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A STUDY OF MATERIALS HANDLING
AT THE RANCHO LOS AMIGOS HOSPITAL

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I. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In this report Souder, Clark and Associates, Inc. presents a review and investigation of materials handling at Rancho Los Amigos Hospital of the Los Angeles County Hospital system. The report is intended as an overview of materials handling in the context of hospital operation.

Extensive use has been made of data gathered earlier in other studies at Rancho, and of verbal descriptions of processes and material flows by the personnel involved. Thus, the data presentations in this report should be viewed as quasi-statistical, suggesting magnitude and frequencies of movements rather than stating strict averages over a single, consistent time period. In essence, then, the study reported was a scouting expedition to view the whole territory rather than a detailed analysis of performance of individual tasks.

A. Summary

Materials handling on the Rancho Los Amigos Hospital campus is a big business. Of a total of about 82 vehicles used on the campus some 22 are used exclusively for materials transport in the sense of a delivery service. The remainder serve a variety of purposes ranging from a bus service to being engaged in material and personnel movements for the General Services, Landscaping, Maintenance Department, etc. The yearly cost for these 22 electric and non-electric materials transport vehicles approximates $9,400.00.

The major cost component in the movement of materials is personnel cost, as is generally true. Some 30 people are more or less exclusively involved in the transport of materials

between major source and use points, at a yearly salary cost in excess of $200,000.

Thus, the transport of goods between major points of storage, receiving, processing, or manufacture and points of use is about a quarter-million dollar yearly business.

(Materials handling operations internal to either source or use points have not been considered in this study. Thus warehousing and inventory control, distribution of supplies within a patient care building, or manufacture of pharmacy goods, for example, are not included in our analyses.)

This study has not shown gross inefficiencies, mismanagement, or major deficiencies in process, personnel or equipment. The studies have highlighted anomalies in operation, of the sort that develop in many large-scale widespread organizations with broad and changing missions. The Conclusions and Recommendations below illuminate these anomalies and suggest possible rectification. The Conclusions section also suggests several different alternatives to the present materials transport process.

B. Conclusions

1. The materials transport process at Rancho is exceedingly complex and diversified. Although a Transport Department is active in movement of materials, half a dozen other organizational entities also perform significant materials transport operations.

Some 700 trips per weekday (Monday through Friday) have been identified as interdepartmental materials handling, as described in Section VI of this report. These trips aggregate over 128,000 lbs. of material and containers, and constitute a volume of approximately 23,000 co. ft. of materials moved per day. The size of items carried varies from a single medical record, order of narcotic drugs, or lab specimen to a large furniture item or a truck load of linen carts.

The averages are in themselves interesting, however, The average weight carried per trip is 185.4 lbs.; the average volume per trip is 34.2 cu. ft. Thus, the average density is very low, on the order of 5.4 lbs./cu. ft., suggesting considerable transport of empty containers and of low density materials such as soiled linen.

The non-electric vehicles, trucks, vans, etc., used exclusively in materials transport average about 400 miles per month, (4800 miles per year), or about 16 miles per day of use at an average cost of approximately $0.13/mile. Assuming an average speed of 5 m.p.h. for movements on the campus (allowing for stop signs, maneuvering, etc.) one would calculate that the average truck is in transit slightly over 3 hours per day. This does not seem unreasonable when one allows for loading and unloading time, and for meals and breaks of drivers.

Of the 30-odd people involved primarily in materials transport about 25 are involved as delivery and pickup personnel either with motorized vehicles or on foot, bicycle or tram. If these 25 people account for nearly all of the 700 trips per day, then, allowing for meals and breaks, a person may average 4-1/2 trips per hour. This does not seem unreasonable either, given the distances to be covered. However, the salary cost of people primarily involved in materials distribution is large, so it is important that possible alternatives be examined which would reduce this cost, or at least improve the data available to Administration for monitoring of the operation.

Conclusions 2 through 4 below reflect the results of this investigation. The recommendations for adjustments in the Rancho system follow these.

2. An over-all automated materials handling system seems infeasible. Any system that connected the major source and use points would entail either a loop or two-way trunk and branch pathways along which carriers could move. Such a trackway would total 10,000 feet in length. No available system of which we are aware could run in the open, unsupervised and unprotected from weather, and without special provisions for crossing over or under pedestrian and vehicular ways. The most obvious system would run in subsurface utility tunnels--a sort or mini-subway--but a network of such tunnels to all major source and use points would be very costly. A cost of 4 to 10 million for such an automated system might be expected.

The primary drawback to such a system need not be the capital costs, as these may be offset in wage and salary savings over the operative lifetime of the system. The principal difficulty is the scale of the system. At carrier travel speeds of 200

feet per minute, common for powered track systems, a vehicle would require 20 minutes for the trip from one end of the campus to the other. Thus, upwards of 100 carriers might be in action in peak periods, necessitating a complement of several times that many, with attendant capital cost, maintenance and congestion problems. And still, human messenger and delivery service would be needed for stat orders.

3. Partially automated systems are possible. The single most feasible candidate would seem to be a pneumatic system for soiled linen delivery to the Laundry. Soiled linen is currently picked up from some 12 points, and a collection trunk and branches to serve all would exceed 4000 feet in length. The projected Stroke/Rehab Center will localize nearly half the total soiled linen service, however, at a location about 2000 feet from the Laundry. The cost of such a partial installation has not been investigated; it is doubted, however, that it can be justified on the basis of savings over a manual system, as it appears that one man and truck can easily handle the load, at a cost of less than $10,000 per year.

4. Another conclusion is that the scale of the Rancho campus, the low density of development, and the great variety of materials to be handled combine to preclude on a cost basis an automated materials transport between major source and use points. There would appear to be, however, ample justification for development of automated load systems within individual new facilities such as the Stroke/Rehab Center.

It is believed that the key to improvement of materials handling service and control of costs lies in organizational adjustments and intensified administrative scrutiny of materials handling operations and related interdepartmental transactions.

C. Recommendations

As noted above, radical change of method for material transport does not appear justifiable or necessary at Rancho. Anomalies in operation of the current manual, partially decentralized system do appear and can be rectified to attain the objectives of improving the quality of the service (timeliness, responsibility for materials) and the cost of the service.

1. Responsibility and authority for coordinating the flow of materials between major source and use points, regardless of the department in which they originate, should be vested in one person at the Assistant Administrator level. In a more compact physical plant it would be recommended that such person have complete line control over all materials movement, but given the widely distributed source and use points at Rancho, it is not certain that this completely centralized unit is feasible. There is therefore suggested in Recommendation 3, below, a compromise involving partial decentralization of some transport responsibility to several major supply services. It is recommended that this administrative person should be responsible for deciding which materials movement tasks are decentralized to the originating departments and which are centralized.

2. In order for effective control over all materials movement to be exerted, appropriate data on transport costs and resources and on the demands placed on the materials movement system must be available to the Administration. Four actions are indicated:

a. Regular and timely reporting of personnel utilization in interdepartmental or internode materials movement should be initiated from all affected departments.

b. An administrative committee with representation from affected departments should explore ways to consolidate delivery functions and eliminate redundant travel. This committee should function in a staff advisory capacity to the Assistant Administrator responsible for coordination of all material flows, and he should be chairman of the committee.

c. An internal analysis of the ordering and order pickup processes should be performed, with a view to improving the predictability of deliveries and thus increasing the proportion of scheduled as opposed to irregular or stat deliveries.

d. A long-term project should be stressed, for development of a campus-wide information system, probably computer-based, to handle ordering, scheduling of deliveries, and ongoing analysis of the transport functions.

3. The Assistant Administrator responsible for material flows, aided by the advisory committee, should evaluate all areas of material flow on the hospital campus. High priority should be given to the following material movement operations that appear to be inefficient.

a. Several support services maintain internal transport operations that appear to be of too-small scale to be efficient in use of personnel and equipment, or unrelated to the primary department functional role. Examples include the delivery of housekeeping uniforms, mopheads, alcohol, etc., by Housekeeping personnel, the delivery of regular daily orders of pharmacy

items by Pharmacy personnel, and the bulk transfer of Central Supply items between North and South portions of campus by Central Supply personnel. It is suggested that a regular delivery service run by the Transport Department as an extension of the messenger service concept could relieve the source departments of the need to operate marginal delivery and pickup operations.

b. Three major supply services that now depend upon the Transport Department for non-electric vehicles and transport personnel are Dietary, Laundry/Linen and Property and Supplies. Each of these uses the equivalent of several vehicles and several full-time men. The view is that these men and vehicles are too extensively involved in these specific operations to be very useful in a general Transport Department pool, but are not subject to direct supervisory control of the supply services that they perform for. They might better be assigned directly to the services.

The issue in these cases is not optimization of a materials handling system, but the attainment of the greatest good for the hospital. It is suggested that in these special cases the most important relationship to preserve is perhaps the uninterrupted responsibility of the particular supply service. Thus, the Dietary manager could be completely responsible for food service from preparation to patient. The free time of Dietary personnel responsible for delivery of meal carts might be used to advantages in the delivery of special foodstuffs and stat orders now done by Dietary staff.

In these cases, Dietary, Linen Service, and Receiving, the problem of staffing for coverage of peak demand, vacation and sick leave, etc., might be overcome by temporary assignments from the Transport Department.

The alternatives to decentralization of these Dietary, Laundry/Linen and Property and Supplies materials transport may be to require that all transport operations on the campus be handled by a centralized transportation service, that this service be monitored for compliance with standards of performance developed with the user of the service, and that no personnel or vehicles for any transport operation be allowed to other departments. The development and maintenance of such standards would not assure the service manager of Dietary, Laundry/Linen and Property and Supplies complete responsibility for their operations, but would provide some indirect control.

4. A further recommendation, not related directly to those above, arises from conclusions of the inapplicability of automated systems for materials handling between major elements of the Rancho campus. It is recommended that the pickup points for soiled laundry and trash be located at the truck service dock of the proposed Stroke/Rehab Center. It is concluded that these pickups are best handled by truck, and that provision of pickup points separate from the main truck dock would be unwise duplication of facilities and complication of circulation patterns.

II. METHODOLOGY OF STUDY

A. Method of Data Collection

Data for this study were collected by interviewing Rancho personnel, both in administrative positions and at the operational level, by reviewing Rancho reports, particularly the RLAH Materials Handling Study of July 1969[1], and by personal observations.

B. Methodology of Data Analysis

Data were collected in both a descriptive and quantifiable format. The operations of each active node or use point (see Section III - Overview of Rancho) are described in depth, depending upon the availability of information, and the information, where possible, is then crystallized in a form whereby the material movements may be summarized into input/output flow charts by (1) trips between nodes, (2) weight carried between nodes, (3) volume carried between nodes, and (4) vehicular conveyances used in transporting materials between nodes.

C. Input/Output Flow Patterns

In using the input/output analysis to look at Rancho's materials handling problems, it is tacitly assumed that the total hospital system is a composite of mutually interrelated use points or nodes. Each node is producing a health related product. One can view each node as being capable of receiving materials (inputs) from other nodes in the Rancho system and, in turn supplying materials to the other nodes. This is an aggregative approach for studying the flow patterns (input/output relationships) that existed at Rancho over a given time period.

The beginning point for an input/output (I/O) analysis is the construction of a symmetrical matrix which shows quantitatively how the "output" of one node is distributed to other nodes in the hospital system. This exposition of input and output flows summarizes, according to the units of quantification used, the flow pattern of materials within the total hospital system.

III. OVERVIEW OF RANCHO

A. Size and Location

Rancho Los Amigos Hospital is in the city of Downey, California, which is approximately 12 miles southeast of the Los Angeles Civic Center. Rancho is situated on a relatively flat parcel of land of approximately 200 acres, divided by Imperial Highway running east and west. The property is an irregularly shaped site with approximate dimensions of 3,900 feet in length and 2,200 feet in width. The area of land north of Imperial Highway is approximately 50 acres; the remainder is south of Imperial. At present, the area north of Imperial has newer buildings and is more densely populated. The larger area of land, south of Imperial, containing some 150 acres of land is less intensively developed and the buildings are older. It has been estimated that the total complex of buildings represents a gross building area of 1,191,000 square feet; of this 454,000 square feet is considered permanent structure. The total complex, including land, buildings and vehicles is valued at $50,000,000.[2/]

B. Rancho Population

Rancho's budgeted capacity for inpatients is 1050. However, during work days Rancho's patient population is swelled by an influx of outpatients. To provide health care and support activities for this patient population Rancho has a complement of paid and non-compensated personnel working 24 hours a day seven days a week. Table III-1 is illustrative of the patient and employee distribution at Rancho. This table is presented to show the total Rancho population component at a particular period in time. However, Table III-1 does not include the daily influx of visitors. While no estimate of this population was made in this study, it is well to note that the size of the visitor population does place strains upon such resources as parking space, canteen supplies and all general circulation space.

TABLE III-1

RANCHO POPULATION 2/

POPULATION	Monday-Friday			Saturday-Sunday		
	Day	Evening	Night	Day	Evening	Night
Bed Patients	929*	929*	929*	929*	929*	929*
Outpatients	36	- -	- -	--	- -	- -
Paid Personnel	1,220	550	550	1,100	550	550
Non-Compensated Personnel	617	410	206	- -	- -	- -
Total Estimated Population	2,802	1,889	1,685	2,029	1,479	1,479

*Budgeted capacity 1,050

Table III-1 presents an overview of the patient staffing relationship at Rancho. Currently the budgeted capacity at Rancho is 1050 beds while Rancho is licensed for 1180 beds. The patient population at the time of the above study was 929, while the administrative personnel at Rancho estimate the average census is 993 (Table III-2).

C. Patient Components

Table III-2 provides a brief ward-by-ward description of the patient population at Rancho, by program, with an average census estimate and budgeted capacity.

D. Selection and Location of Rancho Nodes

It was decided to focus on nodes to study by selecting those buildings, or departments and sub-departments within buildings, that generated the greatest amount of material movement. These nodes and their locations are listed below. Map III-1 (page III-7) is divided into a grid pattern to facilitate location.

Distribution of Nodes at R.L.A.H.

Node		Grid Location
Patient Care Nodes		
1.	300 wards	F5, F6
2.	400 wards	J4
3.	500 wards	J3
4.	600 wards	J5, J6
5.	700 wards	K3, K4
6.	800 wards	L3, L4
7.	900 wards	K6, K7
8.	1100 wards	G5, H5
9.	Casa Consuela	E6
Other Use Nodes		
10.	Outpatient Clinic	K5
11.	Cafeteria	F2
12.	Laboratories	J4
13.	Surgery	K5
14.	Radiology	K5
15.	Medical Science Bldg.	J2, I2
Supply Nodes		
16.	Purchasing (Property and Supply)	B2, C4, C5, D4, E3, E4
17.	Transportation	C2, C3

Node		Grid Location
18.	Dietary	F2
19.	Laundry	B5, B6
20.	Mending	C4
21.	Housekeeping	C4
22.	Maintenance & Power	E4
23.	Central Supply	K5
24.	Pharmacy in Bldg. 30	D4
25.	Clinical Pharmacy	K5
26.	Medical Records	K5
27.	Business Services	C6, D6
28.	Administration	J4
29.	Other Supply	C5
30.	Library	J5
31.	Trash	C2, C3, G1
32.	Morgue	G4
33.	Stroke Rehabilitation	I5, I6

TABLE III-2 *3

DESCRIPTION OF WARD POPULATIONS AND FUNCTIONS

NODE	DESCRIPTION OF POPULATION	AVERAGE DAILY CENSUS	BUDGETED BED CAPACITY
300	South of Imperial Chronic Medical -- Patients too ill to be in nursing homes. Not at this point rehabilitation candidates.	290	296
400	North of Imperial	25	*1
403	ICU and regular surgical beds.	40	44
404	Acute Medical. Most severely ill patients.		
500	North of Imperial		
501	Pulmonary. Post Polio patients in iron lung. Also, scoliosis program.	39	50
502	Pulmonary. Ambulatory, primarily emphysema. Do not need as much care.	24	44
503	Half is orthopedic-neurology and other half is cardiac or heart patients.	39	54
600	North of Imperial All amputees and fractures.	62	70
700	North of Imperial	22	30
701	Spinal cord injury.	20	30
702	Arthritis.	56	60
703-4	Spinal cord injury.		
800	North of Imperial		
801-2-3-4	All neurology.	115	120

TABLE III-2 (CONTD.)

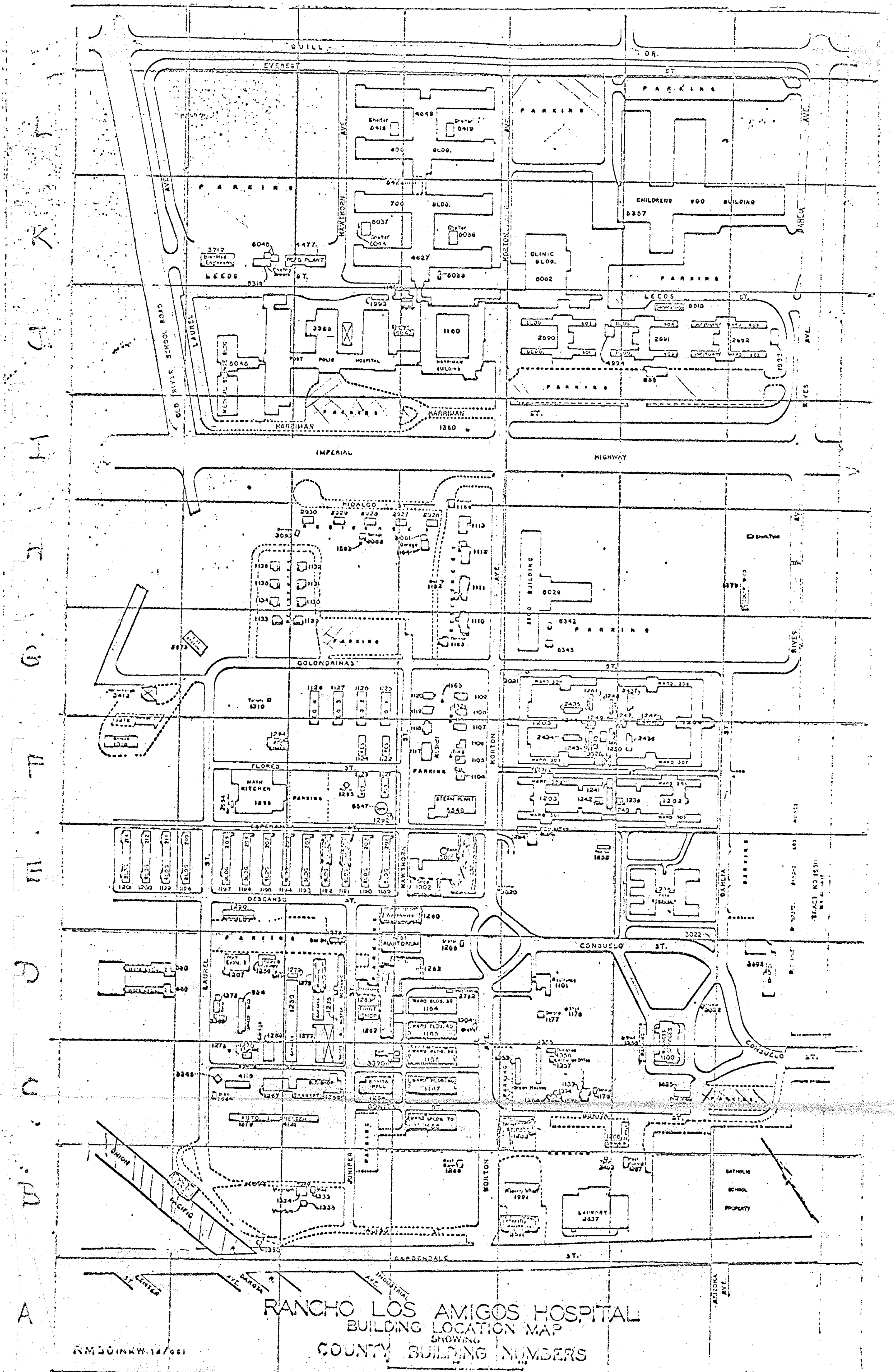
NODE	DESCRIPTION OF POPULATION	AVERAGE DAILY CENSUS	BUDGETED BED CAPACITY
900	North Of Imperial All pediatrics.	115	120
1100	South of Imperial Chronic medical and rehabilitative and non-rehabilitative diabetics.	126	132
Casa Consuela	Vocational rehabilitation. Do not need any more medical care.	20	*2
TOTALS		993	1050

*1 Surgical beds: no budgeted capacity

*2 Casa: a new program with no existing budgeted capacity. It is estimated that the eventual budgeted capacity will be as high as 40.

*3 Average Daily Census Rates were based on estimates of Rancho Administrative Personnel in December 1969.

MAP III-1


RANCHO LOS AMIGOS HOSPITAL
BUILDING LOCATION MAP
SHOWING
COUNTY BUILDING NUMBERS
QUILL DR.
EVEREST ST.
LEEDS ST.
HARRIMAN ST.
IMPERIAL HIGHWAY
HIDALGO ST.
GOLONDRINAS ST.
FLORES ST.
DESCANSO ST.
CONSUELO ST.
GARDENDALE ST.
HAWTHORN AVE.
MORTON AVE.
LAUREL AVE.
DAHLIA AVE.
RIVES AVE.
OLD RIVER SCHOOL ROAD
JUNIPER
800 BLDG.
700 BLDG.
CHILDRENS 900 BUILDING
CLINIC BLDG.
POST POLIO HOSPITAL
HARRIMAN BUILDING
MAIN KITCHEN
AUDITORIUM
STEAM PLANT
LAUNDRY 2037
CATHOLIC SCHOOL PROPERTY
PARKING

IV. ORGANIZATION OF TRANSPORT AT RANCHO

A. Operations

The operations of the Transportation Department encompass such activities as (1) providing emergency and routine patient transportation via ambulance, tram, bus and sedan automobile for inpatients and outpatients within and outside of the hospital campus, (2) providing regular scheduled truck service to distribute food, linen, drugs and other hospital supplies throughout the campus, (3) picking up trash from assigned centers around the hospital, and (4) providing a regularly scheduled pickup and delivery service for the messages throughout the hospital campus. Also, special deliveries and pickups are made to and from patients' homes.

B. Ownership Dichotomy

All non-electric vehicles at Rancho are owned by the Los Angeles County Mechanical Department. Non-electrics include gasoline powered, diesel powered, and propane powered. This County Department leases them to Rancho Los Amigos Hospital at specified per-mile charges (regardless of the mileage). This charge includes all necessary maintenance and repairs on these non-electric vehicles.

Electric vehicles are owned by Rancho Los Amigos Hospital but some are purchased through the County Mechanical Department. All repairs and parts replacements to the electrics are charged against the department to which the vehicle is assigned. The age of Rancho electrics varies considerably. The Transport foreman estimates that the current average replacement cost on an electric vehicle at Rancho is $2,200.00 and that an "average" life span is 10 years.

Vehicles are owned partly by the County Mechanical Department and partly by Rancho Transport Department. However, it remains the prerogative of the Rancho Transport Department to allocate all vehicles to the various hospital departments. Patients or other benefactors have given a vehicle to a specific department for its exclusive use. This apparently has happened only with electrics and Administrative policy has been to allow that department to keep the vehicle on a permanent basis.

C. Vehicular Resources, Allocation and Costs

Tables IV-1, IV-2, IV-3, and IV-4 present in summary form the available vehicle resources, the current departmental allocation of vehicles, and the physical operating costs or charges associated with running the vehicles. As noted above (IV-B), operating costs ascribed to the non-electrics are simply those costs that the Mechanical Department charges Rancho Los Amigos Hospital for the use of County vehicles on a mileage basis. Tables IV-1 and IV-2 have the charge per mile for each vehicle and the estimated monthly average mileage of that vehicle (averaged over a four-month period in late 1969) along with the computed dollars charged for that vehicle. The average monthly costs (for a four-month period in late 1969) on the non-electrics listed in Tables IV-1 and IV-2 amounted to $2,685.99 (the cost for each individual vehicle is shown in the tables) or $53.70 per non-electric vehicle per month.

The average monthly cost of an electric was computed to be $18.33. This was computed on the basis of the replacement cost of an electric being $2200.00 and the expected lifetime of the vehicle being 10 years. In November, 1969, there were 32 electrics at Rancho costing $586.56 per month to operate. The average vehicular operating cost, excluding drivers, attendants and these additional above-mentioned costs for electrics, for all Rancho vehicles amounted to $3,272.55/month or an annual total of $39,270.60.

D. Apportionment of Costs in Materials Handling

The total staff component of the Transport Department of Rancho is as follows:

a. 17 people involved in patient and personnel handling

b. 4 involved in administrative activities related to both people and material handling, and

c. 21 people involved in material handling,

for a total staff complement of 42 individuals. The average salary for members of this department was estimated at $7000/annum. We have, therefore, used $30/day as a rough estimate of Transport Department personnel charges. This figure was arrived at by the following method:

Computations to Arrive at $30/day Figure:

1.	Approximate average yearly salary	$7,000.00
2.	Average yearly vacation time 1-5 years: 2 weeks Greater than 5 years: 3 weeks	2.5 weeks/year
3.	Sick leave	1.2 weeks/year
4.	Scheduled holidays (12 days/year)	2.4 weeks/year
5.	Estimated time off	6.1 weeks/year
6.	Employee time available, 45.9 weeks x 5	229.5 days
7.	This approximates $30/day ($7000 ÷ 230 = 30.4)	

Indirect Costs: It is assumed that 50% of the department's administrative personnel costs could be assigned to the material handling system. Administrative personnel are those not directly involved in the operation or dispatching of vehicles.

There are seven basic material handling activities originating directly out of Transportation. These are: Hospital Receiving, Pharmacy in Building 30, Dietary, soiled linen, clean linen, trash and messenger service. Equal amounts of the daily indirect overhead costs were assigned to each of these activities. While arguments could be presented for apportioning these indirect costs on some other basis, it was felt that since these Transportation activities are so closely inter-related that this method would be the most rational.

Direct Costs Ascribable to Materials Handling: Table IV-5 presents a breakdown of costs associated with the movement of materials at Rancho.

E. Messenger Service

Description: This is an integral and important part of the total Rancho transportation system. This division is responsible for U.S. mail, inter-office mail (including some books), medical records, laboratory reports, and, in many cases, the delivering of payroll checks. The messenger service operates five days per week. U.S. mail is picked up by the messenger service and sorted before delivery to the wards and other areas at Rancho. Also, this division delivers outgoing U.S. mail to the Post Office. In fiscal 1967-1968 mail delivery averaged 5,900 pieces per day. The messenger service makes approximately 300 stops per day in delivering and collecting mail.

Materials Handling Methods: The messenger service uses electric trucks driven by Transport Department personnel in carrying out its operations. As noted in Table IV-5, the direct daily cost of operating this service amounts to $84.70. Each message, thus, costs approximately $0.014 and the cost per stop is $0.282.

While cost computations on the messenger service were carried out, because of the high frequency of trips and stops associated with the messenger service operation this latter information was not incorporated into the flow tables. Also, it was difficult to match the locale of the messenger stops with the nodes chosen for this materials movement study because of multiplicity of each delivery and pickup points.

TABLE IV-1

RANCHO LOS AMIGOS HOSPITAL VEHICLES - NON-ELECTRICS

MATERIALS HANDLING:

VEHICLE NO.	VEHICLE TYPE	DEPT. TO WHICH VEHICLE IS ASSIGNED	FUNCTION OF VEHICLE	MILEAGE CHARGE (PER MILE)	TOTAL MILES (PER MO.)	TOTAL MILEAGE COST/MO.
2235	Inter. Truck 1 1/2 Ton	Transportation	Contaminated trash	.128	175	22.40
41252	Ford Walk-In Truck, 2-Ton	Pharmacy	Deliver drugs	.128	100	12.80
4632	Dodge Truck	Transportation	Moving property and supplies	.128	120	15.36
6645	Ford Stake Truck, 2-Ton	Transportation	Property and Supply movements	.159	220	34.98
4297	International Packer	Transportation	Trash	.159	500	79.50
5002	Ford Walk-In	Transportation	Deliver food and pick up carts-80% Clean linen-20%	.128	525	67.20
5003	Ford Walk-In	Transportation	Deliver food and pick up carts-80% Clean linen-20%	.128	525	67.20
5056	International Bus	Transportation	Deliver beds to patient homes-50% Wheel chair patients-50%	.128	500	64.00
5593	Ford Walk-In Truck	Transportation	Food-Dietary-80% Linen-20%	.128	700	89.60

TABLE IV-1 (CONTD.)

VEHICLE NO.	VEHICLE TYPE	DEPT. TO WHICH VEHICLE IS ASSIGNED	FUNCTION OF VEHICLE	MILEAGE CHARGE (PER MILE)	TOTAL MILES (PER MO.)	TOTAL MILEAGE COST/MO.
5594	Ford Walk-In Truck	Transportation	Linen-25% soiled 5% clean. Food & drugs-40% Pool-30%	.128	300	38.40
5597	Ford Walk-In Truck	Transportation	Food-Dietary-80% Linen-20%	.128	700	89.60
SUBTOTALS	11 Non-Electric Materials Handling Vehicles				4,365	$581.04

TABLE IV-2

RANCHO LOS AMIGOS HOSPITAL VEHICLES - NON-ELECTRICS

(a) PERSONNEL MOVEMENT:

VEHICLE NO.	VEHICLE TYPE	DEPT. TO WHICH VEHICLE IS ASSIGNED	FUNCTION OF VEHICLE	MILEAGE CHARGE (PER MILE)	TOTAL MILES (PER MO.)	TOTAL MILEAGE COST/MO.
41165	Plymouth Sedan	Administration	Administrative automobile	.063	700	44.10
41621	Chev. Sedan	Administration	Administrative automobile	.063	200	12.60
4934	Plymouth Sedan	Occup. Ther.	Static demon. use to show patients how to get in and out of vehicle	----	---	-----
N6392	Chev. Sedan	Occup. Ther.	Training	.063	100	6.30
5105	Chev. 1/2-Ton Mortuary Truck	Pathology	Morgue run	.065	150	9.75
41622	Chev. Sedan	Security	Hospital security service	.063	1500	94.50
2156	Ford Sedan	Transportation	Relief function	.063	200	12.60
3261	Crown Bus	Transportation	Wheel chair patients	.140	1800	252.00
5070	Inter. Trans. Ambulance	Transportation	Ambulance activities	.128	175	22.40
5634	Chev. Ambulance	Transportation	Ambulance activities	.128	1250	160.00

TABLE IV-2 (CONTD.)

(a) PERSONNEL MOVEMENT:

VEHICLE NO.	VEHICLE TYPE	DEPT TO WHICH VEHICLE IS ASSIGNED	FUNCTION OF VEHICLE	MILEAGE CHARGE (PER MILE)	TOTAL MILES (PER MO.)	TOTAL MILEAGE COST/Mo.
6415	Chev. Ambulance	Transportation	Ambulance activities	.078	800	62.40
6943	Valiant Sedan	Transportation	Pool factor. Emer. doctor	.054	50	2.70
7008	Dodge Dart	Transportation	Pool factor. Emer. doctor	.054	1200	64.80
7345	Ford Ambulance	Transportation	Ambulance activities	.078	500	39.00
40634	Dodge Ambulance	Transportation	Ambulance activities	.078	1500	117.00
41197	Chev. Ambulance	Transportation	Ambulance activities	.078	1300	101.40
41699	Chev. Sedan	Transportation	Pool activ-ities	.063	1400	88.20
41785	International Bus	Transportation	Wheel Chair bus	.140	270	37.80
41873	Chev. Carry-All	Transportation	Pool activities	.063	900	56.70
41874	Chev. Carry-All	Transportation	Town run assign-ment	.063	1700	107.10
41877	Dodge Ambulance	Transportation	Ambulance activities	.078	1300	101.40
41901	Chev. Carry-All	Transportation	Pool activities	.063	1700	107.10

TABLE IV-2

RANCHO LOS AMIGOS HOSPITAL VEHICLES - NON-ELECTRICS

(b) MAINTENANCE, GENERAL SERVICE EQUIPMENT, LANDSCAPING AND PERSONNEL MOVEMENT:

VEHICLE NO.	VEHICLE TYPE	DEPT. TO WHICH VEHICLE IS ASSIGNED	FUNCTION OF VEHICLE	MILEAGE CHARGE (PER MILE)	TOTAL MILES (PER MO.)	TOTAL MILEAGE COST/MO.
5178	Ford 1/2-Ton Truck	Gen. Service	Pest Control	.065	100	6.50
1052	Chev. Truck 1-Ton	Maintenance	Materials to and from jobs	.07	135	9.45
3259	Chev. Truck 1-Ton	Maintenance	Materials to and from jobs	.07	375	26.25
3312	Inter. Metro.	Maintenance	Materials to and from jobs	.07	150	10.50
3347	Chev. Truck 1/2-Ton	Maintenance	Transport of electricians' gear	.065	150	9.75
5421	Dodge Lancer	Maintenance	Administrative automobile	.054	270	14.58
6427	Ford Truck	Maintenance	Polio Eng.-repair medical equip.	.07	1100	77.00
7144	Ford Truck 1/2-Ton	Maintenance	Steam fitter operations	.07	190	13.30
7145	Ford Truck 1/2-Ton	Maintenance	Plumbing	.07	215	15.05
40246	Dodge Truck 3/4-Ton	Maintenance	Carry equipment for electricians	.07	1000	70.00
40564	Dodge Truck	Maintenance	Carry equipment for electricians	.07	1600	112.00

TABLE IV-2 (CONTD.)

(b) MAINTENANCE, GENERAL SERVICE EQUIPMENT, LANDSCAPING AND PERSONNEL MOVEMENT:

VEHICLE NO.	VEHICLE TYPE	DEPT. TO WHICH VEHICLE IS ASSIGNED	FUNCTION OF VEHICLE	MILEAGE CHARGE (PER MILE)	TOTAL MILES (PER MO.)	TOTAL MILEAGE COST/MO.
41201	Chev. Van	Maintenance	Trouble shooting	.062	850	52.70
41798	Dodge Truck 3/4-Ton	Maintenance	Polio Eng.-repair medical equipment	.063	1300	81.90
42363	Valiant Sedan	Maintenance	Administrative automobile	.054	300	16.20
3258	Dodge Dump Truck	Landscaping	Pick-up of tree limbs. 90% land-scaping, 10% trash	.128	315	40.32
5169	Ford 1/2-Ton Truck	Landscaping	Landscaping	.065	230	14.95
41251	Int. Carry-All	Landscaping	Landscaping	.063	550	34.65
SUBTOTALS	39 Non-Electric Personnel et al Vehicles				27,525	$2,104.95
TOTAL	50 Non Electric Vehicles (Tables IV-1 and IV-2)				31,890	$2,685.99

TABLE IV-3

CURRENT RANCHO LOS AMIGOS HOSPITAL VEHICLES - ELECTRICS

MATERIALS HANDLING

VEHICLE NO.	VEHICLE TYPE	DEPT VEHICLE IS ASSIGNED TO	FUNCTION
E-34	2000#, 2-pass.	Canteen	Transportation of Canteen items.
E-27	1500#, 2-pass.	Central Supply	To carry Central Supply items. Has attachable trailer.
E-33	2000#, 2-pass.	Dietary	Special food runs.
E-19	1500#, 2-pass.	Housekeeping	Delivery functions for Housekeeping.
E-26	400# box, 2-pass.	Housekeeping	Delivery functions for Housekeeping.
E-18	1500#, 2-pass.	Library	Carry books and library materials.
E-36	Small Walk-Behind (1953 model)	Library	Carry books.
E-40	2000#, 2-pass.	Linen Room	Delivery of linen and laundry items.
E-24	2000#, 2-pass.	Hospital Receiving	Hospital materials movement
E-49	2000#, 2-pass.	Hospital Receiving	Hospital materials movement
E-39	2000#, 2-pass.	Pharmacy	Pharmacy materials movement

SUBTOTAL 11 Electric Materials Handling Vehicles

Total Monthly Operating Cost for Electric Material Handling Vehicles $201.63

TABLE IV-4

CURRENT LOS AMIGOS HOSPITAL VEHICLES - ELECTRICS

(a) PERSONNEL MOVEMENT:

VEHICLE NO.	VEHICLE TYPE	DEPT. VEHICLE IS ASSIGNED TO	FUNCTION
E-8	Donated 400#, 2-pass.	Program Department	Patient recreation activities.
E-15	400#, 2-pass. Golf cart	Administration	Administration activities. Personnel and equipment associated.
E-21	1500#, 2-pass.	Program Department	Patient recreation activities --on and off grounds.
E-28	400#, 2-pass.	Engineering	Transport engineering and lab personnel.
E-29	600#, 2-pass. Runabout	Med.-Education	Personnel carrier.
E-45	200#, 1-pass. Runabout	Urology	Personnel carrier.
E-46	2000#, 2-pass.	Work Evaluation Center	Personnel and equipment carrier.

(b) MAINTENANCE & LANDSCAPING EQUIPMENT & PERSONNEL MOVEMENT:

E-16	1500#, 2-pass.	Landscaping	Landscaping activities.
E-22	1500#, 2-pass.	Landscaping	Landscaping activities.
E-47	2000#, 2-pass.	Landscaping	Personnel and equipment carrier.
E-30	2000#, 2-pass.	Maintenance	Paint Shop personnel and equipment carrier.
E-31	2000#, 2-pass.	Maintenance	Electric Shop.
E-35	2000#, 2-pass.	Maintenance	Transportation of carpentry equipment and personnel.

(b) MAINTENANCE & LANDSCAPING EQUIPMENT & PERSONNEL MOVEMENT: (Contd.)

VEHICLE NO.	VEHICLE TYPE	DEPT. VEHICLE IS ASSIGNED TO	FUNCTION
E-37	2000#, 2-pass.	Maintenance	Use by polio eng. Carry equipment and personnel.
E-42	2000#, 2-pass.	Maintenance	Maintenance Dept. activities.
E-43	2000#, 2-pass.	Maintenance	Maintenance Dept. activities.
E-44	2000#, 2-pass.	Maintenance	Maintenance Dept. activities.
E-9	1500#, 2-pass.	Maintenance	Use by Sheet Metal Section.
E-10	1500#, 2-pass.	Maintenance	Use by plumbers.
E-12	1500#, 2-pass.	Maintenance	Paint shop carrier.
E-13	1500#, 2-pass.	Maintenance	Steam fitters carrier.

SUBTOTAL	21 Electric Maintenance & Landscaping Equipment and Personnel Movement Vehicles	
	Total Monthly Operating for Electric Maintenance & Landscaping Equipment & Personnel Movement Vehicles ((a) + (b))	$ 384.93
TOTAL	Electric Vehicles (Tables IV-3, IV-4)	586.56

SUMMARY TOTAL (Tables Iv-1, IV-2, IV-3, IV-4)

Electrics	586.56
Non-Electrics	2,685.99
	$3,272.55

TABLE IV-5

DAILY MATERIALS HANDLING COST DISTRIBUTION

DEPARTMENT OR USE	DESCRIPTION	COST/TYPICAL WEEK DAY
Property and Supply	Mileage charges, vehicle #4632	.77
	Mileage charges, vehicle #6645	1.75
	Labor Charges (2 men from Transport, 2 from Prop. and Supply)	120.00
	Electric vehicles (2)	1.66
	Indirect overhead	8.50
		$132.68
Pharmacy in Building 30	Mileage charges, vehicle #41252	.50
	Labor charges 1.6 men	48.00
	Electric vehicle	.60
	Indirect overhead	8.50
		$ 57.60
Dietary	Mileage charges, vehicle #5002 (80%)	1.79
	Mileage charges, vehicle #5003 (80%)	1.79
	Mileage charges, vehicle #5597 (80%)	2.40
	Labor charges (5 men-80% time)	120.00
	Electric Vehicle	.60
	Indirect Overhead	8.50
		$135.08

TABLE IV-5

DAILY MATERIALS HANDLING COST DISTRIBUTION (CONTD.)

DEPARTMENT OR USE	DESCRIPTION	COST/TYPICAL WEEK DAY
Soiled linen	Mileage charges, vehicle	$ 2.40
	Labor charges (2 men)	60.00
	Indirect overhead	8.50
		$70.90
Clean linen	Mileage charges, vehicle #5002 (20%)	$ .45
	Mileage charges, vehicle #5003 (20%)	.45
	Mileage charges, vehicle #5597	.60
	Labor charges (5 men-20% time)	30.00
	Electric vehicle	.60
	Indirect overhead	8.50
		$40.60
Non-contaminated Trash	Mileage charges, vehicle #4297	2.66
	Labor charges, 1 man	30.00
	Indirect overhead	4.25
		$36.91
Contaminated Trash	Mileage charges	.75
	Housekeeping Staff Costs (3.3 hours)	10.00
	Labor Charges (1 man)	30.00
	Indirect Overhead	4.25
		$45.00

TABLE IV-5

DAILY MATERIALS HANDLING COST DISTRIBUTION (CONTD.)

DEPARTMENT OR USE	DESCRIPTION	COST/TYPICAL WEEK DAY
Messenger Service	2 electric vehicles	$ 1.20
	Labor charges (2.5 men)	75.00
	Indirect overhead	8.50
		$84.70
Housekeeping	Electric vehicles (2)	$ 1.20
	Labor charges (2 men)	60.00
		$61.20
Central Supply	Electric vehicle and attachment	$ 1.01
	Labor charges (23.5 hours)	87.25
		$88.26
Library	Total delivery costs	$ 8.70
TOTAL COST		$761.63

V. DETAILED DESCRIPTIONS OF MAJOR TRANSPORT NODES

A. Main Rancho Laboratory

Description of Node: The Main Rancho Laboratory is located in the second floor of the Harriman Building. Its main function is to provide a laboratory support system for the over-all health care activities at Rancho. The laboratory performs such patient services as urine analysis, blood chemistry, bacteriological examinations and feces analysis.

Materials Handling Methods: There are four basic materials handling methods:

a. laboratory technologists go from the main laboratory and collect specimens (mainly blood samples).

b. ward attendants deliver specimens from the wards to the laboratory.

c. outpatients visiting the Clinic come directly from the Clinic to have blood specimens taken. Also, inpatients, if well enough, may visit the laboratory to give blood specimens. This is particularly the case where inpatients visit the Clinic and are referred to the laboratory for an evaluative test.

d. The Red Cross and private organizations deliver between 30-40 pints of blood each week day to Rancho to the main laboratory. Blood for patient transfusions is delivered by laboratory technologist to surgery and wards.

Details of Material Movements: While the laboratory technologists must be available for the "stat" requests, a basic schedule for the collection of blood samples is:

a. 300 Ward: The laboratory technologists start drawing blood at the 300 Ward at 8:00 a.m. and work to 9:30-10:00 a.m. Two technologists and sometimes three go to these wards. An additional trip for stat sugar and stat CBC is often made.

b. 400 Ward: One technologist is sent to the 400 Wards. Since the 400 Wards are for the more acute patients at Rancho, up to 9 additional stats are needed in this area daily.

c. 500 Ward: Two technologists are sent from the clinical lab to the 500 Ward each day. This ward will average an additional five stats each day.

d. 600 Ward: One technologist is sent to this area each day. Not many stats are done in this area.

e. 700 and 800 Wards: For both the 700 and 800 Wards, three technologists are assigned and are sometimes used two for the 700 Ward, or two for the 800 Ward with one to the other one.

f. 900 Ward: Two technologists are sent to the 900 Ward each day with one call-back stat on average per day.

g. 1100 Ward: Three technologists are sent to the 1100 Ward each day. This is in part a diabetic ward and, hence, the need for this number of technologists. An additional three stats may be included in this ward each day.

h. Surgery, Ward 403, and other Rancho Wards: Blood for transfusions is distributed throughout Rancho, but the heavy demanders of blood at Rancho are (1) Surgery, and (2) the ICU Ward (403).

Blood samples, as noted above, are in most instances delivered to the laboratory by the laboratory's own technologists while other tests are delivered by ward technicians. A variety of transport modes are invoked depending upon the urgency or size of the test component being carried. These modes include walking, using bicycle, tram, Rancho and private sedan.

Summary: Table V-1 summarizes the basic material flows to and from the main Rancho Laboratory:

TABLE No. V-1

MATERIAL FLOWS TO AND FROM LABORATORY

a. Trips to Pick-up and Deliver Blood Specimens Per Work Day

No. of Trips/Work Day

Node / Trip	300	400	500	600	700	800	900	1100	Clinic	TOT.
To Lab.	5	10	7	3	5	5	2	6	18	61
From Lab.	5	10	7	3	5	5	2	6	--*	43

Weight Carried/Work Day (Lbs.)

Trip \ Node	300	400	500	600	700	800	900	1100	Clinic	TOTAL
To Lab. ←	40	80	36	24	40	40	10	48	7.5	325.5
To Wards and Clinic →	36	72	32	22	36	36	9	43		286.0

Volume Carried/Work Day (Cubic Ft.)

Trip \ Node	300	400	500	600	700	800	900	1100	Clinic	TOTAL
To Lab	13.0	26.0	18.2	7.8	13.0	13.0	5.2	15.6	1.0	112.8
To Wards and Clinic	13.0	26.0	18.2	7.8	13.0	13.0	5.2	15.6		111.8

b. Trips to Deliver Non-Blood Specimens Per Work Day At Rancho

No. of Trips/Work Day

Trip \ Node	300	400	500	600	700	800	900	1100	Clinic	TOTAL
* To Lab ←	4.9	9.8	9.8	4.9	4.9	4.9	4.9	4.9	*1	49.0

Weight Carried/Work Day (Lbs.)

Trip \ Node	300	400	500	600	700	800	900	1100	Clinic	TOTAL
* To Lab ←	48.32	96.64	96.64	48.32	48.32	48.32	48.32	48.32	*2	483.20

Volume Carried/Work Day (Cubic Ft.)

Trip \ Node	300	400	500	600	700	800	900	1100	Clinic	TOTAL
* To Lab	13.27	26.54	26.54	13.27	13.27	13.27	13.27	13.27	13.27	145.97

* In cases where samples are brought to the Laboratory by a ward attendant, the return trip is not considered a material flow trip in that no materials are being taken back to the ward. Results of tests are sent by telephone or the messenger service.

B. Hospital Purchasing (Property and Supplies)

Description: This Department is responsible for the procurement, receipt, storage, allocation and reallocation of materials throughout Rancho Los Amigos Hospital. It is these activities that involve the Department in transportation activities. The sub-section of Hospital Purchasing responsible for these activities is Central Receiving (sometimes called Property and Supplies).

Receiving is responsible for the inspection and warehousing of all supplies purchased. It is also concerned with property moves within the hospital and the storage of all hospital support equipment. The receiving division of Hospital and Purchasing handles, at one time, most materials that pass through Rancho and get distributed to the various nodes. A listing of such items would include wheelchairs, beds, all mechanical supplies, X-ray equipment, can openers, I.V. fluids, TV cameras and monitors, heart machines, gas analyzers, etc.

Materials Handling Methods: Hospital Receiving is assigned two trucks and has a mobile fork lift for warehouse movements, one fork lift and two electric carts. The two trucks plus drivers are assigned directly from the Transport Department.

The Receiving supervisor decides on the basis of an established priority system what materials will be allocated or reallocated. No line control over the assigned drivers is given the Receiving supervisor. He has the availability, on a regular, scheduled basis, of two men and two trucks from transportation for the period of a work day. This excludes time out for breaks and lunch.

Because of the command dichotomy in this operation where the bulk of its functions are movement oriented, there appears to

be a conflict of work pace expectations. Both groups apparently would prefer the assignment of the vehicle operators to the Receiving supervisor's line command.

Details of Materials Movements: Rancho Receiving delivers to nearly every node in the total Rancho system. Table V-2 details by (1) Node, (2) Frequency of Delivery to Node Per Work Day, (3) Average Weight Delivered Per Day, (4) Average Volume of Daily Delivery, and (5) Mode of Transportation.

W = Walk
T = Non-electric truck
E = Electric vehicle
F = Fork lift

TABLE V-2

SUMMARY TABLE OF TRANSPORT ACTIVITIES OF HOSPITAL RECEIVING AT RANCHO

NODE	FREQUENCY OF DELIVERY PER WORK DAY	AVERAGE WT. OF DELIVERY PER WORK DAY (LBS.)	AVERAGE VOL. OF DELIVERY PER WORK DAY (CUBIC FEET)	TRANSPORT MODE
1. 300	3.0	200	.36	T
2. 400	1.4	104	74	T
3. 500	2.0	200	36	T
4. 600	-	-	-	E/T
5. 700	40.0	2000	1200	
6. 800	21.3	1555	404	E/W/T
7. 900	6.0	460	60	
8. 1100*	-	-	-	
9. Casa**	-	-	-	
10. Clinic	3.8	10	295	T
11. Cafeteria	-	-	-	
12. Laboratory	1.0	50	10	T
13. Surgery	.4	4	4	T
14. Radiology	1.0	100	20	T
15. Med. Sci. Bldg.	.3	34.5	19	T
16. Property and Supply	42.0	1020	400	T/F/W
17. Transportation	2.0	70	2	T
18. Dietary	.4	160	16	T
19. Laundry/Linen	.8	300	30	T
20. Mending	-	-	-	T
21. Housekeeping	5.0	750	60	T
22. Maintenance	78.2	6923	1100	T/F/W
23. Central Supply	4.0	500	360	T/F
24. Pharmacy - Bldg. 30	2.0	6000	600	T
25. Clinical Pharmacy	1.0	30	18	T
26. Medical Records	-	-	-	
27. Business Services	1.0	76	21.9	T
28. Administration	.1	10	4.8	T

* Deliveries to this node are included under Housekeeping.

** There were no deliveries to Casa at the time this data was collected, however Casa is now receiving deliveries.

TABLE V-2 (CONTD.)

	NODE	FREQUENCY OF DELIVERY PER WORK DAY	AVERAGE WT. OF DELIVERY PER WORK DAY (LBS.)	AVERAGE VOL. OF DELIVERY PER WORK DAY (CUBIC FEET)	TRANSPORT MODE
29.	Other Supply	6.0	600	30	T
30.	Library	1.0	5	1	
31.	Trash	.1	5	1.5	T
	TOTALS	223.8	21,166.5	4,783.2	

C. Dietary Department at Rancho

Description: The Dietary Department at Rancho has the responsibility of providing a complex variety of foods at different stages of preparation to meet the patient and employee needs of Rancho. The Dietary Department relies on one main kitchen and ten satellite kitchens to furnish the food needs of Rancho. The satellite kitchens are attached to patient care areas and are staffed by dietary personnel.

Materials Handling: To transport materials to the satellite kitchens Dietary makes use of a regularly scheduled truck provided through Transportation. Table V-3(a) shows the current daily transportation schedule that is used to link the central dietary kitchen with its outlying satellite kitchens. In addition to these runs and two other weekly scheduled runs by Transportation, Dietary has its own electric vehicle for specialized food deliveries.

Table V-3(b) has the Rancho meal schedule outlined. This table is presented to illustrate the time lags that exist between preparation and serving. It would be hypothesized that the quality of a meal bears some inverse relationship with the transit time between actual preparation and delivery. While modern equipment can positively offset this quality loss, there is no doubt that this time lag is a problem.

Materials Handling Methods: There are a number of ways in which food is transported from the main kitchen to the satellite kitchens:

a. Hot and cold foods are sent in self-contained (refrigerated and heated) push-carts via trucks supplied by the Transport Department. These trucks are supplied on a regular routine basis, along with drivers from the Transport Department.

b. Special deliveries are made in Dietary's own electric cart. The Transport Department is currently outfitting an electric truck so that it will be able to carry the self-contained food carts.

The Transport Department estimates that it supplies three trucks (for 80% of their total operating time) and five men (again for 80% of their work time) to provide the regular scheduled delivery service.

TABLE V-3(a)

DAILY DIETARY DELIVERY SCHEDULE FOR TRANSPORTATION TRUCKS

	BREAKFAST			LUNCH			DINNER		
Satellite Kitchen	Truck	Leave Kitchen	Arrive Ward	Truck	Leave Kitchen	Arrive Ward	Truck	Leave Kitchen	Arrive Ward
301-2	#1	6:30	6:35-6:40	#3	10:50	10:55-11:00	#3	4:05	4:10-4:15
305-6	#1	6:30	6:45-6:50	#3	10:50	11:05-11:10	#3	4:05	4:20-4:25
307-8	#1	6:30	6:55-7:05	#3	10:50	11:15-11:20	#3	4:05	4:30-4:35
400	#2	5:40	5:50-5:55	#2	10:45	11:20	#2	4:00	4:25-4:30
500	#2	5:40	5:55-6:00	#2	10:45	10:50-10:55	#2	4:00	4:05-4:10
600	#1	5:40	5:55-6:00	#1	10:40	11:00-11:05	#1	3:55	4:10-4:15
700	#2	5:40	6:15-6:25	#2	10:45	11:10-11:15	#2	4:00	4:25-4:30
800	#2	5:40	6:00-6:05	#2	10:45	11:00-11:05	#2	4:00	4:15-4:20
900	#1	5:40	6:10-6:15	#1	10:40	11:10-11:15	#1	3:55	4:20-4:25
1100	#1	5:40	5:45-5:50	#1	10:40	10:50-10:55	#1	3:55	4:00-4:05
RETURN	All Carts Returned to Main Kitchen 8:30-9:00			All Carts Returned to Main Kitchen by 1:15			All Carts Returned to Main Kitchen by 6:30		

TABLE V-3(b)

MEAL SCHEDULE AT RANCHO

WARD / MEAL	300	400	500	600	700	800	900	1100
BREAKFAST (a.m.)	7:00 to 7:25	7:00	7:00 to 7:15	7:00	7:15 to 7:45	7:15 to 7:45	7:00 to 7:15	7:00
LUNCH (Noon)	12:00	12:00	12:00	12:00	12:00	12:00	12:00	12:00
DINNER (p.m.)	5:00	5:00	5:00	5:00	5:00	5:00	5:00	5:00

Table V-4 summarizes the material flows to and from Dietary. The difference in weight between deliveries to the wards and returns to the kitchen represents the food and disposable items taken to the wards. Disposable items are placed in the trash containers at the ward areas. Dietary makes two additional deliveries in its electric cart at 9:00 a.m. and 1:30 p.m. to deliver desserts and special cold food diets. Also, this electric is available for stat deliveries. Three times each week, Monday, Wednesday and Saturday, Dietary deliveries juice and other special stock items to the satellite kitchens. Any stat items are delivered by the electric cart on a need basis. If the electric is not working, Dietary requests Transportation to supply a truck for these activities normally done by the electric.

Table V-5 is a breakdown of the delivery system in terms of how the food is transferred from the food carts via the satellite kitchens to the patient.

TABLE V-4

MATERIALS FLOWS TO AND FROM DIETARY

	300	400	500	600	700	800	900	1100	TRANS	TOTAL
NO. OF TRIPS PER DAY:										
FROM DIETARY TO	*6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	3.4	54.6
TO DIETARY FROM	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	3.4	46.6
WEIGHT DELIVERED PER DAY IN REGULAR MEAL SCHEDULE (LBS.):										
FROM DIETARY TO	16,812	1,538	3,918	2,668	2,661	2,695	1,727	3,690	-	35,709
TO DIETARY FROM	14,355	912	2,736	1,812	1,812	1,812	912	2,736	-	27,087
VOLUME DELIVERED PER DAY IN REGULAR MEAL SCHEDULES (CUBIC FEET):										
FROM DIETARY TO	1,244	111	911	911	911	911	111	1,214	-	6,324
TO DIETARY FROM	1,244	111	911	911	911	911	111	1,214	-	6,324
TRANSPORT MODES USED EACH DAY:										
FROM DIETARY TO	E/T	E/T	E/T	E/T	E/T	E/T	E/T	E/T	-	
TO DIETARY FROM	E/T	E/T	E/T	E/T	E/T	E/T	E/T	E/T	-	

* Five regular deliveries per day plus one stat in addition to the bi-weekly (M-F) delivery.

TABLE V-5

DETAILS OF FOOD DELIVERY SYSTEM TO PATIENTS

SATELLITE KITCHEN (NODE)	NUMBER OF CARTS DELIVERED	NUMBER OF DIETARY PERSONNEL EMPLOYED AT NODE	OPERATIONS
301-2	1 large cart	2 full-time early Dietary personnel. 1 part-time late Dietary personnel.	This is a total dining room situation in which the patients sit in Solarium at tables. The Dietary personnel set up the utensils, etc., on the table and push the cart into the dining room. Both Dietary personnel and nursing staff help carry the food to the patient settings. The Dietary personnel clear the table and pack up after. In this case, as in 605-6, the nursing personnel help to add the coffee.
305-6	2 small carts	1 1/2 late Dietary personnel. 2 early Dietary personnel.	Both dining and bed patients. The operations of this node can be thought of as a combination of the type of delivery for the bed patients in 605-6 and the delivery for the sit-up patients in 301-2. Dietary picks up the trays and cleans up. However, as in the above operations, the nursing personnel help with the coffee.
307-8	2 large carts	1 Nourishment personnel. (8:00 a.m.-4:30 p.m.) 2 1/2 early personnel.	Both dining and bed patients are served at this node. The operation in this setting is similar to 305-6.

TABLE V-5 (CONTD.)

SATELLITE KITCHEN (NODE)	NUMBER OF CARTS DELIVERED	NUMBER OF DIETARY PERSONNEL EMPLOYED AT NODE	OPERATIONS
401 and 403	1 small cart (Pre and post op.)	2 full-time early Dietary personnel. 2 full-time late Dietary personnel.	1 cart covers two ward areas. This is the same operation as in 605-6 for bed and sitting-up patients -- it is not pre-set. Both nursing and Dietary personnel help. Nursing delivers to the bed areas exclusively. Both nursing and Dietary personnel deliver to sit-up patients.
500	3 small carts	5 full-time early Dietary personnel 2 1/2 late Dietary personnel.	Everything is pre-set, the same as pre-set unit in 401-403. However, at this node certain patients do sit at a table and the tray is brought to them by both the Dietary and nursing personnel. The nursing personnel clear the sit-up areas and the lie-down areas. However, they do not scrape the dishes.
605-6	2 small carts	2 early Dietary personnel 1 part-time late Dietary personnel.	The cart is delivered to 605-6 and the Dietary personnel only put out the necessary eating items plus the dessert and milk, cream etc. The food cart is wheeled into the ward along with a coffee serving cart and a serving line in the ward is established. The nursing personnel then queue up making up the trays for the patients with the Dietary employees serving the hot food.

TABLE V-5 (CONTD.)

SATELLITE KITCHEN (NODE)	NUMBER OF CARTS DELIVERED	NUMBER OF DIETARY PERSONNEL EMPLOYED AT NODE	OPERATIONS
605-6 (Contd.)			Nursing personnel pick up the dishes and do some of the scraping. The Dietary personnel does the rest, e.g., washing the dishes, putting away the silverware, etc.
700	2 small carts	2 full-time early Dietary personnel 2 full-time late Dietary personnel.	1 cart covers two ward areas. This is the same operation as in 605-6 for bed and sit-up patients -- it is not pre-set. Both nursing and Dietary personnel help. Nursing delivers to the bed areas exclusively. Both nursing and Dietary personnel deliver to sit-ups.
800	2 small carts	2 full-time early Dietary personnel. 2 full-time late Dietary personnel.	Identical to 700.
900 (Children)	1 large cart	4 1/2 full-time early Dietary personnel. 2 1/2 late Dietary personnel.	In the 900 area some types of food are prepared completely in the satellite kitchens, i.e. hotdogs, pizzas, etc. These activities arise because the patients in this area are children. Nursing passes the trays to the patients and picks them up.

TABLE V-5 (CONTD.)

SATELLITE KITCHEN (NODE)	NUMBER OF CARTS DELIVERED	NUMBER OF DIETARY PERSONNEL EMPLOYED AT NODE	OPERATIONS
1100	3 small carts	4 1/2 early Dietary personnel. 2 1/2 late Dietary personnel. 2 full-time Dietary personnel.	Trays are completely pre-set in the 1100 satellite kitchen. In this kitchen the facilities for cooking are more adequate than in the other kitchens and more is done.

D. Medical Records

Description: The Medical Records Department is responsible for the maintenance, custody, auditing, reporting on, and all other activities associated with the keeping of a comprehensive medical history of the Rancho patients. Medical Records Department also screens and processes admission requests and carries out all admitting procedures. All requests must be handled in compliance with hospital administrative policy and State code.

Medical records at Rancho may be classified into three broad and rather arbitrary categories. These are: (1) Inpatient Records, kept on the wards, (2) Outpatient Records, kept in Medical Records but supplied to the clinics and other areas when necessary, and (3) Non-Active Records (of former patients, living or dead), kept in Medical Records, for legal and possibly for future statistical analyses.

Medical Records Handling Methods: Medical records are sent to the clinics five times a week. Medical record file clerks carry the outpatients records from the department to the clinics while patients visiting these clinics carry their own charts with them from the wards. There are approximately 115 visits to the clinics each day of which 61 are outpatient visits and 54 inpatient visits.

New patients at Rancho have their record forms taken directly to the wards by the admitting clerk. Also, charts are sent from Medical Records to a number of patient care nodes such as radiology, urology, etc. These charts are delivered by a variety of means:

(1) Inter-campus mail (routine messenger service)
(2) Departmental personnel pickup
(3) Direct request for a messenger
(4) Medical Records file clerk delivery

When a death occurs at night the charts are taken by a hospital guard to the switchboard operator and then picked up in the morning by a Medical Records file clerk. If a death occurs during the day, the records are delivered to the Medical Records office by a special messenger from the messenger service.

Details of Material Movements: While the Medical Records Department does not have a set routine analogous to the Dietary material movement schedule, it does have established flow paths, as described above. Patient charts at Rancho are carried in many instances by the patients themselves. These movements take place between the wards and the clinic. Such movements have been excluded from the materials handling flows in this study.

E. Linen

Description: Laundry-linen Room, Mending Room, and Sewing Room, while considered in our flow tables as separate nodes, do, in fact, constitute integral parts of what might be considered a major linen sub-system. The function of this sub-system is to provide clean linen and to manufacture specialized linens in support of the health care services at Rancho. This sub-system is under the over-all jurisdiction of the General Services Department.

The Laundry-linen Room is consolidated under one roof. Its basic function is to receive soiled linen, launder it, and to distribute clean linen. Linen in need of repair is sent to the Mending Room which is located in Room 201. The Mending Room also receives damaged linen from Central Supply and is a drop-off point for engineers' garments in need of cleaning. The Sewing Room, located in the same building as the Mending Room, is responsible for the manufacture of items that Rancho has a specialized need for and that are generally too expensive or difficult to obtain on the open market. Such items are bikinis for radiology, non-standard surgical drapes, curtains for the wards, head and other restraints, etc.

Materials Handling Methods: Soiled and clean linen is transported around Rancho in canvas laundry carts measuring 2' x 3' x 2'. The total weight of a clean linen hamper varies between 150-200 lbs., while a soiled linen hamper loosely packed weighs between 85-100 lbs. Soiled linen is picked up from all wards and the employee quarters.

Clean linen is distributed and delivered from the Laundry-linen Room on a daily schedule. Housekeeping and the Mending Room are also distribution points for laundry articles

The Mending Room receives garments from Central Supply and the Linen Room. These garments are repaired and sent back to the

laundry for washing. Central Supply sends items used in surgery directly to the Mending Room for repair to eliminate the delay experienced in sending torn articles to the laundry. The Mending Room uses the Linen Room uses the Linen Room electric vehicle for pickup and delivery activities and, in addition, is linked to the laundry by a regular once-a-day delivery and pickup provided by the Transport Department. Likewise, deliveries for the Sewing Room are made by the Linen Room electric vehicle.

Details of Material Movement. Tables V-6, V-7 and V-8 present in summary form the activities of the Laundry-Linen room, Mending room and Sewing room. All these tables summarize these movements by daily frequency of trips, weight carried per day (in pounds) and volume flows (in cubic feet) per day. It will be noticed that both the Laundry-Linen room and the Sewing room engage in "to and from" material movements; however, the Sewing room outputs on demand to those parts of the hospital that are in need of special items, i.e. radiology needing a special type of bikini for Xraying female patients or patient conference suits, etc. These are usually items that are not readily available on the market but have a specialized function in Rancho's health care operations.

TABLE V-6

LAUNDRY/LINEN ROOM SUMMARY FLOW TABLES

NODES:	TRIPS PER DAY:		WEIGHT FLOWS PER DAY (LBS)*		VOLUME FLOWS PER DAY (CU. FT.)*	
	FROM LAUNDRY/ LINEN ROOM	TO LAUNDRY/ LINEN ROOM	FROM LAUNDRY/ LINEN ROOM	TO LAUNDRY/ LINEN ROOM	FROM LAUNDRY/ LINEN ROOM	TO LAUNDRY/ LINEN ROOM
300	1.1	6.2	5,508	6,000	476	952
400	1.1	6.2	803	880	68	136
500	1.4	6.2	832	885	82	164
600	1.4	6.2	1,600	1,760	83	166
700	1.2	7.2	579	630	63	126
800	1.4	6.2	626	700	61	122
900	1.4	6.2	755	830	84	168
1100	1.1	4.0	2,746	3,000	243	486
CENTRAL SUPPLY	1.0	4.0	175		30	
DIETARY	1.0	4.0	477	520	50	100
CLINIC	1.0	1.7	137	150	15	30
OTHER	1.0	1.0	65	71	7	14
SURGERY	1.0	1.0		200		12
TOTALS	15.1	57.1	14,303	15,626	1,262	2,476

* Computed on basis of February 1969 data.

TABLE V-7

MATERIALS FLOW FOR MENDING ROOM

RECEIVES FROM	SENDS TO	MODE	FREQUENCY	VOLUME	WEIGHT	DESCRIPTION
Engineers (will call laundry)	Laundry	Truck 9:00 a.m. daily	1/day 5 day wk.	1 hamper/day 10 bushel size 36" x 24" x 25"	200 lbs. when full	Engineers leave laundry in non-surgical-soiled-linen hamper.
Laundry/ Linen Room		Truck 9:00 a.m. daily	1/day 5 day wk.	1 clean hamper 10 bushel size 36" x 24" x 25"	200 lbs.	Engineers laundry is returned and placed on shelves in "will call" status.
Laundry/ Linen Room		Truck 9:00 a.m. daily	1/day	1 hamper/day 10 bushel size 36" x 24" x 25"	200 lbs.	Clothing that has been found to be in need of repair is washed and sent to the mending room.
	Laundry/ Linen Room	Truck 9:00 a.m. daily	1 day 5 day wk.	1 hamper/day 10 bushel size 36" x 24" x 25"	200 lbs.	Repaired clothing is returned to the laundry for washing and redistribution.
Central Supply		E. Truck	1 day 5 day wk.	In a washing bag - approx. 36" x 24" x 20"	70 lbs.	Items used in surgery are sent to the mending room for repairs.
	Laundry/ Linen Room	Truck 9:00 a.m.	1 day	In a special surgical hamper 36" x 24" x 25"	70 lbs.	Hamper is sent to laundry for washing and then returned to Central Supply.
	Laundry	Truck	1/day 5 day wk.	Not specified	Not specified	Certain items such as table cloths, etc., are manufactured in the mending room and then sent to be washed and then delivered to the appropriate node.

TABLE V-8

MATERIALS FLOW FROM SEWING ROOM

DAILY * ACTIVITY	300	400	500	600	700	800	900	1100	Clin.	Lib.	Other	TOTALS
TRIPS	.2	.2	.2	.2	.2	.2	.2	.2	.1	.1	.2	2.0
WEIGHT POUNDS	7	7	7	7	7	7	7	7	3.5	3.5	7	70.0
VOLUME CU. FT.	2	2	2	2	2	2	2	2	1	1	2	20.0

*Five-day week

F. Housekeeping

Description: Housekeeping, located in Building 202, provides environmental sanitation to all hospital areas. This is functionally translated into cleaning all interior hospital areas and sidewalks, removing trash to central pickup areas, and providing a pest control service. Housekeeping is also responsible for assigning and maintaining rooms in the employees' quarters.

Materials Handling Methods: Housekeeping's transportation resources consist of two men and two electric vehicles which are used in the delivery and pickup activities of Housekeeping.

Details of Materials Handling: This comparatively small transport system is currently responsible for a wide variety of transport activities involving the handling of many different types of materials. This requires a somewhat complex and complicated delivery-pickup schedule.

1. Uniforms: Housekeeping uniforms are cleaned off campus. However, Housekeeping transportation is responsible for their on campus distribution and collection.

2. Mopheads: Mopheads for all areas requiring them are channeled through Housekeeping. Housekeeping delivers mopheads to the various use areas. After these mopheads have been used, they are returned to the laundry by Housekeeping for washing. The linen room returns all clean mops directly to Housekeeping.

3. Supplies: Items classified as "supplies" include soaps, disinfectants, toilet paper, etc. These "supplies" are distributed by the Housekeeping transportation staff to the Housekeeping field personnel.

4. Alcohol: Alcohol for surgery is transported from the pharmacy in Building 30 on a regular weekly schedule to surgery. The empty alcohol bottles are picked up daily and returned to Building 30.

5. Housekeeping is responsible on a daily basis for removing contaminated trash from patient care areas. This is later picked up by Transportation and taken to the incinerator for burning.

The following tables, Nos. V-9, V-10 and V-11, summarize these activities by node and type of material. It should be noted that Housekeeping does not deliver to all nodes that it services. When wards are close together Housekeeping will often deliver to one ward from which it can service several areas. This eliminates duplicity in storage and delivery activities.

TABLE V-9
HOUSEKEEPING TRIPS PER DAY BY HOUSEKEEPING TRANSPORTATION STAFF

		300	400	500	600	700	800	900	1100	Casa	Clinic	Surgery	Trans.	Dietary	Laun/ Linen	Ph. 30	Bus. Services	Other	TOTALS
UNIFORMS	FROM	.4	.4			.4		.4	.4										2.0
	TO	.4	.4			.4		.4	.4										2.0
SUPPLIES	FROM		.6			1.6	1.2	.6	.6		.4								5.0
	TO																		
ALCOHOL	FROM											.2							.2
	TO											1.0							1.0
MOPHEADS	FROM		2.0			1.0	1.0	1.0	1.0	.1	1.0			.2	1.0		.2	.6	9.1
	TO		2.0			1.0	1.0	1.0	1.0	.1	1.0			.2	1.0		.2	.6	9.1
CONTAM. TRASH	FROM												1.0						1.0
	TO	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0								9.0
TOTALS	FROM	.4	3.0			3.0	2.2	2.0	2.0	.1	1.4	.2	1.0	.2	1.0		.2	.6	17.3
	TO	.4	3.4	1.0	1.0	2.4	2.0	2.4	2.4	.1	2.0	1.0		.2	1.0		.2	.6	20.1

TABLE V-10

HOUSEKEEPING DELIVERED/PICKED-UP WEIGHTS (LBS.) BY HOUSEKEEPING TRANSPORTATION STAFF

		300	400	500	600	700	800	900	1100	Casa	Clinic	Surgery	Trans.	Dietary	Laun/ Linen	Ph. 30	Bus. Services	Other	TOTALS
UNIFORMS	FROM	19.0	5.6			34.0		7.6	8.2										74.4
	TO	21.0	4.6			40.0		10.9	9.0										85.5
SUPPLIES	FROM		13.0			37.0	30.0	13.0	12.0		8.0								113.0
	TO																		
ALCOHOL	FROM											323.							323.0
	TO											10.							10.0
MOPHEADS	FROM		40.0			12.0	12.0	24.0	12.0	.5	30.0	12.		6.0	307.0		1.0	4.0	460.5
	TO		80.0			24.0	24.0	48.0	24.0	1.0	60.0	24.		12.0	153.5		2.0	8.0	460.5
CONTAM. TRASH	FROM												410.						410.0
	TO	150.	50.0	35.0	55.0	5.0	20.0	20.0	50.0	25.0									410.0
TOTALS	FROM	19.	58.6			83.0	42.0	44.6	32.2	.5	38.0	335.	410.	6.0	153.5		1.0	4.0	1227.4
	TO	171.	134.6	35.0	55.0	69.0	44.0	78.9	83.0	26.0	60.0	34.0		12.0	307.0		2.0	8.0	1119.5

TABLE V-11

HOUSEKEEPING VOLUME (CU. FT.) DELIVERED/PICKED-UP BY HOUSEKEEPING TRANSPORTATION STAFF

		300	400	500	600	700	800	900	1100	Casa	Clinic	Surgery	Trans.	Dietary	Laun/ Linen	Ph. 30	Bus. Services	Other	TOTALS
UNIFORMS	FROM	2.0	8.0			11.0		3.2	4.0										28.2
	TO	4.0	16.0			22.0		6.4	8.0										56.4
SUPPLIES	FROM		8.0			20.0	16.0	8.0	8.0										60.0
	TO																		
ALCOHOL	FROM											.3							.3
	TO											.3							.3
MOPHEADS	FROM		24.0			15.0	15.0	14.4	7.2	.1	9.0	7.2		1.8	81.7		.6	2.4	178.4
	TO		24.0			15.0	15.0	14.4	7.2	.1	9.0	7.2		1.8	81.7		.6	2.4	178.4
CONTAM. TRASH	FROM												93.0						93.0
	TO	40.0	12.0	4.0	8.0	2.0	5.0	5.0	12.0	5.0	5.0								98.0
TOTALS	FROM	2.0	40.0			46.0	31.0	25.6	19.2	.1	9.0	7.5	93.0	1.8	81.7		.6	2.4	359.9
	TO	44.0	52.0	4.0	8.0	39.0	20.0	25.8	27.2	5.1	14.0	7.5		1.8	81.7		.6	2.4	333.1

G. Maintenance and Power Department

Description: The Maintenance Department of Rancho is an extremely active materials-handling node. However, in our I/O matrix, we have only considered the inputs to the Maintenance Department which come primarily from Property and Supply. The reason for this is that while Maintenance provides support for the entire hospital, most of its materials-handling activities are incidental to its maintenance functions.

This Department maintains the Hospital's buildings, streets, parking lots, utilities, and is responsible for surface and sub-surface repairs and improvements. It provides or operates the utilities necessary to run Rancho. Other activities are the maintenance of all hospital equipment and recommendations for new equipment.

The main operating locations for this Department are:

1. Power Plant Division
2. Medical Care Repair Division
3. Carpenter Shop
4. Paint Shop
5. Electric Shop
6. Plumbing Shop
7. Steam Fitting and Refrigeration Shop
8. Metal Shop
9. Lock Shop

Materials Handling Methods: This Department has 13 non-electric vehicles assigned to it, as shown in Table IV-2(b). The lease charges for operation of these vehicles averaged $508.88 per month in late 1969, with average monthly mileage of about 600 miles per vehicle and average cost of $0.066 per mile.

In addition to the non-electrics the Department has 11 electric vehicles (Table IV-4(b)) with an average operating cost (using the straight line depreciation estimate) of $201.63 per month. The total operating cost of this Department's fleet of vehicles amounts to $710.51 per month.

H. Central Supply

Description: Central Supply provides nursing care supplies and surgical materials throughout Rancho Los Amigos Hospital. It also is responsible for the collection and sterilization of surgical reprocessibles and in certain instances, when a person dies between 12:00 midnight and 6:00 a.m., the delivery of cadavers to the morgue. Central Supply is located in the basement of the Clinic Building.

The materials handled consist of medical supplies, sterile instruments, packs, supplies and clothing for surgery, and other patient-care-related items (soiled linen from surgery goes directly back to the laundry). All wards and all clinics are serviced by Central Supply and these operations involve a staff of 24. Central Supply works two shifts, seven days per week.

Materials Handling Methods: Central Supply materials are transported by (1) push carts, (2) clothing bags, (3) electric cart--and then push cart, and (4) morgue ambulance-van. Inside the Clinic Building where surgery and other related nodes are located, use is made of the elevators and dumb waiters.

Central Supply vehicles are the 1500 lbs., 2-passenger (E27) electric cart and a number of push carts of large and small sizes used to transport plastic tubs or tote boxes and other materials.

Details of Materials Handling in Central Supply: Pickup of bodies from deaths on the wards the previous night is performed by a Central Supply employee who begins work at 6:00 a.m.

The regular day's operations for Central Supply begin with pick-up of reprocessibles (thermometers, surgical processing trays, bedpans, urinals, etc.) from the patient wards. Two people cover the wards north of Imperial with push carts. One person

covers the 1100 and the 300 areas south of Imperial, using the electric cart and a push cart. One hour is usually scheduled for this operation.

Becuase Central Supply has responsibility for maintaining inventory complements on the ward after completing the above procedure, several of the staff then regown and go out on the wards for supply and inventory operations, which continue throughout the day.

Special order items (suction equipment, etc.) are delivered from Central Supply using electric cart or push cart as needed. The flows of materials to and from Central Supply are presented in Table V-12.

Detail on personnel assignments for materials handling activities of Central Supply is presented in Table V-13.

TABLE V-12

CENTRAL SUPPLY MATERIALS FLOW

	TRIP/ DAY	WEIGHT LBS./DAY			VOLUME CUBIC FT./DAY		
		DISPOSABLE	REPROCESSIBLE	TOTAL	DISPOSABLE	REPROCESSIBLE	TOTAL
TO 300 FROM CS	4	205	248	453	40	41	81
FROM 300 to CS	4	-	248	248	-	41	41
TO 400 FROM CS	4	80	33	113	60	11	71
FROM 400 TO CS	4	-	33	33	-	11	11
TO 500 FROM CS	4	100	113	213	40	35	75
FROM 500 TO CS	4	-	113	113	-	35	35
TO 600 FROM CS	4	60	45	105	60	17	77
FROM 600 TO CS	4	-	45	45	-	17	17
TO 700 FROM CS	4	60	45	105	17	40	57
FROM 700 TO CS	4	-	45	45	-	40	40
TO 800 FROM CS	4	60	45	105	17	40	57
FROM 800 TO CS	4	-	45	45	-	40	40
TO 900 FROM CS	4	80	60	140	20	40	60
FROM 900 TO CS	4	-	60	60	-	40	40
TO 1100 FROM CS	4	60	45	105	27	34	61
FROM 1100 TO CS	4	-	45	45	-	34	34
TO CLINIC FROM CS	2	10	8	18	4.5	4	8.5
FROM CLINIC TO CS	2	-	8	8	-	4	4
TO LAUNDRY/LINEN	1	-	175	175	-	44	44
FROM LAUNDRY/LINEN	1	-	360	360	-	44	44
TO MENDING ROOM	1	-	140	140	22	-	22
FROM MENDING ROOM	-	-	-	-	-	-	-
TO MORGUE FROM CS	.6	15	-	15	-	-	-
FROM MORGUE TO CS	-	-	-	-	-	-	-
TO SURGERY FROM CS	3		600	600	*	108	108
FROM SURGERY TO CS	-	-	400	400		108	108
TOTALS TO	39.6	730	1557	2287	307.5	414	721.5
FROM	35.0	-	1402	1402	-	414	414.0

*No volume estimated.

TABLE V-13

MATERIALS HANDLING ACTIVITIES OF RANCHO CENTRAL SUPPLY

INDIVIDUAL & ASSIGNMENT	NODE SERVED	EST. OPER. TIME	DELIVERY MODE	OPERATIONAL ANALYSIS
Assignment 6 and 8. 1 person starts at 6:00 a.m.	Primary activity south side of Imperial.	5 hrs.	Elec.cart (E27) and push carts (small).	Picks up body in event of death on either north or south side. Then collects all reprocessibles and returns them to CSS. Then takes inventory, replenishes depleted supplies. On completion of this task, returns to CSS for internal assignment.
	Secondary activity CSS.	3 hrs.		
1 person Assignment *7A	400 Area North of Imp.	1½ hrs.)	Push cart (small)	Takes care of routine inventory analysis and supply, plus contingencies.
Assignment *7B	500 Area Primary activity	1½ hrs.) 3 hrs.		
Assignment 1B Starts at 6:00 a.m.	CSS Secondary Activity	5 hrs.		Returns to CSS for internal assignment.
1 person Assignment *7D	700 Area	)	Push cart	Routine inventory analysis and supply.
Assignment *7E	800 Area	) 5 hrs.		
Assignments *3A				
*3B	CSS	3 hrs.		Internal CSS operation.
1 person Assignment *9	900 Area	)	Push cart (small)	Inventory check and replenishment.
Assignment *7C	600 Area	) 2½ hrs.		
Station* *5	CSS Linen Pack Room	5½ hrs.	- - -	Helping make up surgery Linen Pack.

TABLE V-13 (CONTD.)

MATERIALS HANDLING ACTIVITIES OF RANCHO CENTRAL SUPPLY

INDIVIDUAL & ASSIGNMENT	NODE SERVED	EST. OPER TIME	DELIVERY MODE	OPERATIONAL ANALYSIS
1 person Assignment *4	All Hospital	8 hrs.	North - push cart (small). South - Elec. cart.	Delivery of all wheeled equipment. Suction EQ Foster Frames, etc. Also receives and checks supplies. Orders equipment and can be called upon to assist nurses with patients.
2 persons Assignment *5	Surgical Pack Room	8 hrs./ day -- except when making a delivery or pick-up from Surgery.	Push Cart (large)	Go into surgical linen pack. Inspect linen, fold linen, get linen ready for sterilizing. Rejects linen in need of mending and then is placed in bag(s) and delivered to Mending Room. This step is considered necessary because CSS material going through the laundry bottlenecks and this leads to a shortage in surgical pack.

* Refers to an activity indigenous to Central Supply. These are assignments that are relevant to the individuals in the materials handling system of Central Supply.

I. Pharmacy in Building 30

Description of Pharmacy: The functions of the Building 30 Pharmacy are to supply inpatient drug order needs, to supply the Clinic Pharmacy, to manufacture certain types of needed chemicals and to store pharmacy supplies.

The staff of the Rancho Pharmacy is under the direction of one man, and the staff total of 11 individuals is divided between two operational nodes, with 6 stationed at Building 30 and the others in the Clinic Building Pharmacy.

Materials Handling Methods: Orders come in one day and are delivered the following day (packed at noon). Orders are generally picked up by the men who make the deliveries to patient wards. Empty bottles are also picked up and returned to the Pharmacy in Building 30. The small bottles are then discarded by the Pharmacy staff. However, the gallon bottles are kept for reuse.

Two men with a lift truck are assigned to the Building 30 Pharmacy. All wards are serviced from Building 30 on a regular daily (Mon.-Fri.) basis. The pharmacy has an electric cart for special deliveries which makes, on the average, one additional visit to each ward per day. The estimated use of the electric cart is between 30 and 60 minutes per day. The tram is also used for some special deliveries, and nurses carry narcotics orders for the wards.

The main type of item carried is a 24" x 11" x 18" light-weight plastic tub. Into this are packed the smaller pharmaceutical items necessary for a ward. In addition to these plastic tubs, and larger prepackaged items, a large amount of Zephiran solution is carried in one-gallon bottles. The delivery activity from the pharmacy in Building 30 is presented in Table V-14.

TABLE V-14

BUILDING 30 PHARMACY MATERIAL FLOWS

(Scheduled and Non-scheduled--Per Day for 5-Day Week)

	Other Nodes									
	300	400	500	600	700	800	900	1100	Clinic Pharm.	TOTALS
TRIPS/DAY:										
FROM BLDG. 30	1.2	1.6	1.6	1.4	1.4	1.4	1.4	1.2	1.0	12.2
TO BLDG. 30	1.2	1.6	1.6	1.4	1.4	1.4	1.4	1.2	1.0	12.2
WEIGHT (lbs.)/DAY:										
FROM BLDG. 30	226	115	145	92	134	106	140	62	200	1220
TO BLDG. 30	84	27	31	21	29	21	30	15	10	268
VOLUME (cu. ft.)/DAY:										
FROM BLDG. 30	28.6	12.6	20.6	11.8	17.8	15.0	6.8	22.0	60	195.2
TO BLDG. 30	28.6	12.6	20.6	11.8	17.8	15.0	6.8	22.0	2	137.2

J. Clinic Pharmacy

Description: The Clinic Pharmacy provides prescription drugs to outpatients in the Clinics and works, mainly on an emergency status, in conjunction with the pharmacy in Building 30 to provide total prescription care for the entire hospital complex. This node is located in the basement of the Clinic building.

Methods and Details of Materials Handling: Patients come directly to the Clinic Pharmacy for their prescriptions when possible. However, the Clinic Pharmacy does make regular deliveries to other activities in the Clinic Building, once a day on a 5-day per week basis, and on demand to patient wards. Deliveries within the Clinic Building are by push cart, and amount to 100 lb. and 12 cu. ft. each to Central Service, Surgery and Urology.

K. Library

Description: The Library provides services for patient and staff. These services are provided by arrangement with the Los Angeles County Library System. The Library, which is located in Building 601, services all wards throughout Rancho.

Materials Handling Methods: Books are transported on 2' x 2' x 4' book carts, both north and south of Imperial. South of Imperial the library staff uses an electric golf-type cart for centralized distribution. North of Imperial, an electric book shelf is used.

The Library staff informs patients of books and magazine resources by taking a cart with 50 books, 30-some magazines (different selections), and a library chart to each ward.

Details of Material Handling: Table V-15 summarizes the Library materials handling activities:

TABLE V-15

LIBRARY MATERIAL FLOW

DELIVERIES TO	FREQUENCY OF VISITS	NO. OF BOOKS	LBS OF BOOKS	NO. OF MAGAZ.	LBS. OF MAGAZ.	TRANSPORT MODE
300	Every other wk.	50	150	30	15	Motorized Electic cart
400	Every other wk.	50	150	30	15	Push cart
500	Every other wk.	50	150	30	15	Push cart
600	Every other wk.	50	150	30	15	Push cart
700	Every other wk.	50	150	30	15	Push cart
800	Every other wk.	50	150	30	15	Push cart
900	Once a week	50	150	30	15	Push cart
1100	Every other wk.	50	150	30	15	Push cart and electric cart

L. Trash

Description: There are two types of trash collected at Rancho

1. Contaminated trash, which consists of infectious and pathological waste, and
2. Non-contaminated trash, which consists of all disposable material that would not fall into the above category.

Materials Handling Methods: Contaminated trash and non-contaminated trash is picked up by Housekeeping and delivered to central points where it is then hauled away for disposal by a Transportation truck. Contaminated trash is placed in cans, then taken to the Rancho incinerator where it is dispersed. Non-contaminated trash is taken from the pickup points by Transportation to the South Gate Station at Garfield Street.

Non-contaminated trash is removed by a rear loading packer truck. Transportation estimates that each pickup area is serviced three times daily. Contaminated trash is taken in cans on a flat truck to the incinerator.

Details of Materials Handled: Approximately 6000 lbs. of trash (or 6 lbs. per patient) is disposed of daily. About 400 lbs. of this (or .4 lbs. per patient) is contaminated trash. The contaminated trash is delivered to a central point by Housekeeping from where it is then taken to the incinerator by the Rancho Transportation staff.

VI. MATERIAL FLOWS SUMMARIZED

A. Input/Output Tables

To summarize this material flows described in this study input/output Tables VI-1, VI-2, and VI-3 are presented as an overview of the types of material inter-reactions that were observed to take place at Rancho between nodes. Tables VI-1, VI-2, and VI-3 are presented to quantify these movements. Table VI-4 presents a summary of the various conveyance methods used.

Units of Quantification: Material flow movements at Rancho were summarized by:

1. Number of trips per day
2. Weight of daily flows (in pounds)
3. Volume of daily flows (in cubic feet).

The method of mode of materials conveyance is also presented so that these flows may be related. The various modes used at Rancho are listed below. The letter in parentheses refers to the code used in the input/output table.

1. Truck (non-electric) (T)
2. Truck (electric (E)
3. Sedan (non-electric) (A)
4. Forklift (F)
5. Ambulance (AE)
6. Tran (TM)
7. Bus (B)
8. Bike (BE)
9. Private Automobile (PA)
10. Walk (W)

To illustrate the use of this table we look at a number of examples. From the input/output table (trips per day) we see that the laboratory staff makes 5 trips to the 300 ward area, 10 trips to the 400 ward area, 7 trips to the 500 ward

area, 3 trips to the 600 ward area, 5 trips to the 700 ward area, 5 trips to the 800 ward area, 2 trips to the 900 ward area and 6 trips to the 1100 ward area. In return there are 9.9 trips to the laboratory from the 300 area, 18.9 trips from the 400 area, 16.9 trips from the 500 area, 7.9 trips from the 600 area, 9.9 trips from the 700 area, 9.9 trips from the 800 area, 6.9 trips from the 900 area and 10.9 trips from the 1100 area.

In this example we see that material movement from the wards constitute more trips to the laboratory than vice versa. This can be explained by the fact that trips are counted from the laboratory and back by laboratory technologists as one trip each way (they carry special blood sampling kits over and return with these kits plus the samples). However, when a ward attendant takes a urine sample, for example, to the laboratory, this is counted as one trip. This is because the attendant is not engaged in a materials handling activity on the return trip. The same reasoning can be applied to see how these tables can be used to quantify movement by weight and volume. Instad of looking at an individual trip, materials carried on an average daily work day (Monday through Friday) by number of trips, weight (in pounds), volume (cubic feet) plus method of material transportation was observed.

In reviewing the tables it will be noticed that some figures are expressed to one decimal place. For example, if, as in the case of the Library, it only delivers to most wards on a bi-weekly basis, then this would be expressed as 0.1 trip per day to each ward. Also, weight (in pounds) and volume (in cubic feet) figures where necessary are taken to one decimal place.

1/ Study of Materials Distribution at Rancho Los Amigos Hospital prepared by William Shepherd for Dan Fahey and transmitted to William Stanley, Los Angeles County Department of Engineers, 15 July 1969.

2/ Vol. II, Chapter V, V-3 transmitted 22 October 1969, Solid Waste Handling and Disposal in Multistory Buildings and Hospitals - County of Los Angeles, PHS Grant No. 1-D01-U1-00164-01, Rancho Los Amigos.

	300	400	500	600	700	800	900	1100	Casa	Clin.	Cafet.	Lab.	Surg.	Rad.	M.S.B.	H.R.	Trans.	Diet.	L/L	Mend/S	HsKp	Maint.	C.S.	Ph30	ClPh	M.R.	B.S.	Adm.	O.S.	Lib.	Trash	Morgue	S/R	TOTALS
300												9.9						5.4	6.2		.4		4.0	1.2					.1				27.2
400												19.9						5.4	6.2		3.4		4.0	1.6					.1				40.6
500												16.9						5.4	6.2		1.0		4.0	1.6					.1				35.2
600												7.9						5.4	6.2		1.0		4.0	1.4					.1				26.0
700												9.9						5.4	7.2		2.4		4.0	1.4					.1				30.4
800												9.9						5.4	6.2		2.0		4.0	1.4					.1				29.0
900												6.9						5.4	6.2		2.0		4.0	1.4					.2				26.1
1100												10.9						5.4	4.0		2.4		4.0	1.2					.1				28.0
Casa																					.1												.1
Clin.												18.0							1.7		2.0		2.0	1.0									24.7
Cafet.																																	—
Lab.	5.0	10.0	7.0	3.0	5.0	5.0	2.0	6.0																									43.0
Surg.																			1.0		1.0		3.0										5.0
Rad.																																	—
M.S.B.																																	—
H.R.	3.0	1.4	2.0		40.0	21.3	6.0			3.8		1.0	.4	1.0	.3	42.0	2.0	.4	.8		5.0	7.2	4.0	2.0	1.0		1.0	.1	6.0	1.0	.1			223.8
Trans.																		3.4*																3.4
Diet.	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4									3.4*		4.0		.2													58.8
L/L	1.1	1.1	1.4	1.4	1.2	1.4	1.4	1.1		1.0			1.0					1.0			1.0		1.0					1.0						16.1
Mend/S	.2	.2	.2	.2	.2	.2	.2	.2		.1									1.0										.1	.1					2.9
HsKp	.4	3.0			3.0	2.2	2.0	2.0	.1	1.4			.2				1.0	.2	1.0								1.0		.6					18.1
Maint.																																		—
C.S.	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		2.0			3.0						1.0	1.0												.6		32.6
Ph30	1.2	1.6	1.6	1.4	1.4	1.4	1.4	1.2																	1.0									12.2
ClPh																								1.0										1.0
M.R.																																		—
B.S.																					.2													.2
Adm.																																		—
O.S.																			1.0		.6													1.6
Lib.	.1	.1	.1	.1	.1	.1	.2	.1																										.9
Trash																																		
Morgue																																		
S/R																																		
TOTALS	21.4	27.8	22.7	16.5	61.3	42.0	23.6	21.0	.1	8.3		111.2	4.6	1.0	.3	42.0	6.4	48.2	59.9	1.0	24.7	7.2	42.0	15.2	2.0		2.0	.1	7.7	2.0	.1	.6		693.9
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	

1. 300
2. 400
3. 500
4. 600
5. 700
6. 800
7. 900
8. 1100
9. Casa Consuela
10. Clinic
11. Cafeteria
12. Laboratory
13. Surgery
14. Radiology
15. Medical Science Building
16. Hospital Receiving
17. Transportation
18. Dietary
19. Laundry/Linen
20. Mending/Sewing
21. Housekeeping
22. Maintenance
23. Central Supply
24. Pharmacy Bldg.30
25. Clinic Pharmacy
26. Medical Records
27. Business Services
28. Administration
29. Other Supply
30. Library
31. Trash
32. Morgue
33. Stroke/Rehab.

TABLE VI-1
INPUT/OUTPUT-TRIPS PER WEEK
DAY BETWEEN NODES

*Empty Vehicles

	300	400	500	600	700	800	900	1100	Casa	Clin.	Cafet.	Lab.	Surg.	Rad.	M.S.B.	H.R.	Trans.	Diet.	L/L	Mend/S	HsKp	Maint.	C.S.	Ph30	ClPh	M.R.	B.S.	Adm.	O.S.	Lib.	Trash	Morgue	S/R	TOTALS
300												88.3						14355	6000		171		248	84						16				20962.3
400												176.6						912	880		1246		33	27						16				2179.3
500												132.6						2736	885		35		113	31						16				3948.6
600												72.3						1812	1760		55		45	21						16				3781.3
700												88.3						1812	630		69		45	29						16				2689.3
800												88.3						1812	700		44		45	21						16				2726.3
900												58.3						912	830		78.9		60	30						32				2001.2
1100												96.3						2736	3000		33		45	15						16				5991.3
Casa																					26													26.0
Clin.												7.5							150		60		8	10										235.5
Cafet.																																		0
Lab.	36	72	32	22	36	36	9	43																										286.0
Surg.																			600		34		400											1034.0
Rad.																																		
M.S.B.																																		
H.R.	200	104	200		200	1855	460			10		50	4	100	34.5	1020	70	160 *	300		750	6923	500	6000	30		76	10	6000	5	5			26566.5
Trans.																	*		520		12													36241.0
Diet.	16812	1538	3918	2668	2661	2685	1927	3680										477			1535		175						65					14656.5
L/L	5508	803	832	1600	579	626	755	2746		137			200						240										4	3.5			340.0
Mend/S	7	7	7	7	7	7	7	7		3.5																								1380.9
HsKp	19	58.6			8.3	42	44.6	32.2	.5	38			335				410	6	307								1.0		4.0					
Maint.																																		
C.S.	453	113	213	105	105	105	140	105		18			600						175	70												15		2217.0
Ph30	226	115	145	92	134	106	140	62																	200									1220.0
ClPh																								10										10.0
M.R.	1																																	
B.S.																					2													2
Adm.																																		73
O.S.																			65		8													73
Lib.	16	16	16	16	16	16	32	16																										144.0
Trash																																		
Morgue																																		
S/R																																		
TOTALS	23237	2826.6	5363	4510	5621	5188	3314.6	6701.2	.5	206.5	0	858.5	1139	100	34.5	1020	480	27730	17072	70	1716.	6923	1717	6278	230	—	79.	10	6076	152.5	5	15		128,711.9
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	

1. 300
2. 400
3. 500
4. 600
5. 700
6. 800
7. 900
8. 1100
9. Casa Consuela
10. Clinic
11. Cafeteria
12. Laboratory
13. Surgery
14. Radiology
15. Medical Science Building
16. Hospital Receiving
17. Transportation
18. Dietary
19. Laundry/Linen
20. Mending/Sewing
21. Housekeeping
22. Maintenance
23. Central Supply
24. Pharmacy Bldg.30
25. Clinic Pharmacy
26. Medical Records
27. Business Services
28. Administration
29. Other Supply
30. Library
31. Trash
32. Morgue
33. Stroke/Rehab.

TABLE VI-2
INPUT/OUTPUT-WEIGHT CARRIED (LBS.)
PER WEEK DAY BETWEEN NODES

* Empty Vehicles

	300	400	500	600	700	800	900	1100	Casa	Clin.	Cafet.	Lab.	Surg.	Rad.	M.S.B.	H.R.	Trans.	Diet.	L/L	Mend/S	HsKp	Maint.	C.S.	Ph30	ClPh	M.R.	B.S.	Adm.	O.S.	Lib.	Trash	Morgue	S/R	TOTALS
300												26.3						1244	952		44		41	28.6						.9				2336.8
400												52.5						111	136		52		11	12.6						.9				376.0
500												44.7						911	164		4		35	20.6						.9				1180.2
600												21.1						911	166		8		17	11.8						.9				1135.8
700												26.3						911	126		39		40	17.8						.9				1161.0
800												26.3						911	122		20		40	15						.9				1135.2
900												18.5						111	168		25.8		40	6.8						1.8				371.9
1100												28.9						1214	486		27.2		34	22						.9				1813.
Casa																					5.1													5.1
Clin.												13.3							30		14		2	2										61.3
Cafet.																																		
Lab.	13	26	18.2	7.8	13.0	5.2	15.8	15.6																										114.6
Surg.																			12		7.5		108											127.5
Rad.																																		
M.S.B.																																		
H.R.	36	74	36	-	1200	404	60			295		10	4	20	19	400	2	16 *	30		60	1100	360	600	18		21.9	4.8	30	1.0	1.5			4803.2
Trans.																																		
Diet.	1244	111	911	917	911	911	111	1214									*		100		1.8													6431.8
L/L	476	68	82	83	63	61	84	243		15			12					50			81.7		30						7					1355.6
Mend/S	2	2	2	2	2	2	2	2		1									24										2	1				44
HsKp	2	40			46	31	25.6	19.2	.1	9			7.5				93	1.8	81.7								.6		2.4					359.9
Maint.																																		
C.S.	81	71	75	77	37	57	60	61		4			108						44	22												15		732.0
Ph30	28.6	12.6	20.5	11.8	17.8	15.0	6.8	22.0																	60.0									195.1
ClPh																								2.0										2.0
M.R.																																		
B.S.																					.6													.6
Adm.																																		
O.S.																			14.0		2.4													16.4
Lib.	.9	.9	.9	.9	.9	.9	1.8	.9																										8.1
Trash																																		
Morgue																																		
S/R																																		
TOTALS	1873.5	405.5	1145.6	1089.5	2310.7	1487.1	367.0	1577.7	.1	324.0		267.9	131.5	20	19	400	95	6391.8	2655.7	22	393.1	1100	758	739.2	78.0	22.5	4.8	41.4	10.0	1.5	15			23769.1
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	

1. 300
2. 400
3. 500
4. 600
5. 700
6. 800
7. 900
8. 1100
9. Casa Consuela
10. Clinic
11. Cafeteria
12. Laboratory
13. Surgery
14. Radiology
15. Medical Science Building
16. Hospital Receiving
17. Transportation
18. Dietary
19. Laundry/Linen
20. Mending/Sewing
21. Housekeeping
22. Maintenance
23. Central Supply
24. Pharmacy Bldg.30
25. Clinic Pharmacy
26. Medical Records
27. Business Services
28. Administration
29. Other Supply
30. Library
31. Trash
32. Morgue
33. Stroke/Rehab.

TABLE VI-3

INPUT-OUTPUT-VOLUME CARRIED (CUBIC FEET) PER WEEK DAY BETWEEN NODES

*Empty Vehicles

	300	400	500	600	700	800	900	1100	Casa	Clin.	Cafet.	Lab.	Surg.	Rad.	M.S.B.	H.R.	Trans.	Diet.	L/L	Mend/S	HsKp	Maint.	C.S.	Ph30	ClPh	M.R.	B.S.	Adm.	O.S.	Lib.	Trash	Morgue	S/R
300												E/W/PC						E/T	T		E		PC/E	T/E					E/P			
400												W						E/T	T		E		PC	T/E					P/E			
500												W						E/T	T		E		PC	T/E					P			
600												W						E/T	T		E		PC	T/E					P			
700												W						E/T	T		E		PC	T/E					P			
800												W						E/T	T		E		PC	T/E					P			
900												W						E/T	T		E		PC	T/E					P			
1100												E/W/PC/PE/T/M						E/T	T		E		PC/E	T/E					E/P			
Casa																					E											
Clin.												W							T		E		PC	T/E								
Cafet.																																	
Lab.	E/W	W	W	W	W	W	W/PE	E											T		E		PC										
Surg.																																	
Rad.																																	
M.S.B.																																	
H.R.	T	T	T	E/T	E/T	E/W/T	E/T			T		T	T	T	T	T/E/W	T	T	T		T	T/E/W	T/E	T	T		T	T	T	T	T		
Trans.																																	
Diet.	E/T	E/T	E/T	E/T	E/T	E/T	E/T	E/T									T		T		E												
L/L	E/T	E/T	E/T	E/T	E/T	E/T	E/T	E/T		E/T			E/T					E/T			E/T		E/T						E/T				
Mend/S	E/T	E/T	E/T	E/T	E/T	E/T	E/T	E/T		E/T									T										E/T	E/T			
HsKp	T/E	E/T			E/T	E/T	E/T	E/T	E/T	E			E				T	E	T								E		E/T				
Maint.																																	
C.S.	PC/E	PC	PC	PC	PC	PC	PC	PC/E		PC			PC						T	T											AE		
Ph30	T/E	T/E	T/E	T/E	T/E	T/E	T/E	T/E																T	T/E								
ClPh																								T									
M.R.																																	
B.S.																					E												
Adm.																																	
O.S.																			T		T												
Lib.	E/P	P/E	P	P	P	P	P	E/P																									
Trash																																	
Morgue																																	
S/R																																	
TOTALS																																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

T = Truck Non-Elec.

E = Truck Electric

A = Sedan Non-Elec.

F = Fork-Lift

AE = Ambulance

TM = Tram

B = Bus

BE = Bike

PA = Private Auto.

W = Walk

PC= Push Cart

1. 300
2. 400
3. 500
4. 600
5. 700
6. 800
7. 900
8. 1100
9. Casa Consuela
10. Clinic
11. Cafeteria
12. Laboratory
13. Surgery
14. Radiology
15. Medical Science Building
16. Hospital Receiving
17. Transportation
18. Dietary
19. Laundry/Linen
20. Mending/Sewing
21. Housekeeping
22. Maintenance
23. Central Supply
24. Pharmacy Bldg.30
25. Clinic Pharmacy
26. Medical Records
27. Business Services
28. Administration
29. Other Supply
30. Library
31. Trash
32. Morgue
33. Stroke/Rehab.

TABLE VI-4

MODES OF TRANSPORTATION USED IN INTERNODAL SUPPLY ACTIVITIES