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3220

ANALYSIS NOTES

IMPROVED ACCESS TO MANHATTAN'S EAST SIDE

- SUBURBAN RAILROAD PASSENGERS -

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**TRI-STATE TRANSPORTATION COMMISSION
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This report was prepared by George Haikalis, Research Engineer,
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IMPROVED ACCESS TO MANHATTAN'S EAST SIDE - SUBURBAN RAILROAD PASSENGERS

Each weekday many thousands of Long Island Rail Road passengers bound for the East Side of the Manhattan CBD must transfer to subways or buses for the mile-long trip from Penn Station. Considerable travel time and wear-and-tear on the passengers could be saved if Long Island trains were routed directly to a new East Side terminal. The Metropolitan Transportation Authority in its "Program for Action" recognized this need and recommends a \$ 232.5 million improvement project. Included in this project are a new terminal under Third Avenue extending from 48th Street to 52nd Street, expansion of the proposed 63rd Street East River tunnel to a four-track facility, and connections from the tunnel to the L.I.R.R. in the vicinity of Sunnyside yard in Queens. The program has been approved by the legislature, funding is available, and New York City Board of Estimate approval will be sought shortly.

A preliminary economic analysis of this extraordinarily expensive scheme indicates that the benefits fall far short of the costs. A modification of the MTA plan is outlined herein which will increase the benefits to Long Island passengers bound for the East Side, provide benefits to suburban passengers from other sectors, and cost considerably less.

Modified Plan

East Side access from Long Island can be obtained by connecting the 33rd Street L.I.R.R. tunnel to Grand Central Terminal, as shown in Figure 1. The 32nd Street tunnel would continue to serve Long Island trains bound for Penn Station. The portion of the 33rd Street tunnel from Park Avenue to Penn Station would not be used for L.I.R.R. trains and could also be connected to Grand Central Terminal, as shown in Figure 1, providing a direct Penn Station-Grand Central route. West-of-Hudson passengers could thus obtain direct East-side access, and Westchester-Connecticut passengers could ride through to the Macy's-Gimbel's shopping area.

A rough examination of the engineering feasibility of the connections is shown in Figures 2, 3 and 4. The lower level tracks at Grand Central Terminal would be extended south under the proposed Marcel Breuer office tower, and under Park Avenue. The southbound local track of the East Side IRT line would be relocated to the east, allowing room for the 4-track railroad connection. At 33rd Street and Park Avenue the L.I.R.R. connection would pass 70' below the 71st Regiment Armory which is to be abandoned in the near future. The Penn Station connection would pass 60' beneath various buildings which would have to be demolished or under-pinned. The engineering problems for this connection would appear to be no more formidable than those encountered in building portions of the existing subway lines or those proposed by MTA. Approximately 6000' of double track tunnel is required; perhaps \$ 80,000,000 would be a reasonable estimate of the cost involved. (MTA estimates the cost of the Second Avenue subway from 63rd Street to 34th Street at \$70,000,000, four tracks including three or four stations).

Passenger Benefits

The Manhattan CBD, the most intensively developed business center in the world, is nonetheless quite extensive. The 8.6 square miles of Manhattan south of 60th Street cannot be served by a single suburban railroad terminal, without the assistance of some supplementary transportation mode.

Figure 9 shows the distribution of the CBD's half-billion square feet of non-residential floor space by quarter square mile. The three highest squares - Wall Street, Grand Central, and Macy's-Gimbel's contain only about a quarter of CBD's floor space. Figure 10 shows total mass transit destinations to the CBD from origins outside the CBD, as reported in the 1963 Home Interview Survey. The pattern is quite similar to the floor space pattern; the three highest squares account for a slightly higher proportion of trips than of floor space. Figure 11 shows Long Island Rail Road passenger destinations within the CBD. Though more concentrated than overall mass transit destinations, the railroad destinations are still widely dispersed.

A detailed analysis of passenger travel in the midtown area from 10th Street to 60th Street and from 2nd Avenue to 8th Avenue was undertaken to determine the benefits of a second midtown delivery point for suburban railroad passengers. A one minute grid of walking "time" was overlaid on the area. A walking speed of 3 miles per hour plus a 50% penalty for walking discomfort gave an effective "speed" of 176 feet per minute. Transfers from rail to subway or between subways were assessed at five minutes of delay and five "minutes" of wear and tear on the passenger. Subway fares, where encountered, were weighed at 5 minutes assuming a value of time of 4 cents per minute. Travel "time" was computed to each grid from Penn Station and from the MTA terminal, and Grand Central Terminal. Travel time from Long Island points to each terminal was assumed equal. The travel time savings for Long Island passengers are shown in Figure 6.

The benefits to Long Island passengers resulting from the MTA Terminal location are only 72% of the potential benefits of a Grand Central Terminal location, as shown in Table 1. The annual benefits of the MTA Terminal would approach \$ 6.3 million by 1985 based on estimates of Long Island to Manhattan passenger growth. Capitalized at 10% the benefits cover less than a third of the cost of this scheme.

Much of the suburban area west of the Hudson is tributary to the P.R.R. trans-Hudson tunnel. If current plans for modernizing and reequipping rail lines operating in the southern sector of this area are carried out, and additional routes are operated directly to Penn Station passengers tributary to these lines will find the Penn Station delivery the optimal route to midtown destinations. Figure 8 shows the routes and tributary southern sector currently slated for midtown delivery. If the "southern" sector plan is successful the concept would be extended to the Bergen, Rockland, Orange county "northern" sector. The Manhattan CBD destination pattern for mass transit trips originating in these two sectors is shown in Figures 12 and 13.

The benefits of a second midtown delivery point, Grand Central Terminal, for west-of-Hudson passengers otherwise using Penn Station is shown in Figure 7.

Trains are assumed to arrive at Grand Central four minutes after arriving at Penn Station. A summary of the benefits is shown in Table 2.

New York Central - New Haven Railroad passengers would also benefit from the Grand Central - Penn Station link. The CBD destination pattern of these suburban rail passengers, shown in Figure 14, however, indicates that relatively few passengers would find this link useful. The incremental travel time gain for these passengers is shown in Figure 7. A summary of the benefits is shown in Table 2.

The cumulative appreciation in travel time and convenience for Long Island, Westchester-Connecticut, and West-of-Hudson passengers resulting from the suggested improvement would amount to \$ 17,400,000 annually by 1985. Capitalized at 10% per year the benefits are more than double the estimated cost of the investment.

Capacity

The 63rd Street tunnel would provide two additional suburban rail tracks across the East River. A total of six tracks would thus be available to accommodate Long Island to mid-Manhattan travel. It is unlikely that this capacity will be needed by 1985 considering the future growth of population and employment in Nassau and Suffolk counties. MTA estimates the 1985 use of the 63rd Street tunnel at 39,900 passengers in the inbound peak hour, as shown in Figure 5. The 33rd Street and 32nd Street tunnels would be left to share the remaining 27,600 inbound peak hour passengers, each operating at one-third of the 63rd Street tunnel rate. Clearly the 63rd Street tunnel suburban railroad capacity would not be needed by 1985 even assuming the MTA's highly optimistic traffic projections.

The capacity of the P.R.R. trans-Hudson tunnels to accommodate the anticipated traffic demand is less easily ascertained. Peak hour travel tributary to the P.R.R. tunnels by 1985 would be less than the 40,000 persons per hour MTA estimates it would accommodate in its 63rd Street suburban rail tunnel. However, nine separate routes west-of-Hudson would have to be accommodated, posing some difficult operating problems. Specialized peak hour bus service could be maintained if the rail tunnel could not accommodate all the traffic assigned.

Other Benefits and Considerations

Because of the unevenness of access to different parts of the Manhattan CBD from various suburban sectors commuters have tended to specialize in job location or residence. East midtown commuters tend to live in the Westchester-Connecticut sector, downtown suburbanites prefer New Jersey or Long Island residences. Improving access to a larger number of points in the CBD will permit more choice in living and working places. The benefits of this improvement are difficult to assess but could be substantial.

The proposed Grand Central Terminal connections to the south would permit direct operation through Manhattan of all commuter services using this terminal releasing vast amounts of trackage and underground space. Approximately 1.8 million gross square feet of floor space would be gained if terminal trackage were reduced to only the 8 through tracks of the lower level. The rail

delivery capacity of Grand Central would be doubled, permitting development of even more compact accumulations of employees and floor space if this were commercially desirable. The Grand Central - Penn Station connection would permit the abandonment of the Hell Gate Bridge route and its conversion to a motor vehicular facility increasing capacity of the Manhattan CBD by-pass facility - the Triborough Bridge.

TABLE 1

ANNUAL BENEFIT: EAST SIDE ACCESS, LONG ISLAND RAIL ROAD PASSENGERS

	<u>Grand Central Terminal</u>	<u>Proposed MTA Terminal (50th & 3rd)</u>
Total CBD Passengers (1963)	78,200	78,200
Passengers, 2-8th Ave., 10-60th St.	48,100	48,100
Passengers Benefited	27,500	20,600
Average Benefit ("minutes")	13.96	15.28
Total Daily Benefit (2 way, 4¢/min)	\$ 30,700	\$ 25,200
Annual Benefit (270 weekdays/year)	\$8,290,000	\$6,600,000
Passengers Saving T. A. Fare	12,900	15,300
Total Daily T. A. Rev. Loss (2 way 20¢/ride)	5,200	6,100
Annual T. A. Rev. Loss	\$1,390,000	\$1,650,000
Net Annual Benefit, 1963	\$6,900,000	\$4,950,000
Net Annual Benefit, 1985 (1963 x 1.27)	\$8,760,000	\$6,290,000

TABLE 2

ANNUAL BENEFIT: PENN STATION - GRAND CENTRAL CONNECTION

	N.Y.C.- N.H.R.R.	West of Hudson, Tributary to R.R.'s	
		Southern Sector	Northern Sector
Total CBD Passengers (1963)	55,600	50,100	44,000
Passengers, 2nd to 8th Ave., 10th to 60th St.	45,000	24,700	23,900
Passengers Benefited	5,400	11,700	11,300
Average Benefit ("minutes")	10.72	13.51	11.74
Total Daily Benefit (2 way, 4¢/min)	\$ 4,600	\$ 12,600	\$ 10,600
Annual Benefit (270 weekdays/year)	\$1,240,000	\$3,400,000	\$2,860,000
Passengers Saving T. A. Fare	(600)	6,300	5,600
Total Daily T. A. Rev. Loss (2 way, 20¢/ride)	(\$240)	\$ 2,500	\$ 2,200
Annual T. A. Rev. Loss	(\$50,000)	\$ 680,000	\$ 590,000
Net Annual Benefit 1963	\$1,290,000	\$2,720,000	\$2,270,000
1985/1963 CBD Transit Trip Gain	1.54	1.36	1.30
Net Annual Benefit 1985	\$1,990,000	\$3,700,000	\$2,950,000

APPENDIX

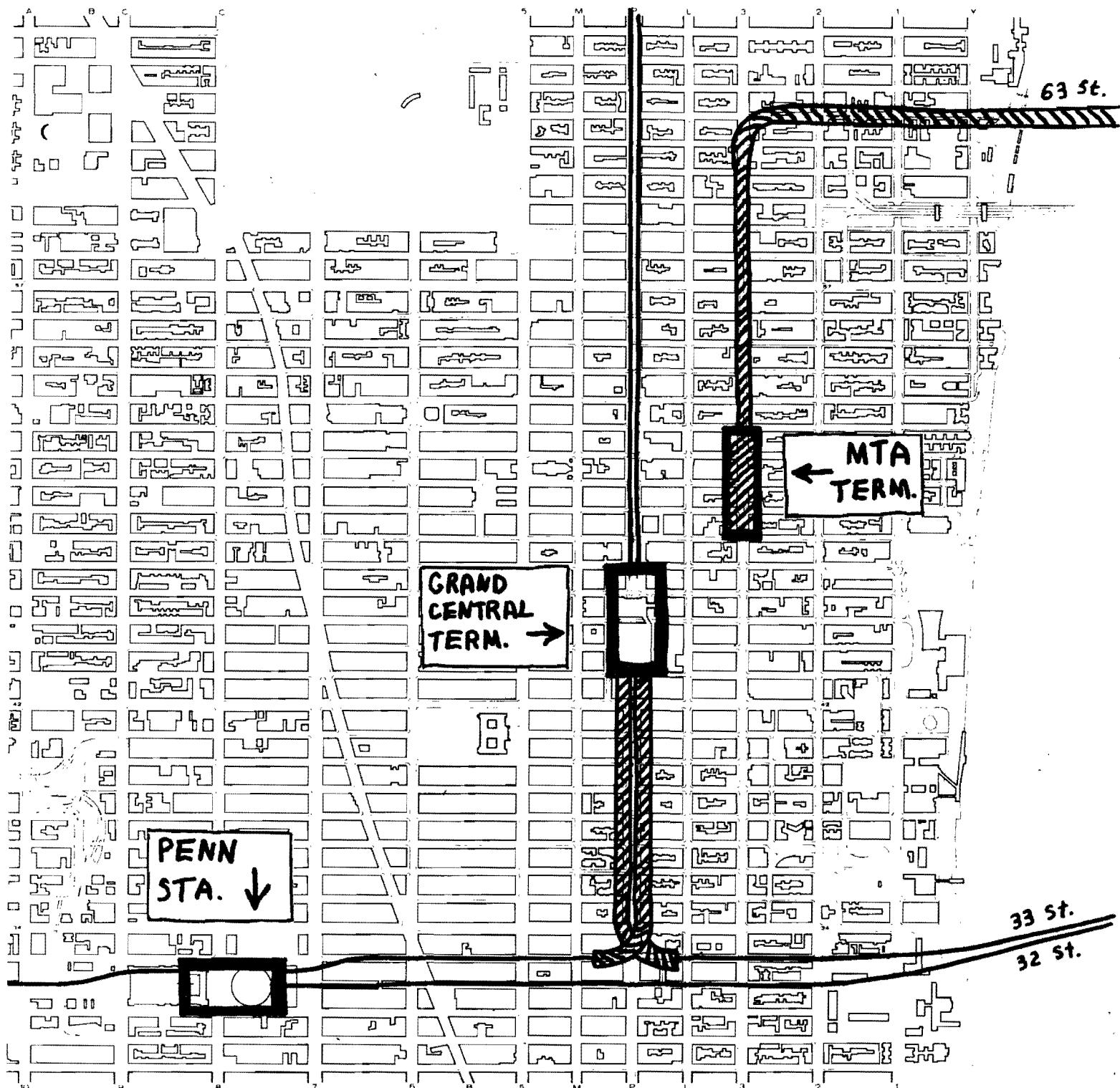
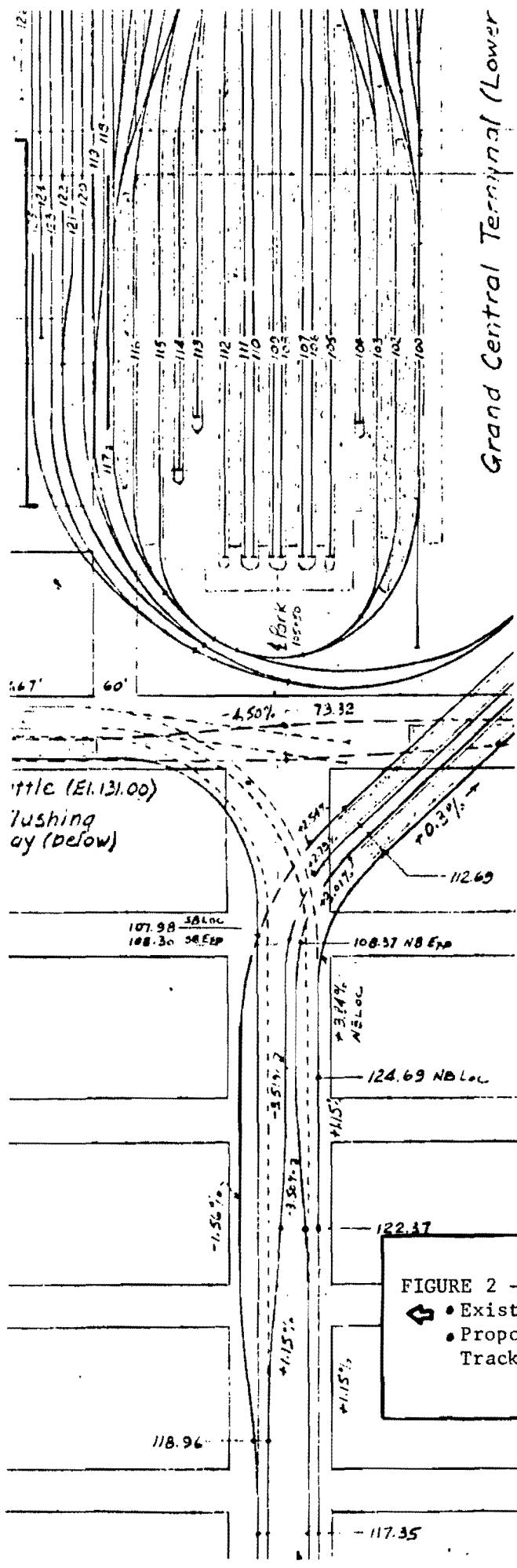
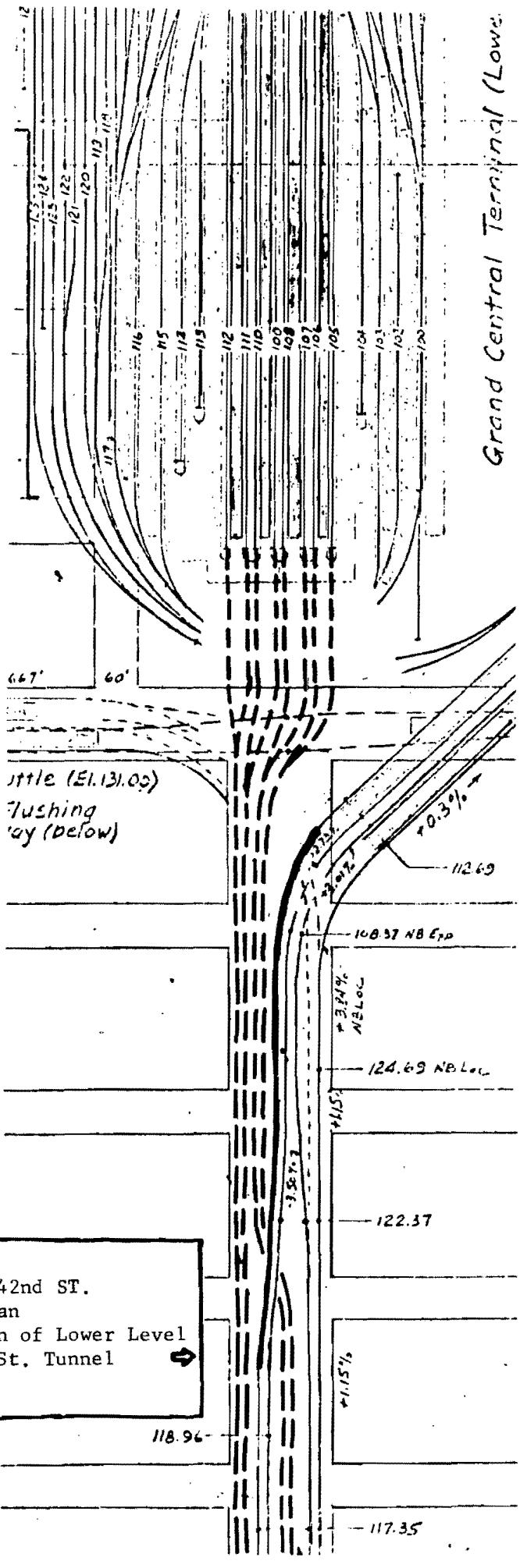


FIGURE 1 - EAST SIDE ACCESS PROPOSALS:

- MTA Terminal at 3rd Ave. and 50th St. via proposed 63rd St. Tunnel
- Grand Central Terminal - via existing 33rd St. Tunnel



Grand Central Terminal (Lower)



Grand Central Terminal (Lowe)

FIGURE 2 - PARK AVE & 42nd ST.

- ◀ • Existing Track Plan
- Proposed Extension of Lower Level
Tackage to 33rd St. Tunnel

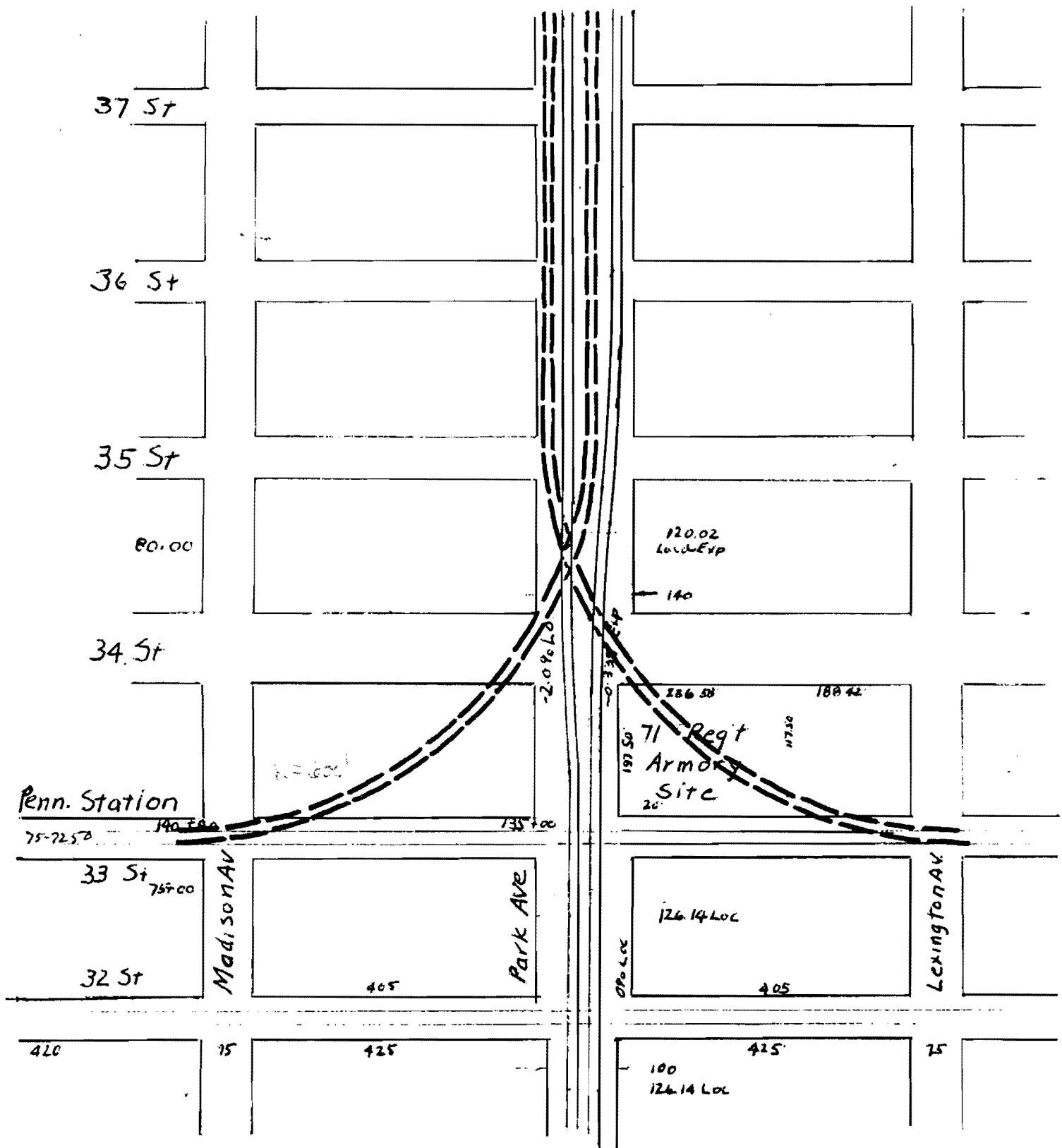


FIGURE 3 - PARK AVENUE & 33rd. STREET

- Proposed connection of 33rd St. Tunnel to Grand Central Terminal Trackage extended.

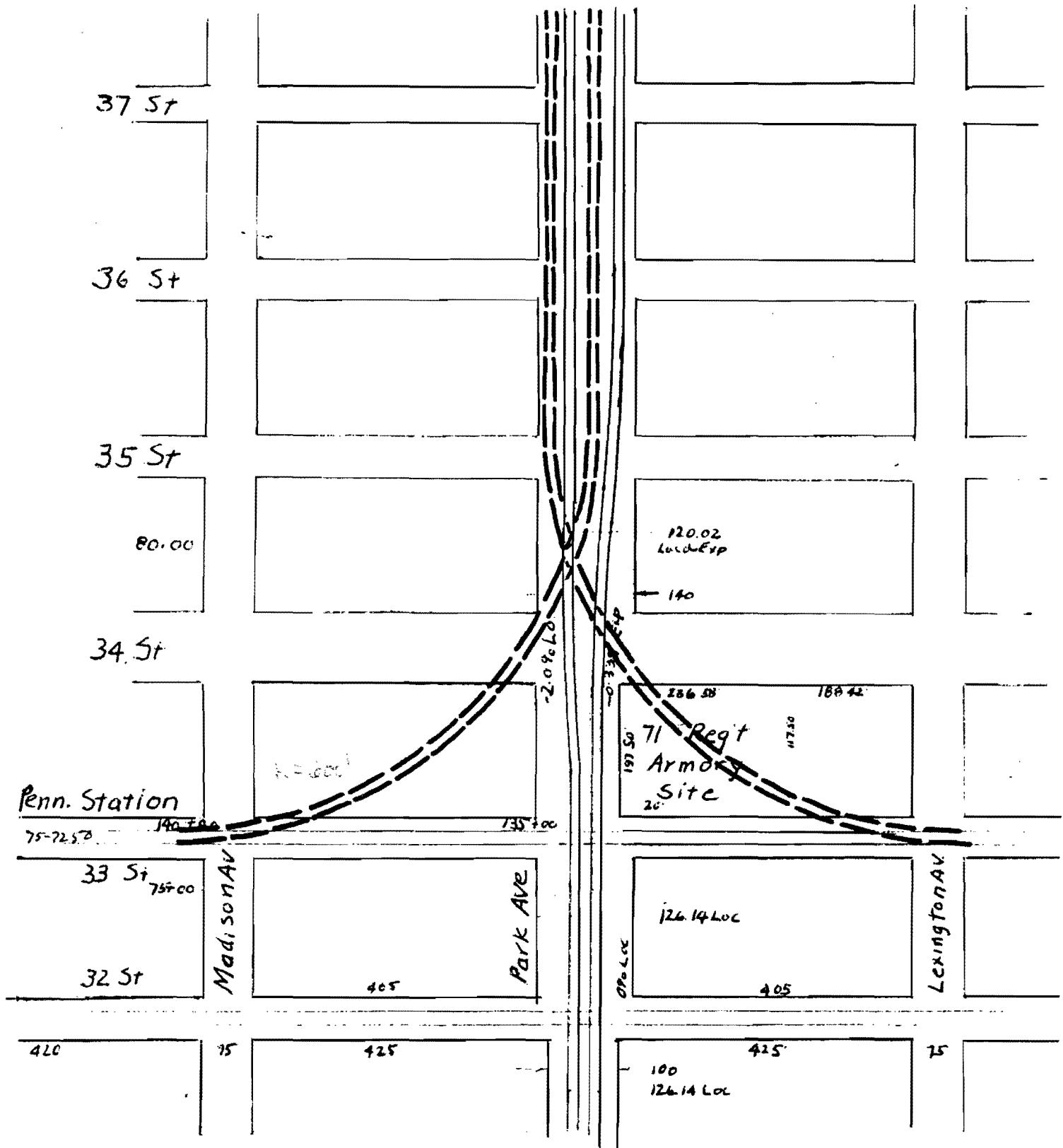


FIGURE 3 - PARK AVENUE & 33rd. STREET

- Proposed connection of 33rd St. Tunnel to Grand Central Terminal Trackage extended.

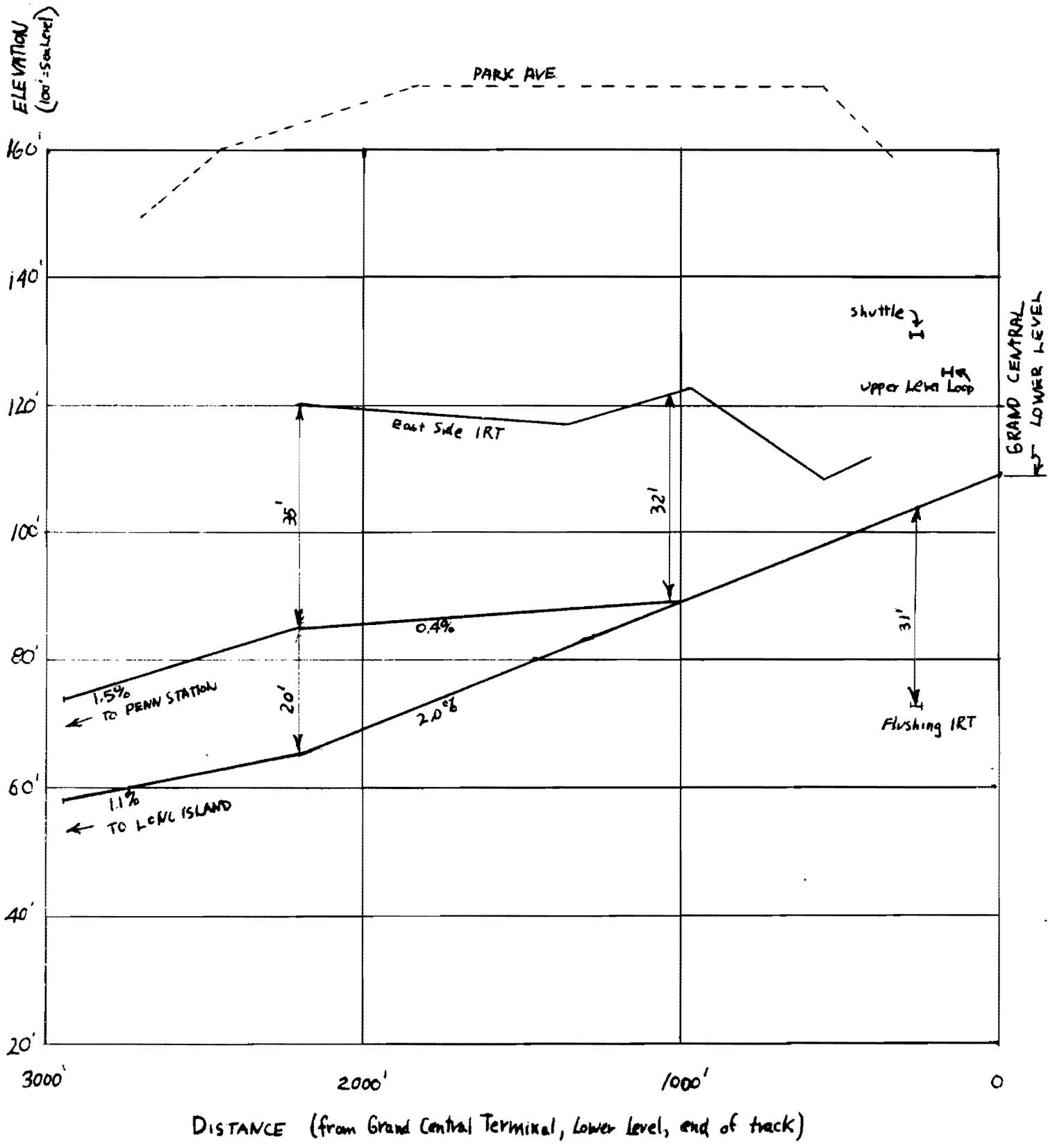
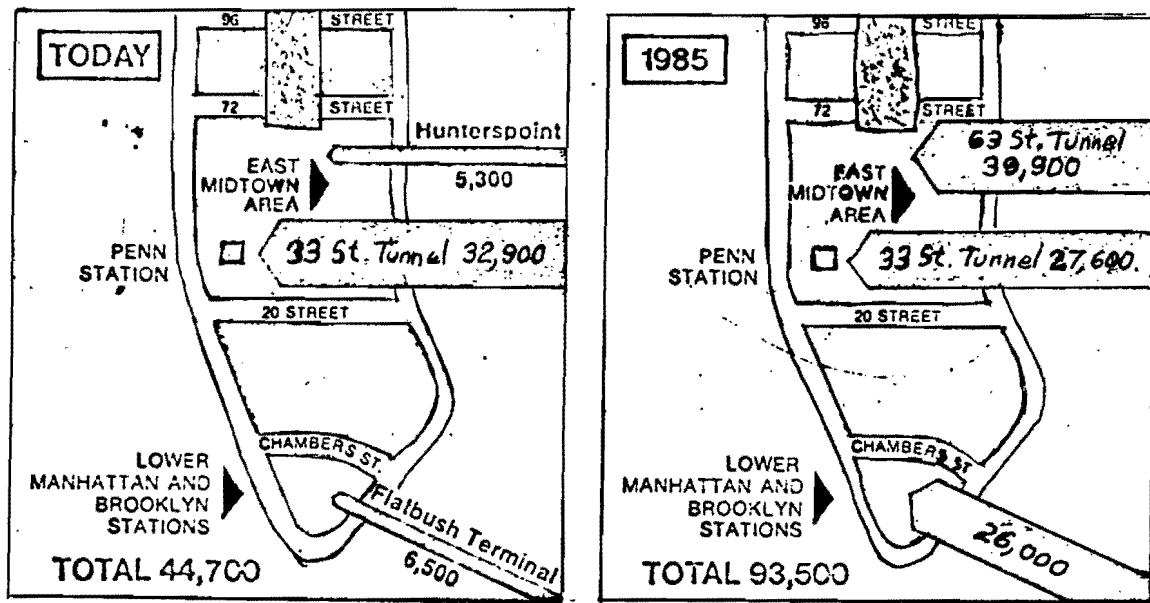


FIGURE 4 - PROFILE OF PROPOSED CONNECTION
- Grand Central Terminal to 33rd St. Tunnel



LIRR Peak Hour Volumes to Manhattan

FIGURE 5 - PRELIMINARY TRAFFIC ESTIMATE

- Reproduced from Annual Report 1966-67 of Metropolitan Commuter Transportation Authority p.22.

FIGURE 6 - TRAVEL "TIME" SAVINGS, EAST SIDE ACCESS vs. PENN STA. ACCESS, L.I.R.R.

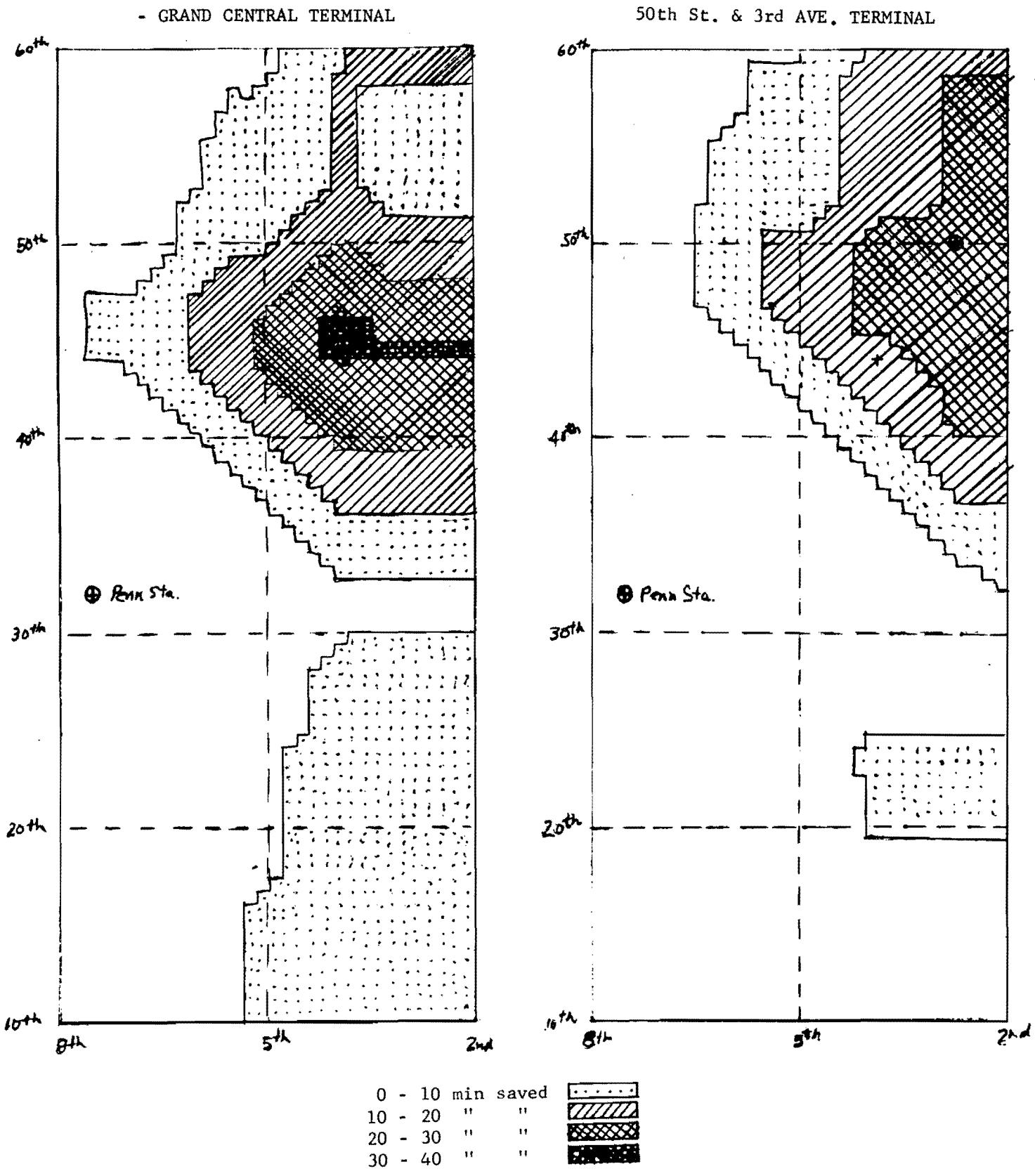
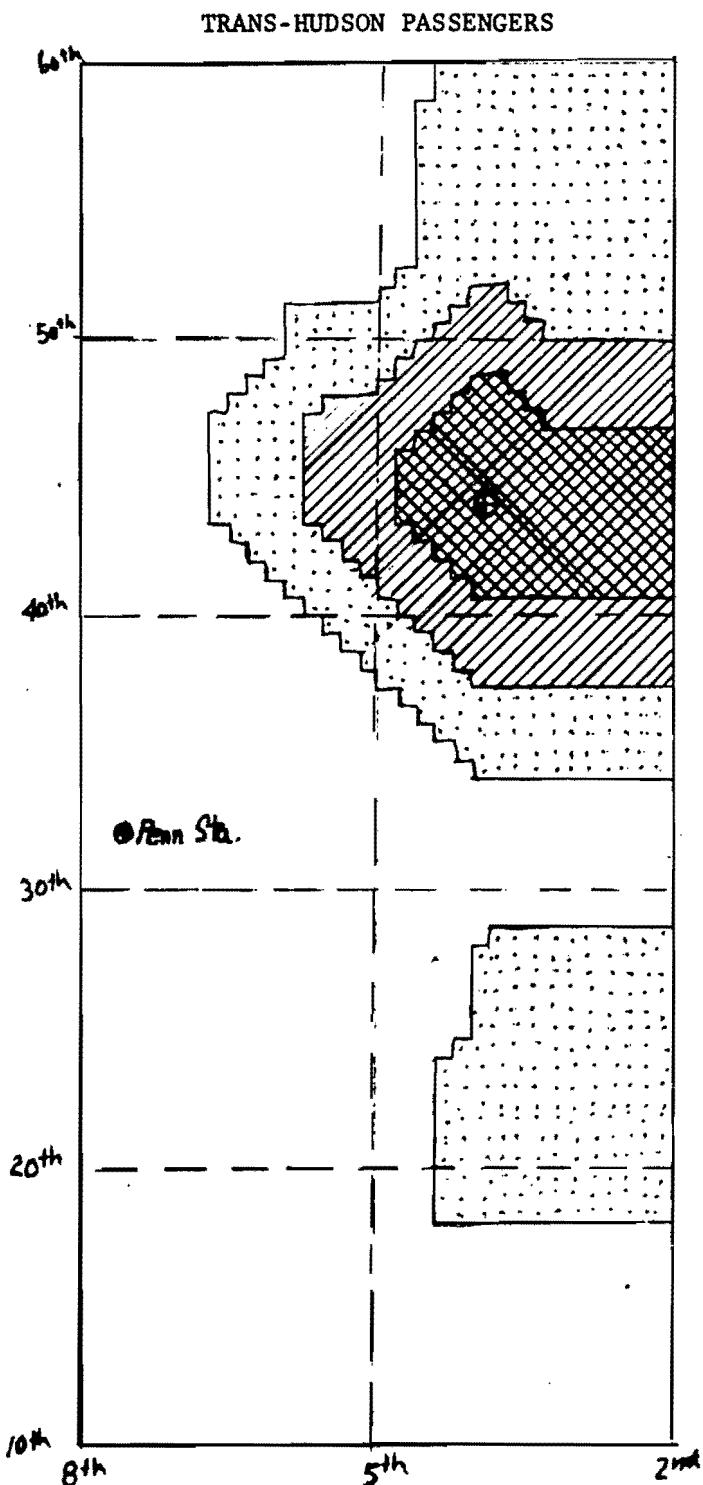
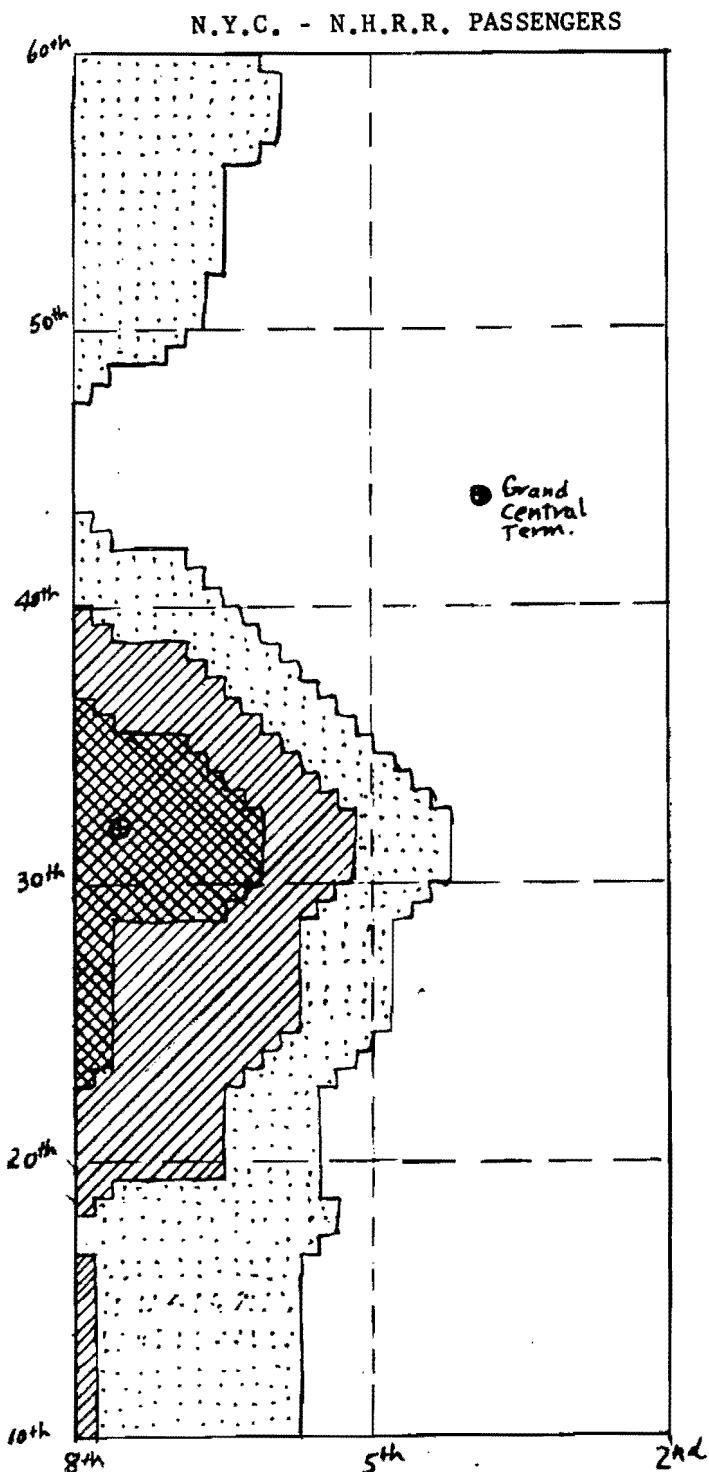


FIGURE 7 - TRAVEL "TIME" SAVINGS RESULTING FROM PENN STATION-GRAND CENTRAL CONNECTION



0 - 10 min saved

10 - 20 " / / / /

20 - 30 " XXXXXX

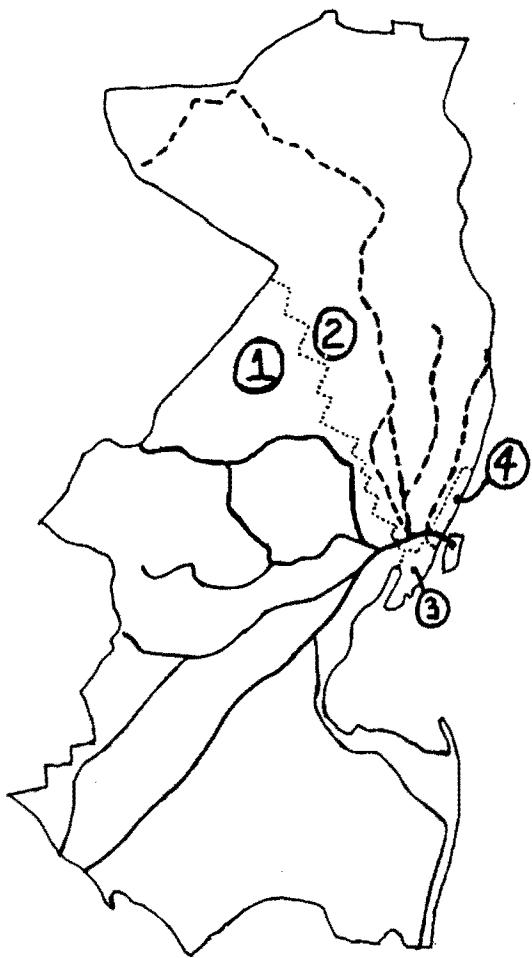
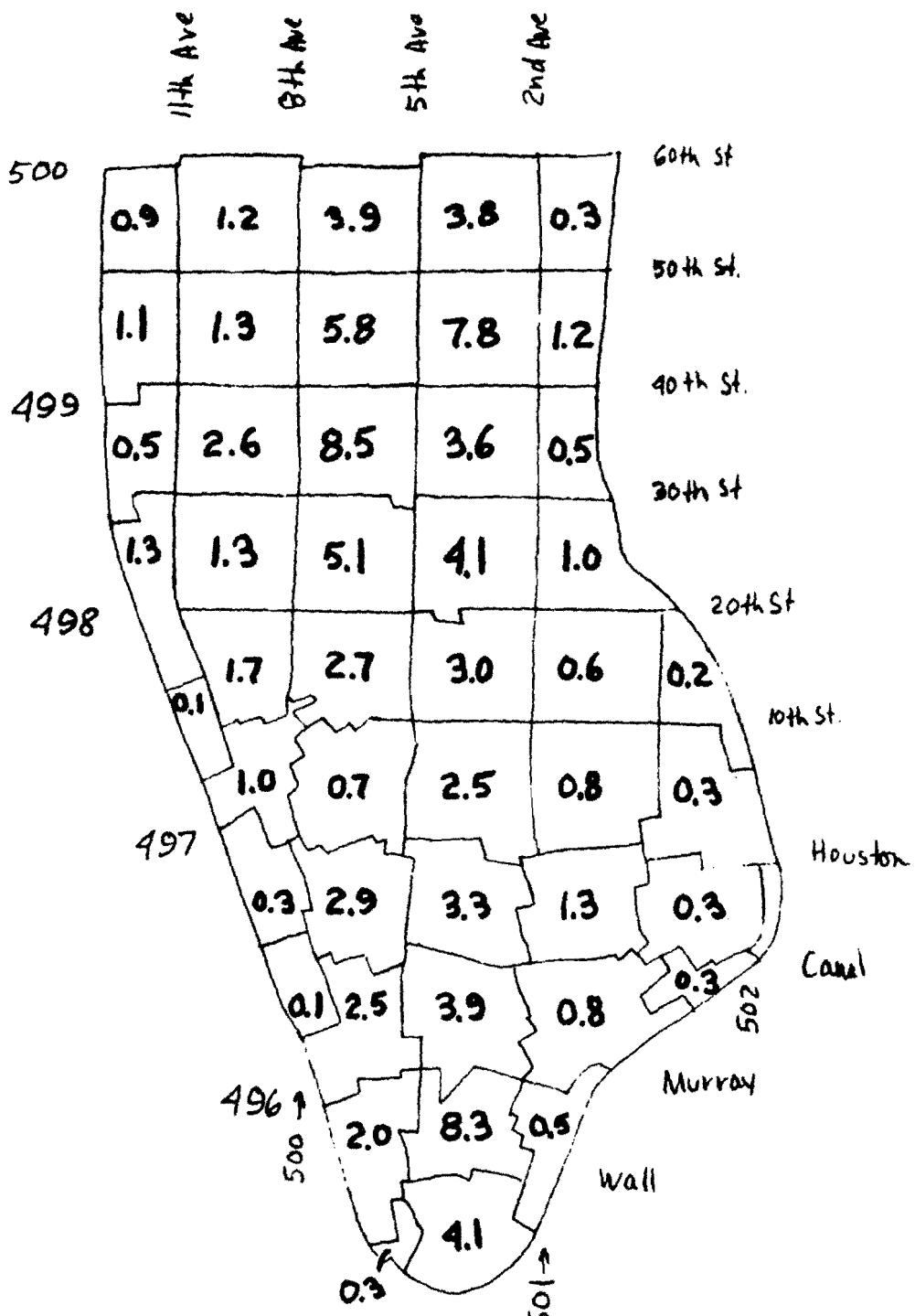


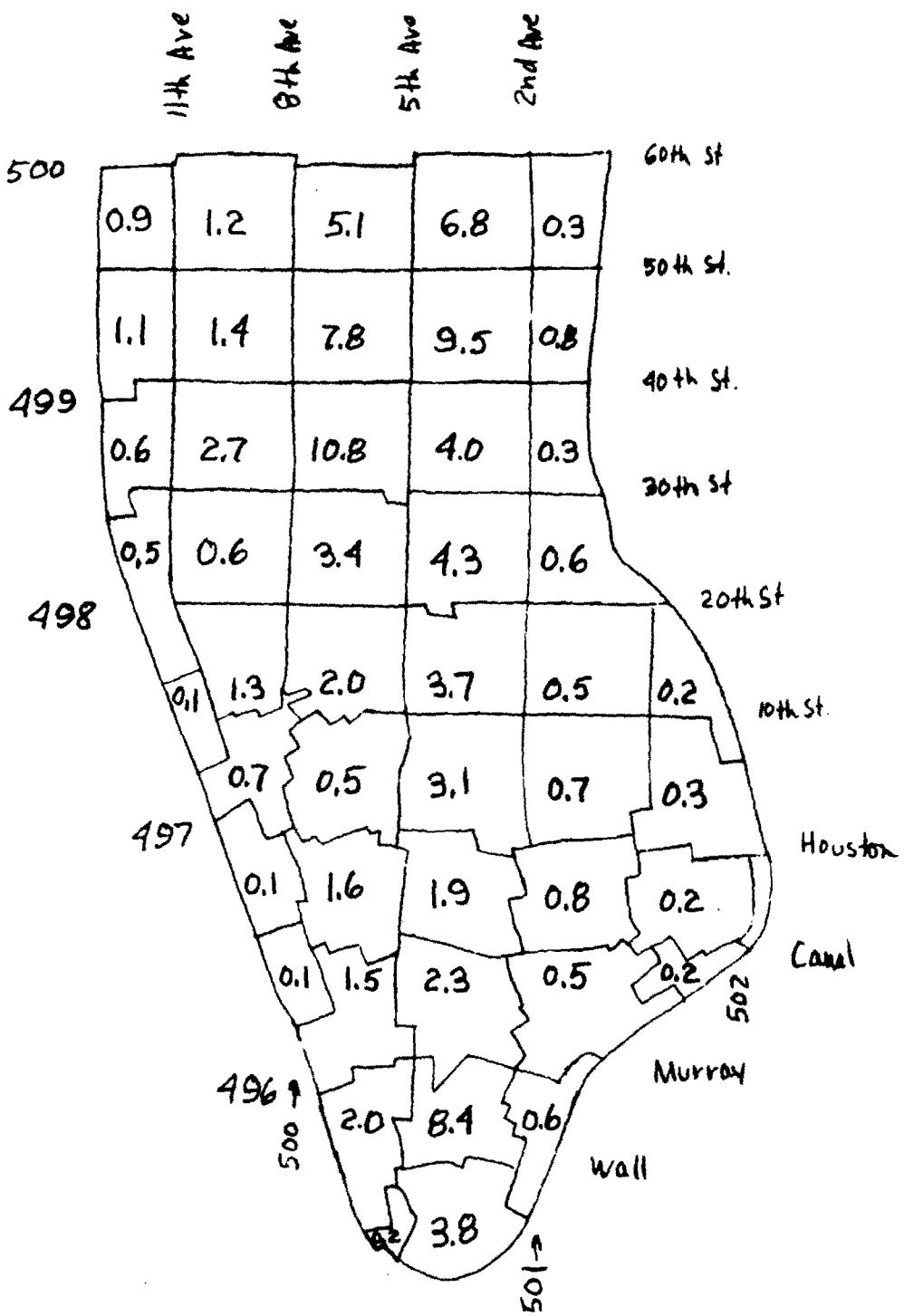
FIGURE 8 - WEST OF HUDSON TRIBUTARY AREAS

- | | | |
|---------------------------------|--------------|--|
| (1) Southern Sector | TRIBUTARY TO | P.R.R., C.N.J., E-L (electrified lines) |
| (2) Northern Sector | " " | E - L (Bergen, Rockland, Orange Co. lines) |
| (3) Bayonne to Hoboken Sector | " " | PATH |
| (4) Weehawken to Ft. Lee Sector | " " | LINCOLN TUNNEL or Geo. Washington Br. Services |



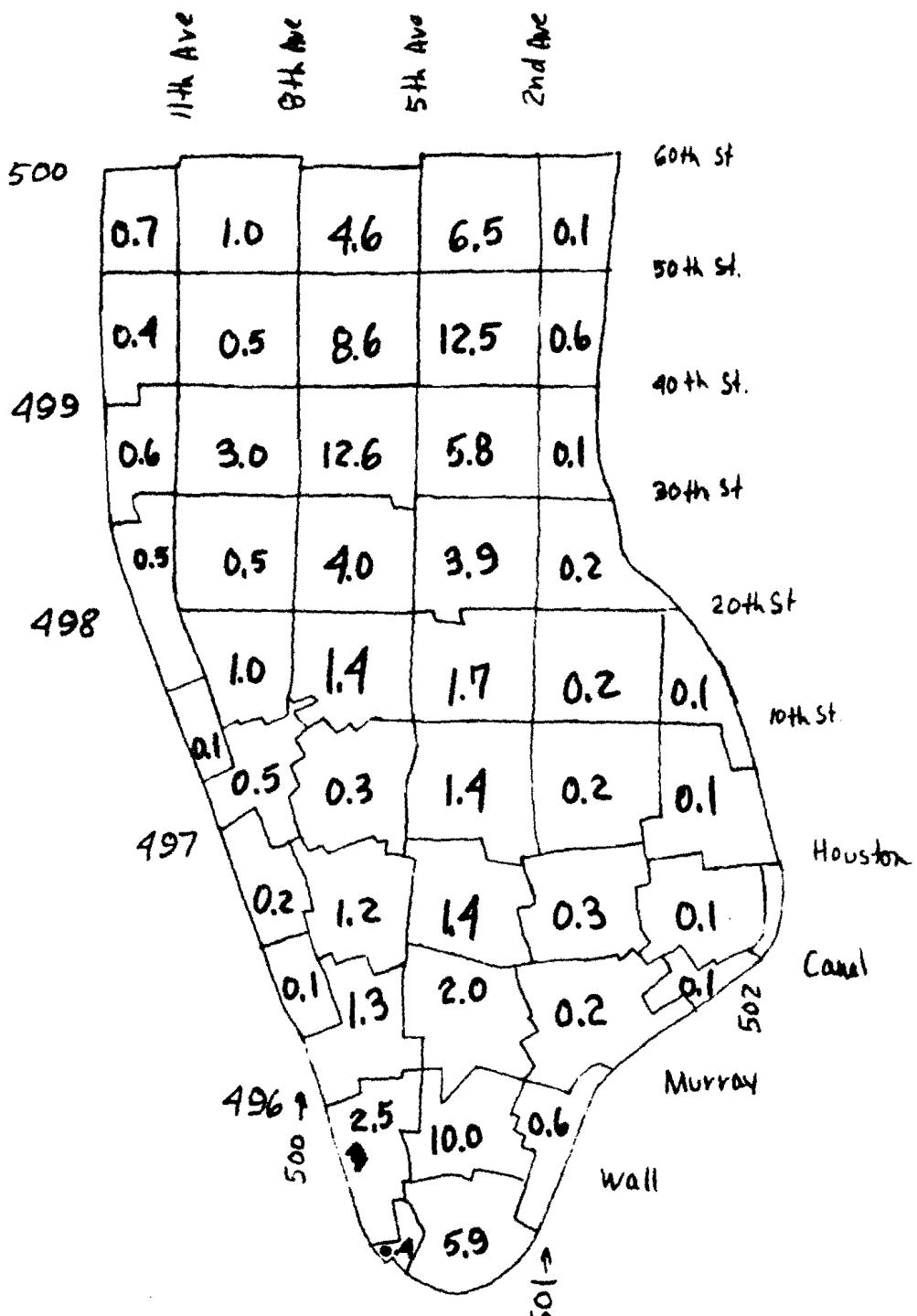
MANHATTAN CBD - QUARTER SQUARE MILES

FIGURE 9 - NON-RESIDENTIAL FLOOR SPACE
 (% by quarter sq. mi.)
 Total = 532.7 million sq. ft.



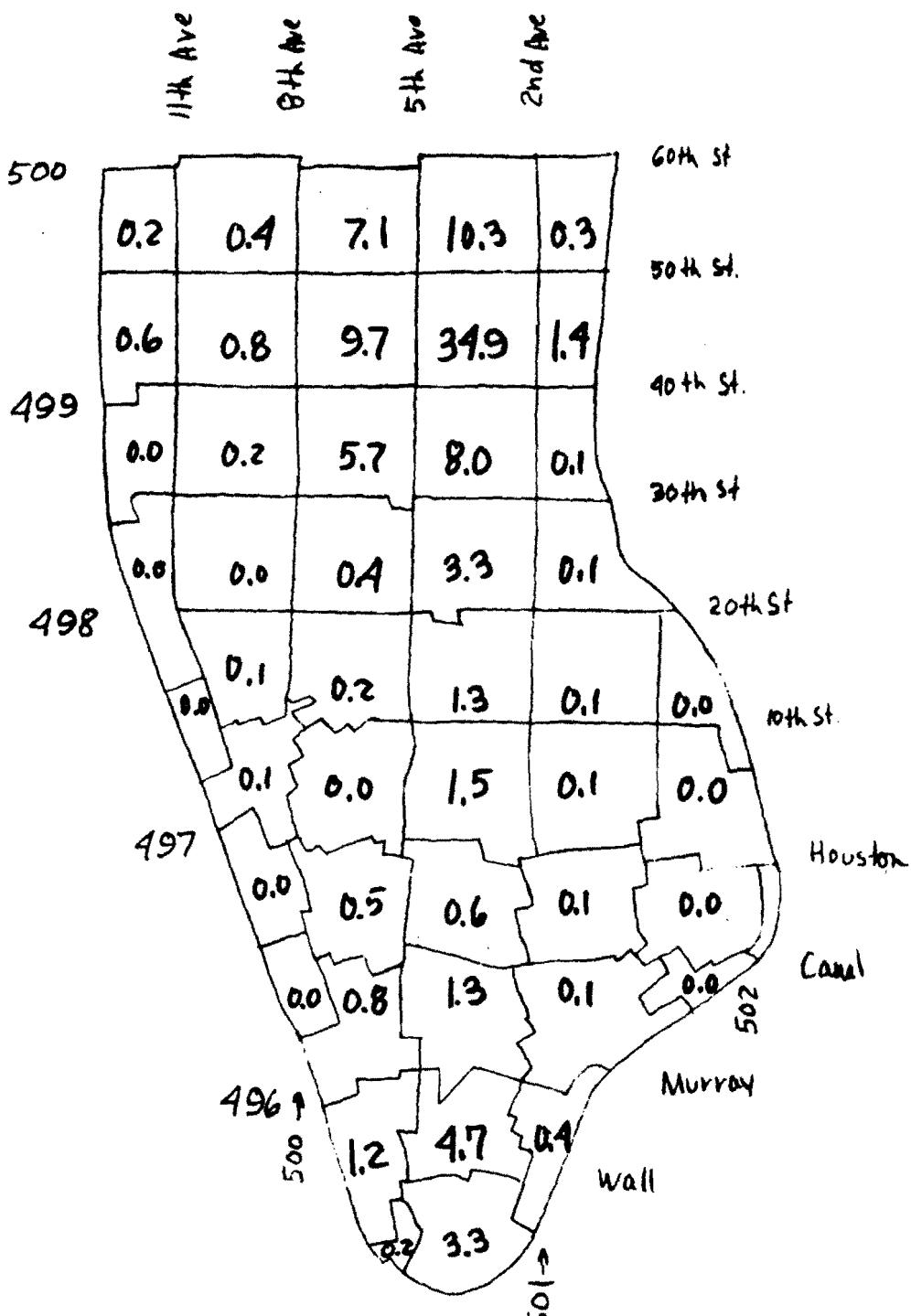
MANHATTAN CBD - QUARTER SQUARE MILES

FIGURE 10 - TOTAL MASS TRANSIT TRIP DESTINATIONS
from non-CBD origins
(% by quarter sq. mi.)
Total = 1,560,000



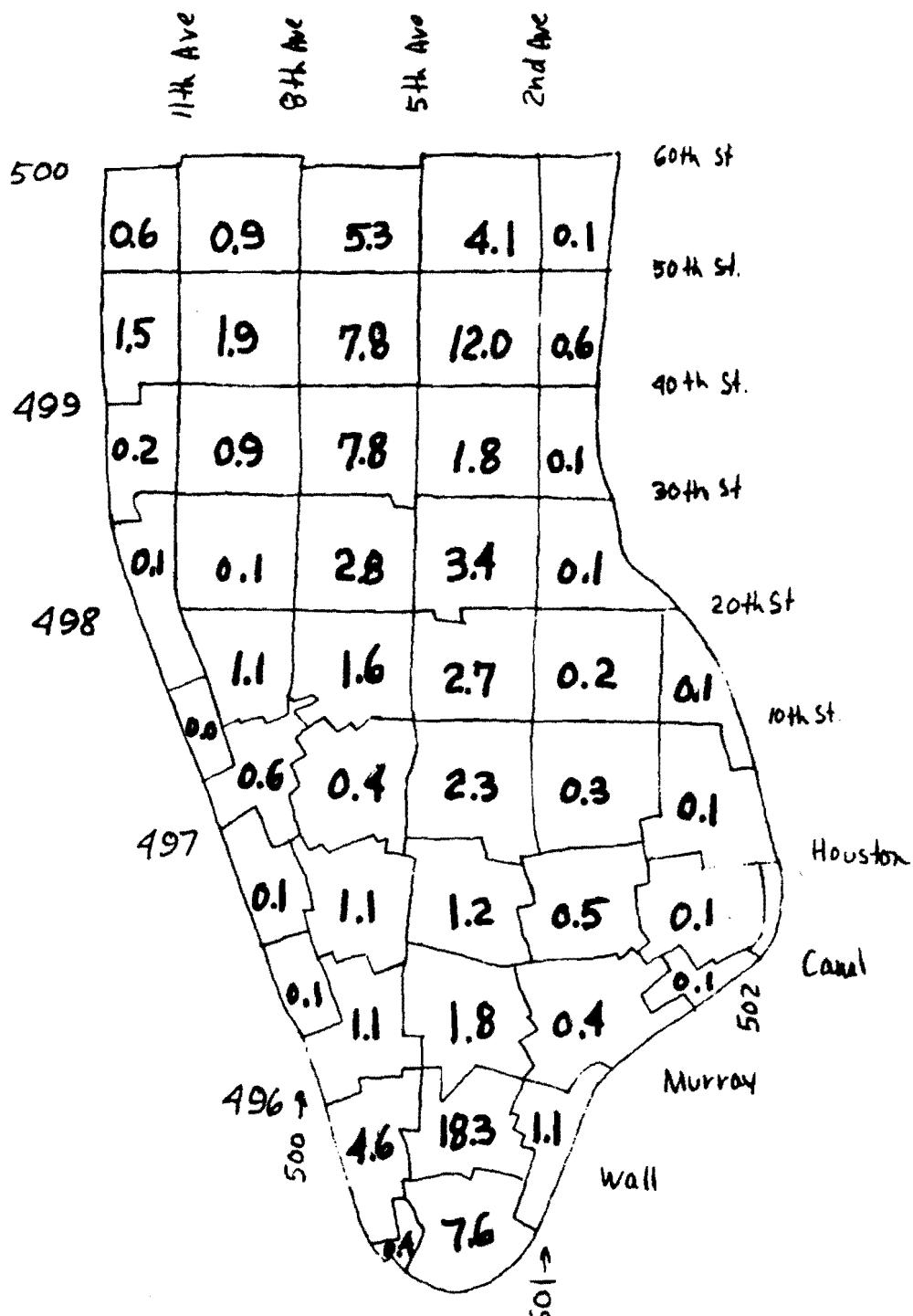
MANHATTAN CBD - QUARTER SQUARE MILES

FIGURE 11 - LONG ISLAND R.R. DESTINATIONS
 (% by quarter sq. mi.)
 Total = 78,200



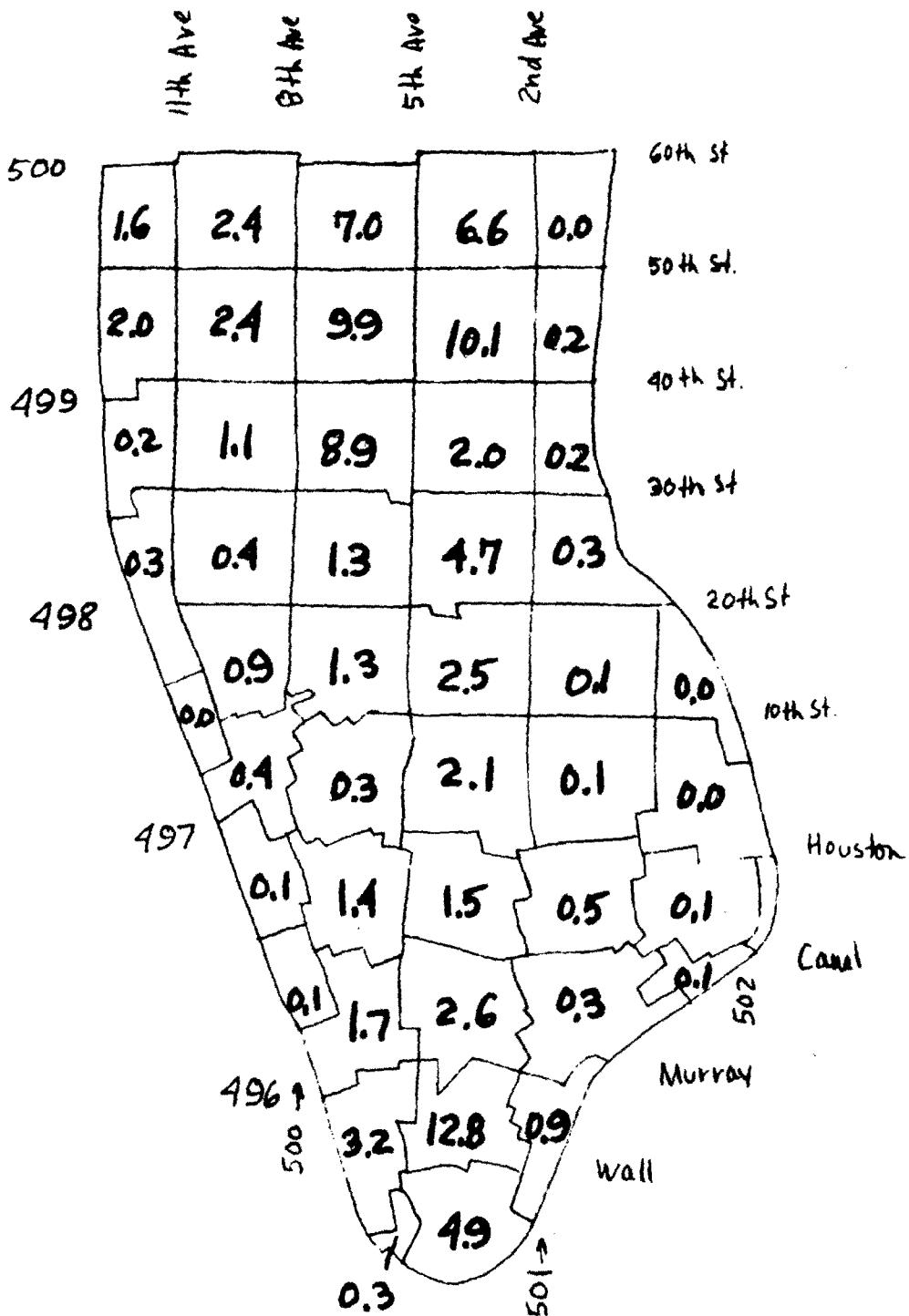
MANHATTAN CBD - QUARTER SQUARE MILES

FIGURE 12 - N.Y.C. - N.H.R.R. DESTINATIONS
 (% by quarter sq. mi.)
 Total = 55,600



MANHATTAN CBD - QUARTER SQUARE MILES

FIGURE 13 - WEST-OF-HUDSON (Southern Sector Trib. to P.R.R. Tunnel) DESTINATIONS
 (% by quarter sq. mi.)
 Total = 50,100



MANHATTAN CBD - QUARTER SQUARE MILES

FIGURE 14 -WEST-OF-HUDSON (Northern Sector Trib. to P.R.R. Tunnel) DESTINATIONS
 (% by quarter sq. mi.)
 Total = 44,000