* * * D R A F T * * *

# 1.0 Purpose of and Need for Action

The North Lake Shore Drive (NLSD) study corridor extends approximately seven miles from Grand Avenue to Hollywood Avenue. See Exhibits 1 and 2 in Appendix A. The corridor is comprised of the eight-lane "Outer Drive" boulevard and the parallel two to four-lane "Inner Drive" local access roadway that is variously named North Lake Shore Drive, Sheridan Road and Marine Drive. The Outer Drive is designated as US 41 from the south study limit to Foster Avenue, where the US route designation continues west on Foster. The Outer Drive between Foster Avenue and the northern terminus at Hollywood Avenue is an unmarked State route. The Outer Drive is on the National Highway System which consists of roadways that are important to the nation's economy, defense and mobility.

North Lake Shore Drive is located primarily within Lincoln Park which is a 1,200-acre regional park dating back to 1860 that is listed on the *National Register of Historic Places.* Since its inception, NLSD has been a heavily used transportation artery in the lakefront corridor and it has evolved into an important multi-modal facility. It is a major north-south corridor through the city as it provides regional connectivity between the north and south suburbs as well as a link to the central business district. Today, the corridor carries as many as 161,000 cars per day as well as 970 Chicago Transit Authority (CTA) buses with 69,000 passengers per day along the Inner and/or the Outer Drives as shown on Exhibits 3 and 4 in Appendix A. The Lakefront Trail, which parallels NLSD in the study area, is also an important element of the transportation facilities in this corridor, serving recreational users, commuters and tourists. The trail comprises the most heavily used section in Chicago's extensive trail system with as many as 31,000 daily users on peak summer days on portions of the trail, as shown on Exhibit 5 in Appendix A.

## 1.1 Project Purpose

The purpose of the project is to improve the NLSD multi-modal transportation facility. The specific needs to be addressed throughout the study include: improve mobility for automobiles, buses and non-motorized modes of travel, improve safety, improve facility deficiencies, improve modal connections and opportunities, and improve accessibility to and from Lincoln Park, the Lakefront Trail and the adjacent communities.

## 1.2 Study Area

The NLSD study area is depicted on Exhibit 2. The study area encompasses the seven-mile multi-modal transportation corridor and includes the parallel Inner Drive roadways as well as crossing arterial streets and the Lakefront Trail.

The logical termini for the NLSD project are identified as Grand Avenue on the south and the northern terminus of NLSD at the Hollywood Avenue/Sheridan Road intersection on the north. The southern terminus was selected as a rational endpoint for several reasons. The Illinois Street/Grand Avenue interchange complex is a major ingress and egress point for trips along NLSD destined to and from the Loop and Navy Pier. Also, whereas the majority of the infrastructure for NLSD north of Grand Avenue was constructed in the 1930s, the transportation infrastructure south of Grand Avenue is by comparison relatively new. The nearly one mile section of NLSD between Monroe Street and Grand Avenue was reconstructed between 1982 and 1984 and includes the elevated structures for the north and south approaches to the two-level Chicago River bascule bridge as well as the NLSD "S-curve". The character of Lake Shore Drive from Monroe Street south is also different from NLSD as it transitions from an access-controlled boulevard with grade separated junctions north of the river to a facility with at-grade signalized intersections that traverses Grant Park and the Museum Campus. The segment of Lake Shore Drive through the Museum Campus was reconstructed in 1996.

The logical northern terminus of the project is the point where NLSD ends at the Hollywood Avenue/Sheridan Road intersection. At this location, traffic to and from the northern terminus of the eight-lane access-controlled boulevard is routed to and from surface streets in the Edgewater neighborhood via a signal controlled intersection of two four-lane roadways.

## 1.3 Project Background

The entire history of NLSD, or "the Drive" as it is often referred to, is intertwined with that of Lincoln Park. North Lake Shore Drive was initially constructed and then reconfigured by the Chicago Park District in concert with northerly and easterly expansions of Lincoln Park over the last century as a "boulevard" through a park. According to the 1909 *Plan of Chicago*, boulevards were intended to be "a combination of park and driveway" where all truck traffic was to be excluded and "where grass and shrubs and trees assert themselves".

North Lake Shore Drive, as recognized today, was constructed in the 1930s with the northernmost extension completed in the early 1950s. Over the years, numerous resurfacing and spot improvements have been conducted to maintain the roadway surface and address safety concerns as described in Section 1.4.3.1. However, the major infrastructure elements of the Drive, such as bridges and lower pavement layers, are nearly 80 years old and have exceeded their expected service lives by 30 or more years. Continued maintenance is not a cost effective strategy for maintaining such a vital facility.

As the NLSD roadway is surrounded by an historic park, any proposed physical changes may affect park property. The "right-of-way" for NLSD is defined by the backs of curb on each side of the roadway. Therefore, any property beyond the curb is Chicago Park District property that is protected under Section 4(f) of the Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act of 1966. Thus, impacts to Park District property as well as access to the park and circulation within it will be important considerations in project decision-making.

## 1.4 Project Need

Improvement needs vary throughout the seven-mile study area and fall into one of five categories:

- Improve safety for all users.
- Improve mobility for all users.
- Address infrastructure deficiencies.
- Improve access and circulation.
- Improve modal connections and opportunities.

Needs within these categories were identified based on the analysis of existing conditions as well as extensive stakeholder input. The following information was utilized as part of the existing conditions analysis:

- 2007-2011 crash data and collision diagrams.
- 2013 ADT and peak hour intersection traffic counts and intersection operational analyses.
- 2013 lakefront access and lakefront trail counts.
- 2012 transit ridership and bus route performance data.
- Field observations of lakefront trail and peak hour transit and traffic operations.
- Structure Conditions Reports.
- Historic and record plan data.
- 2013 measurements of prevailing vehicle speeds.

### 1.4.1 Improve Safety for All Users

There is the need to improve safety in the study area not only for vehicular traffic but also for non-motorized modes of travel.

#### *1.4.1.1 Improve Vehicular Safety*

Based on 2007-2011 crash data, in excess of 5,800 vehicular crashes have occurred along the entire length of the Outer Drive and at its junction intersections over the five-year study period which included 1,005 injury and 17 fatal crashes. An average of three crashes per day occurs along NLSD.

Each year, the State of Illinois produces a report that identifies highway locations that exhibit the most pressing safety needs. This report, called the *Five Percent Report*, helps to provide guidance on where safety investments are most needed. More than 80% of the length of NLSD was identified in the *Five Percent Report*. Within its state-wide peer group of urban multi-lane divided highways, NLSD accounted for six out of the top 10 high crash sections within the entire state. See Exhibit 6 in Appendix A for a graphical overview of vehicular crash data. Table 1 summarizes crashes that have occurred over the 5-year study period along mainline NLSD and at junction intersections and adjacent Inner Drive intersections.

**Table 1**
**North Lake Shore Drive**
**Crash Summary Table**

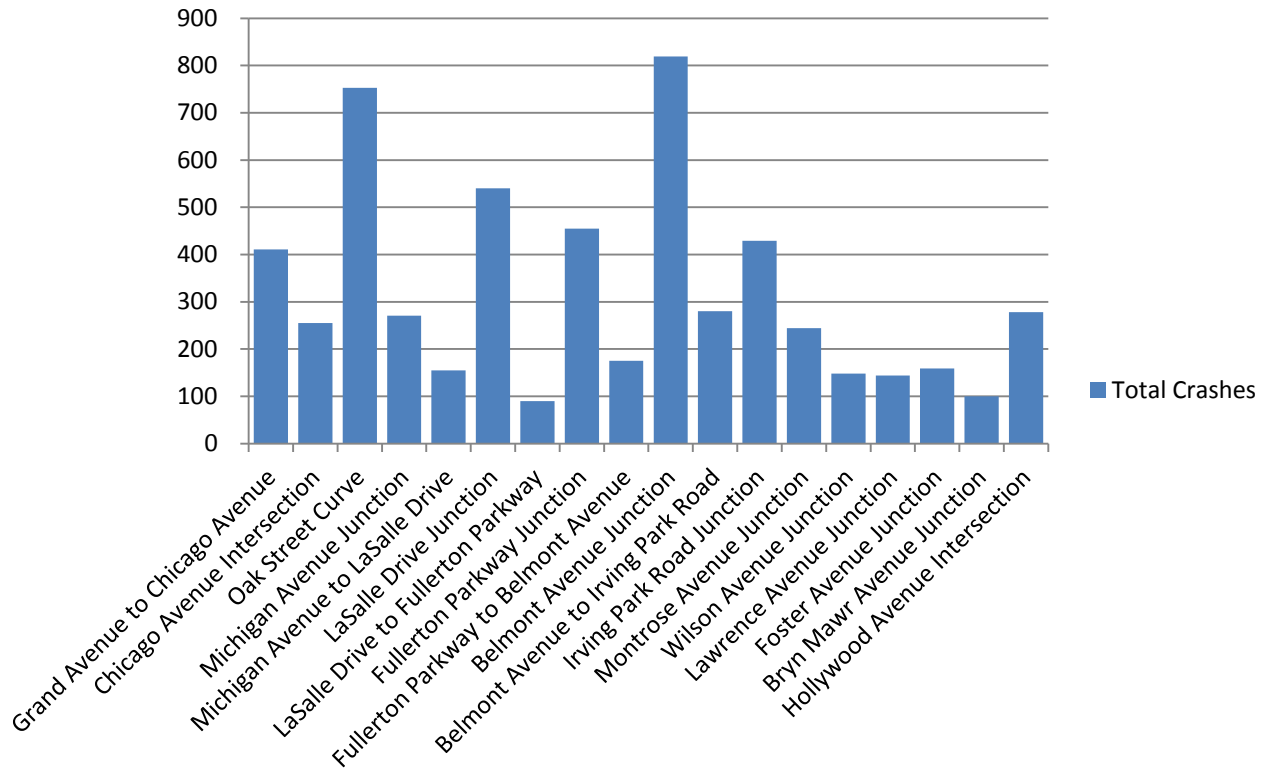
| | Crash Type Breakdown | | | | | | | Crash Severity Breakdown* | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Rear End | Side-swipe | Right-Angle | Left Turning | Ped./ Bike | Fixed Object | Other | K | A | B | C | PDO | |
| 2007 | 531 | 298 | 54 | 118 | 38 | 249 | 78 | 2 | 36 | 106 | 75 | 1147 | **1366** |
| 2008 | 539 | 308 | 47 | 127 | 34 | 313 | 183 | 8 | 25 | 96 | 91 | 1331 | **1551** |
| 2009 | 358 | 213 | 38 | 77 | 33 | 220 | 89 | 4 | 32 | 100 | 88 | 804 | **1028** |
| 2010 | 388 | 190 | 36 | 89 | 36 | 207 | 43 | 2 | 17 | 95 | 85 | 790 | **989** |
| 2011 | 322 | 189 | 27 | 74 | 26 | 177 | 75 | 1 | 24 | 65 | 70 | 730 | **890** |
| **Total** | **2138** | **1198** | **202** | **485** | **167** | **1166** | **468** | **17** | **134** | **462** | **409** | **4802** | **5824** |

*Crash severities are classified as follows:

K – Fatal crash.
A - Incapacitating injury.
B – Non-incapacitating injury.
C – Reported injury, but not evident.
PDO – Property damage only.

Chart 1 depicts crash data by location.

**Chart 1**
**North Lake Shore Drive**
**Schematic Crash Summary**



Although vehicle crashes are dispersed throughout the corridor, the following five locations have substantial crash histories that account for 51% of the total crashes during the study period as well as two-thirds of the crashes that occurred at junctions and intersections:

- Oak Street Curve (753 crashes)
- LaSalle Drive Junction (540 crashes)
- Fullerton Parkway Junction (455 crashes)
- Belmont Avenue Junction (819 crashes)
- Irving Park Road Junction (429 crashes)


**Oak Street Curve -** Fifty-six percent of the crashes on the Oak Street curve were off-road fixed object collisions with the barrier walls that line the curve. Of all of the crashes on the curve, 76% occurred during wet or icy conditions. The maximum safe operating speed on the Oak Street curve under ideal conditions is 30 mph (25 mph posted advisory speed), which is substantially lower than the prevailing speeds of traffic. Despite the geometric limitations of the Oak Street curve and the 40 mph posted speed limit, hourly 85$^{th}$ percentile speeds immediately north and south of the curve have been measured to be as high as 68 mph. Compounding the challenge of negotiating the curve is the fact that lane widths on NLSD are 10 feet wide on the curve.

**LaSalle Drive Junction -** Half of all rear end crashes and sideswipe crashes at this junction occurred at the mainline NLSD terminals for the junction ramps to and from the south. The crashes indicate that exiting vehicles may have difficulty decelerating before encountering vehicles queued at the ramp signal and entering vehicles may be unable to safely merge into the southbound mainline traffic flow.


The next most predominant crash type at this junction was the off-road fixed object collision, of which 80 of 114 crashes occurred on southbound NLSD immediately south of the LaSalle Drive overpass. The concentration of fixed object crashes at this location would indicate a potential problem with the combination of horizontal and vertical roadway alignment south of the bridge and high vehicle speeds. Even though the posted speed limit is 40 mph, the free-flow hourly 85$^{th}$ percentile southbound vehicle speeds measured along this section of NLSD averaged 58 mph.

**Fullerton Parkway Junction -** The predominant crash type at this junction is the rear end collision with 90% of these crashes occurring on mainline NLSD or at the mainline entrance and exit ramp terminals. The rear end crashes are related to the congested conditions that exist along this section of NLSD during peak travel periods. Forty-four percent of all rear end crashes at the junction occurred on northbound mainline NLSD north of the Fullerton Parkway overpass. This section of NLSD coincides with the

southern limit of P.M. peak hour traffic flow disturbance that occurs as a result of congestion at the Belmont Avenue junction which is located about one mile to the north.


**Belmont Avenue Junction -** The Belmont Avenue junction provides the only access to and from NLSD for a distance of two miles, which concentrates heavy entering and exiting traffic volumes at this location. The junction forms the nexus of NLSD, Belmont Avenue, Inner Lake Shore Drive, Sheridan Road and the south harbor driveway in a complex of four signalized intersections that are spaced only about 200 feet apart. Nearly half of the 819 crashes at Belmont Avenue occurred at the four signalized junction intersections, which is indicative of the high levels of traffic congestion which exist at this location for many hours of each day.

A total of 210 rear end and sideswipe crashes occurred at the mainline ramp terminals for the ramps to and from the south. The crashes indicate that exiting vehicles may have difficulty decelerating before encountering vehicles queued at the ramp signal and entering vehicles may be unable to safely merge into the southbound mainline traffic flow.

**Irving Park Road (IL 19) Junction -** Of the 104 fixed object crashes that occurred at the Irving Park Road junction, 81 of them occurred on mainline NLSD south of the Irving Park Road overpass. North Lake Shore Drive in this area has reverse horizontal curves that have smaller radii than adjoining roadway sections in concert with vertical curves for the Irving Park Road overpass. The concentration of fixed object crashes at this location, many of which were of high severity, would indicate a potential problem with the combination of horizontal and vertical roadway alignment south of the bridge and vehicle speeds.


Of the 17 fatal crashes that occurred in the entire NLSD study area, five occurred within this roadway section. Four of the five fatal crashes occurred between the hours of 11 P.M. and 5 A.M. and three occurred in the southbound direction. Although the posted speed limit is 40 mph, the free-flow hourly 85$^{th}$ percentile vehicle speeds measured along this section of NLSD throughout the day averaged between 60 and 65 mph and increased to as high as 70 mph in the early morning hours.

**Overarching Safety Issues –** Analysis of crash data at the five crash hot spots as well as along the remainder of the corridor reveals recurring safety issues that point to a combination of roadway geometry, prevailing vehicle speeds and weather conditions as contributing factors. The horizontal and vertical roadway alignment, when considered in light of the 40 mph posted speed limit, is sufficient to provide adequate safety for vehicle operating speeds of that magnitude, even under adverse weather conditions. However, when

actual vehicle operating speeds are combined with the existing roadway geometry, crash data show that safety issues arise, particularly when weather conditions are less than ideal.

Vehicle speed studies conducted at twelve locations along the length of NLSD for a 48-hour weekday period showed non-compliance rates with the posted speed limit (40 mph at the time of the study) of 78% in the southbound direction and 95% in the northbound direction, with most compliance occurring only during periods of heavy congestion. Within the highest speed section of NLSD, nearly 9% of the 48-hour traffic volume exceeded the posted speed limit by 30 mph or more. The speed study substantiates that prevailing vehicle speeds along much of the Outer Drive are substantially higher than the posted speed limit.

High vehicle operating speeds combined with the boulevard design of NLSD and (within some sections of the Drive) narrow lane widths result in reduced safety margins. North Lake Shore Drive was originally designed as a boulevard with barrier curb & gutter at both edges of pavement. Through the years, barrier walls and guardrails were added along much of the roadway in response to safety issues. Today, barrier wall or guardrail has been installed along approximately 60% of the total roadside length on each side of the roadway. These roadside barriers have been installed at the faces of curb so there is little or no clear zone available for errant vehicles to avoid contacting the barriers.

In addition to roadside barriers, intermittent emergency pull-off bays were added to NLSD through the years as well. These bays, which are spaced roughly two-tenths to one-half mile apart, are very short with only 50 feet of bay combined with 50-foot tapers into and out of the pull-off. Thus, provided a disabled vehicle can reach a pull-off bay, it is hazardous to pull into and out of the bay.

It should be noted that the 1972 *Lakefront Plan of Chicago* and the companion 1973 *Lake Michigan and Chicago Lakefront Protection Ordinance,* as they pertain to NLSD, established a policy to "*strengthen the parkway characteristics of Lake Shore Drive and prohibit any roadway of expressway standards"*. The *Lakefront Plan* specifies:

> *"[t]he Drive is a parkway that should conform to the following general roadway standards: lanes should be no more than eleven feet wide with additional width only at curves and other special locations; regularly spaced emergency pull-off bays should be provided rather than continuous paved shoulders and where continuous shoulders are needed, they should be specially treated; minimum width access ramps should be provided; and design speed should be 45 mph or 50 mph with speed limits set at 40 mph or 45 mph. The median should be developed with appropriate plantings. Protective barriers, where necessary to protect pedestrians, should be blended with landscaping".*

From individual crash reports along NLSD, it is not possible to determine the contribution that the lack of shoulders or the location of the roadside barriers had in crash cause and severity. However, overall crash data suggests that roadway sections where barriers are offset from the edges of pavement are noticeably safer, given similar roadway geometry. The only sections of the Drive that are not listed in the *Five Percent Report* (the northernmost sections) do not have continuous guardrail or barrier wall at the faces of curbs. Where bridge parapet walls and guardrails exist in these areas, they are typically offset from the edges of pavement by about 10 feet. Thus, the ability for errant or disabled vehicles to leave the travel lanes may contribute to the lower incidence of crashes. The poor condition of the grass parkways along the backs of curb in these areas indicates that vehicles leaving the roadway are a common occurrence. It should be noted that the northernmost sections of NLSD have fewer crashes

despite the fact that they have 85th percentile speeds (averaged over 48 hours) that are about 5 mph faster than the remainder of the Drive.

Emergency responders have also indicated that the inability to remove disabled vehicles from the travel lanes increases risks to emergency crews and can often result in secondary collisions due to the lane blockages. The lack of shoulders also makes conventional speed enforcement measures nearly impossible. In light of the above, there is a need to separate roadside barriers from the edges of the travel lanes.

#### *1.4.1.2 Improve Safety for Non-Motorized Modes of Travel*

Lincoln Park draws as many as 20 million visitors each year. The Lakefront Trail is heavily used for recreation, tourism and commuting, with peak Saturday trail utilization between 7,700 users per day north of Hollywood Avenue to more than 31,000 users per day at Oak Street as shown on Exhibit 5.

Park users who desire to access either the lakefront or the Lakefront Trail must cross the trail at at-grade trail crossings located at one of nine roadway junctions, twelve pedestrian underpasses or one pedestrian overpass. Heavy usage results in conflicts and safety concerns at those trail intersections. Peak Saturday park user access volumes range between about 2,000 users per day at northerly access locations to nearly 22,000 users per day at the Oak Street pedestrian tunnel.

The heavy user demand combined with inadequate sight distances in some areas, the variety of user speeds and lack of awareness of other users, among many other factors, often results in collisions on the trail. Input from stakeholders revealed that safety on the Lakefront Trail is a major concern. Task Force members regularly recounted stories of their own or friend's injuries while using or crossing the trail. Many stated they avoid the Lakefront Trail during the busiest times because it is unsafe. The public corroborated the perception of substantial safety issues on the trail as well as along the access routes to Lincoln Park at the first round of public meetings that were held for this project. Of the 605 comments from stakeholders at the three meetings, fully 20% of the comments pertained to pedestrian and bicycle issues.

Despite the suggested abundance of mishaps, no public reporting system or database exists that quantifies the number or cause of pedestrian/bicycle or bicycle/bicycle crashes that occur along the Lakefront Trail. Most minor mishaps go unreported; however, local emergency rooms still see frequent occurrences of serious injuries during peak usage times. Though medical records do not record where injuries occurred, contacts with emergency responders and nearby emergency rooms corroborated the perception that trail safety is a major concern in Lincoln Park during peak times of the year.

A good reporting system does exist for vehicle crashes with pedestrians or bicyclists. Vehicle crash records for 2007-2011 yielded a total of 146 pedestrian or bicyclist crashes with vehicles at roadway junctions or intersections and on the Oak Street curve, resulting in one fatality and 137 injuries.

Based on the analysis of existing conditions and the stakeholder input, safety for non-motorized modes of travel needs to be improved. Inadequate trail capacity to accommodate peak user demands combined with conflicts between user types creates safety hazards along nearly the entire length of the Lakefront Trail. Trail conflicts at junction intersections and where park users cross, enter or leave the trail are other sources of safety hazards at major park access locations. Finally, pedestrian and bicycle

accommodations along park access routes where they cross the Inner and Outer Drives fail to meet Complete Streets requirements and are also inadequate for the magnitude of peak user demands.

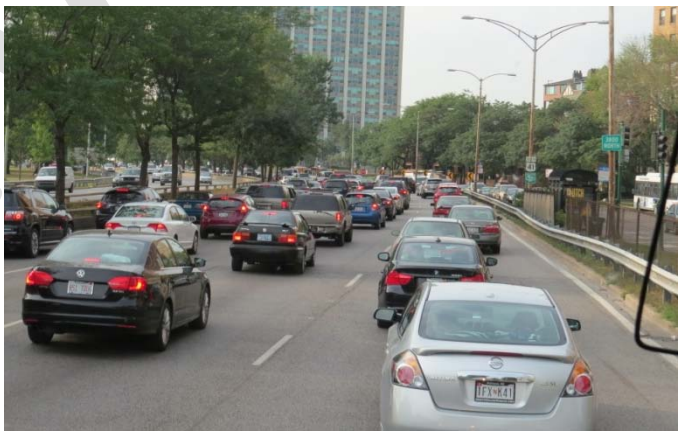
### 1.4.2 Improve Mobility for All Users

Improving mobility for all users in the NLSD study area is an important overarching need for this multi-modal corridor. Existing roadway travel demands overburden NLSD during peak periods and result in substantial traffic congestion in the southern half of the study area as well as bottlenecks at several junctions. Buses in the NLSD corridor are trapped in the same roadway congestion as autos, resulting in unreliable service. The Lakefront Trail is also overwhelmed with users on peak summer weekends with as many as 31,000 daily users competing for space on the 20-foot wide path.

#### *1.4.2.1 Improve Vehicular Mobility*

The Outer Drive is an eight-lane boulevard with a 40 mph posted speed limit that is access-controlled with all but one junction grade separated. Though trucks are prohibited, it carries as many as 155,000 vpd. News organizations report peak period travel times on NLSD along with those of the region's expressways and tollways. Traffic flow along the Drive is often expressway-like, except at the lone signalized intersection at Chicago Avenue or when congestion at junction ramp intersections backs up onto mainline. Because of these unique characteristics, traffic engineering tools for measuring capacity and level of service must be carefully selected and applied to appropriate sections of NLSD.

**Mainline Level of Service –** North Lake Shore Drive is heavily congested in the southbound direction during the morning peak period and in the northbound direction during the afternoon peak. Morning backups begin at or near Irving Park Road and extend beyond the southern limit of the study area. Afternoon congestion begins south of the southern limit of the study area and extends routinely through Belmont Avenue.



Level of Service (LOS) is a congestion measure represented by six levels of service, ranging from A to F. LOS A represents the best (free flow) operating conditions and LOS F, the worst (breakdown) conditions.

Although NLSD is not a freeway, the most applicable measurement tool for calculating the LOS of mainline traffic is to apply the *Freeway Facilities Module* (FFM) in HCM 2010. This analysis yields a mainline Level of Service (LOS) in the A.M. peak hour of Level "D" beginning at the Irving Park Road southbound on-ramp. The southbound mainline LOS diminishes to Level "E" at the Belmont Avenue on-ramp and then to Level "E" again for all sections south of the Fullerton Parkway on-ramp. The FFM yields Level of Service "D" for northbound mainline NLSD largely through the Irving Park Road junction with LOS "E" at the northbound LaSalle Drive on-ramp. This analysis methodology is not applicable south of the Michigan Avenue junction because of the signalized intersection at Chicago Avenue.

The Chicago Metropolitan Agency for Planning (CMAP) has developed 2040 traffic projections for NLSD. The 2040 traffic projections forecast minimal growth in traffic volumes along the length of the corridor, averaging approximately a 4% increase over 2013 volumes. The most heavily traveled section of the Outer Drive is predicted to increase from about 155,000 vpd to approximately 161,000 vpd in 2040.

It should be noted that, regardless of the existing and future levels of traffic demand in the corridor, improving mobility on mainline NLSD must occur within the context of the 1972 *Lakefront Plan of Chicago* and the companion 1973 *Lake Michigan and Chicago Lakefront Protection Ordinance,* as they pertain to NLSD, which established a policy to "*strengthen the parkway characteristics of Lake Shore Drive and prohibit any roadway of expressway standards"*. The *Lakefront Plan* states a goal to "*maintain the current speed and traffic capacity of Lake Shore Drive"*. Therefore, improvement alternatives which increase the number of general purpose traffic lanes on NLSD will not be considered.

Furthermore, it should also be noted that the Inner and Outer Drives along the length of the study area are an integral part of the urban street network. That street network is saturated with travel demand during peak periods to the point where no roadway has any excess capacity to absorb diverted traffic. Any improvement measures in the NLSD corridor that affect traffic volumes or patterns must not shift traffic burdens elsewhere. They must avoid or minimize impacts to the safety and operation of adjacent arterial roadways.

Mobility at at-grade intersections is typically measured by calculating the average control delay per vehicle and relating it to Level of Service benchmarks. Existing junction ramp intersection Levels of Service are shown in Table 2.

**Table 2**
**Existing Junction Intersection Levels of Service**

| Junction Intersection | Level of Service and Delay (sec./veh.) | |
|---|---|---|
| | A.M. Peak Hour | P.M. Peak Hour |
| **Grand Avenue Junction** | | |
| • SB Exit Ramp Intersection | F (228) | B (10) |
| • NB Entrance Ramp Intersection | C (22) | B (19) |
| **Chicago Avenue Intersection** | | |
| • Inner/Outer Drive at Chicago Avenue | A (7) | F (129) |
| **Michigan Avenue/Oak Street Intersection** | | |
| • Michigan/Oak/Inner Drive Intersection | B (13) | B (18) |
| **LaSalle Drive Junction** | | |
| • SB Ramp/Inner Drive Intersection | C (28) | C (34) |
| • NB Ramp Intersection | C (33) | F (80) |
| **Fullerton Parkway Junction** | | |
| • SB Ramp Intersection | B (17) | A (6) |
| • NB Ramp Intersection | B (10) | B (10) |
| **Belmont Avenue Junction** | | |
| • SB Ramp/Inner Dr. Intersection | * | C (29) |
| • NB Ramp Intersection | B (19) | F (331) |
| **Irving Park Road (IL 19) Junction** | | |
| • SB Ramp/Inner Dr./Marine Dr. Intersection | E (58) | D (53) |
| • NB Ramp/Recreation Dr. Intersection | E (61) | C (27) |

| | | |
|---|---|---|
| **Montrose Avenue Junction** | | |
| • SB Ramp/Marine Dr. Intersection | F (98) | D (37) |
| • NB Ramp Intersection | ** | NB LT D (32)** |
| **Wilson Avenue Junction** | ** | ** |
| **Lawrence Avenue Junction** | ** | ** |
| **Foster Avenue (US 41) Junction** | NB LT E (39)** | NB LT F (56)** |
| **Bryn Mawr Avenue Junction** | Free Flow | Free Flow |
| **NLSD/Hollywood Ave./Sheridan Rd. Intersection** | D (47) | F (88) |

* Observed delays are substantial, however, they cannot be accurately modeled in Synchro/Sim Traffic.
** Ramp intersections are stop sign controlled. All movements are at LOS A or B unless otherwise noted.

Three locations stand out in regard to their effects on vehicular mobility as they cause substantial traffic bottlenecks on mainline NLSD during one or both peak periods. Those locations are highlighted in blue in Table 2. The needs for improvement at the three bottleneck locations are described below.

**Chicago Avenue Intersection** - Chicago Avenue, which is the only signalized intersection on NLSD, causes substantial mainline congestion, especially northbound during the P.M. peak period. Northbound queues can extend nearly to Monroe Street, which is about one mile to the south. Southbound queues in the afternoon can extend as far as the Michigan Avenue exit ramp, nearly ¾-mile to the north. Eastbound Chicago Avenue experiences long vehicle queues during the P.M. peak period as well. The intersection LOS in the P.M. peak hour is Level "F" (average delay = 129 seconds/vehicle).

In the A.M. peak period southbound queuing is not an issue because turning movements to and from Chicago Avenue from the Outer Drive are prevented by traffic cones during the morning peak period (i.e. Chicago Avenue only intersects with the Inner Driver during these times). The A.M. road closure, however, creates accessibility issues for educational institutions and hospitals located on Chicago Avenue west of NLSD.

**Belmont Avenue Junction** - The area adjacent to the Belmont junction is the most densely populated area in the city outside of the downtown. Belmont Avenue also provides the only access to NLSD for a distance of two miles which concentrates high levels of traffic at this location. As a result, travel demand at the junction overwhelms the capacity of the existing roadway facilities. The junction ramp intersections operate at low Levels of Service during peak periods. The northbound ramp intersection operates at Level of Service "F" (average delay = 331 seconds/vehicle). Northbound traffic queues during these times can extend nearly a mile to the south on mainline NLSD. The southbound on-ramp at Belmont Avenue in the morning peak period is

heavily congested which backs up traffic in three directions through the adjacent closely spaced intersections.

**North Lake Shore Drive/Hollywood Avenue/Sheridan Road Intersection** - Hollywood Avenue is the northern terminus of Lake Shore Drive. The high volume of vehicle traffic entering and leaving Lake Shore Drive at this terminus, which approaches nearly 70,000 vpd, is funneled through the Sheridan/Hollywood/Lake Shore Drive intersection (see Exhibit 3).

To accommodate traffic volumes of this magnitude while minimizing congestion, a manual traffic management operation has been instituted by CDOT in the weekday morning peak period at the Hollywood/Sheridan/NLSD intersection in concert with special traffic signal phasing. This manual traffic management operation employs traffic cones and unconventional signal phasing where southbound to eastbound left turns flow at the same time as eastbound through vehicles.

The southbound left turns are routed in the wrong direction onto northbound NLSD via a temporary reversible lane configuration on mainline Lake Shore Drive north of Bryn Mawr before crossing over to the southbound lanes. North/westbound traffic on Lake Shore Drive approaching this intersection is forced into a single right turn lane onto northbound Sheridan Road. The northbound queue on Lake Shore Drive due to the lane reduction can extend all the way to Foster Avenue at times. When the queue reaches the Bryn Mawr exit ramp, traffic begins to divert to Bryn Mawr, and then turns north at Sheridan or at Kenmore.

An important project improvement goal is to eliminate the need for the morning manual traffic control operations at the Hollywood Avenue/Sheridan Road intersection. Without the manual traffic management operation, the intersection would operate at LOS “F” in the A.M. peak hour (average delay = 186 seconds/vehicle), with a maximum eastbound queue length of more than 2,500 feet on Hollywood Avenue and a maximum southbound queue length on Sheridan Road of 7,250 feet. With the manual traffic management operation, the intersection operates at LOS “D” (average delay = 47 seconds/vehicle) with a 200-foot queue length on eastbound Hollywood and a 1,460-foot queue length on southbound Sheridan.

#### *1.4.2.2 Improve Transit Mobility*

Transit ridership comprises a substantial portion of the total travel demand in the NLSD corridor on a daily basis. More than 42,000 passengers per day ride on seven express bus routes which utilize the Outer Drive and an additional 27,000 riders per day use two local bus routes which travel on the Inner Drive roadways. According to the CTA, there are a total of 970 revenue bus runs on the Inner and Outer Drives each day.

CMAP has forecast bus boardings within the NLSD corridor to grow approximately 23% corridor-wide by 2040. Within the most heavily traveled section of NLSD north of Michigan Avenue, the bus routes on the Inner and Outer Drives are projected to carry as many as 85,000 riders per day.

Express bus routes that enter and exit NLSD must contend with severe vehicle congestion on some junction ramps during peak periods as well as on the Outer Drive itself, reducing the speed and reliability of transit service on these routes. Overcrowding on some buses is common during peak periods which diminishes the transit experience and further degrades transit mobility. There is a need to improve transit mobility in order to enhance the attractiveness of bus travel.

#### *1.4.2.3 Improve Lakefront Trail Mobility*

The Lakefront Trail is heavily used except during inclement weather or during some winter months when portions of the trail are closed due to ice buildup. On summer weekdays, the 20-foot wide trail accommodates nearly 15,000 daily users along its most heavily utilized section. See Exhibit 5. On summer weekends, that number swells to more than 31,000 users. Trail users include walkers, bikers, joggers, parents with children and strollers, tourists, dog walkers and skaters, among others.

There are several methods for calculating the Level of Service (LOS) on a shared-use path, including the 2010 edition of the *Highway Capacity Manual* and the 2006 FHWA *Shared-Use Path Level of Service Calculator*[1]. Path Levels of Service are similar to the vehicle LOS rankings of A through F. Analyses indicate that even the most lightly used sections of the Lakefront Trail are ranked as LOS F according to both methodologies. Level of Service F in the FHWA methodology is described as:

> ***F: Failing**- Trail is popular to the point of significantly diminishing the experience for at least one and probably all user groups. It does not effectively serve most bicyclists; significant user conflicts should be expected.*

Portions of the Lakefront Trail carry more than twice the user volume per hour that would be characterized as LOS F according to the FHWA methodology.

While it is clear that the Lakefront Trail is an important recreational path, it is also believed to be a heavily used commuter trail, even though it is difficult to accurately quantify the commuter usage. Weekday trail utilization shifts dramatically from weekend utilization. Weekend utilization is split with one out of every four trail users on a bicycle, whereas weekday utilization has nearly the opposite split

[1] The FHWA method was based on research conducted on 15 trails in ten cities nationwide, including a section of the Lakefront Trail at North Avenue beach. Ultimately, the Lakefront Trail was considered an outlier in the study as its average user volume per hour was more than seven times the average of all other trails. Its utilization was termed “off the charts”.

with three out of four users on bicycles. The much higher weekday bicycle utilization would indicate the likelihood of a large number of weekday bicycle commuters. Moreover, a large percentage of stakeholders who attended the first round of public meetings also indicated that they use the Lakefront Trail for commuting. Attendees were asked to fill out a survey to determine how they used NLSD, the Lakefront Trail and Lincoln Park. The survey captured self-described trail utilization data from 295 attendees who filled out the survey card. The results are shown in Table 3.

**Table 3**
**Lakefront Trail Utilization**

| Type of Trail Use | Percentage of Respondents who use the Trail in that fashion |
|---|---|
| Walker | 68% |
| Jogger | 33% |
| Bicyclist (Recreational) | 66% |
| Bicyclist (Commuter) | 41% |
| Rollerblader/Skateboarder | 4% |
| Access the Lakefront | 76% |

As can be seen from the above data, about 40% of the respondents use the trail for commuting between destinations on bicycles rather than just for recreation.

Compounding the effects of high trail volumes are large numbers of park users who enter or leave the trail at access points along its length or cross it to travel to and from the lakefront. These movements cause conflicts between users at each access point which further degrades mobility. Trail access counts identified peak daily user volumes which ranged between about 2,000 users at north end junctions to nearly 22,000 users at the Oak Street underpass.

CMAP has also forecast 2040 socioeconomic (household and employment) growth factors throughout the study area for use in projecting changes in weekday pedestrian/bicycle utilization along the Lakefront Trail. Based on their forecasts, weekday trail utilization is projected to increase between 12% at the north end of the study area to 19% near Oak Street.

### 1.4.3 Address Infrastructure Deficiencies

This section evaluates the need to address deficiencies in pavement and structure conditions, the ability of the existing facilities to meet current design standards related to pedestrian, bicycle and transit facilities, and the adequacy of the existing drainage system. Exhibit 7 in Appendix A depicts a graphical summary of infrastructure conditions along NLSD. Structures were rated based on their condition, an appraisal of their ability to meet current functional requirements and their

compliance with the requirements of the Americans with Disabilities Act (ADA).

### *1.4.3.1 Roadway*

Though the NLSD pavement between Grand Avenue and Irving Park Road has been repaired and resurfaced many times over the years, the underlying roadway structure is the original 1932 pavement. The pavement north of Irving Park Road was originally built in 1953-54 and was subsequently reconstructed in 1967. Large scale improvement projects to repair drainage structures, improve median barriers and guard rails and to patching and resurface the pavement have occurred along sections of NLSD in 1976, 1991, 1996, 1999, 2011 and 2012. The repair cycle for pavement maintenance and renewal as well as structure and lighting system repairs along all of NLSD is becoming more frequent due to the age and condition of the facilities.

### *1.4.3.2 Structures*

Structure condition ratings were obtained directly from the latest Structure Condition Reports or, where Structure Condition Reports did not exist (i.e. for some pedestrian tunnels), they were developed from visual inspections of structures conducted in 2013. Ratings comply with FHWA rating criteria for evaluating structure components (e.g. bridge deck, superstructure and substructure components of bridges). For the purposes of Exhibit 7, a single condition rating was presented for each structure which coincided the lowest rating given to any one of the individual structure components.

The structure condition rating was then combined with an evaluation of the functional adequacy of the structure to develop a ***Structure Appraisal Rating***. The Structure Appraisal Rating falls into one of three categories: *Meets Standards, Functionally Obsolete* or *Structurally Deficient.* The functional adequacy of structures was determined by examining geometric standards for widths and clearances alongside peak motorized and/or non-motorized user demands. Structures which did not meet current standards for deck geometry, load carrying capacity, clearance or approach roadway alignment or which could not adequately serve user demands were judged to be functionally obsolete.

Bridges were classified as structurally deficient where significant load carrying elements were rated to be in *poor* or worse condition due to deterioration or damage. It should be noted that any structure classified as structurally deficient was excluded from the functionally obsolete category as structures that are both structurally deficient and functional obsolete are reported together as deficient structures.

Because much of the NLSD infrastructure was constructed in the 1930s, bridges and pedestrian tunnels have exceeded their typical service lives by 30 or more years. Regular cycles of maintenance and rehabilitation have been successful in extending their service lives; however, maintenance cycles are becoming more frequent and can no longer address many of the underlying issues. As detailed on Exhibit 7, two of the eleven roadway structures (the Wilson Avenue and Lawrence Avenue overpasses) are in poor condition and thus would be considered structurally deficient. Pedestrian tunnels at the Michigan Avenue/Oak Street intersection are also in poor condition and are considered structurally deficient.

Although all other pedestrian/cyclist structures in the corridor are in fair or better condition, three-quarters of the structures can be considered functionally obsolete as the size of the facility does not adequately accommodate the current demand. Most of the pedestrian/cyclist structures are only 10 feet wide and 8 feet high, but must accommodate as many as 22,000 pedestrians and cyclists per day. Pedestrian structures that are considered functionally obsolete include the following:

- Chicago Avenue
- Michigan Avenue
- Oak Street
- Division Street
- North Avenue
- Passerelle Bridge
- Diversey Parkway
- Roscoe Street
- Addison Street

Stakeholders have also identified sight distance problems and the lack of bicycle access at some structures, as well as a general need to improve lighting under bridges and within pedestrian tunnels.

#### *1.4.3.3 ADA Requirements*

Much of the NLSD infrastructure fails to meet the requirements of the Americans with Disabilities Act. Eleven of the twelve pedestrian tunnels and the single pedestrian bridge do not meet ADA requirements. In addition, the accessible routes at six of the nine roadway junctions fail to provide adequate handicap accessibility (see Exhibit 7). Pedestrian tunnels typically fail to meet ADA requirements due to approach ramps with excessive grades and/or a lack of landings and handrails. The Chicago Avenue and Division Street tunnels lack any ramps at all and only have stairs.

#### *1.4.3.4 Drainage Deficiencies*

Another identified deficiency is the accommodation of roadway drainage. Flooding regularly occurs at several locations along the corridor and affects not only the cross street underpasses, the pedestrian underpasses and the Lakefront Trail, but at times can affect mainline NLSD as well. Common flooding locations are illustrated on Exhibit 7.


Flooding occurs as a result of large rain events and from high wave action on Lake Michigan. Most of NLSD drains into the City's combined sewer system, which cannot adequately accommodate heavy storm water flows and results in the flooding of underpasses and adjacent streets.

Due to the proximity of NLSD and the Lakefront Trail to Lake Michigan, they are subject to occasional flooding as a result of high wave action. This flooding causes hazardous conditions, particularly in the wintertime when the roadway and the Lakefront Trail can quickly become ice covered. Portions of the trail are impassible for extended periods of time due to ice buildup in the winter.

### 1.4.4 Improve Access and Circulation

North Lake Shore Drive and Lincoln Park attract tens of thousands of users to the study area every day. Of the 155,000 vehicles per day on the Outer Drive, nearly half enter or leave NLSD via junctions serving the adjacent neighborhoods. Those neighborhoods also generate tens of thousands of transit riders on corridor bus routes. In addition, the Lakefront Trail serves thousands of recreational users, commuters and tourists each day. This intense daily urban activity overburdens the access and circulation systems of both the park and roadway.

#### *1.4.4.1 Vehicular Access to North Lake Shore Drive*

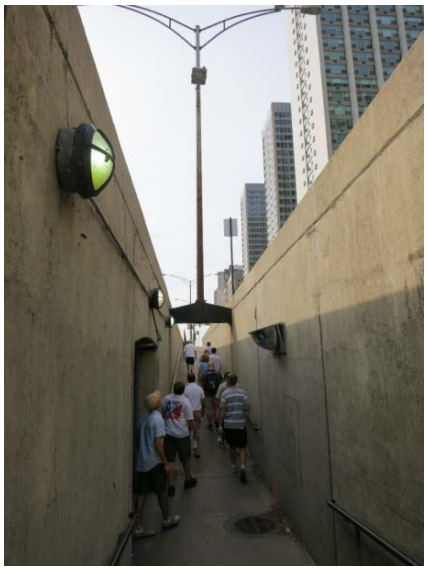
Vehicular access to NLSD occurs at eleven roadway junctions and two signalized intersections. Roadway junctions, however, are not evenly spaced along the length of the Drive. Belmont Avenue is the only junction for a two-mile stretch of NLSD. The long distance between access points in this area overburdens the Belmont Avenue junction as well as the local street network with travel demand during peak periods.

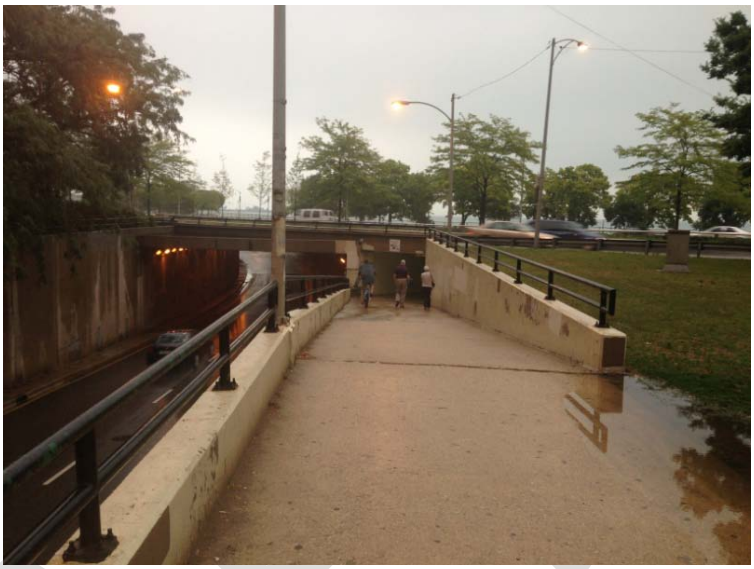
Whereas junctions are widely spaced near Belmont Avenue, they are closely spaced between Montrose and Lawrence Avenues. The junctions at Montrose, Wilson and Lawrence are spaced only one-quarter mile apart, which causes safety and operational problems at the short weaving areas on NLSD.

#### *1.4.4.2 Non-Motorized Access to Lincoln Park*

Non-motorized access to Lincoln Park and the lakefront is limited to nine roadway junctions, twelve pedestrian tunnels and one pedestrian bridge along the seven-mile project area. Access facilities along the northern third of the project area north of Irving Park Road are spaced approximately one-quarter mile apart. Along the remainder of the project area, however, access points generally are spaced one-half to three-quarters of a mile apart. Moreover, many of these access points are at junctions where park users are impeded by heavy traffic flows at ramp intersections. Non-motorized access at roadway junctions occurs via sidewalks that are often too narrow for typical pedestrian demands and few intersecting cross streets provide bicycle accommodations.

Many of the pedestrian tunnels that provide access to Lincoln Park are undersized for current park user demands, flood during heavy rain falls and do not meet ADA requirements for handicapped accessibility (see Exhibit 7). Several tunnels have blind corners and sight distance restrictions at entries.





Two of the stated purposes of the 1973 *Lake Michigan and Chicago Lakefront Protection Ordinance* are:

> *"(f) To promote and provide for continuous pedestrian movement along the shoreline;*
>
> *(g) To promote and provide for pedestrian access to the Lake and Lakefront Parks through areas adjacent thereto at regular intervals of one-fourth mile and additional places wherever possible…"*

There is also a need to create functional and inviting entries into Lincoln Park that are unencumbered by vehicular traffic, are regularly spaced and accommodate varying access demands along the route. There is also a need to enhance the east-west connectivity of pedestrian and bicycle facilities in adjacent neighborhoods to Lincoln Park and the Lakefront Trail.

### 1.4.5 Improve Modal Connections and Opportunities

This section addresses the need to improve connections between all modes of travel, including non-motorized connections to transit, as well as improving opportunities to better accommodate all transportation modes through cooperation and joint planning with transit providers. The study area has a well-developed and utilized public transportation system which includes the CTA Red Line commuter rail facility located west of the project area, as well as nine local and express bus routes that directly serve the NLSD corridor.

Corridor bus routes are heavily utilized and carry as many as 69,000 bus riders per day in the NLSD corridor. Existing peak period ridership demand not only strains the capacity of some bus stops, but the capacity of the buses themselves. It is common for some inbound buses during the morning peak period to be filled to capacity before reaching southerly bus stops. The CTA bus stop at Belmont Avenue is the

most heavily used stop in the corridor where as many as 1,700 passengers board or alight buses during each peak period. CMAP projects that bus ridership in the corridor will increase to as many as 85,000 bus riders per day by 2040.

#### *1.4.5.1 Improve Access to Transit*

Pedestrian access to transit in the corridor is highly developed. Bus stops along the Inner Drive are located nearly every block. Virtually none of the bus stops, however, have accommodations for bicycle parking. The Divvy Bike system, introduced in 2013, may enhance bike access to transit in the area.

For auto access to transit, the nearest CTA park and ride facility is located well north of the study area at the Howard Street station on the CTA Red Line. Parking capacity in the neighborhoods is at a premium and is difficult to find. Many local residents store private vehicles on-street and use them only occasionally, resulting in low parking turnover rates. There are no parking facilities in the study area that provide attractive auto access to transit which could divert some auto trips to transit.

#### *1.4.5.2 Improve Transit Access to Lincoln Park*

East-west transit access to Lincoln Park is limited along the NLSD corridor. On the few east-west bus routes that exist between CTA's elevated Red Line rail transit facility and the park, buses cannot turn around and are forced to enter NLSD at one of the junctions. On summer weekends when transit connections to Lincoln Park are needed most, east-west arterial roadways are gridlocked with traffic, trapping buses in the traffic queues. There is a need to improve east-west transit service that connects to NLSD and Lincoln Park.

#### *1.4.5.3 Improve Non-motorized Connections*

Bus stops throughout the corridor do not efficiently accommodate waiting passengers. Some bus stops, such as the Belmont Avenue stop, are overwhelmed with bus riders during peak periods and lack both sidewalk space and shelters to accommodate the large numbers of waiting bus riders.

Northbound bus stops on the Inner Drive north of Belmont Avenue are squeezed onto the narrow 10-foot wide medians between the Inner and Outer Drives. Bus riders stand only a few feet away from high speed traffic on the Outer Drive, protected only by a guardrail and a Plexiglas splash-shield. There are no northbound bus stops provided on the Inner Drive between Grand Avenue and Oak Street because the median or barrier wall that separates the Inner Drive from the Outer Drive is too narrow.

#### *1.4.5.4 Improve Multi-modal Opportunities*

The projected growth in transit ridership presents both a need and an opportunity to enhance and expand transit service in the NLSD corridor in concert with needed infrastructure improvements. The NLSD study is coordinating with transit agencies and other stakeholders in the planning, design and

potential construction of future transit opportunities. There is an opportunity for the NLSD study to coordinate and work with the Park District and transit providers to explore the need for and feasibility of transit service within Lincoln Park itself.

# Appendix A

# EXHIBITS


Illinois Department of Transportation
CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION
N
Lake Michigan
Project Location
Not to Scale
North Lake Shore Drive Phase I Study
Project Location Map

Exhibit 1


Illinois Department of Transportation
CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION
N
La Salle Boulevard
Michigan Avenue
Oak Street
Division Street
North Avenue
La Salle Drive
Clark Street
Fullerton Parkway
Diversey Avenue
Belmont Avenue
Addison Street
Irving Park Road
Broadway Street
Montrose Avenue
Wilson Avenue
Lawrence Avenue
Sheridan Road
Foster Avenue
Bryn Mawr Avenue
Hollywood Avenue
Chicago River
Grand Avenue
Chicago Avenue
Lake Shore Drive
Oak Street Beach
Lincoln Park Zoo
Cannon Drive
Diversey Harbor
North Avenue Beach
Belmont Harbor
Lake Shore Drive
Marine Drive
Lake Shore Drive
Navy Pier
Montrose Harbor
0' 550' 1100'
Roadways
Structures
Lakefront Trail
Lincoln Park
Study Limits
Other Paths
North Lake Shore Drive Phase I Study
Study Area Map
Grand Avenue to Hollywood Avenue
January 2, 2014

**Exhibit 2**


Illinois Department of Transportation
CDOT
Chicago Department of Transportation
N
La Salle Boulevard
State Street
Michigan Avenue
Columbus Drive
Chicago River
Grand Avenue
Chicago Avenue
Oak Street
Division Street
North Avenue
La Salle Drive
Clark Street
Cannon Drive
Fullerton Parkway
Diversey Avenue
North Lake Shore Drive
Belmont Avenue
Addison Street
Irving Park Road
Montrose Avenue
Wilson Avenue
Lawrence Avenue
Broadway Street
Sheridan Road
Clark Street
Ridge Avenue
Foster Avenue
Bryn Mawr Avenue
Hollywood Avenue
Marine Drive
Lake Shore Drive
Lake Shore Drive
10,400
124,000
8,800
9,900
122,600
6,800
35,500
2,800
11,200
149,700
30,400
154,400
20,500
4,600
140,800
19,300
11,300
122,500
7,800
5,900
121,500
20,800
5,500
110,000
12,100
2,100
100,600
9,400
3,500
95,100
12,600
4,000
85,900
14,500
7,500
71,900
13,200
5,700
58,900
27,600
34,400
Chicago Avenue
Lincoln Park Passerelle
Belmont Avenue Entrance Ramp
Belmont Avenue Exit Ramp
Irving Park Road
Irving Park Road Exit Ramp
Montrose Avenue
Hollywood Avenue
0' 600' 1200'
XXX,XXX
2013 Average Daily Traffic Volume
X,XXX
2013 Average Daily Traffic Volume (inner Lake Shore Drive, Marine Drive, Sheridan Road)
Existing North Lake Shore Drive Traffic Mainline Signal
Existing North Lake Shore Drive Junction Ramp Signal
North Lake Shore Drive Phase I Study
Existing Average Daily Traffic
January 2, 2014

**Exhibit 3**


Illinois Department of Transportation
CDOT
Chicago Department of Transportation
La Salle Boulevard
State Street
Michigan Avenue
Columbus Drive
Chicago River
Grand Avenue
Lake Shore Drive
Chicago Avenue
Oak Street
Division Street
North Avenue
La Salle Drive
Clark Street
Fullerton Parkway
Diversey Avenue
Cannon Drive
North Lake Shore Drive
Belmont Avenue
Addison Street
Irving Park Road
Montrose Avenue
Wilson Avenue
Lawrence Avenue
Broadway Street
Sheridan Road
Foster Avenue
Bryn Mawr Avenue
Ridge Avenue
Hollywood Avenue
Ashland Avenue
Clark Street
Marine Drive
72
156
143 146 147 148 151
134 135 136
151
151 156
134 143
134 143 151 156
76
77
151
152
153
80
135 148
78
135 148
151
81
136 146
136 146 148
92
146
84
147
136 147 151
134 135 136 143 146 147 148
135 136 146 147 148
135 146 151
136 147 148
10,000
42,300
36,000
18,900
14,200
61,300
68,800
56,100
0' 600' 1200'
XXX Bus Route Number
N/S Express Bus Route
N/S Local Bus Route
E/W Local Bus Route
XX,XXX NLSD Average Daily Weekday Transit Ridership
XX,XXX Average Weekday Total Corridor Transit Ridership
North Lake Shore Drive Phase I Study
Existing Weekday Transit Ridership
January 2, 2014

Exhibit 4


Illinois Department of Transportation
CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION
N
La Salle Boulevard
Ohio Street
Oak Street
North Avenue
Clark Street
Michigan Avenue
State Street
Division Street
La Salle Drive
Columbus Drive
Chicago River
Grand Avenue
Chicago Avenue
Cannon Drive
Fullerton Parkway
Diversey Avenue
Belmont Avenue
Addison Street
Irving Park Road
Montrose Avenue
Wilson Avenue
Lawrence Avenue
Broadway Street
Sheridan Road
Foster Avenue
Bryn Mawr Avenue
Ridge Avenue
Hollywood Avenue
Ardmore Avenue
Marine Drive
Lake Shore Drive
North Lake Shore Drive
(9,000)
(21,700)
(3,500)
(5,400)
(5,300)
(3,500)
(2,900)
(2,700)
(1,800)
(1,800)
(2,300)
(2,000)
14,700 (31,500)
13,800 (12,200)
7,400 (13,900)
0' 600' 1200'
Lakefront Trail
Two-way Park Entrance Counts[1]
Two Way Trail Counts[1]
XX,XXX Weekday Daily Trail Volume[2]
(XX,XXX) Weekend Daily Trail Volume[2]
(1) Bicycles, Pedestrians, and Others
(2) Source: Lakefront Trail Counts
June - August 2013
North Lake Shore Drive Phase I Study
Existing Lakefront Trail Usage
January 2, 2014

Exhibit 5

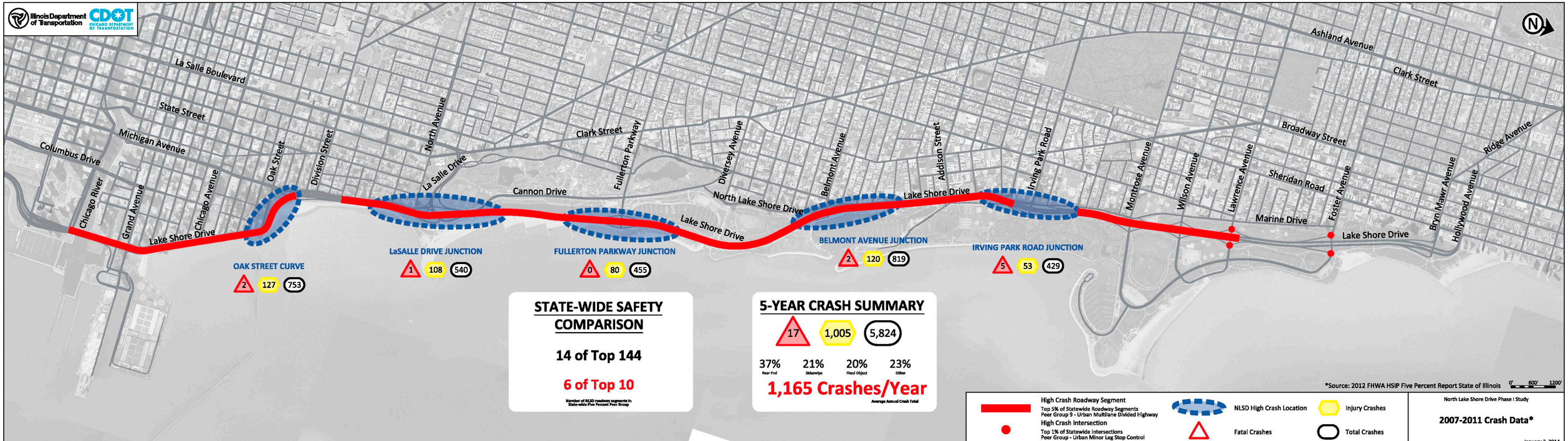

Illinois Department of Transportation
CDOT
CHICAGO DEPARTMENT OF TRANSPORTATION
N
La Salle Boulevard
State Street
Michigan Avenue
Columbus Drive
Chicago River
Grand Avenue
Chicago Avenue
Oak Street
Division Street
North Avenue
La Salle Drive
Clark Street
Fullerton Parkway
Diversey Avenue
Belmont Avenue
Addison Street
Irving Park Road
Montrose Avenue
Wilson Avenue
Lawrence Avenue
Sheridan Road
Foster Avenue
Bryn Mawr Avenue
Hollywood Avenue
Ridge Avenue
Ashland Avenue
Clark Street
Broadway Street
Marine Drive
Lake Shore Drive
Cannon Drive
North Lake Shore Drive
Lake Shore Drive
Lake Shore Drive
Lake Shore Drive
OAK STREET CURVE
2 127 753
LaSALLE DRIVE JUNCTION
1 108 540
FULLERTON PARKWAY JUNCTION
0 80 455
BELMONT AVENUE JUNCTION
2 120 819
IRVING PARK ROAD JUNCTION
5 53 429
STATE-WIDE SAFETY COMPARISON
14 of Top 144
6 of Top 10
Number of NLSD roadway segments in State-wide Five Percent Peer Group
5-YEAR CRASH SUMMARY
17 1,005 5,824
37% Rear End
21% Sideswipe
20% Fixed Object
23% Other
1,165 Crashes/Year
Average Annual Crash Total
*Source: 2012 FHWA HSIP Five Percent Report State of Illinois
0' 600' 1200'
High Crash Roadway Segment
Top 5% of Statewide Roadway Segments
Peer Group 9 - Urban Multilane Divided Highway
High Crash Intersection
Top 1% of Statewide Intersections
Peer Group - Urban Minor Leg Stop Control
NLSD High Crash Location
Fatal Crashes
Injury Crashes
Total Crashes
North Lake Shore Drive Phase I Study
2007-2011 Crash Data*
January 2, 2014

Exhibit 6

Illinois Department of Transportation | CDOT Chicago Department of Transportation


Excessive Lakefront Trail Cross Slope


Wall/Guardrail Deterioration


Division Street Pedestrian Tunnel


Oak Street Curve


NLSD Flooding - Oak St. to North Ave.


Passerelle Bridge


Inner Drive Bus Stop


Bus Stop Splash Guard


Lawrence Avenue Overpass


Lawrence Avenue Overpass


Wilson Avenue Overpass

State Street
Michigan Avenue
Columbus Drive
Chicago River
Grand Avenue
Lake Shore Drive
Chicago Avenue
Oak Street
Division Street
North Avenue
Clark Street
Cannon Drive
Fullerton Parkway
Diversey Avenue
North Lake Shore Drive
Lake Shore Drive
Addison Street
Irving Park Road
Montrose Avenue
Wilson Avenue
Lawrence Avenue
Marine Drive
Lake Shore Drive

Ohio St. Pedestrian Tunnel — F MS ADA
Michigan Ave. Pedestrian Tunnel — P SD ADA
Chicago Ave. Pedestrian Tunnel — F FO ADA
Division St. Pedestrian Tunnel — F FO ADA
Michigan Ave. Ramp Tunnel — G FO
Oak Street Pedestrian Tunnel — F FO ADA
Passerelle Pedestrian Bridge — F FO ADA
LaSalle Dr. Bridge — F FO ADA
North Ave. Pedestrian Tunnel — F FO ADA
Fullerton Pkwy. Bridge — F MS ADA
Fullerton Pkwy. Lagoon Bridge — G MS ADA
Diversey Pkwy. Bridge — F FO ADA
Barry Ave. Pedestrian Underpass — G MS ADA
Belmont Ave. Bridge — F FO ADA
Roscoe St. Pedestrian Underpass — F FO ADA
Addison St. Pedestrian Underpass — F FO ADA
Irving Park Rd. Bridge — F FO ADA
Buena Ave. Pedestrian Underpass — F MS ADA
Montrose Ave. Bridge — F FO ADA
Wilson Ave. Bridge — P SD ADA
Lawrence Ave. Bridge — P SD ADA
Argyle St. Pedestrian Underpass — F MS ADA
Bryn Mawr Ave. Bridge — F MS ADA
Berwyn Ave. Pedestrian Underpass — F MS ADA
Foster Ave. Bridge — F MS ADA

0' 600' 1200'

Notes:
* Structure Condition is based on lowest condition rating for Deck, Superstructure, and Substructure.
** ADA Compliance applies to structure and approach pathways.

**Structure Location**

**Structure Condition***
- G Good
- F Fair
- P Poor

**Structure Appraisal**
- MS Meets Standards
- FO Functionally Obsolete
- SD Structurally Deficient

**ADA Compliance****
- ADA Meets ADA Requirements
- ADA Does not meet ADA Requirements

**Shoreline Protection**
- Roadway/Lakefront Trail Flooding
- Deteriorated Shoreline Revetment

North Lake Shore Drive Phase I Study

# Existing Infrastructure Conditions

January 2, 2014

Exhibit 7