Report on the

PROPOSED INTEGRATION OF COMMUTER SERVICES

of the

HUDSON & MANHATTAN RAILROAD COMPANY

and the

CENTRAL RAILROAD OF NEW JERSEY

for the

METROPOLITAN RAPID TRANSIT SURVEY

October 1956

CHARLES E. DE LEUW
Consulting Engineer

Chicago New York

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150 NORTH WACKER DRIVE
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PLEASE REPLY TO
NEW YORK OFFICE
202 EAST 44TH STREET
NEW YORK 17, N. Y.
MURRAY HILL 2-3950

October 1, 1956

Mr. Arthur W. Page, Project Director
Metropolitan Rapid Transit Survey
111 Broadway
New York 4, New York

Re: Proposed Integration of Commuter Services
of the Hudson & Manhattan Railroad Company
and the Central Railroad of New Jersey

Dear Mr. Page:

At your request we have made studies of the physical feasibility and have estimated the cost of construction and the cost of new equipment in connection with several alternate plans for integrating the facilities and services of the Hudson & Manhattan Railroad Company and the Central Railroad of New Jersey. The proposed improvements would be made primarily for the purposes of providing all rail service for the passengers served by the Central Railroad of New Jersey. It is anticipated, however, that substantial operating economies would benefit the CNJ and that the H&M would enjoy increased passenger income. Our assignment did not contemplate any studies to determine the future distribution of passengers among the rearranged railroad facilities nor were economic studies to be made. We have followed your wishes in this respect.

We acknowledge the very fine cooperation we have received from officials and staff members of the two railroads at interest. We have also been assisted in our studies by members of your own staff as well as that of the Port of New York Authority. We also gratefully acknowledge permission to review reports on related subjects previously made by the engineering organizations of Coverdale & Colpitts and Ford, Bacon & Davis.

Study plans on which we based our recommendations and our cost estimates are available for your inspection.

Very truly yours,

Charles E. De Leuw

CED*dw
cc: Frank H. Simon
Roger H. Gilman

SUMMARY OF THE REPORT

The Problem

In an effort to alleviate related problems, the Hudson & Manhattan Railroad Company and the Central Railroad of New Jersey propose certain joint operations. The H&M has suffered declining patronage over the past several years and now has excess capacity available in its trans-Hudson tubes. The Jersey Central, for its part, is faced with annual operating deficits which could be reduced by elimination of expensive ferry operation across the Hudson River.

A number of studies have been made, under our assignment, of the physical feasibility and the cost of construction and of equipment involved in the necessary improvements for two basic plans:

a. The transfer of passengers between the two railroads at a satisfactory joint terminal west of the Hudson River; and

b. Through service by the Jersey Central by way of H&M trackage into the Hudson Terminal in Manhattan.

Transfer Station Plan

Consideration was given to several variations of each of these two basic plans. The Plan involving the least capital expenditure is Plan #4. (See Exhibit 1). This Plan is based on operating present CNJ service to a new terminal station on the Main Line of the CNJ in the vicinity of Communipaw Avenue in Jersey City. At this point the passengers would change to H&M trains. This Plan would call for a capital expenditure for improvements of $9,360,000 and $4,000,000 for new H&M cars. More important, however, would be the feature that the trip from such a station to the Hudson Terminal, for which a portion of the CNJ passengers would have to stand in rush hours, would take the shortest time of any feasible scheme which we studied. The transfer station could be reached by CNJ trains via the Main Line trackage on the Bayonne Peninsula or, over the West Side Branch if a new Hackensack River bridge was constructed. This latter route would involve an additional expenditure of some $31,000,000 between Communipaw and Elizabethport (Plan #7). (See Exhibit 3).

Through Service Plan

The Through Service Plan which offers the most efficient use of all facilities is Plan #3. (See Exhibit 2). CNJ trains to Hudson Terminal would go via the Newark and Elizabeth Branch of the CNJ. Starting at Elizabethport the line would be electrified and the diesel engine disconnected. The route would pass Port Newark and thence via the Kearny Peninsula to a connection with the Pennsylvania Railroad tracks, on which the H&M service is provided, in the vicinity of Meadows Yard. The basis of this preference is that trains, in rush hours, could operate with a seated load as far as Elizabethport. They would then serve several reasonably

important stations between Elizabethport and the Hudson River. Thus they would acquire a standing load which we believe would be necessary in order to carry all of the passengers involved and yet reamin within the available capacity of the H&M tubes.

Conclusions

It is our opinion that the plan for a transfer terminal at Communipaw has better possibilities for joint operation of the Hudson & Manhattan Railroad and the Central Railroad of New Jersey than any of the other schemes studied. It involves the least capital outlay of any of the transfer plans considered. The transfer station would be used for a period of five years, or even more.

DESCRIPTION OF RAILROADS

Hudson & Manhattan Railroad Company

The H&M operates service between Manhattan and Newark. It has two terminals in Manhattan, one called the Hudson Terminal located at 30-50 Church Street and the other called the 33rd Street Terminal at 33rd Street and Sixth Avenue.

The H&M owns approximately 7.9 miles of double track main line railroad, all of which consists of underground or under-river tunnels. It also leases from the Pennsylvania Railroad approximately 0.6 mile of double track line from Journal Square Station, Newark, to the west end of its tunnels.

Transfer connections are provided with the Pennsylvania Railroad and the Erie Railroad in Jersey City, with the DL&W Railroad in Hoboken, and with the New York subway system at Hudson Terminal as well as along Sixth Avenue at 14th Street, 23rd Street and 33rd Street. There are also stations at Christopher Street and 9th Street on the 33rd Street Branch.

The H&M has four single track tubes under the Hudson River, each approximately 6,000 feet long. Two tubes cross the river from Exchange Place in Jersey City, connecting with the Hudson Terminal on the east and extending to Journal Square Station on the west. The other two tubes cross the river at Hoboken to Christopher Street, Manhattan, connecting with tunnels northeasterly and northerly to 33rd Street and Sixth Avenue.

The H&M connects at Journal Square in Jersey City with the Pennsylvania Railroad branch to Jersey City from the Pennsylvania Main Line near Newark. The H&M and the PRR operate a joint passenger service between Newark and Journal Square over this line and thence via H&M tunnels to Hudson Terminal. The cars used in this service are jointly owned by the two railroads.

The Pennsylvania Railroad also operates its own service between Newark and Jersey City over its own track. At the Pennsylvania Railroad Jersey City terminal, PRR passengers can transfer to and from the H&M at Exchange Place station.

The H&M owns 254 multiple unit cars operating on 600 volts D.C. These cars vary in length from 48 feet to 51 feet and seat 44 passengers. The Pennsylvania owns 54 multiple unit cars 48 feet long and seating 44 passengers. The present schedule calls for 188 cars in local service and 54 cars in joint service. This leaves 66 cars available for spares. The cars are only 8 feet 10½ inches wide because of the restricted clearances in the H&M tubes.

Central Railroad of New Jersey

The CNJ operates service over its central division between Jersey City and Phillipsburg, a distance of 72.1 miles, including several branches in the New York metropolitan area as follows:

1. Newark and New York Branch between Newark Broad Street Station and Brill's Junction on the Newark and Elizabeth Branch (1.78 miles);

2. Newark and Elizabeth Branch between Brill's Yard and Elizabethport on the Main Line (5.03 miles);

3. Perth Amboy Branch between Elizabethport on the Main Line and Perth Amboy Junction with the New York & Long Branch Railroad (10.43 miles);

4. Sound Shore Branch between Elizabeth River Station on the Perth Amboy Branch and Chrome, the end of the line (5.83 miles); and

5. The Seashore Branch of the Southern Division between Matawan Station on the New York & Long Branch Railroad and Highlands, the end of the line (14.35 miles).

The CNJ also operates passenger service over the NY&LB from Woodbridge Junction on the Perth Amboy Branch to Bay Head Junction (38.0 miles). The NY&LB is owned jointly and equally by the CNJ and by the PRR, the latter operating trains over the NY&LB tracks to Bay Head Junction.

CNJ passengers to and from Manhattan use the Hudson River ferry service owned and operated by the CNJ. The Baltimore and Ohio Railroad operates over the CNJ from Jersey City to Bound Brook Juntion (31.76 miles) by trackage rights. The B&O operates seven through trips per day in each direction. Its passengers to and from Manhattan are carried mainly by B&O-owned buses using the CNJ ferries to cross the Hudson River.

The Reading Railway System also operates over the CNJ from Jersey City to Bound Brook Junction (31.76 miles) by trackage rights. The Reading operates six through trains per day in each direction. Its passengers to and from Manhattan use the CNJ Hudson River passenger ferries.

The Jersey City passenger station has 16 stub-end tracks for passenger service and two for mail and express. Four main line tracks extend westward from Jersey City as far as Raritan (35.8 miles) and two tracks

extend from there westerly. A two-track line extends from Newark to Elizabethport and through to Perth Amboy, Matawan and Bay Head Junction. The Sound Shore and the Seashore Branches are single track lines.

The CNJ operates suburban passenger service on its main line as far as Raritan as well as on all the branches described above. There are also seven through trains per normal day on the Main Line in each direction to and from point west of Raritan. Facilities for handling mail, baggage and freight are incorporated in the ferry terminal building in Jersey City.

All of the commuter service is provided in standard railroad coaches. Diesel locomotives are used for motive power. Most of the locomotives go into the power pool between the two rush periods, and are used for freight service as required.

DISCUSSION OF THE PROBLEM

Hudson & Manhattan Railroad

The problem of the H&M is primarily one of too little traffic and disproportionately large overhead expenses. A great many more passengers could be carried at essentially no increase in cost for maintenance of track and roadway, station facilities, yards and shops, and other major items. Likewise, the fixed charges for taxes, interest on the investment, and depreciation on these major items would not be increased even with a substantial increase in business. The railroad is now in receivership, and vigorous efforts are being made by the receiver to find ways to restore the railroad to a sound financial status. The railroad is in need of complete modernization and rehabilitation. Funds for this work could be more readily found if the railroad were assured of a greater share of the trans-Hudson commuter traffic.

Central Railroad of New Jersey

The Central Railroad of New Jersey depends on ferries to transport its passengers from its terminal in Jersey City to Manhattan. The transfer from trains to ferries requires rather long walks, and the ferry docks in Manhattan are some distance from most destinations. Likewise, the Manhattan ferry terminal is not conveniently situated in relationship to transfer connections with the New York City subway system. All these factors impose a hardship upon the passengers. In addition, the railroad suffers an operating loss on the ferries and also is required to maintain and pay fixed charges on a sizeable plant including not only the ferries but also the ferry terminals on each side of the river and the railroad terminal and coach yards in New Jersey.

The Metropolitan Rapid Transit Commission, with the financial aid of the Port of New York Authority, has taken the opportunity of coordinating the various efforts being made toward effecting a solution of the problem of the two railroads as outlined above.

It is in the interest of the M.R.T.C. to collaborate on the preparation of an interim plan seeking to solve this problem so that any proposed improvements will lend themselves to inclusion in the ultimate plans for metropolitan rapid transit for which the commission is primarily responsible.

DISCUSSION OF ALTERNATE SCHEMES

Each of the plans studied will be described in turn. Advantages and disadvantages of each plan will be discussed, and cost estimates will be given. The cost estimates for all the schemes are recapitulated in the Appendix, followed by a detail of each estimate.

While the H&M now owns enough cars to provide the service under any of the proposed transfer schemes, the cars are obsolete and should be replaced. The cost of cars under each plan, therefore, is included in the estimate. Likewise, since new multiple unit cars would have to be purchased to provide through service on the CNJ into Hudson Terminal, the cost of such equipment has been estimated in the through operation schemes considered. Cost of electrifying the CNJ from Elizabethport and Raritan, however, has been omitted. The multiple unit cars would be constructed, it is proposed, so that they could be pulled by presently-owned diesel locomotives on the outer sections of the route.

The estimates include the cost of rights-of-way, structures, stations and fixed railroad equipment required for the extension of the H&M operations to the various points of connection to CNJ service studied. They also include the additional rapid transit required for the extensions of the H&M electric rapid transit service to the various terminals. The estimates do not include the cost of any CNJ rights-of-way, structures or equipment.

Airport Route-Elizabethport Station - Plan No. 1

Under this plan a transfer terminal between the CNJ and the H&M would be built along the present tracks of the CNJ just north of the Elizabethport Station. (See Exhibit 2). The Elizabethport Yard of the CNJ, Newark and Elizabeth Branch, would be used as a coach yard for the CNJ suburban trains.

The terminal would provide six tracks, two for the H&M and four to serve the CNJ, with additional tracks available for transfer of mail, baggage and express. The H&M trains would operate northerly from this terminal. During rush hours, they would carry approximately a seated load upon leaving and arriving at this terminal. They would be carrying a substantial number of standees, however, when arriving at Hudson Terminal in the morning rush period and when leaving Hudson Terminal in the evening rush.

The route of the H&M trains would include the CNJ tracks of the Newark and Elizabeth Branch to Brill's Yard and thence the Newark Branch on the CNJ to Kearny Peninsula. Here a station would serve the Kearny Works of Western Electric Company and the Federal Shipbuilding Company. Continuing north on the tracks of the PRR, with a station at North Kearny, the rapid

transit route would cross the Meadows Yard of the PRR on a new structure and connect with the PRR tracks now used in the H&M service. Station stops would be made at Journal Square, Grove Street and Exchange Place in Jersey City.

The disadvantages of this Plan is the distance from New York (13.5 miles) at which the transfer would be made. All CNJ passengers would be provided with seats in the section west of Elizabethport, and on eastbound trips they could retain these seats to Hudson Terminal. On westbound trips enough passengers will probably disembark at stations east of and including Journal Square to provide seats for almost all CNJ passengers to Elizabethport transfer station. The estimated running time to this transfer station is 28 minutes.

Also, because of the length of the rapid transit portion of the route, a substantial amount of new equipment would have to be provided on the H&M with little if any compensating reduction in the equipment required for the CNJ portion.

The advantages of this plan are that it would provide rapid transit service to the Newark Airport (although a shuttle bus service would have to be operated between the rapid transit station and the airport buildings); to Port Newark; and to industries on Kearny Peninsula. People living along the route of the CNJ would also be able with only one transfer, to reach all of these places as well as destinations in Jersey City.

The estimated construction cost of Plan #1, including track connections, electrical installations, stations, engineering, and contingencies would total $25,400,000. The estimated cost of new cars for the connecting H&M service would be $11,200,000. The total capital cost, as detailed in the Appendix, is $36,600,000.

Airport Route-Port Newark Terminal

This Plan would be the same as that previously described except that the transfer terminal between the two railroads would be located in the vicinity of Port Newark, opposite Newark Airport, rather than at Elizabethport. This Plan is mentioned only because it has been proposed in earlier reports. The land on which it was proposed to build the terminal is no longer available.

Airport Route-Kearny Terminal - Plan No.2

A third location on this route where a transfer terminal might be built would be on the southerly end of Kearny Peninsula just south of the Western Electric Company plant. (See Exhibit 2). The CNJ owns extensive areas of land in this vicinity and could readily build a coach yard east of a pull-through station for this service. The balance of the facility including the connection with the PRR tracks in the joint H&M-PRR service would be as described above.

The advantage of this location over Elizabethport would be the shortening of the H&M route and consequent reduction in the amount of new equipment required. While a station could be built at Port Newark on the CNJ,

passengers from New York would have to transfer at Kearny in order to reach it. The headway of CNJ trains in off-peak hours would be too wide for good service to Newark Airport.

The estimated cost of this plan as detailed in the Appendix, including construction of track connections, electrical installations and stations together with engineering and contingencies, would be $22,730,000. The cost of new cars for the H&M service would be $8,000,000, a total cost of $30,730,000.

Airport Route-Through Service - Plan No.3

Through service could be provided on the Airport-Kearny route as described above between Hudson Terminal and Raritan, New Jersey on the CNJ. (See Exhibit 2). Such through service would obviously be more attractive to the passengers than any transfer arrangement although the capacity of the H&M tubes is such that standing passengers would have to be carried in rush hours on that section between Port Newark and the Hudson Terminal.

There would be obvious economies in providing the service with one set of trains and crews, rather than two, especially since few CNJ trains can make more than one trip in each rush hour. The greatest objection to be overcome in providing such service, however, is the large amount of new equipment required. It is estimated that the necessary rolling stock would cost approximately $18,000,000. This would be in addition to $22,270,000 for tracks bridges, electrical installations, and stations, including engineering and contingencies. The total cost is $40,270,000. See detailed Estimate in Appendix.

Third rail electrification could be installed for the entire distance between Raritan and the connection with the already electrified PRR trackage. It would be more economical, however, to purchase multiple unit coaches which could operate on third rail in the electrified section but would be constructed so that the coaches could be pulled by diesel locomotives in the outer portions of the route. The transfer in motive power would probably take place at Elizabethport so that direct service could be provided between Port Newark and Hudson Terminal without the delays which would be involved in switching motive power.

One of the great disadvantages of this plan is that the trains in the service would have to be limited in length to the length of the station tracks in the Hudson Terminal. These tracks accommodate only eight-car trains approximately 400 feet long whereas the CNJ now operates eight to thirteen-car trains which are 580 to 942 feet in length exclusive of locomotives. With through service, the long trains would have to be broken into shorter units at the point of changing motive power on eastbound trips and re-assembled again into long trains in the outbound direction. The alternate would be to increase the number of diesel locomotives and train crews assigned to the service.

Bayonne Route-Communipaw Station - Plan No.4

This plan contemplates operating present CNJ service to Communipaw. Land is readily available along the CNJ Main Line in the vicinity of Communipaw Avenue, Jersey City for a new transfer terminal. CNJ trains depositing their passengers at such a station would continue through the station and into the present coach yard at the ferry terminal for storage during the off-peak hours.

Trains from the H&M would be routed from the new terminal station via the right-of-way of the Lehigh Valley Railroad to the Waldo Avenue Yard of the PRR. At this point a physical connection would be made with the PRR tracks used in the H&M service. H&M trains would then continue into the Hudson Terminal with stops at Grove Street and Exchange Place. (See Exhibit 1).

The connection between Waldo Junction on the PRR and Communipaw including a new transfer station is estimated to cost $9,360,000.

The estimated cost of new cars for the H&M service alone would be $4,000,000. A total cost of $13,360,000. (See Appendix).

Consideration was given to a transfer terminal north of Communipaw Avenue on the Lehigh Valley right-of-way in order to find a station site that would be more readily available to buses and automobiles via Grand Street, Jersey City as well as via the New Jersey Turnpike. There are ramps at Grand Street to and from the south on the Turnpike. A terminal at this location, however, would require a backup operation of CNJ trains in order to reach the existing coach yards. A prohibitive number of station tracks, for which land is not readily available, would be required in order to assure smooth operation of a terminal in rush hours, however, the potential business in this area could be adequately served by a wayside station on the H&M at Grand Street.

Bayonne Route-Ferry Terminal Station - Plan No.5

This route would be a variation of Plan #4 and would utilize the existing facilities in the CNJ railroad station almost completely since all passengers would transfer to the H&M at that point. (See Exhibit 1). With the relocation of terminal facilities for the through trains on the B&O and Reading railroads, four tracks and two passenger platforms in the existing station could be made available. A substantial part of the construction cost of providing the physical connections between these terminal tracks for the H&M and the existing tracks of the PRR used in the H&M joint service could later be incorporated as a part of the Independent Bi-state Loop.

This connection between Waldo Junction on the PRR and the Jersey Central Station is estimated to cost $11,680,000. Of this amount $4,720,000 would be expended on permanent Bi-state Loop construction. The estimated cost of new cars for the H&M service would be $4,000,000. The total cost would be $15,680,000.

Bayonne Route-Through Service - Plan No.6

Through service could be provided on the Bayonne Route via Communipaw and Waldo Junction on the PRR between Hudson Terminal on the H&M and Raritan, New Jersey on the CNJ. (See Exhibit 1). Such through service would involve an expense of $8,610,000 for construction and an outlay estimated at $21,000,000 for new equipment. A total of $29,610,000.

Under this plan, H&M passengers to and from Exchange Place and Grove Street stations could be handled on the through CNJ Trains.

Discussion of Bayonne Routes

The advantages of a transfer terminal either at Communipaw Avenue or at the existing ferry terminal are that it would shorten the H&M portion of the trip to a practical minimum. This would reduce the number of new cars required to provide the service. It would also shorten the distance over which a portion of the passengers would have to stand. Further advantages are that the existing coach yards could be used almost intact as could the facilities for handling mail, baggage and express on through trains.

The disadvantages of the Bayonne routes are that the service would continue to be subjected to the interruptions caused by frequent openings of the bridge across the lower end of Newark Bay. In a survey on a normal weekday in November 1954, 34 bridge openings occurred. It is estimated that the average at present is about 40 per day. Furthermore, the Main Line serves rather lightly used stations in Bayonne. It is believed that much more important stations could be developed at Port Newark and on Kearny Peninsula.

Consideration was given to plans for extending the CNJ service directly to Grove Street or Exchange Place stations of the H&M, with facilities for transfer of passengers at either station. The cost of such a scheme would be excessive, compared with other plans, and operating difficulties could not readily be solved within the limitations of space available for station tracks and storage yards.

West Side Branch Alternate-Transfer Service - Plan No.7

A variation of Plan #4 would be to route CNJ trains via Airport, Kearny and West Side Branch to Communipaw, transferring to H&M trains at this point. (See Exhibit 3).

The construction costs between Communipaw and Elizabethport including a new Hackensack River Bridge is estimated at $21,670,000. This cost in addition to $9,360,000 for the Waldo Junction-Communipaw connection and $4,000,000 for additional H&M equipment makes a total of $35,030,000 to put this plan in effect.

West Side Branch Alternate-Through Service - Plan No.8

This plan contemplates using the West Side Branch route as described for Plan #7 and providing for change of power at Communipaw. (See Exhibit 3).

The construction costs between Communipaw and Elizabethport, including a new Hackensack River bridge, is estimated at $19,000,000. This cost in addition to $8,610,000 for the Waldo Junction-Communipaw connection (not including transfer station) and $18,000,000 for additional equipment makes a total of $45,610,000 to put this plan in effect.

SUMMARY

COST ESTIMATES FOR CONSTRUCTION AND EQUIPMENT

H&M - CNJ INTEGRATED SERVICE

Plan No.	Route	Type of Service	Terminal Station *	Construction Cost	Cost of Passenger Equipment	Total Cost
1	Airport	Transfer	Elizabethport	$25,400,000	$11,200,000	$36,600,000
2	Airport	Transfer	Kearny	22,730,000	8,000,000	30,730,000
3	Airport	Through	Elizabethport	22,270,000	18,000,000	40,270,000
4	Bayonne	Transfer	Communipaw	9,360,000	4,000,000	13,360,000
5	Bayonne	Transfer	Ferry Terminal	11,680,000**	4,000,000	15,680,000
6	Bayonne	Through	Communipaw	8,610,000	21,000,000	29,610,000
7	West Side Branch	Transfer	Communipaw	31,030,000	4,000,000	35,030,000
8	West Side Branch	Through	Communipaw	27,610,000	18,000,000	45,610,000

** - Of this amount $4,720,000 would be useable in the Independent Bi-state Loop.

* - For transfer of passengers in transfer plans and shift in motive power in through service plans.

SERVICE CHANGES AND ABANDONMENTS

It is presumed in connection with all plans providing through service that the Seashore Branch would be handled by the PRR and the Perth Amboy Branch of the CNJ would be abandoned or served by buses. This would affect approximately 1200 round-trip riders per day who would have to be offered substitute bus service.

On the New York & Long Branch Railroad, south of Woodbridge Junction, commuter service is now provided by both the PRR and the CNJ. The division of traffic is about two-thirds to the PRR and one-third to the CNJ. It is proposed that the CNJ discontinue all passenger service on this route and that the PRR augment theirs, primarily by lengthening their present trains. Passengers would have an opportunity to reach lower Manhattan by a transfer to the H&M which would be equivalent in convenience to their present transfer to the ferry. Those going uptown would transfer to the 33rd Street route to the H&M or go directly into the Pennsylvania Station. The total number of passengers carried through the Hudson Tubes in conjunction with any CNJ through service scheme would not be greatly reduced by this arrangement.

It is presumed that with any routing via Newark Airport the present stations in Bayonne on the CNJ would be served by buses or rail rapid transit connecting with the H&M, probably at Journal Square Station.

CONCLUSIONS

Transfer Plan

If a plan is adopted to transfer passengers between the H&M and the CNJ, the preferred location for the transfer terminal would be at Communipaw Avenue on the Main Line of the CNJ. (Plan #4). The running time via H&M service from this station to Hudson Terminal would be 12 minutes, which would minimize the inconvenience to those passengers who would be required to stand during rush hours.

The estimated cost of this improvement, including equipment, would be $13,360,000 which could be partially offset by the savings to the CNJ through abandonment of ferry service and closing of the ferry terminals and the stub-end railroad terminal.

If it is decided to route the CNJ trains via Port Newark and the Kearny Peninsula, instead of Bayonne, $35,030,000 initial investment, including equipment, would be required, but substantial new riding to the Kearny Peninsula and Port Newark should be generated. This new riding would occur mostly in the non-rush direction during the peak periods. Temporarily, Bayonne Peninsula could be served by buses operating to Journal Square in Jersey City.

Through Service Plan

If a decision is reached to install through service to Hudson Terminal via CNJ, the route serving the area best would leave the Main Line at Elizabethport follow the CNJ's Newark and Elizabeth Branch, pass through Port Newark

the Kearny Peninsula, and Meadows Yard of the PRR to a connection with the trackage used by the H&M and thence to Hudson Terminal. (Plan #3). This Plan would require $40,270,000 initial investment, including equipment.

We have doubts as to the large capital outlay involved in providing through service will be found justifiable.

Conclusions

It is our opinion that the plan for a transfer terminal at Communipaw has better possibilities for joint operation of the Hudson & Manhattan Railroad and the Central Railroad of New Jersey than any of the other schemes studied. It involves the least capital outlay of any of the transfer plans considered. The transfer station would be used for a period of five years, or even more.

APPENDIX

HUDSON & MANHATTAN - JERSEY CENTRAL
CONNECTIONS

SUMMARY OF TRACK & ROADWAY ESTIMATES

TRANSFER SERVICE

PLAN NO.	ROUTE	TRANSFER TERMINAL	SECTION ESTIMATE	DIST. MI.	EST. NO.	CONSTRUCTION COST	TOTAL CONSTRUCTION
1	Airport-Meadows Total - 8.3 Mi.	Elizabethport New Jersey	Meadows to Central Ave.)	1.9	A	$ 9,700,000	
			Central Ave.to) Elizabethport)	6.4	B	15,700,000	$ 25,400,000
2	Airport-Meadows Total - 8.3 Mi.	Central Ave. Kearny New Jersey	Meadows to Central Ave.)	1.9	A	9,700,000	
			Central Ave.) to Elizabeth)	6.4	B Note 2	13,030,000	$ 22,730,000
4	Bayonne Total - 1.8 Mi.	Communipaw Avenue Jersey City	Waldo Jct.to) Golden St.)	0.9	C	$ 5,260,000	
			Golden St. to) Communipaw) Transfer)	0.9	D	$ 4,100,000	$ 9,360,000
5	Bayonne Total - 2.3 Mi.	Jersey Central Ferry Terminal Jersey City	Waldo Jct. to) Golden Street)	0.9	C	$ 5,260,000	
			Golden St. to) J. C. Jct.)	0.73	E	4,720,000 (Bi-state Loop)	
			J. C. Jct. to) J. C. Station)	0.67	F	1,700,000	$ 11,680,000
7	Airport-W.Side Br. Total - 10.85 Mi.	Communipaw Avenue Jersey City	Waldo Jct. to) Golden St.)	0.9	C	$ 5,260,000	
			Golden St. to) Communipaw)	0.9	D	4,100,000	
			Communipaw to) Central Ave.)	2.65	G Note 1	9,100,000	
			Central Ave.) to Elizabeth) port	6.4	B Note 3	12,570,000	$ 31,030,000

SUMMARY - Continued

THROUGH SERVICE

PLAN NO.	ROUTE	POWER CHANGE TERMINAL	SECTION ESTIMATE	DIST. MI.	EST. NO.	CONSTRUCTION COST	TOTAL CONSTRUCTION
3	Airport-Meadows Total - 8.3 Mi.	Elizabethport New Jersey	Meadows to Central Ave.)	1.9	A	$ 9,700,000	
			Central Ave. to Elizabethport)	6.4	B Note 3	12,570,000	$ 22,270,000
6	Bayonne Total - 1.8 Mi.	Communipaw Junction	Waldo Jct. to Golden St.)	0.9	C	$ 5,260,000	
			Golden St. to Communipaw)	0.9	D Note 1	3,350,000	$ 8,610,000
8	Airport-W.Side Br. Total - 10.85 Mi.	Communipaw Junction	Waldo Jct. to Golden St.)	0.9	C	$ 5,260,000	
			Golden St. to Communipaw)	0.9	D Note 1	3,350,000	
			Communipaw to Central Ave.)	2.65	G Note 1	9,100,000	
			Central Ave. to Elizabethport)	6.4	B Note 4	9,900,000	$ 27,610,000

NOTES

1. Estimate includes 1 Transfer Station and Storage Yard located either at Elizabethport or at Central Avenue Kearny.
2. For Kearny Transfer alternate, Estimated Cost Central Avenue to Elizabethport (including Central Avenue Transfer Station) can be reduced to $13,030,000 account elimination of Electrification.
3. For Through Service alternate changing power at Elizabethport deduct $3,130,000 account elimination of Transfer Station.
4. For Through Service alternate via West Side Branch and changing power at Communipaw Junction deduct $3,130,000 for Transfer Station and $2,670,000 for Electrification leaving Net Total of $9,900,000.

ESTIMATE "A"

Estimate of Cost for Extending H & M Service
from Meadows Yard (Penn R.R.) to Connection with

Central Railroad of New Jersey
at
Elizabethport, New Jersey (8.3 Mi.)

SECTION "A" - Meadows Yard to Central Avenue - Kearny (1.9 Mi.)

Items				
Land, Right-of-Way and Other				
Property and Damages	Lump Sum	= $	80,000	$ 80,000
Embankments, Viaducts and Bridges				
Embankment		=	1,074,000	
Bridges, Structures and Retaining Walls		=	3,629,000	4,703,000
Track and Roadway				
20,200' New Track	@ 18.00	=	363,600	
11,000' Relocated Track	@ 12.00	=	132,000	
Special Work	Lump Sum	=	50,400	
Fencing		=	40,000	586,000
Signals and Interlocking				
Signals - 1.9 Miles	Lump Sum	=	200,000	
1 Interlocking Plant (Penn R.R.)		=	700,000	
Communication System		=	41,000	941,000
Power				
3rd Rail 21,000'	@ 10.00	=	210,000	
Feeders, Breakers, etc. 1.9 Miles	@ 100,000	=	190,000	
1 Substation	@ 350,000	=	350,000	
Adjust Penn R.R. Overhead at Meadows		=	50,000	800,000
Stations, Platforms and Equipment				
North Kearny and South Kearny		=	260,000	260,000
				$7,370,000
	Contingencies 20%+			1,470,000
				$8,840,000
	Engineering 10%+			860,000
	Total			$9,700,000

ESTIMATE "B"

SECTION "B" - Central Avenue, Kearny to Elizabethport (6.4 Mi.)

Items				
Land, Right-of-Way and Other				
Property and Damages	Lump Sum	= $	385,000	$ 385,000
Embankments, Viaducts and Bridges				
Embankment		=	434,000	
Bridges, Structures and Retaining Walls		=	2,328,000	
Penn R.R. Grade Separation		=	1,500,000	4,262,000
Track and Roadway				
68,000' New Track	@ 18.00	=	1,224,000	
6,000' Relocated Track	@ 10.00	=	60,000	
Special Work	Lump Sum	=	60,000	
Fencing	Lump Sum	=	46,000	1,390,000
Signals and Interlocking				
Signals 6.4 Miles	@ 100,000	=	640,000	
Interlocking Plant - Jersey Central		=	700,000	
Communication System		=	120,000	1,460,000
Power				
3rd Rail 68,000'	@ 10.00	=	680,000	
Feeders, Breakers, etc. 6.4 Miles	@ 100,000	=	640,000	
2 Substations	@ 350,000	=	700,000	2,020,000
Stations, Platforms and Equipment				
Transfer Station including Jersey Central Tracks, Platforms, Canopies, Stairways, Passageways, Controls, Storage Yard for 190 Cars				2,370,000
				$11,887,000
	Contingencies 20%+			2,377,000
				$14,264,000
	Engineering 10%+			1,436,000
	Total			$15,700,000

ESTIMATE "C"

Estimate of Cost of Extending H & M Service
from Waldo Avenue Yard (Penn R.R.) to Connection with

Jersey Central Railroad
at
Communipaw Avenue Jersey City (1.8 Mi.)

SECTION "C" - Waldo Junction to Golden Street, Lehigh Valley (0.9 Mi.)

Items				
Land and Easements (Not including use of Penn R.R. or Lehigh Valley Right-of-Way)				$ 50,000
Embankments, Viaducts and Bridges				
Earth Excavation 6,500 C.Y.	@ 2.00	=	$ 13,000	
Rock Excavation 17,150 C.Y.	@ 8.00	=	137,200	
Street Bridges - 2	@ 150,000	=	300,000	
Trestle 3,345	@ 700.00	=	2,341,500	
Retaining Walls 1,435 Square Yards	@ 150.00	=	215,300	3,007,000
Track and Roadway				
10,320' New Track	@ 18.00	=	185,760	
5,730' Relocated Track	@ 12.00	=	68,760	
Special Work	Lump Sum	=	70,000	
Fencing 830'	@ 6.00	=	4,980	
Paving 1,500 Square Yards	@ 5.00	=	7,500	337,000
Signals and Interlocking				
Road Signals 0.9 Mile	@ 100,000	=	90,000	
Junction Interlocking	Lump Sum	=	100,000	190,000
Power				
3rd Rail 10,300'	@ 10.00	=	103,000	
Feeders, Breakers, etc. 0.9 Mile	@ 100,000	=	90,000	
1/3 Substation	@ 450,000	=	150,000	
Adjust Penn R.R. Overhead		=	35,000	
Communication System		=	30,000	408,000
				$3,992,000
	Contingencies 20%+			788,000
				$4,780,000
	Engineering 10%+			480,000
	Total			$5,260,000

ESTIMATE "D"

SECTION "D" - Golden Street to Communipaw Transfer (0.9 Mi.)

Land and Easements (Not including Lehigh Valley or Jersey Central lands)				$ 50,000
Embankments, Viaducts & Bridges				
Excavation 56,800 C. Y.	@ 2.50	= $	142,000	
Structures 1275' Trestle	@ 700.00	=	892,000	
1 - 185' span	@ 160,000	=	160,000	
2 - Street Bridges	@ 140,000	=	280,000	1,474,000
Track and Roadway				
12,000' New Track	@ 18.00	=	216,000	
Jersey Central Track Changes		=	65,000	
Special Work				
15 Turnouts	@ 5,000	=	75,000	
2 R.R. Crossings	@ 15,000	=	30,000	
Relocated Tracks and Buildings		=	35,000	
Fencing 1500'	@ 6.00	=	9,000	430,000
Signals and Interlocking				
Roadway Signals 0.9 Mile	@ 150,000	=	135,000	
Adjust Jersey Signals	Lump Sum	=	75,000	210,000
Power				
3rd Rail 9,500'	@ 10.00	=	95,000	
Feeders, Breakers, etc. 0.9 Mile	@ 100,000	=	90,000	
1/3 Substation	@ 450,000	=	150,000	
Communication System		=	30,000	365,000
Stations and Platforms				
2400' - 16' Low Platforms	@ 100.00	=	240,000	
510' - 18' High Platforms	@ 200.00	=	102,000	
810' - Stairs and Passageways	@ 200.00	=	162,000	
120' - Stairs to Street	@ 100.00	=	12,000	
Station Building and Controls	Lump Sum	=	50,000	566,000
				$3,095,000
	Contingencies 20%+			619,000
				$3,714,000
	Engineering 10%+			386,000
	Total			$4,100,000

NOTE

1. For through service deduct $750,000 for elimination of Transfer Station at Communipaw Avenue leaving Net Cost of $3,350,000.

ESTIMATE "E"

Estimate of Cost
Hudson & Manhattan Extension to Communipaw

Alternate Route from Golden Street to Jersey Central Station
(1.4 Mi.)

SECTION "E" - Bi-state Loop Section - Golden Street to Jersey Central Junction (0.73 Mi.)

Items				
Land and Easements (Not including use of R. R. lands)				$ 69,400
Tunnel Section				
175'	@ 2,300	= $	402,500	402,500
Embankments, Viaducts and Bridges				
Excavation 69,759	@ 2.00	=	139,500	
Structures - 6	@ 110,000	=	660,000	
Retaining Walls	Lump Sum	=	1,575,800	2,375,300
Track and Roadway				
7640' New Track	@ 18.00	=	137,520	
850' Guard Rail	@ 9.00	=	7,650	
Fencing 3820'	@ 6.00	=	22,920	168,090
Signals and Interlocking				
Road Signals 0.73 Mile	@ 100,000	=	73,000	
Interlocking - Lehigh Valley		=	150,000	
Communication System		=	30,000	253,000
Power				
3rd Rail 7640'	@ 10.00	=	76,400	
Feeders, Breakers, etc. 0.73 Mile	@ 100,000	=	73,000	
1/3 Substation	@ 450,000	=	150,000	
Utility Changes		=	10,000	309,400
				$3,577,690
	Contingencies 20%+			715,510
				$4,293,200
	Engineering 10%+			426,800
	Total			$4,720,000

ESTIMATE "F"

SECTION "F" - Jersey Central Junction to Jersey Central Station (0.67 Mi.)

Items

Land and Easements - None (Not including Jersey Central lands)			$ ---	
Embankments, Viaduct and Bridges				
Grading and Drainage		= $	30,000	
Remove Existing Pavement 2650 Sq.Yds.	@ 3.00	=	7,950	37,950
Track and Roadway				
6400' New Tracks	@ 18.00	=	115,200	
1650' Old Tracks Removed	@ 8.00	=	13,200	
Special Work				
14 Turnouts	@ 5,000	=	70,000	
3 Double Slips	@ 20,000	=	60,000	
3 R.R. Crossings	@ 15,000	=	45,000	
2 Bumping Posts	@ 1,000	=	2,000	305,400
Signals and Interlocking				
Road Signals 0.67 Mile	@ 100,000	=	67,000	
Interlocking - Jersey Central Station		=	500,000	
Communication		=	33,000	600,000
Power				
3rd Rail 6900'	@ 15.00	=	103,500	
Feeders, Breakers, etc. 0.67 Mile	@ 100,000	=	67,000	
1/3 Substation	@ 450,000	=	150,000	
Utility Changes			25,500	346,000
Station - None				
Use 2 tracks in Jersey Central Station				
				$1,289,350
	Contingencies 20%+			258,650
				$1,548,000
	Engineering 10%+			152,000
	Total			$1,700,000

ESTIMATE "G"

Estimate of Cost of Restoration

Jersey Central - Newark - New York Line
from
Central Avenue, Kearny to Communipaw Avenue, Jersey City (2.65 Mi.)

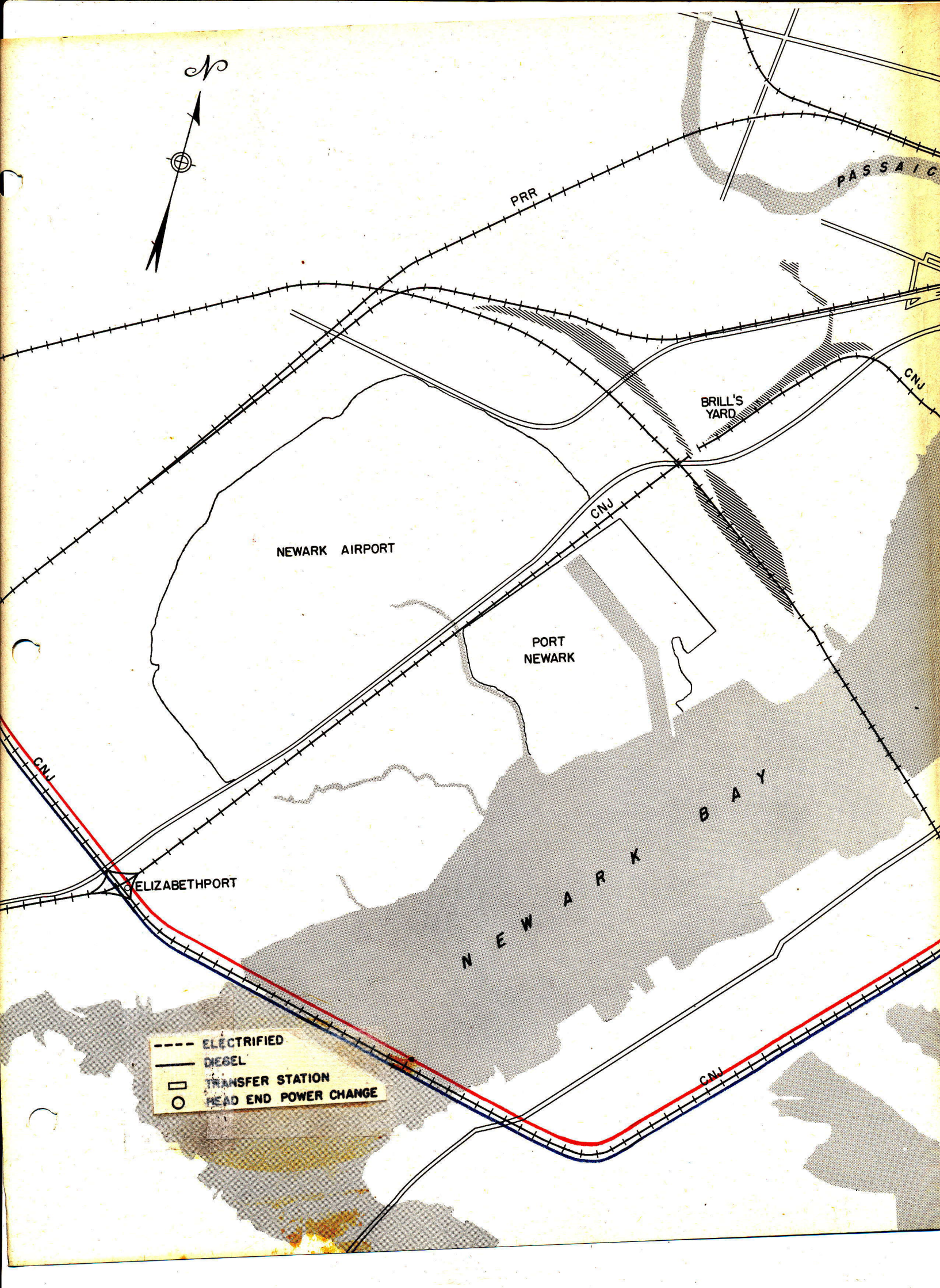
SECTION "G"

Items

Land, Right-of-Way and Other (All Jersey Central Property)				
Embankments, Viaducts and Bridges				
Embankment 87,000 C. Y.	@ 2.00	= $	174,000	$ 174,000
Bridges - Rehabilitate Route #1)				
Rehabilitate Central Avenue)		=	200,000	200,000
Hackensack River Draw Bridge				
Substructure		=	1,770,000	
Superstructure		=	2,223,000	
Electric Equipment		=	186,000	
Operators Housing		=	42,000	
Fenders		=	525,000	4,746,000
Track and Roadway				
28,000' New Track	@ 18.00	=	504,000	
Special Work - 10 Turnouts	@ 4,600	=	46,000	550,000
Signals and Interlocking (Including Communication)				
Road Signals 2.65 Miles	@ 185,000	=	490,000	
Hackensack - Draw Bridge	Lump Sum	=	154,000	
Communication		=	66,000	710,000
Power				
3rd Rail 28,000'	@ 10.00	=	280,000	
Feeders, Breakers, etc. 2.65 Miles	@ 100,000	=	265,000	
1 Substation	@ 350,000	=	350,000	895,000
Stations, Platforms, etc.				
2 Stations complete with Platforms, Canopies, Stairs, Passageways and Controls	@ 265,000	=	530,000	530,000
				$7,805,000
	Contingencies 20%+			1,565,000
				$ 9,370,000
	Engineering 10%+			930,000
			Total	$10,300,000

NOTE
1. For Communipaw Transfer deduct $1,200,000 for Electrification - Net Cost $9,100,000

E X H I B I T S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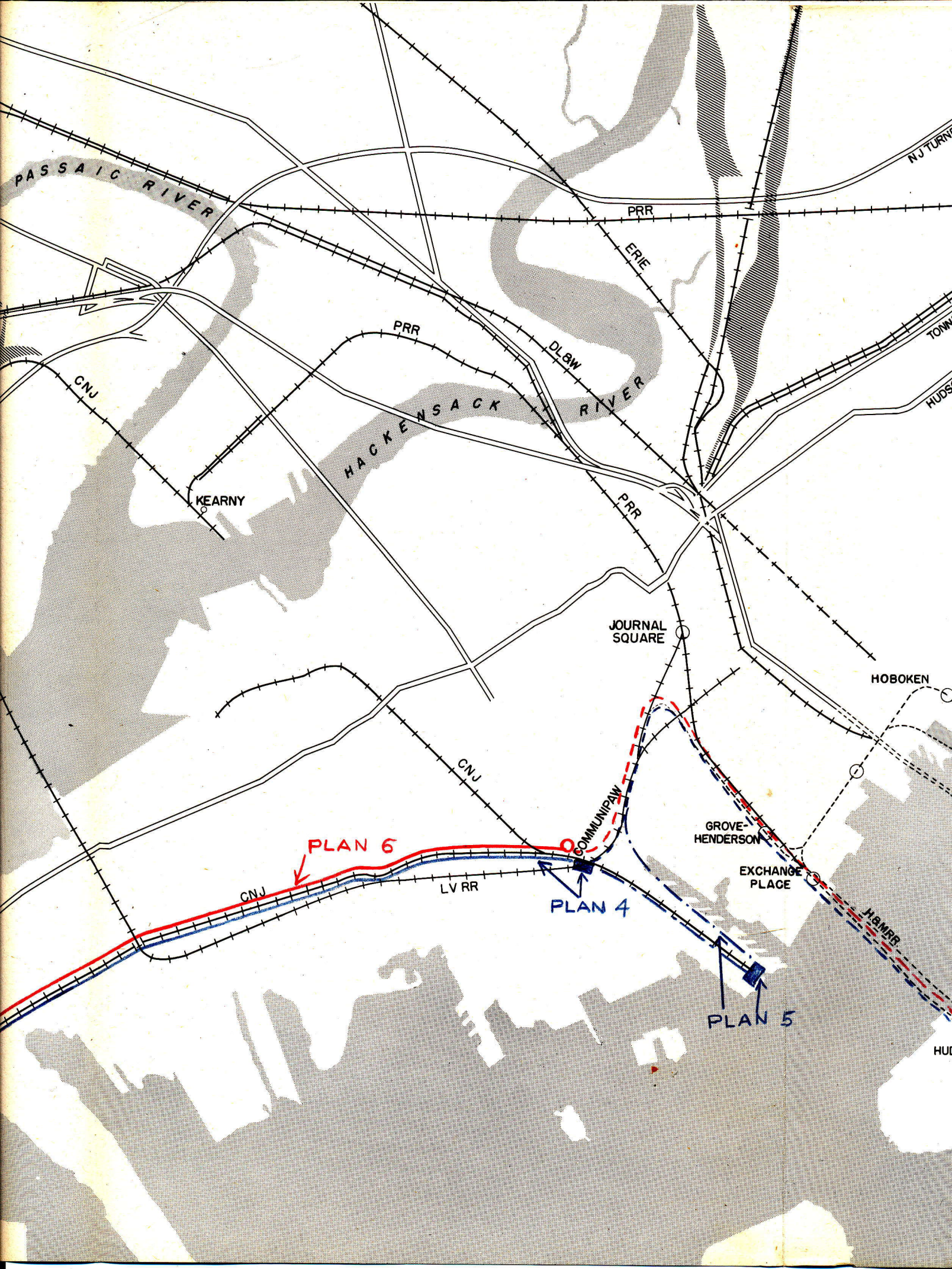
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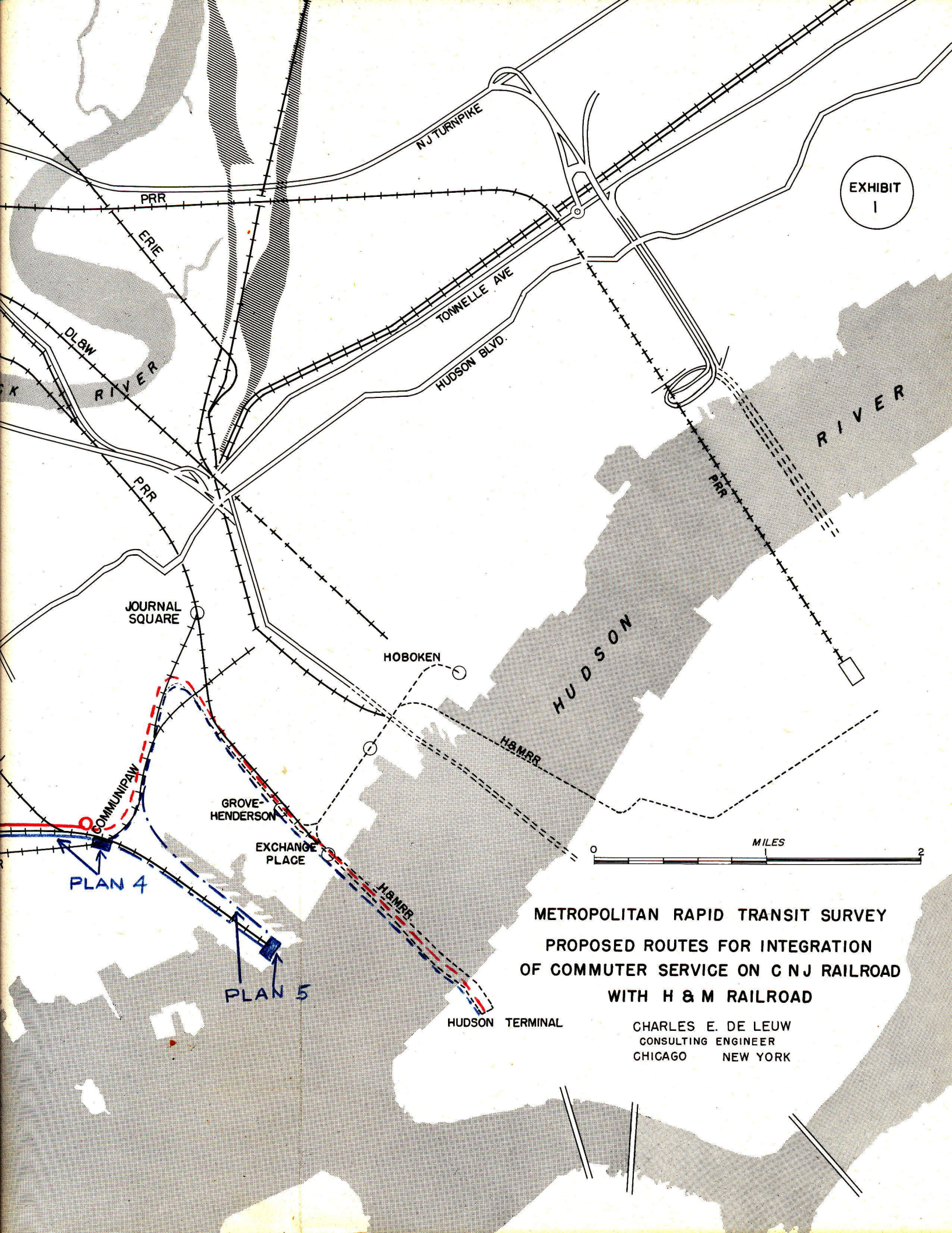
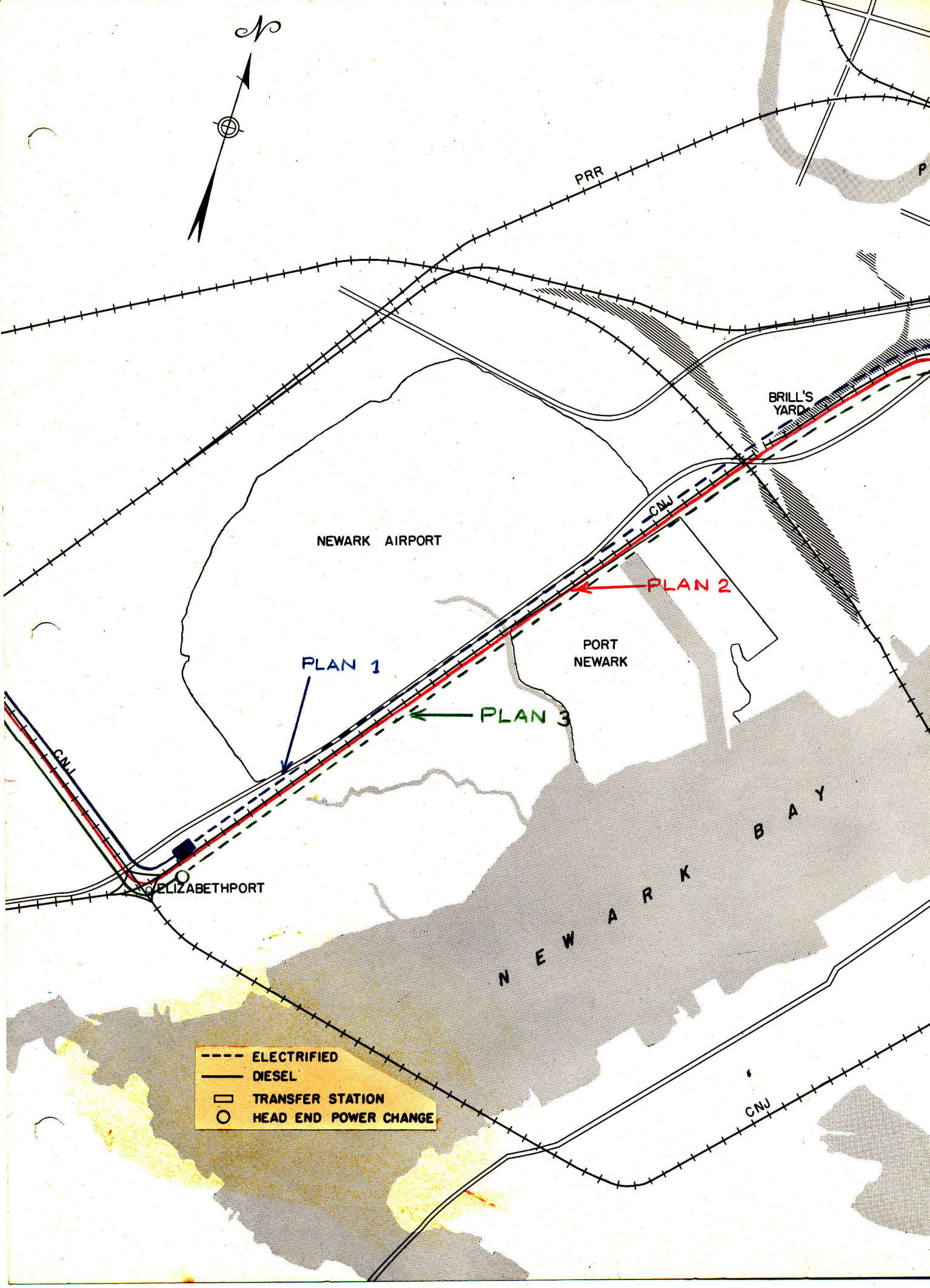


METROPOLITAN RAPID TRANSIT SURVEY

PROPOSED ROUTES FOR INTEGRATION OF COMMUTER SERVICE ON C N J RAILROAD WITH H & M RAILROAD

CHARLES E. DE LEUW
CONSULTING ENGINEER
CHICAGO NEW YORK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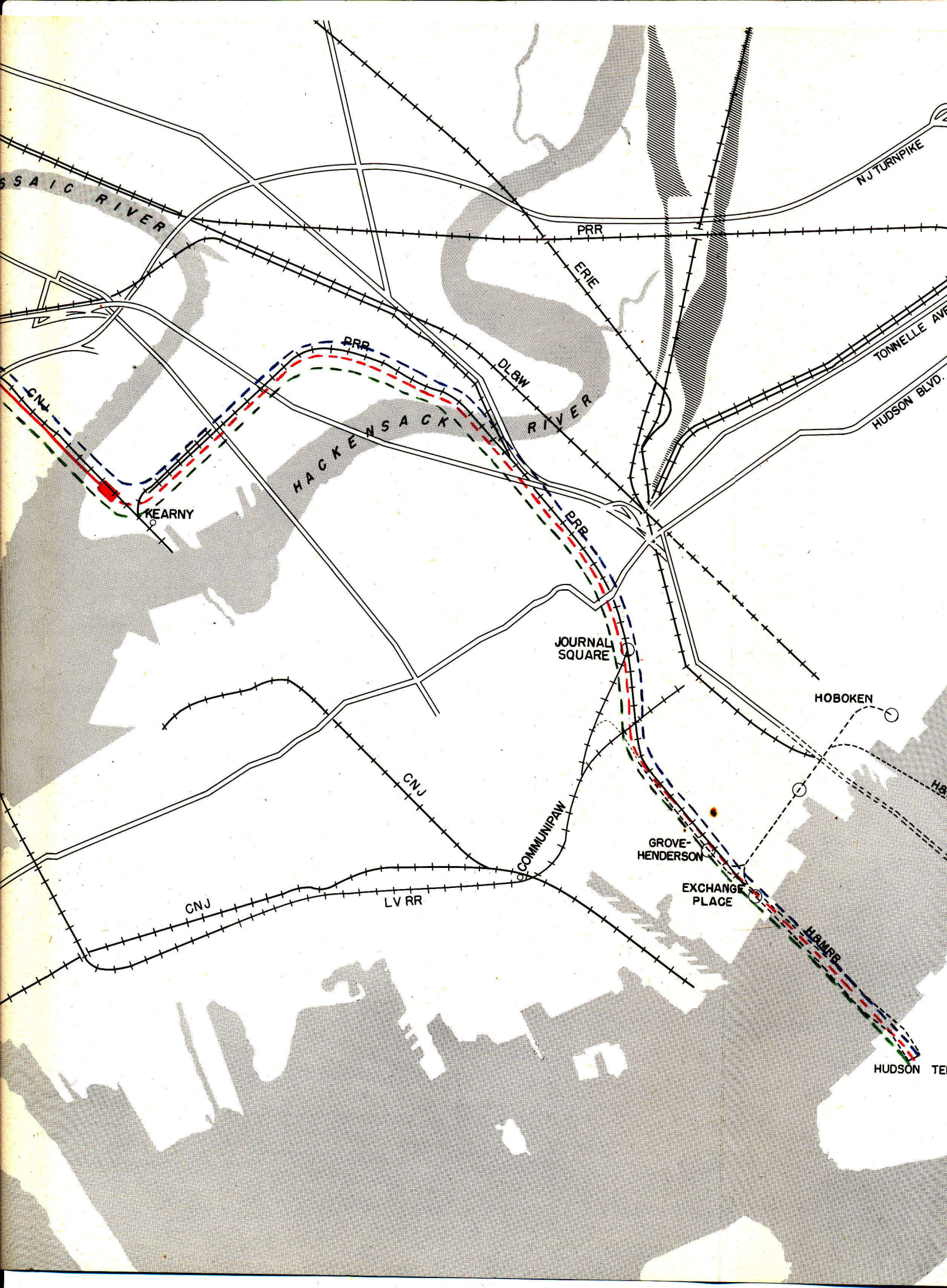
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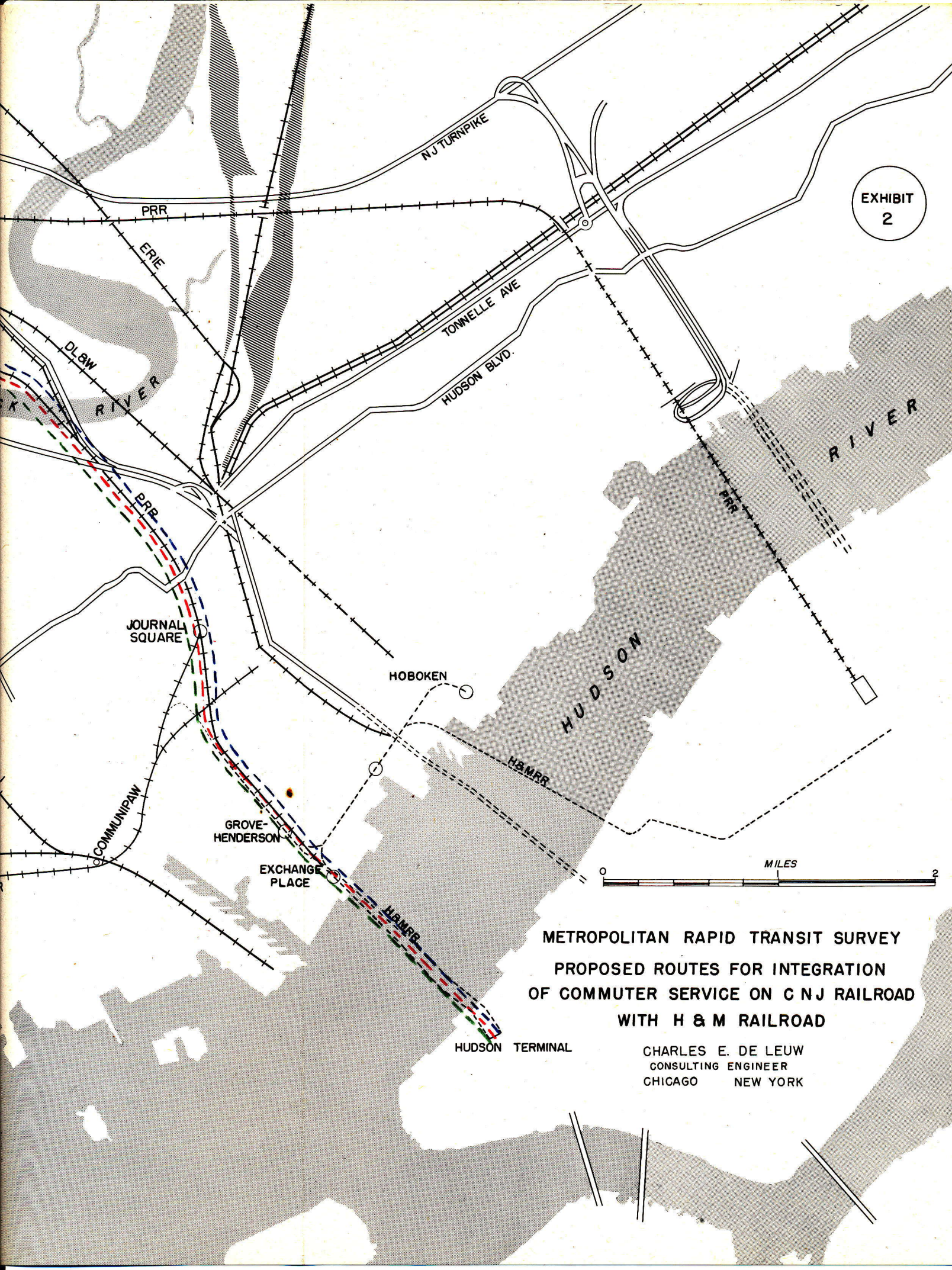
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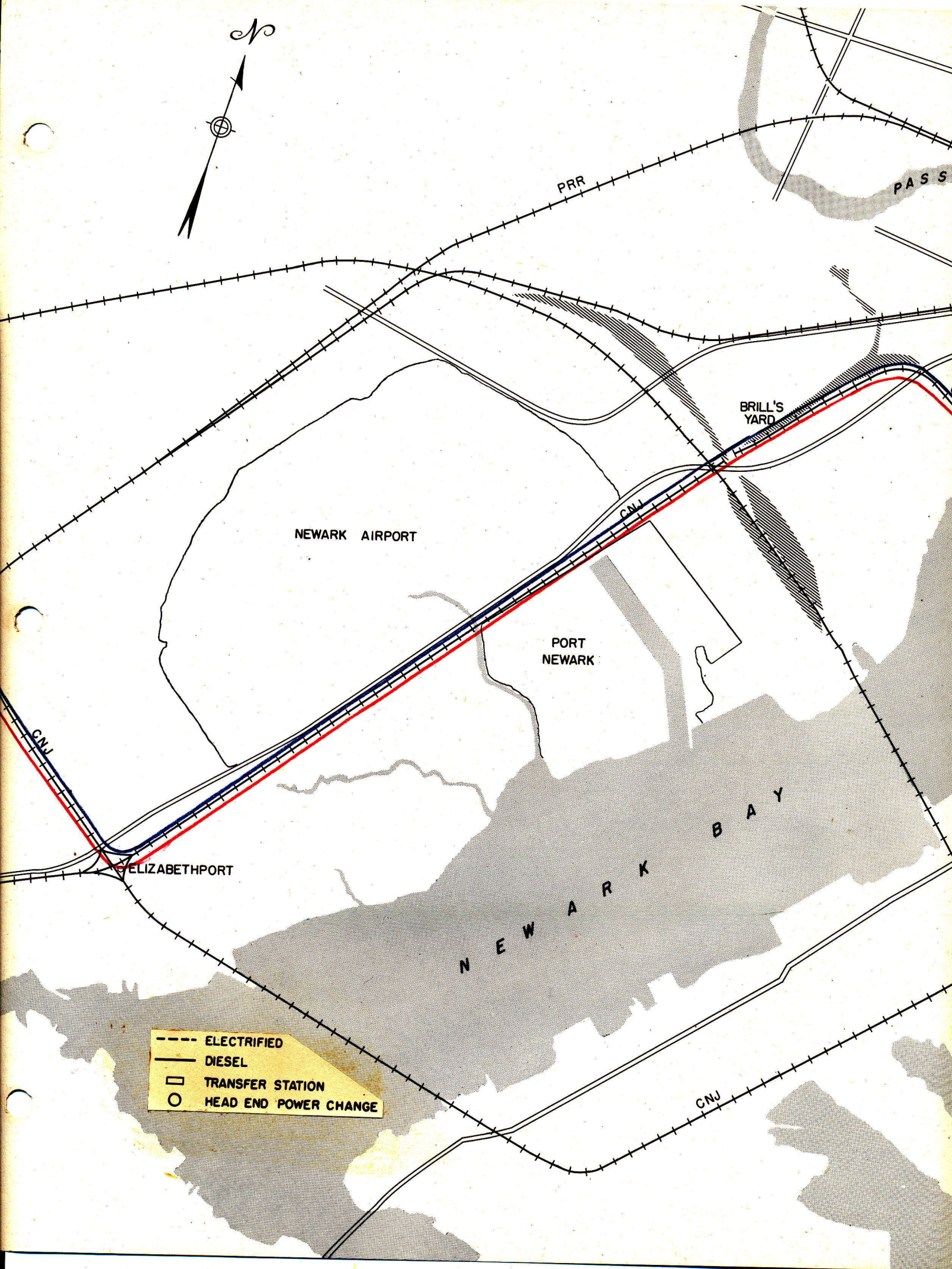
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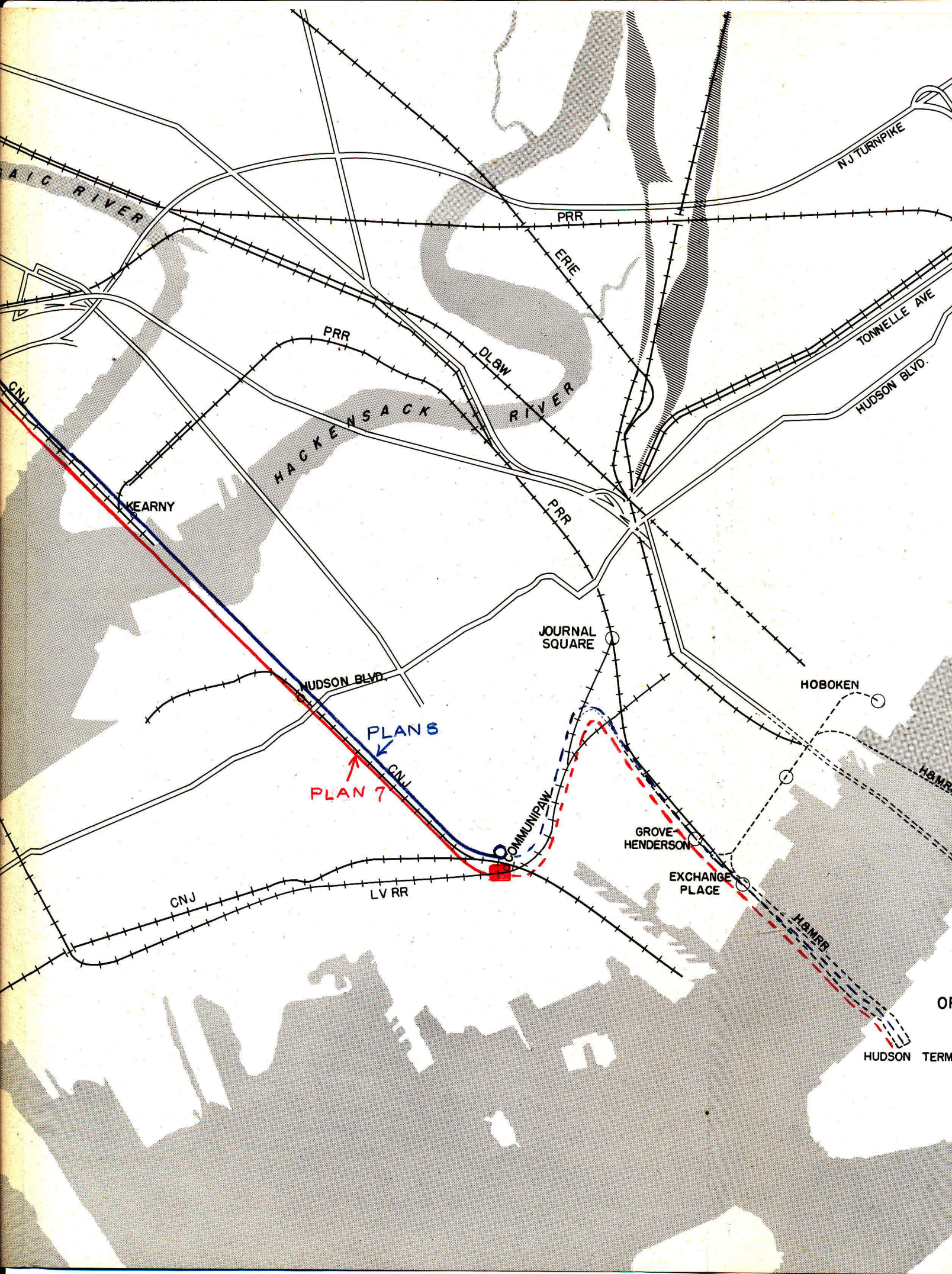
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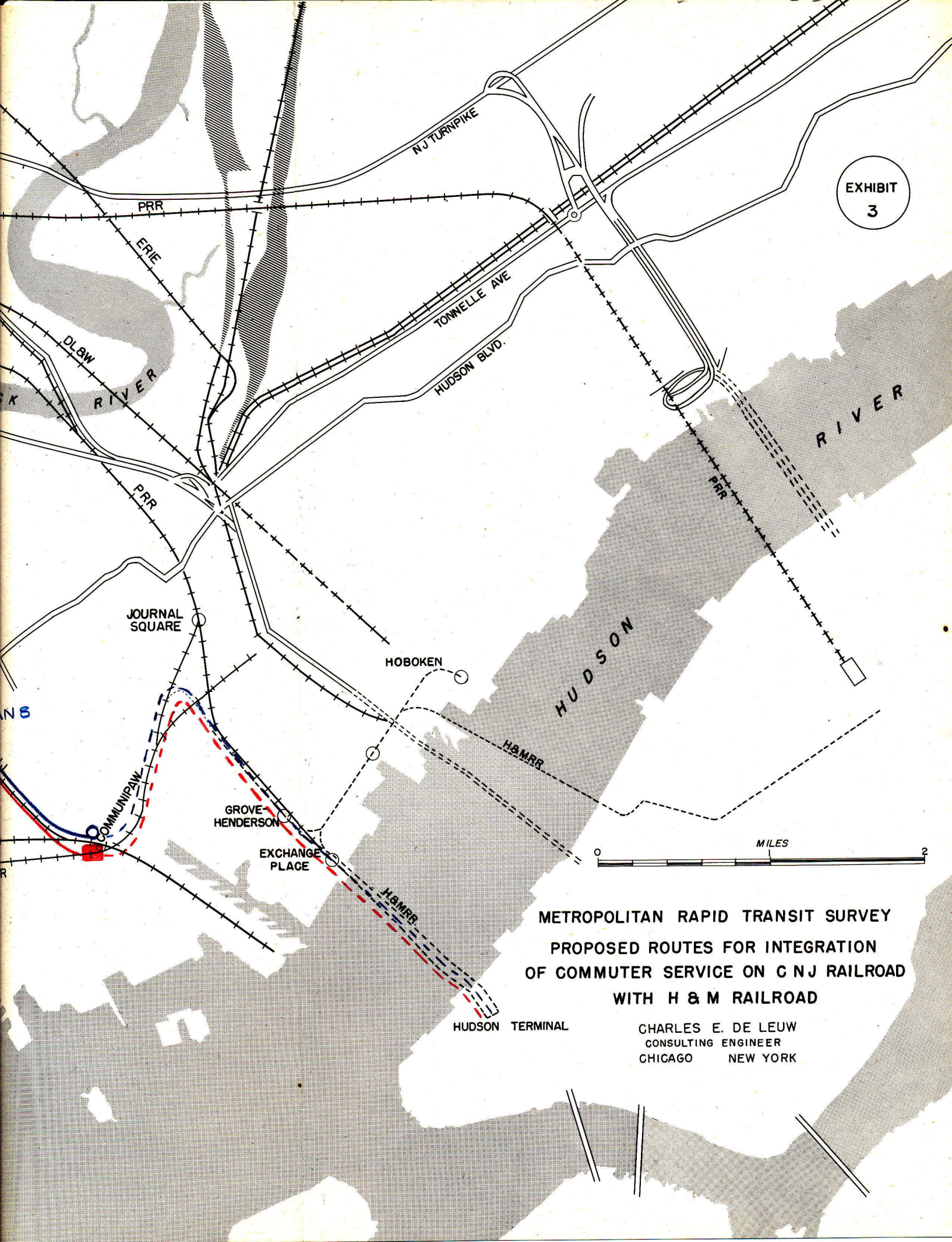
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