The VA hospital, with its dispersed campus of over 50 fairly small buildings built over a two and half decade period, is quite different from the newer hospitals that suffered damage in the San Fernando earthquake (Figure 10). One would certainly expect that the buildings designed prior to 1935, with no seismic provision, would suffer severe damage and destruction. Of the four of these older buildings that collapsed two were heavily populated, resulting in large life loss. This was an unfortunate circumstance that, with today's knowledge, could be averted by ensuring that such buildings were demolished or of minimum occupancy. What is perhaps more remarkable is the small extent of damage suffered by buildings designed as long ago as 1938-1958 - for example Building 41 (built in 1938) demonstrates the intrinsically sound performance of a simple concrete frame and concrete shear wall building even when designed to an obsolete code.

None of the buildings in this complex were unreinforced masonry, the type of building currently regarded as our most dangerous construction type. Analysis of those buildings that suffered severe damage, although short of total collapse, shows that the incidence of life endangering damage to occupants is very small. Life endangering damage to occupants is defined as collapse of interior walls or roofs: collapse of exterior walls endangers only the life of people outside the building who happen to be close to the affected walls.

Aside from the two buildings, built in 1925, that suffered total collapse, of the other pre-1935 buildings, nine suffered wall collapse, but only one of them, Bldg. 11A, suffered interior wall collapse, and this affected only portions of some walls: 15 buildings suffered neither wall nor roof collapse. Of the post-1935 buildings, 2 suffered wall collapse and one of these, Bldg. 350, also suffered partial roof collapse, but both these buildings were garages with essentially no human occupancy. Twenty of these later buildings suffered neither wall nor roof collapse: clearly the post-1935 buildings performed better.

On the basis of above, one may reach two very important conclusions: one is that, as is well known, large life loss is associated with complete

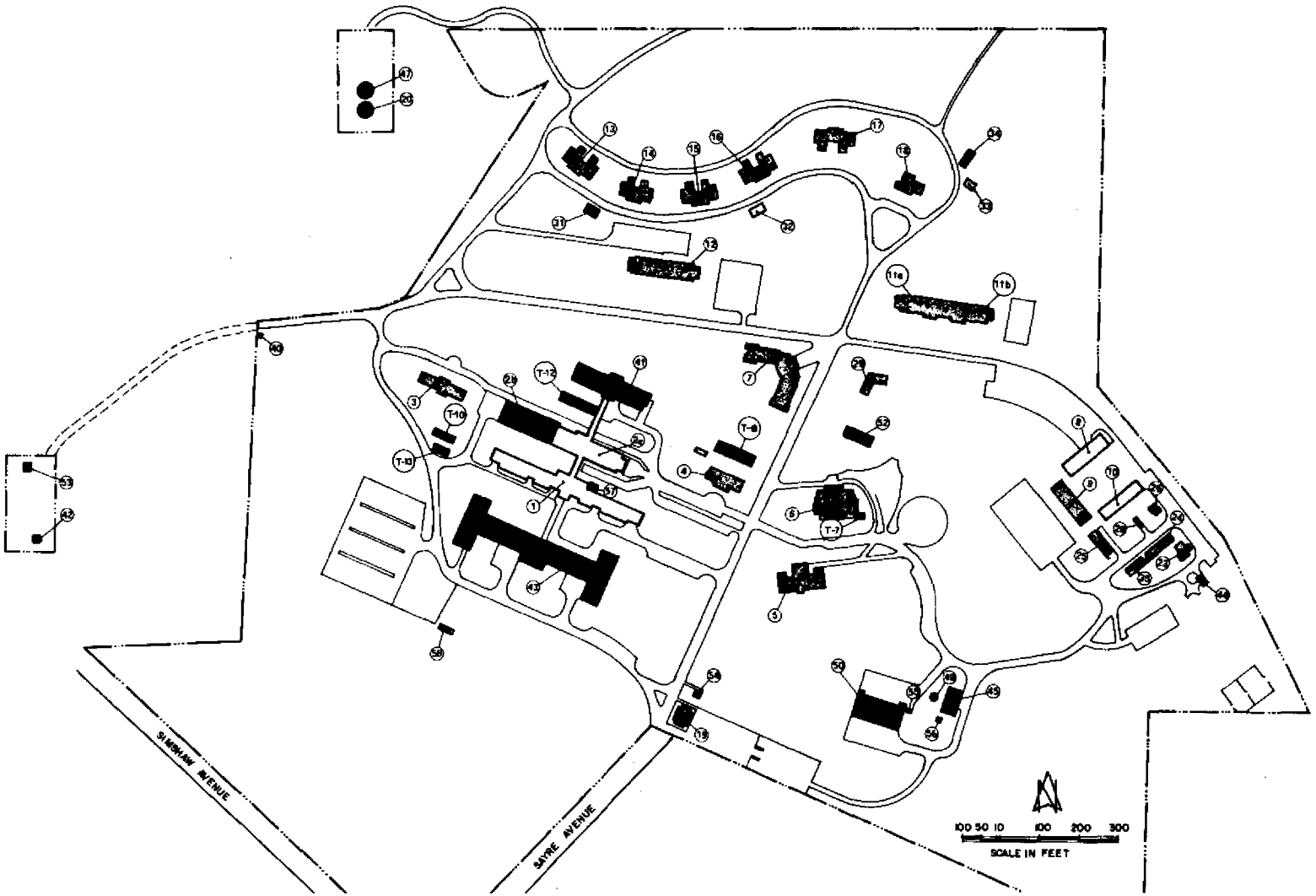

Figure 10: The Veterans Hospital campus. The numbers identifying buildings shown in the damage schedule on pages 70-76. (Drawing from: Lew, H.S., et al, "Engineering Aspects of the 1971 San Fernando Earthquake," National Bureau of Standards, Washington, D.C., 1971).

building collapse. Two, that even for this group of 35-45 year old pre-seismic design buildings, if the building did not collapse, then the incidence of damage that endangered the lives of the building occupants was very low: a small portion of one out of 24 buildings. For the post-1935 (but pre-1950) buildings, the incidence of life endangering damage in this sample was zero.

BUILDING & DAMAGE SCHEDULE * V.A. SAN FERNANDO

Pre-1935 Construction (non-earthquake resistant)

DESTROYED

Bldg. # - Name	Year Built	Type	Type of Damage
1 Semi-ambulant	1925	I	Building totally collapsed.
2a Infirmary and Main Kitchen	1925	I	Building totally collapsed.
8 Garage and Fire House	1925	I	Building totally collapsed.
10 Engineering Office	1925	I	Building totally collapsed.

SEVERE DAMAGE

3 Men's Ambulant	1925	I	Frame was standing, but several columns were fractured, spalled, and displaced horizontally. Portions of walls were collapsed and others had large fractures. 1- to 5-inch downward displacement of adjacent grade was observed on north and west sides.
4 Recreation	1925	I	Frame was standing, but portions of walls were collapsed and others had large fractures and cracks.
5 Infirmary	1925	I	Frame was essentially intact. Walls had large fractures.

* This schedule is adapted from that contained in "San Fernando, California, Earthquake of February 9, 1971," Leonard M. Murphy, Scientific Coordinator, U.S. Department of Commerce, Washington, D.C., 1973.

Bldg. # - Name	Year Built	Type	Type of Damage
6 Infirmary	1925	I	Frame was standing, but several columns were fractured, spalled, and displaced horizontally. Portions of walls were collapsed and others had large fractures.
7 Recreation Supply & Fiscal	1925	I	Frame is essentially intact. Chimneys had collapsed onto roof. Ground floor had several 1/16-inch wide cracks. Basement floor had several 1/8-inch wide cracks and one 1½-inch upward displacement. Exterior and basement walls had diagonal cracks. Interior walls had large fractures.
9 Supply warehouse	1925	I	Frame was partially collapsed and several remaining columns were fractured, spalled, and displaced horizontally. Portions of walls were collapsed and others had large fractures.
11a Nursing home	1925	I	Frame was essentially intact. Chimneys were collapsed. Exterior walls had continuous horizontal cracks at floor and rooflines. Portions of interior walls were collapsed and others had large fractures.
11b Nursing home	1925	I	Frame was essentially intact. South exterior wall had continuous horizontal crack at roofline. North exterior wall had continuous crack at floorline. Interior walls had cracks from 1/8 inch to 1 inch in width.

Bldg. # - Name	Year Built	Type	Type of Damage
12 Nurses Quarters	1925	I	Frame was essentially intact. Upper portions of walls were collapsed and others had horizontal cracks.
13 Quarters	1925	III	Frame was standing, but portions of exterior walls were collapsed and others had large fractures with horizontal displacements.
24 Carpenter Shop	1927	IV	Frame was standing, but displaced horizontally. Walls had cracks and spalls, especially at openings.
14 Quarters	1925	III	Frame was standing, but exterior walls had large fractures.
15 Quarters	1925	III	Frame was standing, but exterior walls had large fractures, especially at window heads.
16 Quarters	1925	III	Frame was standing, but exterior walls had large fractures with horizontal displacements.
17 Quarters	1925	III	Frame was essentially intact, but some exterior walls had cracks up to 1/8-inch in width. Chimneys had cracks at roofline.
18 Quarters	1925	III	Frame was essentially intact, but some exterior walls had cracks up to 1/8-inch in width. Chimney was fractured at roofline.
19 Gate House	1925	III	Frame was standing, but portions of walls were collapsed and others had large fractures.

Bldg. # - Name	Year Built	Type	Type of Damage
23 Ground Maintenance	1931	IV	Frame was essentially intact. Exterior walls had continuous horizontal cracks at floorline. 2-inch downward displacement of adjacent grade was observed on north side.
25 Plumbing Shop	1927	IV	Frame was standing, but displaced horizontally. Walls had cracks and spalls, especially at openings.
28 Guest House	1928	III	Frame was standing, but majority of exterior walls were collapsed.
35 Equipment Repair	1927	IV	Frame was standing, but displaced horizontally. Walls had cracks and spalls, especially at openings.
SERVICEABLE			
20 Water Tank	1925	-	Tank was essentially intact. Looking north, steel I-beam supports had rotated 90° counter-clockwise. Tank was displaced about 4 inches in a west direction. Anchor bolts were deformed.
29 Paint & Oil Storage	1930	II	Frame was essentially intact with no apparent damage. Wood frame canopy between units 26 and 29 was collapsed.
34 Green House	1932	V	Frame was essentially intact with no apparent damage.

Post-1935 Construction (earthquake resistant)

DESTROYED

Bldg. # - Name	Year Built	Type	Type of Damage
32 Garage	1939	III	Frame was standing, but west wall was collapsed and others had cracks.
33 Garage	1939	III	Frame was standing, but large portion of roof was collapsed and most of north wall was collapsed.

SEVERE DAMAGE

26 Paint Shop	1947	IV	Frame was essentially intact. Exterior walls had cracks and spalls, especially at openings. Wood frame canopy between units 26 and 29 was collapsed.
31 Garage	1939	III	Frame was standing, but walls had large fractures with horizontal displacements.
42 Pump House	1940	III	Frame was essentially intact. Walls had diagonal cracks up to 1/8-inch in width.
44 Incinerator	1949	II	Frame was essentially intact. Some walls had diagonal hairline cracks. Chimney was collapsed.

SERVICEABLE

2b Dining Room & Kitchen Addn.	1950	II	Frame was essentially intact. Exterior walls had diagonal hairline cracks. Chimneys from unit 2a had collapsed onto unit 2b and damaged east portion of roof.

Bldg. # - Name	Year Built	Type	Type of Damage
41 Infirmary	1938	II	Frame was essentially intact. Some walls had diagonal hairline cracks. Basement slab-on-grade had 1/16-inch wide continuous crack running parallel to and 6 feet south of north exterior wall.
43 Main Infirmary	1949	II	Frame was essentially intact. Some walls had diagonal hairline cracks.
45 Boiler House	1949	II	Frame was essentially intact. South wall had a diagonal crack. North brick filler wall had several cracks and was bowed outward. Brick boiler walls had several large fractures with horizontal displacements.
47 Steel Water Tower	1949	-	Tank was essentially intact. Slab-on-grade at anchor bolts had short hairline cracks. Water seepage was observed at the base.
49 Concrete Chimney	1949	-	Chimney was essentially intact. Wall had continuous horizontal hairline cracks at approximately 20 feet center to center, probably at construction joints. 2-inch downward displacement of adjacent grade was observed on north side.
50 Laundry	1959	II	Frame was essentially intact. South exterior wall had horizontal hairline cracks at top and bottom of piers between window openings. Interior basement walls had diagonal hairline cracks.

Bldg. # - Name	Year Built	Type	Type of Damage
52 Chapel	1950	II	Frame was essentially intact. No apparent damage was observed.
53 Pump House	1950	II	Frame was essentially intact. No apparent damage was observed. Exterior mechanical equipment (water filters) was displaced and pipes were broken.
54 Main Switch House	1950	II	Frame was essentially intact. No apparent damage was observed.
57 Transformer Vault	?	II	Structure was covered with debris and could not be inspected.
58 Golf Club House	1957	IV	Frame was essentially intact. No apparent damage was observed.
(Temporary Buildings)			
T-7 Patients Recreation Room	1947	IV	Frame was essentially intact. No apparent damage was observed.
T-8 Canteen	1947	V	Frame was essentially intact. No apparent damage was observed.
T-10 Research Storage	1947	V	Frame was essentially intact. No apparent damage was observed.
T-12 Recreation	1947	V	Frame was essentially intact. No apparent damage was observed.
T-13 Animal House	1947	V	Frame was essentially intact. No apparent damage was observed.

b. The Experience:

VA San Fernando was the closest hospital to the epicenter; it received the most severe shaking, its buildings were old, and the damage severe. It was soon obvious that death, injury, and entrapment were of tragic proportions.

The following picture of the experience at the VA Hospital is based on interviews in April 1981 with seven members of the hospital staff.

Dr. David Salkin was the Medical Director and Administrator at VA San Fernando at the time of the earthquake. He lived on the grounds of the hospital; at 6:01am his bed began to shake. The shake lasted about a minute. He tried to get up two or three times but could not. All of his furnishings were tossed around inside the house, but the house was not seriously damaged.

Emergency drills were required and held approximately every four months at the hospital. These drills were usually fire drills. However, three months prior to the earthquake, Washington VA Central Office specified including a drill that featured an H-bomb being dropped on Pomona. The Engineering Department spent a great deal of time rehearsing the engineering aspects of this event; one conclusion was that the ground would shake violently, so when the earthquake shock occurred, Dr. Salkin thought that an H-bomb had exploded. Dr. Salkin reports that since most patients had previously experienced wartime conditions a general calmness prevailed and hospital buildings were evacuated in about 20 minutes.

The VA Hospital had only one access road, which was destroyed by the earthquake, so after the shock vehicles could not get into or out of the grounds. It took the fire department about 2 hours to repair the road. At the time of the earthquake 12 walkie-talkies had been placed in key locations around the facility, but all except one were damaged in the earthquake. There were no fires in the hospital; the gas systems were designed to shut down and evidently operated correctly.

One personnel aspect of this particular hospital's experience was that after the earthquake most of the employees were re-assigned to the VA Sepulveda hospital; the employees were mixed up with the Sepulveda staff and this created low morale and uncertainty about jobs. Dr. Salkin feels that the respective personnel departments should have met with these employees separately.

Jean McPhearson was a nurse on the staff of the VA Hospital at the time of the earthquake. When the earthquake struck she was at her home, which was about 10 minutes drive from the hospital. The earthquake knocked her down 6 times. After the shaking stopped she proceeded by car to the hospital, where she found things in a state of very intense activity.

She arrived at the hospital just before 7:00am, having driven through deserted streets, and saw the side of one of the mountains sloughed off, with steam or dust rising from the ground. She parked her car at the corner of Foothill and Sayre. After encountering difficulty getting onto the hospital grounds she then proceeded to the Pharmacy which was located on the first floor of the destroyed Clinic Building, where she picked up syringes, demerol, and morphine. She then crawled through the rubble of the collapsed building and administered pain-killers to patients who were trapped under the concrete. She was directed to patients by sounds of moaning and groaning.

McPhearson reports that the building which collapsed had recently been remodelled and a new roof added. The remodelling job had just been completed and patients were gradually moving in. In the next few days 30-40 additional patients would have been moved into the building.

As dead patients were found in the rubble they were taken to a makeshift morgue that was set up in one of the quonset huts on the grounds, which had negligible damage. Some patients did not have wrist bands and thus were difficult to identify. On the first floor of the collapsed building one of the patients who was in a respirator put his

head in and was saved. Soon after the earthquake, a decision was made to evacuate all buildings, and patients were carried down stairways. McPhearson thinks that the fire drills that had been held paid off in assisting the evacuation. Blankets and mattresses were placed on the lawn and patients were moved there. Some patients were in very precarious positions in the collapsed buildings, and if not approached correctly a part of the building was likely to collapse on top of them.

Central Supply was located next to Surgery on the top floor of one of the buildings that was left standing, but since there was fear of structural damage and aftershocks people were not allowed to go up there. The Salvation Army brought food and cigarettes sometime around noon, and they stayed two to three days. Prisoners working at a nearby forest service site came to the hospital and set up a camp kitchen.

After the earthquake, many of the patients were taken to VA Wadsworth and Sepulveda. The staff was re-assigned to various VA hospitals and other hospitals: assignment was based on staff seniority, with most of the senior staff going to Sepulveda because it was close to the location of the San Fernando hospital. However, McPhearson reports that the staff was not well received by the Sepulveda staff, which was also in a state of confusion and intense activity.

McPhearson feels that the hospital had operated like a small community nestled in the mountains and was known as the 'garden spot' of the Veterans Administration. Socially it was a real community, since many of the patients were chronically ill and had been at this facility for 15 years. Close bonds had developed between staff and patients, and it was unfortunate to see these bonds broken.

Benjamin Elsant was the Jewish Chaplain at the VA San Fernando Hospital; at the time of the earthquake he lived in Northridge, 8 miles north of the hospital. Arriving at the hospital at about 12:30pm, he had no difficulty getting to the hospital having identified himself as Chaplain. When he arrived he noticed people waiting around and buses coming and going as the patients were being evacuated to other VA

hospitals. He went to the Chapel to obtain a list of the thirteen Jewish patients in the facility and checked them out. One of the Jewish patients had been buried underneath the building and was later found dead. The rest either had been, or were in the process of being, evacuated to other VA hospitals, mostly the VA Sepulveda facility.

One important characteristic of this facility was that about half of the patients were ambulatory to a degree and able to help themselves and others.

After five or six hectic hours, things settled down into a slow routine: people were unable to remove vast amounts of rubble by hand and they had to wait for heavy equipment; removal of rubble continued for two to three days. Lots of people were just waiting around, as removal of rubble was a slow process, so most outside activity was confined to chatting with these people. Some patients reported to him that wallets were missing, and blamed fire and police personnel, but this rumor was not substantiated.

When a patient was removed from the rubble one of the Chaplains would accompany him to the First Aid Station or morgue and spend a little time with him. Mostly, the Chaplains stayed out of the Doctors' way. Most patients however, were more concerned about being attended to by a physician.

Ann Mynt was a staff nurse at the San Fernando hospital; her residence was 2 miles from the hospital. She was in bed at the time of the earthquake and the shock knocked out her electricity. It never occurred to her that anything had happened to the hospital.

Ann arrived at the hospital at 3:00pm and was told that the hospital had been closed; she was directed to the VA Sepulveda facility, where Building No. 2 had been opened, and almost all of the patients from the VA San Fernando were relocated in this building, which was staffed mostly by the San Fernando personnel. Mynt reports that the staff morale was very good, for the staff was very close knit. There was general

discussion of who would do what and how people would adjust to the new situation.

Within 7 to 10 days after the earthquake, the staff was told by the administration of the decision to break up the staff and move them to different facilities, and they were informed of existing openings at VA Sepulveda, VA Wadsworth, VA Phoenix, Arizona, and the VA hospital in Florida. At the end of March or April, Mynt took a part-time position at VA Wadsworth and has since moved back to VA Sepulveda.

Dorothy Myers was a nursing assistant at VA San Fernando at the time of the earthquake. She lived in Pacoima and went to work at 6:45am as scheduled. She noticed live wires hanging from poles. She first went to the back of Building No. 3, which was the building that had collapsed, but was not able to get patient records from the building. On entering the building, Myers noticed all fixtures hanging, mattresses on the floor, broken glass all over, and the smell of gas.

She reports that the fourteen psychiatric patients were more disoriented and had to be restrained. Help arrived at 10:30am; however, most patients were evacuated by the time outside help arrived. Myers said it was very difficult to get patients down the stairwells on mattresses, which is the way the non-ambulatory patients were evacuated. In Building No. 3, there was a lot of rubble on top of people; in all of the buildings patients had been thrown out of beds; many were bleeding and in shock. No areas that she visited were undamaged, and there was a chance of something falling during one of the aftershocks. Myers felt that no one was directing the evacuation; patients helped take other patients out as did staff members. Although some patients could not be identified, many people also did have name tags or arm bands on. Myers told patients to calm down and relax and comforted them. Patients still in the building were concerned that the roof might fall in on them. During the evacuation, Myers tried to get the alert patients out first, because they seemed more frightened. There was no light but she was able to get some flashlights from the standing buildings. The Group Leaders on the scene had flashlights.

Nurse Myers had only worked for the VA 6 months and had not obtained very much seniority. She was therefore transferred to VA Wadsworth; she left the VA in 1972, but came back to work at VA Sepulveda in 1974.

Maria McComb was the Chief Dietitian at San Fernando and now works at the VA Wadsworth hospital; she lived in West Los Angeles at the time of the earthquake. She felt the impact, turned the radio on, and heard about the Olive View disaster. She arrived at the VA San Fernando hospital shortly after 7:00am and had to park in the street. It did not occur to her at the time that the building had been damaged until she walked up the hill to the hospital.

When she arrived her secretary pointed out the collapsed building to her. She decided to go over and check out to see what was left of the dietetic area, which was in that building; little remained except a recent addition for refrigerators and freezers.

At this time people were just standing around, and many appeared to be in shock. On arrival she took command of the dietetic service, and many of the employees helped with the evacuation. In dietetics itself one supervisor was trapped but was freed by dietetic employees. Maria could hear the voice coming from behind the rubble of a man who, it turned out, was trapped for 62 hours before rescue. The refrigerators and freezers were left standing and appeared to be serviceable. Her staff found milk, bread and juice and distributed it to patients and employees. The power was out at the time, so the two big freezers full of food were threatened. She was able to get a bus to take all the food over to Sepulveda; this occurred sometime in the afternoon.

At San Fernando, other staff had assisted in setting up a triage and helped checking for buried employees. Of the dietary staff, who numbered 19 including part-time employees, three died, three were trapped in the rubble for between 2 and 6 hours, and one was trapped for several days. The Chief of Dietetics had to return to San Fernando each day to check on the status of the buried employee, and identify bodies as they were brought out. After the earthquake Dietetics employees were

transferred informally to VA Sepulveda, and this was made official a few days afterwards.

Unfortunately, at the time of the earthquake, the VA had just finished remodelling the Dietetic Services; $200,000 had been spent on the project. Most of this investment was wiped-out.

Maria feels that the following ingredients are essential for morale in a situation like this. These are 1) the presence or absence of the accepted leader, 2) the actions of the leader, 3) a lack of panic on the part of top management: in other works, control.

Frances Kelly was the Chief of Occupational Therapy at that hospital. After the shaking stopped, Kelly left from her home in Arletta for the 25 minute drive to the hospital. She did not notice very much damage around her home, but it got worse as she got closer to the hospital.

Kelly proceeded on Foothill Blvd., could not get through to the hospital, and returned home; it was not until later in the day that she heard about the building collapse. She then went back to the hospital, but could not get through. The next day she reported to the VA Sepulveda hospital, according to the VA procedure that staff report to the nearest VA hospital in case of emergency.

She did not return to the VA San Fernando hospital until 2 days after the earthquake. In Occupational Therapy she noticed that fluorescent lights had fallen down; desks and book cases had marched into the center of the room; even heavy items on the East and West walls had fallen over; those on the North and South walls had just been shaken around. The doors were open and the door knobs banged off of the doors; there was a small store room for locked items and the shelves in the store room had piled against the door. The floor was covered with debris; some cabinets were warped, and some ceramic bowls were broken. Incidentally, the Occupational and Physical Therapy Departments were located in one of the newest and least damaged of the buildings on the grounds.

Kelly was able to salvage most of the furniture, fixtures, and equipment from Occupational and Physical Therapy.

Occupational and Physical Therapy was relocated from the VA San Fernando to Building No. 2 of the VA Sepulveda. Kelly reports that the Sepulveda staff was initially afraid that VA San Fernando staff members with seniority would take their jobs. The Sepulveda people had also gone through an earthquake, people were frightened and felt a tremendous sense of loss. The management solution to this problem was to assemble large groups of people in the hospital theater and try to facilitate communication. Kelly feels that small groups with skilled counseling would have been a more effective solution.

As a footnote to this section, VA San Fernando was not rebuilt: its site is now a public park. The laundry is now a cultural center and the chapel is a therapeutic center for the handicapped. In order to respond to population growth patterns, and in accord with a new VA policy to relate their hospitals to teaching centers, a replacement hospital was built in San Bernardino County. The Jerry L. Pettis Hospital at Loma Linda was completed in 1977 at a cost of $54 million.