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Des Plaines Station Feasibility Study

Station Spacing and Site Screening Technical Memorandum

City of Des Plaines

November 15, 2018

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1. Introduction

The City of Des Plaines is conducting a comprehensive feasibility study for a new station on the Metra North Central Service Line (NCS). The NCS line uses the Canadian National Railway (CN) between Antioch and Franklin Park, and operates its last 12.7 miles to Chicago Union Station (CUS) over the Metra Milwaukee District West (MD-W). The study seeks to answer the following questions:

- Can a location be identified to physically accommodate a station and parking,
- Will the station be compatible with current railroad operations,
- Will there be a sufficient number of potential users,
- Will impacts to traffic, storm water, and other factors be manageable,
- Can the station be realistically funded, and
- Will a station stimulate the redevelopment of adjacent properties?

A question that needs to be answered early in the study is whether a station on this segment of the NCS is appropriate, based on practical or theoretical station spacing considerations. The proposal is to study an infill station between Prospect Heights at milepost (MP) 24.0 and O'Hare Transfer at MP 17.1. The midpoint of this 6.9-mile span would be MP 20.6, just south of the Deval Junction of the NCS and Union Pacific (UP) lines west of downtown Des Plaines. Placing a station at this location would reduce the spacing from 6.9 miles to 3.5 miles. Locating the proposed station north or south of this mid-point will result in a minimum spacing less than this amount. The identification and screening of alternative sites will determine this minimum spacing. The report will review whether this resultant spacing raises issues that could affect the overall viability of the new station, or how it is designed.

The report will cover the following areas:

- Theoretical basis for, and issues with, spacing of transit stops
- Implications of station spacing for commuter rail
- Guidelines, standards and practices of other commuter rail agencies
- Review of Metra station spacing
- Screening of alternative station locations, including the resultant spacing of each
- Conclusions applied to Des Plaines

2. Station Spacing Issues

A fundamental design challenge for any public transit system is deciding the distance between access points of the service. This applies to a local bus, light rail, rapid transit, commuter rail, or intercity rail. The choices are to have:

- Minimal number of stops (i.e., wider spacing) to offer faster service, or
- More stops (i.e., closer spacing) to provide access to a greater number of potential uses, but at slower speeds.

To illustrate the effect of station stops on travel time, Table 2-1 shows scheduled travel times between Naperville and Union Station on the BNSF line serving the western suburbs. This line was chosen to illustrate this because it offers express and local/all-stop service. The two stations are 28.5 miles apart. As can be seen, the difference in travel time between an express train with no intermediate stops and an all-stop train (i.e., 22 intermediate stops) is 115 percent (33 minutes versus 71 minutes). Each added stop increases travel time by about two minutes; variations beyond number of stops are mostly due to differences in the level of ridership, where longer station dwell times are required with higher boardings / alightings.

Table 2-1. Selected BNSF Inbound Train Travel Times between Naperville and CUS

Union Station Arrival	Intermediate Stops	Scheduled Travel Time (mins)	Added Time from No Stops (mins)	Added Time per Stop (mins)	Speed (MPH)
6:53 AM	0	33	0	--	51.8
5:32 AM	9	48	15	1.7	35.6
4:58 PM	11	55	22	2.0	31.1
7:00 AM	19	66	33	1.7	25.9
6:00 AM	22	71	38	1.7	24.1

SOURCE: Metra BNSF Timetable.

The need to provide closer spacing—at the expense of travel time—is driven by serving riders who access or egress by a mode other than private automobile—typically walking. Walking as an access mode is generally less common for commuter rail because it tends to serve lower density suburban and exurban communities where commuters typically have access to an automobile and must travel longer distances to reach the central business district. Automobile access is a key attribute of commuter rail, and it greatly enlarges the station market area from which riders can be drawn to a station, in addition to obviating the need for frequent stops, which would significantly slow travel times across longer distances. Commuter rail station market areas are also comparatively less dense than would otherwise be needed to support transit, since the station parking facilities serve to collect riders from a large area.

Table 2-2 shows the distribution of originating riders by their mode of access to reach a boarding station. Access mode shares are from the Metra 2016 Origin-Destination Survey of riders traveling on AM trains, and are presented in rank order. For the Metra system as a whole, 53.1 percent of riders used an automobile to park at a station. Another 18.6 percent were dropped off or carpooled, totaling 71.7 percent who arrived by car. Riders using the walk mode of access, who would be most impacted by station spacing, accounted for 22.6 percent of surveyed riders. Table 2-2 also presents mode of access shares for the NCS Line, which reveals a lower use of the walk mode, and a higher share arriving by car than for the system overall (79.2% vs. 71.7%). Metra

stations in or near Des Plaines (i.e., Des Plaines, Cumberland, Prospect Heights, O'Hare Transfer) have walk access modes ranging from 11 percent at Prospect Heights to 47 percent at Des Plaines.

Table 2-2 also reveals that riders who access stations by walking travel the shortest distance between their origin and AM boarding station (0.4 miles straight-line distance, on average, at NCS stations—slightly longer than the 0.3 miles systemwide). NCS riders accessing by automobile tend to travel between 1.2 and 1.8 miles.

Table 2-2. Metra and NCS Mode of AM Access and Average Distance

	Share of AM Trips		Avg. Dist.(miles)	
Access Mode	System	NCS	System	NCS
Drive Alone	53.1%	57.7%	2.2	1.7
Walk	22.6%	13.2%	0.3	0.4
Drop Off	14.7%	17.6%	1.4	1.2
Bicycle	2.5%	4.4%	0.9	0.9
Carpool Passenger	2.0%	2.1%	1.9	1.8
Carpool Driver	1.9%	1.8%	1.9	1.7
Pace Bus	1.6%	0.4%	2.4	1.5*
CTA Bus	0.8%	1.1%	1.8	1.9
Other	0.5%	0.4%	1.6	2.3*
Rideshare (Uber, Lyft, Via)	0.3%	0.5%	2.0	1.0*
CTA Rapid Transit	0.2%	1.1%	3.5	2.8*
Taxi	0.2%	0.3%	1.7	1.3*
Another Metra Line	0.1%	0.1%	6.8	0.7*
Divvy bike	0.1%	0.3%	1.0	1.0*
Private Bus	0.0%	0.1%	1.9	
Total / Average	100.0%	100.0%	1.6	1.4
Total AM Boardings	125,921	3,410		

SOURCE: Metra 2016 Origin-Destination Survey.
** Weighted average based on fewer than 10 data points.*
Notes: Excludes downtown station boardings. NCS average includes shared stations Western Avenue and River Grove. Excludes farthest 10% of systemwide origins by mode to correct for outliers in survey results. Uses weighted boardings and straight-line distance in calculating average distance in miles. Values are rounded to the nearest decimal and thus may not sum to 100%.

While the majority of Metra riders board AM Peak Inbound trains at outlying stations and alight at a downtown Chicago station, there are stations in the system that also serve destination riders. A prominent example is the MD-N Lake Cook Road Station in Deerfield, which is supported by a system of distributor buses called Shuttle Bugs. Unlike the traditional commuter rail rider, who is destined for the highly concentrated area of jobs in downtown Chicago (about 700,000 jobs in a three-square mile area), riders traveling to endpoints outside of downtown are bound for destinations generally more dispersed—often beyond walking distance from an alighting station.

The Metra Origin-Destination survey also included data on egress mode, which represented travel means used to reach one's ultimate destination during the AM. The percentages shown on Table 2-3 exclude responses for riders alighting one of Metra's five downtown stations. As can be seen, over one-half of system respondents walked after alighting their train. The NCS showed a lower share of walkers (45.9 percent), but this lower walk share is primarily driven by a large number of riders accessing the Western Avenue station (shared with MD-N and MD-W lines) by CTA bus. Table 2-3 also shows the average distance commuters travel from a non-downtown station to their destination. The system average for distance walked between the alighting station and trip

destination is somewhat farther (0.5 miles) than the distance between the boarding station and trip origin (0.3 miles), but it is even farther for the NCS line (0.8 miles), potentially indicating fewer destinations within easy pedestrian access of the station. NCS O'Hare Transfer and Prospect Heights have notably low walk egress shares (about 20 percent), while UP-NW Des Plaines and Cumberland are rather higher at about 35 percent walk egress.

Table 2-3. Metra and NCS Mode of AM Egress and Average Distance

	Share of AM Trips		Avg. Dist. (miles)	
Egress Mode	System	NCS	System	NCS
Walk	52.3%	45.9%	0.5	0.8
Private Shuttle	8.8%	10.0%	1.9	1.1
Pace Bus	7.9%	2.8%	2.3	3.5*
Get Picked Up	6.4%	6.5%	2.0	1.3
Drive Alone	6.0%	2.1%	2.6	2.3*
CTA Bus	5.7%	16.4%	2.0	1.5
Bicycle	2.7%	3.0%	1.2	1.9*
Rideshare (Lyft, Uber, Via)	2.2%	2.1%	2.0	1.7*
CTA Rapid Transit	1.8%	1.1%	4.5	1.5*
Taxi	1.7%	1.9%	2.2	1.2*
Carpool Passenger	1.6%	1.5%	2.4	2.9*
Other	1.5%	2.9%	1.7	0.5*
Another Metra Train	0.7%	1.1%	7.7	6.5*
Divvy Bike	0.4%	2.3%	1.2	1.6*
Carpool Driver	0.4%	0.6%	3.8	5.5*
Total / Average	100.0%	100.0%	1.3	1.4
Total AM Alightings	16,258	980		

SOURCE: Metra 2016 Origin-Destination Survey.

** Weighted average based on fewer than 10 data points.*

Notes: Excludes downtown station alightings. NCS Average includes shared stations Western Avenue and River Grove. Excludes farthest 10% of systemwide destinations by mode to correct for outliers in survey results. Uses weighted alightings and straight-line distance in calculating average distance in miles. Values are rounded to the nearest decimal and thus may not sum to 100%.

Table 2-4 shows the distribution of AM walk access and egress by one quarter-mile increment for stations outside of downtown Chicago. Systemwide, the first half mile accounts for 75% of walk access trips and 66% percent of walk egress trips, but NCS riders who walk to their destination generally travel much farther, and thus less than 63 percent walk a half mile or less to board and 47% walk a half mile or less after alighting at a NCS station to reach their destination.

Table 2-4. Walk Distances for AM Riders, System and NCS

	Mode of Access		Mode of Egress	
Miles	System	NCS	System	NCS
0.00 - 0.25	38%	37%	32%	29%
0.26 - 0.50	37%	26%	34%	18%
0.51 - 0.75	16%	11%	22%	8%
0.76 - 1.00	5%	6%	5%	6%
1.01 - 1.25	1%	2%	2%	2%
1.26 - 1.50	1%	2%	2%	10%
1.51 +	3%	16%	3%	27%
	100%	100%	100%	100%

SOURCE: Metra 2016 Origin-Destination Survey.

Notes: Excludes downtown station boardings and alightings. NCS values include shared stations Western Avenue and River Grove. Uses weighted boardings/alightings and straight-line distance in calculating average distance in miles. Values are rounded and thus may not sum to 100%.

Generally speaking, while the higher percentage of AM riders who walk from a non-downtown station suggests that closer spacing can be important, this segment of Metra ridership represents one-eighth of riders making Metra's traditional AM commuter trip. In addition, there were only 13 stations of 234 total non-downtown stations that reported more AM Peak offs than ons based on the 2016 Metra passenger count. As such, Metra's accommodation of destinations outside of downtown Chicago is limited to a relatively few areas in the region.

3. Commuter Rail Station Spacing Practice & Guidelines

Table 3-1 lists all commuter railroads in the United States who report statistics to the Federal Transit Administration's (FTA) National Transit Database (NTD), shown in rank order of unlinked passenger trips (i.e., count of each time a passenger boards a vehicle, even if part of the same journey from origin to destination). This data repository is required of FTA grant recipients, and includes a variety of financial, operating, ridership, and asset data. For the 23 systems listed, 2016 data on route miles and number of stations was used to derive the average system spacing of stations. Overall, this statistic was 3.1 miles. This agency average was higher than the 2.0 miles for Metra, as well as higher than most of the older and largest commuter rail systems nationally. The top seven agencies have spacing averages lower than the 3.1 overall average; these agencies accounted for 89 percent of the reported unlinked trips in 2016.

Table 3-1. Station Spacing at US Commuter Railroads

Commuter Rail Agency	Primary city Served	Annual Unlinked Trips	Route Miles	Number of Stations	Average Spacing (miles)
MTA Long Island Rail Road	New York	103,196,857	319.1	124	2.6
New Jersey Transit Corporation	New York	90,872,267	500.9	165	3.0
Metro-North Commuter Railroad Company	New York	86,297,511	272.9	112	2.4
NE IL Regional Commuter Railroad Corp (Metra)	Chicago	72,289,606	487.7	241	2.0
Southeastern Pennsylvania Transp. Authority	Philadelphia	36,187,570	223.5	155	1.4
Massachusetts Bay Transportation Authority	Boston	33,830,904	388.0	138	2.8
Peninsula Corridor Joint Powers Board	San Francisco	18,355,641	76.8	32	2.4
Southern California Regional Rail Authority	Los Angeles	13,758,419	412.2	59	7.0
Maryland Transit Administration	Baltimore	8,961,892	200.2	42	4.8
Utah Transit Authority	Salt Lake City	4,545,849	87.2	16	5.5
Virginia Railway Express	Washington	4,352,814	86.8	19	4.6
Central Puget Sound Regional Transit Authority	Seattle	4,312,113	81.9	12	6.8
South Florida Regional Transportation Authority	Miami	4,241,486	71.1	18	4.0
Northern Indiana Commuter Transportation Dist.	Chicago	3,504,080	89.9	19	4.7
Dallas Area Rapid Transit	Dallas	2,054,001	36.2	10	3.6
North County Transit District	San Diego	1,556,056	41.1	8	5.1
Pennsylvania Department of Transportation	Philadelphia	1,416,029	72.2	12	6.0
Altamont Commuter Express	San Jose	1,290,085	86.0	10	8.6
Rio Metro Regional Transit District	Albuquerque	886,386	96.6	14	6.9
Connecticut Department of Transportation	Hartford	849,942	50.6	9	5.6
Metro Transit	Minneapolis	711,167	39.0	7	5.6
Northern New England Passenger Rail Authority	Boston	473,923	143.8	12	12.0
Regional Transportation Authority	Nashville	277,741	31.4	6	5.2
Commuter Rail Total / *Average*		**494,222,339**	**3,895.0**	**1,240**	***3.1***

SOURCE: 2016 Federal Transit Administration (FTA) National Transit Database
Values are rounded, which may affect totals.

A review of commuter rail agency policies at the five largest commuter rail agencies in terms of ridership found that none have specific guidelines or standards on the spacing of stations. Guidance on spacing can be found in Alternative Analysis studies that include evaluation of candidate transit technologies. In addition, selected state departments of transportation have published characteristics of transit technologies as an aid to state-wide transportation planning. Agencies have also included guidelines to assist agencies in transit-oriented development planning.

Table 3-2 indicates that published guidelines are generally much wider than commuter rail agencies experience in practice, especially compared to older and larger legacy systems. This is believed to be due to guidelines being used principally for new start-up systems, where the main travel market to be served is the suburb-to-center city work commute trip. The guidelines are mostly presented as ranges from two miles to up to ten miles.

Table 3-2. Selected Guidelines on Commuter Rail Spacing

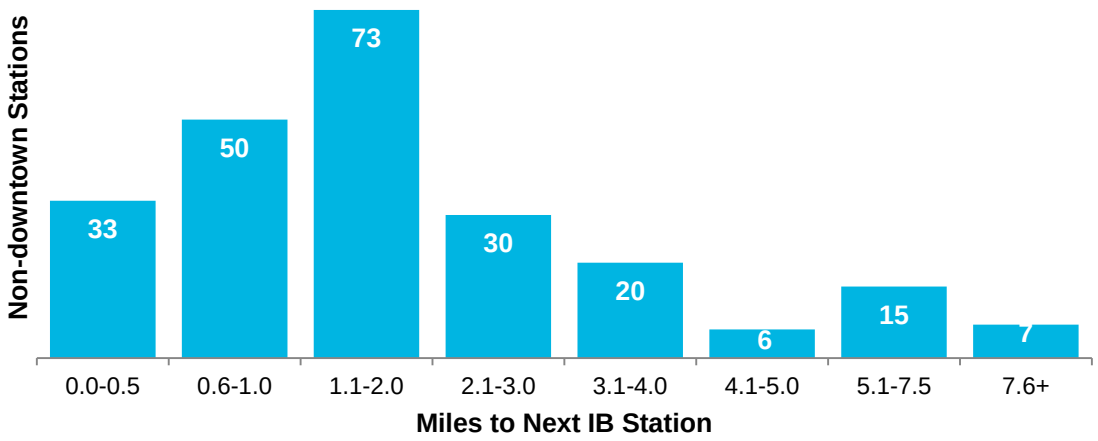
Report	Sponsoring Agency	Published	Spacing in Miles
Wisconsin Urban Rail Transit Technology Alternatives	State of Wisconsin Reference Bureau	1998	3 to 6
New Hartford Springfield Commuter Rail Implementation Plan	Connecticut DOT	2004	5
Circle Line Alternatives Analysis	Chicago Transit Authority	2006	3 to 7
Transit Service Design Guidelines	Virginia Department of Rail & Public Transportation	2008	5 to 10
Planning for Transit-Supportive Development	FTA Research	2014	2 to 5
Understanding the Range of Transit Choices	Florida Department of Transportation	2015	2 to 8
Regional Transit Guidelines	Metropolitan Council (Twin Cities Region)	2016	5 to 7

4. Metra Practice

The Metra system includes 241 stations, including five downtown stations. For the purpose of this analysis, two stations that serve more than one line were treated as single stations (i.e., Joliet-Rock Island/Heritage Corridor and Clybourn-UP-N&NW). As a result, the following is based on 234 stations. This count does not include the Romeoville Station on the Heritage Corridor Line, which opened in February 2018.

Figure 4-1 shows the distribution of stations by range of miles to the next inbound station. Eighty-three stations (35 percent of all stations) have a spacing of one mile or less. Stations between one and two miles number 73 (31 percent). The remaining one-third of stations range between 2.1 and 21.2 miles.

Figure 4-1. Metra Non-Downtown Stations by Miles to the Next Inbound Station



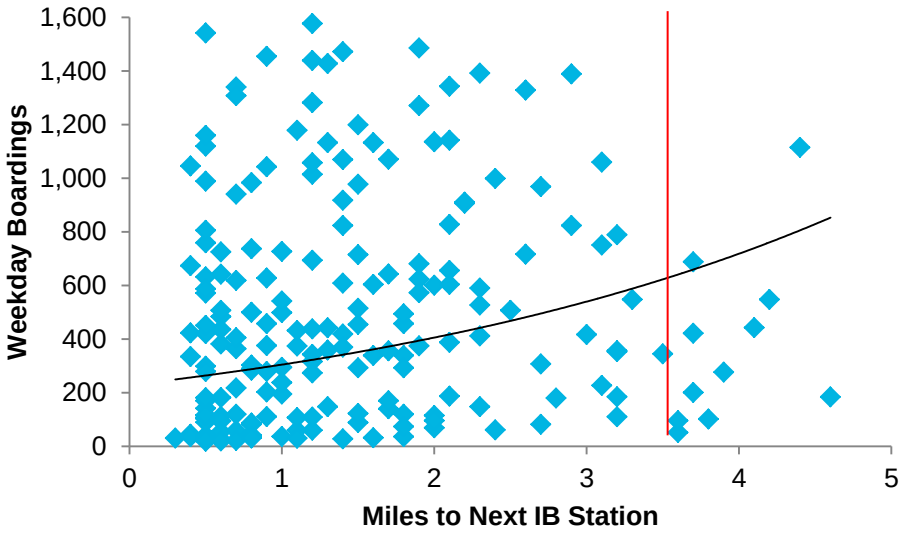
An important question related to the spacing of Metra stations is whether wider spacing translates to higher ridership. That is, when stations are spaced more closely together, does demand spread between stations such that ridership at an individual station is lower? Related, is faster service from wider spacing more important than maximizing access with closer spacing?

Figure 4-2 is a scatter plot of boardings by distance to inbound (IB) station (the y-axis is truncated to improve legibility). This scatterplot illustrates that as spacing increases, so do boardings, but the correlation is very weak. In order to find a stronger correlation between spacing and ridership, over 25 scatterplot analyses were carried out using different subcategories such as travel time to downtown, location, station type, service levels, parking capacity, etc. None of these yielded a strong correlation, which indicates that spacing on its own does cause high or low ridership—multiple other factors influence station performance and may vary by station spacing.

The vertical red line represents the 3.5-mile mark—the midpoint between the O'Hare Transfer Station and Prospect Heights Station—as a representation of the proposed Des Plaines station site. At this spacing (plus or minus a half-mile), boardings range from about 50 to over 5,000. The median weekday boardings for stations between 3.0 and 4.0 miles from the next inbound station is 355, and it includes such high performing stations (over 1,000 boardings in 2016) as Route 59, Ravenswood, and Tinley Park, as well as lower performers (less than 100 boardings) like Kedzie

and Grand/Cicero. Four existing NCS stations are between three and four miles to the next inbound station: Wheeling, Washington Street, Prairie Crossing/Libertyville, and Mundelein.

Figure 4-2. Station Boardings by Distance to Next Inbound Station



Another way of considering the issue of appropriate spacing for a new infill station is examining Metra's experience in adding stations. Since 1983, 32 stations have been added to the system. Of this number, one was a consolidation of two stations, seven were part of line extensions, eleven were stations on a new line (i.e., NCS), and the remaining thirteen were infill stations.

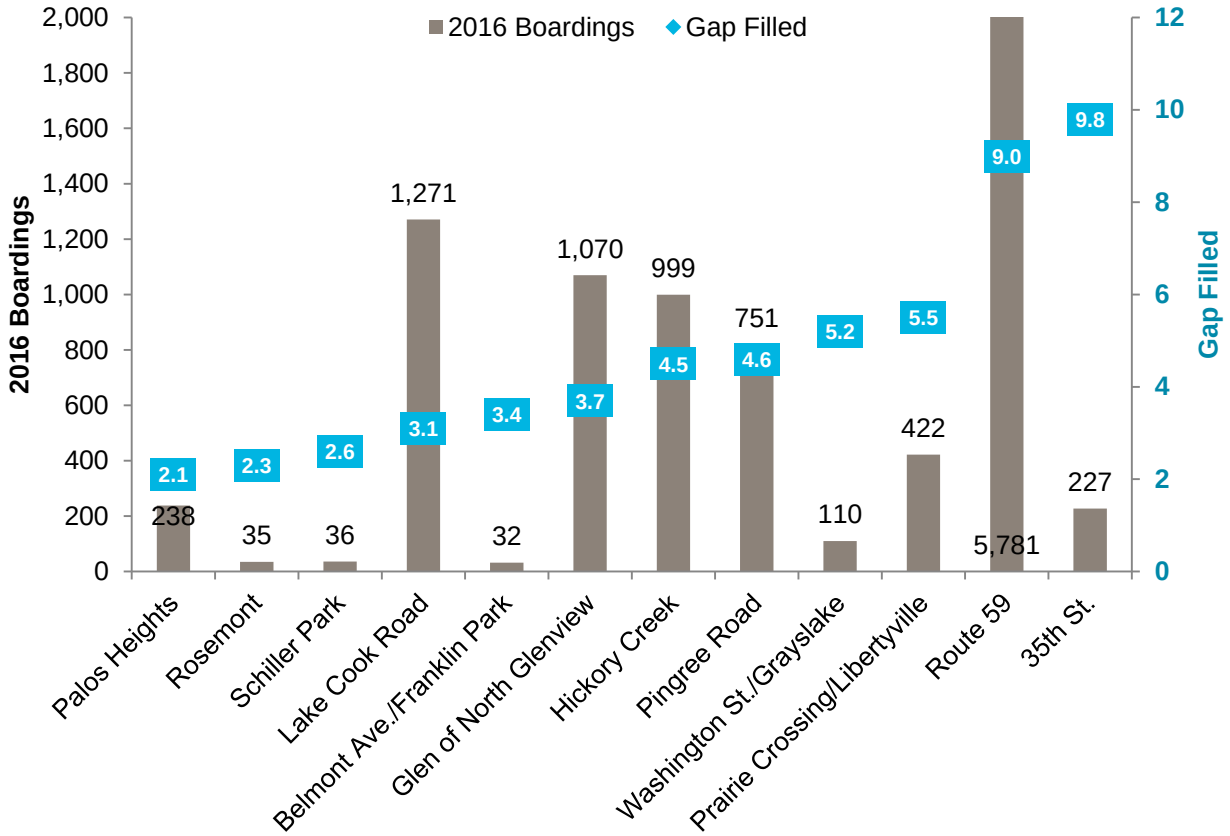
Table 4-1 lists new infill stations ordered by the gap between existing stations that was filled. A Des Plaines NCS station would fill the gap between Prospect Heights and O'Hare Transfer, a distance of 6.9 miles. This distance would be more than all but three Metra infill stations added since 1983, and would be comparable to the most recently added infill stations (i.e., 35th Street in 2011 and Romeoville in 2018). Table 4-1 also includes weekday boardings, which indicates a wide range of performance. Three of the most lightly used stations on the Metra system are included (Belmont Avenue, Rosemont and Schiller Park) as well at the single busiest station outside of downtown Chicago (i.e., Route 59 with 5,781 boardings in 2016). This corroborates systemwide analysis, suggesting that for added infill stations, it is also the case that there is not a clear correlation between station spacing and ridership.

These results are also provided graphically in Figure 4-3, which charts 2016 boardings along with the gap filled by the infill station, in ascending order of gap. The NCS 6.9-mile gap to be filled is wider than the gaps filled by four other infill stations with boardings above the Metra system station average of 637 weekday boardings (i.e., MD-N Lake Cook Road, MD-N Glen of North Glenview, RID Hickory Creek, UP-NW Pingree Road). These four stations range from milepost 18.8 to 41.7 (i.e., track distance to the downtown terminal station).

Table 4-1. Infill Metra Stations Added since 1983

Station	Line	Mile Post	Opening Year	Distance to Next IB Station	Distance to Next OB Station	Gap Filled	2016 Boardings
Palos Heights	SWS	19.2	2004	1.0	1.1	2.1	238
Rosemont	NCS	15.6	2006	0.8	1.5	2.3	35
Schiller Park	NCS	14.8	2006	1.8	0.8	2.6	36
Lake Cook Road	MD-N	23.0	1996	1.9	1.2	3.1	1,271
Belmont Ave./Franklin Park	NCS	13.0	2006	1.6	1.8	3.4	32
Glen of North Glenview	MD-N	18.8	2001	1.4	2.3	3.7	1,070
Hickory Creek	RID	27.5	1993	2.4	2.1	4.5	999
Pingree Road	UP-NW	41.7	2005	3.1	1.5	4.6	751
Washington St./Grayslake	NCS	43.9	2006	3.2	2.0	5.2	110
Prairie Crossing/Libertyville	MD-N	39.2	2004	3.7	1.8	5.5	422
Romeoville	HC	29.2	2018	3.9	3.7	7.6	n/a
Route 59	BNSF	31.6	1989	3.1	5.9	9.0	5,781
35th St.	RID	3.1	2011	3.1	6.7	9.8	227

Figure 4-3: Infill Stations by Boardings and Gap Filled



SOURCE: Metra 2016 Boardings. Note: Vertical axis is truncated for the BNSF Route 59 Station to improve chart legibility.

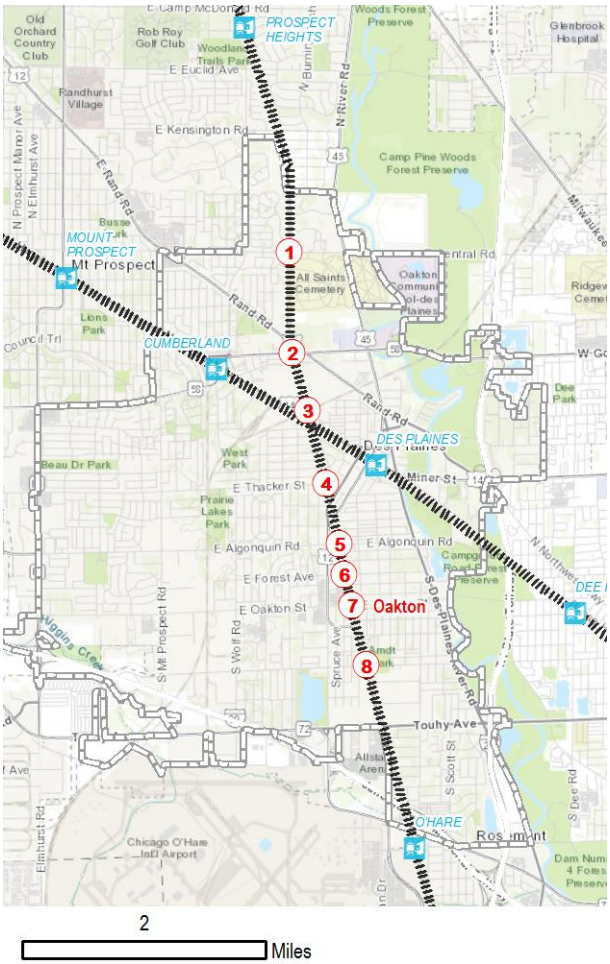
5. Initial Station Screening

As noted above, the gap between existing NCS stations for this study is comparatively wide, and multiple sites can be considered for a proposed station. To narrow the field of prospective sites, an initial screen of alternative station locations was performed. As shown on Table 5-1 and Figure 5-1 eight locations were identified, with each providing varying degrees of roadway accessibility.

Table 5-1. Potential Station Sites and Mileposts

	Location	Distance to Union Station
	Prospect Heights Station	***24.0***
1	Central Road	22.1
2	Rand Road / Golf Road / Seegers Road	21.3
3	Northwest Highway (US 14)	20.8
4	Thacker Street	20.2
5	Algonquin Road	19.7
6	Forest Avenue	19.4
7	Oakton Street	19.2
8	Howard Avenue	18.6
	O'Hare Transfer Station	***17.1***

Figure 5-1. Potential Station Locations



The screening involved determining impacts using a limited number of criteria, which were generally qualitative, and the completion of a matrix–based evaluation. This fatal flaw screening determined which of the alternative sites should advance for more detailed analysis. The following describes each of the station sites evaluated.

1. Central Road is an east-west 2-lane collector roadway in the northern tip of the City. A ComEd high tension wire right-of-way is on the west side of the tracks. West of the utility right-of-way is primarily single-family residential. The eastern portion of the site is made up of institutional uses.

2. Rand Road / Golf Road / Seegers Road, Golf is a four-lane arterial roadway with an east west orientation. Immediately north of the Golf/CN rail crossing is Rand Road (US12), a four-lane arterial with a southeast-northwest orientation. In addition, Seeger Road parallels and is about 400 feet to the south Golf Road. Seegers is a local through-street connecting Rand Road on the

east to Northwest Highway on the west. Land uses surrounding the site include ComEd right-of-way on the east side, a ComEd substation south of Seegers Road, institutional/open space uses to the east and residential to the west.

3. Northwest Highway (US14) is a four-lane roadway generally paralleling the north side of the Union Pacific (UP) Northwest rail line. Northwest Highway passes under the diamond crossing of the CN and the UP Milwaukee Subdivision railway tracks. The UP Northwest line is 500 feet to the west, creating a complex area of rail lines and roadways with severe access constraints. The larger site includes industrial and logistics uses to the north and residential to the south. Downtown Des Plaines is 0.7 miles to the southeast.

4. Thacker Street is a two-lane east-west collector connecting areas of south downtown Des Plaines to areas west of downtown and west of the city. It is known as Dempster-Thacker starting in downtown and heading west. In Mount Prospect and to the west, the roadway is known only as Dempster Street. The station site contains a mix of residential, industrial and commercial uses, and is one-half mile from downtown Des Plaines.

5. Algonquin Road is a two-lane east-west collector with commercial uses west of the CN and single family residential east.

6. Forest Avenue is local residential street that dead ends from both sides of the CN. East of the tracks is single family and west commercial.

7. Oakton Street is a four-lane east-west collector between Evanston and Elk Grove Village. Areas west of the crossing are mostly commercial and east primarily single family residential, although commercial uses front Oakton for much of its length in Des Plaines.

8. Howard Avenue is an east-west collector west of Mannheim Road (US 45), which is parallel and 25 feet from the CN line. East of the CN, Howard is a local street, but there is a gap at Arndt Park. The station area is mixed-use, with open space, commercial, industrial and residential.

To assess the locational and physical differences of the sites, Table 5-2 provides distances relative to existing NCS and UP-NW line stations. In addition, the number of tracks (i.e., one or two) and the elevation of the roadway at each of the sites are indicated.

Two of the sites would result in spacing of less than two miles (i.e., Central Road and Howard Avenue). While not a hard cut-off, based on the prior review of appropriate commuter rail spacing, this would seem a reasonable initial criterion. Previous NCS improvements extended double-track portions of the CN route. A section that remains single-track is the two-miles between south of Thacker Street and Central Road. Since locating a station on a single-track section of the route would create an operational constraint, The Rand-Golf-Seegers Roads, Northwest Highway, and Thacker Street sites would be not be preferred.

Table 5-2. Key Rail Network Features

		Distance in Miles to:			Airline Miles from UP-NW Stations:				
		Union Station	Prospect Heights	O'Hare Transfer	Des Plaines	Cumber-land	Dee Road	No. of Tracks	Rail/Road Elevation
	Prospect Heights Station	24.0	0.0	6.9				2	at-grade
1	Central Road	22.1	**1.9**	5.0	1.9	1.1	3.7	2	at-grade
2	Rand-Golf-Seegers Rds.	21.3	2.7	4.2	1.1	**0.6**	3.1	**1**	at-grade
3	Northwest Highway	20.8	3.2	3.7	**0.7**	**0.8**	2.7	**1**	separated
	midpoint	*20.6*	*3.4*	*3.5*				*1*	at-grade
4	Thacker Street	20.2	3.8	3.1	**0.5**	1.3	2.2	**1**	at-grade
5	Algonquin Road	19.7	4.3	2.6	**0.8**	1.8	1.9	2	at-grade
6	Forest Avenue	19.4	4.6	2.3	1.0	2.0	1.8	2	at-grade
7	Oakton Street	19.2	4.8	2.1	1.2	2.2	1.8	2	at-grade
8	Howard Avenue	18.6	5.4	**1.5**	1.7	2.8	1.7	2	at-grade
	O'Hare Transfer Station	17.1	6.9	0.0				2	at-grade
			Less than 2.0		*Less than 1.0*				

An important consideration in selecting a site is the opportunity to use development to maximize the number of potential users who would be within walking distance of the station. Transit Oriented Development (TOD) principles include adding higher density, mixed-use development and improvements to encourage a walkable environment. Table 5-3 provides relevant information for each of the sites, including the following metrics:

- **Walk Score** | Available at walkscore.com, Walk Score is a commonly accepted metric for the pedestrian friendliness of a given location. Walk Score points are awarded based on the walking distance to common amenities, such as shops, restaurants, and other businesses and cultural facilities. Walk Score also evaluates pedestrian friendliness by analyzing infrastructure characteristics like block length and intersection density. On a scale from 0 to 100, locations 50 or above are considered walkable.
- **Percent Residential** | Based on land use data from CMAP (most recent vintage at the time of analysis is 2013), the percent of acreage within a half-mile that is classified as residential was calculated. This is intended to estimate potential for non-motorized access riders. (see Figure 5-2)
- **Multi-Family Units** | Similar to the above, multi-family residential are more likely to achieve the densities that support transit ridership and minimize the need for auto-access infrastructure, parking, and also lessen traffic impacts at the station.
- **Households** | Using 2010 census data at the block level, the number of households within a half mile were estimated to further understand potential non-motorized access riders within the station area.

  (Re) Development Area | The estimation of potential redevelopment acreage was carried out by identifying large contiguous parcels of low-intensity usage that could be acquired and redeveloped at a relatively low cost and with minimal impact to station area households. The parcel and land use (such as industrial, vacant, parking) information, as well as occupancy metrics available from the CoStar real estate database, were used to perform this initial screening, but no efforts have yet been made to contact parcel owners to determine their perspective on, or receptiveness to, potential redevelopment (see Figure 5-3, Figure 5-4, and Figure 5-6).
- **Pace Bus Routes** | The presence of existing Pace Bus routes highlights a station area's potential to grow its ridership outside of the half-mile walkshed without relying on riders accessing by private automobile. It also suggests the potential of creating a mobility hub and a larger potential market for commercial enterprises established as part of the TOD.

Figure 5-2: Des Plaines Land Use and Potential Station Sites

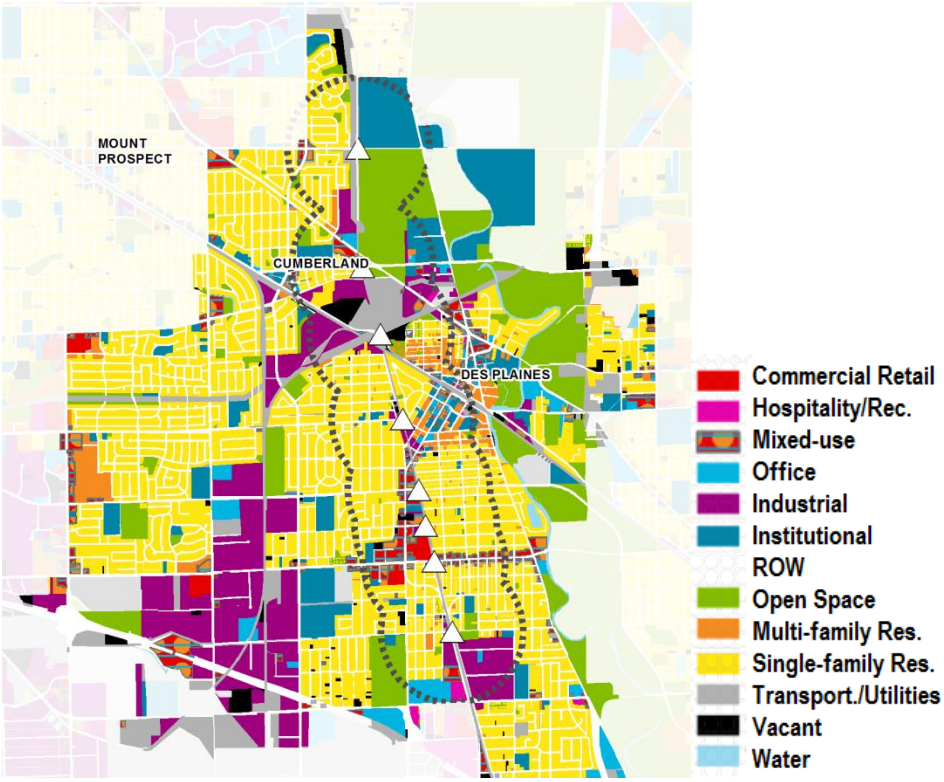
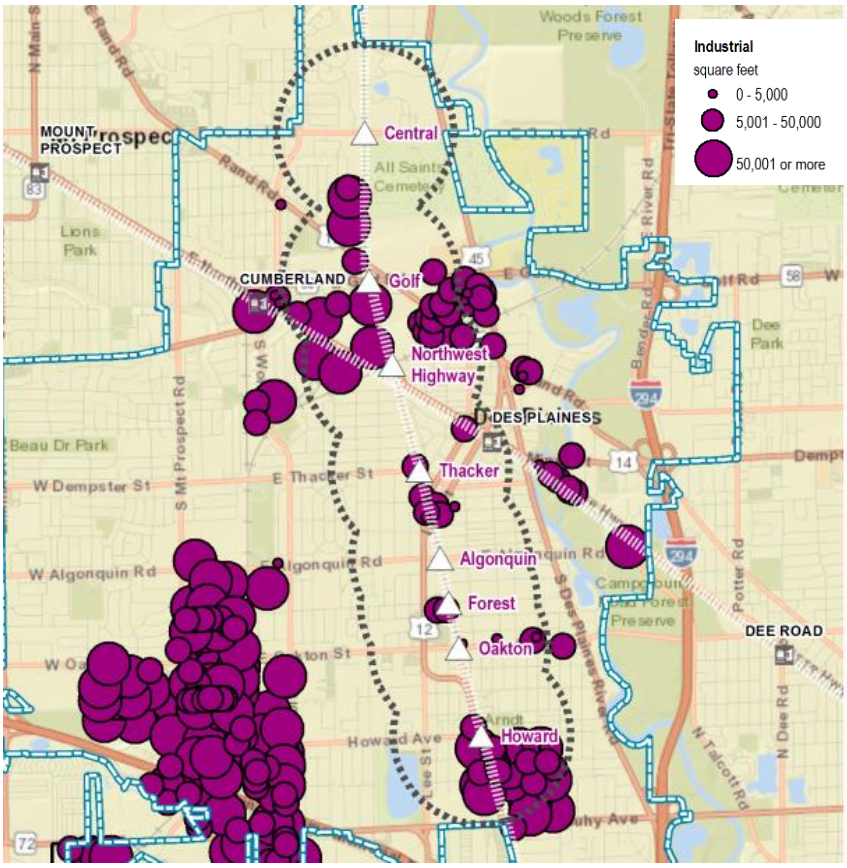


Table 5-3. Key Station Area Characteristics

	Walk Score	% Residential in ½-mile	Multi-Family Units in ½-mile	Est. 2010 Households in ½ mile	(Re)Development Area (acres)	Pace Bus Route
Central Road	29	26%	0	2,600	2.8	none
Rand Road-Golf Road-Seegers Road	43	14%	350	1,800	10.0	234
Northwest Highway	42	32%	610	4,600	0.0	208
Thacker Street	66	55%	600	6,700	3.1	226, 230, 250
Algonquin Road	75	57%	290	4,900	2.4	226, 230, 250
Forest Avenue	73	53%	0	4,200	1.3	226, 230, 250
Oakton Street	79	49%	10	4,800	3.0	226, 230, 250
Howard Avenue	52	39%	140	5,000	0.8	250
	<50	low: <35%	low: <100	low: <3000	low <3	low: <2

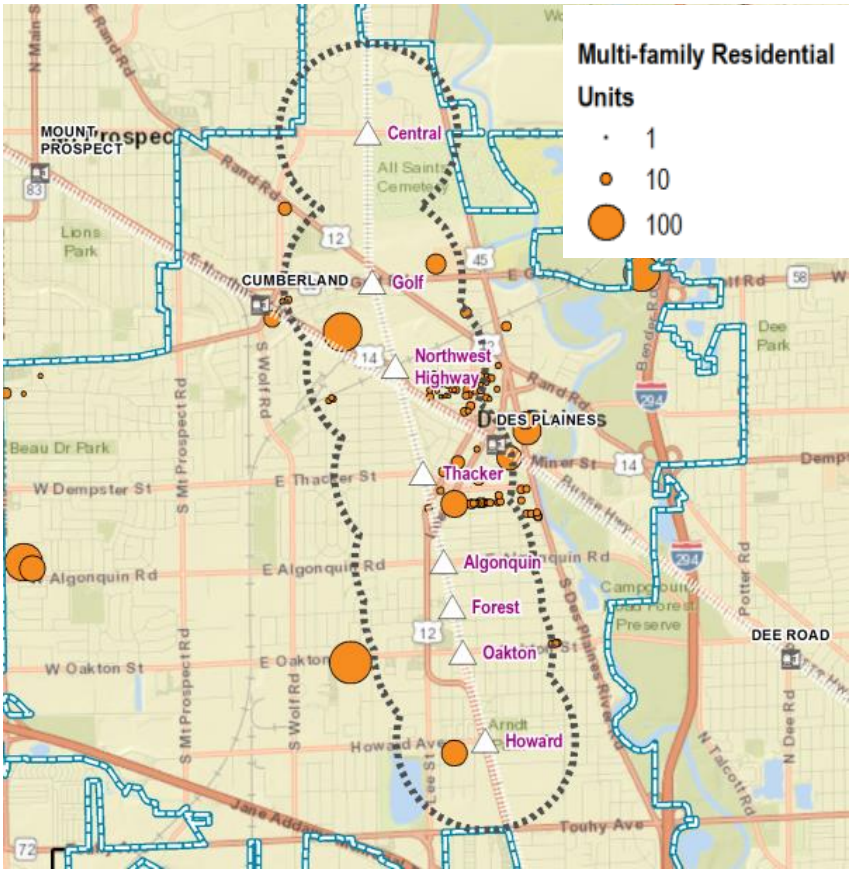
To better understand the commercial real estate market framework, and particularly any large clusters that may affect potential station site locations, data on market inventory were gathered from the CoStar real estate database and mapped in Figure 5-3, Figure 5-4, Figure 5-5, and Figure 5-6. These maps highlight the largely industrial character around the Golf, Northwest Highway, and Howard locations, which can be important as this less dense use tends to be less supportive of commuter rail ridership, with some exceptions. Sites closer to downtown, like Thacker, have greater proximity to multi-family residential properties as well as office inventory, supporting both traditional and reverse commute trips. Algonquin, Forest, and Oakton have ample retail nearby—another supportive use type—thanks to the retail corridors of Lee Street and Oakton Street.

Figure 5-3: Commercial Inventory Maps - Industrial



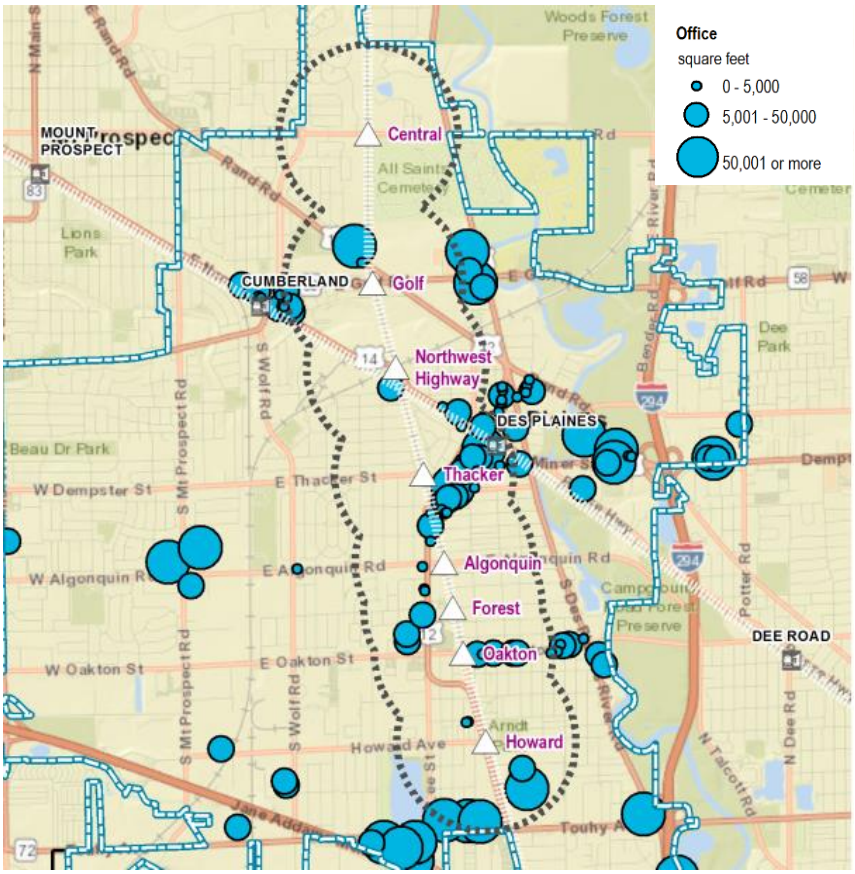
SOURCE: CoStar

Figure 5-4: Commercial Inventory – Multi-Family Residential



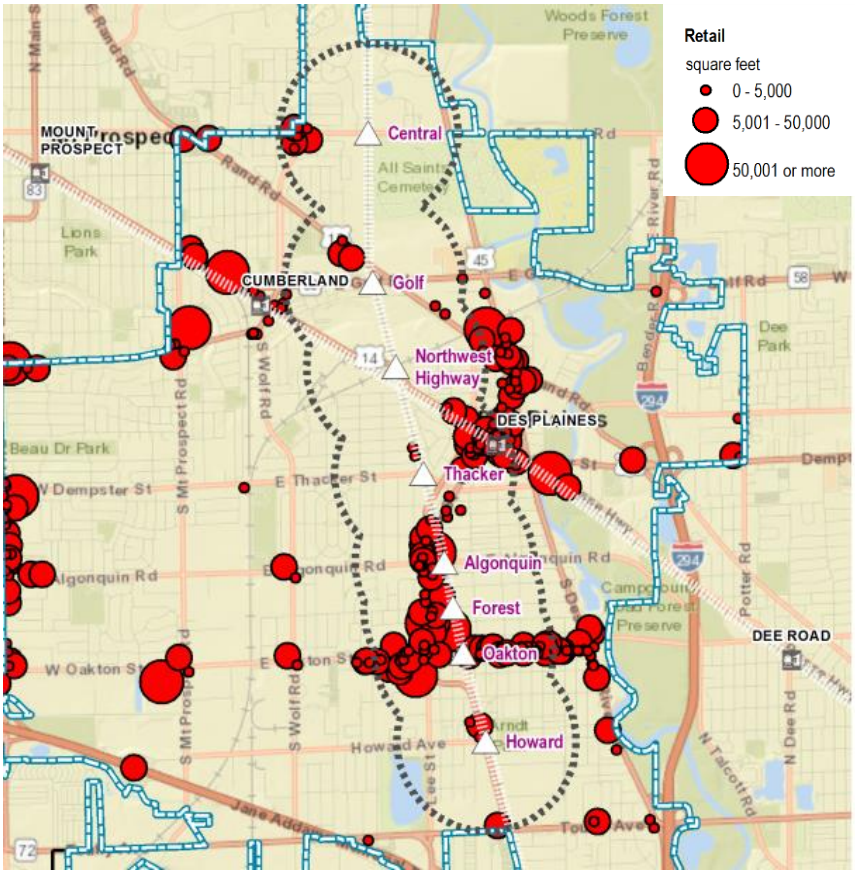
SOURCE: CoStar

Figure 5-5: Commercial Inventory - Office



SOURCE: CoStar

Figure 5-6: Commercial Inventory – Retail



SOURCE: CoStar

An overall evaluation matrix was prepared (Table 5-4), assigning one point for rail and station area characteristics meeting the evaluation criterion and thus favorable as a station site. Red highlighting indicates a serious negative impact at the site, and yellow indicates a negative impact.

Table 5-4. Site Evaluation Summary

Evaluation Factor	Central Road	Golf Road	Northwest Highway	Thacker Street	Algonquin Road	Forest Avenue	Oakton Street	Howard Avenue
More than two miles from a NCS Station		1	1	1	1	1	1	
More than one mile from a UPNW Station	1					1	1	1
Double Track	1				1	1	1	1
At-Grade	1	1		1	1	1	1	1
Walk Score 50+*				1	1	1	1	1
Multi-Family Units 100+		1	1	1	1			1
Households 3000+			1	1	1	1	1	1
(Re)Development acres 3+		1		1			1	
Pace Bus Routes 2+				1	1	1	1	
Total Score	3	4	3	7	7	7	8	6

1=Meets Evaluation Criterion Serious Impact Impact

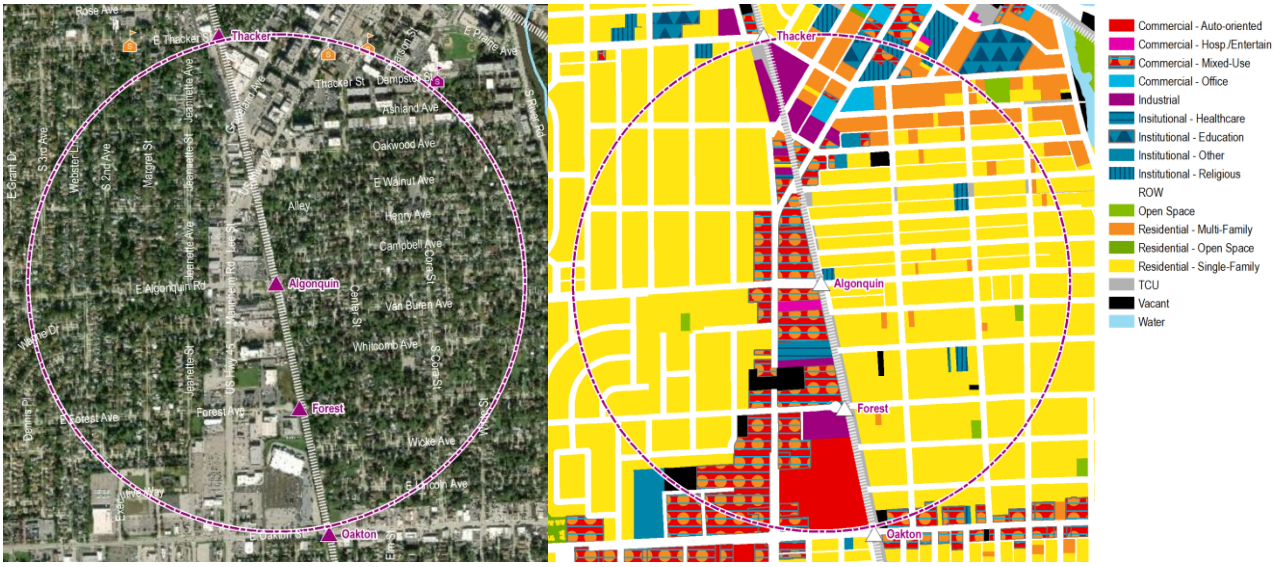
*walkscore.com

The three sites to the north scored much lower than the other five, and should be dropped from further consideration. The Howard Avenue site performed somewhat better, but given proximity to the O'Hare Transfer Station (1.5 miles), it is recommended to drop as well. The Thacker Street site generally performed well, but would serve a single track, which can negatively impact operations as opposed to the double-track sites. The remaining three sites, Algonquin, Forest, and Oakton, each offer plusses and minuses. The discussion provides an additional assessment of the three sites.

Algonquin Road

Figure 5-7 provides an aerial and land use map of the half-mile area of the Algonquin Road site. Positives of the site include commercial land to the west that is potentially redevelopable. Also, a parking lot at a church on the east side could potentially be shared by commuters on weekdays. However, this location is 0.8 of a mile from the UP-NW Des Plaines Station, which could be somewhat duplicative. While bus service on Lee Street is near the crossing, plans to improve Pace Route 250 as part of the Pulse system would not include a stop here (the nearest stops would be downtown Des Plaines and Oakton Street. New parking would be sited to the west side of the CN, which could create problems for the Lee Street/Algonquin intersection. The 400-foot length between the railroad and Lee could result in track back-ups on the two-lane Algonquin roadway. It is recommended that Algonquin be dropped from further study.

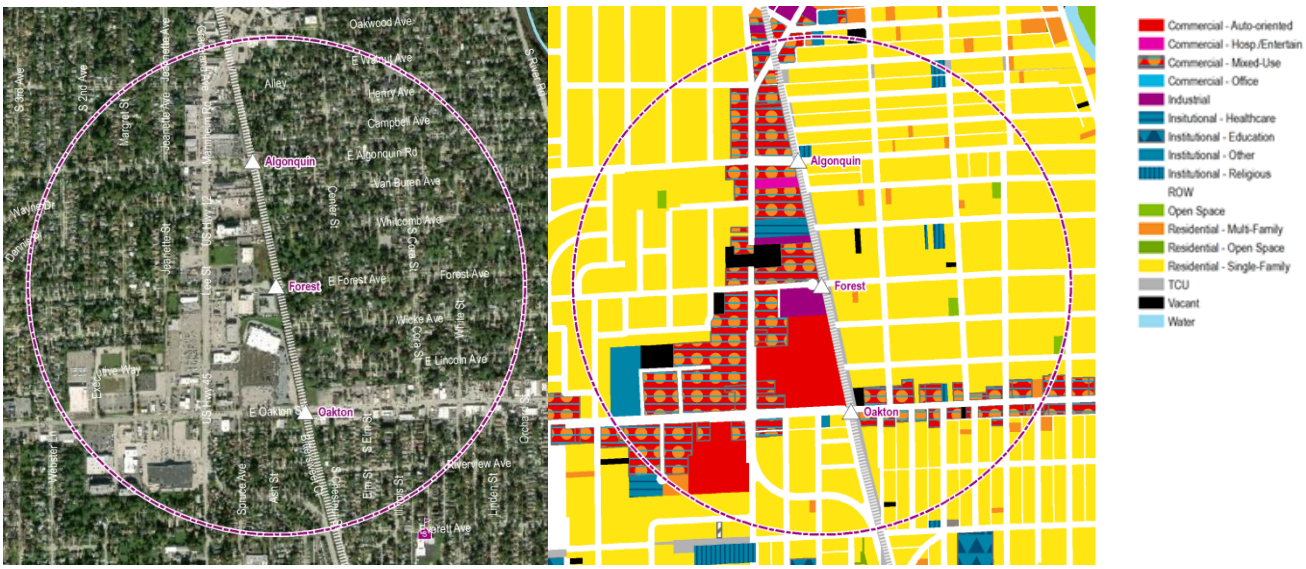
Figure 5-7: Algonquin Road Station Site - Aerial and Land Use Maps



Forest Avenue

This site is a quarter mile south of Algonquin. Forest Avenue is a local residential street that does not cross the railroad. There is a vacant 1.2-acre parcel in the northwest quadrant of the crossing, which could be used for parking. A major issue is that vehicle access would be limited to the west. Residents from areas to the east would likely benefit from walk-on access, but opportunities to construct parking or allow commuters to use street parking would probably be met with opposition. Also, without a street crossing, Metra and the CN would require a pedestrian tunnel or bridge. Although the Lee/Forest intersection is further from the rail crossing than is the case at Algonquin (i.e., 700 feet versus 400 feet), similar traffic issues would likely occur even with the upcoming signalization of the Lee-Forest intersection in 2018. For these reasons, Forest is recommended to be dropped. Figure 5-8 provides an aerial and land use map of the half-mile area of the Forest Avenue site.

Figure 5-8: Forest Avenue Station Site - Aerial and Land Use Maps



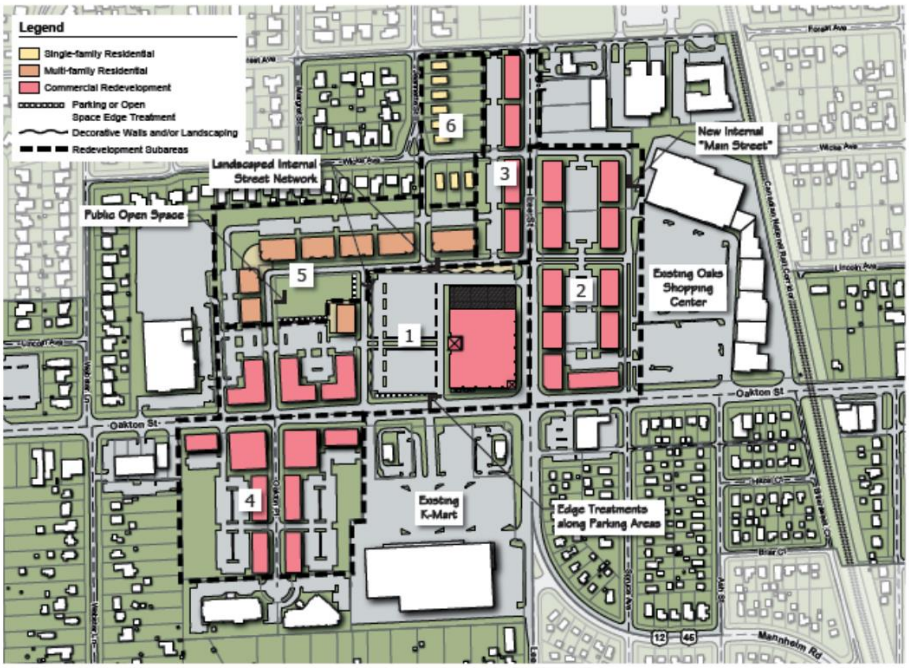
Oakton Street

The Oakton Street site offers several key advantages over Algonquin and Forest, including:

- Oakton would provide good roadway access from the east and west,
- This site is more distant from existing UP-NW stations,
- Access to the Pace Pulse Dempster Line station at Lee and Oakton would be available,
- The Lee Street intersection is 1,000 feet to the west, so the potential back-up from park-n-ride lots emptying would be less likely compared to the Algonquin and Forest sites.
- If the proposed Oakton/Lee TIF district is approved, a Metra station on the NCS line at Oakton could be a significant catalyst for development. This mechanism would help to bolster investment in the area by dedicating the growth in real estate taxes to financing improvements within the district, such as a train station or other supportive infrastructure. Such improvements are likely to both benefit existing residents and businesses, as well as attract new development.
- The Oakton/Elmhurst Road Corridor Study (completed in 2009) established two districts that would fall partly in an NCS station area: Oakton Retail District to the west and Oakton Mixed-use District to the east. The latter established guidelines for development along Oakton Street east of the NCS line to the Des Plaines River, including mixed-use improvements along Oakton as well as a targeted redevelopment area adjacent to the rail line. Streetscaping was recommended along Oakton to create a more attractive and welcoming environment and to encourage redevelopment along Oakton Street. Oakton Retail District was positioned as a retail destination, with a combination of large-format retail outlets and mixed-use developments, including multi-family and limited single-family residential. Plans for the two districts are provided in Figure 5-9 and Figure 5-10.

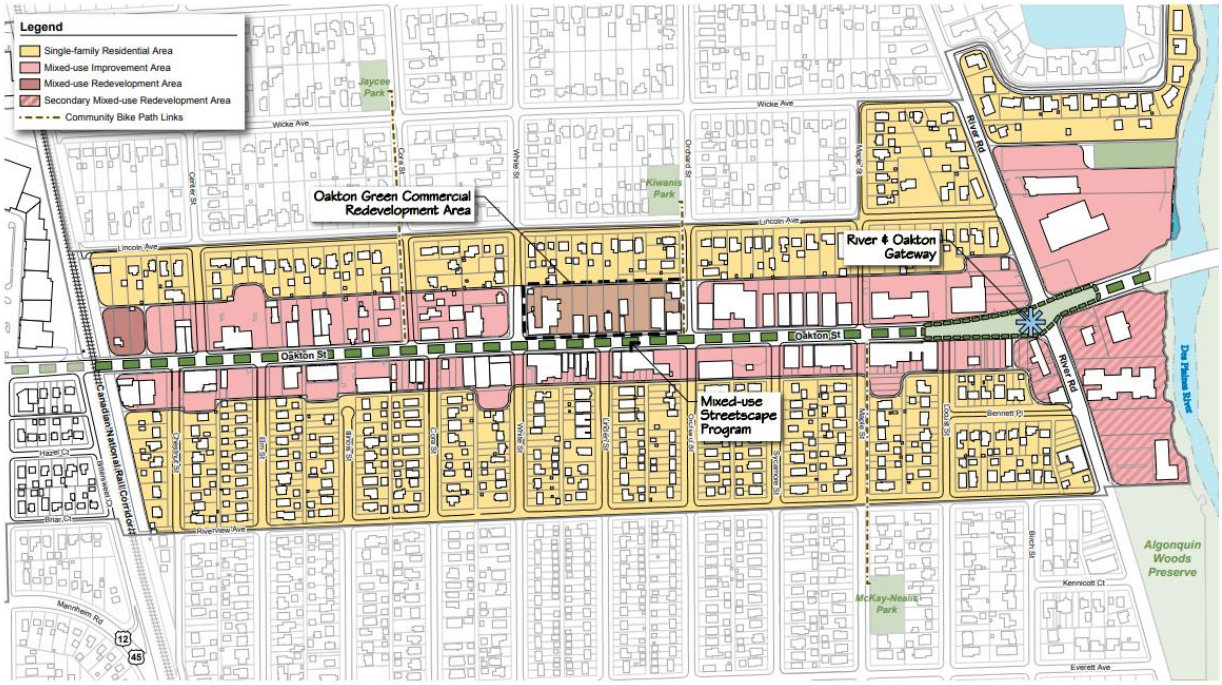
The 1.5-acre vacant land and shuttered restaurant site to the east of the NCS line could be used for parking or a joint development project. In addition, it is understood that much of commercial properties to the west may be ripe for redevelopment, excluding the Butera Markets grocery. For these reasons, a site on the north side of Oakton Street is recommended to advance for more detailed study. Figure 5-11 provides an aerial and land use map of the half-mile area of the Oakton site.

Figure 5-9: Oakton Retail District Plan



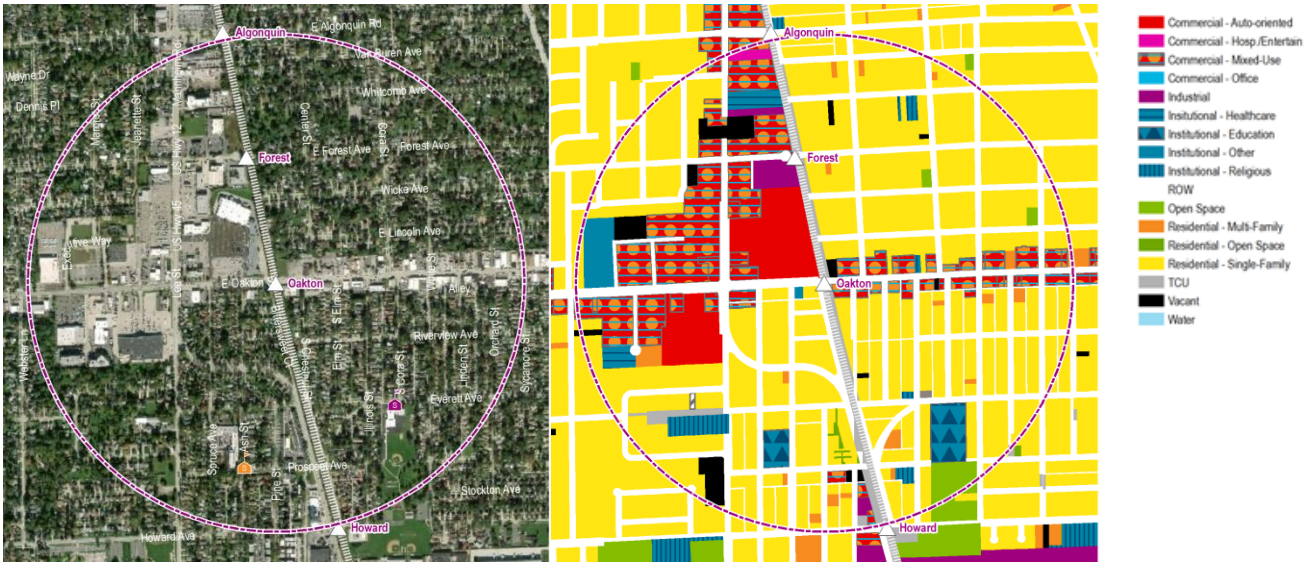
SOURCE: Oakton/Elmhurst Corridor Study (2009)

Figure 5-10: Oakton Mixed-use District Plan



SOURCE: Oakton/Elmhurst Corridor Study (2009)

Figure 5-11: Oakton Street Station Site - Aerial and Land Use Maps



6. Conclusions Applied to Des Plaines

The site screening recommended that a new NCS station be studied at Oakton Street, which would be 4.8 miles from the Prospect Heights Station to the north and 2.1 miles from the O'Hare Transfer station to the south. This review concludes that this spacing would not preclude the consideration of a new Metra station in Des Plaines. The factors leading to this conclusion include the following:

- Published guidelines suggest that commuter rail stations should be comparatively widely spaced (e.g., more than 3 miles). This is a reasonable parameter to follow if a downtown-destined service is being developed from scratch. While the resultant minimum spacing of 2.1 miles is less than published guidelines, this point should not be the basis for ruling out consideration of a station,
- The experience of larger, legacy commuter rail systems shows comparatively close spacing between stations, many with averages falling below three miles. Metra is consistent with this, with average spacing of about two miles, including 83 stations within one mile of the next inbound station.
- Based on Metra system data, there is not a clear correlation between close spacing and lower station ridership.
- New stations that have been added to the Metra network have filled gaps ranging from 2.1 to 11.9 miles, and there has not been an obvious effect on performance related to the distance between stations that were filled. It is acknowledged that Metra's most recent examples of adding infill stations have filled wider gaps (e.g., Romeoville at 7.6 and 35th Street at 9.8), compared to the gap between O'Hare Transfer and Prospect Heights of 6.9 miles.
- Analysis of NCS origins and destinations shows an average straight-line distance of 1.4 miles for riders accessing the station and the same for riders leaving the station—versus 1.6 and 1.3 respectively, systemwide. Further, among riders driving, carpooling, or taking a Pace bus to board at an NCS station, the average distance is 1.2 to 1.8 miles. Assuming that these distances should be doubled to account for the adjacent station's radius, average spacing of roughly three miles should capture the typical motorized-access Metra passenger while minimizing the service overlap.
- The availability of parking is an important component provided at Metra stations, and needs to be included in the Oakton Street Station design plans. But accommodations for walk access and egress can also be an important consideration in attracting ridership to the station. This walkability goes hand-in-hand with developing the station area to maximize the use of transit. Further, opportunities to create destinations that would be accessible by commuter rail should be fully explored. The success of the Lake Cook Road Shuttle Bug program offers evidence that station area workers are willing to use connecting bus service.
- The addition of another station on the NCS line will result in increased travel times for some current upstream riders due to deceleration/acceleration and dwell time required at the station for each stop (approximately two minutes). These impacts will need to be carefully evaluated, and considered in the context of new Metra riders that the station could attract.

While station spacing can be an important element to the success of a potential commuter rail station, analysis of Metra ridership shows that spacing alone does not determine ridership performance. Service levels, station amenities, and the size of the potential ridership market are likely to be deciding factors in the feasibility of an infill station between the O'Hare Transfer and Prospect Heights Stations.

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