Weekday	-	171
Saturday	-	144
Sunday	-	120

- Assuming an average of 7.0 train hours per operator assignment (this average accounts for preparatory and sign-off time allowances, travel times for reliefs, and other non-productive work time) results in a total of 32 five-day work runs.

Factoring this for extra board duties, it is estimated that 42 train operators are needed to operate the proposed schedules. Additionally, train operators will be required to move trains in the yard, to move trains to and from the mainline, and for other unscheduled train movements that may be necessary for operations and maintenance purposes. It is estimated that 5-6 train operators will be required for this work. For planning purposes, it is reasonable to assume that the number of train operators required for line operations will be between 40 and 50. With the modeling capabilities being provided in conjunction with this preliminary staffing plan, the number of train operators required for line operations can be estimated for different line operating plans.

3.1.3.5 Division Steno (BRAC)

This position will be implemented to assist with office and recordkeeping tasks. One position is proposed in connection with initial Long Beach-Los Angeles LRT operations based on the level of service being operated and the staffing of this position for bus operating divisions.

3.1.4 URAMPS Model Inputs

Positions are modeled within the URAMPS package as being fixed, dependent on the numbers assigned to other selected positions, or variable depending on system characteristics. Tables 3-3 through 3-5 show the URAMPS model inputs for each Transportation Department position associated with the startup of LRT operations. These tables include department and position numbers, position affiliation and pay grade codes (see Tables 3-6 and 3-7), and model relationships used to estimate manpower requirements.

Requirements for the rail operations supervisory positions identified for LRT operations were verified using rail transit operator survey data. For the number of Transportation Operations Supervisors (Rail), data from four operators indicated that the ratio of supervisors/train operators varied from 0.07 to 0.25 with an unweighted average of 0.167. Based on the consultant team's analysis of planned operations for the Long Beach-Los Angeles LRT line, the supervisor/train operator ratio may be calculated as approximately 0.19-0.21. Due to the length of the line and hours of operation, it is reasonable that requirements for the Long Beach-Los Angeles LRT line would be higher than the average based on survey data. Importantly, it should also be noted that the survey data is limited and its interpretation to identify supervisory positions with similar responsibilities to those of Transportation Operations Supervisor (Rail)

TABLE 3-3

URAMPS MODEL INPUTS FOR
TRANSPORTATION DEPARTMENT
FIXED POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Fixed Number
Division Transportation Manager	220	01	09	17	1
Chief Central Control Supervisor	210	25	90	15	1
Division Steno	220	36	3	3	1

TABLE 3-4

URAMPS MODEL INPUTS FOR
TRANSPORTATION DEPARTMENT
DEPENDENT POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Based on Positions	Number Per Position
Transportation Operations Supervisor	220	35	90	12	Train Operators (Line)	0.20
					Train Operators (Yard)	

TABLE 3-5

URAMPS MODEL INPUTS FOR
TRANSPORTATION DEPARTMENT
VARIABLE POSITIONS

Position	Department No.	Position Number	Union Affiliation	Pay Grade	Shifts Per Week	Shifts Per Day	Days Worked	System Characteristic	Factor
Central Control Supervisor	210	20	90	14	5	1	230	Number of Lines	4.2
								Peak Trains	0.025
Yard Supervisor	220	25	90	12	5	1	230	Main Yards	4.2
Train Operator (Line)	220	30	1	5	5	1	205	Weekday Train Hours	0.15
								Saturday Train Hours	0.03
								Sunday Train Hours	0.03
Train Operator (Yard)	220	31	1	5	5	1	205	Peak Trains	0.20
								Main Yards	2.00

TABLE 3-6

UNION AFFILIATION CODES
FOR URAMPS MODEL

Code	Affiliation
1	United Transportation Union (UTU)
2	Amalgamated Transit Union (ATU)
3	Brotherhood of Railway Airline and Steamship Clerks (BRAC)
4	Teamsters Union (TU)
90	Management

TABLE 3-7

GRADE CODES FOR URAMPS MODEL

Pay Grade Code	Annual Wages (thousands)
1	$20.0
2	20.4
3	20.8
4	22.8
5	25.8
6	26.6
7	28.7
8	30.2
9	31.1
10	31.9
11	32.2
12	34.3
13	35.4
14	37.9
15	39.9
16	41.9
17	44.0

Source: Southern California Rapid Transit District.

personnel was based on judgments that may not be fully accurate in some instances.

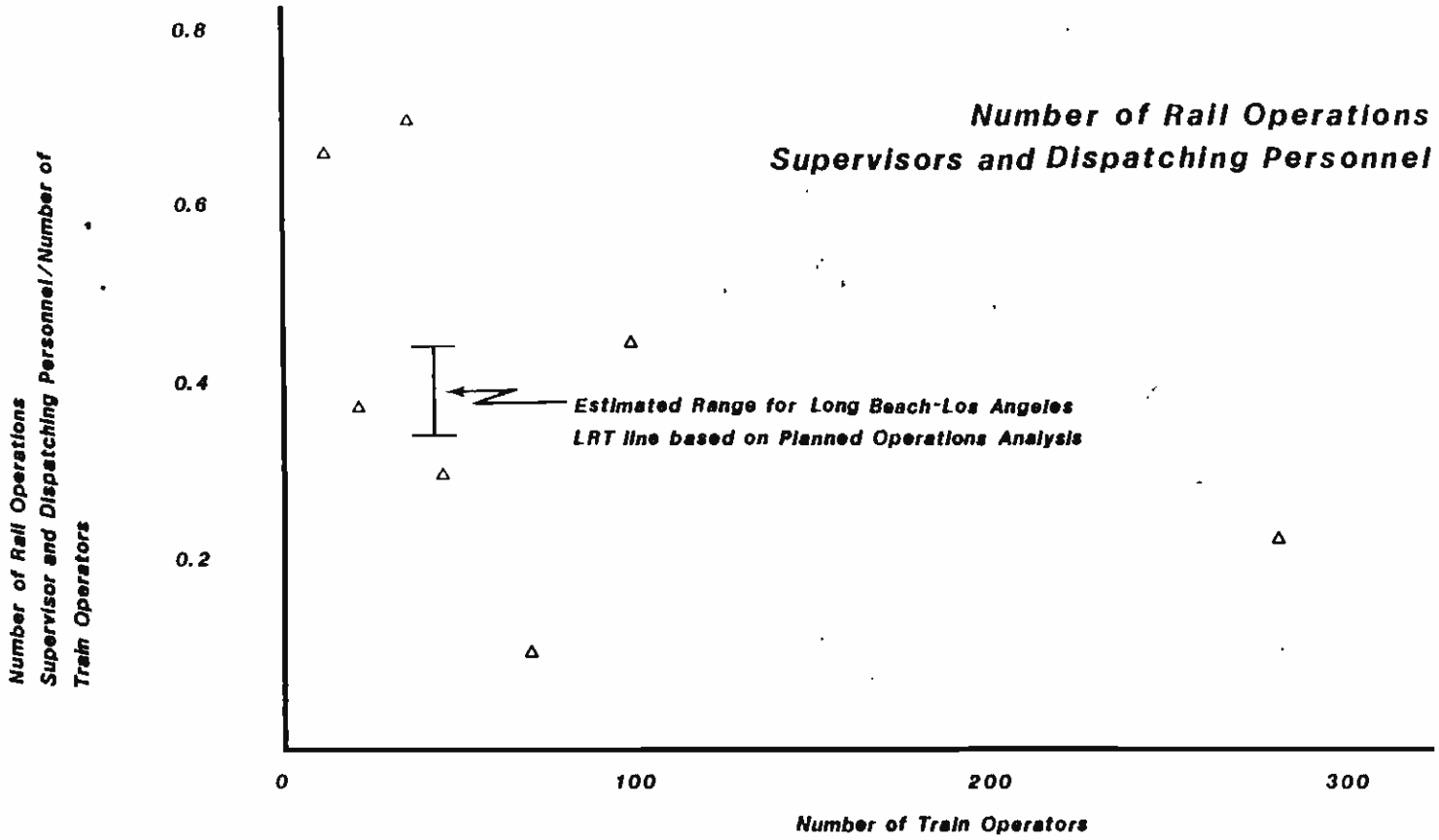
Comparative data from seven rail transit operators was available to verify estimated staffing requirements for the total of the Transportation Operations Supervisor (Rail), Central Control Supervisor, and Yard Supervisor positions. From the survey data, the ratio of the number of rail supervisory personnel (for line supervision, crew dispatching, central control, yard operations control, and instruction functions) to the number of train operators ranged between 0.12 and 0.70 with an unweighted average of 0.41 supervisor and dispatching personnel per train operator. Clearly, the particulars of each system's operating practices and characteristics appear to cause a wide variation in supervisory staffing requirements. Figure 3-4 shows the number of supervisors and dispatchers per train operator ratio plotted as a function of the number of train operators. While the survey data used for this figure is limited, the plot appears to illustrate that the ratio declines as the number of train operators increases (which is a logical relationship). From the consultant team's analysis of planned operations, the ratio of supervisor and dispatching personnel per train operator may be calculated as 0.38-0.45, which is close to the average for transit operators from the survey data.

3.2 EQUIPMENT MAINTENANCE

The startup of LRT operations will result in the formation of a new Maintenance Operating Division within the District's Equipment Maintenance Department. It is also anticipated that vehicle engineering support may be required, and that 1-2 positions may be necessary to provide this support (see Section 3.5 later in this chapter). For the startup of LRT operations, it is not recommended that any Superintendent positions be added to this Department. The RTD has identified the need to add an Assistant Director position for the Equipment Maintenance Department, and it is planned that this position will require background and familiarity with rail transit vehicle maintenance. If this position is not filled by an individual with rail transit experience, the possibility of adding a Maintenance Superintendent for rail operations might be considered by the District. For expanded light rail and Metro Rail operations, it will be necessary to provide an additional Superintendent position regardless of how the filling of the Assistant Maintenance Director position may be handled.

3.2.1 Staffing Requirements

A new operating division (designated 3319) headed by a Division Maintenance Manager will be created for vehicle maintenance functions (except for electronic systems repairs which will be the responsibility of the Facilities Maintenance Department) to support the Long Beach-Los Angeles LRT operations. At the main yard, vehicle maintenance will be carried out primarily on two shifts per weekday, as one from approximately 8:00 a.m. to 4:00 p.m. and the second from 8:00 p.m. to 4:00 a.m. It is planned that electro-mechanical repairs will be done primarily one one of the shifts, and electronic systems repair work will be carried out on the second vehicle maintenance shift. Vehicle service and inspection (S&I) activities, including minor corrective repairs and component changeouts, will be carried out on all work shifts for seven days per week in order to provide for the maximum availability of train equipment and to allow for 'on the line' troubleshooting at all hours. A summary of the new positions



Source: Rail Transit Operator Survey

Figure 3-4

and staffing requirements is presented in Table 3-8, and an organization chart for the added positions is shown as Figure 3-5.

3.2.1.1 Division Maintenance Manager

A Division Maintenance Manager will be responsible for the management of electrical and mechanical vehicle systems repairs for LRT operations. This position will be staffed for one shift per day, five days per week.

3.2.1.2 Equipment Maintenance Supervisor (Rail)

Two Equipment Maintenance Supervisors will be required to direct electro-mechanical systems repair, S&I, and vehicle cleaning activities for initial LRT operations. The supervisors will be assisted by lead workers for each function (as necessary) and for the supervision of S&I and car cleaning work done on other shifts. For the District's bus requirement maintenance, there is one Equipment Maintenance Supervisor for every 12 mechanics on the average. The planned level of supervision for rail vehicle maintenance is consistent with this average for bus maintenance.

3.2.1.3 Electro-Mechanic (ATU)

It is estimated that 14-18 Electro-Mechanics will be required for service and inspection (S&I) work and repairs to vehicle electrical and mechanical systems. This estimate provides for two S&I work assignments on all shifts per day for seven days per week, and an additional 6-10 work assignments for vehicle repairs on one shift, five days per week. Note that this staffing may include specialists such as a machinist and welder for heavy repair work, depending on how much is done at the main yard facility.

The range given for the staffing of this position reflects uncertainty regarding the location where certain heavy vehicle repairs will be done for all District LRT and Metro Rail lines. These repairs include the overhauling of major components such as motors, trucks, wheels, and compressors. Survey data from four rail transit operators (where sufficient detail was available to distinguish vehicle maintenance functions) indicated an unweighted average of approximately 0.5 rail vehicle maintainers per peak car (ranging from 0.4 to 0.7 maintainers per peak car), and an average of 18 rail vehicle maintainers per 100,000 annual car hours (ranging more widely from nine to 36 maintainers per 100,000 annual car miles). The estimated range is based on the lower end to average values of this comparative data which should be appropriate for the type of LRT vehicles being planned for. The staffing of this position should be reviewed and adjusted accordingly as actual experience with the maintenance characteristics of the LRT vehicles purchased for the Long Beach-Los Angeles line is obtained by the District.

TABLE 3-8

STAFFING SUMMARY FOR MAINTENANCE
OPERATING DIVISION (3319)

Position	Estimated Number Low	Estimated Number High
Division Maintenance Manager	1	1
Equipment Maintenance Supervisor (Rail)	2	2
Electro-Mechanic	14	18
Car Cleaner	8	9
Typist Clerk	1	1
Equipment Records Specialist	1	1

MAINTENANCE OPERATING DIVISION ORGANIZATION CHART

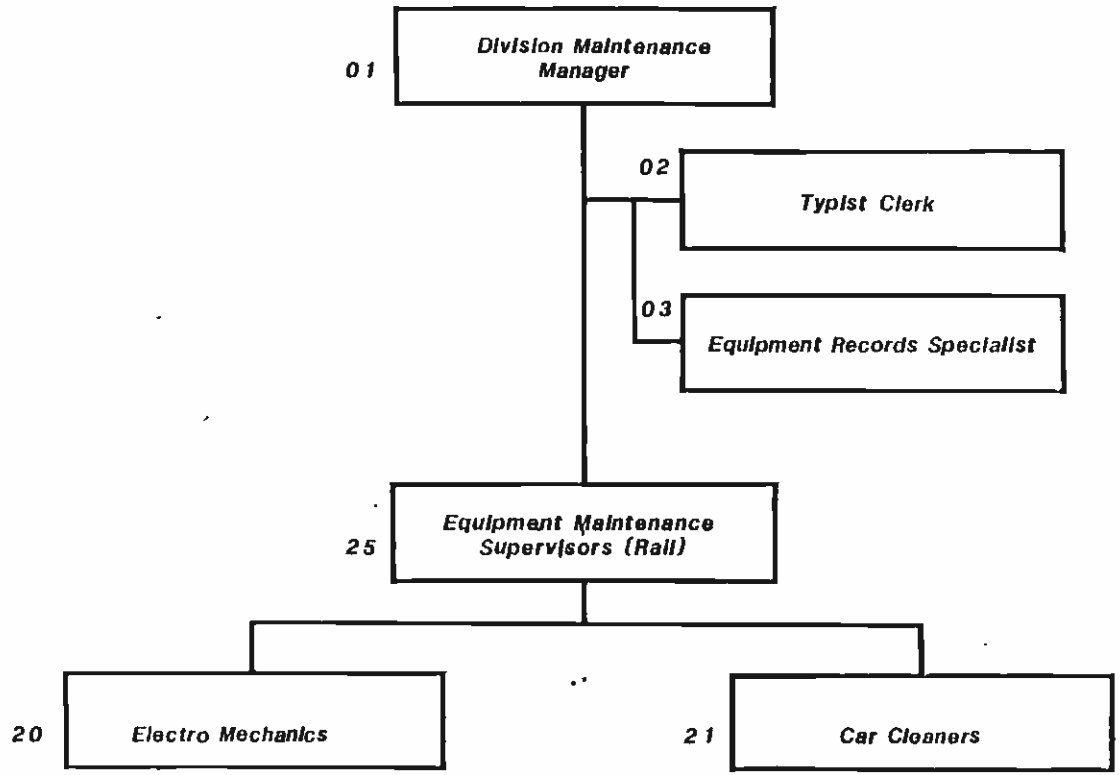


Figure 3-5

3.2.1.4 Car Cleaner (ATU)

Based on survey data for six rail transit operators, it is estimated that 8-9 Car Cleaners be adequate for LRT vehicle cleaning. Survey data indicated an unweighted average of 0.3 car cleaning personnel per peak car, with a range from 0.2 to 0.4 car cleaners per peak car.

Car cleaning might be considered by the District for contracting out instead of being done by District staff.

3.2.1.5 Equipment Records Specialist (BRAC)

To assist with vehicle maintenance recordkeeping, one Equipment Records Specialist will be required for the new LRT operating division based on staffing provided for this position at bus operating divisions.

3.2.1.6 Typist Clerk (BRAC)

One Typist Clerk position is recommended to support LRT vehicle maintenance operations based on staffing provided for this position at bus operating divisions.

3.2.2. URAMPS Model Inputs

Positions are modeled within the URAMPS package as being fixed, dependent on the numbers assigned to other selected positions, or variables depending on system characteristics. Tables 3-9 through 3-11 show the URAMPS model inputs for each Maintenance Department position associated with the startup of LRT operations.

3.3 FACILITIES MAINTENANCE

Maintenance of the vehicle electronic and communications systems, wayside and grade crossing signals, central train control systems, shops and other buildings, fare collection equipment, main line and yard tracts, and station areas will be provided by the District's Facilities Maintenance Department. While this will reinforce the existing staff capabilities of the Department, it will also result in LRT vehicle maintenance responsibilities being split between departments. Since much of the Facilities Maintenance Department work may involve the repair of interchangeable electronic components, the division of vehicle maintenance responsibilities should not adversely affect the overall vehicle maintenance program for the District.

Within the Facilities Maintenance Department, functions relating to the maintenance and cleaning of station areas, shops, other buildings, and the right-of-way should be assigned to the Department's Facility Maintenance (3334) group which is currently responsible for the District's property maintenance activities. Other functions related to the maintenance of the power distribution systems, tracks, fare collection equipment, and electronic and communications systems for the vehicles, signals, and central control would be supervised by a Manager, Rail Systems Maintenance assigned to the Electronics Maintenance Superintendent within the Facilities Maintenance Department. For expanded LRT and Metro Rail operations, it is recommended that the position of Superintendent, Rail Systems Maintenance be created to direct the maintenance

TABLE 3-9

URAMPS MODEL INPUTS FOR EQUIPMENT
MAINTENANCE DEPARTMENT FIXED POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Fixed Number
Division Maintenance Manager	310	01	90	17	1
Typist Clerk	310	02	3	1	1

TABLE 3-10

URAMPS MODEL INPUTS FOR
EQUIPMENT MAINTENANCE DEPARTMENT
DEPENDENT POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Based on Positions	Number Per Position
Equipment Maintenance Supervisor Rail	310	25	90	16	Electro-Mechanic (20) Car Cleaner (21)	0.08

TABLE 3-11

URAMPS MODEL INPUTS FOR
EQUIPMENT MAINTENANCE DEPARTMENT
VARIABLE POSITIONS

Position	Department No.	Position Number	Union Affiliation	Pay Grade	Shifts Per Week	Shifts Per Day	Days Worked	System Characteristic	Factor
Electro-Mechanics	310	20	2	9	5	1	230	Peak Cars	0.50
Car Cleaners	31	21	2	7	5	1	230	Peak Cars	0.25
Equipment Records Specialist	310	03	3	4	5	1	230	Peak Cars	0.02

of these functions. This position would report directly to the Director of the Facilities Maintenance Department.

3.3.1 Rail Systems Maintenance

This new organizational unit will be responsible for the maintenance of main line and yard tracks, wayside and grade crossing signals, central train control systems, vehicle electronic and communications systems, fare collection equipment, and power distribution systems for the Long Beach-Los Angeles LRT line. As already noted, its responsibilities will be assigned to the Electronics Maintenance Superintendent within the Facilities Maintenance Department. The unit will be based at the main yard facilities for the line. A summary of the new positions and staffing requirements is presented in Table 3-12, and an organization chart for the added positions is shown as Figure 3-6.

It should be pointed out that position titles have been given using the designation 'Systems Maintainer' followed by the area of specialization. Other titles could be used for these positions, such as Rail Mechanic for Systems Maintainer/Track or Electronic and Communications Technician for Systems Maintainer/Signals.

3.3.1.1 Manager, Rail Systems Maintenance

This position will be required for the day-to-day management of rail systems maintenance work activities based at the main yard facilities for the Long Beach-Los Angeles LRT line.

3.3.1.2 Systems Maintenance Supervisor

Based on the breakdown of systems maintenance functions, it is estimated that four Systems Maintenance Supervisors are required. This estimate assumes that one supervisor will be assigned for two shifts, five days per week to supervise all power, signal, and fare collection systems maintenance work. Vehicle systems repairs will be carried out on the second of the two vehicle maintenance work shifts under the supervision of a third Systems Maintenance Supervisor. A fourth Systems Maintenance Supervisor will be responsible for track inspection and repairs. Lead will would be assigned for field work crews and for work done on other shifts as necessary.

The current ratio of supervisors to electronic systems repair personnel in the Facilities Maintenance Department is approximately one to 6.5. Applying this ratio would result in an estimated requirement for five Systems Maintenance Supervisors, one more than indicated by the analysis outlined in the preceding paragraph.

3.3.1.3 Systems Maintainer/Power (ATU)

Two Systems Maintainer/Power work assignments will be required for two shifts per day, seven days per week for power distribution inspection and repair work. These personnel will also be responsible for inspecting fare collection equipment and making minor field repairs to this equipment. To implement these work assignments, six positions will need to be created by the District.

TABLE 3-12

STAFFING SUMMARY FOR RAIL
SYSTEMS MAINTENANCE DEPARTMENT

Position	Estimated Number Low	Estimated Number High
Manager, Rail Systems Maintenance	1	1
Typist Clerk	1	1
Equipment Records Specialist	1	1
Systems Maintenance Supervisor	4	5
Systems Maintainer/Power	6	6
Systems Maintainer/Track	5	6
Laborers	2	4
Systems Maintainer/Signals	9	11
Systems Maintainer/Central Control	3	3
Systems Maintainer/Vehicle	7	9

RAIL SYSTEMS MAINTENANCE ORGANIZATION CHART

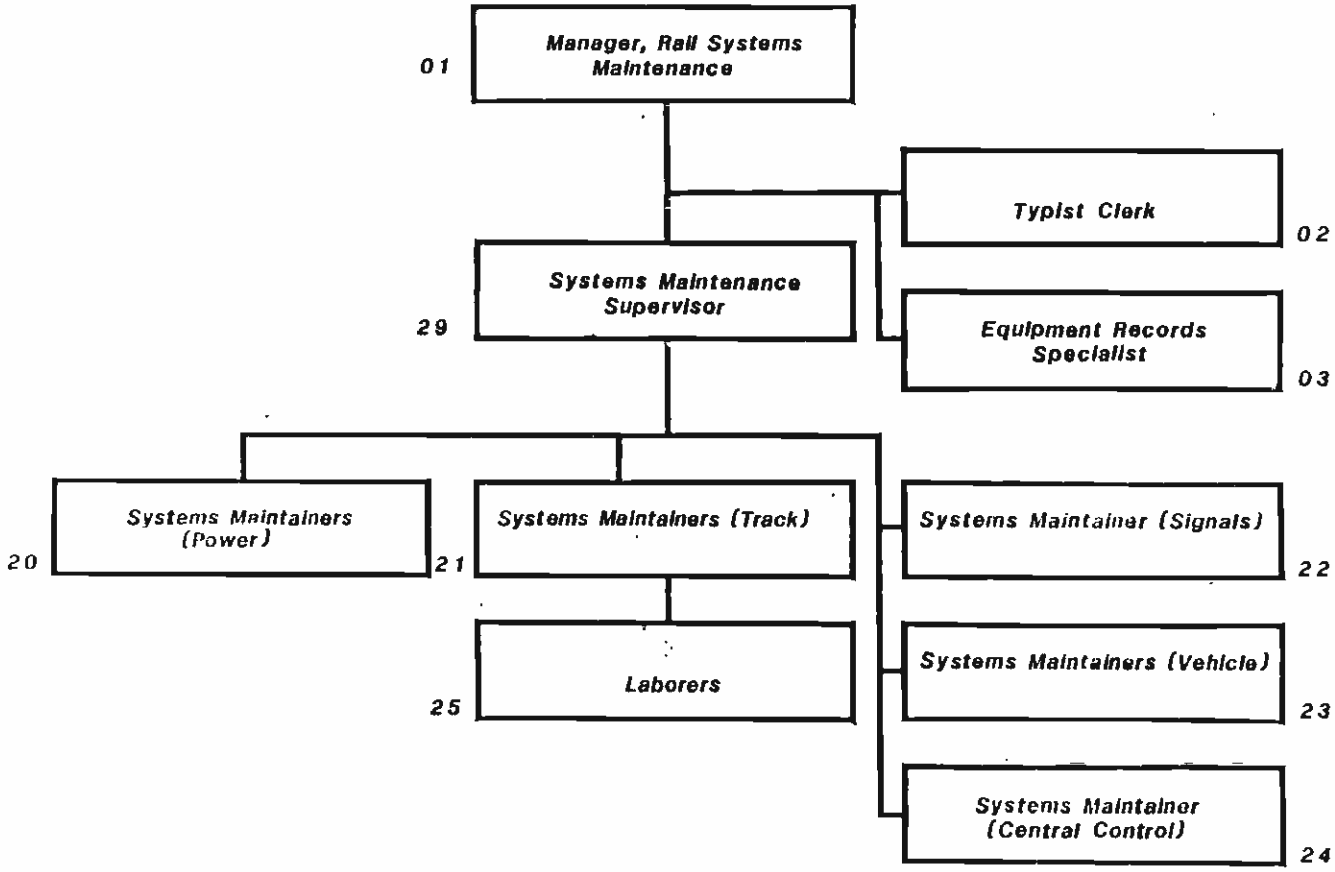


Figure 3-6

Working with power distribution systems requires specialized training and capabilities. Furthermore, it is recognized that power systems are essential for train operations. Consequently, the work assignment schedule has been developed for the coverage of two shifts on each day with the night shift being covered by 'on call' personnel. Additionally, two person work crews have been assumed in view of the safety hazards involved in working with power distribution systems. To some extent, this level of staffing represents an 'insurance policy' against possible power system failures and hazards that will be shared by other LRT and Metro Rail lines in the future.

For the City of Edmonton, power distribution system maintenance is provided by the local power utility. This approach might be possible for the RTD, and would eliminate the need for Systems Maintainer/Power personnel.

3.3.1.4 Systems Maintainer/Signals (ATU)

It is estimated that 9-11 System Maintainer/Signals personnel will be required for the inspection and repair of wayside and grade crossing signals. Since this work involves being on the main line, these personnel will also be responsible for inspecting and making minor repairs to fare collection equipment. Some rail transit operators (such as San Diego's MTDB) combine the responsibilities of power and signal maintenance into a single position since both require working on the line. Due to the special requirements of working safely with power, this approach has not been taken for the Long Beach-Los Angeles LRT line.

Survey data obtained as part of this study from four rail transit operators was analyzed to determine signal and power distribution systems maintenance staffing levels. From this survey data, the number of power and signal systems maintenance personnel per two-way track mile ranged from 0.8 to 2.3. The unweighted average was calculated as 1.6 maintainers per track mile. For the Long Beach-Los Angeles LRT line, a total of 15-17 power and signal systems maintenance personnel has been estimated. This is equivalent to 0.7-0.8 maintainers per track mile which corresponds to the lower end of the survey data range.

3.3.1.5 Systems Maintainer/Track (ATU)

It is estimated that 5-6 Systems Maintainer/Track personnel working one shift per day, five days per week are needed for track inspection and repair work. These personnel will be assisted by 2-4 Laborers (see Section 3.3.1.6), and may include 1-2 track repair machinery operators.

Survey results for four rail transit operators provides comparative data for estimating track maintenance staffing requirements. For these operators, the number of track maintenance personnel per two-way track mile varies widely from 0.3 to 1.2. For the Long Beach-Los Angeles LRT line, estimated requirements are based on the lower end of this range for track maintenance staffing levels. In the preceding section, it was similarly shown that staffing estimates for signal and power distribution systems maintenance have been established corresponding with the lower end of a range calculated from comparative data.

3.3.1.6 Laborer (ATU)

As already noted, 2-4 Laborer positions are recommended to assist with heavy repair work associated with track, switches, and ballast maintenance.

3.3.1.7 Systems Maintainer/Central Control (ATU)

Due to the importance of central control computer and communications systems, coverage by a Systems Maintainer for two shifts per day, seven days per week is required at the central control facility.

3.3.1.8 Systems Maintainer/Vehicle (ATU)

On the second of the two vehicle maintenance work shifts each weekday, repairs for vehicle electronic and communications systems will be carried out requiring an estimated 7-9 Systems Maintainer/Vehicle personnel.

In Section 3.2 of this chapter, it was determined that 14-18 Electro-Mechanics should be adequate for vehicle maintenance, and that 8-9 Car Cleaners are required for vehicle cleaning. Adding the 7-9 Systems Maintainer Vehicle personnel assigned to the Facilities Maintenance Department results in a total of 29-36 positions for vehicle servicing and repairs. This is equivalent to 1.0-1.3 maintenance persons per peak car, and to approximately 24-30 vehicle maintenance personnel per 100,000 annual car hours.

Survey data for seven rail transit operators was analyzed to investigate vehicle maintenance staffing. This comparative data included rail operators having diverse system and operating characteristics (such as heavy rail transit operators with sophisticated train control systems that incorporate vehicle electronics not planned for the Long Beach-Los Angeles LRT line). From this survey data, it was determined that the number of vehicle maintenance personnel ranged from an estimated 0.7 to 1.7 per peak car (with an unweighted average of 1.3 maintainers per peak car), and from approximately 15 to 56 per 100,000 annual car hours (with an unweighted average of 39 vehicle maintainers per 100,000 car hours). Thus, in comparison to other rail transit operators for which comparative data was obtained, staffing requirements for the Long Beach-Los Angeles LRT line are consistent with the lower end to average range of staffing levels for the other operators. For the planned system and operating characteristics, this range represents an appropriate one for initial LRT operations.

3.3.1.9 Typist Clerk (BRAC)

One Typist Clerk position will provide for clerical and office support tasks in connection with rail systems maintenance functions.

3.3.1.10 Equipment Records Specialist (BRAC)

One Equipment Records Specialist will maintain records concerning the vehicle and system repairs made by this new organizational unit established for the Long Beach-Los Angeles LRT line.

3.3.2 Facility Maintenance (3334)

Maintenance of the station areas, shops and other buildings, and the main line right-of-way will be incorporated into the on-going responsibilities of the Facility Maintenance Department under the direction of the existing Building and Grounds Superintendent. Note that this Department is part of one with a very similar designation (Facilities Maintenance), and that the Building and Grounds Superintendent position fits into the District's organizational structure as a 'manager' position. A summary of the new positions and staffing requirements is presented in Table 3-13, and an organization chart for the added positions is shown as Figure 3-7.

All or portions of the property maintenance work done by this Department for the Long Beach-Los Angeles LRT line could be contracted to an outside firm as an alternative to expansion of the District's staff levels.

3.3.2.1 Building and Grounds Maintenance Supervisor

Currently, the District has four Building and Grounds Maintenance Supervisors responsible for 65 property maintenance employees. The Supervisors are assisted by lead workers assigned to work crews. This same ratio for supervision should be retained in connection with the addition of property maintenance personnel for LRT operations, which means that one Building and Grounds Maintenance Supervisor will be required.

3.3.2.2 Property Maintainer (ATU)

For planned LRT operations, it is estimated that 12-15 Property Maintainers will be required for maintaining station areas, yards, buildings, and other LRT facilities. This number includes lead workers and when actually hired, may consist of positions other than the Property Maintainer position depending on specific cleaning and repair requirements. For example, one or more personnel could be added as Laborers, Janitors, or Sweeper Operators.

Survey data for rail transit operators is completely inconclusive regarding property maintenance staffing requirements. The estimated numbers are based on the analysis of planned LRT operations by the consultant team.

3.3.3 URAMPS Model Inputs

Positions are modeled within the URAMPS package as being fixed, dependent on the numbers assigned to other selected positions, or variables depending on system characteristics. Tables 3-14 through 3-16 show the URAMPS model inputs for each Facilities Maintenance Department position associated with the startup of LRT operations.

TABLE 3-13

STAFFING SUMMARY FOR FACILITY
MAINTENANCE DEPARTMENT (3334)

Position	Estimated Number Low	Estimated Number High
Buildings and Ground Superintendent	(a)	(a)
Buildings and Grounds Maintenance Supervisor	1	1
Property Maintainer	12	15

Note: (a) Existing SCRTD position.

FACILITY MAINTENANCE DEPARTMENT ORGANIZATION CHART

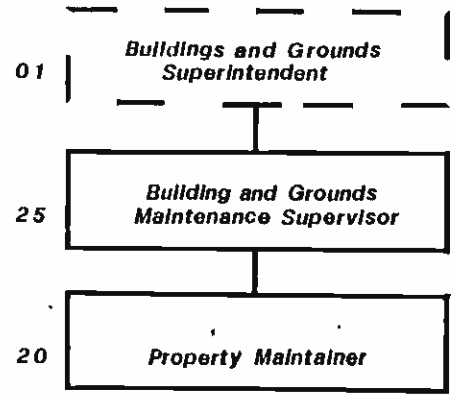


Figure 3-7

TABLE 3-14

URAMPS MODEL INPUTS FOR
FACILITIES MAINTENANCE DEPARTMENT
FIXED POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Fixed Number
Manager, Rail Systems Maintenance	320	01	90	17	1
Typist Clerk	320	02	3	1	1

TABLE 3-15

URAMPS MODEL INPUTS FOR
FACILITIES MAINTENANCE DEPARTMENT
DEPENDENT POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Based on Positions	Number Per Position
Systems Maintenance Supervisor	320	20	90	16	Systems Maintainer (20, 21, 22, 23, 24) Laborer (25)	0.12
Building and Grounds Supervisor	330	25	90	17	Property Maintainer (20)	0.06

TABLE 3-16

URAMPS MODEL INPUTS FOR
FACILITIES MAINTENANCE DEPARTMENT
VARIABLE POSITIONS

Position	Department No.	Position Number	Union Affiliation	Pay Grade	Shifts Per Week	Shifts Per Day	Days Worked	System Characteristic	Factor
Systems Maintainer Power	320	20	2	11	7	2	230	Number of Lines	2.0
Systems Maintainer Track	320	21	2	10	5	1	230	Track Miles	0.20
Systems Maintainer/ Signals	320	22	2	11	5	1	230	Track Miles	0.40
Systems Maintainer Vehicle	320	23	2	11	5	1	230	Peak Cars	0.25
Systems Maintainer/ Central Control	320	24	2	11	7	2	230	Number of Lines	1.0
Laborer	320	25	2	7	5	1	230	Track Miles	0.10
Property Maintainer	330	20	2	10	5	1	230	Track Miles	0.20
								Number of Stations	0.35
Equipment Records Specialist	320	03	3	4	5	1	230	Peak Cars	0.01
								Track Miles	0.02

3.4 TRANSIT POLICE

The Transit Police Department will assume responsibility for line and train security, fare inspection, and CCTV system monitoring functions in connection with the Long Beach-Los Angeles LRT line operations. With regard to line and train security, police officer requirements have been estimated based on the assumption that stations will be unattended (except for assigned Transportation Department supervisory personnel) and fare payment will be on an 'honor' basis enforced by roving on-train inspectors. Staffing requirements have been estimated based on discussions with the District's Police Chief, and on the results of available studies regarding fare payment inspection requirements.

To provide more direct supervision of police activities in connection with the operation of the Long Beach-Los Angeles LRT line, it is recommended that police personnel responsible for LRT line and train security be assigned at the central control facility planned for the line.

3.4.1 Staffing Requirements

For line and train security, it is recognized that the line will operate through some neighborhoods having crime rates among the highest in Los Angeles County. However, the development of a quantifiable relationship that reflects this operating environment has not been possible as part of this study. A summary of the new positions and staffing requirements is presented in Table 3-17, and an organization chart for the added positions is shown in Figure 3-8.

3.4.1.1 Transit Police Lieutenant

For initial LRT operations, it is recommended that a Transit Police Lieutenant be added to direct rail transit police functions. With the opening of the Metro Rail and other LRT systems, an Assistant Transit Police Chief position should be introduced for rail transit police activities (this position is organizationally equivalent to superintendent positions used in other District departments).

3.4.1.2 Transit Police Officer (TU)

It is estimated that approximately 35 Transit Police Officers will be required for initial LRT operations. This estimate is based on providing 16 officers for on train/in station coverage on two shifts, five days per week, and 19 officers assigned to mobile patrols on all shifts, seven days per week. In Table 3-15, a range of from 32 to 38 Transit Police Officers is shown, accounting for a reasonable amount of variation in the estimated number.

3.4.1.3 Security Guard (TU)

It is estimated that 11-13 Security Guard personnel will be required. This number of positions provides for 24-hour coverage at the main yard and at the central control facility, and for 2-4 personnel to assist in the collection of revenues from fare machines. It has been assumed that no security personnel will be required for the satellite yard.

TABLE 3-17

STAFFING SUMMARY FOR
TRANSIT POLICE DEPARTMENT (3800)

Position	Estimated Number Low	Estimated Number High
Transit Police Lieutenant	1	1
Transit Police Sergeant	9	9
Transit Police Officer	32	38
Security Guard	11	13
System Monitors	20	24
Typist Clerk	2	2

TRANSIT POLICE DEPARTMENT ORGANIZATION CHART

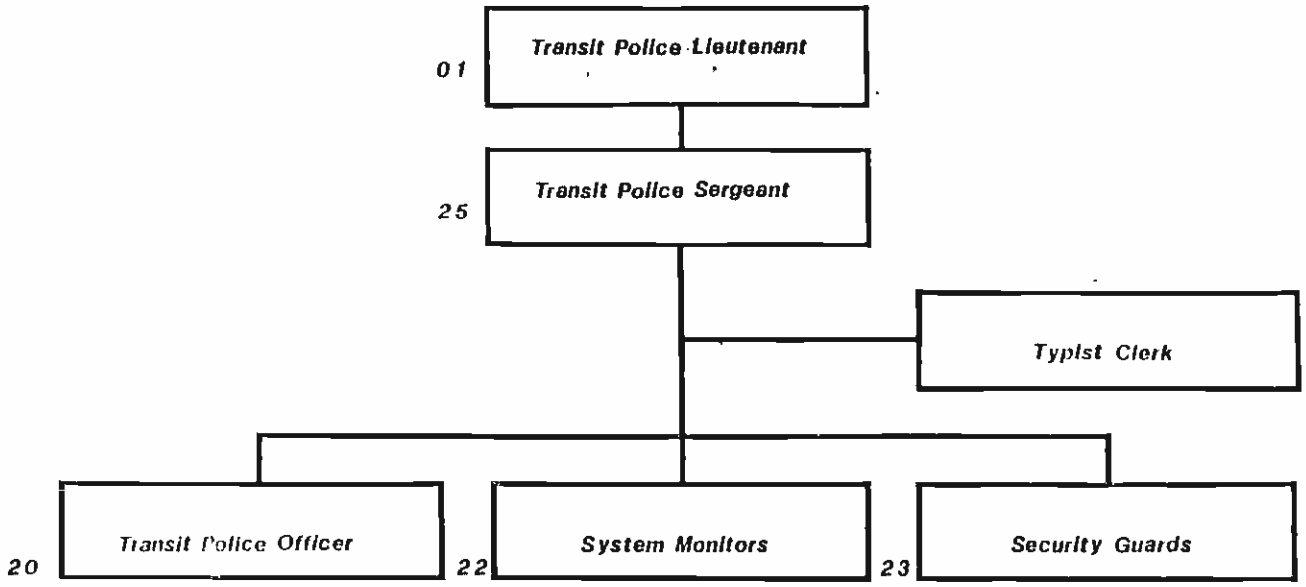


Figure 3-8

3.4.1.4 System Monitor (TU)

Other studies have indicated the need for eight CCTV Monitor positions and 14 Fare Inspector positions. It is proposed that these positions be considered as a single job classification with work assignments varied between inspection and monitoring duties. The combined position has been designated as System Monitor. In Table 3-15, staffing requirements for this position are shown as a range from 20 to 24 personnel.

3.4.1.5 Transit Police Sergeant

Supervision of the rail transit functions will be provided by nine Transit Police Sergeants, who will be responsible to the Transit Police Lieutenant designated for LRT operations. This level of supervision is consistent with current levels employed in the Department for police officers, investigators, and security guards.

3.4.1.6 Typist Clerk

It is estimated that two Typist Clerk positions (this position could be implemented under a different designation) will be necessary to assist with clerical tasks, particularly for recordkeeping in connection with fare inspection activities.

3.4.2 URAMPS Model Inputs

Positions are modeled within the URAMPS package as being fixed, dependent on the numbers assigned to other selected positions, or variables depending on system characteristics. Tables 3-18 through 3-20 show the URAMPS model inputs for each Transit Police Department position associated with the startup of LRT operations.

3.5 SUPPORT SERVICES

Additional staffing will be required to support the startup of Long Beach-Los Angeles LRT operations for stores management, vehicle and systems engineering, and perhaps the collection of monies at LRT stations. It is believed that all other support activities can be effectively handled by existing RTD staff resources. More specifically with regard to the additional support services staffing, four departments will be affected as discussed in the following paragraphs.

TABLE 3-18

URAMPS MODEL INPUTS FOR
TRANSIT POLICE DEPARTMENT
FIXED POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Fixed Number
Transit Police Lieutenant	230	01	90	16	1
Typist Clerk	230	26	3	1	2

TABLE 3-19

URAMPS MODEL INPUTS FOR
TRANSIT POLICE DEPARTMENT
DEPENDENT POSITIONS

Position	Department Number	Position Number	Union Affiliation	Pay Grade	Based on Positions	Number Per Position
Transit Police Sergeant	230	25	4	13	Transit Police (20) System Monitor (21) Security Guard (22)	0.125

TABLE 3-20

URAMPS MODEL INPUTS FOR
TRANSIT POLICE DEPARTMENT
VARIABLE POSITIONS

Position	Department No.	Position Number	Union Affiliation	Pay Grade	Shifts Per Week	Shifts Per Day	Days Worked	System Characteristic	Factor
Transit Police Officer	220	20	4	6	5	1	230	Peak Trains	1.0
								No. of Stations	0.75
Security Guard	230	22	4	2	5	1	230	Main Yards Central	4.2
								Control Facility	4.2
								Number of Stations	0.10
System Monitor	230	21	4	2	5	1	230	Number of Stations	0.32
								Daily Ridership (Thous.)	0.45
Systems Maintainer Track	320	21	2	10	5	1	230	Track Miles	0.20
Systems Maintainer/ Signals	320	22	2	11	5	1	230	Track Miles	0.40
Systems Maintainer Vehicle	320	23	2	11	5	1	230	Peak Cars	0.25
Systems Maintainer/ Central Control	320	24	2	11	7	2	230	Number of Lines	1.0

3.5.1 Office of Contracts, Procurement, and Material (9400)

From preliminary plans for the main yard, it appears that two storerooms may be required (in addition to special tool and bulk material storage areas). Due to the layout of the main yard, the vehicle maintenance shops may need to be separated from the rail systems shops (where electronic, communications, power distribution, and fare collection system components are repaired). Assuming that each storeroom will be manned only for two shifts on five days per week (with access to the storerooms controlled by supervisory personnel at other times), one Storekeeper and four Stock Clerks will be needed for initial LRT operations.

3.5.2. Equipment Engineering (3400)

This Department is part of the Equipment Maintenance Department, and will assume added responsibilities for vehicle engineering support and vehicle maintenance quality assurance. For initial Long Beach-Los Angeles LRT operations, it is proposed that one Engineer supervised in electro-mechanical systems and one Engineering Technician be hired. This technical assistance could be provided by an outside contractor if desired by the District.

3.5.3 Facilities Maintenance (3500)

The staffing requirements of this Department for rail systems and property maintenance were discussed in Section 3.3 of this chapter. This Department will also provide engineering support for vehicle and wayside electrical and electronic systems, as well as quality assurance monitoring of modifications and repairs being made to rail systems equipment and components in the prescribed manner. For the initial LRT operations, it is estimated that two engineers (one with an electronic background and the other experienced in electrical/power engineering) and two engineering technicians will be required to carry out these support functions. These personnel should be assigned as responsible to the Director of Facilities Maintenance outside of this rail systems and property maintenance lines of reporting. As for the recommended vehicle engineering and vehicle maintenance quality assurance support, this technical assistance could be provided by an outside contractor for the District.

3.5.4 Accounting and Fiscal (7100)

It is estimated that 2-4 revenue servicers to collect fare revenues from the fare ticketing machines at each LRT station will be required. This function could be contracted for by the District.

4. TIMETABLE FOR HIRING AND TRAINING

As noted in the introductory chapter, the Long-Beach Los Angeles LRT line is planned for the start of revenue service in October, 1989. This schedule is based on the Commission's meeting its design and construction schedule milestones for the development of the line. Figure 4-1 summarizes selected system development milestones.

In this chapter, staffing requirements for the operations and maintenance functions of the line are related to the system development schedule. Where possible, hiring actions are related to system development milestones. Factors affecting these hiring actions such as training program requirements and the possible sources of the personnel (which may serve to lengthen the hiring time-frame where specialized sources are necessary) are discussed.

4.1 OPERATIONS PERSONNEL HIRING

Table 4-1 summarizes the recommended timing for the hiring of operations personnel for the District's Transportation Department in connection with the shortup of the Long Beach-Los Angeles LRT line. The hiring program for operations personnel might be roughly summarized as follows:

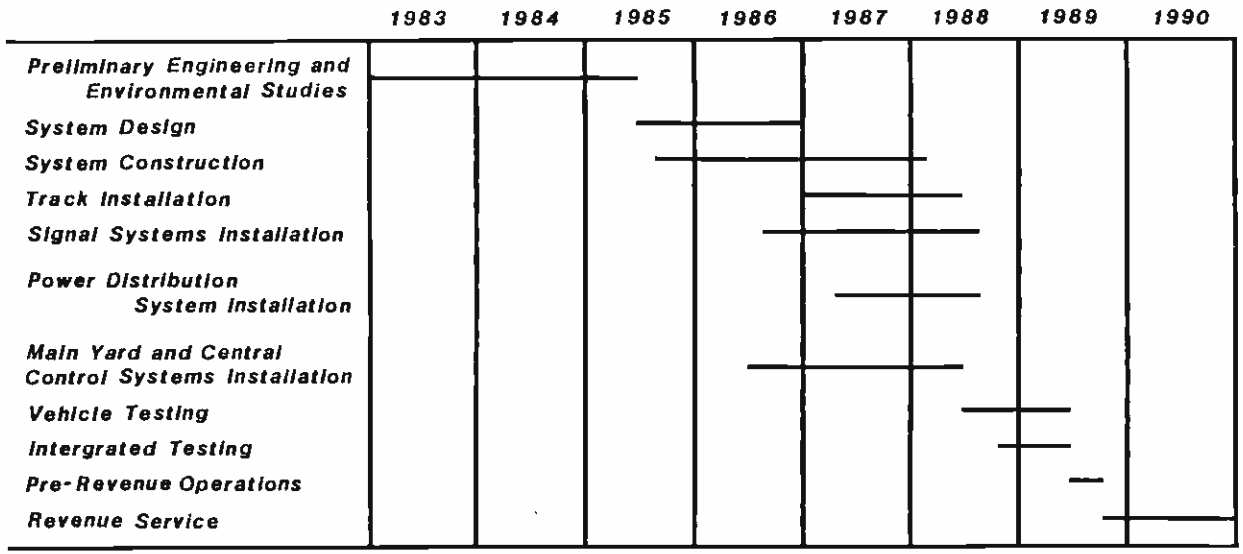
- o A superintendent to lead RTD planning and coordination activities hired prior to the startup of final system design activities.
- o A small group of supervisory employees with rail transit experience hired prior to the initial vehicle delivery to form the nucleus of an expanding training program in train operations.
- o Additional supervisory employees hired to conduct operational testing of the vehicles and systems.
- o Operating and support employees hired for pre-revenue and revenue service operation.

This approach to the hiring of operations personnel has been successfully employed by other transit operators starting up rail service. For the RTD, it represents a sound approach that will provide for the effective blending of existing staff capabilities with those of experienced rail transit supervisory personnel.

4.1.1 Operations Personnel Training Requirements

The training of supervisors, dispatching, and operating employees will be a significant task. It will be necessary to develop a well-trained operating staff which can be certified for revenue service by successfully executing operational tests involving the performance of the various duties.

Prior to the start of the initial vehicles testing, a small group of supervisory employees will be hired to establish operating rules and procedures, develop training programs, and assist in the performance of early vehicle and systems testing. Their basic training will have been derived from manufacturers' training programs, experience with other transit operators, and operation of the



SOURCE: Los Angeles County Transportation Commission

LONG BEACH-LOS ANGELES RAIL TRANSIT PROJECT SCHEDULE

FIGURE 4-1

TABLE 4-1

HIRING PLAN FOR TRANSPORTATION
DEPARTMENT PERSONNEL

Position	Number of Positions Low	High	Source	When Hired	Date Based on Current Schedule
Rail Transportation Superintendent	0	1	Transit Industry Search	At commencement of active system design work.	April, 1985
Division Transportation Manager	1	1	Transit Industry Search	At least two years prior to the startup of revenue service at the discretion of the Rail Transportation Superintendent.	September, 1987
Transportation Operations Supervisor (Rail)	9	10	SCRTD	Two positions filled at 3 months prior to the delivery of the first vehicle. Other positions filled at least three months prior to the startup of the integrated testing program.	2 - March, 1988 Others prior to September, 1988
Chief Central Control Supervisor	1	1	Transit Industry Search	At least two years prior to the startup of revenue service at the discretion of the Rail Transportation Superintendent.	September, 1987
Central Control Supervisor	4	7	SCRTD/ possible transit & railroad industry	Two at approximately 3 months prior to the delivery of the first vehicle. Other positions filled at least three months prior to the startup of the integrated testing program.	2 - March, 1988 Others prior to September, 1988
Yard Supervisor	4	5	SCRTD/ possible transit & railroad industry	One at approximately 3 months prior to the delivery of the first vehicle. Other positions filled at least three months prior to the startup of the integrated testing program.	1 - March, 1988 Others prior to September, 1988
Train Operator	40	50	SCRTD	Approximately three months prior to the startup of revenue service as required for training and pre-revenue service operations.	July - September, 1989

train during early periods of system verification. This small group will form the nucleus of an expanding training program in all aspects of train operations. Its members will train other supervisors and personnel who will, in turn, train and certify personnel who will ultimately operate the trains in revenue service.

For the thorough training of the additional supervisory staff, it is estimated that a period of approximately three months will be required. For most supervisory employees, this training will be reinforced by 'on the job' responsibilities in connection with the carrying out of the integrated testing program. The training for supervisory employees will be intensive, covering all phases of train and station operation, including troubleshooting and emergency situations where the evacuation of trains and stations may be necessary. They will also be trained in methods of instructing other operating and support employees.

The training of operators will require one week of classroom instruction followed by an additional three to four weeks of line and yard operations instruction in the field. While complete course details remain to be developed prior to the start of training activities, the classroom training would be designed to emphasize the following subjects.

- o System orientation
- o Safety
- o Track and wayside description
- o Station operation detail
- o Vehicle familiarization
- o Communications
- o Emergency procedures

The field training in train operations would provide instruction in both line and yard service. Specific training items to be covered would include the following.

- o Safety
- o Simulation of abnormal conditions
- o Normal yard and line operation
- o Emergency procedures
- o Troubleshooting
- o Communications

Throughout the train operator instruction program, considerable emphasis on safety and responding to emergencies will be required. The operation of rail trains involves an operating environment of underground and overhead facilities where the track, switches, and other potentially hazardous equipment will be relatively unfamiliar to most RTD employees. Proper use of the facilities, including prompt and effective action in the handling of emergencies should be emphasized in all training and operating activities.

4.1.2 Transit Police Training Requirements

At the District, transit police functions are carried out under the direction of the Assistant General Manager for Operations. The training of transit police personnel would encompass both regular police training and specialized instruction in rail transit system operations. For transit police officers, at least 16 weeks of academy instruction is required followed by a period of on-the-job training covering all aspects of transit police work. The Transit Police Department has contacted the Bay Area Rapid Transit District (BARTD) in anticipation of obtaining BARTD assistance to establish a rail transit operations training program for RTD transit police officers.

4.2 MAINTENANCE PERSONNEL HIRING

Tables 4-2 and 4-3 summarize the recommended timing for the hiring of vehicle and systems maintenance personnel for the Long Beach-Los Angeles LRT line. In order to allow ample time for proper orientation and training, it is recommended that the buildup of maintenance personnel be scheduled in accordance with the following approach.

- A systems maintenance manager hired roughly at the time corresponding with the start of systems installation work.
- A small group of systems maintenance supervisory employees, experienced in rail transit operations, hired approximately one year prior to the completion of power, track, signals and central control systems. These personnel would be assigned to 'monitor' systems installation work in order to gain maximum familiarity with the systems.
- A small group of supervisory employees with rail vehicle maintenance experience hired at least six months prior to the initial vehicle delivery to assist in establishing vehicle maintenance procedures and to serve as the District's in-plant inspection for the assembly of the vehicles.
- Vehicle and systems maintenance personnel hired as needed to support initial vehicle testing and integrated testing activities.

The hiring of the equipment maintenance supervisory group (and systems maintenance supervisory personnel responsible for vehicle electronic and communications systems) is tied to the acquisition and delivery of vehicles. Familiarization with the vehicle may be initiated prior to delivery of the manufacturer's site or test track facility. It is proposed that these supervisory personnel be added at least six months prior to the delivery of the first vehicle, depending on the length of time necessary to hire personnel and the time schedule required for the manufacturer of the vehicle. In addition to inspecting the vehicle's manufacturer in finalizing shop and repair procedure and in planning for the delivery of vehicles. Also, during this period prior to vehicle delivery, a time schedule for the hiring of additional vehicle maintenance personnel may be completed taking into account the manufacturer's training program and vehicle maintenance requirements at the main yard until all vehicle testing is completed.

TABLE 4-2

HIRING PLAN FOR EQUIPMENT MAINTENANCE DEPARTMENT PERSONNEL

Position	Number of Positions Low	High	Source	When Hired	Date Based on Current Schedule
Division Maintenance Manager	1	1	Transit Industry Search	At least two years prior to the startup of revenue service.	September, 1987
Equipment Maintenance Supervisor (Rail)	2	2	Transit Industry Search	Six months prior to the delivery of the first vehicle.	January, 1988
Electro-Mechanics	14	18	SCRTD/ local area search	Initial personnel with delivery of the first vehicle. Other positions filled as vehicles delivered.	5 - July, 1988. Others prior to June, 1989.
Car Cleaners	8	9	SCRTD/ local area search	Initial personnel with delivery of first vehicle. Other positions filled as necessary.	2 - July, 1988. Others prior to September, 1989.

TABLE 4-3

HIRING PLAN FOR FACILITIES MAINTENANCE
DEPARTMENT PERSONNEL

Position	Number of Positions Low	High	Source	When Hired	Date Based on Current Schedule
Manager Rail Systems Maintenance	1	1	Transit Industry Search	At least three years prior to the startup of revenue service corresponding with the start of systems installation work.	September, 1986
Systems Maintenance Supervisor	4		Transit Industry Search	At least one year prior to the completion of power, track, signal, and central control systems.	July, 1987
Systems Maintainer/ Power	6	6	Local Area Search	Initial personnel with delivery of the first vehicle. Other positions prior to the completion of the integrated testing program.	2 - July, 1988 Others prior to June, 1989
Systems Maintainer/ Track	5	6	SCRTD/ Local Area Search	Initial personnel with delivery of the first vehicle. Other positions prior to the completion of the integrated testing program.	2 - July, 1988 Others prior to June, 1989
Systems Maintainer/ Signals	9	11	SCRTD/ Local Area Search	Initial personnel with delivery of the first vehicle. Other positions prior to the completion of the integrated testing program.	3 - July, 1988 Others prior to June, 1989.
Systems Maintainer/ Central Control	3	3	SCRTD/ Local Area Search	Initial personnel with delivery of the first vehicle. Other positions prior to the completion of the integrated testing program.	2 - July, 1988 Others prior to June, 1988
Systems Maintainer/ Vehicle	7	9	SCRTD/ Local Area Search	Initial personnel with delivery of the first vehicle. Other positions prior to the completion of the integrated testing program.	3 - July, 1988 Others prior to June, 1989

--continued

TABLE 4-3 (CONTINUED)

HIRING PLAN FOR FACILITIES MAINTENANCE
DEPARTMENT PERSONNEL

Position	Number of Positions Low	High	Source	When Hired	Date Based on Current Schedule
Laborers	2	4	SCRTD/ Local Area Search	Approximately three months prior to the startup of revenue service as required for pre-revenue service operations.	July, 1989
Building and Grounds Maintenance Supervisor	1	1	SCRTD/ Local Area Search	Approximately three months prior to the completion of of the main yard and shops.	December, 1987
Property Maintainer	12	15	Local Area Search	Initial personnel with the completion of the main yard and shops. Other positions filled as necessary prior to the startup of revenue operations.	2 - February, 1988 Others prior to September, 1989

Systems maintenance supervisory personnel would be hired so that they may be assigned to monitor the construction and installation of the power distribution, signal, central control, fare collection, and track systems. This approach will require close coordination with the LACTC which has responsibility for system construction management.

For both vehicle and systems maintenance training, vehicles and systems supplies should be required to provide training as a condition of their contracts. Final instruction will be reinforced by 'on the job' training during the period of initial vehicle testing and integrated testing. Additionally, the direct involvement of maintenance supervisory personnel with vehicle manufacturing and systems installation work will provide the basis for establishing maintenance procedures and practices that build on the vendor training programs in the most effective manner.

The hiring of the vehicle maintenance supervisory group is tied to the acquisition and delivery of vehicles. Familiarization with the vehicle may be initiated prior to delivery of the manufacturer's site or test track facility. It is proposed that these personnel be added at least three months prior to the delivery of the first vehicle, depending on the length of time necessary to hire personnel and the nature of problems anticipated in the manufacture of the vehicle. During this time, the equipment maintenance supervisors would assist the Division Maintenance Manager in the preparation of shop and repair procedures and in planning for the reception of vehicles (outside contractors, railroads, and other RTD departments). Also, during this period prior to vehicle delivery, a time schedule for the hiring of additional vehicle maintenance personnel may be finalized taking into account the manufacturer's training program and on-site availability of personnel at the main yard until all vehicles are delivered and accepted.

Systems maintenance personnel should be hired so that they may be assigned as inspectors during the construction or installation period for the power distribution, signal, fare collection, and track systems. In addition, vendor training would be required as a condition of the installation contracts. This approach will require close coordination with the Commission which is responsible for system construction management.

5. LABOR AGREEMENT ANALYSIS

The introduction of LRT operations by a bus transit system raises issues and questions to be resolved by collective bargaining. Some revisions to work rules and personnel policies may be necessary to ensure that adequate manpower is available to meet the requirements of both the rail services startup and on-going bus operations simultaneously, as well as to provide for the efficient operation of both modes in the future. To determine the labor agreement changes which may be required as a result of the startup of LRT services by the RTD, an examination of the pertinent labor rules used by transit operators in several other cities was conducted. Four transit systems for which labor agreement data were available were analyzed and compared to the agreements currently existing between the District and its largest unions -- the United Transportation Union (UTU), Amalgamated Transit Union (ATU), and Brotherhood of Airline, Railway, and Steamship Clerks (BRAC). Follow-up contact with appropriate managers and labor relations specialists assigned to these organizations was also undertaken.

The analysis suggests that two issues deserve particular scrutiny -- first, the development of rules that governing the transition of personnel from bus-related positions to rail-related positions for the startup of rail operations, and second, the development of rules governing the transfer of personnel between bus and rail operating positions following the startup of rail operations. In particular, the timing and seniority impacts of these personnel actions are important considerations for the District.

It is not intended to imply that these issues constitute the only areas associated with the startup of rail operations of the RTD which must be considered in collective bargaining. They are, however, believed to comprise the primary issues for which special attention and revisions to existing work rules may be required. Other areas associated with the startup of rail services which are covered by existing work rules and may require modifications include the following -- training and qualification pay, pay levels for selected operations and maintenance positions, travel time for reliefs, deadheading times, preparatory and turn-in time allowances, procedures and pay differentials for instructors, pay differentials for maintenance lead workers, and tool allowances and/or tools provided to rail maintenance personnel by the District. The nature of changes to work rules in these areas will become more apparent only as the construction and installation of rail system elements progresses and decisions on scheduling and service levels are finalized. It is also possible that additional work rule issues may be identified which cannot be anticipated at this time.

The discussion which follows will examine the policies and procedures governing personnel transfers used by four other transit operators who provide both bus and rail services. These transit operators are the Metropolitan Dade County Transportation Administration serving the metropolitan Miami area, Metropolitan Atlanta Rapid Transit Authority, Calgary Transit, and Edmonton Transit. The experience of these operators reflects a cross section of approaches to the management of bus/rail personnel transfers.

5.1 TRANSFER OF BUS AND RAIL SERVICE OPERATORS

The labor agreement analysis examined the rules used by the four transit operators to control the movement of operators between bus and rail positions. Basically, there are three points in time at which regulations must be applied in order to ensure efficient operation of the transit system -- first, at the initial commencement of rail operations, second, at the time of periodic bids or 'shake-ups' where operators may change their work assignments, and third, at other times when vacancies occur between shake-ups. While it is clear that restrictions on the movement of personnel are necessary due to operator instruction requirements and other factors, these restrictions may vary in their degree of stringency as indicated from the analysis of the four transit systems studied.

5.1.1 Metropolitan Dade County Transportation Administration (Miami)

In Miami, rules established concerning bus/rail personnel transfers are the most restrictive of the four systems studied. Prior to the system opening, a separate agreement covering these rules and other provisions related to rail preparations and maintenance was negotiated.

Initial Rail Operations

In Miami, separate seniority lists were established for bus and rail operators. All new rail operator positions were first offered to bus operators. A signup for bus operators wishing to be considered for rail operations was held. In order for an operator to be eligible for rail operations and to retain seniority when transferring from bus to rail operations in the future, it was necessary to participate in this signup. Then, bus operators were selected for rail operator training in accordance with their seniority as bus operators. Once selected, these operators were allowed to transfer their full bus seniority to the new rail operations seniority list.

It was agreed that there would be a one year probationary period for bus operators receiving rail operator training. During this time, the operator could return to bus operations, if desired, or management could elect to return the employee to bus operations subject to grievance review. If this option was exercised by either party within the probationary period, the operator would retain full seniority upon returning to bus operations. Transfers occurring after the probationary period had elapsed would result in the operator being placed at the bottom of the bus operator seniority list.

Shake-Ups

Currently, an operator may transfer from bus operations to rail operations at shake-ups held at least two times per year, if a vacancy in rail operations exists. Operators transferring from bus to rail operations, if they participated in the eligibility signup conducted for rail operations startup, are permitted to transfer with their full bus seniority. Operators not participating in the eligibility signup for rail operations and later transferring to rail (after the eligibility list has been exhausted) are placed at the bottom of the rail operator seniority list.

Operators may also transfer from rail to bus operations at a shake-up. Unless the transfer occurs within the probationary period, operators transferring from rail to bus operations are placed at the bottom of the bus operator seniority list.

By directly impacting operator seniority, these rules governing bus/rail transfers were designed to limit the number of personnel movements occurring in conjunction with shake-ups. As a result, bus/rail operator transfers occur at a very low rate in Miami. Of the four transit analyzed as part of this study, Miami is the only one to have separate seniority systems for bus and rail operators.

Filling Vacancies

Operators may bid on vacant open work assignments at any time with selection being dependent upon qualifications and seniority. The rules for these transfers are the same as already described above. Operators transferring from bus operations to rail operations, if they participated in the eligibility signup for rail, are permitted to carry their bus seniority to rail. Operators transferring from rail to bus operations are placed at the bottom of the bus operator seniority list, if the transfer occurs after the probationary period has elapsed.

5.1.2 Metropolitan Atlanta Rapid Transit Authority (MARTA)

The rules used by MARTA to manage bus/rail personnel transfers are less restrictive than those employed in Miami. Rather than establishing rules which directly impact operator seniority, MARTA elected to establish minimum time-in-position and advance notification requirements to control personnel movements. The seniority list for bus operators was expanded to include both bus and rail operators. At the time of rail operations startup, MARTA negotiated a supplementary agreement to its existing labor contract.

Initial Rail Operations

New positions for rail transit operations were posted for selection by bus operators according to seniority. Bus operators who received rail operator training were required to remain in rail operations for at least one year, except in cases mutually agreed by the employee and MARTA management.

Shake-Ups

Shake-ups are held three times per year for operators to choose bus and rail work assignments. After completing one year of rail operations service, operators with sufficient seniority may move between rail and bus operations as often as every shake-up provided that notice of at least six weeks is given when leaving rail operations. It is also required that rail operators giving advance notification transfer at the time of the shake-up. MARTA has found that the six-week advance notice requirement provides sufficient time in which to select bus operators desiring to participate in the rail operator training program in accordance with seniority, and to complete all required training prior to the shake-up.

In practice, MARTA has found that movement between bus and rail operations is limited. Although a period of adjustment was experienced, operating personnel appear to have stabilized in their preference for bus or rail transit operations. In addition, it was noted that the amount of overtime work for operators is limited by local law, so that a possible incentive for a rail operator to return to bus operations is not present.

Filling Vacancies

Vacancies are advertised and filled through monthly bidding for the open assignments. No transfers to and from rail operations are permitted as part of this bidding.

5.1.3 Calgary Transit

Calgary Transit employs an approach similar to MARTA's for regulating bus/rail personnel transfers including the use of a single seniority list for bus and rail operating personnel. Transfers to and from rail operations are permitted only at specified times and require three months advance notification.

Initial Rail Operations

New positions in rail operations were posted for selection by bus operators according to seniority. Bus operators selected and completing rail operator training were required to remain in rail operations for at least six months, except in cases mutually agreed upon by the employee and Calgary Transit management.

Shake-Ups

Shake-ups for operators are held four times per year, but operators may transfer between bus and rail operations only at shake-ups held every six months. There is an advance notification requirement of three months for operators desiring to transfer between bus and rail. Rail operators returning to bus operations are placed on a contingency list of trained rail operators from which they may be returned to rail operations, if necessary, in accordance with seniority. Calgary Transit has found that these rules provide sufficient flexibility for effective personnel planning. Transfers between bus and rail operations occur at moderate levels and, in many cases, may be related to weather conditions (that is, some operators desire to work rail assignments in the winter months and bus operations in the summer).

It should be noted that Calgary Transit is currently attempting to limit bus/rail transfers to one shake-up per year. This is because there are separate vacation lists for bus and rail operators. Bus/rail transfers may be complicated for operators who sign up for a vacation period on one list and later transfer to the other mode. This complication could be avoided by limiting movements to the one shake-up annually.

Filling Vacancies

Vacancies in rail operator positions between shake-ups are filled from the rail spareboard. There is also a contingency list of trained rail operators as noted above. In cases where a vacancy would exist until the next shake-up where personnel transfers could be made, the vacancy will be filled from the spareboard and the opening on the spareboard will be filled from the contingency list. Any vacancies in bus operations caused by these actions will be covered by new hires or overtime work, as deemed appropriate by Calgary Transit management.

5.1.4 Edmonton Transit

Edmonton Transit uses the least restrictive rules of the four transit operators studied to manage the transfer of operators between bus and rail operations. A single seniority list is maintained for both bus and rail operators, and there are few restrictions on personnel transfers between bus and rail operations. To date, no problems have been experienced with this approach, perhaps because of the small size of the rail system operated (18 regular operators required).

Initial Rail Operations

New positions in rail operations were offered to bus operators for selection according to seniority. No minimum time-in-rail requirements for operators receiving rail operator training were imposed.

Shake-Ups

Shake-ups are held five times per year at Edmonton Transit. As noted above, there is one seniority list for both bus and rail operators. Operators with sufficient seniority are permitted to transfer between bus and rail operations without restriction as frequently as every shake-up. Additionally, any bus transit operator may sign up for rail system training at any shake-up if the operator has sufficient seniority to ensure eligibility for a rail position once the operator has completed rail training. In other words, an operator may bid for a rail work assignment without prior qualification for rail operations or advance notification.

Filling Vacancies

Vacancies occurring between shake-ups are filled from the rail spareboard only. Operators are permitted to transfer between bus and rail operations only at shake-ups.

5.1.5 Summary of Analysis Findings

The experience of all four transit systems suggest that rules pertaining to bus/rail transfers are necessary to ensure effective operation of both transit modes. However, the four systems reflect a wide variation with regard to the degree of stringency of the regulations, with those employed in Miami constituting the most restrictive approach and the rules used by Edmonton Transit being the least restrictive. With regard to policies for offering new rail operator positions to current bus operators prior to startup of rail operations, these positions were offered to bus operators for selection on the

basis of seniority at all four transit systems studied. Beyond this point, there are generally two approaches by which management may exercise control over the transfer of operators between bus and rail operations -- by modifying the seniority of operators desiring to make these transfers, or by administratively controlling the timing of the transfers. Of the four transit systems studied, only Miami uses the first approach and operators in Atlanta, Calgary, and Edmonton the second approach (see Figure 5-1).

5.1.6 Recommendation for District LRT Operations

The experience of MARTA, Calgary Transit, and Edmonton Transit suggest that the dual seniority procedures established for Miami rail operations may be unnecessarily restrictive. Each of these transit systems use a single seniority list for bus and rail operators coupled with administrative regulations to manage bus/rail operator transfers which have proven to be effective to date. No significant difficulties for personnel planning or administration have been encountered using these rules. Implementation of the Miami approach would entail considerable administrative effort for the District, including the maintenance of an additional seniority list and eligibility list for future rail training.

Additionally, even if it were more desirable to implement the more restrictive rules, Miami was forced to moderate its approach by agreeing to the one-year probationary period in which rail operators could return to bus operations without losing any seniority. On the other hand, MARTA, Calgary Transit, and Edmonton Transit have found that operators ended up in either bus and rail positions, commensurate with their preferences and relative seniority, within a year without imposing the strict restrictions of the Miami approach.

Additional justification for adopting rules which are somewhat less restrictive for bus/rail operator transfers may come from the additional flexibility for providing cross training which such an approach provides. In the long run, it may be advantageous for RTD to develop a cadre of operators who are proficient in both bus and rail operations and who would then choose to routinely move between the two modes. These operators would possess skills which could be of significant use during future transition periods at additional light rail lines become operational.

For the startup of operations, it is recommended that the existing seniority list for bus operators be expanded to include rail operators. It is further recommended that new rail operator positions be offered to current bus operators based on seniority as the positions are required to be filled. Bus operators receiving rail transit should be required to remain in a rail operations position for a minimum period of six months from the date on which rail operator training commences except when the employee's return to bus operations is mutually agreed upon by the employee and District management.

It is recommended that transfers between bus and rail operations positions be subject to the same restrictions currently in effect for operators desiring to transfer between bus divisions. This would restrict transfers between bus and rail operations to be done in conjunction with systemwide bidding on open assignments only. Any operator with sufficient seniority should be permitted the opportunity to transfer at that time. It is further recommended that an operator desiring to transfer between bus and rail operations be required to

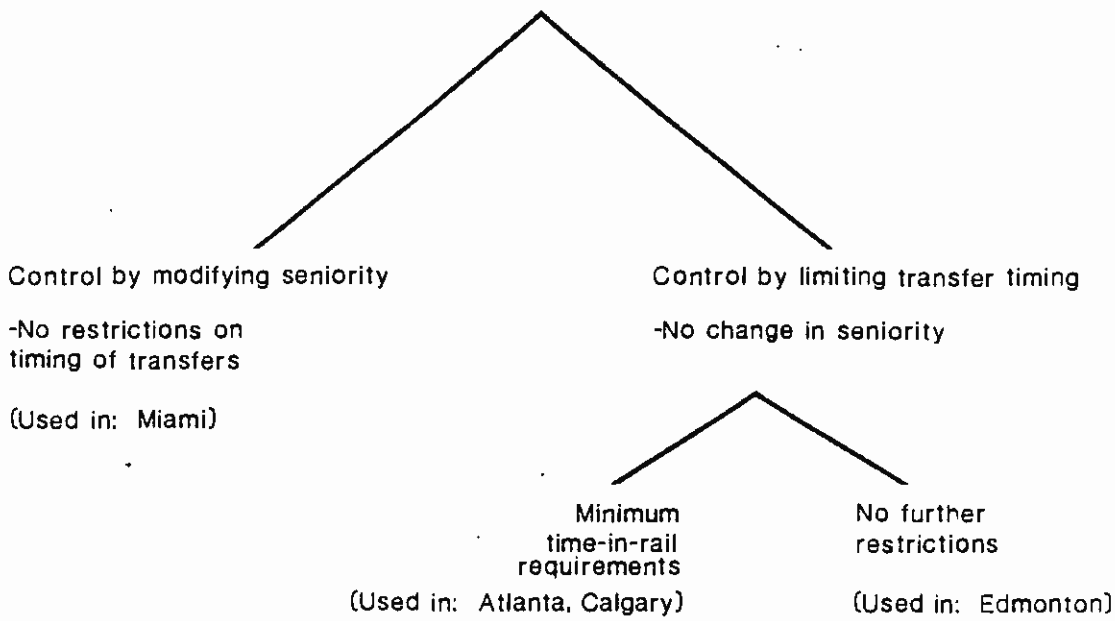

Operators Desiring Bus/Rail Transfer
Control by modifying seniority
-No restrictions on timing of transfers
(Used in: Miami)
Control by limiting transfer timing
-No change in seniority
Minimum time-in-rail requirements
(Used in: Atlanta, Calgary)
No further restrictions
(Used in: Edmonton)

Figure 5-1

provide notification of intent prior to a specified point in time before the systemwide bidding for open assignments.

5.2 TRANSFER OF BUS AND RAIL MAINTENANCE PERSONNEL

The labor agreement analysis also examined the rules used by the four transit systems to regulate the transfer of personnel between bus and rail maintenance positions. This analysis suggests that transfer of personnel between bus and rail maintenance is less common than among with operators, as might be expected because of skill requirements. While virtually any bus operator has the necessary skills to become a rail operator with additional instruction, the same is not necessarily true for personnel required to maintain rail systems which may be significantly different from their bus counterparts. In each of the four systems studied, personnel qualifications were the most important factor impacting upon personnel transfers between bus and rail operations.

Each of the four transit operators studied have negotiated formal personnel rules which regulate the movement of personnel between maintenance positions both at rail system startup and during on-going rail operations. As with the rules governing operating personnel movements, the systems vary in the degree to which such personnel transfers are restricted.

5.2.1 Metropolitan Dade County Transportation Administration (Miami)

Miami has four seniority classifications within the Maintenance Department -- vehicle cleaners, mechanics, electricians, and electronic technicians. Where positions within these classifications are contained within both bus and rail maintenance organizations, employees may transfer between bus and rail positions without affecting their seniority.

Initial Rail Operations

New rail positions were offered to qualified bus maintenance personnel. Selection was made in accordance with qualifications and seniority. Technicians selected for transfer were given additional training (primarily vendor-supplied) and allowed to carry full seniority to the new positions, even if the new position was in a different seniority classification (for example, a mechanic qualified to become an electronic technician).

In practice, Miami officials found that few bus maintenance personnel elected to transfer to rail operations. Most initial hires for rail maintenance were made from outside the agency. This greatly increased personnel management flexibility for the startup of rail maintenance. Additionally it was recognized that maintenance personnel might be required for work outside their specific job classifications due to the uncertainties in establishing an entirely new rail maintenance organization. In response to this anticipated concern, it was negotiated that all maintenance personnel could be employed for work at its discretion, regardless of job classification, during the first year of rail operations.

Shake-Ups

Shake-ups are held for maintenance personnel two times per year where work assignments are selected by seniority within the four job classifications. An employee may transfer from one classification to another at a shake-up if a vacancy exists in the classification to which the transfer is desired, but the employee will then move to the bottom of the seniority list for the new classification.

An employee may move from bus to rail maintenance at a shake-up, if qualified, within the same job classification and retain full seniority (for example, bus mechanic to rail mechanic). In practice, this occurs infrequently as was noted for the rail startup period.

Filling Vacancies

An employee may change job classifications within the Maintenance Department only by bidding on a vacancy. All vacancies are posted and advertised in-house as they become available. An employee transferring to a new classification loses all classification seniority and moves to the bottom of the seniority list within the new classification.

5.2.2 Metropolitan Atlanta Rapid Transit Authority (MARTA)

The supplementary agreement negotiated for the startup of rail operations also addressed areas applicable to maintenance personnel. All MARTA maintenance personnel are assigned to one seniority classification. MARTA has experienced larger numbers of bus to rail personnel transfers than reported for Miami. This was problematic, particularly at the time of the initial startup of rail operations.

Initial Rail Operations

New rail maintenance positions were offered to bus maintenance personnel at the commencement of rail operations, along with additional training (primarily vendor-supplied) according to seniority. With only one seniority list for maintenance personnel, the transferring of seniority between bus and rail positions, or among job classifications, was not an issue for MARTA. MARTA also agreed to establish at least seven electronic technician apprentice positions for the in-house development of rail electronic technicians.

Unlike the situation in Miami, MARTA experienced a significant movement of personnel from bus to rail maintenance positions. For example, for the initial addition of 48 electronic technicians for rail operations, most (exact figure is not available) were made from among bus maintenance personnel. As a result, MARTA experienced a shortage of bus maintenance employees at the time of rail operations startup.

Shake-Ups

There are no shake-ups held on a periodic basis for maintenance personnel. At MARTA senior maintenance personnel can 'bump' into positions held by junior personnel within their craft at any time, providing the more senior employee has been in his current position at least six months. If an employee desires to change crafts, a vacancy must exist in the new craft for the transfer. In practice, MARTA has found that most employees ultimately occupy their preferred positions commensurate with their seniority, where they remain until a vacancy occurs in a position occupied by a more senior employee.

Because of the problems caused by large numbers of bus maintenance employees transferring to rail maintenance positions, MARTA negotiated an additional understanding after the startup of rail operations that permits the transfer of maintenance personnel to rail only at the apprentice level. Although employees transferring under this arrangement retain their full maintenance seniority, it is required that an 18-month to two-year apprenticeship program be completed before journeyman status is obtained (or regained).

Filling Vacancies

Vacancies are posted for all maintenance personnel and may be applied for by qualified personnel as they occur. A vacancy is required for employees to transfer between bus and rail maintenance, or between different crafts. When a transfer does occur, the employee will carry full maintenance seniority to the new position where the employee must remain for a period of at least six months.

5.2.3 Calgary Transit

Calgary Transit uses a single seniority list for all maintenance personnel. Transfers between bus and rail maintenance positions and between skill (or job classification) groups are allowed only if a vacancy exists in the new position.

Initial Rail Operations

New rail maintenance positions were first offered to bus maintenance personnel for selection based on qualifications and seniority. With a single seniority list for maintenance personnel, transferring of seniority was not an issue for Calgary Transit. Unlike MARTA, Calgary Transit did not experience significant numbers of bus maintenance personnel transfers, perhaps because of the smaller size of the rail operations in Calgary.

Shake-Ups

There are no shake-ups for maintenance personnel of Calgary Transit, and transfers occur only in conjunction with vacancies.

Filling Vacancies

Vacancies are posted weekly, and are awarded according to qualifications and seniority. A vacancy is required for an employee to transfer between bus and rail maintenance, or between skill classifications. When a transfer within the Maintenance Department occurs, the employee carries full maintenance seniority to the new position. The employee must remain in the new position for a minimum of three months.

5.2.4 Edmonton Transit

Edmonton Transit has separate seniority classifications for different trades. In some cases, such as vehicle cleaners, the seniority classification encompasses both bus and rail maintenance. However, for the most part, personnel in rail maintenance positions occupy a separate seniority classification from their bus counterparts.

Initial Rail Operations

When rail operations commenced in 1978, a new seniority classification was developed for Electro-Vehicle Mechanics (EVM). These new positions were offered to qualified trolley and diesel bus mechanics, along with vendor-supplied training. Personnel selected for these positions were allowed to transfer full seniority into the new classification. Employees transferring to this classification after the initial startup of rail operations are placed at the bottom of the seniority list.

Shake-Ups

Maintenance personnel at Edmonton Transit have shake-ups two times per year. Transfers between bus and rail maintenance positions are allowed at shake-ups, if a vacancy exists in the new classification. However, if this transfer constitutes a change in trade, the employee is placed at the bottom of the seniority list in the new job classification.

Filling Vacancies

Transfers between bus and rail maintenance positions are also allowed whenever vacancies exist, with the same limitations on transferring seniority as noted above. Edmonton Transit has not experienced significant personnel movements between the different trades. New employees have a six-month probationary period in which transfers may occur without loss of seniority. In most cases, however, employees have generally remained within their original trade for the duration of their employment with Edmonton Transit.

5.2.5 Summary of Analysis Findings

For all systems studied, new rail maintenance positions required for the startup of rail operations were offered to bus maintenance personnel for selection based on qualifications and seniority. Transfers between bus and rail maintenance positions are allowed only when there is a vacancy in the new position. The primary issue related to the transfer of maintenance personnel between bus and rail positions is seniority. There are generally two approaches which may be applied -- a single seniority list for all maintenance personnel, or separate seniority lists for different job classifications. For the four transit systems studied, MARTA and Calgary Transit employ the first approach while Miami and Edmonton Transit maintain separate seniority lists for job classifications.

5.2.6 Recommendations for District LRT Operations

The District's agreement with the ATU establishes four seniority classifications -- equipment maintenance, facility maintenance, telecommunications, and stops and zones. It is recommended that an additional seniority classification be established for personnel occupying rail vehicle maintenance positions. This seniority classification could be entitled 'Rail Equipment Maintenance' with the existing category of 'Equipment Maintenance' renamed as 'Bus Equipment Maintenance'. It is recommended that Electro-Mechanics and Car Cleaners be assigned to the new seniority classification. Personnel involved in other rail maintenance functions would be incorporated in the established seniority lists corresponding to the existing classifications.

It is further recommended that new rail maintenance positions and vendor-supplied rail maintenance training be offered to current bus maintenance personnel as the positions are required to be filled. Selection should be based on qualifications and seniority. It is not required that unqualified personnel be accepted into rail maintenance positions. Maintenance personnel receiving this training should be required to remain in rail maintenance for a minimum period of one year.

For the startup of rail operations, personnel involved in transfers to rail maintenance positions should be allowed to retain full classification seniority. If the transfer occurs within the same classification, the employee should remain in the same position on the seniority list. If the transfer is made to a new position which is part of a different seniority classification, the employee should be permitted to transfer with full seniority.

It is recommended that all vacancies be filled as currently provided for in the existing agreement. Using these procedures, vacancies are first offered for pre-bid by personnel in the same classification and department. If there are no pre-bids, bids from other qualified employees are taken. An employee transferring from one department seniority classification to another would be placed at the bottom of the new departmental seniority list. For example, a bus mechanic would be allowed to bid on a vacancy as a rail electro-mechanic, but only after the position was first offered to personnel within the Rail Equipment Maintenance classification. If the transfer were approved, the employee would be placed at the bottom of the Rail Equipment Maintenance seniority list.

APPENDIX A

SELECTED SYSTEM POSITION DESCRIPTIONS

CHIEF CENTRAL CONTROL SUPERVISOR

Basic Function

Under administrative supervision, directs and coordinates light rail transportation activities at the central control facility; supervises central control operation activities, including overseeing and resolving scheduled operating problems, monitoring revised schedule operations caused by service interruptions, and implementing emergency plans as necessary to ensure safe operation of the light rail system; performs other related work.

Classification Characteristics

Supervised Received From: Radio Dispatch Manager

Supervision Exercised Over: Central Control Supervisors

Examples of Duties

Plans, directs, coordinates and controls the activities and personnel of the Central Control operations center. Promulgates operational rules, regulations and related procedures for the efficient operation of central control.

Enforces operational safety policies and reviews problem areas to determine the need for changes to improve safety procedures and policies.

Implements contingency plans, making necessary changes to scheduled service during disruptions or other emergencies to minimize length of delays and discomfort to passengers.

Supervises and coordinates the flow of communications, from central operations to supervisors, passengers on trains, and in stations.

Maintains close liaison with the transit police relative to police and fire department assistance; coordinates the entry on to transit property of all fire, life, and safety agencies.

Formulates work schedules and makes assignments to subordinates.

Estimates staffing and material requirements, analyzes efficiency of the central control center and submits recommendations for required equipment and personnel.

Implements and executes appropriate training programs.

Discusses complaints and grievances with employees, attempting to resolve complaints in accordance with sound employee relations practices and operating requirements. Evaluates and discusses performance of personnel, recommending laudatory or disciplinary action as appropriate.

Maintains a required level of understanding of technical problems in order to contribute to the resolution of electrical and electro-mechanical malfunctions.

Reviews and completes operational and other reports.

Required Knowledge and Abilities

Knowledge of rapid rail transit system functions, operating regulations and scheduling techniques; functions and services of all other departments involved in transit operation interruptions; electrical distribution systems and switching facilities; knowledge of, or the ability to rapidly attain knowledge of SCRTD rules, regulations and procedures and the ability to implement them for passenger safety during emergencies; ability to coordinate the functions of central control operations center with other functions of SCRTD and be able to obtain effective cooperation from them; ability to devise new and improved methods for handling transit interruptions; ability to supervise and train new personnel; ability to communicate effectively, orally and in writing; ability to deal tactfully and effectively with others.

Desirable Qualifications

Any combination of training, education and experience which demonstrates the ability to perform the duties of this position. A bachelor's degree in a related field and three years supervisory experience, preferably in transit operations, are preferred.

Special Requirements

Must possess a valid California driver's license.

CENTRAL CONTROL SUPERVISOR

Basic Function

Under administrative supervision, is responsible for efficiently controlling and operating the light rail transit system; receiving, by way of numerous methods of communication, data relative to breakdown, incidents, occurrences and delays or changes in pre-scheduled operations, coordinating any necessary corrective action with other District divisions or outside agencies.

Classification Characteristics

Supervision received from: Chief Control Supervisor

Supervision exercised over: All operations and maintenance field personnel, either directly or through their immediate supervisor.

Examples of Duties

Monitors the light rail operation, promulgating the rules, regulations and procedures, thereof; constantly reviewing the application in order to maintain or improve the standard.

Monitors the status of the systems and devices related to the light rail operation, such as interlockings, gate crossings, traction power, ventilation, air conditioning, pumps, fire alarms, and intrusion alarms.

Coordinates the correction of malfunctions in any of the above.

Maintains communication with Train Operators, Transportation Operations Supervisors, Equipment and Systems Maintenance Supervisors, Yard Supervisors, and Maintenance work crews.

Coordinates the correction of any problem, relative to safe and timely movement of passengers on the rail system.

Monitors and directs the safe movement of non-revenue vehicles over the main line, and the safe re-routing or diversion of passenger vehicles in emergency situations.

Properly receives and disseminates to the pertinent divisions or sections all reports incidental to the rail operation, such as accidents, disabled vehicles, sick/injured, disorderly passengers, fare evasion, assaults, and robberies.

Properly tests and operates the power distribution system, analyzing any failures therein and recommending corrective action.

Maintains a daily, comprehensive report relative to rail operation activities.

Participates in the training of newly hired personnel for the Central Control Supervisor position.

Required Knowledges and Abilities

Knowledge of or the ability to rapidly attain knowledge of SCRTD rules and regulations, rail transit operating functions and procedures, current labor relations agreements, electrical power distribution systems, and interlocking/switching facilities. Ability to coordinate the central control function with other functions of SCRTD. Ability to design and implement contingency procedures to overcome rail operation interruptions. Ability to participate in the training of new personnel. Ability to communicate effective, orally and in writing with peers, supervisors and subordinates. Knowledge of and ability to modify rail operating schedules. Ability to evaluate factors, exercise good judgment, take appropriate action and effectively document actions taken in stress situations. Ability to work variable hours.

Desirable Qualifications

Bachelor's degree in transportation administration, or related field preferably with responsible transportation experience that required the resolution of operational problems related to scheduled services, equipment failure and other service disruptions, is desirable. Rail operations or related experience, including successfully demonstrated rail supervisory experience, or an equivalent combination of education and experience may also be acceptable.

Special Requirements

Must possess a valid California driver's license.

TRANSPORTATION OPERATIONS SUPERVISOR (RAIL)

Basic Function

Under administrative supervisor, is responsible for direct supervision of train operators, and the monitoring and direction of main-line rail operations in the field.

Classification Characteristics

Supervision received from: Division Transportation Manager.

Supervision exercised over: Train Operators.

Examples of Duties

Supervises Train Operators relative to all activities involved in the movement of train on the main-line, including the conduct of Train Operators in the performance of their duties.

Monitors the operation of vehicles, performs troubleshooting techniques to determine vehicle defects, and recommends to central control the disposition of disabled vehicles.

Reports violations of operating rules and procedures.

Coordinates with central control in the maintenance of schedules and adjustments in headways operated.

Provides roving supervision of main-line right-of-way, station platforms and structures, and other operational equipment for fault or abnormal function.

Trains candidate Train Operators in rail operating rules and procedures.

Maintains a working knowledge of passenger vehicles, yard, main-line, station and terminal operations and applies same in a professional manner.

Investigates passenger and rail vehicle accidents, reporting same to central control with followup written reports.

Operates wayside switches in an emergency and safely routes vehicle through them at the discretion of central control.

Coordinates with other SCRTD divisions and other outside agencies at the direction of central control in order to relieve and correct operational problems.

Required Knowledges and Abilities

Knowledge of all operating rules and procedures, insuring adherence to and reporting violations thereof. Knowledge of rail passenger vehicles, procedures for use of emergency telephones and trip stations, and schedules and ability to make adjustment thereto. Ability to properly utilize radio communications and

insure proper use by those in their charge. Ability to exercise prudence and good judgment, make evaluations in emergencies and concisely report and record same.

Desirable Qualifications

Prior experience as a Train Operator or as a transit employee familiar with rail operations is desirable. Graduation from high school or equivalency certificate required.

YARD SUPERVISOR

Basic Function

Under administrative supervision, is responsible for the safe and timely movement of rail vehicles within the limits of the yard and shop areas, and for coordinating with central control regarding the movement of rail vehicles to and from the main-line.

Examples of Duties

Expedites the safe and timely entry of rail vehicles into scheduled or unscheduled main-line service, coordinating with central control.

Expedites the safe and timely removal of rail vehicles from scheduled and unscheduled main-line service, coordinating with central control.

Coordinates with Equipment and Systems Maintenance Supervisors relative to vehicle movements to and from shop and storage areas.

Insures safe control of power within yard limits, maintaining an updated record of the yard power sections. Promptly shuts power down where emergencies or operations demand, and insures the safe restoration of power.

Monitors all alarm systems on the tower panel.

Keeps an updated log as to the location and status of the rail vehicles in the shop and storage areas.

Reports all unusual occurrences such as accidents, power outages, and switch and signal failures to central control.

Participates in the training of any candidate for entry into this classification.

Required Knowledge and Abilities

Knowledge of or the ability to rapidly attain knowledge of SCRTD rules and regulations, rail transit operating functions and procedures, current labor agreements pertinent to yard activities, and yard power distribution system.

Ability to communicate effectively, orally and in writing with others.

Ability to function safely and properly in stress situations.

Ability to work variable hours.

Desirable Qualifications

Completion of high school education, and three to five years of rail transit supervisory experience.

TRAIN OPERATOR

Basic Function

Responsible for the safe, courteous, and efficient operation of an assigned rail train vehicle including pre-departure inspection and testing, and the monitoring of passenger movements.

Classification Characteristics

Performs rail transit vehicle operations work under limited supervision, exercising prudent judgment in accordance with pre-established rules and regulations.

Examples of Duties

Makes necessary announcements over public address systems; carries out instructions issued by central control; safely maintains pre-established schedule and headways; reports all unusual occurrences to central control; provides information and assistance to passengers, supervisors, and other SCRTD personnel.

Inspects, make up, tests, and operates rail vehicles to transfer track or point of entry to main-line under direction of the Yard Supervisor.

Operates designated vehicles from storage to shop and return under direction of the Yard Supervisor.

Prepares defective vehicle and accident reports.

Participates in the on-the-job instruction of new personnel.

Performs platform, yard, or train work as assigned.

Required Knowledge and Abilities

Knowledge of components, systems, and procedures necessary for the propulsion and stopping of rail vehicles.

Ability and willingness to learn and comply with operating rules, regulations, and procedures.

Knowledge of or the ability to acquire the knowledge of the location and method of de-energizing and re-energizing power and the rules and regulations governing these actions.

Ability to work variable hours.

Ability to communicate effectively, orally and in writing, with others.

Ability to exercise prudent and timely judgment in normal and emergency situations.

Ability to properly and effectively utilize intercom and radio systems.

Ability to complete the training program and pass any test required for this classification.

Desirable Qualifications

Completion of 10th grade or equivalent vocational school. A minimum of two years satisfactory driving experience in the operation of a public passenger-carrying vehicle.

Special Requirement

Possession of a valid California driver's license.

Applicants traffic records should reflect responsibility and a respect for traffic rules and regulations.

EQUIPMENT MAINTENANCE SUPERVISOR (RAIL)

Basic Function

Under direction of the maintenance operating Division Manager, responsible for the scheduling and completion of inspections and repairs to rail vehicle electrical and mechanical systems and equipment.

Examples of Duties

Supervises the inspection, preventative maintenance, and repair of electrical and mechanical systems in rail equipment.

Assists in developing and administering staff training programs including coordination with vendor training provided for in contracts for vehicle systems and equipment.

Conducts first level hearings of employer discipline and grievance cases.

Implements electro-mechanical systems and equipment preventive maintenance programs in accordance with manufacturer recommendations and warranty.

Coordinates the resolution of vehicle maintenance problems, between maintenance staff, outside vendors, and other District departments.

Investigates incidents involving electro-mechanical systems and equipment failure.

Prepares written and oral reports.

Required Knowledge and Abilities

Thorough knowledge of light rail vehicle electro-mechanical components, parts, systems, and devices.

Thorough knowledge of or the ability to develop effective maintenance procedures, and the ability to enforce their use in the shop environment.

Ability to analyze and solve complex electrical and mechanical systems problems using blue prints, specifications, and schematics.

Ability to supervise a subordinate staff, efficiently establishing priorities and assigning tasks in order to enhance production and assisting staff in resolving complex maintenance problems.

Knowledge of or ability to obtain knowledge of the use of computer terminals for maintenance work scheduling and tracking.

Ability to communicate effectively orally and in writing.

Ability to work variable hours.

Ability to pass any test required for this classification.

Desirable Qualifications

Any combination of training, education, and experience which demonstrates the ability to perform the duties of this position. A minimum of two years experience supervising electro-mechanical repairs and maintenance for rail vehicles is preferred.

Special Requirements

Must possess a valid California driver's license.

ELECTRO-MECHANIC

Basic Function

Under direction of Equipment Maintenance Supervisor, is responsible for the proper inspection, preventive maintenance, and repair of rail vehicles and their various electrical and mechanical systems and equipment, adhering to pre-established maintenance procedures and instructions and utilizing any necessary diagrams and manuals.

Examples of Duties

Inspects, repairs, and replaces rail vehicle trucks and truck equipment, such as wheels, axles, gear units, traction motors, friction brake equipment, and air suspension systems.

Maintains, repairs, and overhauls hydrualic/air systems and equipment such as compressors, hydraulic pumps, brake control units, and valves.

Operates heavy duty machine tools, overhead cranes, hoists, and other special equipment.

Inspects, repairs, and replaces doors and door operating units, couplers, drawbars, and control equipment.

Inspects, repairs, and replaces rail vehicle electrical systems and equipment including vehicle traction motors, generators, couplers, motor controls, unit switches and solenoid valves, and auxiliary electric motors using test instruments such as voltmeters, ohmeters, and oscilloscopes.

Replaces and repairs batteries and associated equipment.

Repairs equipment according to instructional diagrams, manuals, and manufacturers direction using proper tools and precision testing equipment.

Repairs and replaces defective or worn parts; installs special parts in systems and devices; lubricates and cleans parts and equipment.

Rides rail vehicles as assigned during peak operating periods to troubleshoot minor problems in order to preclude removal of vehicle from revenue service.

Performs related duties as required.

Required Knowledge and Abilities

Ability to read and properly interpret diagrams, sketches, operations manual, and vendor repair instructions and procedures.

Knowledge of and ability to use precision measuring instruments such as micrometers, calipers, and electrical testing equipment.

Ability to comprehend and adhere to safety regulations in the performance of assigned tasks.

Ability to communicate effectively, orally and in writing with others.

Ability to work variable hours.

Ability to pass any test required for entry into this classification.

Desirable Qualifications

Graduation from high school or possession of a high school equivalency certificate. Vocational training in electrical systems, mechanics, metal working, or air conditioning. Three to five years of responsible experience maintaining complex electrical or mechanical systems and equipment. An equivalent combination of education and experience may be acceptable.

Special Requirement

Must possess a valid California driver's license.

SYSTEMS MAINTENANCE SUPERVISOR

Basic Function

Under direction of the manager for Rail Systems Maintenance, responsible for the scheduling and completion of inspections, preventative maintenance, and repairs to rail power distribution, signal, central control, track, and fare collection.

Examples of Duties

Supervises the inspection, repair, and maintenance of rail systems and equipment.

Assists in developing and administering staff training programs.

Conducts first level hearings of employee discipline and grievance cases.

Implements electronic, power, track, and communications systems preventive maintenance programs in accordance with manufacturer recommendations and warranty requirements.

Coordinates the resolution of systems maintenance programs between maintenance staff, outside vendors, and other District departments.

Investigates incidents involving electronic power, track, and communications systems and equipment failures.

Required Knowledge and Abilities

Thorough knowledge of or the ability to acquire knowledge of the maintenance procedures for track, signal, power distribution, communications, central control, and/or fare collection systems required for light rail transit operations.

Ability to supervise a subordinate staff, efficiently establishing priorities and assigning tasks in order to enhance production and assisting staff in resolving complex maintenance problems.

Knowledge of or ability to obtain knowledge of the use of computer terminals for maintenance work scheduling and tracking.

Ability to communicate effectively orally and in writing.

Ability to work variable hours.

Ability to pass any test required for this classification.

Desirable Qualifications

Any combination of training, education, and experience which demonstrates the ability to perform the duties of this position. A minimum of two years experience supervising rail systems repairs and maintenance for rail vehicles is preferred.

SYSTEMS MAINTAINER/POWER

Basic Function

Under direction of Systems Maintenance Supervisor, is responsible for the electrical inspection, repair, adjustment, testing, and normal maintenance of high voltage substation equipment, fare machine equipment, and the overhead contact wire system. Responsible for adherence to pre-established maintenance procedures and utilizing proper diagrams and manuals.

Examples of Duties

Performs scheduled maintenance, installation, repair, modification and testing of electrical power distribution systems, transformers, rectifiers, power conversion equipment, high voltage switch gear and DC switch gear.

Inspects for guage and integrity, maintains, repairs, and replaces overhead contact wire and all related parts and devices.

Performs scheduled inspection and maintenance of fare machines, including repair or replacement of defective modules, parts, or devices.

Maintains records and presents reports of inspection, testing and repair as required.

Adheres to and gives instructions regarding high voltage safety procedures.

Responds to equipment failure reports, determines the cause, and restores equipment to service.

Responds to transportation emergencies and performs related duties as directed.

Required Knowledge and Abilities

Ability to read and interpret diagrams, manuals and vendors repair instructions and procedures.

Ability to perform complex wiring including utilization of conduits, measuring, cutting, threading, bending, assembling and properly installing.

Ability to work from scaffolding, ladders, and hydraulically raised platforms or below grade in manholes.

Ability to participate in training and instruction of candidates for this classification.

Knowledge of and ability to use precision measuring instruments.

Ability to comprehend and adhere to safety regulations and procedures in the performance of assigned tasks.

Ability to communicate effectively and courteously while dealing with others, orally and in writing.

Ability to pass any test required for a candidate for this classification.

Desirable Qualifications

Completion of at least the 10th grade with supplemental training at a trade school or as an apprentice in high voltage electrical systems, and three to five years experience in installation, testing, and maintenance of high voltage electrical equipment, wire, and cable. Training or experience in electronic applications and DC power conversion equipment.

Special Requirement

Must possess a valid California driver's license.

SYSTEMS MAINTAINER/VEHICLE

Basic Function

Under direction of Systems Maintenance Supervisor, is responsible for performing the maintenance, repair, troubleshooting, and diagnostic testing of rail transit vehicle electronic systems and equipment; at times, employing independent judgment and action within pre-established guidelines.

Examples of Duties

Performs diagnostic testing of vehicle electronic systems utilizing automated transit vehicle diagnostic equipment as necessary.

Performs electronic maintenance duties involving calibration, inspection, testing, adjustments, repair and design modifications. Determines the operational reliability of equipment.

Uses wiring diagrams, schematics, manuals, and manufacturers maintenance instructions with appropriate test equipment in the inspection, troubleshooting, and repair of transit car systems, subsystems, components, and printed circuit boards.

Evaluates equipment malfunctions and prepares failures reports; maintains a log of system, subsystem and component failures.

Performs calibrations, repair, and modification of various electronic test equipment, digital voltmeters, counters, oscilloscopes, precision power supplies, and resistance bridges.

Participates in training programs and instructs personnel as necessary.

Performs related duties as required.

Required Knowledge and Abilities

Knowledge of safety rules and procedures.

Thorough knowledge of and ability to troubleshoot solid state devices, integrated circuitry, operational amplifiers, silicone control rectifiers, shift registers, digital to analog and analog to digital convertors, etc and related systems and equipment.

Ability to analyze and interpret computer printouts is desirable.

Ability to locate, diagnose, repair, install, replace, or modify rail vehicle electronic systems and components.

Ability to read, properly interpret and use schematics, line and wire diagrams, operations manuals, and vendor maintenance instructions.

Ability to operate diagnostic equipment to perform diagnostic testing of rail vehicle as necessary.

Ability to give technical assistance to other personnel and participate in training programs.

Ability to distinguish basic colors for wire and safety identification.

Ability to work variable hours.

Ability to communicate effectively, orally and in writing with others.

Ability to pass any test required for entry into this classification.

Desirable Qualifications

Graduation from high school or possession of high school equivalency certification and completion of an acceptable electronics maintenance course. Three to five years of responsible experience in the inspection, maintenance, troubleshooting, and repair of complex electronic systems and components. An equivalent combination of education and experience may be acceptable.

Special Requirement

Must possess a valid California driver's license.

SYSTEMS MAINTAINER/SIGNALS

Basic Function

Under direction of Systems Maintenance Supervisor, performs inspection, maintenance, installation and repair work under scheduled or emergency conditions of train and grade crossing signal systems.

Examples of Duties

Inspects, tests, adjusts, cleans, lubricates, properly maintains and repairs, train signal systems and fare collection equipment adhering to instructions as set forth in wiring diagrams, schematics and maintenance manuals as provided by vendors.

Inspects, maintains, and insures the safe and proper function of all signals, track circuitry, and interlocked switching in the yards and on the mainline.

Inspects, maintains and repairs grade crossing gates, and insures the proper functioning of the track circuitry and signals that govern their operation.

Monitor the synchronization of rail signals with city traffic signals to allow non-conflicting traffic flows.

Inspects and maintains the yard tower route locking system, track circuit control, display boards, and operating console.

Inspects and maintains fire and intrusion alarms in structures and stations, and subway fans.

Performs scheduled inspection and maintenance of fare machines, including repair or replacement of defective modules, parts, and devices.

Maintains valid records and presents reports of inspection, testing and repair as required.

Adheres to and gives instructions regarding safety procedures.

Responds promptly to equipment failure reports, determines the cause, and restores equipment to service.

Responds to transportation emergencies and performs related duties as directed.

Required Knowledge and Abilities

Ability to reach and properly interpret diagrams, manuals, and vendors repair instructions and procedures.

Ability to perform complex wiring including utilization of coduit, measuring, cutting, threading, bending, assembly and property installing.

Ability to work from scaffolding, ladders, raised platforms or below grade in manholes.

SYSTEMS MAINTAINER/TRACK

Basic Function

Under the direction of Systems Maintenance Supervisor, responsible for the proper inspection, maintenance, repair, or replacement of track and switches in yards and on the mainline including ties, ballast, embedding material, direct fixation pads and appurtenant structures, and protective enclosures.

Classification Characteristics

Classification work is principally mechanical in nature requiring considerable physical effort, and a basic knowledge of various mechanical crafts and skills.

Examples of Duties

Inspects, guages, and adjusts main-line track on a scheduled basis or as required.

Removes and replaces track plates, ties, and tie rail.

Performs welding and grinding operation as needed.

Mixes and applies concrete and asphalt as required.

Assists in the placement of rails.

Installs drainage pipes and may dig ditches as needed.

Operates impact machines, rail saws, rail drills and related track repair equipment and vehicles.

Maintains track related tools and vehicles.

Performs maintenance and repair tasks on transit stations and structures as directed.

Works in the fabrication of rail, repairing or preparing track and related components.

Performs related duties as required.

Required Knowledge and Abilities

Knowledge of, or the ability to acquire the knowledge necessary to properly, effectively and safely operate assigned tools.

Ability to perform difficult physical tasks such as lifting and moving heavy objects.

Ability to work from written or oral instructions.

Ability to work variable hours while exposed to various weather conditions.

Ability to transmit and receive messages by radio and telephone.

Ability to comprehend and adhere to safety regulations and procedures in the performance of assigned tasks.

Ability to perform during operating hours with high speed rail vehicles passing on adjacent tracks.

Ability to pass any test required for a candidate for this classification.

Desirable Qualifications

Completion of, at least, the 8th grade or equivalent vocational training, at least two years experience as a laborer, track repairer or related work with good work record and demonstrated abilities.

SYSTEM MONITOR

Basic Function

Responsible for monitoring the proper payment of fare and the issuance of citations for fare evasion; deserving activities in stations, fare collection areas, and other designated locations by CCTV; and providing information to system passengers.

Examples of Duties

Monitors stations fare collection areas, and other designated locations by closed circuit television (CCTV).

Reports fare machine malfunctions.

Checks passengers in fare collection areas and on vehicles for possession of a proper ticket for evidence of fare payment.

Issues citations, according to pre-established guidelines, to those passengers who do not possess proper tickets.

Provides assistance, information or direction to passengers for using the system.

Provides assistance to rail supervisory personnel.

Reports abnormal or unusual occurrences to central control.

Provides testimony and documentation in court as a result of the issuance of a citation or CCTV monitoring of criminal activity.

Maintains a chronological log of activities observed in stations by means of CCTV.

Required Knowledge and Abilities

Knowledge of or ability to acquire knowledge of the rules and procedures involved in the operation of a rail transit system.

Ability to communicate effectively with others orally and in writing, at times using handheld radios and telephones.

Knowledge of the geographic layout of the rail transit system, its stations, and its interface with bus services.

Ability to work variable hours.

Ability to handle stressful situations.

Ability to complete the training program and pass any testing required for this classification.

Desirable Qualifications

Completion of high school or possession of a high school equivalency certificate. Two years of experience involving security or surveillance in related or similar work.

Special Requirement

Must possess a valid California driver's license.

APPENDIX B

RAIL TRANSIT OPERATOR SURVEY DATA SUMMARIES

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Atlanta

OPERATOR Metropolitan Atlanta Rapid Transit Authority

DATA PROVIDED:

Short range transit plan: Yes

Organization charts: Yes

Position descriptions: Yes

Annual operating budget: Yes

Labor agreements: Yes

UMTA Section 15 annual submission: Yes

Rail Operators Handbook: Yes

System track map: Yes

Management reports: No

Questionnaire: Yes

RTD

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR Metropolitan Atlanta Rapid Transit Authority

PERSON COMPLETING SURVEY Ann F. Johnson

POSITION/DEPARTMENT Manager of Research and Analysis

DATE May 31, 1985

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines 2

b) Number of two-way rail track miles (not including yards) (Electrified Track)

At grade 26.4

Subway 15.8

Elevated 13.3

c) Number of stations (25)

At grade 6

* Subway 12

* Elevated 8

d) Number of repair yards 1

e) Number of storage only yards 1

f) Number of vehicles

Peak 110

Base 84

Early/late 110/54

g) Number of trains

Peak 21

Base 21

Early/late 21/13

h) Annual vehicle miles 7,622,000

i) Annual vehicle hours 371,500

j) Annual service miles 979,000

k) Annual boarding passengers 51,932,000

* Civic Center rail station is both subway and elevated.

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

Manufacturer-Cubic Western. Faregates accept coins, tokens, magnetic strip cards and transfers. Certain stations have barrier free entrances (buses only) which do not require transfers.

m) Number of personnel required to operate each train

Operators 1

Other (position and number) None

n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

There is no charge for a transfer from bus/rail or rail/bus. For buses which enter a barrier-free intermodal transfer area of a rail station, no transfer document is required; for buses which discharge passengers outside the "paid" area of a rail station, the operator dispenses bus-to-rail transfers. Conversely, if a rail patron needs a transfer to bus, it maybe secured at the rail faregate, also at no charge.

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

Rail Stations are generally unattended. A few part-time attendants are employed for situations or events of unusually high patronage, or expected crowds of persons unfamiliar with the system.

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes X No _____

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

Represented positions were filled in this manner. Non-represented positions were filled by both internal transfers and external hires.

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

Many represented positions are still filled by transferring bus personnel or by transfers and promotions within the rail division. Some positions requiring specific background not normally part of bus operation are frequently filled by external hire.

(d) How is rail seniority established for transferring bus personnel?

Operators (Bus & Rail) occupy one seniority unit. In the maintenance unit, seniority in grade (for pay) is established by "time in craft". A transferring bus employee with no "time in craft" will start at the first step in grade.

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

There are no restrictions on transfers. Employee will retain seniority for amount of time spent in a particular craft but will not be able to transfer any seniority gained in another craft.

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

Approximately 60 Operators have transferred from bus to rail. There has been transferring in maintenance but that information is not available.
From rail to bus? 24 operators approximately from rail to bus.

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair Wheel/axle work - All vital printed circuit boards

~~If yes, which components?~~ and all DC & AC motors

Vehicle/system engineering

Vehicle/system cleaning

Parking facility operations

Fare collection system maintenance

Security

Facilities maintenance

Other Elevator and Escalator maintenance

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

No part-time personnel are used for maintenance functions nor rail operations.

However, part-time personnel are used as:

1. Facility Attendants - monitor washrooms (20)
2. Faregate Agents - assist passengers in faregate entry and exit (14)
3. Security Agents - Control parking lots (18)

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs In-house training included:

1. Walked the mainline to gain detailed knowledge of wayside signals and equipment.
2. 28-day Train Operator Development Program

Use of suppliers/vendors Vendors used were:

1. Societe Franco Belge, manufacturer of initial fleet of 120 cars.
2. Hitachi Itoh, manufacturer of second contract of 50 cars.
3. Pace Development - ATC (Automatic Train Control)
4. WABCO - Construction & placement of switch machines in yard area.
5. GRS - Signals and interlockets.

Use of outside training programs at local universities, colleges, etc.

Georgia State University trained in Public Relations. All training was conducted for Supervisory Personnel.

Participation in testing/construction/inspection activities

Performed "pre revenue service testing" over newly constructed tracks with inhouse system engineering and SFB Company.

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs 6 month refresher on train operator development program. Line Instructors Development Program. Red Flag Procedures

Use of suppliers/vendors

TRANSPORTATION ONLY

Use of outside training programs at local universities, colleges, etc.

Accident/Incident Investigation Techniques, and various other rail related info administered by the Rail Institute of Oklahoma City.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring? *

(1) Asst. Director of Rail Transportation (9/77) internal

(2) Deputy Asst. Director of Rail (9/77) internal

(3) Manager of Central Control (9/77) internal

(4) Rail Training Instructors (5/78)

(5)

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

Central Control Dispatchers

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

* Source of hiring came from within, except for the Training Instructor. He came from PATCO but drove a bus for MARTA approximately 2 years.

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs General Familiarization & Safety

Use of suppliers/vendors System Suppliers & Vehicle Contractor contracted supplier maintenance training

Use of outside training programs at local universities, colleges, etc.

---- ----

Participation in testing/construction/inspection activities

Limited prior to startup

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

* In-house training programs Electronic Technician in various system types (i.e., ATC, Trans. Vehicle, Fare Collection, Computers, Communications, Power)

Use of suppliers/vendors Job Task Analysis

*Note: In-house training of 1,340 hours was given to 186 people. Trainees included Electronic Technicians, Maintenance personnel and Supervisory personnel.

MAINTENANCE ONLY

Use of outside training programs at local universities, colleges, etc.

Short period of Local Trade School Basic Electronics.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring? Rail start-up 6/79.

(1) Director of Maintenance Rail (8/77) - external Transit/RR

(2) Foreman of Power/Maintenance (10/77 - external Transit/RR

(3)

(4)

(5)

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

Hiring: Highly technical positions, i.e. Journeyman, Electronic Technicians.

Personnel Admin: Contract administration - seniority in grade.

Training: Apprentice ET program

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Baltimore

OPERATOR Mass Transit Administration of Maryland

DATA PROVIDED:

Short range transit plan: No

Organization charts: Yes (by telephone)

Position descriptions: No

Annual operating budget: No

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: No

Questionnaire: No

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Boston

OPERATOR Massachusetts Bay Transportation Authority

DATA PROVIDED: did not respond

Short range transit plan:

Organization charts:

Position descriptions:

Annual operating budget:

Labor agreements:

UMTA Section 15 annual submission:

Rail Operators Handbook:

System track map:

Management reports:

Questionnaire:

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Buffalo

OPERATOR Niagara Frontier Transportation Authority

DATA PROVIDED:

Short range transit plan: No

Organization charts: No

Position descriptions: No

Annual operating budget: No

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: No

Questionnaire: Yes

RTD

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR Niagara Frontier Transit Metro System Inc.

PERSON COMPLETING SURVEY Paul O'Brien

POSITION/DEPARTMENT Operations Control Center Manager/Rail Transportat

DATE April 20, 1985

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines ONE

b) Number of two-way rail track miles (not including yards)

At grade 1

Subway 4

Elevated 0

c) Number of stations

At grade 6

Subway 6

Elevated 0

d) Number of repair yards 1

e) Number of storage only yards NONE

f) Number of vehicles

Peak 16

Base 8

Early/late 6

g) Number of trains

Peak 8

Base 4

Early/late 3

h) Annual vehicle miles 583,200 estimated

i) Annual vehicle hours 48,746 estimated

j) Annual service miles 291,600 estimated

k) Annual boarding passengers not available

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

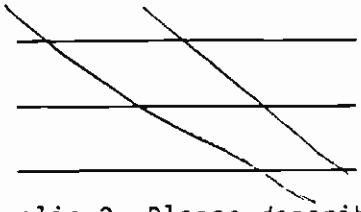
Free on surface

Barrier free ticket/transfer system in subway

m) Number of personnel required to operate each train

Operators ONE

Other (position and number)



n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

Rail ticket is transfer to bus at no extra charge

Bus transfer is fare for rail trip

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

Unattended

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes ✓ No _____

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

All union positions except a few electrical workers who were hired from outside NFT Metro. Most managers were hired from outside NFT Metro

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

Yes

(d) How is rail seniority established for transferring bus personnel?

Bus seniority carried over until approx. December 1986 — then date of rail qualification

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

Yes — at any time within 60 days. After then by mutual agreement.

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

~~80~~ 70

From rail to bus? 15

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair _____

If yes, which components? _____

Vehicle/system engineering _____

Vehicle/system cleaning NONE

Parking facility operations NONE

Fare collection system maintenance NONE

Security NONE

Facilities maintenance NONE

Other Snow hauling

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

NC

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs

4 week operator training
6 week rail supervisor training
8 week rail controller training

Use of suppliers/vendors

GRS, CSC vendors did some controller training

Use of outside training programs at local universities, colleges, etc.

None in transportation

Participation in testing/construction/inspection activities

All Rail Supervisors, Operators, & Controllers participated in system testing

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs

Use of suppliers/vendors

Use of outside training programs at local universities, colleges, etc.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring?

(1) Rail Transportation Superintendent → transit consultant

(2) OCC Manager – NFT Metro

(3) District Manager – NFT Metro

(4) Rail Supervisor – NFT Metro

(5) Way + Power Supt. + Rail Car Supt. — FRA; consultant

two positions filled at same time

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

① Union Contract + restrictions

② Difficult to train on incomplete systems

③ Coordination with construction staff and vendors/suppliers

④ Poor scheduling of training activities by vendors/suppliers and construction managers

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Calgary

OPERATOR Calgary Transit

DATA PROVIDED:

Short range transit plan: No

Organization charts: Yes

Position descriptions: Partial

Annual operating budget: No

Labor agreements: Yes

UMTA Section 15 annual submission: Not applicable

Rail Operators Handbook: Yes

System track map: No

Management reports: No

Questionnaire: No (completed by project personnel from data provided)

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR Calgary Transit

PERSON COMPLETING SURVEY Project Team

POSITION/DEPARTMENT _____

DATE _____

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines 1

b) Number of two-way rail track miles (not including yards)

At grade 7.0

Subway 0.7 (est)

Elevated 0

c) Number of stations

At grade 16

Subway 0

Elevated 0

d) Number of repair yards 1 (combined bus/rail)

e) Number of storage only yards 0

f) Number of vehicles (27 total)

Peak (5 min headway)

Base (10 min headway)

Early/late

g) Number of trains

Peak 10

Base 5

Early/late 3 to 5

h) Annual vehicle miles

i) Annual vehicle hours

j) Annual service miles

k) Annual boarding passengers

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

Barrier-free, proof of payment

m) Number of personnel required to operate each train

Operators _____

Other (position and number) _____

_____

_____

n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail-Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes _____ No _____

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

See Chapter 5 of Final Report for detailed discussion

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

See Chapter 5 of Final Report for detailed discussion

(d) How is rail seniority established for transferring bus personnel?

See Chapter 5 of Final Report for detailed discussion

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

See Chapter 5 of Final Report for detailed discussion

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

From rail to bus? _____

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair _____

If yes, which components? _____

Vehicle/system engineering _____

Vehicle/system cleaning _____

Parking facility operations _____

Fare collection system maintenance _____

Security _____

Facilities maintenance _____

Other _____

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs _____

Use of suppliers/vendors _____

Use of outside training programs at local universities, colleges, etc.

Participation in testing/construction/inspection activities _____

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs _____

Use of suppliers/vendors _____

Use of outside training programs at local universities, colleges, etc.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Cleveland

OPERATOR Greater Cleveland Regional Transit Authority

DATA PROVIDED:

Short range transit plan: No

Organization charts: No

Position descriptions: No

Annual operating budget: No

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: No

Questionnaire: Yes

RTD

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR Greater Cleveland Regional Transit Authority

PERSON COMPLETING SURVEY Calvin S. Cross

POSITION/DEPARTMENT Assistant Director of Rail Transportation

DATE May 1, 1985

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines 1 (2 branches)

b) Number of two-way rail track miles (not including yards)

At grade 38.4

Subway .1

Elevated 0

c) Number of stations

At grade 28

Subway 1

Elevated 0

d) Number of repair yards 1

e) Number of storage only yards 1

f) Number of vehicles

Peak 28

Base 7

Early/late 5

g) Number of trains

Peak 18

Base 7

Early/late 5

h) Annual vehicle miles 1,064,598

i) Annual vehicle hours 37,198

j) Annual service miles 1,062,305

k) Annual boarding passengers 4,801,186

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

Cash, Pass, Tickets. Farebox on trains.

m) Number of personnel required to operate each train

Operators 1

Other (position and number) Conductor 1

n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

Passenger can transfer from one to the other. This system has been in effect since 1975. No major problems.

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

Unattended, except for main station in Cleveland. 4 Attendants.

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes X No _____

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

Any, if applicant passes a test - Civil Service.

No, most from outside company.

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

Yes, applicant must take Civil Service test.

(d) How is rail seniority established for transferring bus personnel?

All new employees (transfer/or from outside) start at bottom of list

No seniority.

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

Yes, personnel can take a test - Civil Service.

No seniority.

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

N/A

From rail to bus? N/A

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair Track, some equipment.

If yes, which components?

Vehicle/system engineering in-house

Vehicle/system cleaning in-house

Parking facility operations in-house

Fare collection system maintenance in-house

Security in-house

Facilities maintenance in-house

Other

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

Yes, part-time operators and conductors.

Season track work (labor).

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs Training instructors and training manuals.

Use of suppliers/vendors in-house

Use of outside training programs at local universities, colleges, etc.

Some.

This is due to budget.

Participation in testing/construction/inspection activities

Some in-house.

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs Follow-ups, retraining, refresher courses, season courses.

Use of suppliers/vendors None

Use of outside training programs at local universities, colleges, etc.

Some, very little.

This is due to budget.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring?

(1) This light rail system started in 1929, no records or

(2) personnel left that could remember this.

(3)

(4)

(5)

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

Not on entry interview.

Employee interaction with customers.

Physical and height requirements not considered.

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Edmonton

OPERATOR Edmonton Transit

DATA PROVIDED:

Short range transit plan: Yes

Organization charts: Partial

Position descriptions: Partial

Annual operating budget: No

Labor agreements: Yes

UMTA Section 15 annual submission: Not applicable

Rail Operators Handbook: Yes

System track map: No

Management reports: Yes

Questionnaire: No (completed by project personnel from data provided)

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR Edmonton Transit

PERSON COMPLETING SURVEY Project Team

POSITION/DEPARTMENT _____

DATE _____

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines 1

b) Number of two-way rail track miles (not including yards)

At grade 4.9

Subway 1.0

Elevated 0

c) Number of stations

At grade 6

Subway 2

Elevated 0

d) Number of repair yards 1 (midway, not at station)

e) Number of storage only yards 0

f) Number of vehicles (21 total)

Peak (5 min headway)

Base (10 min headway)

Early/late (15 min headway)

g) Number of trains

Peak 6 (2 to 3 cars)

Base 3 (1 car)

Early/late 2

h) Annual vehicle miles

i) Annual vehicle hours

j) Annual service miles

k) Annual boarding passengers 6,400,000 (1980 est)

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

m) Number of personnel required to operate each train

Operators _____

Other (position and number) _____

_____

_____

n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes _____ No _____

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

See Chapter 5 of Final Report for detailed discussion

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

See Chapter 5 of Final Report for detailed discussion

(d) How is rail seniority established for transferring bus personnel?

See Chapter 5 of Final Report for detailed discussion

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

See Chapter 5 of Final Report for detailed discussion

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

From rail to bus?

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair

If yes, which components?

Vehicle/system engineering

Vehicle/system cleaning

Parking facility operations

Fare collection system maintenance

Security

Facilities maintenance

Other Power maintenance to Edmonton Power

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs _____

Use of suppliers/vendors _____

Use of outside training programs at local universities, colleges, etc.

Participation in testing/construction/inspection activities _____

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs _____

Use of suppliers/vendors _____

Use of outside training programs at local universities, colleges, etc.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Miami

OPERATOR Metropolitan Dade County Transportation Administration

DATA PROVIDED:

Short range transit plan: No

Organization charts: No

Position descriptions: Yes

Annual operating budget: No

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: No

Questionnaire: No

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY New Orleans

OPERATOR Regional Transit Authority

DATA PROVIDED: did not respond

Short range transit plan:

Organization charts:

Position descriptions:

Annual operating budget:

Labor agreements:

UMTA Section 15 annual submission:

Rail Operators Handbook:

System track map:

Management reports:

Questionnaire:

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Philadelphia

OPERATOR Southeastern Pennsylvania Transportation Authority

DATA PROVIDED: did not respond

Short range transit plan:

Organization charts:

Position descriptions:

Annual operating budget:

Labor agreements:

UMTA Section 15 annual submission:

Rail Operators Handbook:

System track map:

Management reports:

Questionnaire:

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Pittsburgh

OPERATOR Port Authority of Allegheny County

DATA PROVIDED:

Short range transit plan: No

Organization charts: Yes

Position descriptions: Yes

Annual operating budget: No

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: No

Questionnaire: No

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Portland

OPERATOR Tri-County Metropolitan Transportation District

DATA PROVIDED: did not respond

Short range transit plan:

Organization charts:

Position descriptions:

Annual operating budget:

Labor agreements:

UMTA Section 15 annual submission:

Rail Operators Handbook:

System track map:

Management reports:

Questionnaire:

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY San Diego

OPERATOR Metropolitan Transit Development Board

DATA PROVIDED:

Short range transit plan: Yes

Organization charts: Yes

Position descriptions: No

Annual operating budget: Yes

Labor agreements: Not applicable

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: Yes

Questionnaire: Yes

SAN DIEGO

Returned 4/22/85

RTD

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR Metropolitan Transit Development Board

PERSON COMPLETING SURVEY Tom Larwin

POSITION/DEPARTMENT General Manager

DATE 4/18/85

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines 1

b) Number of two-way rail track miles (not including yards)

At grade 16

Subway

Elevated

c) Number of stations

At grade 18

Subway

Elevated

d) Number of repair yards 2

e) Number of storage only yards 1

f) Number of vehicles

Peak 19

Base 12

Early/late 2

g) Number of trains

Peak 6

Base 6

Early/late 2

h) Annual vehicle miles

i) Annual vehicle hours

j) Annual service miles

k) Annual boarding passengers

See enclosed tables

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

Self service, barrier free

m) Number of personnel required to operate each train

Operators 1

Other (position and number) _____

n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

see enclosed Regional Transit Guide

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

unattended

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes _____ No ✓

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

n/a

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

no

(d) How is rail seniority established for transferring bus personnel?

n/a

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

n/a

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

n/a

From rail to bus? _____

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair Some

If yes, which components? Major electronic components (e.g., traction motors)

Vehicle/system engineering Some

Vehicle/system cleaning Some

Parking facility operations Some

Fare collection system maintenance No

Security Yes

Facilities maintenance Some

Other _____

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

Yes; see enclosed material

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs Basic 3 wk. training for operators; substantial variance in program depending on skill level

Use of suppliers/vendors dependent upon specific contractor and contract

Use of outside training programs at local universities, colleges, etc.

not with start-up; does exist for existing new maintenance hires; enrolled in State apprenticeship program for maintenance in conjunction w/ local community college

Participation in testing/construction/inspection activities no special training program

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs above apprenticeship program; others are constantly going on in various areas

Use of suppliers/vendors none to speak of

Use of outside training programs at local universities, colleges, etc.

See above

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring?

(1) Managing Director (consultant helped)

(2) Electro mechanics (in-house)

(3) Electro mechanic (in-house)

(4) Mgr. of Administration (in-house)

(5) Mgr. of Transportation (in-house)

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

E/H lift; skilled electronic technicians

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY San Francisco

OPERATOR San Francisco Municipal Railway

DATA PROVIDED:

Short range transit plan: Yes

Organization charts: Yes

Position descriptions: No

Annual operating budget: Yes

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: Yes

System track map: Yes

Management reports: Yes

Questionnaire: No (completed by project personnel from data provided)

SURVEY OF RAIL TRANSIT OPERATORS

NAME OF OPERATOR S.F. Municipal Railway

PERSON COMPLETING SURVEY Project Team

POSITION/DEPARTMENT _____

DATE _____

A. Available Reports

Copies of the most recent version of the following documents are requested. Please bill us for any copying or related charges.

1. Short range transit plan.
2. Organization chart including the number of authorized positions and union designation.
3. Position descriptions, including pay grades, for bus and rail operations and maintenance functions. We are interested in bus position descriptions for comparative purposes. Position descriptions for administrative and support positions are not required.
4. Annual operating budget.
5. Labor agreements pertaining to bus and rail operations and maintenance positions.
6. UMTA Section 15 non-financial data reports for the most recent year.
7. Rail operations rule book or operators handbook.
8. Rail system track map or schematic showing the location of storage and repair yards, mainline switches and crossovers, signal towers, traction substations, and interlocking plants.
9. Any management reports concerning staff development and hiring for the startup of rail operations and maintenance functions.

B. Rail System Characteristics Data

a) Number of lines 5, 6th planned

b) Number of two-way rail track miles (not including yards)

At grade 28.9

Subway 11.9

Elevated 0

c) Number of stations

At grade 46

Subway 8

Elevated 0

d) Number of repair yards 2

e) Number of storage only yards 1

f) Number of vehicles (130 total)

Peak 92

Base

Early/late

g) Number of trains

Peak (3 to 4 car trains)

Base (1 to 4 car trains)

Early/late

h) Annual vehicle miles 4,000,000 (FY82-83)

i) Annual vehicle hours 360,411 (FY82-83)

j) Annual service miles

k) Annual boarding passengers 48.2 million (FY82-83)

l) Type of rail fare collection system (token/turnstile, magnetic strip card/turnstile, honor system with barrier free stations, etc.)

self-service on cable cars

operator-monitored on others, examining self-service option for LRV

m) Number of personnel required to operate each train

Operators 1 to 4

Other (position and number)

n) What is bus/rail transfer policy? Please describe any additional personnel requirements or problems related to bus/rail transfers.

Transfers good for all modes, extra 40 cents to transfer to cable car

Transfers valid for 1.5 hours

o) Are rail stations normally attended or unattended? If attended, how many attendants are required?

C. Personnel Information

Data concerning a number of personnel policies and practices are of interest. This data may be contained in one or more of the requested reports, and, if so, need not be filled in below. Some questions relate specifically to the startup of rail transit operations and may not be applicable.

1. Bus/Rail Personnel Transfers

(a) When rail service was started, were rail operations and maintenance positions filled by personnel transferring from bus operations?

Yes not applicable No _____

(b) Which positions were filled in this manner? Were all available positions filled through transfers?

Not applicable

(c) Are rail operations and maintenance vacancies currently filled by transferring bus personnel as described above?

Not applicable

(d) How is rail seniority established for transferring bus personnel?

Not applicable

(e) Are rail operations and maintenance personnel permitted to transfer back to bus operations? If so, under what circumstances may this be done?

Not applicable

(f) In the past one year, approximately how many operations and maintenance personnel have transferred from bus to rail?

From rail to bus?

2. Use of Outside Contractors and Part-time Labor

(a) Which of the following operations and maintenance functions are contracted for?

Component repair

If yes, which components?

Vehicle/system engineering

Vehicle/system cleaning

Parking facility operations

Fare collection system maintenance

Security

Facilities maintenance

Other Power distribution to Hetch Hetchy

Power substation maintenance to Dept of Water and Power

(b) Are part-time personnel used for operations and maintenance functions? If so, please describe which functions and how many part-time personnel.

3. Training Programs

(a) For the startup of rail operations, please describe training programs implemented for rail operations and maintenance functions.

In-house training programs _____

Use of suppliers/vendors _____

Use of outside training programs at local universities, colleges, etc.

Participation in testing/construction/inspection activities _____

(b) For ongoing rail operations, what training programs are in place for rail operations and maintenance functions.

In-house training programs 4 week program for entry-level LRV employees on electricity and specifics of LRV, also door and brake courses for trolley mechanics, self-study programs for maintenance mechanics and technicians

Use of suppliers/vendors _____

Use of outside training programs at local universities, colleges, etc.

4. Startup Hiring

For the startup or rail operations, what were the first five positions filled (not counting positions concerned with system development and construction)? What was the source of hiring?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

5. Problem areas

For the startup of rail operations and for on-going operations, what problem areas have required special attention for hiring, personnel administration, training, labor relations and related activities?

Thank you for your assistance in completing this questionnaire. Any questions concerning this survey should be directed to Craig Fajnor, Senior Planner, at (213) 237-2133.

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Toronto

OPERATOR Toronto Transit Commission

DATA PROVIDED:

Short range transit plan: No

Organization charts: Yes

Position descriptions: Partial

Annual operating budget: No

Labor agreements: Yes

UMTA Section 15 annual submission: Not applicable

Rail Operators Handbook: Yes

System track map: Yes

Management reports: No

Questionnaire: No (payment required)

RAIL TRANSIT OPERATOR DATA SURVEY RESPONSE

CITY Washington

OPERATOR Washington Metropolitan Area Transit Authority

DATA PROVIDED:

Short range transit plan: No

Organization charts: Yes

Position descriptions: No

Annual operating budget: Yes

Labor agreements: No

UMTA Section 15 annual submission: No

Rail Operators Handbook: No

System track map: No

Management reports: No

Questionnaire: No

APPENDIX C

EXAMPLE URAMPS MODEL OUTPUTS

08-29-1985 17:59:40

LONG BEACH-LOS ANGELES LRT PLANNING

SUMMARY RESULTS

VEHICLES	DAILY	ANNUAL
REVENUE MILES	7744.00	1951488
DEAD HEADING MILES	496.00	124992
TOTAL MILES	8240.00	2076480
REVENUE HOURS	310.93	78355
DEAD HEADING HOURS	19.23	4847
HOURS AT STATIONS	58.53	14750
TOTAL HOURS	388.70	97952

TRAINS	DAILY	ANNUAL
REVENUE MILES	3872.00	975744
DEAD HEADING MILES	248.00	62496
TOTAL MILES	4120.00	1038240
REVENUE HOURS	155.47	39178
DEAD HEADING HOURS	9.62	2423
HOURS AT STATIONS	29.27	7375
TOTAL HOURS	194.35	48976

NUMBER OF PEAK TRAINS	12
NUMBER OF PEAK CARS	24

08-29-1985 18:00:21

LONG BEACH-LOS ANGELES LRT PLANNING

SCHEDULED ARRIVALS AT YARD

TIME	OPPOSITE TIME	FROM	NO. OF TRAINS	TRAIN NO.	NO. OF CARS
9:45	9:29	L.B.	11	8	2
10:04	9:29	L.A.	10	7	2
10:15	9:59	L.B.	[illegible]	[illegible]	2
10:34	9:59	L.A.	6	4	2
19:25	19:09	L.B.	11	16	2
19:44	19:09	L.A.	10	15	2
19:45	19:29	L.B.	9	1	2
20:04	19:29	L.A.	8	2	2
20:25	20:09	L.B.	7	12	2
20:44	20:09	L.A.	[illegible]	11	2
25:15	24:59	L.B.	[illegible]	[illegible]	[illegible]
25:34	24:59	L.A.	4	[illegible]	2
27:15	26:59	L.B.	[illegible]	[illegible]	2
27:34	26:59	L.A.	[illegible]	[illegible]	2

08-09-1985 18:00:56

LONG BEACH-LOS ANGELES LRT PLANNING

SCHEDULED DEPARTURES AT YARD

TIME	OPPOSITE TIME	TO	NO. OF TRAINS	TRAIN NO.	NO. OF CARS
23:19	23:54	L.A.	1	2	2
23:38	23:54	L.B.	2	1	2
23:59	0:34	L.A.	3	4	2
0:18	0:34	L.B.	4	3	2
5:29	6:04	L.A.	5	6	2
5:48	6:04	L.B.	6	5	2
5:49	6:24	L.A.	7	8	2
5:59	6:34	L.A.	8	10	2
6:08	6:24	L.B.	9	7	2
6:09	6:44	L.A.	10	12	2
6:18	6:34	L.B.	11	9	2
6:28	6:44	L.B.	12	11	2
14:59	15:34	L.A.	9	14	2
15:18	15:34	L.B.	10	13	2
15:29	16:04	L.A.	11	16	2
15:48	16:04	L.B.	12	15	2

08-29-1985 18:02:51

LONG BEACH-LOS ANGELES LRT PLANNING

SCHEDULED DEPARTURES AT L.B.

TIME	OPPOSITE TIME	TO	NO. OF TRAINS	TRAIN NO.	NO. OF CARS
0:00	0:53	L.A.	3	1	2
0:40	1:33	L.A.	4	3	2
1:20	2:13	L.A.	4	2	2
2:00	2:53	L.A.	4	4	2
2:40	3:33	L.A.	4	1	2
3:20	4:13	L.A.	4	3	2
4:00	4:53	L.A.	4	2	2
4:40	5:33	L.A.	4	4	2
5:20	6:13	L.A.	4	1	2
6:00	6:50	L.A.	8	3	2
6:10	7:00	L.A.	10	5	2
6:20	7:13	L.A.	11	2	2
6:30	7:23	L.A.	12	7	2
6:40	7:33	L.A.	12	9	2
6:50	7:43	L.A.	12	11	2
7:00	7:53	L.A.	12	4	2
7:10	8:03	L.A.	12	6	2
7:20	8:13	L.A.	12	1	2
7:30	8:23	L.A.	12	8	2
7:40	8:33	L.A.	12	10	2
7:50	8:43	L.A.	12	12	2
8:00	8:53	L.A.	12	3	2
8:10	9:03	L.A.	12	5	2
8:20	9:13	L.A.	12	2	2
8:30	9:23	L.A.	12	7	2
8:40	9:33	L.A.	12	9	2
8:50	9:43	L.A.	12	11	2
9:00	9:53	L.A.	12	4	2
9:15	10:08	L.A.	12	6	2
9:29	9:23	YARD	12	8	2
9:30	10:23	L.A.	12	1	2
9:45	10:38	L.A.	11	10	2
9:59	9:53	YARD	11	3	2
10:00	10:53	L.A.	11	12	2
10:15	11:08	L.A.	9	5	2
10:30	11:23	L.A.	9	2	2
10:45	11:38	L.A.	8	9	2
11:00	11:53	L.A.	8	11	2
11:15	12:08	L.A.	8	6	2
11:30	12:23	L.A.	8	1	2

No.	Basic Characteristic	Qty	Units
1	NUMBER OF LINES	1	
2	PEAK TRAINS	14	
3	MAIN YARDS	1	
4	WKDY TRAIN HRS	171	
5	SAT TRAIN HRS	[illegible]	
6	SUN TRAIN HRS	120	
7	PEAK CARS	[illegible]	
8	TRACK MILES	[illegible]	
9	STATIONS	22	
10	CENTRAL CONTROL	1	
11	DAILY RIDERSHIP	27.5	THOUS

menu/first/next/input/delete/line route change

[illegible]	[illegible] Name	Number	Cost
1	OPERATIONS [illegible]	210	[illegible]
2	TRANS OF [illegible]	250	3219
3	MAINT OF [illegible]	[illegible]	3319
4	RAIL SYSTEMS	350	3500
5	FACILITY MAINT	370	[illegible]
6	TRANSIT POLICE	200	[illegible]

[illegible]

ORGANIZATION STRUCTURE

DIVISION:

	OPERATIONS CNTL	CODE: 332
	TRANS OP DIV	CODE: 321
	TRANSIT POLICE	CODE: 322

	MAINT OP DIV	CODE: 3319
	RAIL SYSTEMS	CODE: 350
	FACILITY MAINT	CODE: 3334

1	HOURLY	2
2	HOURLY	2
3	HOURLY	20.0
4	HOURLY	2
5	HOURLY	3
6	HOURLY	2
7	HOURLY	2
8	HOURLY	3
9	HOURLY	2
10	HOURLY	31.9
11	HOURLY	3
12	MONTHLY	4
13	HOURLY	3
14	MONTHLY	37.4
15	MONTHLY	39.9
16	MONTHLY	41

17	MONTHLY	[illegible]
2	HOURLY	20.4
3	HOURLY	20.6
4	HOURLY	22.8
5	HOURLY	[illegible]
6	HOURLY	26.6
7	HOURLY	28.7
8	HOURLY	[illegible]
9	HOURLY	[illegible]
10	HOURLY	31.[illegible]
11	HOURLY	30.2
12	MONTHLY	34.[illegible]
13	HOURLY	35.4
14	MONTHLY	37.[illegible]
15	MONTHLY	39.9
16	MONTHLY	41.[illegible]

menu: first/next/input/delete/line no. to change

No.	Allocation	Fixed	Percent of Base
1	UTL	0	45.5
2	ATU	0	45.5
3	SPAC	0	45.5
4	TU	0	45.5
90	MANAGEMENT	0	30

menu/first/next input/delete/line no to change

LABOR COSTS SUMMARY BY DIVISION

NO.	POSITION TITLE	AFFIL.	POSITIONS	SALARY	BENEFITS	ANNUAL COST
[illegible]	20 CATL SUPERVISOR	NAC	5.00	$[illegible]	$[illegible]	$[illegible]
[illegible]	20 [illegible] SUPV	[illegible]	[illegible]	$[illegible]	$[illegible]	$[illegible]

UNION	POSITIONS	TOTALS:	0.00	$0	$0	$0

BENEFITS ARE DETERMINED BY AFFILIATION

NON-UNION	POSITIONS	TOTALS:	6.00	$229	$[illegible]	$298

BENEFITS ARE DETERMINED BY AFFILIATION

TOTALS	6.00	$[illegible]	$298

[illegible]

[illegible] NO. 220 DIVISION NAME TRANS OF DIV [illegible]

LABOR COSTS SUMMARY BY DIVISION

NO.	POSITION-TITLE	[illegible]	POSITIONS	SALARY	BENEFITS	ANNUAL COST
[illegible]	1 DIV MANAGER	NON	1.00	$44	$13	$57
220	25 YARD SUPERVISOR	[illegible]	5.00	$34	$10	$[illegible]
220	30 LINE OPERATOR	U 1	45.00	$26	$12	$1614
220	31 YARD OPERATOR	U 1	5.00	$26	$12	$189
220	35 OPS SUPERVISOR	NON	1.00	$34	$10	$44[illegible]
220	36 DIVISION STENO	U 3	1.00	$21	$9	$30
	UNION POSITIONS	TOTALS:	45.00	$1359	$573	$1832
BENEFITS ARE DETERMINED BY AFFILIATION						
	NON-UNION POSITIONS	TOTALS:	[illegible]	$[illegible]	$168	$726
BENEFITS ARE DETERMINED BY AFFILIATION						
		TOTALS:	55.00	$1818	$740	$2556

[illegible] NO. [illegible]

[illegible]ISION NO. [illegible] [illegible] TRANSIT POLICE [illegible]

LABOUR COSTS SUMMARY BY DIVISION

	NO.	POSITION-TITLE	APPR. POSITIONS		SALARY	BENEFITS	ANNUAL COST
230	1	LIEUTENA[illegible]	[illegible]	.00	$42	[illegible]	$3[illegible]
[illegible]	20	POLICE OFFICER	[illegible] 4	[illegible]	$[illegible]7	[illegible]	$13[illegible]
230	21	SYSTEM MONITOR	U 4	22.00	$20	[illegible]	$[illegible]
[illegible]	22	SECURITY GUARD	[illegible]	[illegible]	$20	[illegible]5	$[illegible]
230	25	POLICE SERGEAN[illegible]	[illegible] 4	[illegible]	$[illegible]	$1[illegible]	$464
230	26	TYPIST CLER[illegible]	[illegible]	2.00	$20	$9	$52

UNION POSITIONS TOTALS:	[illegible]	$1957	[illegible]	$28[illegible]
BENEFITS ARE DETERMINED BY AFFILIATION				
NON-UNION POSITIONS TOTALS:	[illegible]	$42	[illegible]	$54
BENEFITS ARE DETERMINED BY AFFILIATION				
TOTALS:	80.0[illegible]	$1999	$90[illegible]	$2901

CASE NO. [illegible]

DIVISION NO. 310 DIVISION NAME MAINTENANCE [illegible] PAGE 3 OF 5

LABOR COSTS SUMMARY BY DIVISION

NO.	POSITION TITLE	AFFIL	POSITIONS	SALARY	BENEFITS	ANNUAL COST
310	1 DIV MANAGER	NON	1.00	$44	$13	$57
310	2 TYPIST CLERK	U 2	1.00	$27	$9	$36
310	3 EQUIP RECORDS	U 2	1.00	$23	$10	$33
310	20 ELECTRIC MECH	U 2	16.00	$31	$14	$724
310	21 CAR CLEANER	U 2	8.00	$29	$13	$334
310	25 EQUIP SUPRV	NON	2.00	$42	$13	$109
	UNION POSITIONS TOTALS		26.00	$770	$350	$1120
BENEFITS ARE DETERMINED BY AFFILIATION						
	NON-UNION POSITIONS TOTALS		3.00	$128	$38	$166
BENEFITS ARE DETERMINED BY AFFILIATION						
	TOTALS		29.00	$898	$387	$1286

No.	Basic Characteristic	Qty	Units
1	NUMBER OF LINES	1	
2	PEAK TRAINS	14	
3	MAIN YARDS	1	
4	WKDY TRAIN HRS	171	
5	SAT TRAIN HRS	[illegible]	
6	SUN TRAIN HRS	120	
7	PEAK CARS	29	
8	TRACK MILES	21.[illegible]	
9	STATIONS	22	
10	CENTRAL CONTROL	1	
11	DAILY RIDERSHIP	37.9	THOUS

menu/first/next/top + [illegible]/line no. to change

DIVISION NO. 320 DIVISION NAME RAIL SYSTEMS DEPT 15

LABOR COSTS SUMMARY BY DIVISION

NO.	POSITION TITLE	AFFIL.	POSITIONS	SALARY	BENEFITS	ANNUAL COST
320	1 MANAGER SYSTEMS	NON	1.00	$44	$13	$57
320	2 TYPIST CLERK	U 3	1.00	$20	$6	$26
320	3 EQUIP RECORDS	U 3	1.00	$23	$10	$33
320	20 POWER MAINT	U 2	3.00	$[illegible]	$[illegible]	$[illegible]
320	21 TRACK MAINT	U 2	5.00	$[illegible]	$15	$[illegible]
320	22 SIGNALS MAINT	U 2	10.00	$32	$15	$409
320	23 VEHICLE MAINT	U 2	8.00	$32	$[illegible]	$375
320	24 CONTROL MAINT	U 2	3.00	$32	$15	$141
320	25 LABORER	U [illegible]	[illegible].00	$[illegible]	$[illegible]	$125
320	29 SYSTEMS SUPRV	NON	4.00	$42	$[illegible]	$216
	UNION POSITIONS TOTALS		37.00	$1155	$[illegible]527	$1685
	BENEFITS ARE DETERMINED BY AFFILIATION					
	NON-UNION POSITIONS TOTALS		5.00	$212	$63	$275
	BENEFITS ARE DETERMINED BY AFFILIATION					
	TOTALS		42.00	$1367	$[illegible]79	$1760

LABOR COST SUMMARY BY DIVISION

NO.	POSITION-TITLE	# OF POSITIONS	SALARY	BENEFITS	TOTAL $
020	20 PROPERTY MAINT	1.00	$[illegible]	[illegible]	$650
025	25 BLDG ENG & SUPR	1.00	$[illegible]	[illegible]	$57
UNION POSITIONS TOTALS		1.00	$445	$707	$650
BENEFITS ARE DETERMINED BY AFFILIATION					
NON-UNION POSITIONS TOTALS		1.00	$44	$13	$57
BENEFITS ARE DETERMINED BY AFFILIATION					
[illegible]	[illegible]	[illegible]	$451	[illegible]	$707

DIVISION NO. 210 DIVISION NAME OPERATIONS CNTL CODE 3296

POSITION NO.	TITLE	AFF. CODE	SALARY AMOUNT	CONTROL VAR.	SHIFTS/DAYS/WEEKS/SHIFTS RATE	DAY/WEEK/YEAR / YEAR	NO. OF EMPLOYEES
25	CH CNTL SU 90 15		$40 F				1.00
20	CNTL SUPER 90 14		$38 V	1	4.20	1.0 5.0 52.0 230.0	

DIVISION NO. 220 DIVISION NAME TRANS OF DIV CODE 3219

POSITION NO.	TITLE	AFF. CODE	SALARY AMOUNT		CONTROL VAR.	RATE	SHIFTS/DAYS/WEEKS/SHIFTS NO. DAY/WEEK/YEAR / YEAR				OF EMPLOYEES
1	DIV MANAGE	90 17	$44	F							1.00
35	OPS SUPERV	90 12	$34	D		0.20	1.0	1.0	1.0	1.0	
25	YARD SUPER	90 12	$34	V	3	4.20	1.0	5.0	52.0	230.0	
30	LINE OPERA	1 5	$26	V	4	0.15	1.0	5.0	52.0	205.0	
					5	0.03					
					6	0.03					
31	YARD OPERA	1 5	$26	V	2	0.15	1.0	5.0	52.0	205.0	
					3	2.00					
36	DIVISION S	3 3	$21	F							1.00

DIVISION NO. 310 DIVISION NAME MAINT OF DIV CODE 3319

POSITION NO.	TITLE	AFF. CODE	SALARY AMOUNT		CONTROL VAR.	SHIFTS/DAYS/WEEKS/SHIFTS RATE	DAY/WEEK/YEAR	/ YEAR		NO. OF EMPLOYEES
1	DIV MANAGE	90 17	$44	F						1.00
25	EQUIP SUPR	90 16	$42	D		0.08	1.0	1.0	1.0	1.0
20	ELECTRO ME	2 7	$31	V	7	0.50	1.0	5.0	52.0	230.0
21	CAR CLEANE	2 7	$29	V	7	0.25	1.0	5.0	52.0	230.0
2	TYPIST CLE	3 1	$20	F						1.00
3	EQUIP RECO	3 4	$23	V	7	0.02	1.0	5.0	52.0	230.0

DIVISION NO. 320 DIVISION NAME RAIL SYSTEMS CODE 3500

POSITION NO.	TITLE	AFF. CODE	SALARY AMOUNT	CONTROL VAR.	SHIFTS/DAYS/WEEKS/SHIFTS RATE	DAY/WEEK/YEAR / YEAR				NO. OF EMPLOYEES
1	MANAGER SY	90 17	$44	F						1.00
29	SYSTEMS SU	90 16	$42	D	0.12	1.0	1.0	1.0	1.0	
20	POWER MAIN	2 11	$32	V 1	2.00	2.0	7.0	52.0	230.0	
21	TRACK MAIN	2 10	$32	V 8	0.20	1.0	5.0	52.0	230.0	
22	SIGNALS MA	2 11	$32	V 8	0.40	1.0	5.0	52.0	230.0	
23	VEHICLE MA	2 11	$32	V 7	0.25	1.0	5.0	52.0	230.0	
24	CONTROL MA	2 11	$32	V 1	1.00	2.0	7.0	52.0	230.0	
25	LABORER	2 7	$29	V 8	0.10	1.0	5.0	52.0	230.0	
2	TYPIST CLE	3 1	$20	F						1.00
3	EQUIP RECO	3 4	$23	V 7	0.01	1.0	5.0	52.0	230.0	
				8	0.02					

DIVISION NO. 330 DIVISION NAME FACILITY MAINT CODE 3334

POSITION NO.	TITLE	AFF. CODE	SALARY AMOUNT	CONTROL VAR.		SHIFTS/DAYS/WEEKS/SHIFTS RATE	DAY/WEEK/YEAR	/ YEAR	NO. OF EMPLOYEES
25	BLDG GNDS	90 17	$44	D		0.06	1.0	1.0	1.0
20	PROPERTY M	2 10	$32	V	R	0.20	1.0	5.0	52.0	230.0
					9	0.35			

DIVISION NO. 230 DIVISION NAME TRANSIT POLICE CODE 3800

POSITION NO.	TITLE	AFF. CODE	SALARY AMOUNT	CONTROL VAR.	SHIFTS/DAYS/WEEKS/SHIFTS RATE	DAY/WEEK/YEAR / YEAR				NO. OF EMPLOYEES
1	LIEUTENANT	90 16	$42	F						1.00
25	POLICE SER	4 13	$35	D	0.13	1.0	1.0	1.0	1.0	
20	POLICE OFF	4 6	$27	V 2	1.00	1.0	5.0	52.0	230.0	
				9	0.75					
21	SYSTEM MON	4 2	$20	V 9	0.32	1.0	5.0	52.0	230.0	
				11	0.45					
22	SECURITY G	4 2	$20	V 3	4.20	1.0	5.0	52.0	230.0	
				9	0.10					
				10	4.20					
26	TYPIST CLE	3 1	$20	F						2.00