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An Intercity-International Bus Terminal For Downtown El Paso, Texas

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Presented to

Dr. George T. Peng

Division of Architecture

Texas Tech University

In partial fulfillment of

Bachelor of Architecture Degree

Arch. 4394

Architectural Programming

by

Kellee Bowers

December 21, 1984

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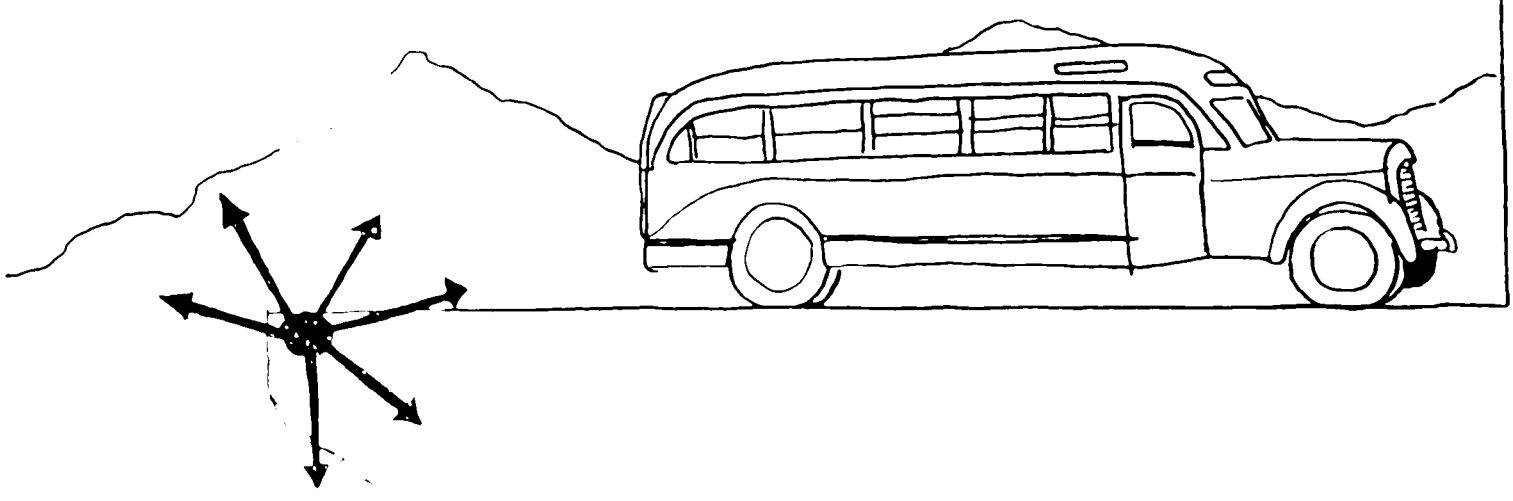
EL PASO INTERCITY / INTERNATIONAL BUS TERMINAL



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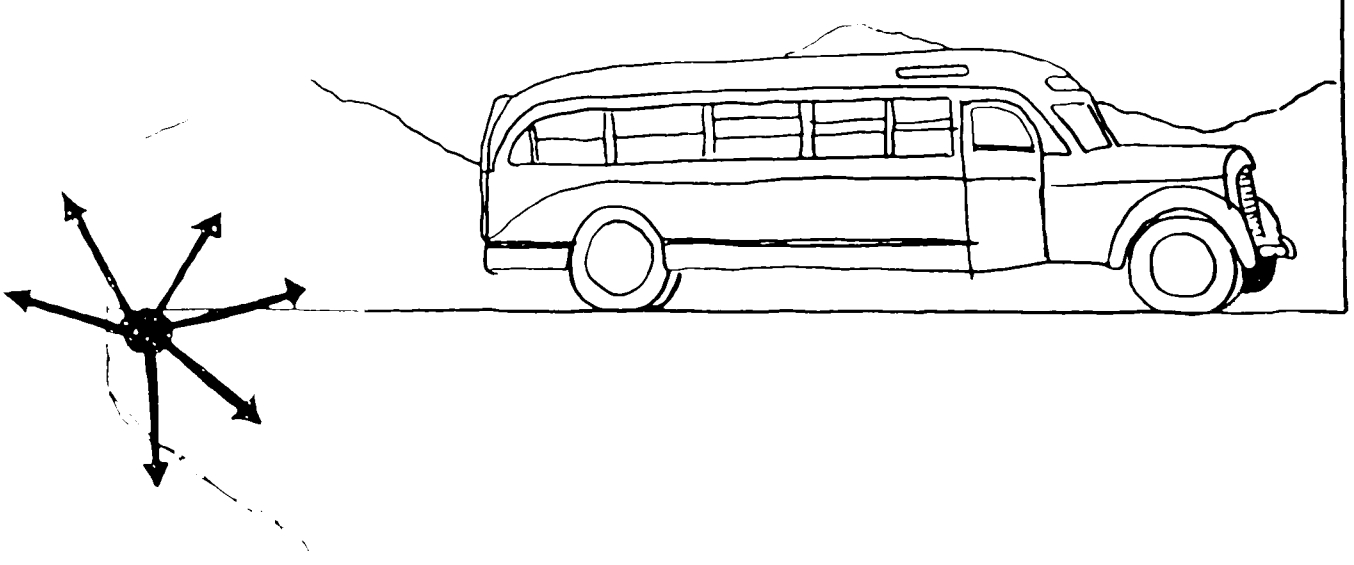
INTRODUCTION



Introduction

El Paso, Texas is a fast growing metropolitain area interested in redeveloping and revitalizing its downtown area. City officials agree that one positive way of approaching this goal is to promote convention activity in and around the Civic Center (also located downtown). In order to accommodate conventions however, El Paso needs more hotel rooms downtown. Although the El Paso Del Norte Hotel is being refurbished and expanded it will not be enough to handle all potential convention business. In response to this a new hotel site has been proposed by our El Paso urban design team under the direction and supervision of Dr. George Peng (Spring '84 T.T.U.) to help carry the load and to help accommodate tourists.

Our team has chosen the site adjacent to the Civic Center that presently houses Greyhound Bus Line's operations as the optimum site for the new hotel. It is within walking distance of the Civic Center (across the street) and most of the surrounding central business district. In order for this hotel to be developed, however, the bus terminal must be relocated.

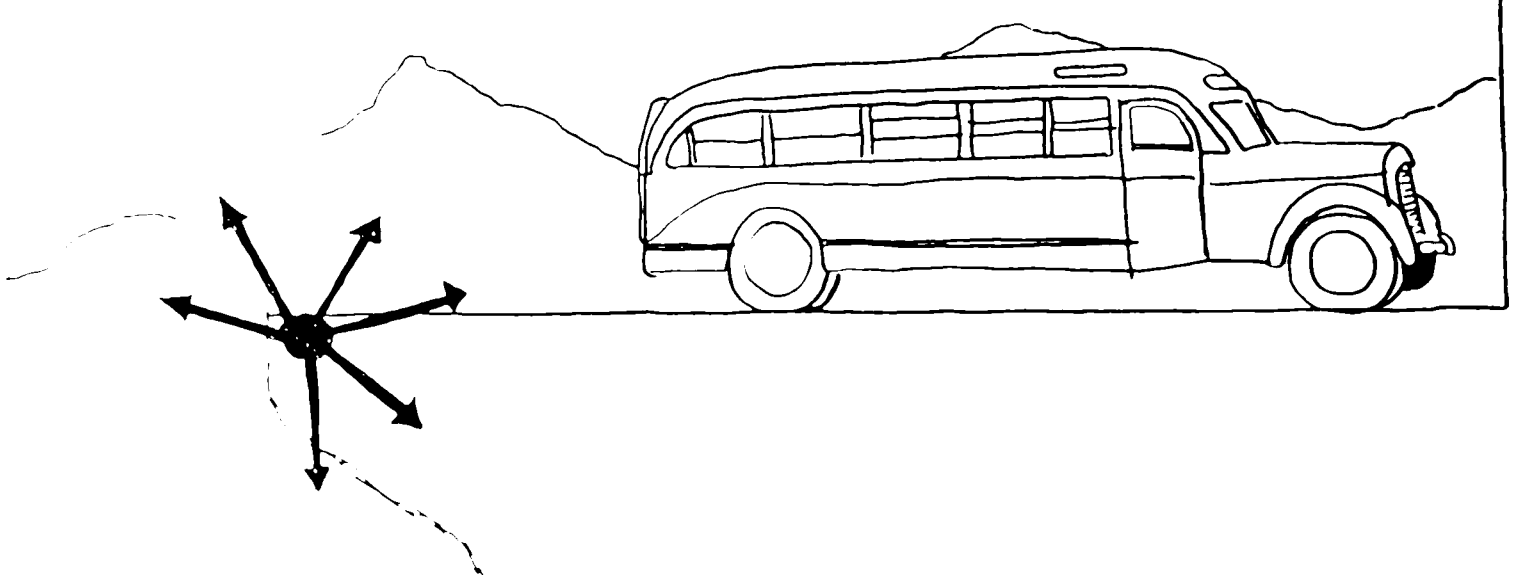
In accordance with our team's downtown plan a more favorable site has been chosen for this terminal. This site is just two blocks south of the existing Greyhound terminal and one block south of the Continental Trailways

terminal on the corner of Santa Fe and Paisano Streets. The intercity and international bus lines will still have convenient access to IH-10 and to Mexico and will have easier access when the downtown plan is completed. This will be accomplished by an additional freeway access that has been proposed. The site is large enough to handle all intercity and international bus line operations including: Greyhound, Trailways, T.N.M.&O., and the two Mexican lines.

It is necessary that this bus terminal be completed and operating prior to the starting of the development of the Hotel complex. This program will discuss the factors that will influence the terminal's design and leave guidelines for the outcome.

More extensive studies of El Paso's background and details of the proposed downtown design by our team are available through Dr. George Peng at Texas Tech University.

CITY BACKGROUND STUDIES

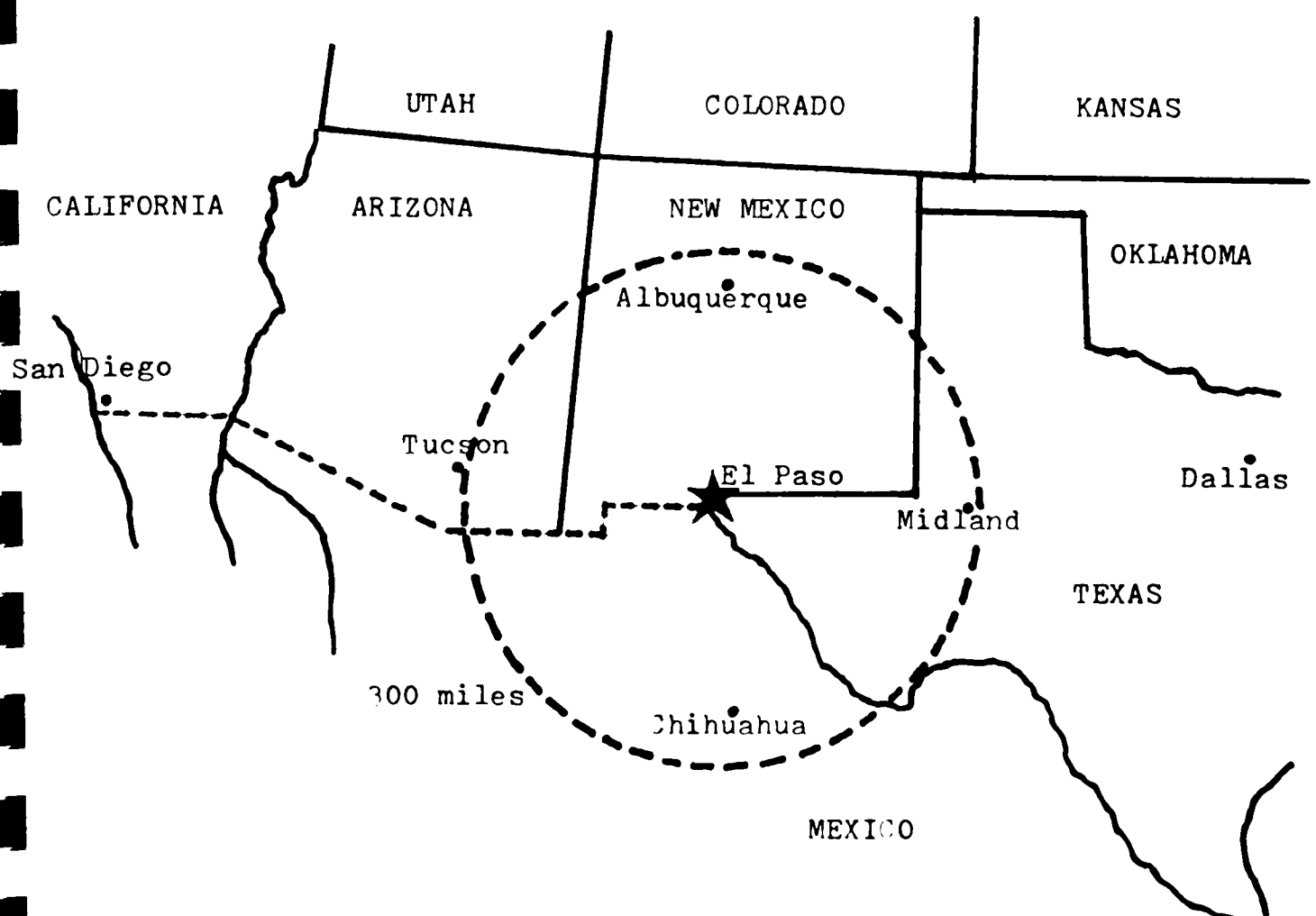


I. A. Geographical Setting and Climatic Conditions

The city of El Paso is located in El Paso County at the western most tip of Texas. Its logitudinal axis is approximately 106.5 degrees and the latitudinal coordinate is 32°. It is bordered to the north and west by south central New Mexico and to the south and southwest by Chihuaua, Mexico. Major cities besides Juarez, Mexico (El Paso's sister city) within an approximate 300 mile radius of El Paso are as pictured in figure 1:

Tucson, Arizona.....315 miles (west)
Albuquerque, New Mexico.....270 miles (north)
Midland, Texas.....302 miles (east)
Chihuahua, Chihuahua.....233 miles (south)

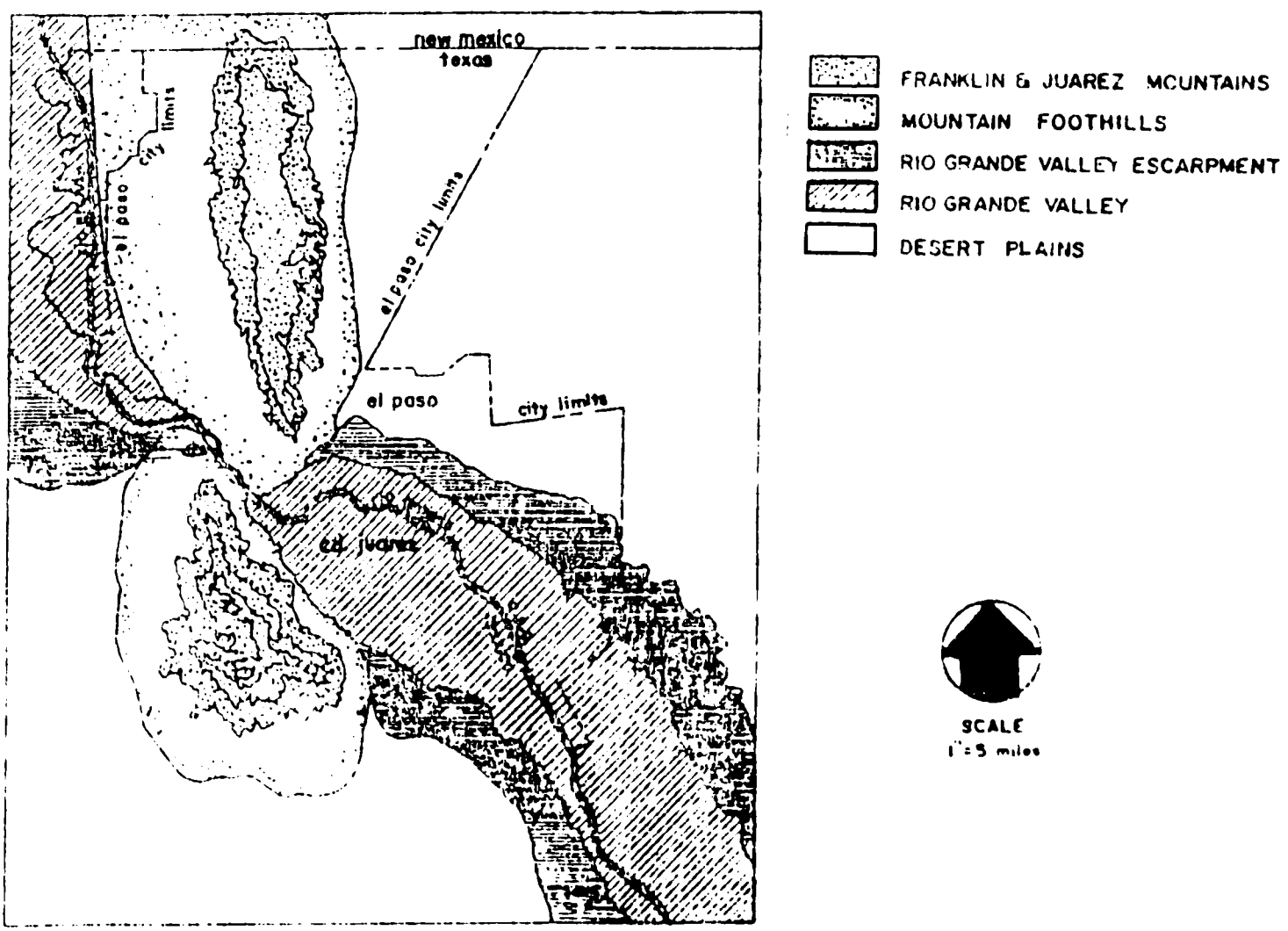
Fig. 1 Geographic Location



Populations between El Paso and these cities are relatively sparse leaving El Paso somewhat isolated.

The topography of the area consists of the Franklin Mountains, (an extention of the Rockies) desert plains and the Rio Grande Valley. Land elevations vary from 2,800 feet, mean sea level, in the Valley, to 7,192 feet at the top of the north Franklin Peak. Elevations of the metropolitan area range from 3,650 to 4,500 feet, making El Paso the lowest all weather pass through the Rocky Mountains.

Fig. 2. El Paso area topography. Source: El Paso Department of Planning, Research and Development Environmental report August 1978, page 48.



Because of El Paso's geographical setting, the climate is warm and dry. The sun shines an average of over 329 days a year. In the past 18 years, the sun has failed to shine an average of only five days per year. This is less than any other city in the nation, thus the nickname "The Sun City" was adopted for El Paso. In this semi-arid region the humidity is usually very low especially when temperatures are high. In April, May, and June when temperatures are above 90° the humidity averages 10-14%. In July, August and September the average is 22-24%.

El Paso's annual rainfall averages 10 inches, most of which falls during late summer thunderstorms. Poor soil percolation qualities and intense heat cause much of this rainfall to evaporate. The following chart lists the monthly temperatures, rainfall and humidity.

Temperatures in Degrees Fahrenheit

Month	Max.	Mean	Min.	Rainfall (inches)	Humidity (%)
Jan.	57.3	44.7	32.1	0.43	29
Feb.	62.4	49.3	36.2	0.41	21
Mar.	69.1	55.6	42.1	0.33	14
April	77.6	63.8	49.9	0.25	17
May	85.9	72.2	58.4	0.34	24
June	94.3	80.7	67.3	0.60	15
July	93.7	81.8	67.9	1.71	41
Aug.	91.9	80.2	68.5	1.41	28
Sept.	86.8	74.8	62.8	1.26	43
Oct.	77.8	64.6	51.4	0.79	32
Nov.	65.7	52.5	39.2	0.44	47
Dec.	59.4	45.2	42.9	0.15	39
Annual	76.7	63.8	50.9	8.47	29

Prevailing winds and frontal systems generally move from west to east. In the summer, winds are usually out of the south with an average velocity of eight miles per hour. Winter winds are usually out of the north at average velocities of nine to ten miles per hour. March and April are the windiest months and for most El Pasoans the least favorite time of the year. These high winds combined with dry soil conditions produce frequent duststorms during the spring.

I. B. Historical Background

El Paso means "The Pass" which was derived as a result of the city's location as the southern most all weather pass through the Rocky Mountains. The pass was discovered by a small group of Spanish explorers led by Alvar Nunez Cabeza de Vaca in 1536. The first European settlement in the pass was located on the south bank of the Rio Grande in 1659 with the establishment of the mission of Guadalupe.[1] As the mission was being built, the area was settled by families that wanted to do business with the northern colonies and farmers who realized the potentials of the rich soils of the Rio Grande Valley. By 1668 when the mission was completed, some one thousand people had settled in the area.

After Mexico gained independence from Spain, the Mexican constitution established the state of Chihuahua including the city of El Paso Del Norte (now Juarez) which was organized with a city government in 1824. The first permanent community on the north bank of the Rio Grande was built by Juan Maria Ponce de Leon in 1827 on the present site of El Paso.[2] Four separate settlements along the north bank of the river were united in 1850 under the name of El Paso with a total population of 300 persons. In 1873, after the land north of the Rio Grande was acquired by the United States El Paso was established as a city.

On May 19, 1881, the Southern Pacific Railroad reached El Paso followed by the Santa Fe Railroad and the Mexican Central Railroad within two years.[3] With this development, the pass of the North had shifted its major traffic axis from North/South to East/West while maintaining a role as a Continental Crossroad. The railroads also opened the door for industrialization and urbanization in the area. Since 1952, El Paso has grown from fourteen square miles to 240 square miles and today El Paso and her sister city Juarez constitute the largest and busiest border metropolitan area in the world.[4]

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[1]David V. LeMone Earl M.P. Lovejoy. El Paso Geological Society symposium on the Franklin Mountains. Quinn Memorial Vol. p. 229.

[2]Ibid., page 231.

[3]Ibid., page 234.

[4]El Paso Team Urban Design Downtown El Paso, Texas. Texas Tech Univeristy p. 45.

I. C. Socio-economic Background

Population

In 1982, the El Paso S.M.S.A. (Standard Metropolitan Statistical Area) and Juarez had a combined population of 1,285,460 persons, with respective amounts of 507,000 and 778,460.[1] These figures do not include the 25,000 troops and families stationed at Fort Bliss and Wm. Beaumont Hospital. From 1970 to 1980, El Paso's population increased thirty-two percent, making El Paso the fourth largest city in Texas and the twenty-eighth largest in the nation.[2]

With Juarez growing at a rate of 5.74 percent per year, it is estimated that by the year 2000, 1,900,000 persons will live there. El Paso's population increases from 10,000 to 12,000 per year, its projected population for the year 2000 is 680,750 which combined with Juarez totals 2,580,750. The following chart reveals the population trends of the two cities.

Population Growth Trends

Year	El Paso	E. P. County	Juarez
1940	96,810	131,067	55,024
1950	130,458	194,968	131,308
1960	276,687	314,070	276,995
1970	322,261	359,291	436,054

Population Growth Trends -- (Continued)

Year	El Paso	E. P. County	Juarez
1980	425,124	400,971	436,054
1990	530,000	590,000	Unknown
2000	680,750	705,000	1,920,000

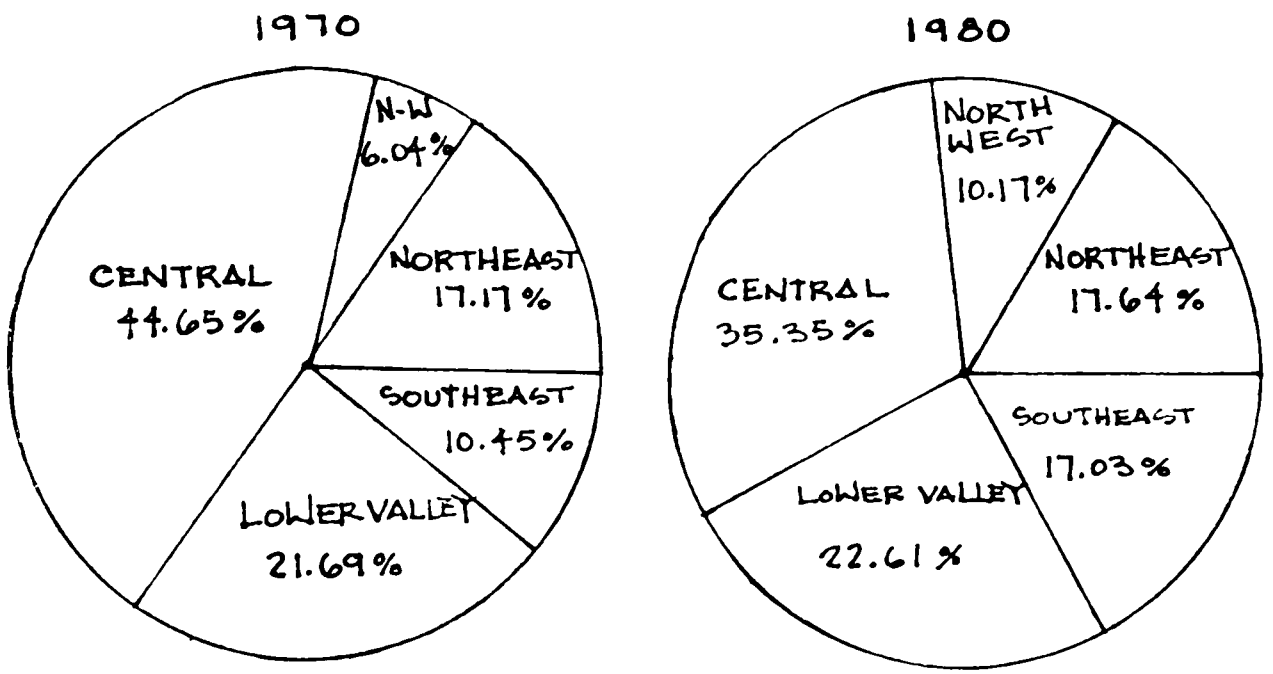
Source: Ruth Arnold, A City on the Border.

El Paso's population is composed of many racial categories. Two races however, dominate the percentages, these are Anglo-Saxon and Spanish surname. Those of Spanish surname comprise 62.5 percent of the population and those in the Anglo Saxon category comprise 58.6 percent.[3] The census report explains the overlap in percentages by claiming "those of Spanish surnames may be of any race." Other percentages include: Black, 3.7 percent; Indian, 3 percent; and Asian and Pacific Islanders, 8 percent.[4]

An idea of the population distribution is helpful in choosing a site for any project. Especially for one dealing with a considerable amount of people such as a bus terminal. The following diagram illustrates population distributions in 1970 and 1980.

Population Distribution

Diagram #1



Social Patterns and Lifestyle

El Paso and Juarez were one and the same until they were separated by political intervention. Hence, the atmosphere is definitely international as immigrants from all over the world have taken residence here. While traditionally the Mexican culture is dominant in language, art, architecture and philosophies of lifestyle of American customs are being tightly interwoven to create a unique living fabric and environment.

Education opportunities are ample throughout the city and county. There are 99 elementary schools, 15 junior

high schools, 21 senior high schools and over 20 parochial schools. The University of Texas at El Paso provides higher education along with a number of community college campuses located around the city. Total enrollment in schools of El Paso County in 1981-82 including kindergarten through college numbered 155,262 students.[5]

There are also numerous cultural and recreational activities available to El Pasoans and visitors. They are 23 art museums and galleries and seven fine arts theatres including one natural outdoor amphitheatre in McKelligon Canyon offering fine productions. The El Paso Symphony Orchestra also provides a full concert season and summer pop concerts. Four old Spanish Missions that were influential to El Paso's growth remain today as a reminder of the past. Catholic, Protestant, Jewish, Episcopal, Baptist and other faiths are supported by some 325 churches.[6]

Economic Base

Since the arrival of the railroad in El Paso, the city has experienced consistent growth. Many factors have contributed to this growth including El Paso's climate and mineral wealth within the surrounding area. Petroleum, gold, silver, copper, lead, tin and zinc are all common in this area. Petroleum refining, mineral refining, and distribution of natural gas have become important contributors to El Paso's economy. El Paso is also a leading

city in apparel manufacturing, housing 60 plants and employing more than 15,350 people. El Paso apparel manufacturers have built one million square feet of new facilities in the past decade. The manufacture of building materials and food processing play an important role in the growth of the city. Manufacturing employment has increased from 6,200 in 1947 to 32,600 in 1980, in a total of 475 plants in the El Paso -- Juarez area.[7]

Farming and ranching programs in the Rio Grande Valley, combined for over 100 million dollars of annual sales, and included the highest pecan producing farm in the United States. Other principal farm crops include sugar beets, tomatoes, beans, chili peppers, onions, pears, and long-staple cotton. The livestock production is mostly comprised of dairy and egg operations.

El Paso's economy includes major military expenditures in the area. More than 480 million dollars is paid into the El Paso economy by military payrolls and local purchases each year.

Travel and tourism is the third largest industry in El Paso with 1.5 million visitory a year and a total of 300 million dollars annually. Local employment in this industry is estimated at over 13,000 persons. Many of El Paso's visitors travel to Juarez at least once during their stay and tourism is ranked as the number two industry there.

El Paso's trade area includes West Texas, Southeastern Arizona, New Mexico, and the Mexican State of Chihuahua with a trade population of approximately 5 million. Medical and dental facilities attract patronage from distances of well over 300 miles on either side of the border. Retail sales in El Paso increased from 540.8 million dollars in 1970 to over 1.9 billion in 1980.[8]

El Paso's strategic location, with its assurance of year around ease of transportation attracts industry and manufacturing to the area and has led to its development as a major trade and regional distribution center. El Paso's location also makes the city a major crossroads for continental North-South and East-West traffic.

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[1]Department of Planning Research and Development. PHC 820 Census Tracts 100% Texas El Paso SMSA. Oct. 1982.

[2]El Paso Chamber of Commerce. El Paso Profile. p. 3.

[3]Ibid, p. 3.

[4]Department of Planning Research and Development. PHC 820 Census Tracts 100% Texas El Paso SMSA. Oct. 1982.

[5]El Paso Chamber of Commerce. El Paso Profile. p. 5.

[6]Ibid, p. 10.

[7]Ibid, p. 6.

[8]Ibid, p. 6.

I. D. City Form and Development

Through the years, El Paso's development has been dictated by three influential forces, the Franklin Mountains, Fort Bliss Military Reservation, and the international border. These three forces have shaped the city into a series of "five fingers" leaving the downtown area as the palm.

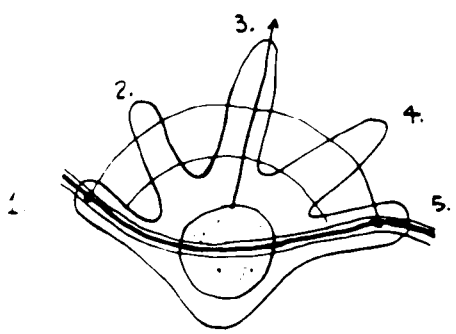
The city's form can best be described as a five finger concept composed of:

1. West finger (developed)
2. Northwest finger (Franklin Mountains)
3. North finger (developed)
4. Northeast finger (Fort Bliss Military Reservation and El Paso International Airport)
5. Eastern finger (developed)

The following diagram is provided as an aid to better visualize the form of El Paso.

Five Finger Concept Plan

Source: Urban Design Downtown El Paso Project, Texas Tech University.



Although El Paso covers some 240 square miles, only 70 square miles are developed. The Franklin Mountains and the Military Reservation are relatively open spaces within the city which separate the other three fingers.

The continued policy of the military maintaining its land reserve as an open, undeveloped area places restrictions on city growth in and around that area. The relative nearness of the New Mexico state line created potential problems for growth in the western and northern fingers of tieh city and the El Paso county line may someday pose limitations on the city's eastward growth. With the growth confinements posed in the western, northwestern, northern and northeastern fingers of the city, primary growth is directed toward the east and southeast. If this trend continues, it is likely that the city will take on a multi-nuclear form because of the increased distances of future housing developments from the downtown area.

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The location of downtown El Paso is the approximate site of the original settlements of the area. It is situated on the northern banks of the Rio Grande in the center of the pass through the lower Rocky Mountain Range. The area is bordered to the south and west by Paisano Street which parallels the Rio Grande and to the north by Interstate 10. The eastern boundary is partially restricted by the railroad operation yards to the northeast and extends to Virginia Street on the southeast.

Because of the fixed boundaries to the north, south, and west, the downtown area can only expand to the east. San Antionio Street creates a major east-west axis extending from Virginia Street to the newly renovated El Paso del Norte Hotel on El Paso Street. This axis ties the government facilities in east downtown and the rest of downtown together. Another major axis created through downtown is a north-south one along El Paso Street. This axis extends nine blocks from the Santa Fe Bridge to the center of downtown, the San Jacinto Plaza.

The proposal offered by our El Paso team (Texas Tech University spring - summer 1984) has centered on these two axes and treated them as major urban design concerns. In order for the downtown area to recover it's popularity and activity after work hours, the design of these two axes

must bring a greater feeling of security and liveliness and bring the area together as a whole.

In the proposal, the axes are referred to as corridors. The El Paso Street Corridor is an important consideration for this project because it is located just one block east of the proposed bus terminal site. The two should be related and accessible to each other to contribute to the overall goal for the downtown area of security and liveliness.

I. F. Traffic and Transporation

Transportation in El Paso consists of normal private vehicles, city buses and taxi services. Intercity, interstate and international modes consist of private vehicles, bus lines, railroad lines and air lines.

There are currently more than 1,279 miles of paved arterial and non-arterial streets within the city and approximately 17 miles of unpaved roads. Major highways that connect El Paso to other cities are Interstate 10, Interstate 25, U.S. Highways 54, 80, 62, 180, 85 and Mexico Highway 45. Intra-city highways include: Interstate 10, North-South Freway, Border Freway and Loop 375.

El Paso is served by three international border crossings:

1. Santa Fe (adjacent to downtown)
2. Cordova (east of downtown)
3. Zaragosa (far southeast in the lower valley)

The following is a list of transporation services available to the City of El Paso:

Rail Service:

Santa Fe, Southern Pacific, Missouri Pacific, National Railways of Mexico, Amtract Passenger Service

Bus Service:

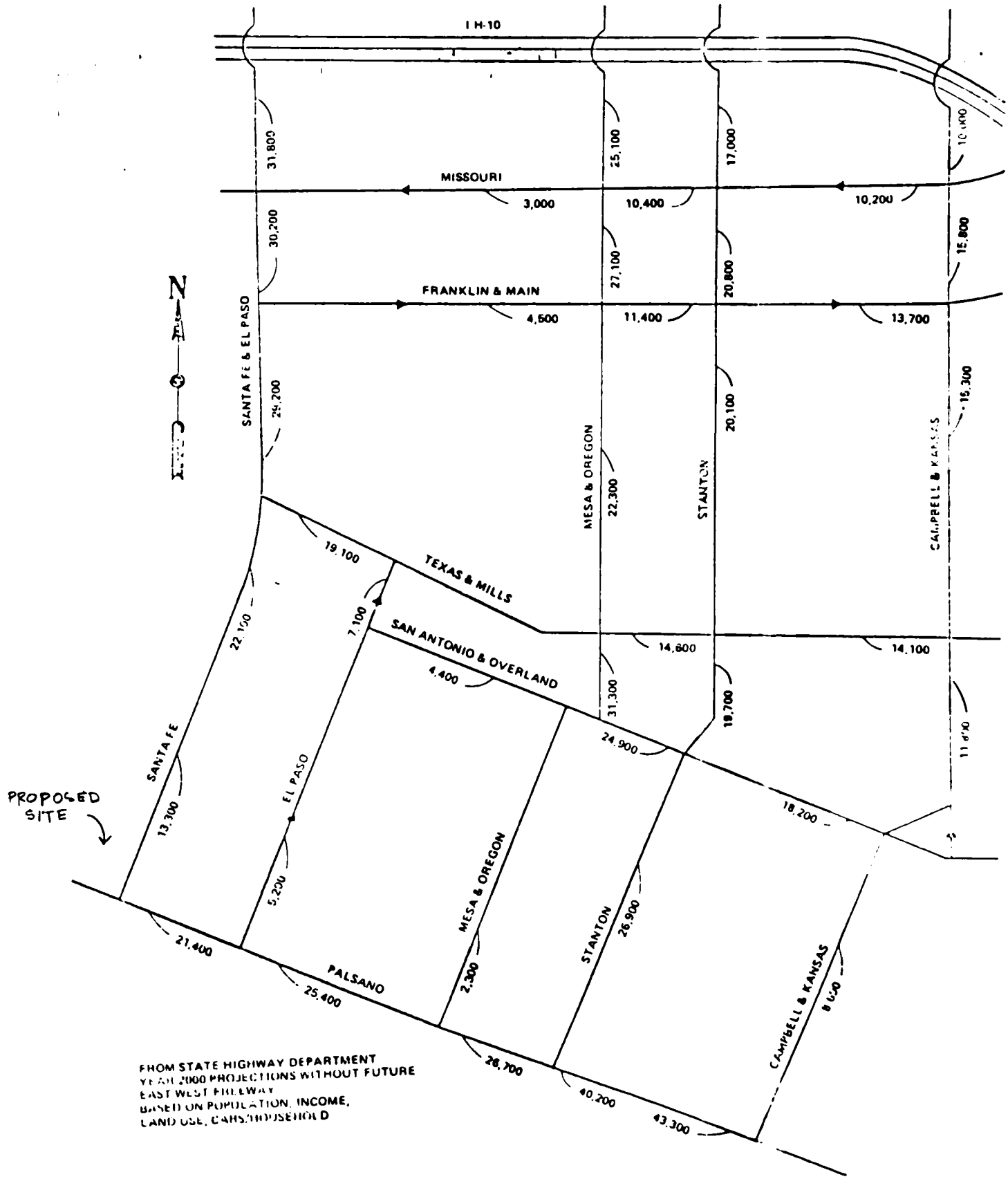
Greyhound, National Trailways Bus Systems, Texas New Mexico and Oklahoma, Transportes Chihuahuences,

Omnibus de Mexico, and the S.C.A.T. (Sun City Area Transit) System.

Airlines:

American, Continental, Eastern, Frontier, Southwest, Texas International, Aero Mexico

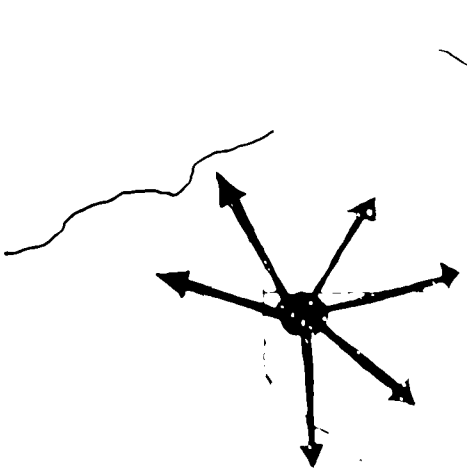
TRAFFIC VOLUMES PER 2000

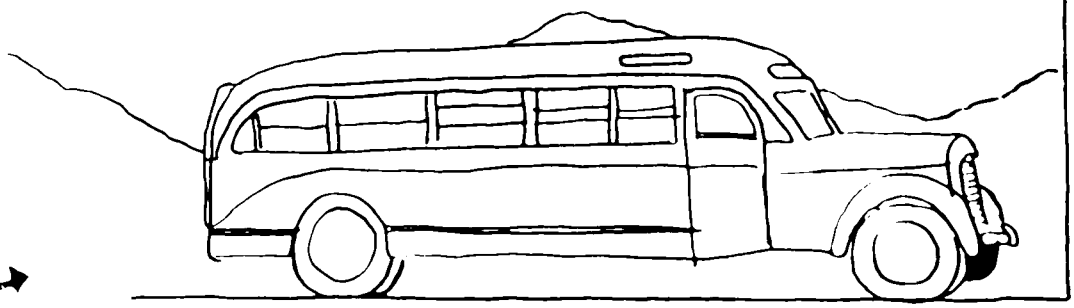


FROM STATE HIGHWAY DEPARTMENT
YEAR 2000 PROJECTIONS WITHOUT FUTURE
EAST WEST FREEWAY
BASED ON POPULATION, INCOME,
LAND USE, CARS/HOUSEHOLD

PROJECTED 2000 A D TRAFFIC VOLUMES
IN EL PASO CBD

SITE BACKGROUND





II. Site Background Studies

The project site is located in a warehouse district on a double block in the southwest section of downtown El Paso. The site is situated on a north-south axis and is 504 feet long and 260 feet wide with a total of 131,040 square feet in area. Major streets bordering the site are Paisano to the South and Santa Fe to the east. Chihuahua Street and Overland Avenue border the site to the west and north respectively.

Buildings presently situated on the site predominantly consist of old warehouse structures with the exception of an old fire station located on the corner of Paisano and Santa Fe Streets. Approximately 20 percent of the site is occupied by surface parking. A 20 foot alley runs north and south through the site with electrical and phone service lines running overhead.

Current conditions adjacent to the site are as follows and are shown below on an aerial photo courtesy of the El Paso City Planning Department and in slides provided by Ann and Sherree Bowers:

- -Directly to the north of the site is the old Trailways Bus Depot.
- -On the east (along Santa Fe Street) a variety of uses are apparent including housing, cafe, bars, and a tire dealership, all of which are in poor condition.
- -To the south of the site rests a Texaco station, a warehouse, and an open lot.

-Directly west of the site there exists a grocery store, a bus parking lot, and various housing types.

Two blocks north of the site is the location of the Civic Center and the El Paso del Norte Hotel and five blocks south is the location of the Border Control Station. Further to the west of the site exists primarily warehouse type structures.

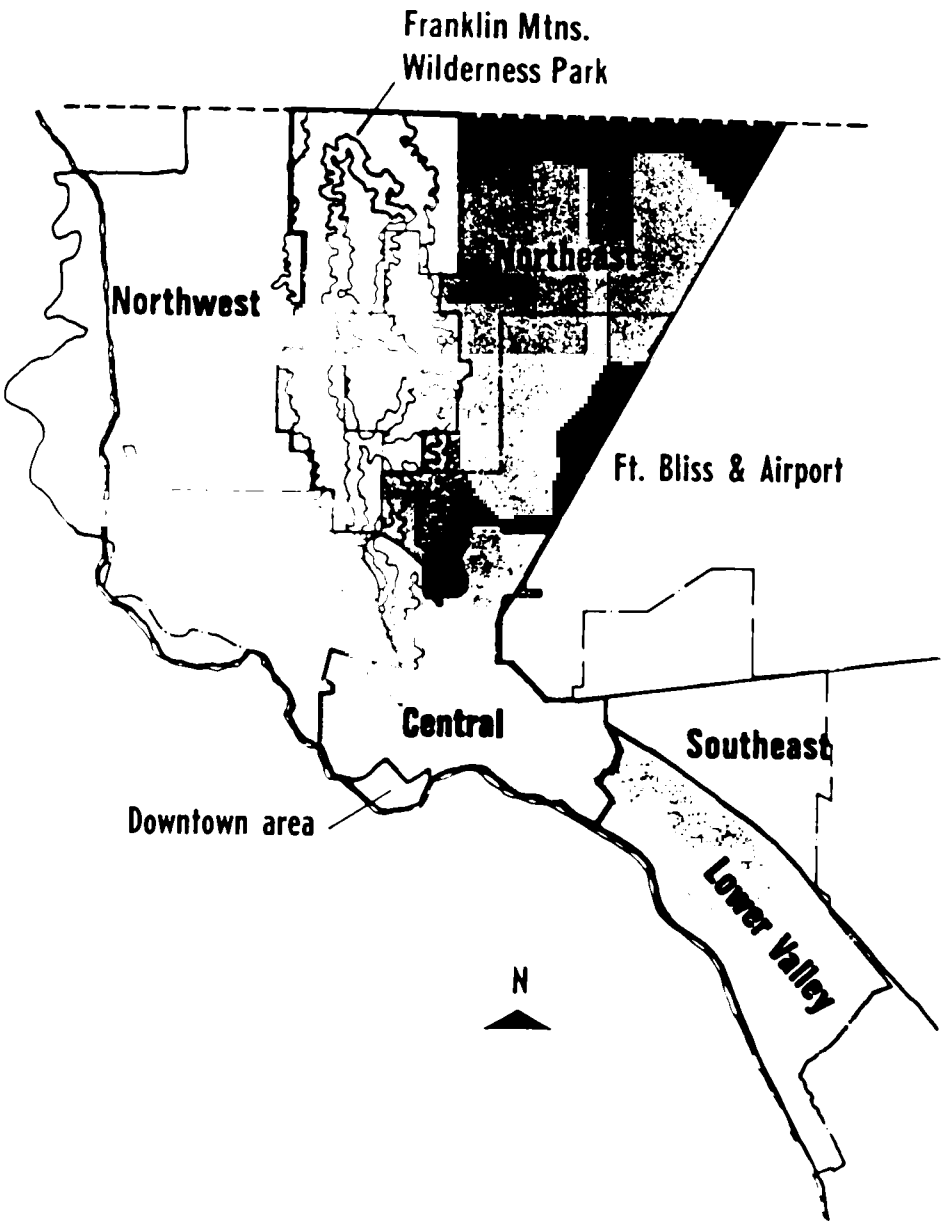
All of the sites in the area, however, have proposed changes including a cultural center and Community College to the north and west, a Farmer's Market to the south and the renovation of the El Paso Street corridor to the east. These proposals are from the studies done by the El Paso team of Texas Tech University in the spring of 1984. As previously mentioned.

Illustration #1 depicts the locational relationships of the downtown area to the City as a whole.
Source: El Paso Parks and Recreation Plan 1978-2000, Department of Planning Research and Development City of El Paso, Texas: 1978 p. 1.

Illustration #2 depicts the proposed site in relationship to the downtown area and is located within the "acceptable locations" area found suitable by the studies by Turner Collie and Braden. Inc.
Source: Multi-modal Ground Transportation Center for Downtown El Paso, Texas, Turner, Collie and Braden, Inc. September 1980.

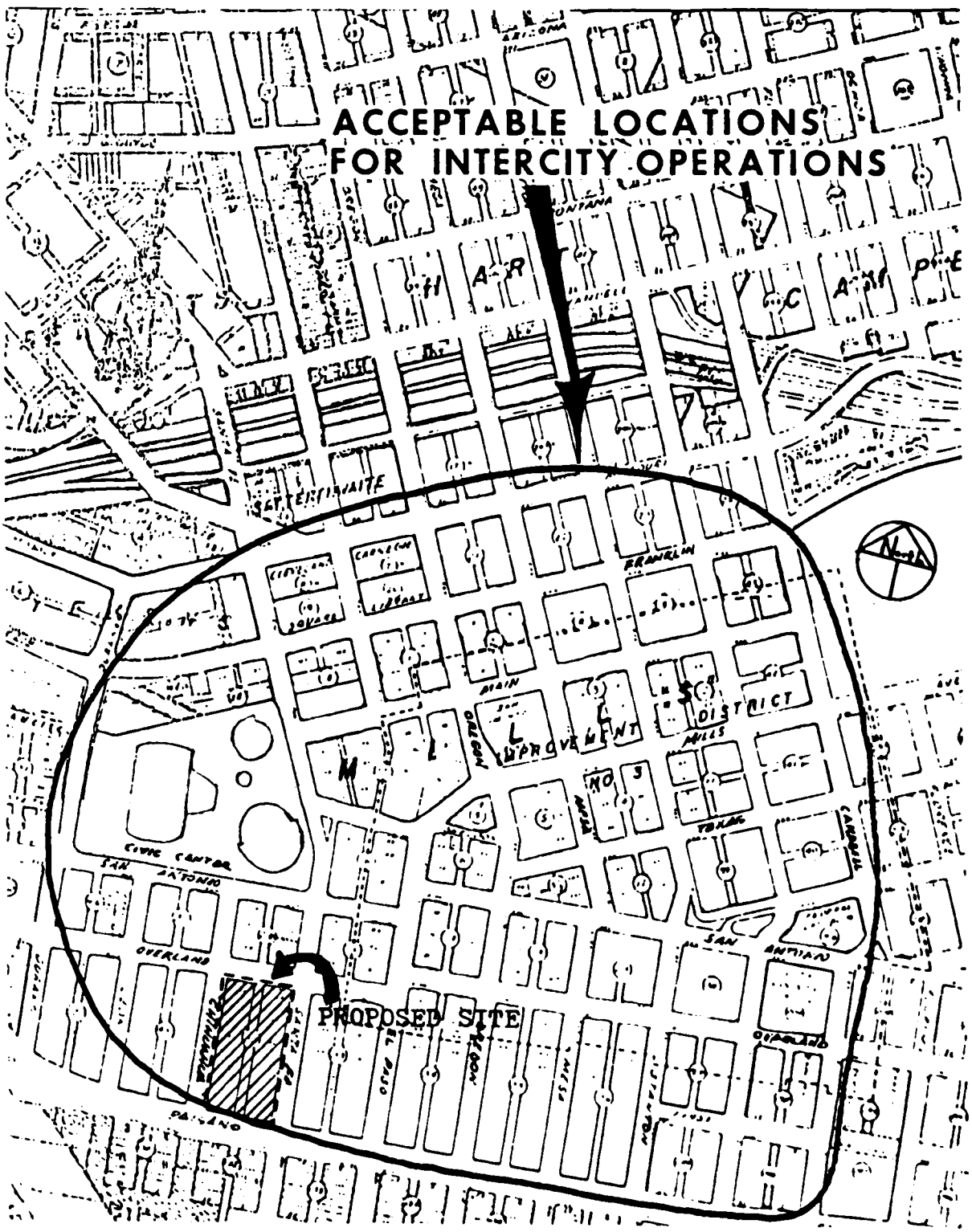
Illustration #3 depicts dimensions of proposed site
Source: El Paso City Planning Department.

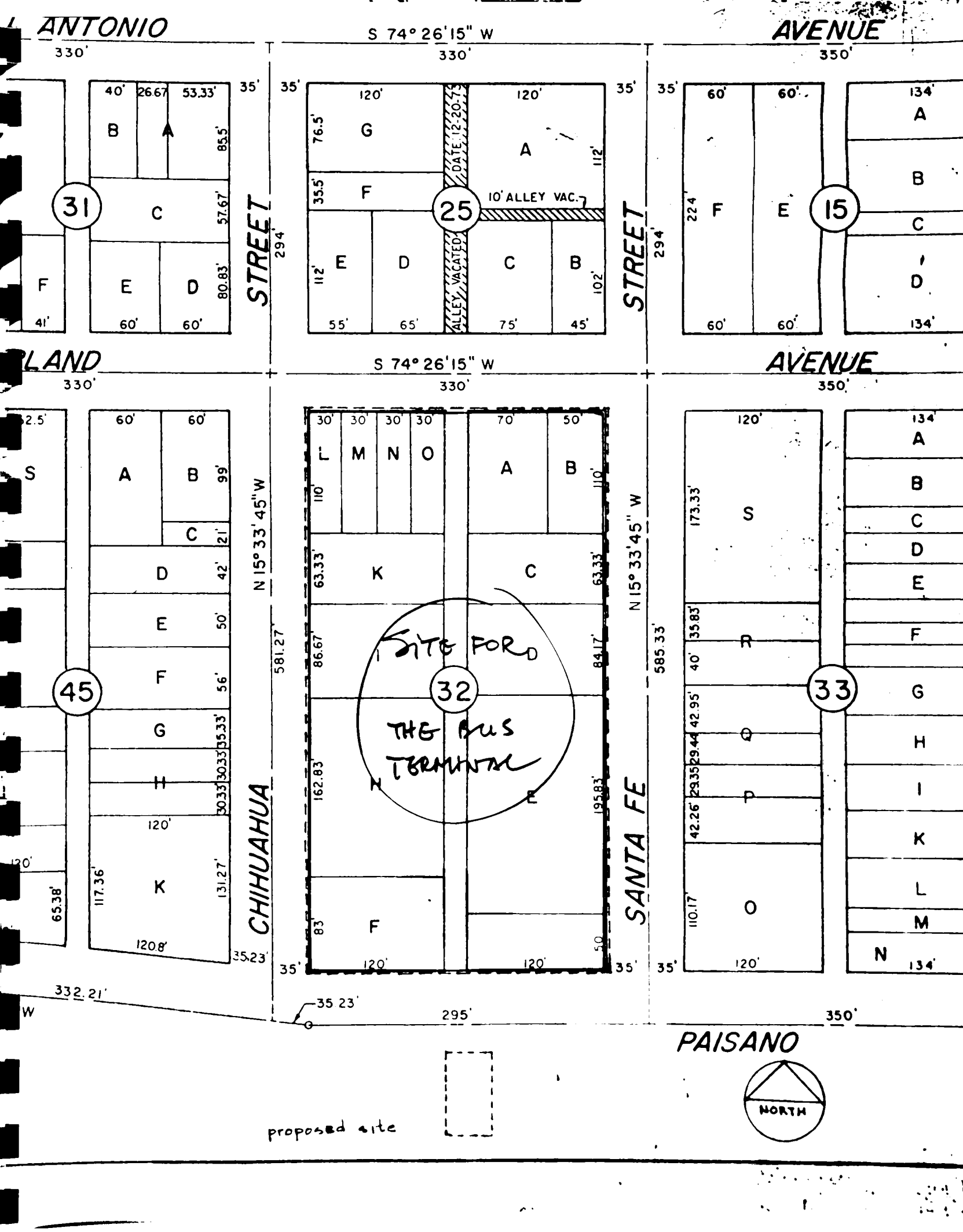
Illustration #4 This aerial photograph illustrates current conditions and conditions of adjacent sites.
Source: El Paso City Planning Department.



Downtown Area and Proposed Site Location

Source: Multimodal Ground Transportation Center for Downtown El Paso, Texas, Turner, Collie & Braden, Inc. Sept. '80.

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AVENUE
S 74° 26' 15" W
330'
350'
35'
294'
STREET
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N 15° 33' 45" W
581.27'
585.33'
332.21'
295'
35.23'
31
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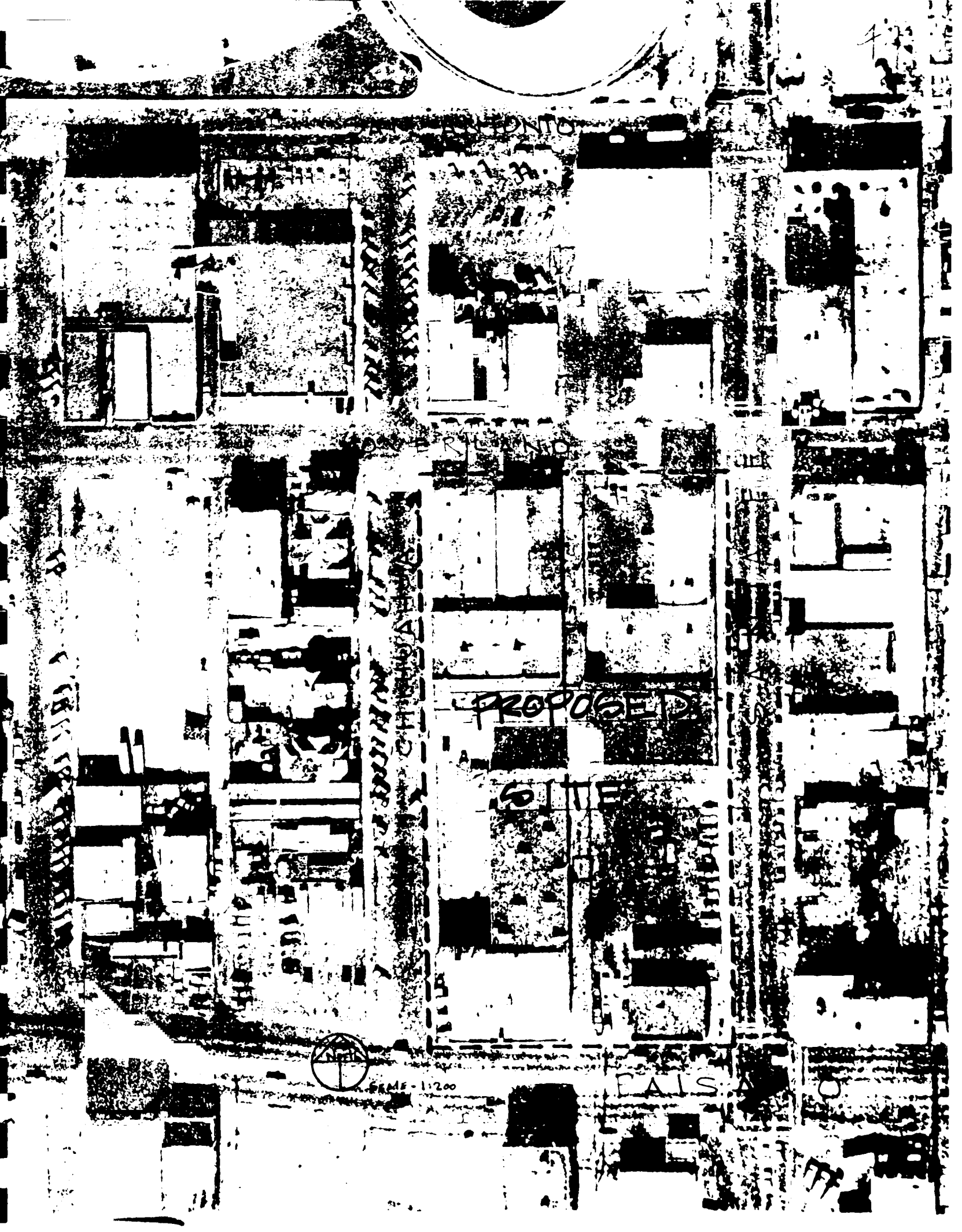
10' ALLEY VAC.
ALLEY VACATED
DATE 12-20-73
SITE FOR THE BUS TERMINAL
PAISANO
NORTH
proposed site


PROPOSED
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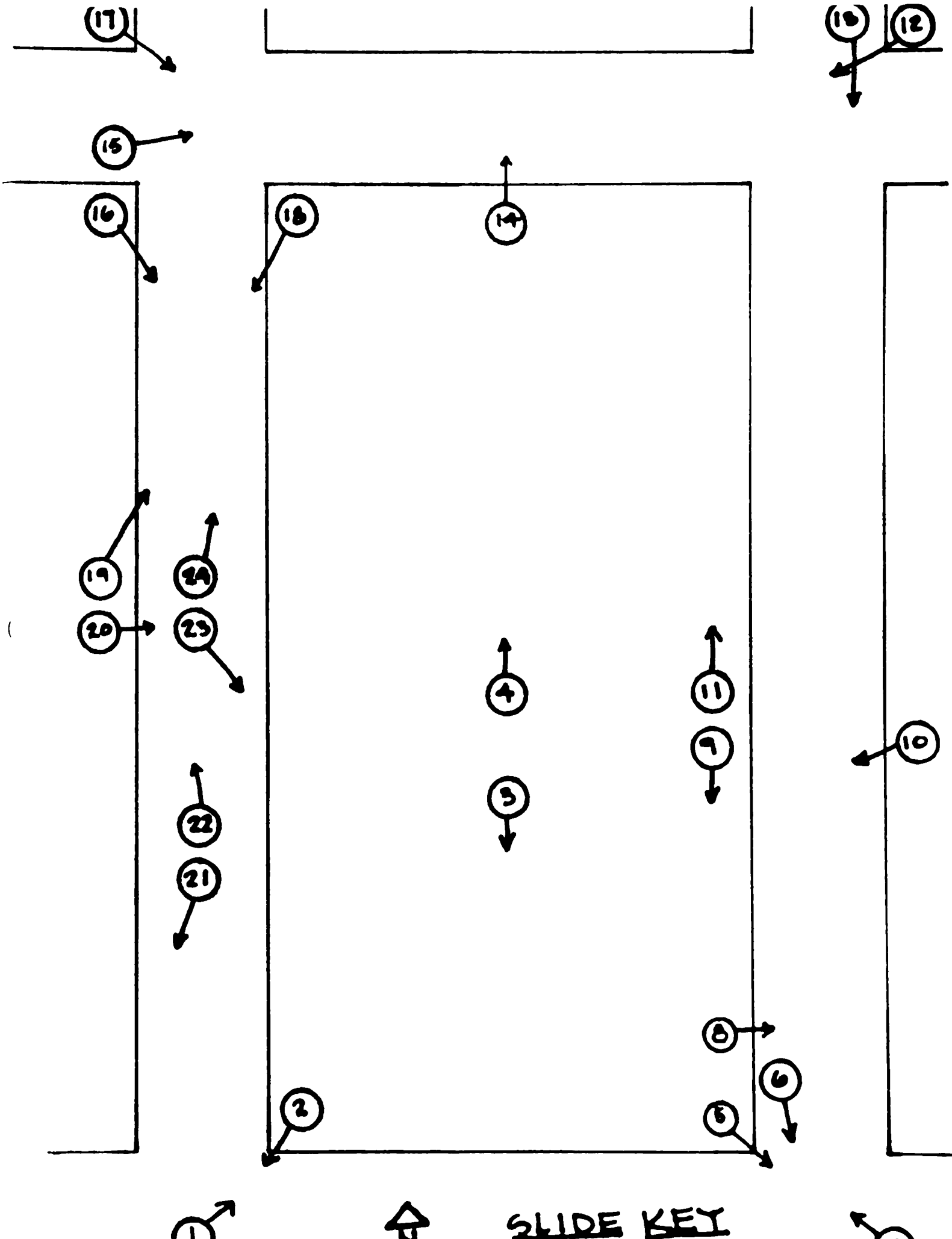
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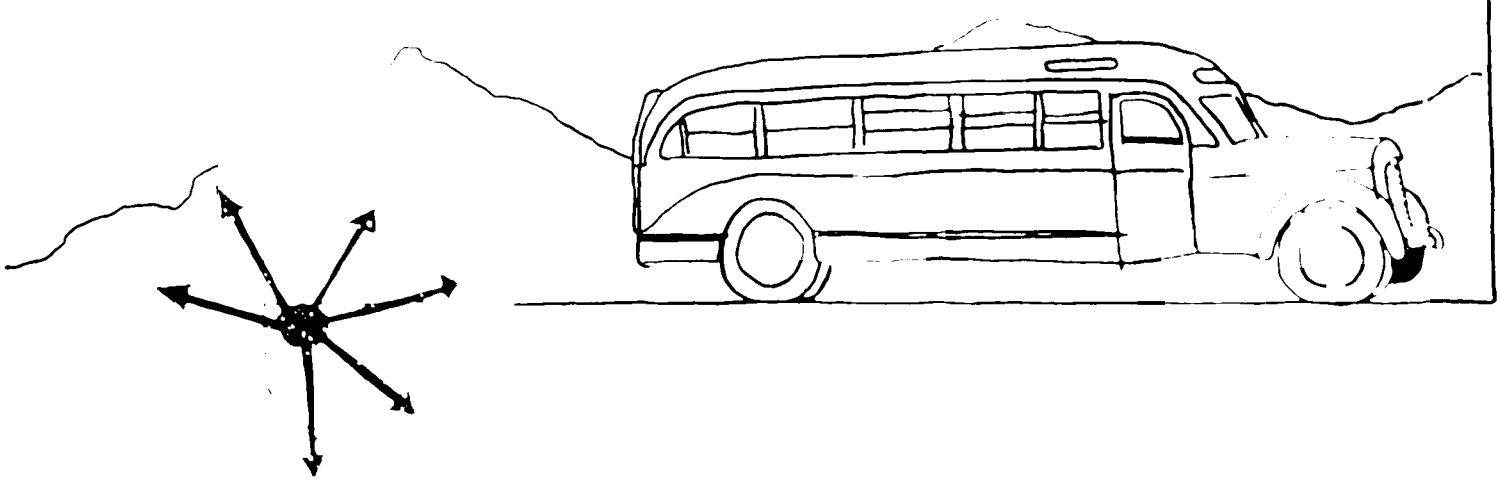
SLIDE KEY

BUS TRANSPORTATION STUDIES

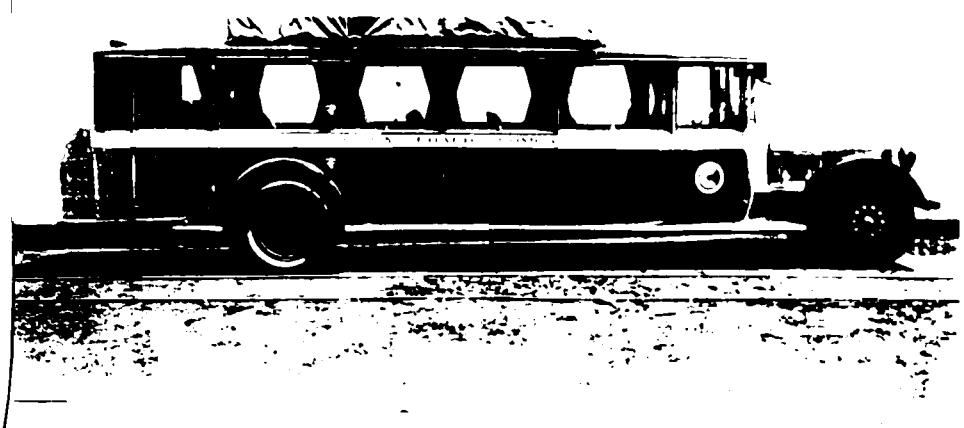


III. A. Development Trends

When bus travel was first introduced to the public, buses were little more than expanded stage coaches or automobiles, thus the name motorcoach. The buses often resembled long cars with individual doors for each seat, and most of these did in fact use automobile engines. Parts were often difficult to find and tires, due to poor road conditions and design, were almost always in need of repair.

As bus travel increased in popularity, the need for better vehicles became evident. In 1921, experimentation with truck chassis brought about the first real "motor bus." It was introduced by Frank and William Fageol.[1]

Source: Motor Coach Age Vol. XXXIV, No. 4 & 5 Motor Bus Society. 1982. p. 5.



A Fageol Safety Coach operated by Carolina Coach Company. About seven years removed from the original 1921 Fageol design, this coach featured window curtains balloon tires, and a canvas covered baggage rack. This 1928 vintage bus operated around Raleigh, NC

Shortly thereafter the White Company introduced a chassis especially designed for bus use. Eventually several manufacturing companies were created to serve the bus industry. Bus lines began taking on service characteristics similar to those of the railroad because many of them were owned by railroad companies. Some went to the extent of incorporating sleeping berths, kitchens, stewards, chefs and observation decks into one single bus. Although their services were nice, they did not prove to be economical and it was obvious that bus line would have to establish their own operation procedures.

The latest results from bus technology are evident in the Greyhound Americruiser and more recently Trailway's Eagle Model 10. Both offer better mileage and smoother rides, however the Eagle 10 is considered "state of the art." It is used by the vast majority of the N.T.B.S. members. It offers a smoother ride, tinted windows, complete temperature control, thickly padded seats and a revolutionary torsilastic suspension system to provide a comfortable ride for passengers, while design innovations like a shorter turning radius (42' - 6") and an electroluminescent instrument panel make the driver's job easier than ever before.[2]

The Eagle 10 is also the most aerodynamic motorcoach in history and 700 pounds lighter than previous models.[3] These features provide even greater efficiency to the already most efficient mode of intercity transportation.

Source: Motor Coach Age Vol. XXXIV, No. 4 & 5, Motor Bus Society. 1982. p. 37.

The Eagle Model 10 has proven to be a superior motorcoach for both regular route passenger service and charters. This Eagle took a group to the Six Flags over Texas

The new innovations in buses would not have been possible however, without the national support given to the government's "Good Roads" program (an effort to widen, pave, and repair inadequate roads) and the Interstate Highway System. These improvements in highways were, perhaps, the greatest single contribution to the advancement of the bus industry.[4]

When intercity motorcoach travel first came into being, most bus companies were independently operated and family-owner businesses which had limited routes, usually in or near their origin city. As buses improved technically and the railroads began to see the value of interlining with buses (thereby much of their passenger load) this all changed. Other factors which enticed railroad participation were: the potential savings by converting branch lines to motorcoaches; the staving off of competition by investing in growing bus lines; and expansion of the basic railroad system through the systematic use of motorcoaches. At the same time, once small companies, whose profits now allowed them to expand, began to buy other small bus companies.[5] By this practice, the nation's two largest bus companies, Greyhound and National Trailways Bus Systems (N.T.B.S.) were formed.

Today the bus industry is at a crossroads, declining ridership caused primarily by their major competitor the private automobile and increasing property taxes pose major problems. These factors have made new equipment, new terminals and upkeep of old terminals difficult to afford. Hence, a new trend of consolidating many bus lines into one major terminal has come about to help ease the economic strains.

Recent studies have shown that fare reductions provide little incentive in attracting new riders. This is due mainly to the types of people who use bus lines. The most

common customers are repeat customers that have retired or those who can't affort their own vehicles.[6] Other factors that restrict ridership are the relatively longer time involved riding buses as opposed to air travel and the minimal price differences between the two. Those who can afford air travel usually cannot afford the time it takes to ride the bus to their respective destinations. For these reasons, bus lines serve more small communities that are not served by airlines and cater to their primary user groups as mentioned above.

To keep revenues up, bus companies have found that express package deliveries are profitable, so much so that this service has become an important marketing target. Profits from package express services are now more than compensating for lost revenues from low ridership.

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[1] Motor Coach Age Vol. XXXIV, No. 4 & 5, Motor Bus Soceity, 1982, p. 5.

[2] Ibid, p. 18.

[3] Ibid, p. back cover advertisement.

[4] Ibid, p. 5.

[5] Ibid, p. 1.

[6] R. Scott Snyder Telephone Interview Oct. '84.

III. B. Tenant Bus Lines

1. Greyhound

Greyhound lines was started in 1912 in Hibbing, Minnesota by Eric Wickman. After acquiring and consolidating many separate lines, such as The Short Line and Yelloway, Inc., Greyhound became incorporated in 1929 with lines stretching from the Atlantic coast to the Pacific coast. The company was started with one small twelve passenger bus and has grown into the largest intercity bus line in the nation controlling over 60 percent of all intercity bus traffic.[1]

2. Texas, New Mexico and Oklahoma

TNM&O is based in Lubbock, Texas and serves most of Texas and New Mexico with connecting routes throughout Oklahoma. Currently, they have sixty-five drivers and fifty company vehicles including forty buses, several automobiles and repair trucks. It is a relatively small comapny with 135 employees. TNM&O serves 58 cities in West Texas and Eastern New Mexico, and a number of smaller communities for a total of 1,326 route miles.

Chartered bus services for football games, high school bands, service clubs, church groups and high school senior class trips are also provided besides the regular daily schedules.[2]

3. Ominibus de Mexico and Transportes Chihuahuenses

These Mexican lines provide service to Chihuahua and Mexico City and many small towns along Highway 45 in Mexico. Between the two, their scheduled departures number from 22 to 30 per day. This figure equals the amount of Greyhound departures.[3]

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[1]Dunn's Business Monthly, Feb. '84, p. 66.

[2]T.N.M.&O. Pamphlet

[3]Turner Collie & Braden, Multimodal Transportation Center for Downtown El Paso, Texas, Sept. 1980, p. 21.

III. C. National Trailways Bus System -- Project Client

The National Trailways Bus System is a group of independent, intercity bus companies united in a non-profit association to strengthen their individual and cooperative positions in the bus industry. The basic principles and purposes outlined in the original charter of the N.T.B.S. were: the coordination of schedules to provide better service to the traveling public; adoption of a uniform color scheme to strengthen market identification; the establishment of uniform safety measures; the promotion of traffic; and the pursuit of cooperative public relations and advertising strategies to highlight Trailways as the symbol of superior bus service nationwide.[1]

N.T.B.S. was formed in 1936 with sixteen members and has expanded to more than seventy intercity motorcoach companies throughout the United States. These lines currently serve over 15,000 cities and towns with a ridership of over 60 million passengers per year.[2]

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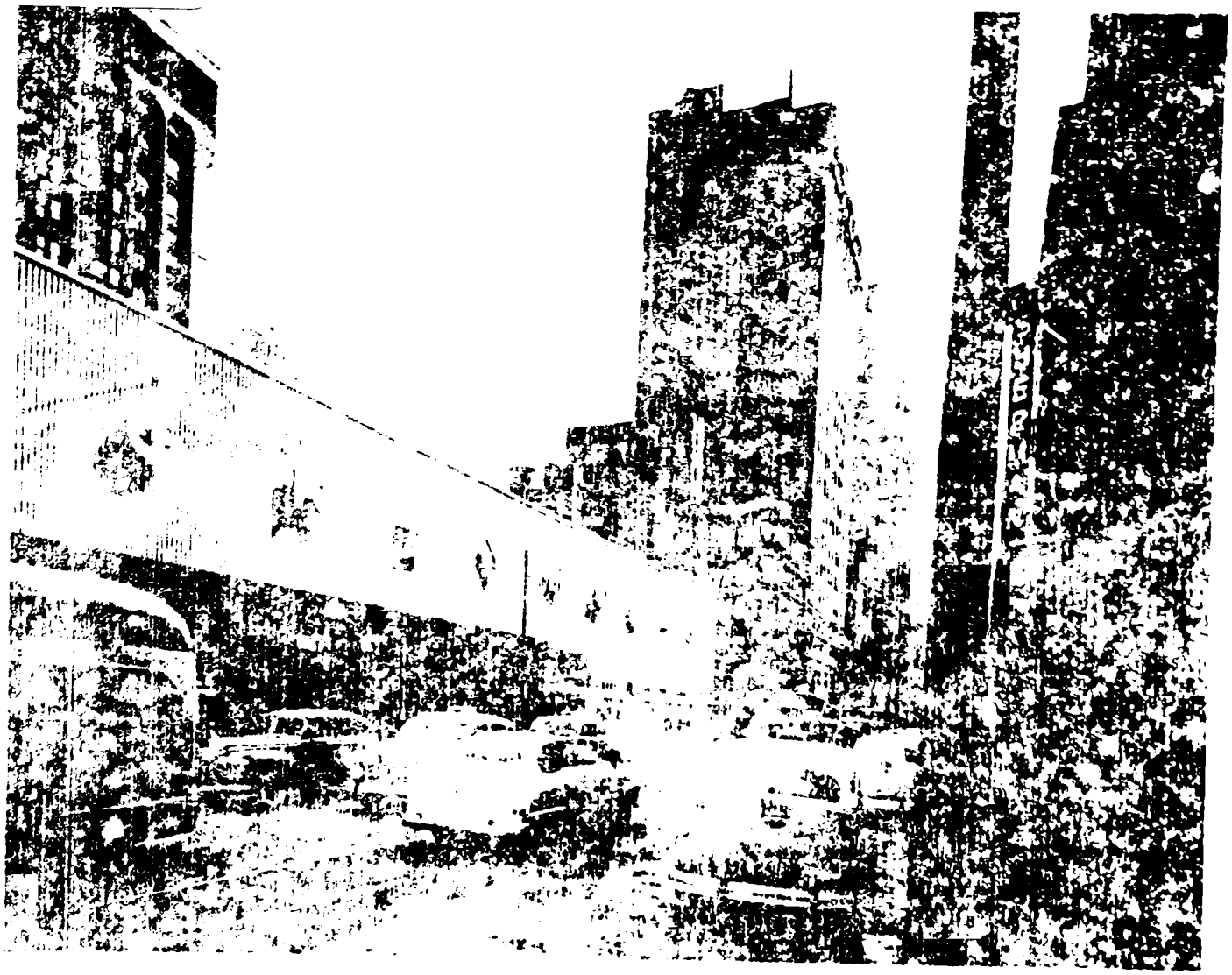
[1]Motor Coach Age Vol. XXXIV, No. 4 & 5, Motor Bus Society, 1982, p. 1.

[2]Ibid, p. 3.



GREYHOUND'S NEW CHICAGO TERMINAL

[illegible]

[illegible] Harris Associates, Contractors

A DESIGN FOR BUSINESS THAT INCORPORATES 4 SOUND IDEAS:

[illegible]

III. D. CASE STUDIES

Greyhound Terminal Chicago

This terminal, like my proposed terminal is located in a busy metropolitan area. The structure was designed to support a multistory office tower above to conserve valuable air space above the site. Bus traffic has been isolated by an under street ramp originating one block from the site. The bus concourse and berths are located two floors (25) feet below grade with passenger access from the ground floor by stairs and escalators. Elevators are used to convey luggage to and from each floor. The baggage area as shown in plan view presents a high degree of vehicle-pedestrian conflict that should be avoided in any terminal design. All administrative offices are located away from public access at one floor below ground level.

The waiting room is situated in a symetrical fashion one floor below ground level and appears to have an uncomfortable and cold environment. The floor is all tile and there are no interesting features to aid in comfort and interest.

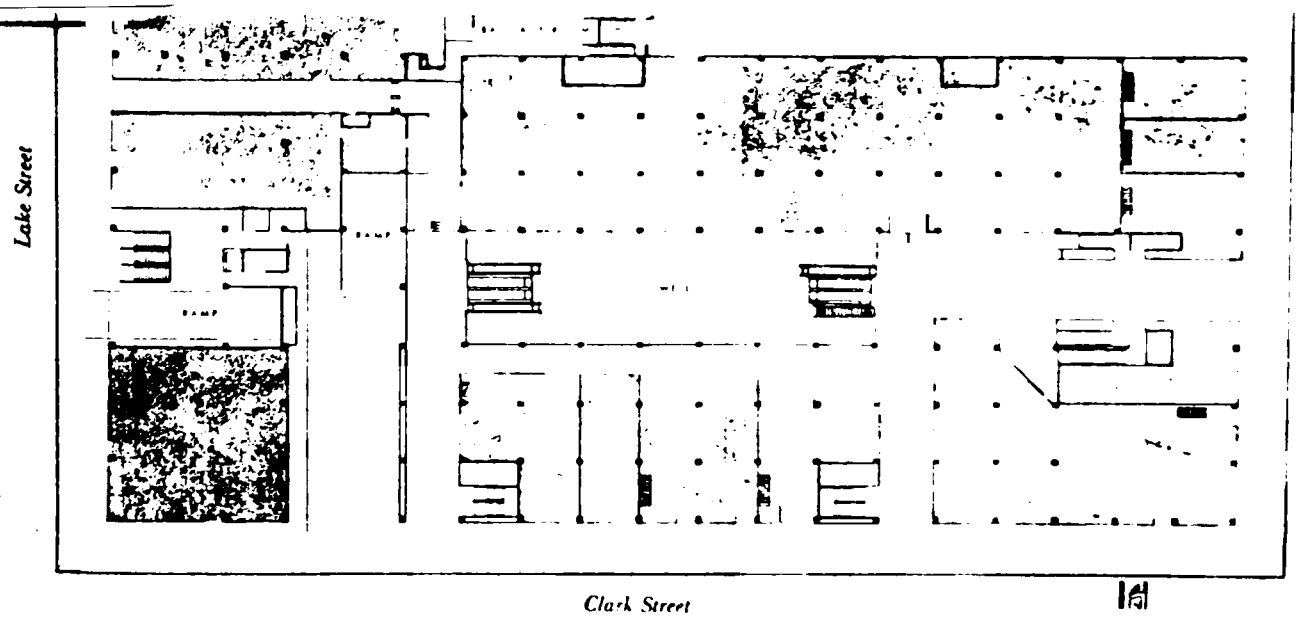
The terminal provides ample leasable space (shown shaded in the waiting room plan) for shops and concessions. These areas are located in close proximity to the waiting area for optimum passenger interaction.

On the bus concourse level, glass is used extensively for easy identification fo desired loading areas. Glare in this area is eliminated by the use of lighting on both

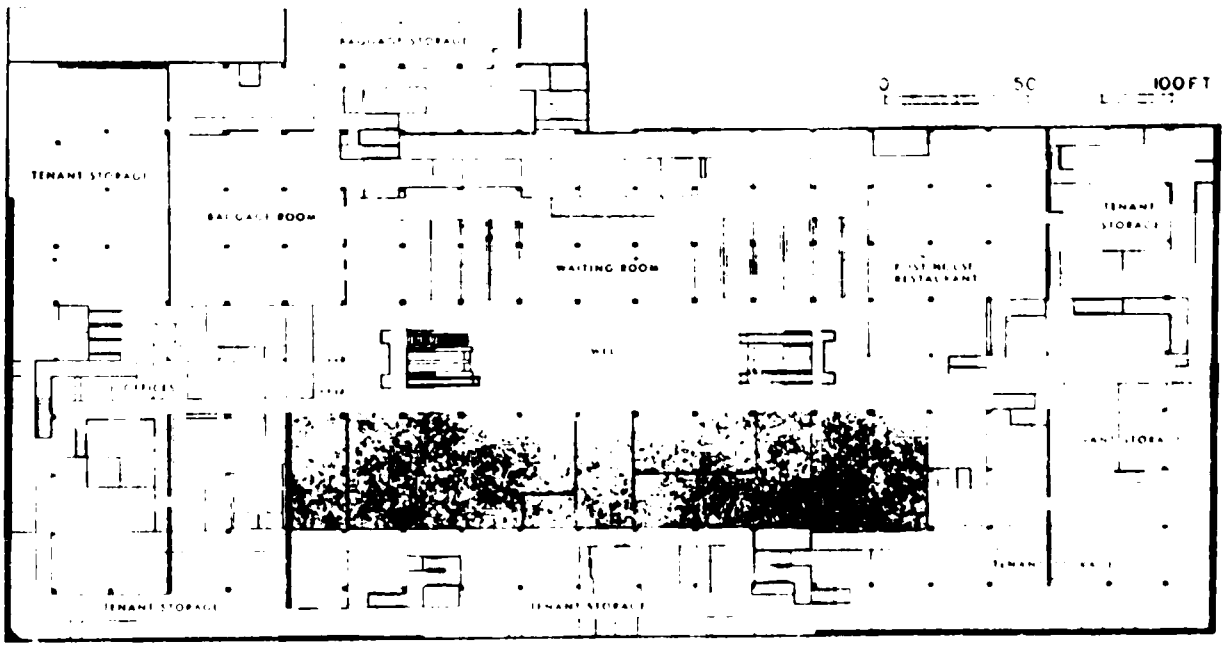
sides of the windows.

The terminal is accessible from three sides by pedestrians, however, there are no spaces provided for taxi berths and private vehicle drop-offs accept on the streets. Without these spaces, traffic conflicts can be extremely dangerous and annoying to vehicle operators along these streets.

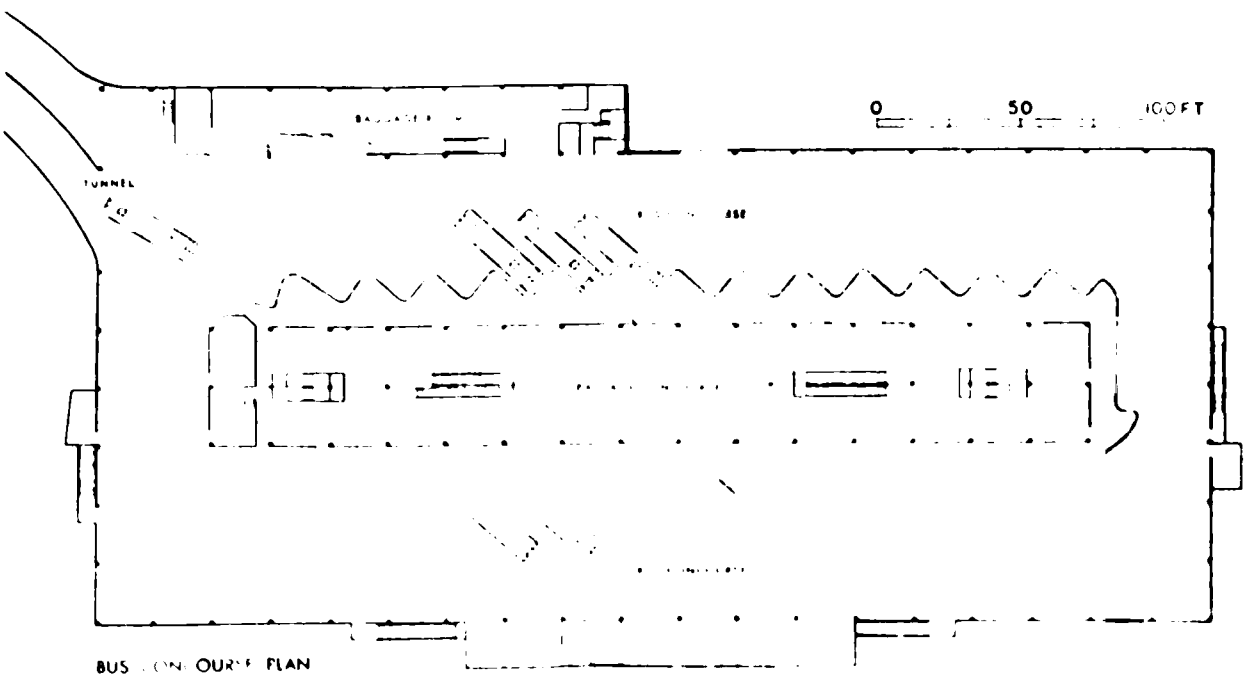
[illegible] TERMINAL IN CHICAGO



STREET LEVEL PLAN



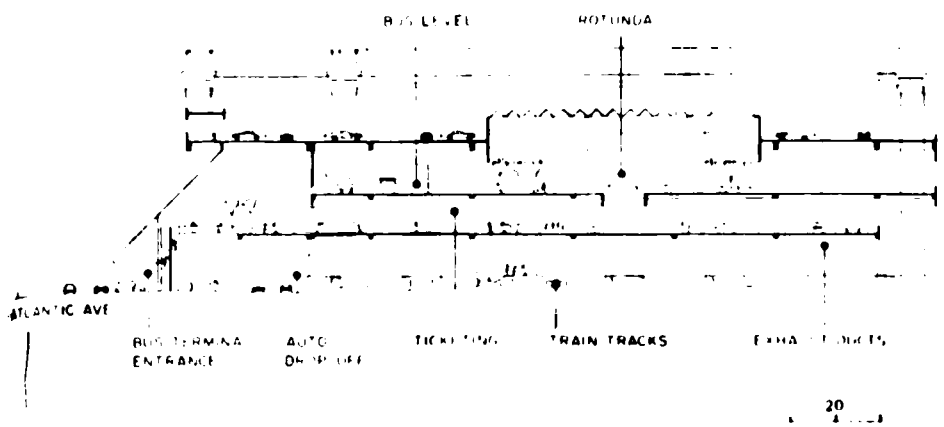
WAITING ROOM PLAN



BUS [illegible] PLAN

South Station Tranist Terminal

This project is also a result of a need for urban revitalization. Located in an old section of Boston, Mass., near downtown, the architects and developers have successfully combined new structures with the historic south station structure which is an existing train station. Included in the design is a 12 story, 400,000 square foot office building; a 24 story 600 room hotel; a two story, 250,000 square foot exposition center; and a bus terminal. The bus terminal is located on the second and third levels directly above the train operations (shown in section) and serves both local and intercity bus operations.

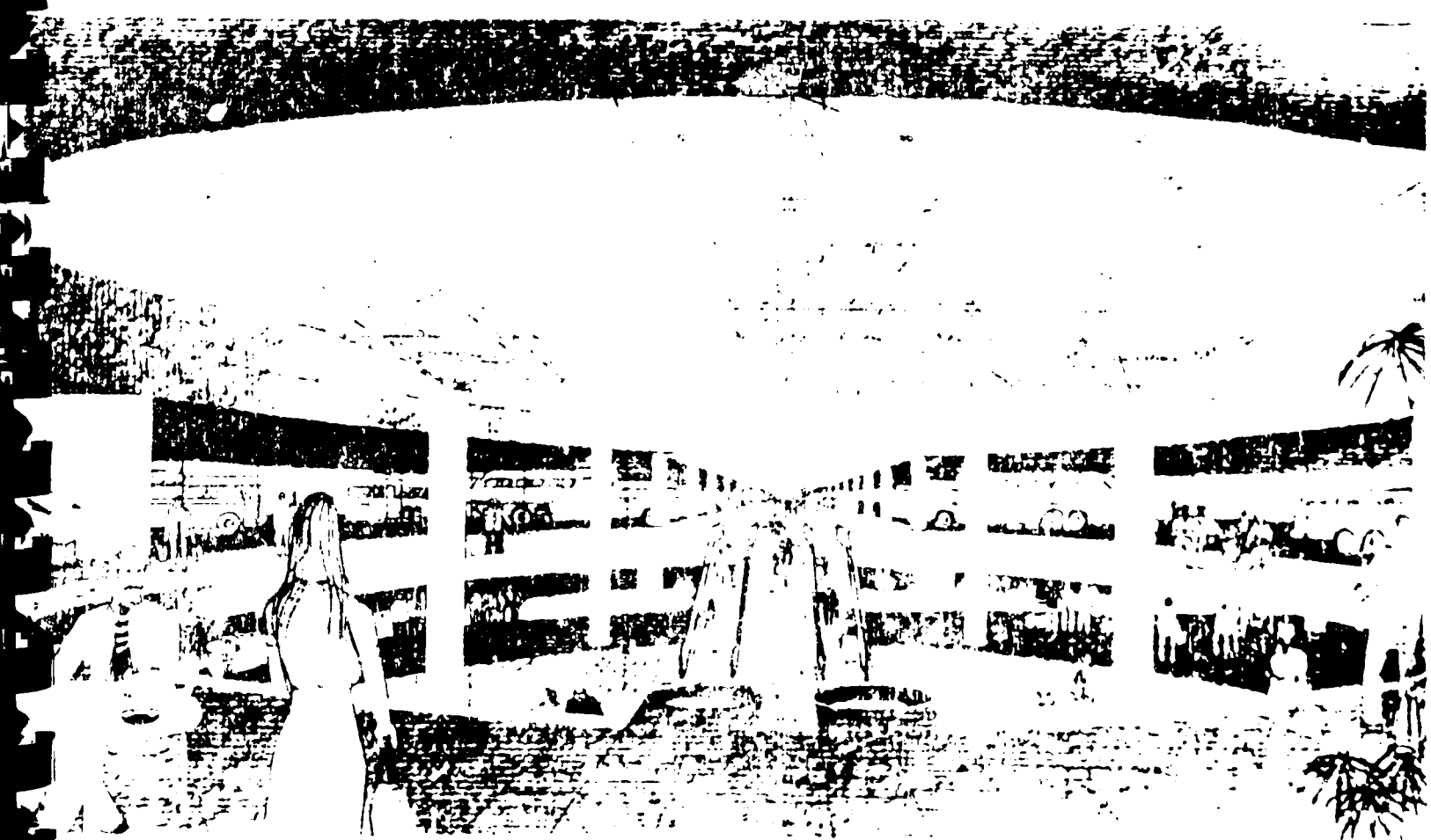


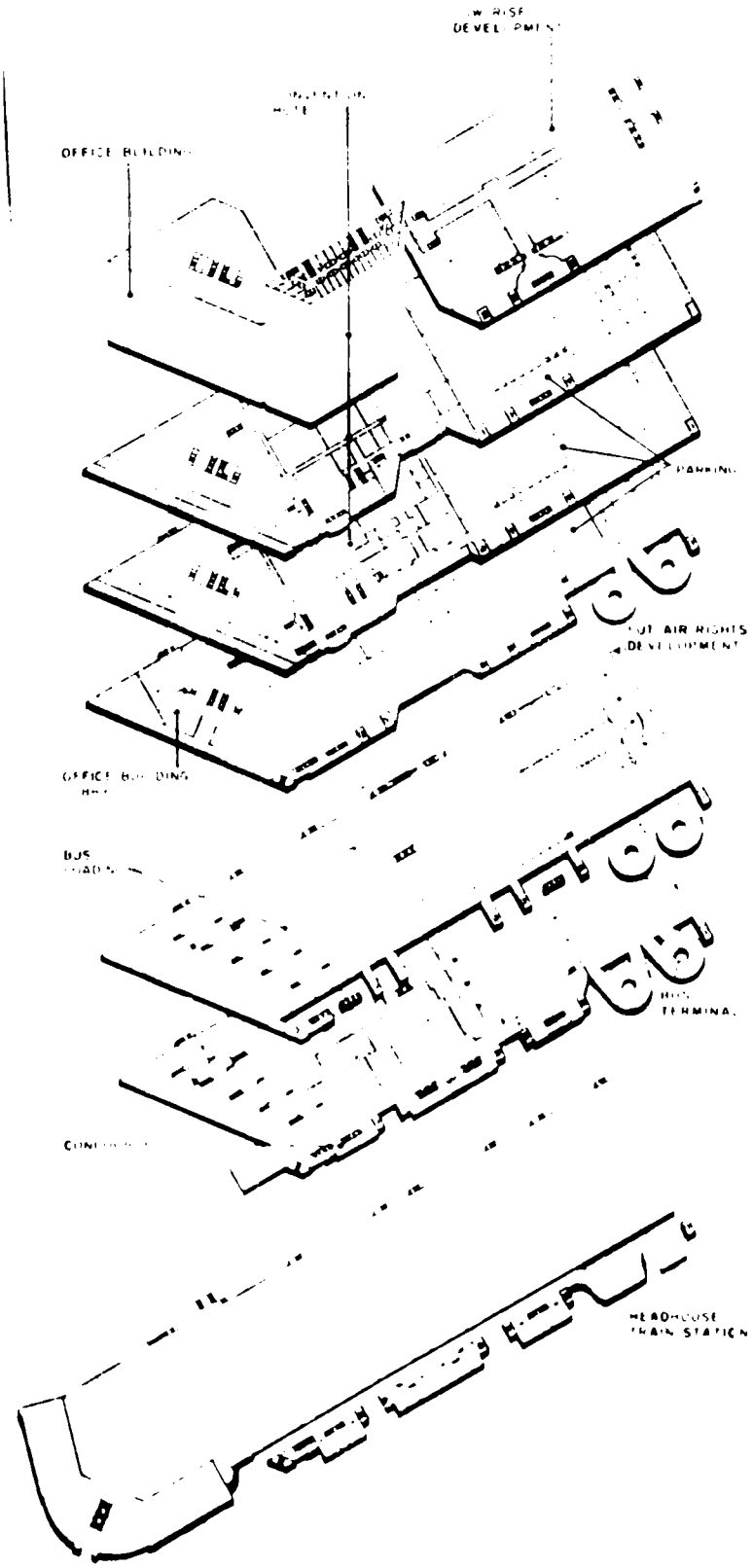
Vertical pedestrian access throughout the bus terminal is achieved by ramps, stairs or elevators. A large skylight creates a major focal point. At the center of this portion

of the complex around which all terminal activities are located. The following rendering depicts this large skylight and adjacent activities.

Due to the enormous size of the complex, care was taken to prevent it from overpowering the head house. This was achieved by the segmenting of the adjacent facade into five entrances along Atlantic Ave.

Private vehicle parking is located above the bus terminal. An intricate ramp system separates this traffic from bus traffic as show in exploded view.

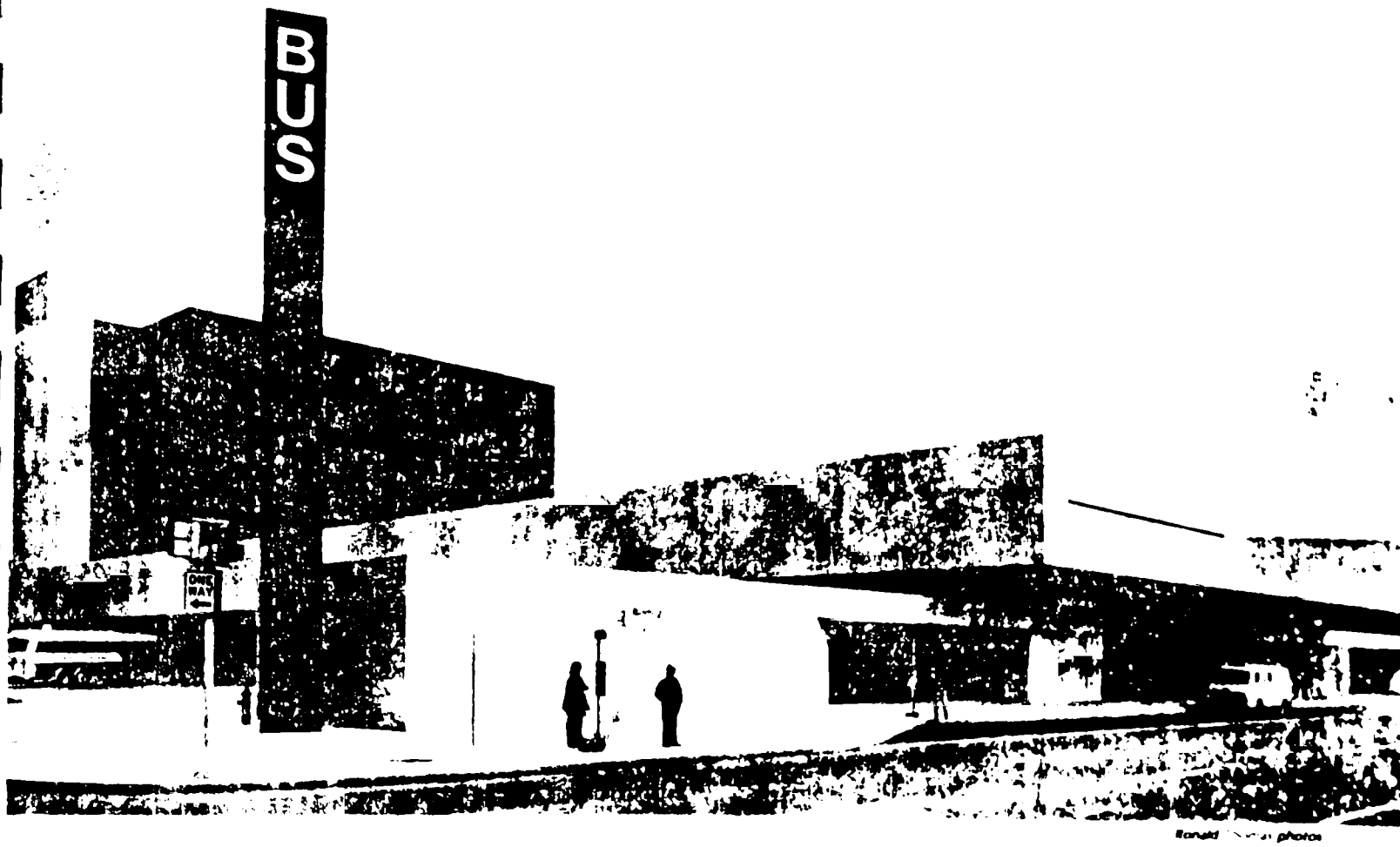




EXPLODED VIEW OF COMPLEX

The massive amounts of vehicle exhaust require an extensive HVAC system for proper air circulation. Huge ducts run from the train area on ground level and from the bus circulation area on the third level and expel the fumes out the roof.

BUFFALO'S NEW BUS STOP



The Metropolitan Transportation Center, by Cannon Design, Inc., efficiently splices office functions and terminal facilities

Metropolitan Transportation Center
Buffalo, New York

This terminal is similar to my proposed terminal for El Paso in that it is also part of an attempt to revitalize a run-down section of a downtown area of a large city. It has set a standard for other revitalizing effort in the surrounding area. The architects, Cannon Design, Inc., have turned around some preconceptions about necessity, amenity and security with this design. Previously, security meant a fortress-style atmosphere. This terminal uses openness and lighting to provide security for passengers. This concept is logical because there are less concealed areas in this type of design than in fortress-style type design. It is also a much more comfortable atmosphere. Also, one does not feel "boxed in" with this type of openness.

This terminal also utilizes air space above the site for a more efficient use of space. A mid-rise office tower is situated above the terminal on one end. This practice is a necessity in dense areas of any city as property costs and taxes are very high. The horizontal configuration (bus terminal) is connected to the vertical structure (office tower) by a roof garden area. This garden makes the transition from terminal activities to office activities and vice-versa, a smooth and pleasant experience.

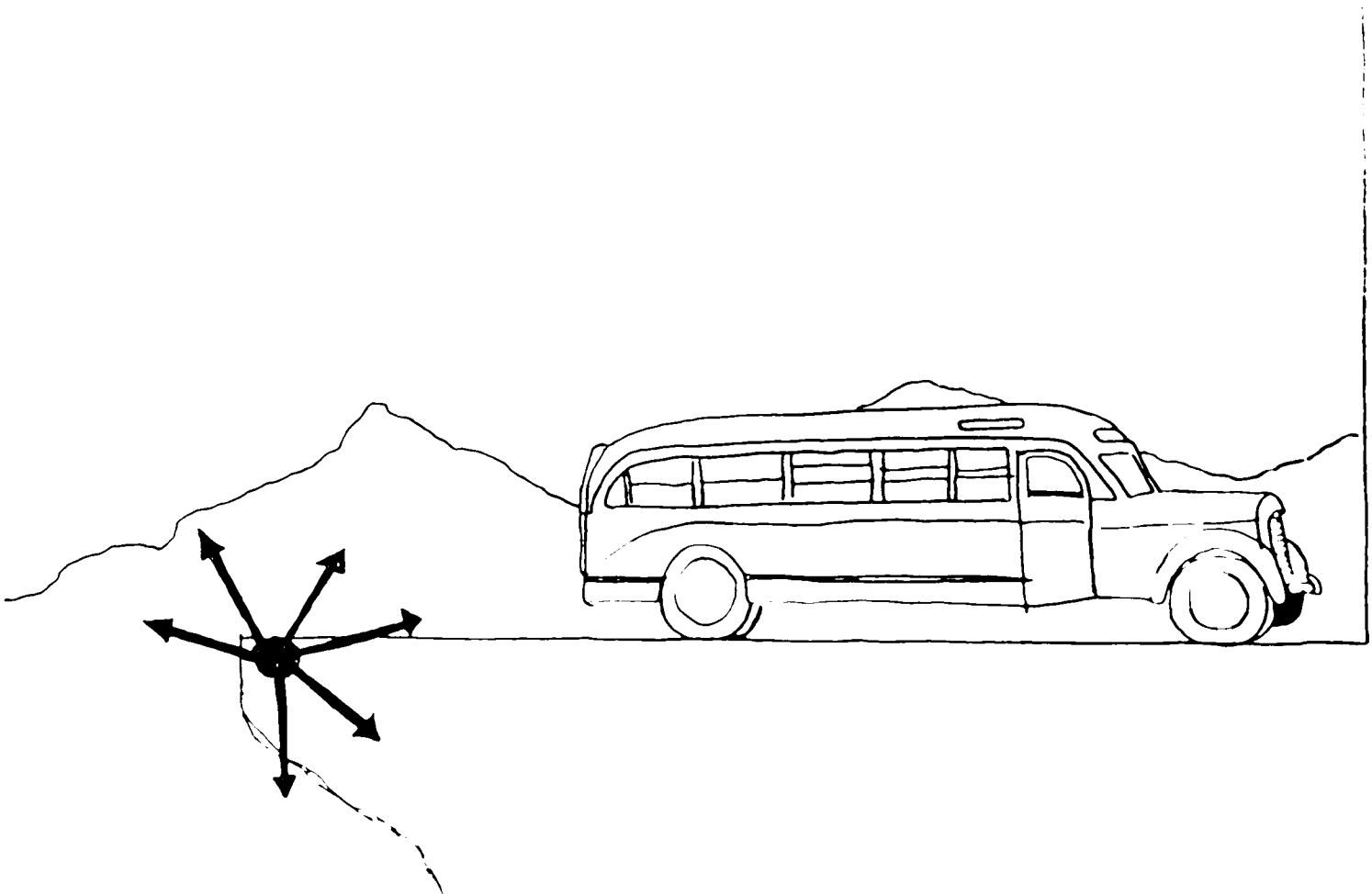
The most effective features of the terminal, however, are the waiting and concourse areas. "Two elements animate

these areas -- the effect of people moving around the room and the effect of light moving around the room." The 140 foot exposed trusses create interesting shadow patterns throughout the day as sunlight floods through the skylights above. These wide open, naturally lit spaces with irregularly placed seating, combined with ample glazing and graphics create a safe, exciting and active space.

One undesirable feature that seems evident in this bus terminal is the high probability of glare due to direct sunlight reflecting off the hard floor in the waiting and concourse areas.

This photograph illustrates the wide open waiting area and concourse. Note the glare reflecting off the floor.

GOALS AND OBJECTIVES



write a short statement as the transition (or introduction) between the title and the text.

IV. Goals and Objectives (may be better to use one single word)

To combine all intercity/international buslines in the downtown area into one terminal to serve the El Paso area.

This facility should be accessible by and work without disruption of the major traffic arteries of the city, and also be easily accessible to IH-10 and the border (Santa Fe Bridge).

Use another symbol to identify goals or objectives

Provide a catalyst for future projects in the area in the form of image and functionality and to harmonize with the proposed urban design by the El Paso team under the direction and supervision of Dr. George Peng.

Create a new image for bus terminals as a safer, more active place, rather than the ugly dangerous "hangout" that has become a stereotype for them, and to add to the realization of the general goal of downtown El Paso to be a safer more active place after business hours.

To provide a harmonious transfer of the large number of people to and from buses and the facility and to produce a pleasant transition from a quiet comfortable bus ride to the busy downtown streets.

Utilization of El Paso's sunshine for winter heating and daylighting for an energy-efficient structure.

To achieve separation and integration of passenger-vehicular traffic in the safest manner possible.

Create a functional people oriented terminal that satisfies physiological, psychological, social, and cultural needs of those people.

To control undesirables associated with bus terminals such as noise and fumes.

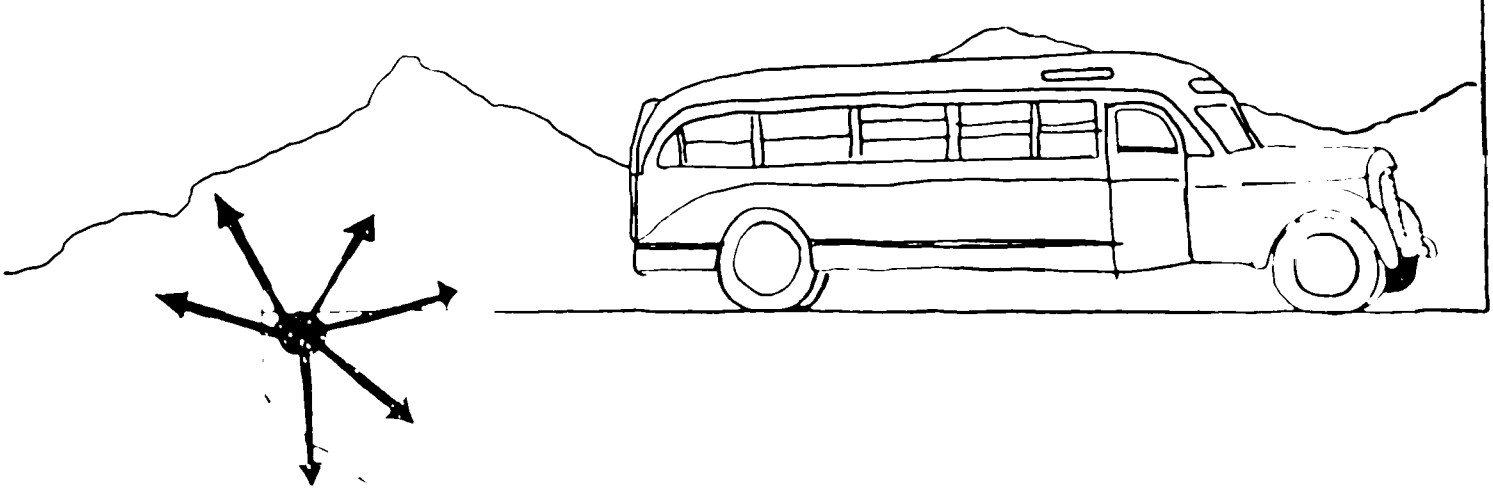
A comfortable human environment requires a subtle presence of natural elements including landscaping, plants, natural light and water or a combination of the above. Temperature is also a part of this comfort and all can contribute to the physiological and psychological needs of humans. These should be used where applicable, especially in waiting areas and traffic flow area.

Pleasurable views and/or interesting activities are helpful in waiting areas. Some form of refreshment should be available into these areas also.

Spaces should be flexible to handle the extremes in pedestrian and vehicular traffic volumes.

Keep major pedestrian flow patterns simple to avoid confusion and congestion as people will normally be carrying cumbersome loads, and need to be able to identify their destinations and reach them as soon as possible. Attempts of beautifying spaces are better noticed by pedestrians if they are not confused or congested. The use of graphics and architectural forms can eliminate confusion in traffic flow patterns.

DESIGN APPROACHES



V. A. Philosophies Concepts

A bus terminal should primarily cater to passengers who use it. All activities should be intermixed and related into an organic form. This form should function smoothly and without interruption or confusion not only within the terminal but with it's surrounding environment as well.

Activities and spaces within and around the terminal should stimulate and satisfy human needs. Physical and psychological comfort should be available and care should be taken to create an atmosphere that stimulates the mind and senses. These needs are not always present in public places but it is essential that they be fulfilled if a design is to be successful.

V. B. Activity Analysis

1. Bus Activity
   a. Bus accessability to the terminal must be as simple as possible without disrupting the automobile traffic along Paisano and Santa Fe Streets. These streets will have a very high volume of traffic during business and rush hours.
   b. Because there are four bus companies to be housed in the terminal, a high level of bus traffic is expected during peak hours. Provisions should be made to accommodate the activity. A smooth flow of incoming and outgoing buses is of importance.
2. Pedestrian Activities
   a. Ease of potential passenger accessability is very important. This must also be achieved with the least possible disruption of traffic flow on bordering streets. Private vehicles, taxis and local bus lines will be used to drop off and pick-up passengers.
   b. Passenger transitions from drop-off to terminal and from bus to terminal should create a pleasant, inviting feeling for the passenger. This may be achieved through openness, use of color and natural features (light, plants and/or water).
   c. Passengers should be able to circulate through the spaces in direct, unobstructed fashion. There should be no confusion as to where each space or

activity is and each should be readily identifiable. Circulation, especially during peak traffic is critical matter. Automatic doors, signage and graphics, as well as wide corridors can be used to help achieve better circulation.

d. Ticket Sales and Check-in: This is a major queuing area that has almost constant activity. It is an area where many passengers will sometimes create large lines. Ample space must be provided to keep these lines out of circulation paths. This activity should be close to but not interfere with the pedestrian traffic that ties passengers with the buses and to outside activities. Provisions such as a pass through should be provided for ease of baggage check-in.

e. Passenger Waiting

This activity requires a high degree of sensitivity in design. While offering opportunity for innovative and interesting design features, this area must comply with basic functional needs such as relaxation and comfort. Some passengers will spend hours at a time in this area waiting for departure. During that time they should experience physical and psychological rest or peace of mind. They should also have opportunity for social interaction and cognitive stimulation. Satisfaction of these needs may require some sort of refreshments i.e.

coffee, tea or soft drinks and these should be provided adjacent to this area. Other operative elements to insure comfort include the use of indirect natural light, plants, water movement, warm colors, texture and low noise levels. Comfortable seating and semi-private areas are also desirable, varying ceiling heights can help to achieve these effects.

f. Passenger Boarding

This activity is closely related to both the waiting areas and to the ticket counter areas. Transitions between the two should be direct and simple. Distances to boarding platforms from these activities should be as short as possible while meeting the requirements of each. Success of this activity depends on efficiency and no confusion as to the location of the passenger's desired gate destination. Boarding passengers and deboarding passengers should not come into conflict.

g. Food Services ([illegible] Terminal Architect)

Passengers as well as local businessmen and the general public will use the facilities food services. "Fast food" and a formal dining area will be required. The fast food to be offered will vary in types, from Mexican to Italian, Chinese, etc., and chain store franchises can be considered. These types are offered

for those passengers who have short layovers and those businessmen with little time for lunch.

One formal dining room should be included in the design. Formal dining activity is desirable for those with long layovers who want to relax while eating and for locals who want to eat in a more serene and formal atmosphere for professionals discussing business matters.

The food services are related to the general public as well as travelers, the image of these areas are very important. There should be a sense of security and comfort here to help create a good impage. These food services should be easily accessible for both user groups as a main focus.

h. Cocktail Lounge

The cocktail lounge also must maintain a clean, classy type appearance in an attempt to eliminate "undesirables." It too should be accessible to the public and to the passengers, however it may be advisable to make it less accessible than other functions.

i. Outdoor Dining

El Paso's climate permits the use of outdoor dining areas. Such areas should be situated in a manner to provide interesting views (preferably away from bus traffic to prevent intrusion of diesel fuel odors and noise).

j. Outdoor Plaza

This is an area where activities are similar to those in the waiting area and is related directly with the waiting area. It possesses an opportunity to function as a transitional space between downtown activity and the terminal area. Views of the Franklin Mountains and the downtown skyline should be emphasized. Local cultural flavor can be expressed in the area as well as the entire terminal. Use of local historical references would also be of interest to visitors as well as local people.

Sound barriers will be required in order to eliminate street noise, especially if located on the east or south side of the site. This is due to the heavy traffic volumes along the bordering streets. (Santa Fe and Paisano)

k. Restrooms

Restrooms should be accessible and recognizable from waiting areas and deboarding areas. However, some discretion should be used to avoid overemphasizing this area.

Separate restroom facilities should be provided for the dining areas.

3. Terminal Activities

a. Baggage Processing

This activity involves collecting, sorting and properly distributing incoming and outgoing baggage.

Due to changeovers and late departing passengers, which are common in any mode of public transportation, this process must be performed as efficiently as posssible. In order to help achieve greater efficiency, this activity should be located adjacent to both the passenger check in and the bus berth areas. Separation of these activities from passenger activity is also desirable in maintaining an efficient processing system. Some storage may be necessary for misplaced or forgotten baggage. Baggage pickup areas may be separate for each bus line or may be consolidated into one central area. Again, this area should not interfere with major pedestrian traffic flows.

b. Package Express

This activity involves processing and distributing packages entering and leaving the terminal. Storage space is required for arriving packages until they are picked up by their respective owners. An additional storage space is necessary for outgoing packages until their particular bus routes arrive. These spaces can be one in the same as long as adequate storage for both activities is provided. Separate public accessability is desirable, but not necessary for the activity for shipping and receiving packages, because those who are dropping

off or picking up packages are generally not passengers.

This activity is related to the baggage processing because both baggage and packages are stowed in the same compartment on the bus. They are sorted in the receiving area before they are processed. Thus, the two activities may be integrated into one large area.

c. Service Vehicles

Food services and the gift shop will require periodical service calls for deliveries of supplies, food and merchandise. Drives and spaces for vehicles such as phone, electrical, and/or plumbing repair trucks, as well as garbage trucks should be provided in an inconspicuous area. All areas that may require services of these types should be accessible from this area.

d. Restaurants

Both types of restaurants (fast food and formal) require easy circulation characteristics in the food preparation areas. Conflicts in circulation of employees i.e. cooks, dishwashers, and waiters should be avoided. The transition from food preparation to serving should be without conflict.

Maintainability of all areas is important. Surface areas should be adequate for activities

involved on each. They should also be easily cleaned for greater efficency as time is a factor in all restaurant activities. Surfaces such as stainless steel and ceramic tile may be used for easy maintenance.

Proper ventilation is required to prevent smoke and cooking odors from infiltrating the dining areas and for safety.

All food preparation areas will require storage of dry goods and refrigerated goods. Storage for cleaning utensils must be provided.

Service entrances should be centralized if possible to accommodate deliveries in the most efficient manner. They should also avoid interference with food preparation and potential customers. Waste disposal activities should not conflict with other activities but should be convenient for each food service.

Employees of the bus companies will need a separate lunch room for use during their respective lunch hours -- this room should include counter space, a refrigerator and sink.

e. Gift Shop(s)

Visitors to the El Paso area who do not have time to shop in local stores will be provided shopping facilities in the terminal. The shops will carry

merchandise from both sides of the border, so Mexican tourists can take home U.S. goods and vice versa. Design of these areas should include a space for a newsstand and non-prescription drugs. The shops should convey a comfortable shopping atmosphere.

f. Amenities

These are provisions for terminal users that are intended to make the user's stay more comfortable and relaxing:

Vending Machines - soft drinks, candy and chips

Locker Storage - for personal belongings

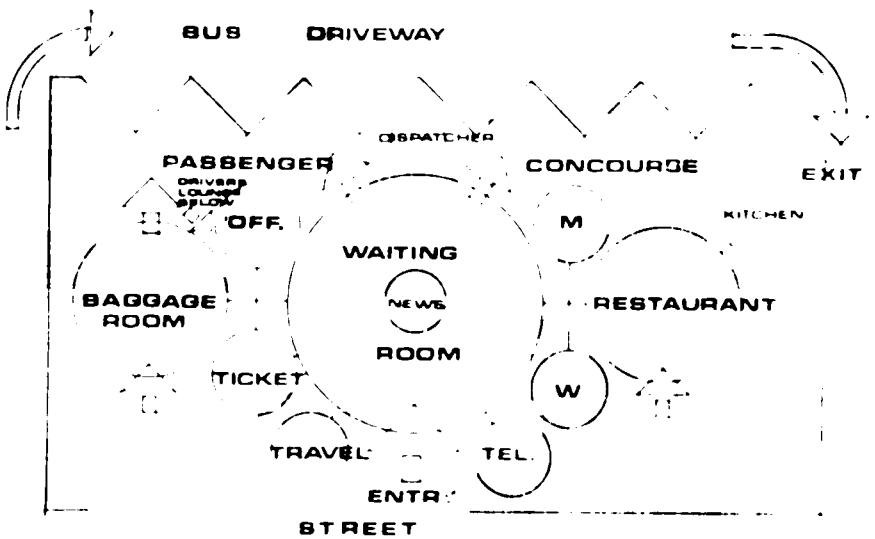
Telephones

Television Area - use personal T.V.'s or one with large screen and seating for ten to twenty viewers

Visitor Information and Displays

V. C. Flow Diagrams

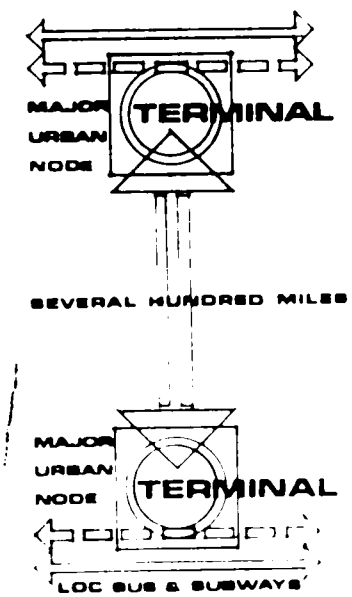
The following flow diagram from Time Saver Standards shows one possible relationship between all activities involved in bus terminal design. There are of course, an infinite number of ways to relate the various spaces involved, however, this one works quite well.

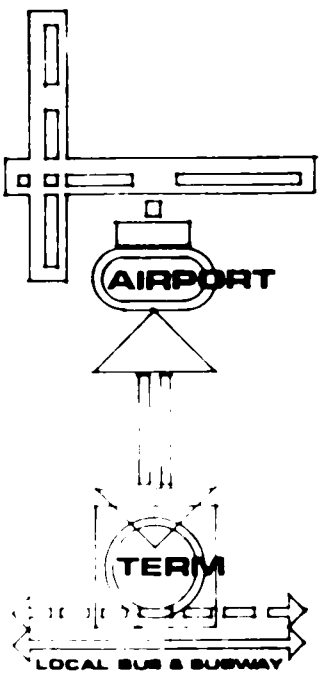


As cited in the Standards section of this paper, "non-reverse loading" is more desirable than reverse loading because of limited space conditions involved in reverse loading design. A non-reverse design will dictate a bus circulation in a clockwise fashion as indicated on the above diagram. It also makes driving easier and demands less space in some cases when a bus will have to turn right, then left from the

street onto the site. Passenger loading is also more direct in a non-reverse configuration.

These diagrams also from Time Savers Standards depict desirable locations and important adjacencies.





BUS BERTHS

Functional description:

Buses park here for loading and unloading of passengers, packages, and baggage.

General requirements:

1.	number of occupants:	20 buses
2.	sq. ft. per occupant:	750
3.	total area:	15,000 sq. ft.
4.	number of exits:	1
5.	security control:	moderate

Material finishes

1.	floors:	hard surface (bus loads)
2.	walls:	washable finish-painted concrete of vinyl
3.	ceilings:	clearance 13 ft. min.

Environmental requirements

1.	temp. control:	natural
2.	lighting:	15-20 fc and natural lighting
3.	mechanical:	fresh air/exhaust if enclosed

Equipment / furnishings

1.	communications:	public address system
2.	office equipment:	N. A.
3.	seating:	N. A.
4.	special equipment:	sewage dumps/electrical supply

Adjacent areas:
baggage processing, package express, concourse, ticketing, driver's lounge

Special notes:
provide 100% of this required area for passenger circulation, see Standards for design requirements

PASSENGER WAITING

Functional description:

This area will function as an area for passengers to sit, relax, and/or socialize while awaiting their respective departure times. This area should be comfortable and provide relaxing accommodations.

General requirements:

1.	number of occupants:	702
2.	sq. ft. per occupant:	10
3.	total area:	7020 sq. ft.
4.	number of exits:	3
5.	security control:	none

Material finishes:

1.	floors:	durable carpet and/or tile
2.	walls:	vinyl or painted gyp. bd.
3.	ceilings:	accoustical or plaster

Environmental requirements:

1.	temp. control:	70°F
2.	lighting:	30/100 fc
3.	mechanical:	fresh air 20 cfm heating cooling

Equipment / furnishings

1.	communications:	public address, phones
2.	office equipment:	N. A.
3.	seating:	234 seats
4.	special equipment:	paid t. v. booths, ash trays, trash cans, clock(s).

Adjacent areas:
concourse, ticketing, restrooms, information, food services

Special notes:

BAGGAGE, PACKAGE EXPRESS

Functional description:

This area is used for baggage and package sorting and distribution. Some of this area is used for temporary storage.

General requirements:

1. number of occupants: varies
2. sq. ft. per occupant: 50 per bus berth
3. total area: 1,000 sq. ft.
4. number of exits: 1
5. security control: high

Material finishes:

1. floors: concrete or hard tile
2. walls: impact resistant
3. ceilings: exposed fire proofed

Environmental requirements:

1. temp. control: 70°F
2. lighting: 30 fc normal 100 fc sorting
3. mechanical: fresh air 20 cfm heating and cooling

Equipment / furnishings

1. communications: phone, intercom system
2. office equipment: N. A.
3. seating: benchs or chairs for workers (10)
4. special equipment: stack shelves for temporary storage, (15) luggage carts

Adjacent areas:
ticket sales, bus concourse, package express pick-up

Special notes:

OFFICES-PACKAGE EXPRESS

Functional description:

These offices will serve as a space for completing and storing paperwork involved in the process of package express. Provide three offices.

General requirements:

1. number of occupants: 1
2. sq. ft. per occupant: 100-150
3. total area: 100-150
4. number of exits: 1
5. security control: none

Material finishes:

1. floors: carpet
2. walls: vinyl or painted
3. ceilings: accoustical drop

Environmental requirements:

1. temperature control: 70°F
2. lighting: 100 fc flourescent
3. mechanical: heating and cooling 50 cfm

Equipment / furnishings

1. communications: phone and intercom
2. office equipment: desk, files, chairs, adding machine
3. seating: 3 chairs
4. special equipment: N. A.

Adjacent areas:
storage, baggage, package express

Special notes:

TOUR OFFICES (3) EACH

Functional description:

Area provided for discussion and reservation of charter bus trips. Records are kept of these activities in this area.

Genral requirements:

1.	number of occupants:	6
2.	sq. ft. per occupant:	100
3.	total area:	600
4.	number of exits:	1
5.	security control:	none

Material finishes:

1.	floors:	carpet
2.	walls:	vinyl or painted finish
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100 fc
3.	mechanical:	heating and air conditioning 250 cfm

Equipment / furnishings

1.	communications:	6 phones
2.	office equipment:	6 desk and chairs, filing equipment
3.	seating:	N. A.
4.	special equipment:	none

Adjacent areas:
Administrative offices, pedestrian circulation

Special notes:

ADMINISTRATIVE OFFICES

Functional description:

This area is the offices for the terminal manger and five company offices for each company represented should be provided. All of these offices have similar functions, hence the same criteria may be used for each.

General requirements:

1.	number of occupants:	2
2.	sq. ft. per occupant:	N. A.
3.	total area:	200 sq. ft. each
4.	number of exits:	1
5.	security control:	moderate

Material finishes:

1.	floors:	carpet
2.	walls:	vinyl or painted
3.	ceilings:	accoustical drops

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100-150 fc
3.	mechanical:	heating and cooling 75 cfm

Equipment / furnishings

1.	communications:	(2) phones each
2.	office equipment:	(2) desk each, filing, storage
3.	seating:	(6) chairs each
4.	special equipment:	private restrooms

Adjacent areas:
sales counters, terminal offices

Special notes:

These offices may be centralized into one pool or seperated to be adjacent to their respective ticketing counters depending on the designer's preference. One secretary area should be provided for each office.

DISPATCHER'S OFFICE

Functional description:

The dispatcher controls all bus movements within the terminal.

General requirements:

1.	number of occupants:	2
2.	sq. ft. per occupant:	N. A.
3.	total area:	150 sq. ft.
4.	number of exits:	1
5.	security control:	N. A.

Material finishes:

1.	floors:	carpet or tile
2.	walls:	vinyl or painted gypsum board
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100 fc
3.	mechanical:	heating and cooling 40 cfm

Equipment / furnishings:

1.	communictions:	phone, dispatch radio
2.	office equipment:	2 desks
3.	seating:	2 chairs
4.	special equipment	N. A.

Adjacent areas:
bus circulation and bus berths

Special notes:

TICKET COUNTER/STOCKROOM

Functional description:

This is an area where large volumes of money are exchanged for tickets

General requirements:

1.	number of occupants:	8
2.	sq. ft. per occupant:	60
3.	total area:	480 sq. ft.
4.	number of exits:	1
5.	security control:	high

Material finishes:

1.	floors:	durable carpet or tile
2.	walls:	vinyl, carpet, or painted gyp bd
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100-150 fc
3.	mechanical:	heating and cooling, 100 cfm

Equipment / furnishings:

1.	communications:	1 phone and a paging system
2.	office equipment:	computer terminal, cash register
3.	seating:	none
4.	special equipment:	conveyor to baggage room

Adjacent areas:
stockroom, concourse, baggage

Special notes:

Stockroom should be provided for storage of ticket material and cut outs should be provided in counter for easy transfer of baggage.

DRIVER'S LOUNGE

Functional description:

This space is supplied for drivers to rest and shower after or before their runs. Drivers must also log in at this station.

General requirements:

1.	number of occupants:	varies
2.	sq. ft. per occupant:	N. A.
3.	total area:	500 sq. ft.
4.	number of exits:	1
5.	security control:	none

Material finishes:

1.	floors:	carpet and tile
2.	walls:	vinyl or painted
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	40 fc general 100 work surfaces
3.	mechanical:	heating and cooling 90 cfm

Equipment / furnishings:

1.	communications:	1 phone
2.	office equipment:	3 desk
3.	seating:	3 chairs for desk and 5 lounge
4.	special equipment:	lavatories (3) showers (3)

Adjacent areas:
bus concourse and pedestrian circulation

Special notes:

INFORMATION CENTER

Functional description:

This area is provided for people with inquiries about bus schedules and other information.

General requirements:

1. number of occupants: 3
2. sq. ft. per occupant: 40
3. total area: 120 sq. ft.
4. number of exits: 1
5. security control: none

Material finishes:

1. floors: carpet
2. walls: vinyl or formica counter
3. ceilings: accoustical drop

Environmental requirements:

1. temp. control: 70° F
2. lighting: 100 fc
3. mechanical: heating cooling 20 cfm

Equipment / furnishings:

1. communications: 3 phones, 1 P. A. microphone
2. office equipment: cabinet storage
3. seating: 3 chairs
4. special equipment: 3 computer terminals

Adjacent areas:
ticket counter, pedestrian circulation

Special notes:

SECURITY AND CLAIMS OFFICE

Functional description:

This space is the main headquarters for the terminal's security. It will be used to monitor key areas of the terminal and as a "home base" for the officers.

General requirements:

1.	number of occupants:	4
2.	sq. ft. per occupant:	75
3.	total area:	300 sq. ft.
4.	number of exits:	1
5.	security control:	N. A.

Material finishes:

1.	floors:	tiles
2.	walls:	painted gyp. bd.
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100 fc
3.	mechanical:	heating and cooling 45 cfm

Equipment / furnishings

1.	communications:	2 phones, radio comm. base
2.	office equipment:	2 desk, filing
3.	seating:	6 chairs
4.	special equipment:	t. v. monitors

Adjacent areas:
baggage claims, ticket sales, bus concourse

Special notes:

RESTROOMS

Fucntional description:

General requirements:

1.	number of occupants:	50
2.	sq. ft. per occupant:	N. A.
3.	total area:	2 at 1200 each
4.	number of exits:	1
5.	security control:	none

Material finishes:

1.	floors:	tile
2.	walls:	tile and/or vinyl
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	50 fc
3.	mechanical:	heating and cooling 400 cfm

Equipment / furnishings:

1.	communications:	N. A.
2.	office equipment:	N. A.
3.	seating:	N. A.
4.	special equipment:	toilets, urinals, soap dispensers hand dryers, storage, and maintenance storage.

Adjacent areas:
waiting, fast food services, pedestrian circulation

Special notes:

MAINTENANCE

Functional description:

This area is used primarily for storage of interior maintenance equipment and a work area for the maintenance employees.

General requirements:

1.	number of occupants:	varies
2.	sq. ft. per occupant:	N. A.
3.	total area:	300 sq. ft.
4.	number of exits:	1
5.	security control:	N. A.

Material finishes:

1.	floors:	tile or finished concrete
2.	walls:	painted byp. bd.
3.	ceilings:	exposed

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	75 fc
3.	mechanical:	heating and cooling 75 cfm

Equipment / furnishings:

1.	communications:	N. A.
2.	office equipment:	N. A.
3.	seating:	3 chairs
4.	special equipment:	large lavatory, mop rack, vaccumes, floor polishers

Adjacent areas:

Special notes:

This space can be divided into seperate locations if necessary.

LEASABLE RETAIL AREAS

Functional description:

These spaces are to be used for retail sales of gifts and other articles from both sides of the border.

General requirements:

1.	number of occupants:	varies
2.	sq. ft. per occupant:	N. A.
3.	total area:	1200 each (3) 3,600
4.	number of exits:	1
5.	security control:	light

Material finishes:

1.	floors:	carpet or tile
2.	walls:	varies
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100-250 fc
3.	mechanical:	heating and cooling 3,000 cfm

Equipment / furnishings:

1.	communications:	1 phone each
2.	office equipment:	N. A.
3.	seating:	varies
4.	special equipment:	cash registers

Adjacent areas:
passenger circulation, waiting, terminal entrance

Special notes:

Storage should be provided for stock

BAR

Functional description:

All alcoholic beverages are stored and prepared in this area. People can relax and socialize in this area also.

General requirements:

1.	number of occupants:	varies
2.	sq. ft. per occupant:	N. A.
3.	total area:	200 sq. ft.
4.	number of exits:	1
5.	security control:	light

Material finishes:

1.	floors:	carpet and tile (behind the bar)
2.	walls:	varies
3.	ceilings:	accoustical drop

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	50 fc at bar subdued rest
3.	mechanical:	heating cooling 7,500 cfm

Equipment / furnishings:

1.	communications:	phones, public address
2.	office equipment:	N. A.
3.	seating:	65 seats and 20 tables
4.	special equipment:	ice bin, running water, glass washing facilities

Adjacent areas:
dining areas, service entrances

Special notes:

OUTDOOR RESTAURANT

Functional description:

This area serves as an outdoor dining area when weather permits.

General requirements:

1.	number of occupants:	60
2.	sq. ft. per occupant:	40
3.	total area:	2,400 sq. ft.
4.	number of exits:	2
5.	security control:	none

Material finishes:

1.	floors:	carpet and or floor tile
2.	walls:	plaster, vinyl, wainscoting
3.	ceilings:	accoustical or plaster

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	natural partially controlled artificial 15-20 fc with spot-light
3.	mechanical:	none

Equipment / furnishings:

1.	communications:	P. A.
2.	office equipment:	N. A.
3.	seating:	60 seats
4.	special equipment:	tables for 60 seats, umbrellas possibly ceiling fans

Adjacent areas:
indoor restaurant, bar, food preparation

Special notes:

design is flexible

INDOOR RESTAURANT

Functional description:

This area requires a comfortable relaxing atmosphere for dining.

General requirements:

1.	number of occupants:	120
2.	sq. ft. per occupant:	40
3.	total area:	4800 sq. ft.
4.	number of exits:	2
5.	security control:	none

Material finishes:

1.	floors:	carpet and/or tile
2.	walls:	plaster, vinyl, wainscoting
3.	ceilings:	accoustical or plaster

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	varies from 10 fc in dining to 100 fc cashier
3.	mechanical:	heating and cooling 1500 cfm

Equipment / furnishings:

1.	communications:	P. A.
2.	office equipment:	N. A.
3.	seating:	120
4.	special equipment:	tables for 120 chairs and booths

Adjacent areas:
outdoor restrooms, bar, food preparation, concourse, rest-rooms.

Special notes:

KITCHEN

Functional description:

This is where food for indoor and outdoor restaurants are stored and prepared.

General requirements:

1.	number of occupants:	varies
2.	sq. ft. per occupant:	N. A.
3.	total area:	3200 sq. ft.
4.	number of exits:	2
5.	security control:	none

Material finishes:

1.	floors:	treated concrete or tile
2.	walls:	stainless steel wainscoting or tile
3.	ceilings:	painted gyp. bd.

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100 fc/ 30 fc storage
3.	mechanical:	heating and cooling 1500 cfm exhaust

Equipment / furnishings:

1.	communications:	none
2.	office equipment:	N. A.
3.	seating:	none
4.	special equipment:	(2) 15 ft. exhaust hoods 3000 cfm, refrigerators, dry storage, freezer storage, stoves, ovens, dishwashing equipment.

Adjacent areas:
indoor restaurant, outdoor restaurant, delivery, and bar

Special notes:

FAST FOOD RESTAURANTS (4) EACH

Functional description:

This area is to provide fast food service to lunch customers or to those passengers who do not have time for sit down dining.

General requirements:

1.	number of occupants:	2-5
2.	sq. ft. per occupant:	N. A.
3.	total area:	600 sq. ft.
4.	number of exits:	1
5.	security control:	light

Material finishes:

1.	floors:	treated concrete or tile
2.	walls:	stainless steel and/or tile
3.	ceilings:	painted gyp. bd.

Environmental requirements:

1.	temp. control:	70° F
2.	lighting:	100 fc, 30 fc storage
3.	mechanical:	heating and cooling, 150 cfm exhaust

Equipment / furnishings:

1.	communications:	intercom
2.	office equipment:	desk and chair, file
3.	seating:	1
4.	special equipment:	exhaust hood, stove, oven, freezer, refrigerator, dry storage

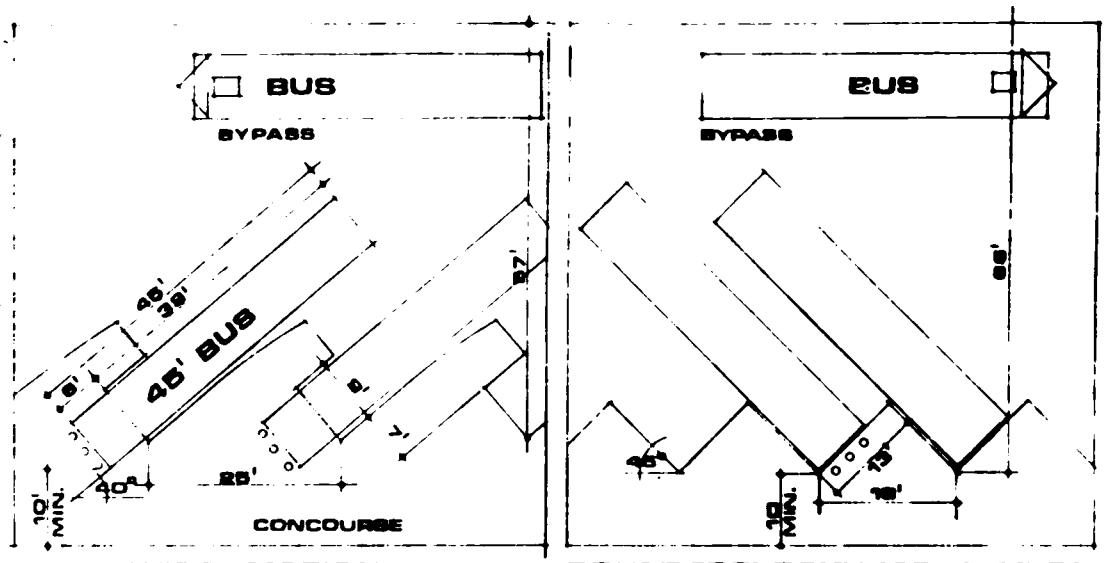
Adjacent areas:
dining area, lobby, waiting, passenger circulation

Special notes:

These spaces should be clustered with a common dining area.

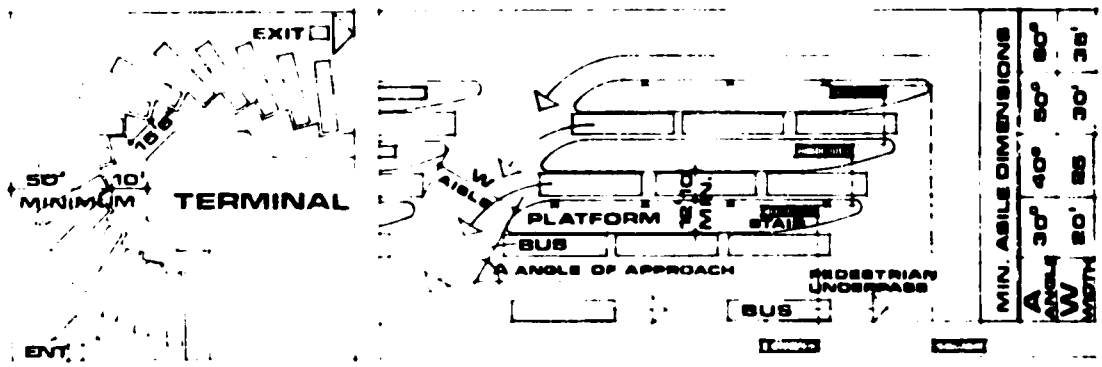
STANDARDS

The following standards and data are provided as design aids. Sources include Time Saver Standards and Greyhound Corporation.

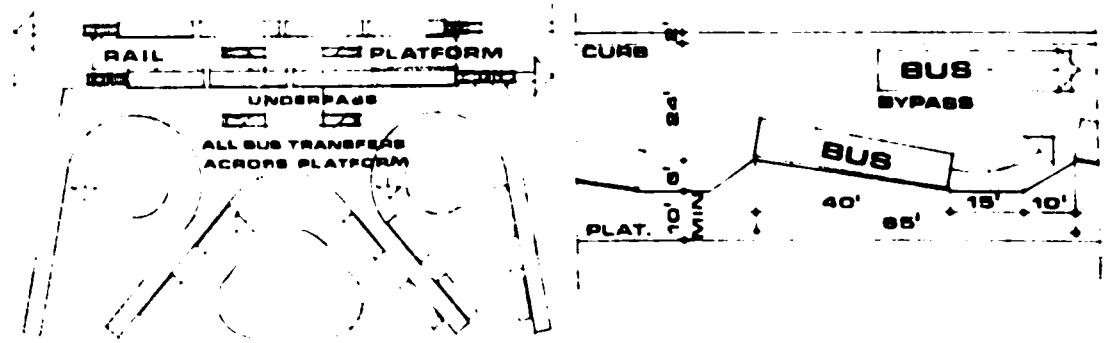


CLOCKWISE MOTION COUNTERCLOCKWISE MOTION

(a) SAWTOOTH LOADING



RADIAL SAWTOOTH PARALLEL SINGLE LANE ISLAND



SINGLE ISLAND BUS RAIL TRANSFER STEPPED PARALLEL

(b) PARALLEL LOADING

PLATFORM TYPES

Parallel Loading

- Requires excessive amount of space
- Buses must usually wait until first bus exits
- Large terminal requires pedestrian underpass facilities to protect passengers while crossing lanes

Right-Angle Loading

- Disadvantages include
  1. Outswinging bus door which forms a barrier around which passenger must pass.
  2. Bus maneuvering difficult

Straight Sawtooth Loading

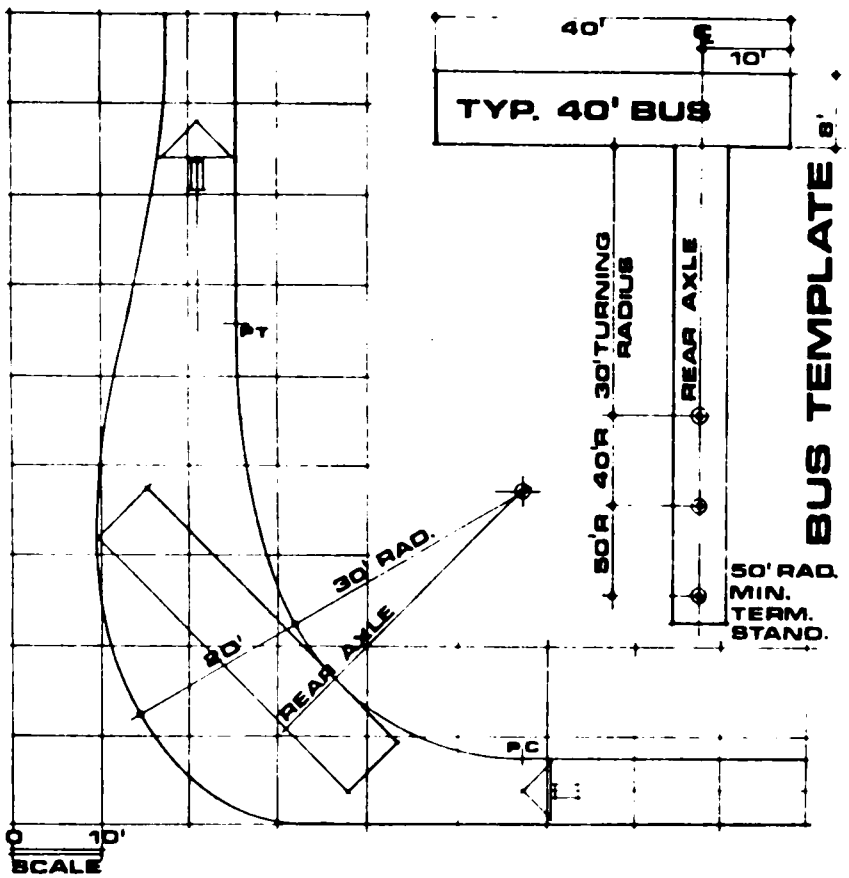
- Efficient employed where lot is comparatively narrow and deep
- Passenger has direct approach to loading door.
- Baggage truck can operate between buses for side loading

Radial Sawtooth Loading

- Most efficient buses swing into position along natural driving arc
- Space required at front is minimum wide space at rear making maneuvering easy

(See Fig. 4.)

BUS TERMINALS



SWEEP PATH 40' BUS 90° TURN

By JULIUS PANERO.
Architect and Planning Consultant

BUS GEOMETRICS

Bus Data Bus geometrics, or the physical dimensions and maneuverability of the bus, determine the width of roadways, shapes of platforms, column spacing, ceiling heights, and other aspects of bus-level design. The apparently insignificant detail of the right-side loading of buses often restricts terminal design possibilities.

Swept Path When a bus turns normally, it always turns about a point which is somewhere on the center line of the rear axle. This is true whether motion is forward or backward.

The turns required to accomplish the movement and positioning of buses are variable and differ considerably with the equipment encountered. The turning template provides a convenient graphic method to determine minimum clearances required. (See Fig. 3.)

ROADWAY RAMPS

Bus Roadway Widths Ten-foot-wide single lanes will suffice for 8-ft-wide equipment. *Eleven-foot lanes are preferable* where ample terminal space is available and especially to accommodate equipment 8 ft wide, the use of which steadily is increasing.

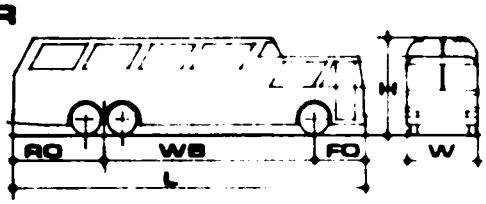
Double-lane runways, enabling standing buses to be overtaken by other buses, provide a great advantage over one-lane runways because of the increased flexibility of operations that is made possible.

For the purpose of merely overtaking another

BUS SPECIFICATIONS

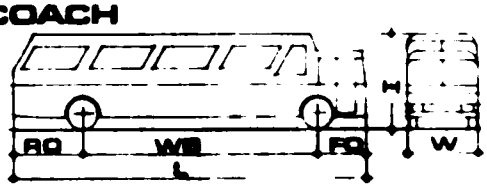
40' SCENICRUISER

L	LENGTH	40'0"
W	WIDTH	8'0"
H	HEIGHT	10'11"
WB	WHEEL BASE	23'7"
RO	REAR OVERHANG	10'7"
FO	FRONT "	5'9"
OR	MIN. OUTSIDE TURNING RADIUS	42'4"



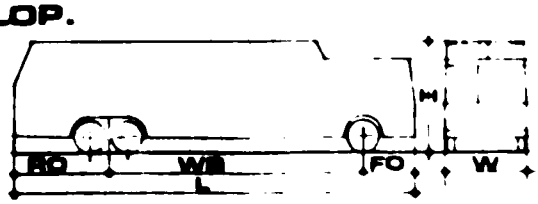
GMC INTERCITY COACH

L	40'0"
W	8'0"
H	10'11"
WB	23'6"
RO	8'9"
FO	5'8"
OR	45'0"



FUTURE DEVELOP.

L	45'0"
W	9'0"
H	12'0"
WB	28'6"
RO	10'7"
FO	5'4"
OR	50'7"



er Phoenix, Arizona 85077. Sta. 327.
Phone (602) 248-5029, 6549, 5321.
Architectural Engineering & Properties Dept.

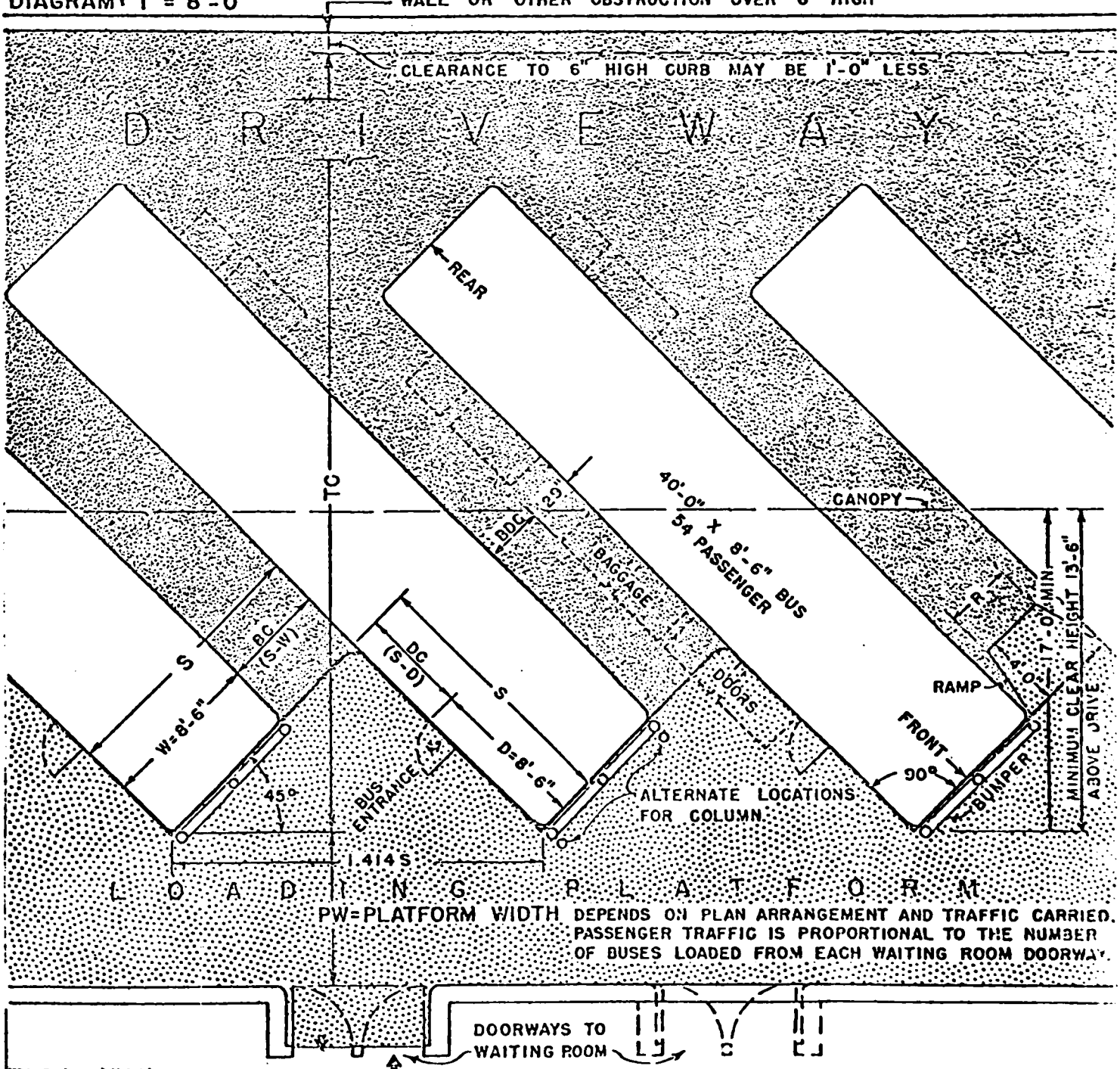
FILE: C2 DATE: SEPT. 1946 PAGE: T2.1.2 BY: WEBSTER

PLANNING STANDARDS FOR TERMINALS AND GARAGES

TERMINAL LOADING CLEARANCES - 45° ANGLE PARKING - AVERAGE CONDITIONS

FIGURES GIVEN DO NOT APPLY TO SPECIAL CONDITIONS OR ANGLES OTHER THAN 45°.
LOADING WITH BUSES ARRANGED IN REVERSE DIRECTION NOT RECOMMENDED.

DIAGRAM: 1" = 8'-0"



TABULATION:

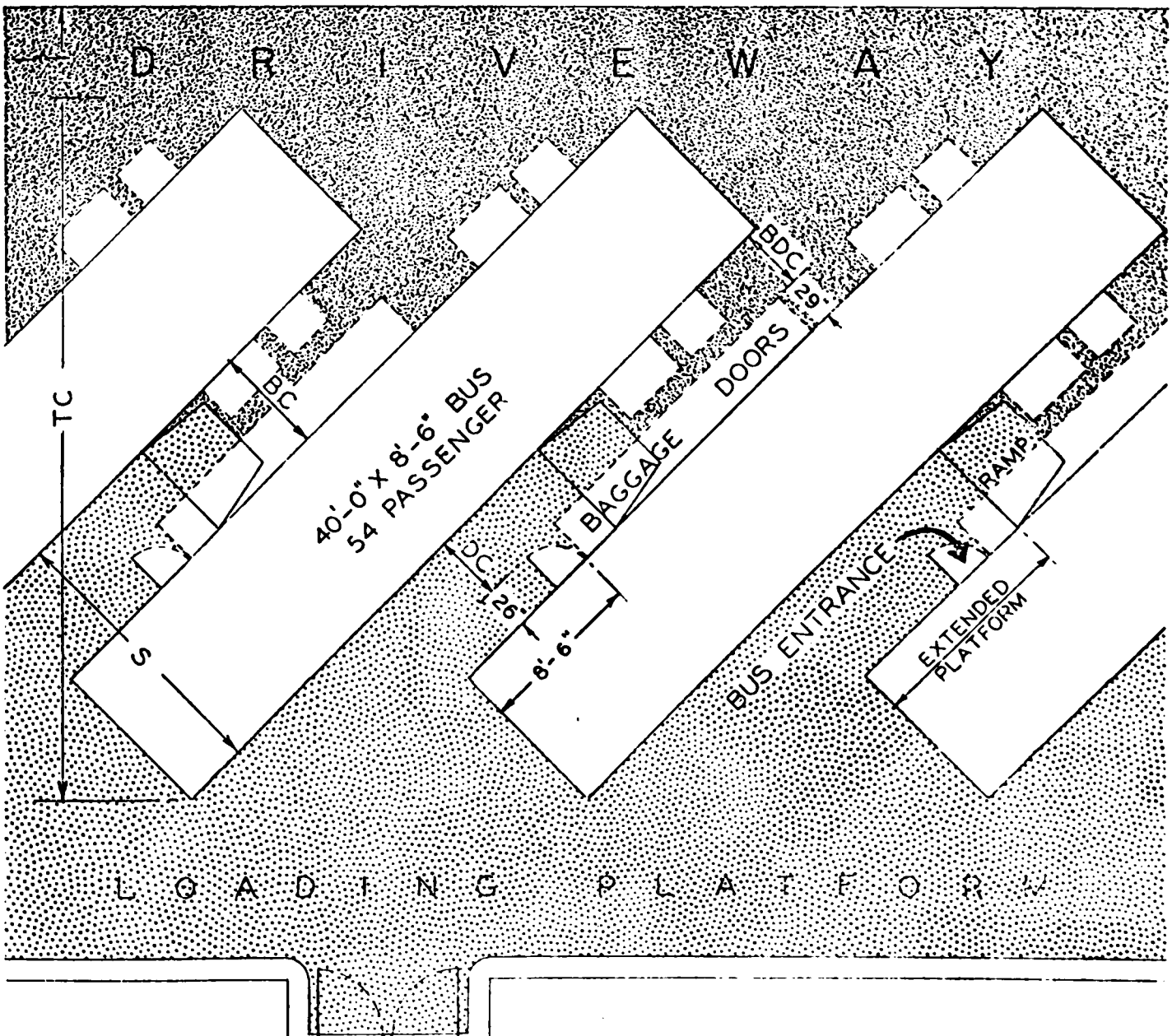
CLEARANCE	S=SPACING CENTER TO CENTER OF BUSES						
	FOR RESERVE PARKING		FOR PASSENGER LOADING				
	11'	12'	13'	14'	15'	16'	17'
TC =TURNING CLEARANCE FOR TYPICAL POSITIONS * RECOMMENDED MINIMUM TO CURB	63'-6"	60'-6"	57'-9"	55'-3"	52'-9"	52'-0"	51'-6" TO 52'-6"
TC =TURNING CLEARANCE FOR TYPICAL POSITIONS * TO WALL	64'-6"	61'-6"	58'-9"	56'-3"	53'-9"	53'-0"	
BC =CLEARANCE BETWEEN BUSES DC =DOOR CLEARANCE	2'-6"	3'-6"	4'-6"	5'-6"	6'-6"	7'-6"	8'-6"
BDC=BAGGAGE DOOR CLEARANCE	1"	1'-1"	2'-1"	3'-1"	4'-1"	5'-1"	6'-1"
R =RAMP WIDTH	1'-10"	2'-6"	3'-2"	3'-10"	4'-6"	5'-0"	5'-6"

* FOR CLEARANCE AT INTERMEDIATE SPACINGS SEE GRAPH. SPECIAL CONDITIONS REQUIRE SPECIAL CLEARANCES. WHEN BUSES ENTER WITH RIGHT TURN FROM STREET, FIRST FEW LOADING POSITIONS WILL

PLANNING STANDARDS FOR TERMINALS & GARAGES.
DIAGRAM ILLUSTRATING DISADVANTAGES OF REVERSE LOADING

Reverse Loading is NOT RECOMMENDED for the following reasons:

1. Passenger loading occurs in narrow space between buses instead of in large space ahead of adjacent bus.
2. Baggage loading spaces of adjacent buses are in conflict.
3. Extension of platform to reach doorway impairs turning space and will require increased turning clearance in driveway.



TABULATION:

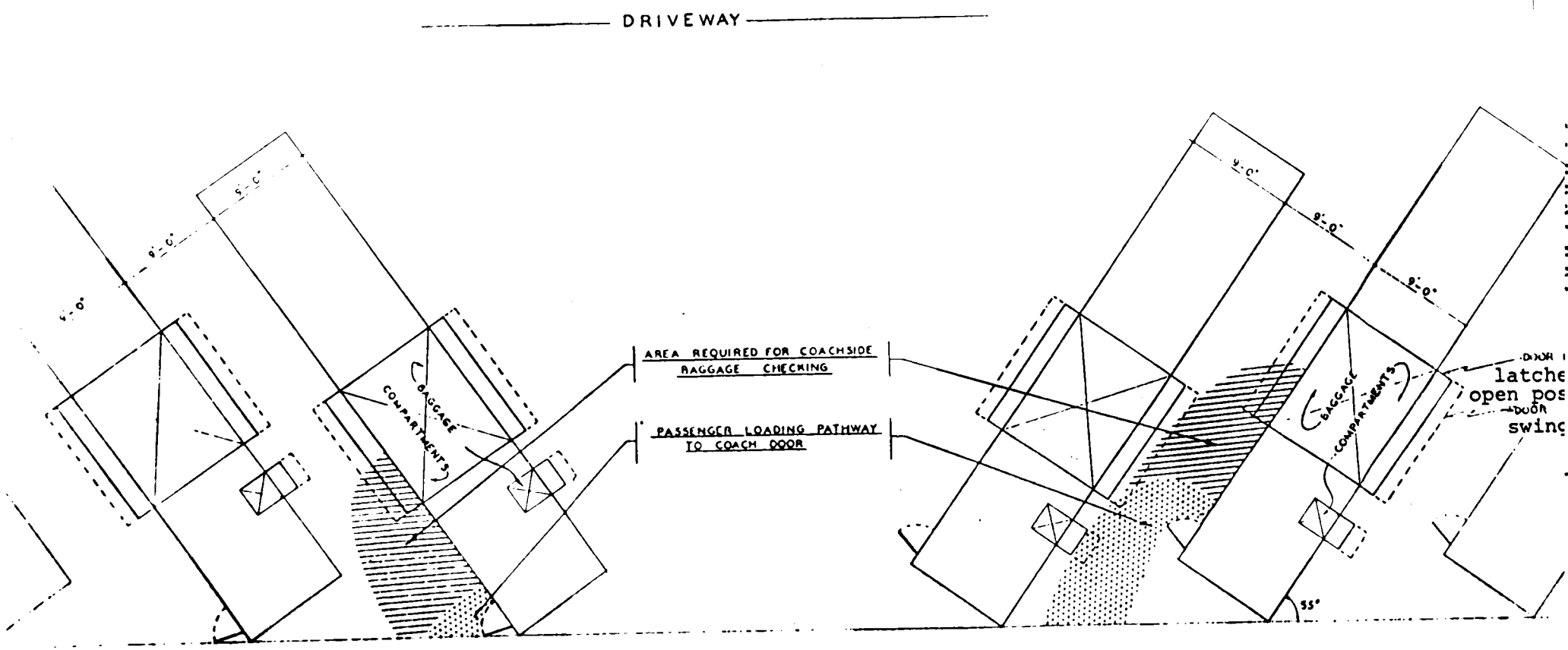
CLEARANCE	S = SPACING CENTER TO CENTER OF BUSES						
	FOR RESERVE PARKING		FOR PASSENGER LOADING				
	11'	12'	13'	14'	15'	16'	17'
BC = CLEARANCE BETWEEN BUSES	2'-6"	3'-6"	4'-6"	5'-6"	6'-6"	7'-7"	8'-8"
DC = DOOR CLEARANCE	4"	1'-4"	2'-4"	3'-4"	4'-4"	5'-4"	6'-4"
BDC= BAGGAGE DOOR CLEARANCE	1"	1'-1"	2'-1"	3'-1"	4'-1"	5'-1"	6'-1"

Greyhound Lines, Inc.
Greyhound Tower Phoenix, Arizona 85077

FILE:
DATE: 3-11-63

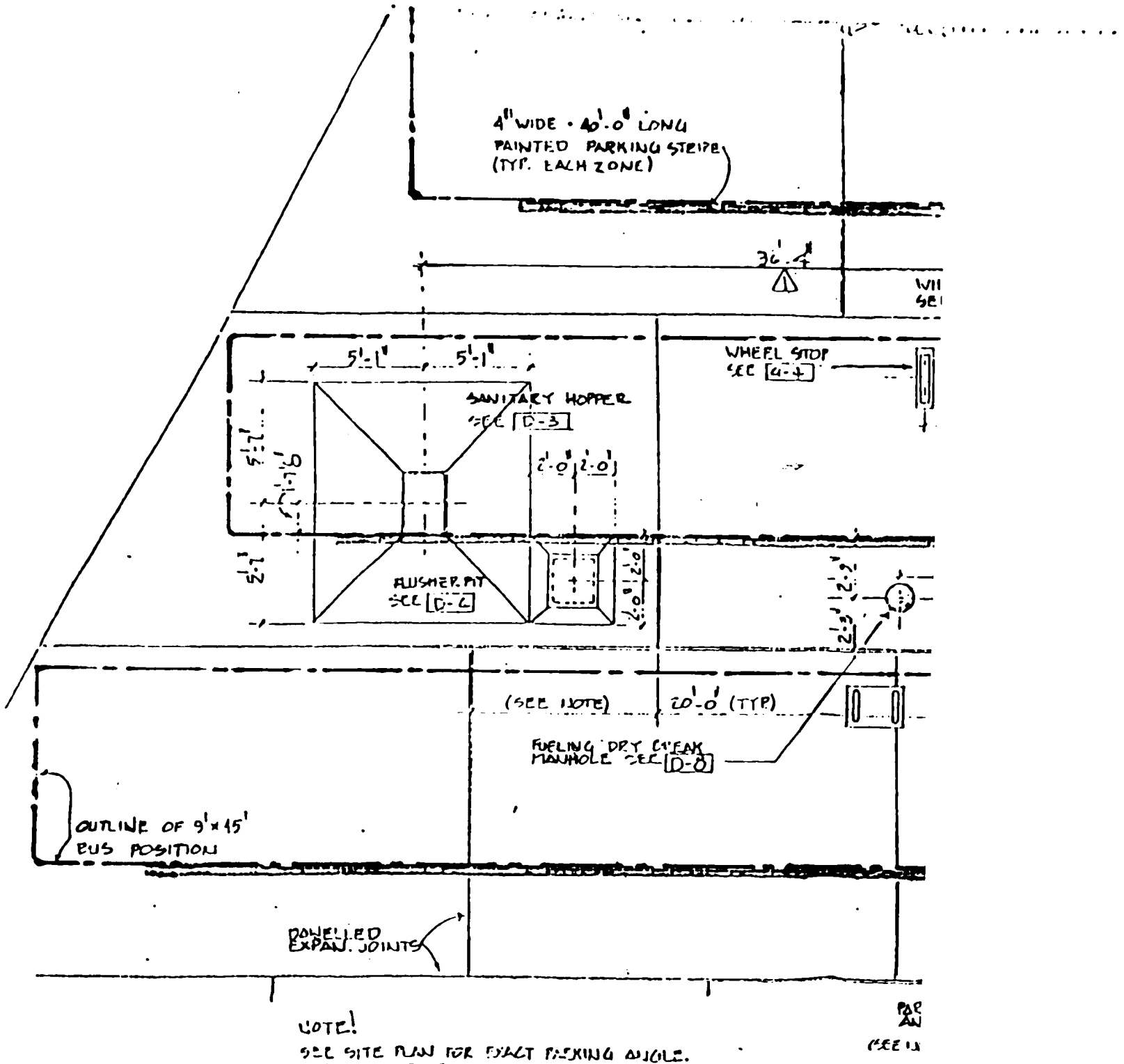
PAGE: T2.1.3-2
BY: DOBYNS
SCALE: 1/8" = 1'-0"

SUBJECT: DIAGRAM ILLUSTRATING COMPARISON OF REVERSE & NON-REVERSE LOADING



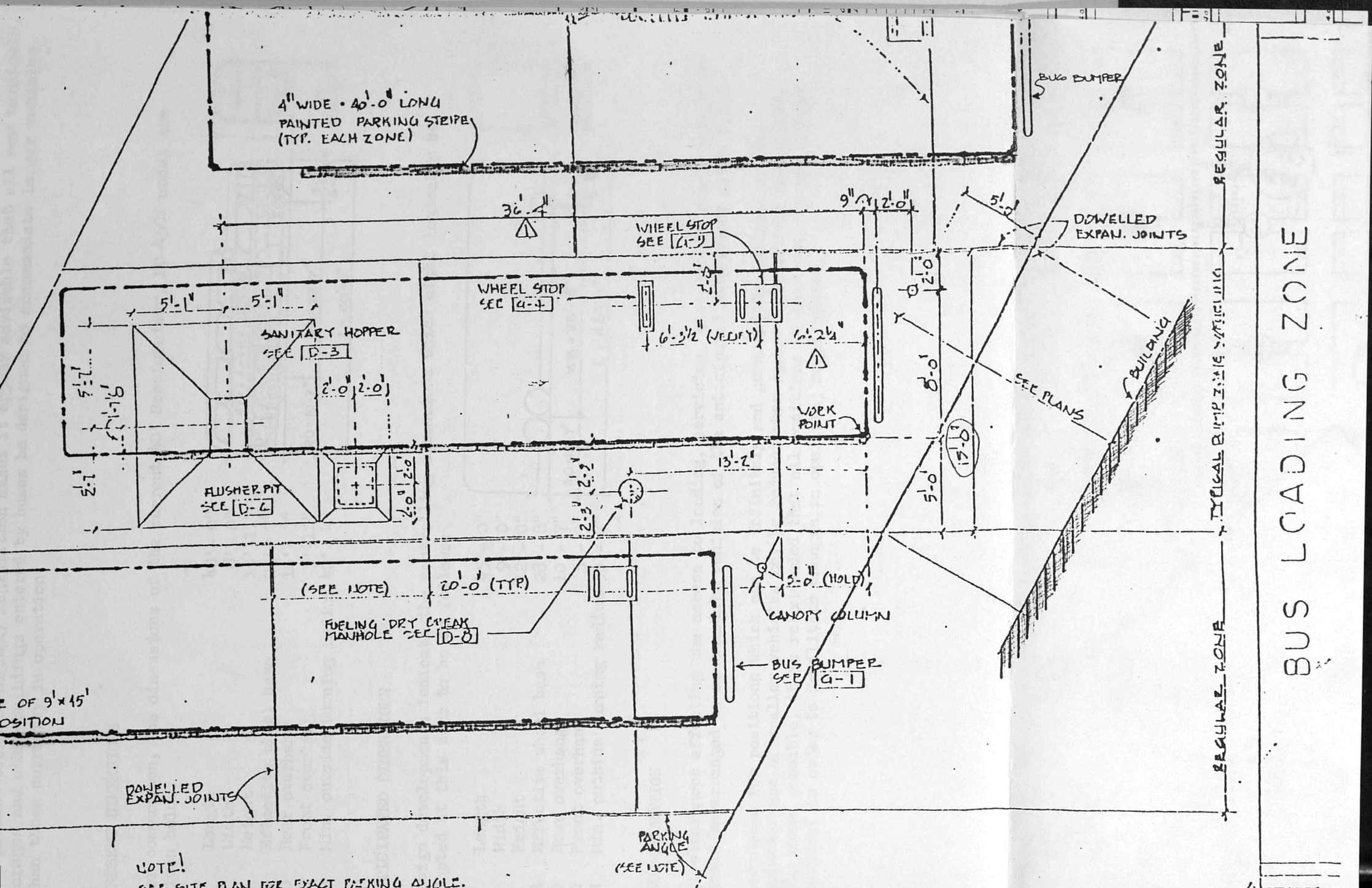
NON-REVERSE LOADING

REVERSE LOADING



NOTE!

SEE SITE PLAN FOR EXACT PARKING ANGLE. ADJUSTMENTS TO PAVING JOINT LAYOUT MAY BE NECESSARY AS PARKING ANGLE INCREASES OR DECREASES. SEE SITE PLAN FOR



NOTE!
SEE SITE PLAN FOR EXACT PARKING ANGLE.
ADJUSTMENTS TO PAVING JOINT LAYOUT MAY
BE NECESSARY AS PARKING ANGLE INCREASES
OR DECREASES SEE SITE PLAN FOR

SCALE:

COURTESY
GREYHOUND

Greyhound Lines, Inc.
Greyhound Tower Phoenix, Arizona 85077
Phone: (602) 248-5000

PLANNING STANDARDS FOR TERMINALS & GARAGES - ANTICIPATED BUS DIMENSIONS

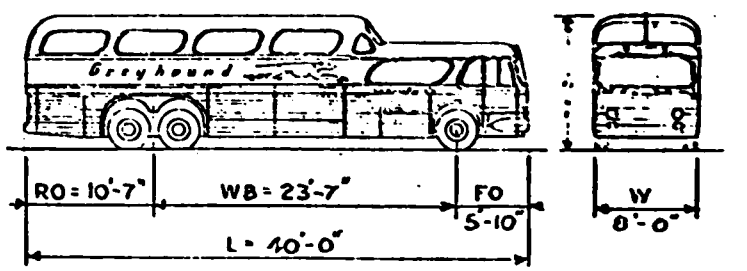
BUS DIMENSIONS

The present trend in highway legislation makes it appear advisable that all new terminals, garages and other buildings entered by buses be designed to accommodate larger vehicles than those currently in operation.

PRESENT DIMENSIONS

For comparison, the dimensions of the current 40' Scenicruiser, PD-4501 model are given below:

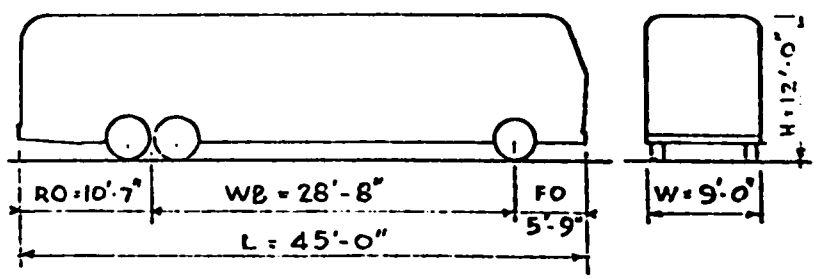
L	Length	40'- 0"
W	Width	8'- 0"
H	Height	10'-11"
WB	Effective wheel base	23'- 7"
RO	Rear overhang	10'- 7"
FO	Front overhang	5'-10"
OR	Min. outside turning radius	42'- 4"



ANTICIPATED DIMENSIONS

Design developments indicate the controlling dimensions which might logically be adopted at this time to be as follows:

L	Length	45'- 0"
W	Width	9'- 0"
H	Height	12'- 0"
WB	Effective wheel base	28'- 8"
RO	Rear overhang	10'- 7"
FO	Front overhang	5'- 9"
OR	Min. outside turning radius	50'- 7"



RECOMMENDATION

All clearances affecting the access to loading, servicing, storage and repair positions should be arranged to accommodate vehicles of the anticipated dimensions given above.

Clearances for positions which can be definitely and permanently assigned to the exclusive use of smaller vehicles may be reduced when space requirements necessitate but, where possible, it is recommended that all positions be laid out for the larger equipment in order to facilitate changes in operating requirements.

PLANNING STANDARDS FOR TERMINALS AND GARAGES

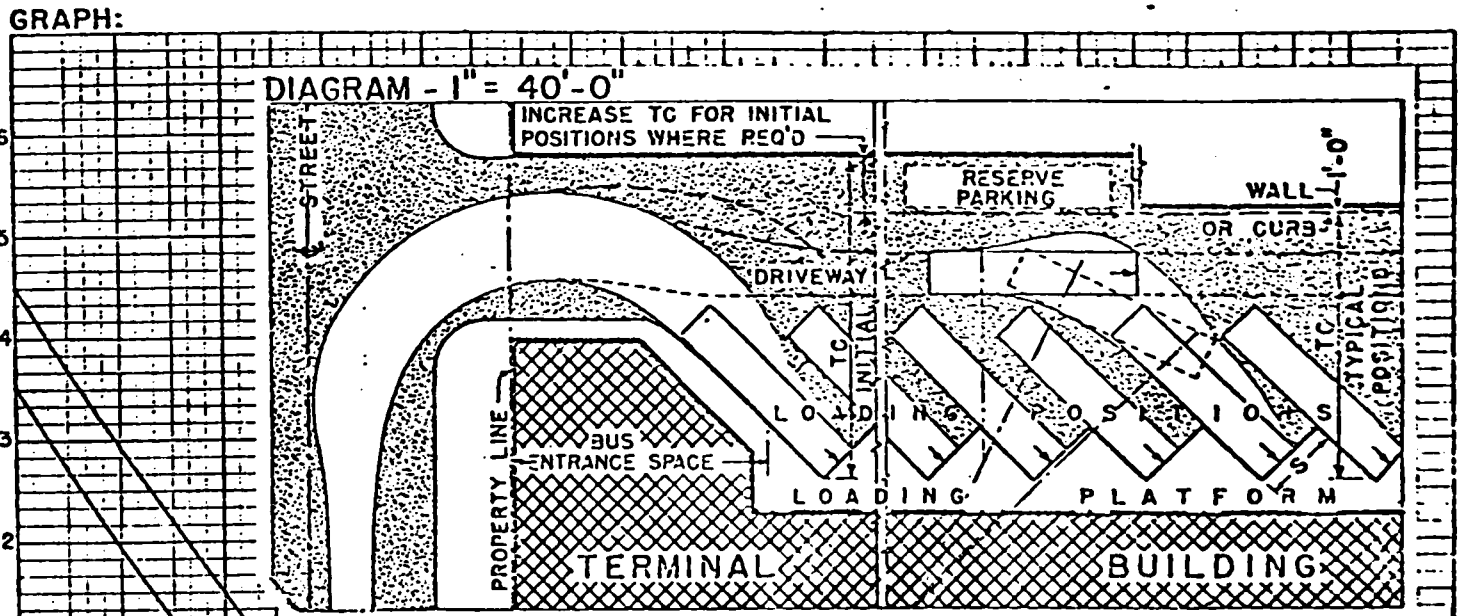
RECOMMENDED TURNING CLEARANCES - 40' X 8'-6" BUS - 45° ANGLE PARKING

TABULATION:

S = SPACING OF BUSES C-C *		RESERVE PARKING		PASSENGER & BAGGAGE LOADING POSITIONS				
		11'	12'	13'	14'	15'	16'	17'
TC = RECOMMENDED TURNING CLEARANCE FOR TYPICAL POSITIONS	TO CURB	63'-6"	60'-6"	57'-9"	55'-3"	52'-9"	52'-0"	51'-6"
	TO WALL	64'-6"	61'-6"	58'-9"	56'-3"	53'-9"	53'-0"	52'-6"

* FOR INTERMEDIATE SPACINGS SEE GRAPH BELOW.

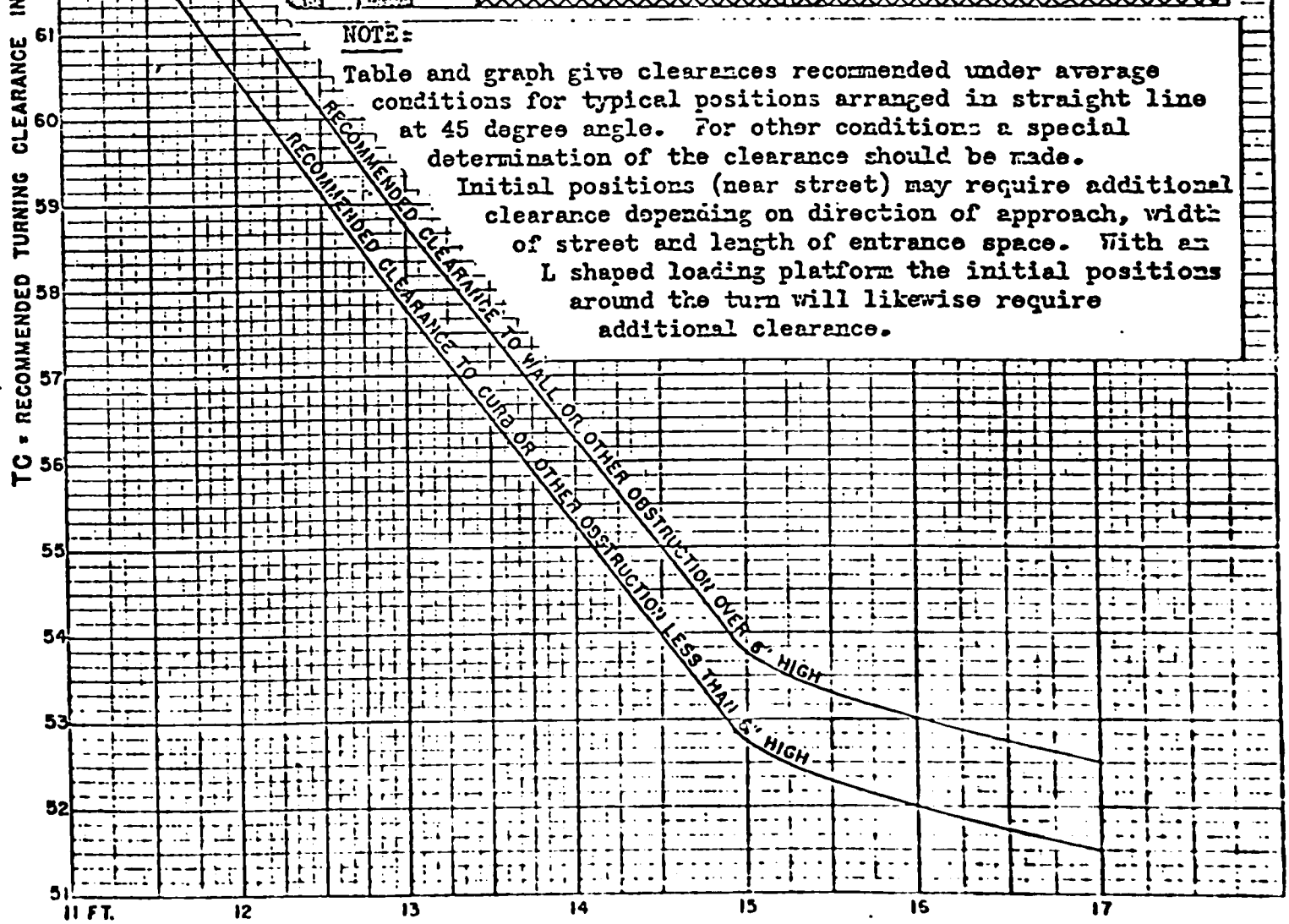
GRAPH:



NOTE:

Table and graph give clearances recommended under average conditions for typical positions arranged in straight line at 45 degree angle. For other conditions a special determination of the clearance should be made.

Initial positions (near street) may require additional clearance depending on direction of approach, width of street and length of entrance space. With an L shaped loading platform the initial positions around the turn will likewise require additional clearance.



Greyhound Lines, Inc.
Greyhound Tower Phoenix, Arizona 85077
Phone (602) 248-5000

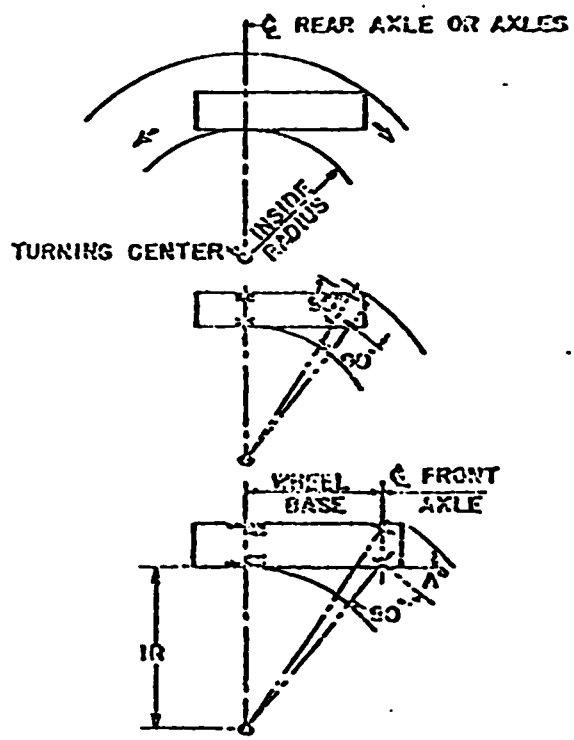
File: C2. Date: Sept.1946. Page: B3.1.1.
Revised: September, 1970. By: W.C.Harggraf

PLANNING STANDARDS FOR TERMINALS & GARAGES - BUS TURNING CHARACTERISTICS

The factor most affecting the layout of areas for vehicular movement is the turning space required and the accurate determination of the proper turning clearances is of primary importance to the efficiency of the plan.

GENERAL TURNING DATA

The following data pertains to conventional two axle vehicles and to vehicles with tandem rear axles, in which case the center line of the rear axle may be considered to be the effective center line of the tandem group.

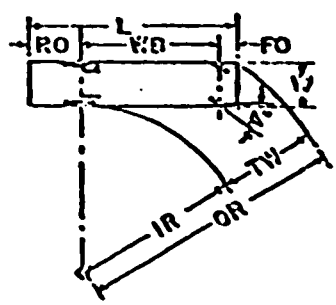


When a bus turns normally, it always turns about a center which is somewhere on the center line of the rear axle. This is true whether motion is forward or backward.

While making a turn the front wheels are at 90° to a line through the turning center and the steering mechanism is designed to maintain this relationship for all turning angles.

The turning radius depends on the angle A through which the front wheels are turned and on the wheel base. For a given wheel base the inside turning radius is determined by the maximum angle A through which the inside front wheel can be turned. This may be from 38° to 45°.

For a given angle A, the minimum outside radius depends on the wheel base, front overhang, and width. The outside radius minus the inside radius is the turning width or off-tracking dimension.



For comparison, the computed minimum turning dimensions of a few current and projected models are given below:

Model.	Inside Radius	Turning Width	Outside Radius
35' x 8' cruiser (4104) current	23'-10"	18'- 3"	42'- 1"
40' x 8' " (4501) Scenicruiser	22'- 6"	19'-10-3/4"	42'-4-3/4"
45' x 9' " Projected	28'- 1"	22'- 6"	50'- 7"

(In the above figures the rounded corners of the vehicle are assumed to be square. The radii given represent the theoretical minimum and actual clearance should be increased by about 10% to 15% to provide for errors in adjustment and operation.)

V. E. Systems Performance

1. Structural:

There is a probability that some long spans will be necessary for waiting areas and possibly for other areas. Selection of types of spanning materials will likely influence design and cost and should be chosen carefully.

This system will have to support large live loads created by heavy pedestrian traffic and buses.

Centilevered structures may be necessary in the bus berth area for passenger comfort during loading and unloading.

The structure of the terminal should not be connected to any parking structures or bus ramps. This creates potential problems of vibrations within both structures that should not be present in the terminal structure.

2. Mechanical:

The climate of El Paso is ideal for solar energy production. A passive system may be utilized in conjunction with a mechanical system to save in energy costs. An active solar system may be incorporated also. At least one type of solar system should be used for the terminal.

Large areas such as restaurants and waiting areas can cause circulation problems. There is a possibility

that the system will be heating one area while it is cooling another. Hence, the mechanical system should be flexible.

It may be necessary to provide a separate system for the office areas. The air velocities required are significantly less than those in larger, more open areas. Drafts and white noise should not be present in these areas.

Higher volumes of air are required in entrances and exits to compensate for infiltration of outside air, especially in the bus traffic areas.

The following is a list of recommended air changes per hour per room type:

Baggage and Package Express	25-40
General Assembly	15-25
Eating Facilities	15-20
Kitchen	15-20
Offices	10-20
Restrooms	25-35

3. Electrical:

The electrical power is suppoied by the city on overhead lines. It is possible, and may be necessary, to run these underground prior to construction. Within the terminal, electricity should be provided for all areas, activities, and systems that require it (i.e., mechanical, vertical, maintenance, lighting, communication).

Special electrical supply is required in the bus berths for maintaining light and climate control in the buses while they are not running.

It will be necessary to provide a backup electrical supply to insure comfort and safety of passengers, employees and others using the terminal during a power failure.

4. Lighting:

During daylight hours, natural light is most comfortable and pleasant, however, care must be taken to avoid glare in any instance. Large open spaces are ideal for natural light usage. Amounts of daylight can be controlled in many ways in order to achieve desired intensities. Louvers, partitions, refelctive surfaces and window tinting can all be utilized for different lighting effects. Other design alternatives that can aid in controlling natural light are varying degrees of reflective surfaces. The use of coarse, dark colored surfaces and carpeting create a darker effect; lighter smooth surfaces create lighter effects.

On cloudy days and at night, artificial lighting systems will be necessary. Incandescent and flourescent lighting can be used in many ways to enhance design and to dictate activities. Flourescent lighting is usually used for large open areas as they have a more uniform distribution of light. Flourescent lights are available

in different color temperatures to add to the flexibility of choice, however, the middle sunlight range is generally the most desirable.

Incandescent lighting is used mostly for small areas or as a spotting effect. They are useful in gallery type areas where accents are desired and in outdoor areas for safety and decoration.

The following is a table of recommended minimum foot candles for the given space types (Source: Mechanical And Electrical Equipment for Building, 6th Edition, McGuinness, Stein, Reynolds):

Building Exteriors (flood lighting)	Dark	Light
Light Surfaces	5	15
Medium-Dark Surfaces	15	30
Dark Surfaces	20	50

Exterior Areas	Min. Recommended Foot Candles
Entrances - Active	5
Inactive	1
Building Surroundings	1
Storage Areas - Active	20
Inactive	1
Loading and Unloading Platforms	20
Parking Garages - Entrance	50
Traffic Lanes	10
Parking Lots	50

	Min. Recommended Foot Candles
Interiors	
Restrooms	20-30
Package and Baggage	30
Sorting Area	100
Entrances	30
Lobbies	50
Stairways - Corridors	20
Ticketing Areas	150
Galleries General	30
Statuary - Accents	100
Bars - Lounges	10-30
Reading Areas	30
Subdued Environments	15
Regular Office Work	70
Restaurants	
Dining - Cashier	50
Light Environment	10
Subdued Environment	3
Leisure Type - Light	30
Store Interiors	
Circulation	30
Show Cases	200
Feature Displays	500
Stock Rooms	30

5. Traffic Circulation:

These systems should be smooth and void of queuing areas. Ample space should be provided to avoid congestion especially in verticle system areas, i.e., stairs, esculators and ramps. Space requirements involved are discussed in "Design Approaches."

Bus and other vehicular traffic should remain separate as well as pedestrian traffic.

6. Communication Systems

Computer terminals will be used at information counters and ticketing areas. Space should be provided for these terminals. Video display boards depicting departure and arrival infomation should be located in queuing areas and out of passenger circulation areas. They should also be recognizable from circulation and waiting areas.

A paging system will be desirable to contact people within the terminal area.

V. F. Special Code Restrictions

The site, block number 32, is zoned as M-1 in El Paso's zoning code. M-1 allows many types of uses including "bus passenger terminals, including storage of buses." Under the heading of "General Height Standards" the code states, "All buildings maximum height of two and one-half (2½) stories on a floor ratio of 1.0. Buildings may exceed thrity-five feet in height where an additional setback of one foot is provided from all required adjacent yard lines for each one foot of height in excess of thirty-five (35) feet."

Signage

Signage on the front yard of the property will not pass property line and will not interfere with visibility of traffic. Signs may be illuminated but not of the flashing or intermittant type. The maximum length of a sign may be 60', however, a maximum of 1,200 square feet is allowed per sign. This figure is a combined total for front and back of the sign. The maximum height of any sign is 25 feet.

Yard Standards

All uses shall have a minimum front yard of fifteen (15) feet, rear yard of ten (10) feet, and a side yard abutting a residence or apartment or abutting side street of ten (10) feet.

Performance Standards

1. All uses shall meet or exceed the environmental standards of the United States Environmental

Protection Agency and the State of Texas.

2. Nothing in this section shall be construed to authorize the maintenance of any public or private nuisance.

3. In case of doubt regarding the nature of a process or use, the administrator may require an engineering report describing the process or use and probable impact thereof at property lines in terms of the factors listed as permitted uses or other significant factors as may be associated with a particular process or use.

Off Street Parking

Parking by code is restricted to the following table:

Square Ft. of Building	Berths
0 - 5,000	1
5,000 - 12,000	2
12,000 - 25,000	3
25,000 plus	4

* Add one berth per 12,000 additional square feet of building.

The following map shows the proposed site in relation to other zoning code assignments.

Source: El Paso City Planning Department

CLEVELAND
SQUARE
LIBRARY
MAIN
SAN JACINTO
PLAZA
IMPROVEMENT
OREGON
MESA
SHELDON
SAN FRANCISCO
CIVIC CENTER
SAN ANTONIO
OVERLAND
DURANGO
LEON
CHIHUAHUA
SANTA FE
EL PASO
STANTON
FRANKLIN ELEMENTARY SCHOOL
PROPOSED SITE
M-1 ZONING
ROAD RESERVATION
CANAL ST.
North
C.5
C.4
C.5 SP
A.3 SC
NO 3
DIS
MILLS
TE
E N S
A F E
G A M P

V. G. Cost Analysis

This Cost Analysis is based on the Dodge Multiplier Method of costing which estimates the actual costs of building types. Data for "Airport Terminal Buildings" was used because it was the most similar building type available. Prices were based on 1982 figures cited in the 1982 Dodge Construction Systems Costs and adjusted according to inflation and area cost multipliers.

The costing process was divided into three general parts: Terminal, Restaurant and Parking, then combined for the grand total. The following basic space breakdown was used to determine the square footage for each general part:

Termnal	57,500 s.f.
Restaurant	15,000 s.f.
Parking	26,000 s.f.

Terminal:

Bus Bays and Platforms	30,000 s.f.
Terminal Area (Ticketing, Restrooms, Seating, etc.)	10,000 s.f.
Offices and Storage	3,900 s.f.
Access Areas	5,000 s.f.
Retail	3,600 s.f.
Express Package Handling	10,000 s.f.
Subtotal	62,500 s.f.

Food and Drink Services:

Restaurant - Indoor	4,800 s.f.
Outdoor	2,400 s.f.
Kitchen	3,200 s.f.
Fast Food	2,400 s.f.
Bar	200 s.f.
Subtotal	13,000 s.f.

Parking:

Employee (20)	8,000 s.f.
Taxi Queuing (8)	2,000 s.f.
Customer (40)	16,000 s.f.
Subtotal	26,000 s.f.
Total Square Footage	101,500 s.f.

The Dodge figure for average cost per square foot of terminal is $70.000. This figure is based on a 20,000 - 30,000 square foot terminal. The size factor is found by dividing the dize of proposed terminal (62,500 s.f.) by the "typical size terminal" (20 - 30,000 s.f.): 62,500 + 25,000 - 2.5.

Size factor = 2.5; this equivalent to a cost multiplier of .9 (cost multiplier graph). Therefore: $70.00 x .9 cost multiplier x 62,500 - 3,937,500 dollars.

The locality adjustment factor for El Paso is equal to .77 therefore, the adjusted cost of the terminal is:

.77 x 3,937,500 = 3,031,875 dollars before inflation

The adjustment factor for inflation is found by multiplying the difference between the date of estimated cost and project midpoint x months per year x inflation per month. The estimated cost date is 1982 and the project midpoint is 1986; a difference of 4 years. Therefore the inflation factor is:

4 years x 12 months x 1.5 inflation per month

inflation factor is equal to 72% increase

adjusted cost = .72 x $63 per s.f. = 45.36
+63.00

$108.36 per s.f.

or 108.36 x 62,500 s.f. = 6,757,500 dollars

Restaurant

The Dodge factor for average cost of restaurant is $69.50. This figure is based on a 3,000 - 10,000 s.f. restaurant. The size factor is equal to 13,000 s.f. ÷ 6,500 s.f.;

13,000 ÷ 6,500 = 2

size factor = 2 or a cost multiplier of .95

cost multiplier .95 x average cost 69.5 = 66.03 dollars per s.f.

locality adjustment = .77 x 66.03 - 50.84 dollars per s.f.

inflation factor = 72% or .72 x 50.84 = 36.60
+50.84

87.44 dollars per s.f.

total adjusted cost for restaurant = 87.44 x 13,500 s.f. =

1,136,720 dollars

Parking

The Dodge factor for average cost per s.f. of parking garage is $25.00. This figure is based on a 20,000 - 30,000 s.f. garage. The proposed garage is within this range so the size factor and cost multiplier are not relevant. The locality and inflation adjustments, however do apply.

locality adjustment - .77 x 25.00 - 1925 dollars per s.f.

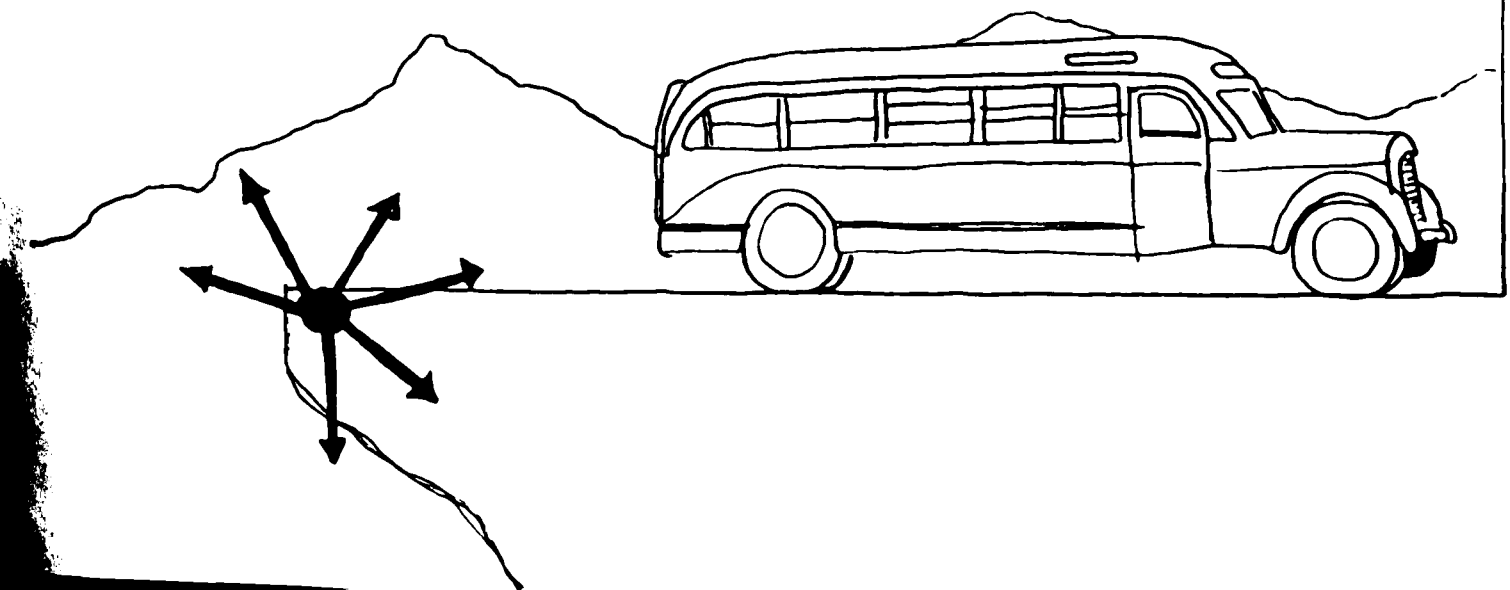
inflation factor = 72% or .72 x 19.25 = 13.86
+19.25

33.11 dollars per s.f.

total adjusted cost for parking = 33.11 x 26,000 s.f. = 860,860 dollars

	Total Cost of Facility
terminal	6,757,500
restaurant	1,136,720
parking	860,860
Total cost	8,755,080 dollars

EXECUTIVE SUMMARY



Executive Summary

A new bus terminal is needed in downtown El Paso as a result of urban needs and interests. Due to the high costs of property and taxes in the downtown area, consolifation of all five intercity bus lines into one terminal is desirable. This terminal will require a total of 101,000 s.f. and will cost a total of 8,755,080 dollars. This cost does not include architectural and site development fees.

The site will cover two city blocks with a total of 131,040 s.f. in area, and is located on the corner of Santa Fe and Paisano Streets. This site is one block south of the Civic Center and is easily accessible from Interstate 10, numerous major arteries and the Mexico border.

The design of the terminal will coinside with the proposed urban design by Texas Tech University (under the direction and supervision of Dr. George T. Peng). It will relate to this design to enhance the overall goal of downtown El Paso of creating a safer, more active place.

The terminal proper will consist of twenty berths, three gift shops, four fast food services, one restaurant, 10,000 s.f. of package express and baggage processing, and 2,000 s.f. for taxi queuing. Restroom facilities, long and short term parking, office space, locker facilities and ticketing areas will also be provided.

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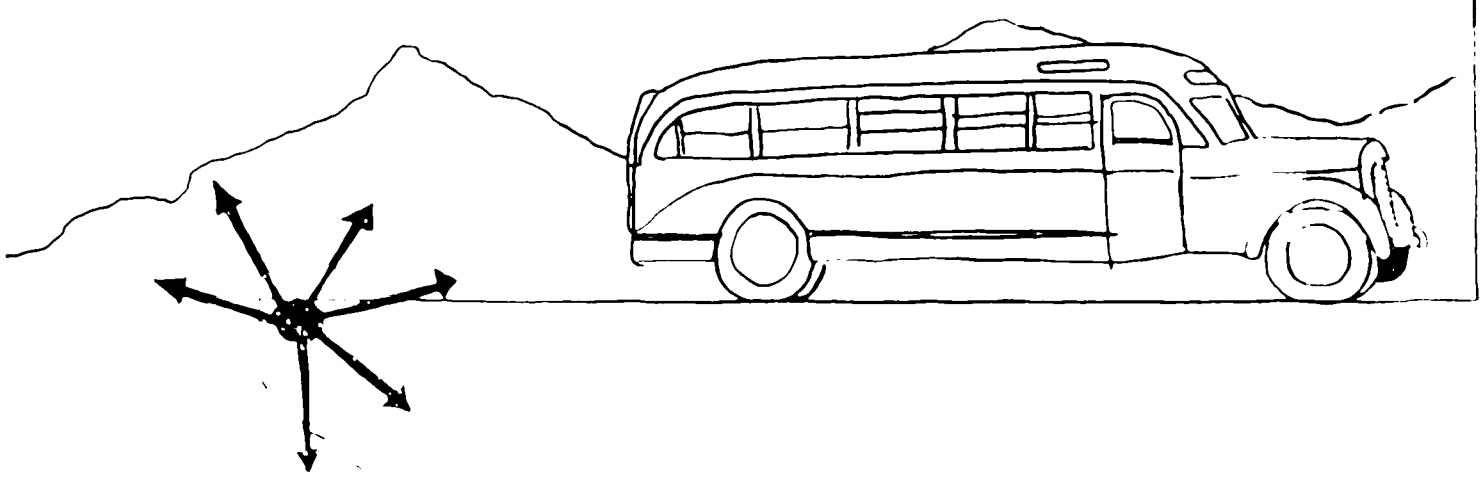

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