



Consulting Engineer's Report

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CONSULTING ENGINEER’S REPORT ¹

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¹ **Important:** This report is subject to limitations contained in the Official Statement and Part 8.0 below.

1.0 History and Status

The Illinois State Toll Highway Authority is a user-financed administrative agency of the State of Illinois whose purpose is to operate, maintain and service a system of toll roads located in northern Illinois (Illinois Tollway system). The Illinois State Toll Highway Authority began in 1953 as the Illinois State Toll Highway Commission, created by an act of the Illinois State legislature. The Illinois State Toll Highway Commission was directed by the legislature to construct the original 187 miles of the Illinois Tollway system that included the Tri-State, Northwest (now the Jane Addams Memorial) and East-West (now the Reagan Memorial) Tollways. These routes opened to traffic in 1958. On April 1, 1968 the Illinois State Toll Highway Commission became the Illinois State Toll Highway Authority (hereafter referred to as the Illinois Tollway).

The Illinois Tollway system has been an important component of the transportation network in northern Illinois. When it opened in 1958, it was envisioned as a high-speed bypass around the urban core of Chicago. However, over the last five decades, the Illinois Tollway system has evolved to not only continue this function, but to also serve both commercial and commuter-oriented traffic within the Chicago metropolitan region. Expansion of the system through the construction of extensions and new routes was initiated to keep pace with overall traffic growth in the region. Improvements have been made in coordination with and in response to transportation planning efforts at both the regional and state levels.

The Illinois Tollway system has grown over the last five decades as a result of Legislative directives:

- In 1970, the Governor approved the construction of the Reagan Memorial Extension (originally called the East-West Extension), between IL Route 56 west of Aurora and US Route 30 near Sterling – Rock Falls, which added an additional 69.5 miles to the system. This extension was included in the original authorization for the Illinois Tollway system but was not included in the original construction. This route was opened to traffic in 1974.
- In 1984, the Illinois State Legislature directed the Illinois Tollway to construct the Veterans Memorial Tollway (originally called the North-South Tollway), which added an additional 17.5 miles to the system. This route opened to traffic in 1989.
- In July 1993, the Illinois General Assembly authorized the Illinois Tollway to construct the South Extension of the Veterans Memorial Tollway from I-55 to I-57 (the portion from I-55 to I-80 opened to traffic in November 2007), the North Extension of the North-South Tollway from Lake-Cook Road to IL-120 in Grayslake and east to I-94, and the Richmond Extension from IL-120 in Grayslake to the Illinois-Wisconsin border near Richmond, Illinois. In 1995, the Illinois Tollway was further authorized to construct the Elgin-O'Hare Extension and the Western O'Hare Bypass. Studies by the Illinois Department of Transportation have been completed for the Elgin-O'Hare Extension and the Western O'Hare Bypass. The projects are now collectively known as the "Elgin O'Hare Western Access" (EOWA) Project and are identified within the Move Illinois Program described below. In addition, the Move Illinois Program includes studies for the North Extension of the Veterans Memorial Tollway.

The Amended and Restated Trust Indenture of the Illinois State Toll Highway Authority, effective March 31, 1999 (Trust Indenture) renamed the Capital Improvement Program as the Improvement Program (I) and the Major Improvement Program as the Renewal and Replacement Program (RR). Improvement projects are those that add to or improve the existing Illinois Tollway system infrastructure while Renewal and Replacement projects are those that maintain, repair or improve the existing infrastructure. Funding for these programs is provided entirely through user fees (i.e., tolls), concession and miscellaneous revenues, investment earnings, and revenue bonds.

As of the end of 2016, there are 290.7 centerline miles of mainline roadway consisting of 1,918.3 mainline and auxiliary lane miles, 340.3 ramp and mainline toll plaza cash lane miles, and 676 bridges.

In mid-2004, the Illinois Tollway unveiled a \$5.3 billion 10-Year Congestion-Relief Plan that addressed the condition of existing infrastructure, congestion relief, the needs of growing communities, and enhancement of local economies. As part of the long-range planning process, a comprehensive re-evaluation of the entire system and an extensive review of the condition of the Illinois Tollway's then 274-miles of roadways and structures were completed. Illinois Tollway staff met with various community leader groups to develop concepts and to validate ideas of the proposed 10-year program. The Congestion-Relief Plan was approved by the Illinois Tollway Board at the September 2004 Board meeting. Upon board approval, it became known as the Congestion-Relief Program (CRP).

The Illinois Tollway reassessed the CRP during the spring of 2007. A number of projects were re-evaluated and were modified or enhanced due to the condition of the roadway and overpass bridges or to accommodate input from municipalities. Also, due to increased material and overall construction costs during the 2005 and 2006 construction seasons, the estimates for projects in design were adjusted. Finally, several significant additions were made to the CRP to address portions of the system and to provide access improvements to the Illinois Tollway. Based upon these CRP changes, the overall budget for the CRP was increased by approximately \$1.0 billion and the schedule was lengthened by two years. The revised Congestion-Relief Plan was approved by the Illinois Tollway Board at the September 7, 2007 Board meeting. Since that time, costs and schedules for projects have been modified based upon market dynamics. Information detailing the completion of CRP projects is included in a later section. The completion of projects remaining under the CRP program is expected to be paid for entirely with revenue funds.

On August 25, 2011, the Illinois Tollway Board of Directors approved a \$12.1 billion long-range plan for the Illinois Tollway system known as "*Move Illinois: The Illinois Tollway Driving the Future.*" Upon board approval, it became known as the "*Move Illinois Program*". The key goals of the Move Illinois Program are to:

- Save drivers time and money
- Drive the economic engine
- Build a 21st century transportation system
- Take care of the existing system
- Be the "cleanest and greenest" program in history

The program includes two elements – maintaining the existing Illinois Tollway system and enhancing regional mobility with new priority projects. The program and the projects that make up the program are described in detail in later sections of this report.

In April 2017, the Illinois Tollway Board of Directors authorized an amendment of the *Move Illinois* Program which increased the amount authorized for the central portion (Balmoral Avenue – 95th Street) of the Tri-State Tollway (I-294) (the “Central Tri-State”) by approximately \$2.1 billion, from \$1.9 billion to \$4.0 billion, increasing the total cost of the *Move Illinois* Program from \$12.149 billion to \$14.273 billion.. Enhancements included in the new Central Tri-State scope will allow the Illinois Tollway to rebuild roadway and improve bridges on the 22 mile long portion of I-294, as well as construct additional lanes to relieve congestion, improve interchanges to increase access and work to deliver solutions for stormwater, noise abatement and freight.

2.0 Condition of the Existing Illinois Tollway System

The Illinois Tollway system continues to function as an essential component of the transportation network in northern Illinois. As part of the CRP and *Move Illinois* Program (collectively, the “Capital Programs”) to date, approximately 65.5% of the system mainline pavement has been constructed, reconstructed, or reconstructed and widened, approximately 32.3% of the system mainline pavement has been rehabilitated, Open Road Tolling (ORT) has been implemented at all mainline toll plazas systemwide, and the Veterans Memorial Tollway (I-355) South Extension to I-80 has been completed; reconstruction and widening of the Jane Addams Memorial Tollway (I-90) west of Elgin Plaza 9 has been completed; construction of a new interchange for the Tri-State Tollway (I-294) with Interstate 57 has commenced with the initial phase ramps opened in 2014; the Elgin O’Hare Western Access (IL-390) west of Rohlwing Road has been rehabilitated and widened.

Though significant progress has been made with regard to the Illinois Tollway system infrastructure, there are still many challenges remaining. The original mainline pavement not addressed by the Capital Programs to date continues to be maintained at high levels; however, some infrastructure elements will require attention in the near future due to the effects of age and increasing traffic volumes. Many of the original bridge decks have had bituminous overlays (now removed), concrete overlays (existing) and have been widened to respond to increasing traffic demand.

The geometry of the existing roadway system generally meets or exceeds Federal highway design criteria.

A majority of the system’s original mainline pavement not reconstructed or reconstructed and widened to date (approximately 17.1% systemwide total), is programmed for reconstruction or reconstruction and widening as part of the *Move Illinois* Program through 2026. Additionally, sections of pavement constructed, reconstructed and widened or rehabilitated as part of the CRP (approximately 22.9% systemwide) are programmed for rehabilitation required by the pavement preservation program as part of the *Move Illinois* Program through 2026.

At the conclusion of the current Capital Programs, the Illinois Tollway will have:

- Reconstructed approximately 62.2 centerline miles or 22.9% of the mainline pavement systemwide;
- Reconstructed and widened approximately 144.6 centerline miles or 53.2% of the mainline pavement systemwide;
- Rehabilitated approximately 58.0 centerline miles or 21.3% of the mainline pavement systemwide;
- Rehabilitated and widened approximately 5.5 centerline miles or 2.0% of the mainline pavement systemwide;
- Added the Elgin-O’Hare Western Access corridor into the system (including the existing Elgin-O’Hare Expressway)

NOTE: *The above percentages are based upon the approximately 271.8 centerline miles of mainline pavement existing prior to the CRP and do not include new construction/expansion of interchange ramps, auxiliary or plaza pavements.*

In addition, it is anticipated that the Illinois Tollway will have increased the systemwide lane mileage by approximately 42% at the conclusion of the current Capital Programs. This increase

of lane mileage will have been accomplished through various widening projects, construction of route extensions and interchanges, and the inclusion of the Elgin O'Hare corridor.

Inspections are performed annually throughout the entire Illinois Tollway system (Annual Inspections) pursuant to requirements of the Trust Indenture. The purpose of these inspections is to evaluate Illinois Tollway assets which include but are not limited to pavement, bridges, overhead sign structures, structural walls, drainage structures, slopes, ditches, safety appurtenances and facilities. Certain Illinois Tollway assets including bridges, structural walls, overhead sign structures, and facilities are inspected on multi-year cycles which are described in further detail later in this report.

The overall condition of the Illinois Tollway facilities has also improved due to ongoing rehabilitations at the maintenance yard facilities and repairs performed by the Illinois Tollway Engineering Department's Division of Maintenance and Traffic (Maintenance Division).

As in previous years, the Annual Inspections were completed by the Consulting Engineer on the entire 290.7 miles of the Illinois Tollway system. The following sections summarize the Consulting Engineer's Annual Inspection findings for 2016. The deficiencies noted will be addressed by the Illinois Tollway Maintenance Division or as part of the current Capital Programs and in some cases, have already been addressed.

2.1 Pavement

The Illinois Tollway roadway pavement is inspected annually. The inspection includes: a structural evaluation, a pavement surface evaluation, and a visual inspection that detail areas for repair to be completed by contract or by the Illinois Tollway Maintenance Division.

Visual Inspection Overview

Visual inspection of the Illinois Tollway roadway system is performed annually during the spring and summer months. This inspection consists of the recording of visible deficiencies of the mainline and ramp pavements from edge-of-shoulder to edge-of-shoulder including all bridge decks, shoulders, gutters and curbs. Prior to the visual inspection, the Inspectors interview each Maintenance Section Manager/Supervisor and document any concerns. Through the results of these interviews and subsequent visual inspections, repair quantities are estimated and prioritized based on the level of severity and repair recommendations are created. These repair quantities and recommendations are utilized to assist the Illinois Tollway Maintenance Division in scheduling work activities; to aid the Engineering Division in ensuring that all necessary repairs are included in upcoming construction contracts; and to aid the Planning Division in the determination and creation of future repair programs. An overall condition rating is then assigned for the areas inspected based upon the estimated repair quantities and level of severity. This overall condition rating typically coincides with the CRS rating discussed elsewhere within this report.

The overall condition ratings utilized for the visual inspections are as follows:

- Excellent:** No deficiencies requiring repairs other than preventative maintenance noted.
- Good:** Deficiencies noted requiring repairs typically within the capabilities of the Illinois Tollway Maintenance Division.
- Fair:** Deficiencies noted requiring repairs by Contract or by the Illinois Tollway

Maintenance Division. Deficiencies requiring repairs by Contract are typically beyond the capabilities of the Illinois Tollway Maintenance Division due to size, quantity, or repair process.

Poor: Deficiencies noted throughout which are beyond the capabilities of the Illinois Tollway Maintenance Division due to size, quantity, or repair process.

Structural Evaluation Overview

The structural evaluation of the Illinois Tollway roadway system is performed annually by the Illinois Tollway's Pavement Consultant during the summer and fall months. This evaluation consists of Falling Weight Deflectometer (FWD) testing and data analysis and a pavement coring program, the results of which are utilized to assess the structural integrity of the mainline pavements and assist in identifying deficiencies.

FWD testing is completed by measuring the deflections caused by an impulse deflection device that applies a dynamic load by dropping a weight onto a circular load plate placed on the pavement surface. The results of the FWD testing are utilized to determine pavement layer and subgrade structural parameters, to evaluate load transfer characteristics at pavement joints and to detect the presence of subsurface voids.

The pavement coring program consists of six-inch diameter full depth cores taken through bound pavement layers at strategically placed locations throughout the Illinois Tollway system. Pavement cores are used to verify pavement layer thickness and to inspect material and bonding conditions.

Surface Evaluation Overview

The pavement surface evaluation of the Illinois Tollway roadway system is performed annually during the summer and fall months. This evaluation utilizes electronic and visual surveillance of the pavement surface to determine the extent of pavement distress.

The Illinois Tollway utilizes a pavement inspection and evaluation system similar to that developed by the Illinois Department of Transportation (IDOT) which categorizes pavement conditions using Condition Rating System (CRS) values. This system is a subjective measurement of pavement surface condition based on a 1 to 9 scale; with 9 representing a newly constructed or resurfaced pavement and 1 representing a completely failed pavement.

While both the Illinois Tollway and IDOT consider a CRS rating of less than 4.5 "poor", IDOT may consider it tolerable on a rural route. On the Illinois Tollway system and other higher level facilities, a CRS of 5.5 or less indicates a riding surface that has become uncomfortable and inconsistent with Illinois Tollway operations and user expectations. Therefore, a CRS of 5.5 or less on the Illinois Tollway system is a candidate for repairs or rehabilitation. In addition, based upon the Illinois Tollway's maintenance and repair histories and pavement age, the Consulting Engineer considers pavement with a CRS value between 6.0 and 6.5 as "transitional" likely requiring repairs in the following two to seven years due to the diminishing life span of repeated repair cycles.

The CRS ratings utilized for the Illinois Tollway pavement surface evaluation are provided in the following table.

Table 1: CRS Rating System

CRS Rating	General Pavement Surface Condition
< 4.5	Poor
4.5 – 5.9	Fair
6.0 – 6.5	Transitional
6.6 to 7.4	Good
>7.4	Excellent

It should be noted that while the riding surface may reflect a high CRS rating, the aging pavement substructure, drainage problems, or other unknown conditions that may exist below the pavement surface are unaccounted for by the CRS rating.

CRS values are determined by digitally recording surface conditions and measuring certain types of surface distress and rideability of pavements through the collection of electronic sensor data. This data is collected by a semi-automatic survey process which utilizes a survey vehicle outfitted with cameras that capture continuous images of the pavement surface and panoramic images of the roadway. The images and sensor data are processed by trained CRS rating personnel who assign CRS values. A summary of the most recent systemwide CRS ratings is included in the following table:

Table 2: Summary of Pavement CRS Ratings from the 2016 Evaluation in Lane Miles

Tollway Route	Excellent >7.4	Good 6.6-7.4	Transitional 6.0-6.5	Fair 4.5-5.9	Poor <4.4	Not rated **
Tri-State (I-294)	174.4	135.3	81.9	22.8	0.0	7.8
Tri-State (I-94)	72.7	85.1	22.3	18.0	0.0	0.0
Edens Spur (I-94)	0.1	2.9	11.0	1.6	0.0	0.0
Jane Addams Memorial (I-90)	303.1	7.0	0.0	0.0	0.0	146.7
Reagan Memorial (I-88)	258.4	133.9	20.7	4.7	0.0	48.7
Veterans Memorial (I-355)	60.5	107.4	5.6	0.0	0.0	15.1
Total*	869.2	471.7	141.4	47.1	0.0	218.4
% of Total	49.7%	27.0%	8.1%	2.7%	0.0%	12.5%

* Lane Miles Surveyed does not equal total actual system lane mileage due to approximate beginning and ending points of the field survey, construction activity along the Jane Addams Memorial Tollway (I-90) and the Reagan Memorial Tollway (I-88), and the exclusion of auxiliary lanes and other lane types.

** Sections that contained construction and the long bridges were excluded from the survey and listed as "Not Rated".

Note: This evaluation does not include auxiliary or ramp lanes that are required for entering and exiting the Illinois Tollway. Due to this, route and system totals, may not match information in other sections of the report. Percentages may not total to 100% due to rounding.

Ramp lanes are evaluated on a three year basis due to the reduced traffic and anticipated improved condition compared to the mainline, though the Illinois Tollway may begin to monitor the ramps more closely since the current programs are not expected to address many of the system's ramps. Auxiliary lanes are generally in better condition than the adjacent mainline lanes due to reduced traffic and are generally maintained in conjunction with the mainline lanes.

As previously stated, CRS ratings are a subjective measurement of the pavement surface condition. These ratings are only one indicator of overall pavement condition and if used alone can be misleading. A newly rehabilitated roadway will likely receive an "excellent" CRS rating even though the underlying concrete pavement and base could be largely deteriorated. In such a case the "excellent" CRS rating is expected to rapidly deteriorate to a "transitional" or "poor" CRS rating and the pavement will likely require additional work in a relatively short period of time. It is anticipated that Illinois Tollway pavement sections not reconstructed as part of recent Capital Program projects which received a CRS rating of "good" to "excellent" will rapidly deteriorate to a transitional or lower rating due to the condition of the underlying concrete base pavement.

Considering this, the Remaining Service Life (RSL) categories were developed. The RSL categories take into account current CRS ratings, traffic volumes, and pavement thickness information. This data is projected to determine how many theoretical years are remaining before a terminal level is reached and major repairs would be required. The RSL categories are developed using specific pavement performance models, historical condition data for a specific pavement type, and assumed rehabilitation treatments. The RSL categories have been found to be a reliable indicator of pavement performance. However, if there is any deviation from the future rehabilitation treatments assumed in developing the performance model, then the model will no longer accurately predict pavement performance, and the RSL category may be incorrect.

Historically, the Illinois Tollway RSL categories included 0 years, 1-2 years, 3-4 years, 5-8 years, 9-12 years and 13 or more years. In 2010, additional RSL categories of 13-19 years and 20 or more years were created to allow for better programming of future rehabilitation projects. New pavement with an expected life of 30 or more years would typically be categorized with an RSL of 20 or more years. In contrast, pavement categorized with an RSL of 0 years will require extensive intermittent pavement repairs to maintain the pavement integrity.

The Illinois Tollway has generally been successful in maintaining consistent pavement conditions to date. This has been accomplished through activities performed by the Maintenance Division and programmed major repair work through the Capital Programs.

The system mainline pavement sections which have been constructed, reconstructed, or reconstructed and widened as part of the Capital Programs to date addresses the concern of failing base pavement on those portions of the system. However, there is still a substantial amount of pavement that has not been reconstructed. In addition to intermittent repairs systemwide, other short term repairs in these areas include asphalt resurfacing on the Edens Spur (I-94) completed in 2010, on the Reagan Memorial Tollway (I-88) completed in 2012, and on the Tri-State Tollway (I-294) completed in 2012. These short-term repairs serve to improve pavement surface conditions and rideability; however they do not adequately address the deterioration of the underlying concrete base pavement. Based on pavement age and repair histories, reconstruction of these pavements is likely the most cost-effective long-term repair strategy. Currently, a majority of the system mainline pavement not reconstructed or reconstructed and widened to date, is programmed for reconstruction or reconstruction and widening as part of the Capital Programs through 2026. Additionally, sections of pavement

constructed, reconstructed, reconstructed and widened or rehabilitated as part of the CRP are programmed for rehabilitation required by the pavement preservation program as part of the *Move Illinois* Program through 2026.

While the Illinois Tollway's annual maintenance efforts have focused on maintaining the basic integrity of the roadway through projects such as emergency patching and intermittent pavement repairs, the original pavement infrastructure continues to deteriorate due to load-related (vehicle loading) and non-load related (environmental) impacts. In the past, this had resulted in a repair cycle that continued to accelerate until the implementation of CRP Capital Program where more substantial improvements were initiated. The strategy of maintaining pavement through small-scale maintenance projects is no longer feasible due to increasing construction costs, repair quantities, traffic disruptions, and reduced pavement life. The current Capital Programs are focusing on rehabilitating or reconstructing the aging infrastructure through the reconstruction or reconstruction and widening of approximately 76.1% of the entire mainline system by 2026 with approximately 65.5% of the system mainline pavement having been completed to date. The majority of mainline pavement exhibiting advance deterioration is currently under construction or programmed for construction by 2026.

The first year of the CRP was 2005, which began to address long-term pavement repairs. As part of this, the underlying concrete base pavement deterioration issues along the Tri-State Tollway (I-294/I-94) and the Reagan Memorial Tollway (I-88) have been or are programmed to be addressed. As is shown in the following table, approximately 22.1% of systemwide pavement surveyed in 2016 was categorized with an RSL of eight years or less. The pavement within these categories will require repairs within the next eight years to maintain pavement integrity. This is a major improvement over the 95% of pavement systemwide which was within these categories in 2004 before the CRP began.

NOTE: The above percentages are based upon the approximately 271.8 centerline miles of mainline pavement existing prior to the CRP and do not include expansion of ramp, auxiliary or plaza pavements. The mainline pavement reconstruction along the Jane Addams Memorial Tollway (I-90) east of Elgin Plaza 9 commenced in 2014 and was substantially completed in 2016. Additionally, the above calculated percentages do not include the Elgin-O'Hare Western Access corridor which will be added upon acceptance of maintenance responsibility of the corridor by the Tollway.

Table 3: Summary of Pavement RSL Values from the 2016 Evaluations in Lane Miles

Tollway Route	20+ Years	13-19 Years	9 – 12 years	5 – 8 years	3 – 4 years	1 – 2 Years*	0 Years*	Not rated ***
Tri-State (I-294)	200.3	35.2	11.1	80.4	50.0	15.5	20.9	7.8
Tri-State (I-94)	156.7	4.0	4.0	3.3	0.0	8.9	9.6	0.0
Edens Spur (I-94)	0.1	0.0	0.0	2.9	2.5	10.5	11.3	0.0
Jane Addams Memorial (I-90)	215.9	32.1	58.1	4.0	0.0	0.0	0.0	146.7
Reagan Memorial (I-88)	135.1	86.3	59.9	111.2	14.7	5.8	4.7	48.7
Veterans Memorial (I-355)	61.7	22.9	60.6	28.2	0.0	0.0	0.0	15.1
Total**	769.8	180.5	193.7	230.1	67.2	40.6	46.5	218.4
% of Total	44.1%	10.4%	11.1%	13.2%	3.9%	2.3%	2.7%	12.5%

* Critical areas in need of attention. Reagan Memorial Tollway (I-88) – programmed for rehabilitation and reconstruction in various years, the Tri-State Tollway (I-294) from 95th Street to Balmoral Avenue – programmed for reconstruction in 2017 to 2023 and the Edens Spur (I-94) – programmed for reconstruction in 2021 to 2022.

** Lane Miles Surveyed does not equal total actual system lane mileage due to approximate beginning and ending points of the field survey, and the exclusion of auxiliary lanes and other lane types.

*** Sections that contained construction and the long bridges (such as the Mile Long and Bensenville bridges on I-294) were excluded from the survey and listed as “Not Rated”.

Summary of Mainline Pavement Condition

Tri-State Tollway (I-294/I-94)

The 77.6-mile Tri-State Tollway (I-294/I-80/I-94) was constructed in 1958 as part of the original pavement network and consisted of either two or three lanes in each direction. The two lane portions of this route were widened to three lanes in each direction in 1966 and at various times throughout the 1970s. As part of these widening projects, an HMA (Hot Mix Asphalt) overlay was also typically added to the original lanes. A portion of the route from approximately 95th Street to Balmoral Avenue, commonly referred to as the Central Tri-State, was widened to four lanes in each direction and either reconstructed or partially reconstructed in 1992 & 1993. A rehabilitation of the Central Tri-State was completed in 2012 which included full depth concrete patches, removal of the existing HMA overlay and the placement of a thicker SMA (Stone Matrix Asphalt) overlay. The Central Tri-State mainline pavement is scheduled for reconstruction in 2020 to 2023 as part of the *Move Illinois* Program. The majority of the mainline pavement along this route outside the limits of the Central Tri-State was reconstructed or reconstructed and widened to four lanes in each direction in 2006 to 2009 as part of the CRP.

For the purposes of this report, the Tri-State Tollway is separated into the following three sections:

South Tri-State Tollway (Bishop Ford Freeway to 95th Street):

The majority of this pavement was rated in “excellent” condition (CRS) with an RSL rating of 13 to 20 years or more. The pavement from the Bishop Ford Freeway (I-94) to 163rd Street has undergone reconstruction and widening which was completed in 2007. The pavement from 163rd Street to 95th Street has undergone reconstruction and widening which was completed in 2009.

Central Tri-State Tollway (95th Street to O'Hare Interchange):

The majority of this pavement was rated in “good” to “fair” condition (CRS) with an RSL rating of 1 to 8 years. The pavement from 95th Street to the O'Hare Interchange was widened and either reconstructed or partially reconstructed in 1992 and 1993. The partial reconstruction and widening included the reconstruction of the outside (third) lane in each direction on the existing six-lane facility and the addition of a new fourth lane in each direction. The remaining two inside lanes in each direction were left in place, rehabilitated, and resurfaced. The reconstruction and widening areas included jointed plain concrete pavement throughout. A rehabilitation of this section was completed in 2012 which included full depth concrete patches, removal of the existing HMA overlay and the placement of a thicker SMA overlay. Reconstruction of this section is programmed to occur in 2020 to 2026 as part of the *Move Illinois* Program. This reconstruction work will replace the portions of original construction (1958) pavement remaining within this section.

North Tri-State Tollway (O'Hare Interchange to Russell Road):

The majority of this pavement was rated in “excellent” to “good” condition (CRS) with an RSL rating of 20 years or more. The pavement from O'Hare Interchange to the Deerfield/Edens Spur improvement limits and from Half-Day Road to the Russell Road has undergone reconstruction and widening which was completed in 2009.

The Deerfield/Edens Spur improvement was a project completed in 2000 which included the removal of the original Toll Plaza 25 (Deerfield), widening and reconstruction of the Tri-State Tollway in the vicinity of Deerfield Road, reconstruction of the west end of the Edens Spur, construction of the new mainline Toll Plaza 24 on the Edens Spur, and reconfiguration of the Deerfield Road interchange ramps.

Edens Spur (I-94)

The 4.8-mile Edens Spur (I-94) was constructed in 1958 as part of the original pavement network and consisted of two lanes in each direction. An HMA overlay was added to this pavement in 1976 and was subsequently resurfaced in 1995. Rehabilitation of this section was completed in 2010 which included removal of the existing HMA overlay and the placement of an SMA overlay. As part of the Deerfield/Edens Spur improvement project, the west end pavement was reconstructed in 1997 and Toll Plaza 24 (Edens Spur) was constructed in 1998. Toll Plaza 24 (Edens Spur) was subsequently converted to ORT in 2006.

The majority of this pavement was rated in “good” to “fair” condition (CRS) with an RSL rating of 0 to 8 years. These ratings are primarily a result of the rehabilitation completed in 2010 which has extended the RSL of this pavement. However, as anticipated, the CRS and RSL ratings have rapidly deteriorated to a point where the majority of the pavement is anticipated to require work in the near future. Reconstruction of this route is programmed to occur in 2021 to 2022 as part of the *Move Illinois* Program. Intermittent repairs will likely be required in this area prior to this scheduled reconstruction.

Jane Addams Memorial Tollway (I-90)

The 75.9-mile Jane Addams Memorial Tollway (I-90), originally referred to as the Northwest Tollway until 2008, was constructed in 1957 as part of the original pavement network and consisted of two lanes in each direction. The pavement from East River Road to Barrington Road was widened to three lanes in each direction in 1967. The pavement from Barrington Road to Randall Road was widened to three lanes in each direction in 1992 and 1998. The majority of pavement from Mill Road to Rockton Road was reconstructed and widened to three

lanes in each direction in 2009.

The pavement from Mill Road to Elgin Toll Plaza 9 was reconstructed and widened to three lanes in 2013 to 2014 as part of the Jane Addams Memorial Tollway (I-90) corridor reconstruction/widening projects. The pavement from Elgin Toll Plaza 9 to the Eastern Terminus was reconstructed and widened to four lanes in each direction in 2014 to 2016.

For the purposes of this report, the Jane Addams Memorial Tollway (I-90) is separated into the following sections:

Western Corridor (Rockton Road to Mill Road):

The majority of the pavement in this section was reconstructed and widened in 2009 and is rated in “excellent” condition (CRS) with an RSL rating of 9 to 19 years. Since this pavement is a mix of rubblized and reconstructed pavement, the RSL rating is slightly lower due to the future surface rehabilitations required on the rubblized sections.

Central Corridor (Mill Road to Elgin Plaza 9):

The majority of the pavement in this section was reconstructed and widened in 2013 to 2014 as part of the *Move Illinois* Program and is rated in “excellent” condition (CRS) with an RSL rating of 20 years or more.

Eastern Corridor (Elgin Plaza 9 to Des Plaines River):

The pavement within this section was omitted from the inspections during 2016 due to ongoing construction operations as part of the Jane Addams Memorial Tollway (I-90) corridor reconstruction/widening projects. Reconstruction and widening of the pavement from Elgin Plaza 9 to the Des Plaines River was completed in 2016 and it is expected to be in “excellent” condition (CRS) with an RSL of 20 years or more.

Reagan Memorial Tollway (I-88)

The 26.7-mile Reagan Memorial Tollway (I-88) east of Illinois Route 56, originally referred to as the East-West Tollway until 2006, was constructed in 1957 as part of the original pavement network and consisted of two lanes in each direction. The pavement from the Eisenhower Expressway to Naperville Road was widened to three lanes and resurfaced in each direction in 1977. The pavement from Naperville Road to Prairie Path was reconstructed and widened to three lanes in each direction in 1987. The pavement from Prairie Path to Toll Plaza 61 (Aurora) and from Toll Plaza 61 (Aurora) to Orchard Road was reconstructed and widened to three lanes in each direction in 2000 and 2008 respectively.

The pavement from York Road to Naperville Road and from Naperville Road to Illinois Route 59 was reconstructed and widened to four lanes in each direction in 2008 to 2009 and 2004 to 2005 respectively. Subsequently, the pavement from the Eisenhower Expressway to York Road was resurfaced in 2008 to 2009. The pavement from Illinois Route 56 to Orchard Road was reconstructed and widened to three lanes in each direction in 2012 as part of the CRP.

The majority of the pavement along this route was rated in “excellent” to “transitional” condition (CRS) with an RSL rating that varies widely between 3 to 20 or more years (over 70% with an RSL of over 20 or more years). Reconstruction and widening of this route from Orchard Road to Illinois Route 56 was completed in 2012 as part of the CRP. Reconstruction from the Eisenhower Expressway to York Road is programmed to occur in 2018 to 2019 as part of the *Move Illinois* Program.

Reagan Memorial Extension (I-88)

The 69.5-mile Reagan Memorial Tollway (I-88) Extension west of Illinois Route 56 was constructed in 1974 as a western extension to the original Reagan Memorial Tollway (I-88) and consisted of two lanes in each direction. This pavement received an HMA overlay in 1993. The HMA overlay was placed to a nominal 2¼ inch thickness, thinner than the typical 3 inch HMA overlay. The thinner overlay was originally intended to act as a bond breaker for a future concrete overlay. However, due to the poor performance of a similar concrete overlay installation on a section of the original Reagan Memorial Tollway (I-88) the concrete overlay was never placed. Instead, the HMA overlay remained as the riding surface. This thinner overlay did not perform well and required constant repairs by the Maintenance Division.

Illinois Route 56 to Illinois Route 251

In January 2001, the HMA overlay between Illinois Route 56 and Illinois Route 251 failed and the Illinois Tollway initiated immediate emergency repairs. Adverse weather conditions during the course of these emergency repairs limited their effectiveness and life expectancy, thus requiring subsequent full-width, shoulder to shoulder resurfacing during the summer of 2001. The pavement from Illinois Route 56 to Illinois Route 251 was rehabilitated including the application of a thicker SMA overlay in 2012.

The majority of the pavement between Illinois Route 56 and Illinois Route 251 was rated in “excellent” to “good” condition (CRS) with an RSL rating of 5 to 12 years. The rehabilitation of this pavement completed in 2012 has served to increase the remaining service life of this pavement. However, these projects were intended to rehabilitate the pavement surface and did not include rehabilitation of the deteriorating original concrete pavement and base. As a result, the ratings of this pavement have deteriorated from the 2013 ratings (“excellent” condition (CRS) with approximately 90% with an RSL of 9 to 19 years). It is expected that this original concrete pavement and base will continue rapidly deteriorating and will result in a rapid depreciation in the current ratings and may require a more frequent rehabilitation cycle.

Illinois Route 251 to Rock Falls/US Route 30

The 2004 Annual Inspections and preliminary development of intermittent HMA repair quantities in 2005 revealed severe deterioration of the pavement west of Illinois Route 251. It was decided to accelerate the reconstruction of this pavement that was originally programmed in 2006. The reconstruction included the removal of the original HMA overlay, the rubblization of the original concrete base pavement, and the application of a 6 inch HMA overlay. The rubblization consisted of breaking the original concrete pavement into baseball-size and smaller pieces. The intent of this reconstruction is the eventual removal of 2 inches of HMA overlay and the application of an additional 6 inch HMA overlay for a total HMA thickness of 10 inches.

The pavement west of Illinois Route was omitted from the inspections during 2016 due to ongoing construction operations as part of the placement of the final asphalt layer within this section which was completed in 2016. It is anticipated that this work will have addressed all previously noted deficiencies within this section including the shoulder pavement which was reconstructed as part of the aforementioned work.

Veterans Memorial Tollway (I-355)

The 17.5-mile Veterans Memorial Tollway (I-355) north of Interstate 55, originally referred to as the North-South Tollway until 2007, was constructed in 1988 and consisted of two lanes in each

direction except between Maple Avenue and Butterfield Road which consisted of three lanes in each direction. The pavement from Toll Plaza 89 (Boughton) to Maple Avenue and from Butterfield Road to North Avenue was widened to three lanes in each direction in 1994 and 1996, respectively. The pavement from Boughton Road to Interstate 55 was widened to three lanes in each direction in 2007 as part of the Veterans Memorial Extension project discussed later in this report. The pavement from Interstate 88 to 75th Street was widened to four lanes in each direction in 2008 and 2009. As part of these 2008 and 2009 widening projects, an HMA overlay was also added to the original three lanes. Rehabilitation of the pavement outside the limits of the aforementioned widening projects from North Avenue to Interstate 88 and from 75th Street to Boughton Road was completed in 2010 and included the placement of an SMA overlay to all lanes in each direction.

The majority of this pavement was rated in “excellent” to “good” condition (CRS) with an RSL rating of 5 to 19 years. The areas north of the Interstate 55 interchange were rehabilitated in 2010 and 2013, which has served to extend the remaining service life and improve the CRS ratings. A subsequent rehabilitation of this pavement including resurfacing and base pavement patching is programmed to occur in 2018 to 2020. It is anticipated that the work completed in 2010 and 2013 will extend the RSL of this pavement until this programmed rehabilitation work without need for extensive interim repairs.

Veterans Memorial Tollway (I-355) South Extension

The 12.3-mile Veterans Memorial Tollway (I-355) South Extension was constructed in 2007 as a southern extension to the original Veterans Memorial Tollway (I-355) south of Interstate 55 to Interstate 80 and consists of three lanes in each direction. Upon completion of the extension construction, the entire route was memorialized as the Veterans Memorial Tollway. This extension serves 13 municipalities/townships in three counties, and provides a regional connection that improves north-south mobility between Interstate 55 and Interstate 80.

The majority of this pavement was rated in “excellent” to “transitional” condition (CRS) with an RSL rating of 20 or more years.

Elgin O’Hare Western Access (IL-390)

The existing 6.1-mile Elgin O’Hare Western Access (IL-390), originally referred to as the Elgin O’Hare Expressway until 2013, was constructed in 1993 by the Illinois Department of Transportation (IDOT) and consisted of two lanes in each direction between US Route 20/Lake Street and IL Route 53/Rohlwing Road. The pavement east of US Route 20/Lake Street to IL Route 53/Rohlwing Road was rehabilitated and widened to three lanes in each direction in 2014 to 2016. Tolling of this section commenced in July 2016 designating this route under the jurisdiction of the Illinois Tollway.

The Consulting Engineer performed an inventory of the major assets including the pavement, bridges, structural walls, overhead sign structures, ITS and facilities along the existing 6.1-mile Elgin O’Hare Western Access (IL-390). Since this route was under construction through July 2016, no inspections were performed. It is anticipated that annual inspections by the Consulting Engineer along this corridor shall commence in 2017.

The current capital programs include the extension of this route east to an interchange with the future Elgin O’Hare Western Bypass (I-490) which is anticipated to connect the Jane Addams Memorial Tollway (I-90) to the Tri-State Tollway (I-294) along the western border of O’Hare International Airport. Construction of this route extension commenced in 2014 and is

programmed to complete in 2017 to York Road. It is anticipated that the north leg of the Elgin O’Hare Western Bypass (I-490) to the Jane Addams Memorial Tollway (I-90) will be constructed through 2025 while the south leg to the Tri-State Tollway (I-294) will be constructed through 2022.

2.2 Roadway Appurtenances

The Illinois Tollway roadway appurtenances are visually inspected annually by the Consulting Engineer. This inspection consisted of the recording of visible deficiencies from the edge-of-shoulder to the right-of-way fence including the drainage systems and all safety appurtenances. Repair quantities were then estimated and prioritized based on the level of severity. These quantities are used to assist the Maintenance Division in scheduling work activities and the Engineering department in scheduling future contracts. Based upon this information, an overall condition rating was assigned for each area. The overall condition ratings utilized for the visual inspections are provided in the following table.

Table 4: Roadway Appurtenances Inspection Ratings Summary

Rating	Description
Excellent	No deficiencies requiring repairs other than preventative maintenance noted.
Good	Deficiencies noted requiring repairs typically within the capabilities of the Illinois Tollway Maintenance Division.
Fair	Deficiencies noted requiring repairs by Contract or by the Illinois Tollway Maintenance Division. Deficiencies requiring repairs by Contract are typically beyond the capabilities of the Illinois Tollway Maintenance Division due to size, quantity, or repair process.
Poor	Deficiencies noted throughout which are beyond the capabilities of the Illinois Tollway Maintenance Division due to size, quantity, or repair process.

Drainage Systems

Visual inspection of the Illinois Tollway roadway drainage systems is performed annually during the spring and summer months. This inspection consists of the recording of visible deficiencies of the drainage structures, crossing culverts, slopes, ditches and vegetation.

The drainage systems throughout the Illinois Tollway system are generally in excellent to fair condition. The majority of the embankment slopes are stable. Typical deficiencies noted during the inspections included concrete headwall issues; drainage structures requiring cleaning; drainage structures requiring repair due to heaving or sinking which may have been caused by expansion and contraction of the pavement or gutter during the summer months; tire rutting, erosion of slopes; and ditches identified requiring cleaning or restoration due to erosion. The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section. Corrective repairs are recommended to be performed by the Illinois Tollway Maintenance Division within their capabilities. All deficiencies beyond the capabilities of the Maintenance Division are recommended for inclusion with any future contracts.

Closed drainage systems are typical throughout the urban areas systemwide. Only limited inspections can be performed on closed drainage systems due to limited access, therefore it is recommended to have these televised and/or flushed to obtain better inspection data and to

determine the general condition of these systems. This work commenced in 2014 and will continue annually thereafter as required. In areas in which roadway rehabilitation work has been programmed, televising of the closed drainage systems has been programmed to occur prior to the design development stage of subsequent roadway rehabilitation to identify areas of concern so that they may be addressed as part of the programmed roadway construction.

Crossing culverts are inspected for functionality, obstructions and conveyance. The crossing culverts throughout the Illinois Tollway system are generally structurally sound. However, some have exposed reinforcement bars, misaligned wingwalls, honeycombing of the concrete surface, open joints, deterioration of the metal pipe (metal pipe culverts), or require cleaning. The crossing culverts not replaced during recent reconstruction or rehabilitation projects may in some cases be over 50 years old.

The deterioration of Corrugated Metal Pipes (CMPs) continues to be a major concern regarding the drainage structures systemwide. The deterioration typically occurs along the flow line or at the joints of the pipe. This causes backfill material and soil to erode through the pipe during rain events creating voids beneath the roadway. As the volume of these voids increases, the probability of roadway pavement slab settlement or failure also increases. In many cases, these pipes may have been extended due to roadway widening or other construction. Although the ends of these pipes may appear in excellent condition, further examination reveals deterioration of the original pipe and separation of the joints where the original pipe joins the new.

Due to the collapse of several CMP crossing culverts, the Consulting Engineer completed a detailed systemwide inspection of all culverts which cross beneath Illinois Tollway pavement with a diameter of three feet or greater in 2007. The purpose of this inspection was to identify CMP culverts that require re-lining, repair or replacement. Culverts classified as bridges by the Federal Highway Administration (FHWA) were not included in the inspection and are included with the bridge inspections.

To date, many CMPs have been replaced or lined as part of reconstruction or rehabilitation contracts. Additionally, two repair/lining contracts were completed in 2010 to repair or line CMPs with a diameter of three feet or greater that cross beneath pavement. These contracts have addressed some major concerns with crossing CMPs. However, smaller diameter and non-mainline crossing CMPs still require repair or replacement in future contracts.

Due to the large quantity of CMPs located throughout the Illinois Tollway system and the over 50 years of changing roadways, not all CMPs may have been identified for repair or replacement in the initial contracts. It is recommended that replacement or repair/lining of CMPs systemwide continue in ongoing and future contracts as they are identified. If there are no programmed Capital Program projects in the near future, it is recommended that these drainage structures be televised, flushed and repaired in a systemwide contract.

The current Capital Programs include funds for drainage and safety improvements which are anticipated to include the repair or replacement of identified CMPs. Additionally, areas of programmed reconstruction are anticipated to include replacement of CMPs within the limits of construction.

Safety Appurtenances

Visual inspection of the Illinois Tollway roadway safety appurtenances is performed annually during the spring and summer months. This inspection consisted of the recording of visible deficiencies of the concrete barriers, guardrails/terminals, cable median barriers, impact

attenuators, delineators and reflectors, roadway lighting and ITS systems, right-of-way fence, ground mounted traffic signs, pavement markings and raised pavement markers.

Concrete Barriers, Guardrail/Terminals, Cable Median Barriers, and Impact Attenuators:

The concrete barriers, guardrails, cable median barrier systems, and impact attenuators throughout the Illinois Tollway system are generally in excellent to fair condition. The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section. Corrective repairs are recommended to be performed by the Illinois Tollway Maintenance Division within their capabilities. All deficiencies beyond the capabilities of the Maintenance Division are recommended for inclusion with any future contracts.

The guardrail/terminals within the limits of Capital Program reconstruction/rehabilitation projects have been upgraded as applicable. However, guardrail/terminal installations outside of these areas and in some cases within the limits of rehabilitation contracts, as well as along interchange ramps have generally not been upgraded, do not conform to the current Illinois Tollway standards, and in some instances have not been successfully tested under the requirements of National Cooperative Highway Research Program (NCHRP) Report 350. Some of these guardrail/terminal installations have mechanical deficiencies which the Illinois Tollway Maintenance Division works diligently to repair. Additionally, Illinois Tollway policy requires that any guardrail/terminal safety concerns or damages as a result of vehicular accidents be addressed within 24 hours, though procurement requirements for new material sometimes prohibit this.

It should be noted that the FHWA does not require replacement of any safety appurtenance with new standards just for the sake of replacing. Installations of safety appurtenances are considered acceptable if they were installed according to the standard at the time of installation. In other words, if the safety appurtenance was crash-worthy at the time of installation, then it is still considered crash-worthy.

Guardrail standards are regularly updated to reflect current crash test data and new technologies. The current Illinois Tollway guardrail standards were developed in conformance with the requirements of NCHRP Report 350. In 1993, NCHRP Report 350 was published by the NCHRP which conducts research in areas of highway planning, design, construction, operation and maintenance nationwide. NCHRP Report 350 presents uniform guidelines for the crash testing of highway safety features, recommends evaluation criteria for the assessment of the crash test results, and presents guidelines for the in-service evaluation of safety features. These guidelines are developed utilizing current technology and the collective judgment and expertise of experts in the field of roadside safety design. NCHRP Report 350 parts A and B are available for free download at:

- http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_350-a.pdf
- http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_350-b.pdf

MASH is an update to NCHRP Report 350, for the purposes of evaluating new safety hardware devices based primarily on changes in the vehicle fleet. Any new or revised highway safety hardware under development as of October 15, 2009 when MASH was published may continue to be tested using the criteria in NCHRP Report 350. However, FHWA stopped accepting or reviewing requests for new or revised highway safety hardware tested using NCHRP 350 criteria after January 1, 2011. In the summer of 2015, AASHTO established sunset dates for

NCHRP Report devices. Based on those dates, W-Beam guardrail installed after January 1, 2018 must comply with MASH criteria.

As stated previously, the FHWA does not require that the safety appurtenances throughout the Illinois Tollway system be upgraded just for the sake of replacing; however the Illinois Tollway has no tort immunity as do many governmental agencies. The Illinois Tollway Risk Management Division works in conjunction with other departments to maintain loss control. Considering these factors and to protect the interests of the Illinois Tollway, it is recommended that all guardrail installations which have not been successfully tested under NCHRP Report 350 requirements continue to be upgraded to the current Illinois Tollway Standard as currently programmed over the next several years. All guardrail/terminals programmed for installation after January 1, 2018 will need to be MASH-tested devices.

The current Capital Programs include funds for drainage and safety improvements systemwide which should include the replacement of non-NCHRP Report 350 compliant guardrail installations. Additionally, areas of programmed reconstruction/rehabilitation are anticipated to include the replacement of non-NCHRP Report 350 compliant guardrail installations within the limits of construction.

Cable median barrier systems are installed west of Deerpath Road on the Reagan Memorial Tollway (I-88), along the Edens Spur (I-94), at the southern terminus of the Veterans Memorial Tollway (I-355), and along the Reagan Memorial Tollway (I-88) connector ramps with the Tri-State Tollway (I-294) commonly referred to as the Mary and Nora ramps. Median cable barrier systems consist of tensioned cables extending between bridges and emergency turnarounds in grassy median locations to minimize the occurrence of vehicles crossing into oncoming traffic. There are few federal standards for median cable barrier systems; however, all installations are inspected to ensure they meet the current industry practices.

Delineators and Reflectors:

The delineators and reflectors throughout the Illinois Tollway system are generally in good to fair condition. Damage to these typically occurs due to traffic accidents or by snowplows. As these inspections typically occur at the end of the winter season, it is common to note large quantities of missing or damaged reflectors. The Illinois Tollway Maintenance Division performs regularly scheduled maintenance on these items systemwide at least twice annually.

The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section. Corrective repairs are recommended to be performed by the Illinois Tollway Maintenance Division within their capabilities. All deficiencies beyond the capabilities of the Maintenance Division are recommended for inclusion with any future contracts.

Raised Pavement Markers:

The raised pavement markers (RPMs) throughout the Illinois Tollway system are generally in excellent to fair condition. Areas of missing reflectors or castings were noted during the inspections. As these inspections typically occur at the end of the winter season, it is common to note large quantities of missing or damaged reflectors. The Illinois Tollway Maintenance Division performs regularly scheduled maintenance on these items systemwide on a three year cycle within each individual maintenance section. During this regularly scheduled work, the Maintenance Division replaces damaged or missing reflectors and removes any castings which are damaged or appear as if they may become loose. Since the replacement of missing

castings is typically beyond the capabilities of the Maintenance Division and the replacement of reflectors occurs on an extended cycle, it is recommended that RPMs continue to be included with any future contracts or systemwide contracts.

It should be noted that reconstruction projects occurring from 2007 to 2009 did not include the installation of RPMs while a study was conducted to review their use. In 2012, it was decided to include RPMs as part of all contracts systemwide. In 2013, the contract work commenced for the installation of RPMs in sections of pavement in which they were not originally included. In addition, repair/replacement of RPMs is typically included with the annual systemwide pavement marking contracts.

Pavement Markings:

The pavement markings throughout the Illinois Tollway system are generally in excellent to fair condition. Typical deficiencies noted were missing or damaged sections of pavement markings. The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section.

The Illinois Tollway Pavement Management Consultant maintains a Pavement Marking Database (available upon request) which contains historical installation data and retroreflectivity values. These values are updated as new information becomes available. The retroreflectivity values in conjunction with visual inspection and age of the markings is utilized by the Illinois Tollway to determine areas for inclusion in the annual systemwide pavement marking contract and the scheduling of future contracts.

The ongoing annual pavement marking renewal program continues to improve the pavement marking visibility throughout the Illinois Tollway system. As part of this annual program, pavement markings are upgraded and maintained through the use of epoxy paint.

Since pavement marking replacement is typically beyond the capabilities of the Maintenance Division, it is recommended that areas of deficient pavement markings as identified in the visual inspection and areas which exhibit low retroreflectivity be included within the annual systemwide pavement marking contract.

Roadway Lighting System:

The roadway lighting systems throughout the Illinois Tollway system are generally in excellent to fair condition. The majority of the light poles appeared to be plumb with no noticeable movement or tilt. The typical deficiencies noted during the inspections were concrete or helix foundations which have been installed too high (over four inches from finished grade) or installations with improper breakaway devices. These locations are generally not shielded with guardrail and minimize the effectiveness of the breakaway bases installed on the poles by creating a snag point. Additionally, instances of missing light pole handholes with exposed pole wiring were noted.

It is recommended that, as part of any future contracts, designers research available data from the Illinois Tollway and perform a field analysis to determine locations where unshielded light pole foundations installed too high above finished grade and locations where ground mounted light poles do not include sufficient FHWA approved breakaway devices. Based on the results of this research and field analysis, it is recommended that a barrier warrant analysis be performed for all locations where any of the aforementioned deficiencies exist to determine the appropriate course of action.

The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section. Corrective repairs are recommended to be performed by the Illinois Tollway Maintenance Division within their capabilities. All deficiencies beyond the capabilities of the Maintenance Division are recommended for inclusion with any future contracts.

Intelligent Transportation System (ITS):

Historically, the inspection of ITS devices on the Illinois Tollway system consisted of a visual inspection as part of the annual general visual inspection of the right-of-way. In 2015, due to the increased deployment of ITS devices throughout the system over the past five years, the Consulting Engineer performed a field inventory of the ITS devices systemwide. The purpose of this inventory was to verify the deployed devices and to confirm that they are functional. This information will allow the Illinois Tollway to accurately account for the number of ITS devices under its jurisdiction and to enable the Consulting Engineer to develop more detailed ITS device inspection and preventive maintenance program.

There are several types of ITS devices deployed throughout the system. These include CCTV, DMS, VDS, RWIS, WIM sites and Flashing Beacons. Each device that was inventoried was also given a basic inspection to gain an understanding of the process and required data fields.

In 2016, the Illinois Tollway had the following ITS devices deployed system:

Device Type	CCTV*	DMS	VDS	RWIS	WIM	FLASHER	Total
Quantity	1,015	48	350	18	5	6	1,442

* CCTV devices consist of ITS, exterior security, interior security, toll plazas and shared use cameras.

Beginning in 2016, basic inspections of all ITS devices systemwide are performed annually while in-depth inspections are performed annually on one quarter of the ITS devices systemwide. The basic inspection consists of a ground level visual inspection of the device and control components as well as verification that the device is communicating with TIMS. The in-depth inspection includes an arms-length detailed inspection of the device and control components including inventory verification and operational verification.

Right-of-Way Fence:

The right-of-way fence throughout the Illinois Tollway system is generally in excellent to fair condition. Recent reconstruction projects have included the replacement of existing four foot high field right-of-way fence with the current Illinois Tollway standard six foot high chain-link fence. This type of fence is more compatible with the continued development of properties adjacent to the roadway and serves as a better barrier to pedestrians and animals from entering the Illinois Tollway property.

The majority of right-of-way fence along the Tri-State Tollway (I-294/I-94) and the Reagan Memorial Tollway (I-88) and all of the Veterans Memorial Tollway (I-355) has been upgraded to the current Illinois Tollway standard chain-link fence as required. Additionally, approximately half

of the Jane Addams Memorial Tollway (I-90) has been upgraded to the current Illinois Tollway standard chain-link fence as required. The Illinois Tollway follows guidelines for land use such that fencing in the vicinity of residential or public access is to be upgraded to the current Illinois Tollway standard six foot chain-link fence; whereas fencing located in rural or other areas not readily accessible such as farm fields may remain with the four foot high field fence.

It is recommended that the original four foot high field fence continue to be upgraded, where necessary, to the current Illinois Tollway standard six foot high chain-link fence as major projects are programmed.

The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section. Corrective repairs are recommended to be performed by the Maintenance Division within their capabilities. All deficiencies beyond the capabilities of the Maintenance Division are recommended for inclusion with any future contracts.

Ground Mounted Traffic Signs:

The ground mounted traffic signs throughout the Illinois Tollway system are generally in good to fair condition. Damage to these signs typically occurs due to traffic accidents or by snowplows. The Illinois Tollway Sign Shop repairs or replaces these signs as damage occurs. Additionally, instances were noted at which wooden ground mounted traffic sign posts are either installed with incorrectly placed or missing breakaway holes.

The specific deficiencies identified during the inspections are documented in the Annual Field Inspection Reports prepared for each Maintenance Section. Corrective repairs are recommended to be performed by the Maintenance Division within their capabilities. All deficiencies beyond the capabilities of the Maintenance Division are recommended for inclusion with any future contracts.

Please note: The ground mounted traffic sign inspection does not include overhead sign structures which are discussed elsewhere within this report. In addition, traffic signs are only rated based upon visual inspection of the physical condition. Retroreflectivity measurements are not taken as part of these inspections and are not accounted for in the ratings assigned.

New standards were developed for milepost markers across the nation per the Manual on Uniform Traffic Control Devices (MUTCD). Therefore, the Illinois Tollway Maintenance Division developed a new milepost marker standard conforming to the MUTCD standards while meeting the needs of field staff and patrons. These new milepost markers were placed at quarter mile increments instead of the historic past half mile increments on all routes by December of 2009, with the exception of the Jane Addams Memorial Tollway in which the new markers were installed in October 2010. The Illinois Tollway utilized existing contracts and the Maintenance Division to install the new milepost markers.

Following the construction and establishment of the numbering for the original Illinois Tollway routes, Federal Guidelines for interstate numbering were developed. The Illinois Tollway has investigated re-numbering each route to ensure proper mile marker placement conforming to the Federal Guidelines for interstate numbering. Based on the results of this investigation, the North Tri-State Tollway and the Edens Spur (I-94) mile marker numbering was reversed in December 2009 and the Jane Addams Memorial Tollway (I-90) mile marker numbering was reversed in October 2010. This effort commenced in 2014 and is scheduled for completion in 2015 on most routes with the exception of the Jane Addams Memorial Tollway (I-90) which will

have new markers installed as part of the reconstruction and widening which commenced in 2013 with construction completed in 2016. The reversing of mile marker numbering was coordinated with all outside agencies, particularly those involved in emergency response. Training for the new mile markers was required by internal staff in Dispatch, Maintenance, TIMS, Toll Operations, IT and Engineering.

2.3 Structural Elements

The structural elements inspected throughout the Illinois Tollway system consist of bridges, large culverts, retaining walls, noise abatement walls, sight screen walls and overhead sign structures.

Bridges and Large Culverts

In accordance with FHWA guidelines, bridges throughout the Illinois Tollway system must receive a routine inspection at least every two years. A routine inspection consists of, at a minimum, a complete visual inspection of all major components of the bridge. Routine inspections determine the physical and functional condition of the bridge and identify any changes from “Initial” or previously recorded conditions. Underwater inspections are performed every five years. During routine inspections, inspection of submersed portions of the substructure is limited to observations during low-flow periods. The Illinois Tollway conducted routine bridge inspections each year and the resultant “Structure Inspection Field Reports” were reviewed by the Consulting Engineer.

As part of the inspections, condition ratings are assigned to the deck, superstructure, and substructure components for each bridge inspected. The bridge deck consists of the wearing surface, joints, and parapets. The superstructure consists of beams, diaphragms, and stiffeners. The substructure consists of piers, abutments, bearings, foundations, slope and crash walls, and piling.

It should be noted that many of the bridge decks which pass over the Illinois Tollway are not under the Illinois Tollway’s jurisdiction. However, these bridge decks are included with the inspection as an informational courtesy to the responsible agency.

The FHWA classifies culverts as bridges if the span of the culvert is at least 20 feet when measured along the centerline of the roadway. Therefore, all Illinois Tollway culverts that meet this criterion are also inspected at a minimum every two years as part of the bridge inspections and are assigned a condition rating similar to that of the bridges. A Health Index, as described below, is then determined from this condition rating. The Health Index for culverts is directly related to the condition ratings used for the annual bridge inspections. This rating is an all-encompassing review of the culvert elements and only recorded as a single rating value. In 2009, the Health Index calculation for culverts was changed to follow the same description as bridges.

There are currently 676 structures classified as bridges throughout the Illinois Tollway system. Of these, there are 603 vehicular bridges, six railroad bridges, 58 culvert bridges, one land bridge, three pedestrian bridges, and five over-the-road oasis structures. Of these structures, 359 were inspected by the Illinois Tollway in 2016.

The bridge inventory is revised on an as needed basis to account for new construction, demolition and/or ownership transfers to other agencies. The bridge inventory revisions in 2016 for bridge structures under the jurisdiction of the Illinois Tollway include:

Thirty six vehicular bridges were added to the inventory:

- Bridge 1600: EW US 20 (Lake St.) over Elgin-O'Hare Western Access (IL-390)
- Bridge 1601: EB Elgin-O'Hare Western Access (IL-390) over Metra/Wetlands
- Bridge 1602: WB Elgin-O'Hare Western Access (IL-390) over Metra/Wetlands
- Bridge 1603: NB Gary Avenue Ramps over IL-390 and Ramp D
- Bridge 1604: SB Gary Avenue Ramps over IL-390 and Ramp D
- Bridge 1605: EB Elgin-O'Hare Western Access (IL-390) over Springinsguth Rd.
- Bridge 1606: WB Elgin-O'Hare Western Access (IL-390) over Springinsguth Rd.
- Bridge 1606A: WB Elgin-O'Hare Western Access (IL-390) over Springinsguth Rd.-Ramp
- Bridge 1607: EB Elgin-O'Hare Western Access (IL-390) over Irving Park Rd. (IL 19)
- Bridge 1608: WB Elgin-O'Hare Western Access (IL-390) over Irving Park Rd. (IL 19)
- Bridge 1609: EB Elgin-O'Hare Western Access (IL-390) over Rodenberg Rd.
- Bridge 1610: WB Elgin-O'Hare Western Access (IL-390) over Rodenberg Rd.
- Bridge 1611: EB Elgin-O'Hare Western Access (IL-390) over Wright Blvd.
- Bridge 1612: WB Elgin-O'Hare Western Access (IL-390) over Wright Blvd.
- Bridge 1613: EB Elgin-O'Hare Western Access (IL-390) over Mitchell Blvd.
- Bridge 1614: WB Elgin-O'Hare Western Access (IL-390) over Mitchell Blvd.
- Bridge 1615: EB Elgin-O'Hare Western Access (IL-390) over RR – CP Spur
- Bridge 1616: WB Elgin-O'Hare Western Access (IL-390) over RR – CP Spur
- Bridge 1617: NS Roselle Rd. over Elgin-O'Hare (IL-390)
- Bridge 1618: NS Plum Grove Rd. over Elgin-O'Hare (IL-390)
- Bridge 1619: EB Elgin-O'Hare Western Access (IL-390) over Meacham/Medinah Rd.
- Bridge 1620: WB Elgin-O'Hare Western Access (IL-390) over Meacham/Medinah Rd.
- Bridge 1622: NS Elgin-O'Hare Western Access (IL-390) over IL 53/Rohlwing Rd.
- Bridge 1623: Ramp K2, IL Rte. 53 over Ramp G3, I-290
- Bridge 1624: Ramp K1, IL Rte. 53 over Ramp G5, I-290
- Bridge 1626: EB Elgin-O'Hare Western Access (IL-390) over I-290 (Eisenhower)
- Bridge 1627: WB Elgin-O'Hare Western Access (IL-390) over I-290 (Eisenhower)
- Bridge 1629: EW Ramp G3 I-290 over I-290 (Eisenhower)
- Bridge 1632: WB Elgin-O'Hare Western Access (IL-390) over Hamilton Lakes Dr.
- Bridge 1637: EB Elgin-O'Hare Western Access (IL-390) over Salt Creek
- Bridge 1638: WB Elgin-O'Hare Western Access (IL-390) over Salt Creek
- Bridge 1639: EB Elgin-O'Hare Western Access (IL-390) over Mittel Blvd.
- Bridge 1640: WB Elgin-O'Hare Western Access (IL-390) over Mittel Blvd.
- Bridge 1641: Wood Dale Rd. over Elgin-O'Hare Western Access (IL-390)
- Bridge 1642: EB Elgin-O'Hare Western Access (IL-390) over Lively Blvd.
- Bridge 1643: WB Elgin-O'Hare Western Access (IL-390) over Lively Blvd.

Two culvert bridges were added to the inventory:

- Bridge 533C: EB Jane Addams Memorial Tollway (I-90) over Higgins Creek, Tributary A
- Bridge 1602C: EB Elgin-O'Hare Western Access (IL-390) over W. Branch DuPage River

There are bridges located within the jurisdiction limits of the Illinois Tollway that are entirely under the jurisdiction of another agency. As of 2015, these bridges have been omitted from the Illinois Tollway bridge inventory. Since these bridges cross over Illinois Tollway roadways, they are informally inspected for safety. Formal inspections are conducted and submitted to the FHWA by the responsible agency. The following eight bridges are entirely under the jurisdiction and maintained by another agency:

Illinois Department of Transportation

- Bridge 197C: Tri-State (I-294/I-80) over Calumet Union Drainage Ditch
- Bridge 198: EN I-80 Ramp A over Tri-State Tollway (I-294/I-80)
- Bridge 521: I-290/IL Route 53 over Jane Addams Memorial Tollway (I-90)
- Bridge 1146: NB I-39 over Reagan Memorial Tollway (I-88)
- Bridge 1146A: SB I-39 over Reagan Memorial Tollway (I-88)
- Bridge 1621: SE Ramp G1 I-290 over WB IL-390 to EB I-290 (Ramp G7), IL-390, I-290
- Bridge 1625: NW Ramp G5 over I-290 & IL-390
- Bridge 1628: SE Ramp G1 I-290 over WB IL-390 to EB I-290 (Ramp G7)

Chicago Transit Authority (CTA)

- Bridge 366A: EB CTA O'Hare Rapid Transit over Tri-State Tollway (I-294)
- Bridge 366B: WB CTA O'Hare Rapid Transit over Tri-State Tollway (I-294)
- Bridge 366C: CTA O'Hare Rapid Transit over NW I-90 Ramps M & P

DuPage County Division of Transportation

- Bridge 1408: Great Western Trail pedestrian bridge over Veterans Memorial Tollway (I-355)

Illinois Department of Conservation

Bridge 702: Rock Cut State Park over Jane Addams Memorial Tollway (I-90)

The FHWA guidelines do not include bridge deck ratings in the determination of the overall Sufficiency Rating. Therefore, the deck is not typically the driving force behind replacement. However, the deck is important in the programming of repair work based on general aesthetics and rideability. The deck is also the most visible bridge component to the traveling motorist/patron. Since the Illinois Tollway is patron-oriented and bridge deck repairs, other than minor deterioration, are typically beyond the capabilities of the Illinois Tollway Maintenance Division, the deck should be accounted for in the overall bridge condition rating.

Considering this, the Consulting Engineer created a Health Index in order to more appropriately quantify the condition of the bridges throughout the Illinois Tollway system. The Health Index is a weighted representation of the deck, superstructure and substructure ratings based on field inspections and is intended to give an overall indication of the structural integrity of a bridge. A higher weight is placed on the deck rating because the deck tends to deteriorate faster than the other components of the bridge.

The Health Index is a number on a scale from 0 to 100 with 100 being the best. It does not consider the individual ratings of components such as joints, diaphragms or bearings, though these ratings are generally used to develop future repair contracts. The Health Index replaces the "Overall Condition" rating that had been used prior to 2005 to classify the bridges. The following table provides descriptions of the bridge Health Index numbers.

Table 5: Bridge Health Index Number Descriptions

H.I.	Description
≥90	No problems or some minor problems noted. No action required.
89 – 80	Some areas of minor deterioration. Minor repair by Maintenance or Contract would prevent additional deterioration.
79 – 70	Structural elements are sound but exhibit minor section loss or deterioration. Repair Contract likely needed within 5 years.
69 – 60	Advanced section loss. Repair Contract should be initiated within 2 years.
< 60	Advanced loss of section and deterioration. Local failures possible. Immediate attention needed.

The following table illustrates the bridge inspection Health Index summary. Since the bridges are on a two-year inspection cycle, the table illustrates the health index rating for all bridges inspected in 2015 and 2016.

Table 6: Bridge Inspection Summary

Health Index	2015	2016	Total
≥90	274 (91.3%)	287 (79.9%)	561 (85.1%)
80-89	22 (7.3%)	48 (13.4%)	70 (10.6%)
70-79	4(1.3%)	22 (6.1%)	26 (3.9%)
60-69	-	2 (0.6%)	2 (0.3%)
<60	-	-	-
Total	300	359	659

Two bridges have a Health Index indicating repairs are necessary within two years. Bridge 125 is scheduled for reconstruction in 2018. Bridge 226 has a repair contract scheduled in 2017 to perform interim repairs until the bridge is reconstructed in 2024 to 2025 as part of the Central Tri-State Tollway (I-294) reconstruction.

Of the 26 bridges with a Health Index of 70-79, the majority are programmed for repair within the next five years. However, a number of these bridges are located within the Central Tri-State (I-294) corridor which is programmed for reconstruction in 2024 to 2025. Depending on the nature of the deficiencies noted, some of the bridge structures may be included with these contracts. These structures will continue to be monitored and if required, will be included for repair in advance of this programmed reconstruction.

In 2016, the Consulting Engineer performed an in-depth inspection of 88 bridges throughout the Illinois Tollway system. In-depth inspections are performed by the Consulting Engineer at those bridges most in need of repair as identified in the previous year's biennial inspection by the Illinois Tollway and which are not already programmed into a repair contract or were identified for monitoring. The in-depth inspection is conducted in addition to the biennial inspection. If a railroad bridge was scheduled for inspection, the adjacent twin bridge was also inspected while permission for railroad site access was available. Additionally, the Illinois Tollway has requested that the Consulting Engineer also inspect Fracture Critical bridges carrying highway traffic. In-depth inspections are generally not performed for bridges included in current design or

construction contracts. The intent of the in-depth inspection is to gather defect repair quantities in order to develop anticipated costs and contract scopes for future bridge repair projects. The Consulting Engineer has provided the Illinois Tollway with repair recommendations resulting from the in-depth inspections in 2016 and a grouping of the bridges into recommended contracts for design and construction.

Bridge deck age is also an indicator of the amount of bridge work that may be required in the future. The typical expected service life of a bridge deck is between 40 to 50 years. It is recommended that bridge decks aged over 40 years be replaced during the next repair cycle to reduce the need and frequency of interim repairs. The following table provides the number and percentage of bridge decks throughout the Illinois Tollway system within various age categories. To date, the bridge decks aged over 40 years are programmed for reconstruction as part of the multi-year systemwide budget or the Capital Program.

Table 7: Bridge Deck Age

	Age	Number of Decks	Percent of Total
Bridge Decks:	Over 40 Years	133	21.7%
	25 to 40 Years	60	9.8%
	1 to 25 Years	355	57.8%
	Under 1 Year	66	10.7%
Total		614*	100%

** This bridge deck age summary does not include bridge culverts or oasis bridges.*

Structural Walls

Structural walls include retaining walls, noise abatement walls and sight screen walls. Visual inspections of the structural walls located throughout the Illinois Tollway system are performed annually. Due to the number of structures to be inspected, the effort is scheduled as a multi-year task. The structural walls throughout the Illinois Tollway system are generally inspected on a four-year cycle. However, newly constructed structures or those last rated in excellent condition may be inspected on a slightly extended cycle due to the expectation of their remaining in excellent condition for several years. Approximately, one quarter of Illinois Tollway structural walls are inspected each year.

A total of 134 structural walls consisting of 68 retaining walls, 59 noise abatement walls and 7 sight screen walls were inspected in 2016 on the Tri-State Tollway (I-294) from milepost 39.3 (near Canadian Pacific RR) to milepost 52.75 (near the north terminus of I-294), on the Tri-State Tollway (I-94) from milepost 1.05 (near Old US 41) to milepost 25.25 (near Eden’s Spur Ramp) and on the Eden’s Spur (I-94) from milepost 26.2 (near Eden’s Toll Plaza 24) to milepost 29.15 (near Union Pacific RR). Detailed reports were prepared and submitted under a separate cover for these structural walls.

An overall condition rating is assigned for each structural wall inspected. In order to improve objectivity and uniformity between maintenance sections and inspectors, a condition rating system was developed for the structural wall inspections. The condition ratings utilized for the structural wall inspections are included in the following table.

Table 8: Structural Wall Inspection Condition Rating Summary

Rating	Description
Excellent	There are no problems noted.
Good	Good condition exists with only minor problems noted.
Fair	Fair condition exists with minor section loss, cracking or spalling observed.
Poor	Poor condition exists with signs of advanced deterioration, section loss, wide cracks, water seepage, and out of plumb but stable condition. Wall requires close monitoring.
Critical	Critical condition exists with major defects, significant deterioration and section loss, obvious vertical or horizontal movement affecting wall stability exists. Wall requires replacement or immediate attention.

Deficiencies noted at structural walls assigned a condition rating excellent to fair are typically minor and do not require immediate attention. These deficiencies are typically addressed by the Maintenance Division or are included in a future contract. Therefore, recommendations are only provided for structural walls assigned a condition rating of poor to critical since those deficiencies typically require either monitoring or immediate attention.

The following table summarizes for all structural walls inspected during the previous four year cycle. In addition, the table accounts for any special inspections conducted in interim years to ensure the severity of noted defects has not increased.

Table 9: Structural Wall Inspection Summary

Inspection Year	2013	2014	2015	2016
Total Walls Inspected	156	203	132	134

There are a number of projects ongoing or recently completed systemwide as part of the current Capital Programs which include the reconstruction of existing or the construction of new structural walls. Many of these structures are not accounted for in the Structural Wall Inspection Summary over the previous four years provided herein because they have not been phased into the inspection schedule. It is expected that these structural walls are and will remain in excellent condition for several years. These structural walls will be accounted for and phased into the inspection schedule over the next four year inspection cycle.

The majority of structural walls throughout the Illinois Tollway system have generally been assigned a condition rating of excellent to fair over the previous four year inspection cycle. There were 65 structural walls systemwide assigned a condition rating of poor and three which were assigned a condition rating of critical during this period. The three structural walls assigned a condition rating of critical are scheduled for repair in 2017 as part of contract RR-16-5716.

The structural walls assigned a condition rating of poor are typically programmed for repair

within two years of the inspection. In some cases, repairs are delayed to coincide with adjacent work when prudent. Of the structural walls last assigned a condition rating of poor, 7 have been repaired, 21 have been transmitted to the Illinois Tollway Maintenance Division for repair and 36 are programmed to be included within upcoming repair contracts. One additional structural wall is being monitored by the Consulting Engineer prior to recommending further action.

Overhead Sign Structures

Visual inspections of the overhead sign structures located throughout the Illinois Tollway system are performed annually. Due to the number of structures to be inspected, the effort is scheduled as a multi-year task. The overhead sign structures throughout the Illinois Tollway system are generally inspected on a four-year cycle. However, newly constructed structures or those last rated in excellent condition may be inspected on a slightly extended cycle due to the expectation of their remaining in excellent condition for several years. Approximately, one quarter of Illinois Tollway overhead sign structures are inspected each year.

An overall rating is assigned for each overhead sign structure inspected. In order to improve objectivity and uniformity between maintenance sections and inspectors, a condition rating system was developed for the overhead sign structure inspections. The condition ratings utilized for the overhead sign structure visual inspections are included in the following table.

Table 10: Overhead Sign Structures Inspection Condition Rating Summary

Rating	Description
Excellent	There are no problems noted.
Good	Good condition exists with only minor problems noted. Rust or foundation cracking observed.
Fair	Fair condition exists with the following: loose bolts, missing safety chains, damaged lighting, sign legend/background problems, etc.
Poor	Poor condition exists with signs of moderate structural cracking or collision damage. Sign structure requires monitoring.
Critical	Critical condition exists with major structural defects or loose components that could fall on roadway. Overhead sign requires immediate attention.

Deficiencies noted at overhead sign structures assigned a condition rating of excellent to fair are typically minor and do not require immediate attention. These deficiencies are typically addressed by the Maintenance Division or are included in a future contract. Therefore, recommendations are only provided for overhead sign structures assigned a condition rating of poor to critical since those deficiencies typically require either monitoring or immediate attention.

The following table illustrates for all overhead sign structures inspected from 2013 to 2016. In addition, the table accounts for special inspections conducted in interim years to ensure the severity of noted defects has not increased.

Table 11: Overhead Sign Structure Inspection Summary

Inspection Year	2013	2014	2015	2016
Total Sign Structures Inspected	112	166	176	188

The majority of overhead sign structures throughout the Illinois Tollway system have generally been assigned a condition rating of excellent to fair over the previous four year inspection cycle. There were 3 overhead sign structures systemwide assigned a condition rating of poor and none which were assigned a condition rating of critical during this period. Of the overhead sign structures last assigned a condition rating of poor, these three still require repairs. Of these, one is included in a DUR contract for repairs. The remaining two overhead sign structures will be replaced in 2018 as part of the programmed Tri-State Tollway (I-94) pavement preservation project in 2018.

There are a number of projects ongoing or recently completed systemwide as part of the current Capital Programs which include the reconstruction of existing or the construction of new overhead sign structures. Many of these structures are not accounted for in the Overhead Sign Structure Inspection Summary over the previous four years provided herein because they have not been phased into the inspection schedule. It is expected that these overhead sign structures are and will remain in excellent condition for several years. These structural walls will be accounted for and phased into the inspection schedule over the next four year inspection cycle.

2.4 Facilities

Visual inspections of the facilities located throughout the Illinois Tollway system are performed annually by the Illinois Tollway's Consulting Engineer. The inspection consists of the recording of visible deficiencies of all facility elements including but not limited to buildings, tunnels, canopies, and sites with associated appurtenances. Facilities that are inspected include maintenance facilities, toll plazas, telecommunications buildings, oases and miscellaneous facilities.

Due to the number of Illinois Tollway facilities of various complexities to be inspected, the effort is scheduled as a multi-year task. The facilities throughout the Illinois Tollway system are generally inspected on a four-year cycle. However, newly constructed facilities or facilities last rated in excellent condition may be inspected on a slightly extended cycle due to the expectation of these facilities remaining in excellent condition for several years. Approximately, one quarter of Illinois Tollway facilities are inspected each year.

The objective of these inspections is to assess the general condition of Illinois Tollway facilities and associated site elements, identification of elements requiring remedial work, to make repair or replacement recommendations, and an evaluation of the remaining useful life. The data provided by these inspections is utilized by the Illinois Tollway in programming repairs and replacements of various facility components and to aid the Illinois Tollway Building Maintenance Division in planning and estimating maintenance repairs. The evaluations and recommendations are based upon visual observations, discussions with Illinois Tollway Building Maintenance Division personnel, and the reviews of available reports. Emphasis is given to the identification

of specific issues identified by on-site personnel experienced with the actual operating conditions of the facility. No destructive or non-destructive testing is performed and no physical samples are collected as part of these inspections.

An overall condition rating is assigned for each facility inspected. Additionally, a separate condition rating is also typically assigned to each associated facility element. In order to improve objectivity and uniformity between facilities inspected and inspectors, a rating system was developed. Based upon the assigned condition rating, the future inspection schedule for each facility may either remain on a four-year cycle or be recommended for more near-term inspections. The overall condition ratings utilized for the visual inspections are provided in the following table.

Table 12: Facilities Inspection Ratings Summary

Rating	Description
Excellent	All four conditions must be exhibited: <ul style="list-style-type: none"> • New Facility or component • No repair required • Condition like new • Component performing as intended
Good	All three conditions must be exhibited: <ul style="list-style-type: none"> • Facility is performing essentially as intended • Minor repair required (i.e. paint, clean, patching, etc.) • Less than 25% of the replacement cost of the facility or component is required to return the component to intended condition
Poor	Any condition exhibited may be cause for rating: <ul style="list-style-type: none"> • Facility is approaching end of useful life • Major components need extensive repair / replacement work • 25% - 50% of the replacement cost of the system or component is required to return the component to intended condition
Critical	Any condition exhibited may be cause for rating: <ul style="list-style-type: none"> • System or component is non-functioning • Safety or environmental concerns are prevalent (If component exhibits safety or environmental concerns, entire system will be graded as critical) • More than 50% of the replacement cost of the facility or component is required to return the component to intended condition

Many of the facilities located throughout the Illinois Tollway system are over fifty years old and are candidates for rehabilitation or replacement of their component systems. Renovation work performed at these facilities has enabled them to continue to function. Architectural and site improvements have been made to maintenance facilities on an “as needed” basis through capital improvement projects. In addition, the I-PASS implementation program has enabled many upgrades, renovations, and replacement of toll plazas. To date, all mainline toll plazas have been reconstructed or rehabilitated to accommodate ORT. Although the inspected facilities are functional, the condition of the major systems (mechanical, electrical, HVAC, plumbing, roofing, etc.) continues to deteriorate resulting in inefficiencies and higher operational costs.

Illinois Tollway Building Maintenance Division forces provide necessary day to day repairs of facilities to the extent possible. More intensive repair and rehabilitation work is performed as part of Capital Programs.

Maintenance Facilities and Miscellaneous Facilities

The maintenance facilities typically consist of garages, offices, salt domes, gas pumping facilities, storage buildings, telecommunication towers and other components.

The Consulting Engineer completed an assessment for each maintenance facility throughout the system in 2006 and 2007. These assessments reviewed the functionality, efficiency and condition of the sites, buildings, and all associated components located within and made recommendations for improvement or replacement. Details of these assessments are available in the respective Assessment and Recommendation Report for each maintenance facility.

Utilizing the Assessment and Recommendation Report, a major Facilities' Capital Program to repair or replace a number of maintenance facility buildings began in late 2008. The initial emphasis of this program was the repair of existing systems and the improvement of the working environment for Illinois Tollway employees. These improvements have been and continue to be consistent with the Illinois Tollway's desire for sustainable facilities. A scope and schedule for this ten year program has been approved. However, due to funding restrictions the budget is approved annually thus requiring annual review of the program and prioritization of the repairs.

To date, the following improvements have been made at most of the appropriate maintenance facility buildings as part of the Facilities' Capital Program.

As a result of the adoption of the *Move Illinois* Program, a number of maintenance facilities are programmed for relocation, reconstruction or rehabilitation. Due to this, the emphasis at these facilities has shifted to keep them functional until the programmed reconstruction or rehabilitation. As a result, Professional Service Bulletin No. 12-5 was issued in October 2012 which included contract RR-12-4079 (Maintenance Facilities) that began in 2013. The purpose of this contract is to provide Phase I and II engineering services for the development of a master plan and design/architectural plans for the maintenance facilities. The scope of work includes the following:

- Development of a short-term maintenance repair plan to keep the existing facilities functional until reconstruction or rehabilitation.
- Development of master plans for reconstructed or relocated maintenance facilities.
- Development of the plats of survey for the Maintenance Facility M-4 (Gurnee), M-8 (Naperville) and Elgin-O'Hare Western Access maintenance facilities.
- Development of contract documents for the construction of the maintenance buildings including the finalization of two prototype designs for the reconstructed and relocated maintenance facilities.
- Development of a strategy to maintain facilities and maintenance operations during construction.
- Site investigations and potential remediation.

The improvements completed to date and those anticipated as part of contract RR-12-4079 have been and will continue to be consistent with the Illinois Tollway's desire for sustainable facilities. It is anticipated that the improvements which were not completed as part of the original Facilities' Capital Program will be addressed as part of contract RR-12-4079 as budget permits.

The prototype master plan developed for the reconstruction of maintenance facilities has been implemented at Maintenance Facility M-1 (Alsip). Work commenced in 2014 and was

completed in 2015. This reconstruction did not include the existing salt dome which was previously reconstructed.

In 2001, it was first recommended to program the replacement of deteriorated salt dome roofs throughout the system into a systemwide contract and to replace the vehicle storage building at Maintenance Facility M-1 by 2006. To date, salt dome repair/replacement has been completed at Maintenance Facilities M-1, M-2, M-3, M-4, M-7, M-8, M-11, and M-12 and at the Illinois Route 251 salt dome.

The majority of maintenance and miscellaneous facilities throughout the Illinois Tollway System have generally been assigned a condition rating of good over the previous four year inspection cycle. These facilities typically only require minor repairs and continued routine maintenance. There were four facilities assigned a condition rating of poor during this period.

- Maintenance Facility M-3 (Park Ridge)
- Maintenance Facility M-4 (Gurnee)
- Maintenance Facility M-5 (Arlington Heights)
- Maintenance Facility M-6 (Marengo)

Toll Plazas

The majority of Toll Plazas throughout the Illinois Tollway System have generally been assigned a condition rating of good over the previous four-year inspection cycle. These facilities typically only require minor repairs and continued routine maintenance. There were four Toll Plazas systemwide last rated in poor condition.

- Plaza 31 (O'Hare West)
- Plaza 32 (O'Hare East)
- Plaza 38 (95th Street)
- Plaza 47 (Halsted Street/Illinois Route 1)

Communication Facilities

All communication facilities throughout the Illinois Tollway System have been assigned a condition rating of good over the previous four-year inspection cycle. These facilities typically only require minor repairs and continued routine maintenance.

Oases

All oases throughout the Illinois Tollway System have been assigned a condition rating of good over the previous four-year inspection cycle. These facilities typically only require minor repairs and continued routine maintenance.

2.5 Intelligent Transportation Systems (ITS)

Deployment of Intelligent Transportation Systems (ITS) on the Illinois Tollway began in the late 1980s with installation of Road Weather Information Systems (RWIS) for monitoring atmospheric and pavement conditions during inclement weather. The system was further expanded with the construction of a system-wide fiber optic communications network and the I-PASS electronic tolling initiative in the late 1990s.

Since then, the Illinois Tollway ITS system has been expanded and enhanced in an effort to reduce the incident timeline (the time from once an incident is detected, to the time the incident is cleared and the roadway is returned to normal conditions) to include a systemwide network of

communications, monitoring, and traveler information tools. This system has enhanced the Illinois Tollway's ability to meet the overarching traffic and incident management goals and objectives of improving the mobility, efficiency, and safety of the Illinois Tollway roads.

To date the Illinois Tollway ITS system includes the following primary components:

- System-wide fiber optics and communications equipment.
- Closed Circuit Television (CCTV) camera surveillance – for detecting, verifying and monitoring congestion and incidents.
- Dynamic Message Signs (DMS) – for providing traveler information such as travel time, roadway conditions and incidents to motorists ahead of major decision points on the roadway.
- Microwave Vehicle Detection System (MVDS) – for measuring volume, vehicle speed and roadway lane occupancy on both the mainline and ramps. The data from this detection system provides the basis for the Illinois Tollway's posted travel times.
- Portable Changeable Message Signs (PCMS) – for providing traveler information to motorists on a short-term basis or within construction zones.
- Weigh-in-Motion (WIM) – to assist overweight vehicle enforcement by measuring the weight of vehicles moving at highway speeds.
- Road Weather Information Systems (RWIS) – to assist roadway operations to prepare and respond to snow and ice events by measuring atmospheric and pavement conditions.
- Wireless Queue/Count Stations – for automatic queue detection and traffic counting.

These devices and component systems are integrated into a centralized Traffic & Incident Management System (TIMS) software package, which is monitored and controlled from the Traffic Operations Center at the Central Administration (CA) building. The TIMS software package is a management platform that allows operators to monitor traffic conditions in real-time, manage response and clearance of incidents, monitor construction zones, and communicate with a variety of stakeholders including Illinois Tollway staff, other Traffic Management Centers, the media, and directly to the motorist.

Since 2010, the Illinois Tollway's focus has shifted from significant expansion of the ITS system, which coincided with the broader CRP, to filling in gaps in the system with devices to better manage traffic operations, while maintaining and improving the existing assets. While additional deployment was scaled down compared to recent years, the system did continue to expand as part of both standalone ITS projects and the "mainstreaming" of ITS system within larger roadway rehabilitation projects.

Major deployments included the following:

- ITS guide specifications and drawings were developed in 2016 and implemented in construction contracts.
- Improved maintenance and management systems with the goals of reducing system downtime.
- Completed design activities for CCTV gap analysis, queue detection, communication upgrade and continued DMS upgrades within the system.
- Commence design activities for systemwide maintenance design and RWIS maintenance.
- Completed VWIM upgrade of WIM on the Veterans Memorial Tollway (I-355). The system has helped the Illinois State Police enforce overweight commercial vehicle, and collect fines over \$300,000.
- Implemented ITS acceptance process in e-Builder for all ITS devices within construction

contracts. The process will ensure that ITS devices will be commissioned and integrated with Illinois Tollway ITS system in a timely fashion.

- Completed first annual inspection of the ITS components and developed OCI ratings. These rating will normalize over the next four years once the detailed inspections have been completed on all devices.

Major initiatives planned for 2017 include the following:

- The Illinois Tollway is completing construction of a “smart corridor” along the Jane Addams Memorial Tollway (I-90) corridor as part of the current Capital Programs. This corridor will include a combination of traditional Illinois Tollway ITS devices including CCTV, MVDS and enhanced full color/full matrix DMS capable of illustrating color and graphic messages and new ITS devices including LCS over each lane. The LCS will be capable of indicating if a specific lane or lanes are open (green arrow), closed (red “X”) or merging (yellow diagonal arrow). The goal is to increase roadway efficiency and safety through this implementation.
- Commence with active construction contracts for CCTV gap analysis, queue detection, communication upgrade and continued DMS upgrades within the system.

2.6 Environmental Initiatives

The Illinois Tollway is committed to protecting the environment and implementing numerous green initiatives throughout the Illinois Tollway system and its construction projects. In general, recycling and waste reduction is utilized in most construction projects including recycling tires, shingles or waste asphalt surfaces in new HMA pavements or rubblized old concrete in new base materials. The Illinois Tollway is also working with Argonne Laboratories to investigate various solar technologies effectiveness in the upper Midwest. As part of the Illinois Tollway’s 15-year Move Illinois program, construction has begun to retrofit maintenance yards to achieve LEED status including better protection of stormwater and introducing Green Infrastructure Practices. During the 2016 calendar year, environmental initiatives throughout the Illinois Tollway included both the continuation of previous commitments along with new programs. The following is a summary.

Systemwide Threatened and Endangered Species Mitigation

The Illinois Tollway continued its endangered species mitigation, as part of previous projects throughout the Illinois Tollway system including the construction of the I-355 South Extension, I-294 and I-90 widening and reconstruction for the Hine’s Emerald Dragonfly (Hine’s), Eastern Massasauga Rattlesnake (Massasauga) and Black Sandshell Mussel (Sandshell), respectively.

Large scale mitigation efforts associated with the Hine’s, including habitat enhancement and creation along with the establishment of a captive rearing program for the species and genetic research on its distribution had been conducted in previous years. Long term mitigation efforts associated with the Hine’s emerald dragonfly continued through 2016. The primary effort was the ongoing support of a focused, less labor intensive, captive rearing program with funding to support the program also coming with the United States Fish and Wildlife Service, Illinois Department of Natural Resources and the Forest Preservice District of DuPage County.

Activities associated with the Eastern Massasauga Rattlesnake included a final controlled burn at the Portwine Woods site, owned by the Forest Preserve District of Cook County, in early spring of 2015 and final 100 hour species survey that was conducted in early summer by the Illinois Natural History Survey. A final report of survey activities was provided by the Illinois Natural History Survey in early 2016. The Illinois Tollway has received final close-out on the

Incidental Take Authorization with the Illinois Department of Natural Resources in 2016.

The Illinois Tollway received final concurrence in 2016 from the Illinois Department of Natural Resources that all requirements of the Incidental Take Authorization have been met.

Systemwide Wetland and Waters Mitigation

North Chicago Mitigation Site:

The Illinois Tollway partnered with IDOT on a 160-acre wetland mitigation project in North Chicago. Work at the North Chicago mitigation site commenced in 2010 with the clearing of invasive trees, shrubs, and herbaceous plants. The clearing work allowed for the re-establishment of the native prairie and diverse wetland complex providing a home to endangered species and benefitting a wide range of wildlife. Additional benefits include a deep and fibrous root system that can infiltrate rain water resulting in flood reduction and uptake nutrients resulting in improved water quality within the Des Plaines watershed. Performance measures of the restoration effort are anticipated to be approved by the U.S. Army Corps of Engineers in 2017. Once sign-off has been secured, the Illinois Department of Natural Resources will take over long-term management of the site.

I-294/I-57 Interchange:

The Nature Conservancy is conducting wetland mitigation on 45-acres at the Indian Boundary Prairies to offset isolated wetland impacts, associated with the interchange. The Indian Boundary Prairies are a consortium of sites within the vicinity of the interchange that are dedicated nature preserves.

Fox River Country Day School Forested Fen:

The Illinois Tollway partnered with the City of Elgin and the Forest Preserve District of Kane County for the purchase of a high-quality forested fen wetland, one of two in the State, located at IL Route 25 off of the Jane Addams Memorial Highway (I-90), just north of Trout Park. The site was designated as an Illinois nature preserve in 2014. This marked the first time an Illinois Tollway mitigation site gained this designation. Maintenance on the site, by the Forest Preserve District of Kane County in 2016 consisted of herbicide treatment of invasive species re-sprouts and other undesirable plant species.

Orland Grassland South:

The Illinois Tollway developed, advertised and let a construction contract for the restoration of a 162-acre site near Orland Park known as Orland Grassland South. Restoration activities include native planting and seeding, invasive species control, removal of drain tiles, creation of a snake hibernaculum, and the restoration of a section of tributary to Marley Creek. Public access was provided with the construction of a new entrance road, parking lot, and a path system. The work began in the fall of 2014 and reached substantial completion in October 2015. Vegetative and hydrological maintenance and monitoring is ongoing through 2019.

Formerly farmland, the property is owned by the Forest Preserve District of Cook County and is adjacent to the 960-acre Orland Grassland Preserve, which provides important breeding habitat for grassland birds. The restoration of Orland Grassland South provides an expansion of the important Orland Grassland Preserve INAI site. Approximately 58 acres of wetlands were restored to offset impacts from the reconstruction/widening of Jane Addams Memorial Tollway (I-90).

St. James Farm Stream Restoration:

The Illinois Tollway provided funds to the Forest Preserve District of DuPage County to restore

Spring Brook No. 1 Creek within the St. James Farm Forest Preserve in Warrenville. This was to offset the Elgin O'Hare Western Access (IL-390) corridor construction water impacts. Restoration activities included re-meandering the creek back to its pre-settlement configuration, which has reduced flooding and improved water quality. Restoration also provided aesthetic improvements to enhance the natural setting of the popular recreational site.

The Forest Preserve District of DuPage County awarded the construction contract for the stream restoration effort in early 2015. Maintenance and monitoring of the site took place throughout the 2016 season.

Pine Dunes Wetland Mitigation:

The Illinois Tollway partnered with the Lake County Forest Preserve to restore the 315-acre Pine Dunes Forest Preserve District parcel. This parcel contains approximately 220 acres of upland that is currently under agricultural production or is woodlands comprised of White Oak, Red Oak, and other desirable hardwood trees. The Illinois Tollway, in 2014, established a construction contract for wetland creation and enhancement, stream stabilization, and the transition of farmed hills to prairie and savanna ecotypes and will serve as mitigation for the Elgin O'Hare Western Access Project.

Substantial completion of the work on the site was reached in late fall 2015. Maintenance and monitoring of the site took place throughout the 2016 season. Moving forward, vegetative and hydrological maintenance and monitoring of the site will occur for the next three years and approximately 4,800 trees and shrubs are scheduled to be planted in 2017.

Bioswale Water Quality Improvement Demonstration Project

The Bioswale Demonstration Project is a water quality improvement/stormwater management project designed to treat roadway surface water runoff. Bioswales are open, gently sloping, vegetated channels designed to filter stormwater runoff from the roadway. By slowing and filtering the water, pollutants settle in the bioswale prior to reaching the nearest stream or waterway. The Illinois Tollway partnered with the Forest Preserve District of Cook County to construct bioswales on 16 acres of Forest Preserve property adjacent to the North Tri-State Tollway (I-294/I-94).

2015 marked the final year of detailed monitoring efforts for the project area and final reports have been received from the Illinois State Geological Survey. The project has been deemed an overall success and the study has provided quantitative data on the effectiveness of different bioswale types. The knowledge gained from this project has led to the incorporation of approximately 60 linear miles of bioswales as part of the *Move Illinois* program. Further, the project has become the standard in which the regional resource and regulatory agencies turn to for treating stormwater generated from highway facilities. A formal presentation to the Forest Preserve District of Cook County, Illinois Department of Transportation Hydraulics Unit, and the Cook County Highway Department regarding the success and areas for design improvement took place in October 2016.

Pollinator Habitat Restoration

In May 2015, the White House's Pollinator Health Task Force released a national strategy to promote the health of pollinators. Due to the importance of bees and butterflies, the Pollinator Health Task Force has recommended the restoration and enhancement of seven million acres of pollinator habitat over the next five years.

In response, the Illinois Tollway has initiated a Pollinator Habitat Program and is working towards establishing pollinator habitat within its ROW. The Illinois Tollway has incorporated 900 acres of pollinator habitat as part of the construction of Illinois Best Management Practices and wetland mitigation sites. Additionally, approximately 330 acres of habitat are scheduled to be planted over the coming years of the *Move Illinois* program. Seed mixes have been developed to include native flowers important to pollinators, in order to ensure the establishment of pollinator habitat within these areas.

Systemwide Landscape Master Plan

The Illinois Tollway has entered into a partnership with Morton Arboretum to support the Chicago Regional Trees Initiative. The goal of this initiative is to increase regional tree populations. In support of this goal, the Illinois Tollway has committed to planting 58,000 trees, or 1,000 trees for every year the Illinois Tollway has been in existence. The Illinois Tollway is currently developing a systemwide landscape master plan to guide this effort. This master plan will identify planting locations that consider safety, maintenance, connectivity, and sustainability, as well as develop planting schematics that can be utilized for design at specific locations.

NPDES Inspection and Annual Reporting

The Illinois Tollway maintains compliance with the Illinois EPA's Storm Water Management Program ILR40 Permit conditions (ILR40 Permit) under the Small Municipal Separate Storm Sewer System (MS4), permit number ILR400494. An inspection of the entire system is completed annually and includes outfall inspections, illicit discharge detection, and visual dry weather screening. This inspection was conducted in 2016.

The Illinois Environmental Protection Agency issued a new ILR40 permit which became effective March 1, 2016. The Illinois Tollway Environmental Unit is currently studying procedures and policies to identify the most efficient means for complying with other new permit requirements.

INVEST

INVEST is a self-evaluation tool developed by the FHWA that enables transportation agencies to assess the sustainability of their projects and systems as a whole. Its goal is to promote the incorporation of sustainability by improving all three legs of the triple bottom line. The Illinois Tollway has customized the FHWA's INVEST program by incorporating supplements to existing FHWA criteria and creating new criteria as well. In 2015, many of the Illinois Tollway's unique criteria and supplements to FHWA criteria have been incorporated into the update of FHWA's national program.

In 2016, the INVEST team assessed the Illinois Tollway using the System Planning and Operations and Maintenance modules to determine 2015 system scores. The 2015 System Planning and Operations and Maintenance scores continue to maintain the highest level of achievement, Platinum. Opportunities for improvement have been identified and will be further developed in 2017.

In 2016, baseline and in-progress design/construction contracts were analyzed using the INVEST Project Development module for projects with a construction cost exceeding \$10 million dollars. The baseline contracts were completed prior to the *Move Illinois* program and scored below the threshold for achievement levels. Early *Move Illinois* contracts mostly attained Silver achievement levels, and individual projects under development in 2015 have attained Silver or Gold achievement levels, with an overall average of Gold.

INVEST has demonstrated that the Illinois Tollway has established a robust culture of sustainable design and management of all three modules of INVEST. The continued utilization of INVEST will ensure the Illinois Tollway seizes every opportunity to maximize its impact on the regional economy while minimizing its impact on the environment.

2.7 Systemwide Flooding Study

Several storm events have occurred throughout the Illinois Tollway's history resulting in pavement flooding. The Consulting Engineer has listed all known flooding issues, with the potential to impact the traveling public. Until mitigation measures are completed in each of these locations the Consulting Engineer monitors them during, or following, severe rain events to evaluate the public impacts and provide recommendations to the Illinois Tollway. Most of the listed flooding concerns are in locations where mitigation efforts may be incorporated into the current Capital Program projects. The mitigation measures listed along the Jane Addams Memorial Tollway (I-90) were completed as part of the corridor reconstruction and widening from 2013 to 2016. The remaining flooding concerns are either included as part of the Central Tri-State Tollway (I-294) corridor reconstruction or are programmed to be addressed as part of the Systemwide Pavement Rehabilitation.

	Location	Special Issue #	Status
1	I-294 & Cermak Ave	(SI 95)	I-294 Reconstruction
2	I-294 & Archer Ave	(SI 1104)	I-294 Reconstruction
3	I-294 & St. Charles	(SI 1107)	I-294 Reconstruction
4	I-90 EB to I-294 SB Ramp	(SI 479)	I-90 Reconstruction
5	I-294 & Irving Park Road	(SI 1127)	I-294 Reconstruction
6	I-90 & Des Plaines Oasis	(SI 1111)	I-90 Reconstruction
7	I-90 & Arlington Heights Road	(SI 1119)	I-90 Reconstruction
8	SB Balmoral Ramp to I-294	(SI 1041)	I-294 Reconstruction
9	NB I-294 to Hinsdale Oasis	(SI 1315)	I-294 Reconstruction
10	WB I-88 near Watson Road	(SI 1263)	Monitoring for further study
11	SB I-355 near Boughton Road	(SI 1129)	Monitoring for further study

3.0 Move Illinois: The Illinois Tollway Driving the Future

What was envisioned in 1953 as a bypass to route interstate traffic around Chicago has become an integral hub for commerce and commuter travel and a system of roadways critical to the movement of goods, services, and people throughout Northern Illinois. The Illinois Tollway has planned for the future to ensure that its customers have a fully rebuilt, state-of-the-art system that will provide better travel conditions and accommodate the needs of the traveling public well into the 21st century.

As required by the Toll Highway Act, the Illinois Tollway undertook a process to develop a long-term capital plan which resulted in a comprehensive 15-year capital program to complete the rebuilding of the 55-year old system and commit approximately \$12 billion in transportation funding to improve mobility, relieve congestion, reduce pollution and link economies across Northern Illinois. *Move Illinois: The Illinois Tollway Driving the Future* (Move Illinois Program) mapped out the Illinois Tollway's next capital program for 2012 – 2026.

In April 2017, the Tollway Board of Directors agreed to move forward with planning for a \$4 billion rebuilding project on the Central Tri-State Tollway (I-294) between Balmoral Avenue and 95th Street to increase capacity, reduce congestion and improve travel reliability. The Board also agreed to expand the Tollway's *Move Illinois* Program commitment to more than \$14 billion in spending over 15 years. Enhancements included in the new Central Tri-State scope will allow the Tollway to rebuild roadway and improve bridges on the 22-mile-long portion of I-294, as well as construct additional lanes to relieve congestion, improve interchanges to increase access and work to deliver solutions for stormwater, noise abatement and freight.

The *Move Illinois* Program will create jobs, stimulate local economies and provide the congestion relief customers want and need. The Illinois Tollway is committed to ensuring that this region remains competitive with other major cities in the U.S. and around the world and unlocking the economic potential of the region for years to come.

The program outlined in this report funds necessary improvements to the existing Illinois Tollway system. These needs are programmed to be performed at the right time to keep the existing 286 centerline miles in a state of good repair. The projects include:

- Reconstructing and widening the Jane Addams Memorial Tollway (I-90) from the Tri-State Tollway (I-294) near O'Hare Airport to the I-39 interchange in Rockford
- Reconstructing and widening the central Tri-State Tollway (I-294) from 95th Street to Balmoral Avenue and the Edens Spur (I-94)
- Preserving the Reagan Memorial Tollway (I-88)
- Preserving the Veterans Memorial Tollway (I-355)
- Repairing roads, bridges, and maintenance facilities
- Other capital projects

In addition, the program commits money to new priority projects that focus on enhancing regional mobility including:

- Constructing a new interchange at I-294/I-57 and 147th Street ramps
- Constructing the Elgin O'Hare Western Access, including completion of the Elgin O'Hare and construction of the West Bypass between I-90 and I-294, and rehabilitation and widening of the existing Elgin O'Hare Expressway
- Planning for transit options on the Jane Addams Memorial Tollway (I-90)
- Planning for the Illinois Route 53 Corridor

- Planning for other routes as determined by the Board of Directors

Some of the projects included in the Move Illinois Program have been modified from the previous capital program, the Congestion-Relief Program (CRP). The current state of the CRP is described in detail in Section 5.0 of this report.

The table below provides the estimated annual program expenditures required to fund the current *Move Illinois* Program. This table is based upon information provided by: (i) the Illinois Tollway for the years 2012 through 2016; and (ii) the Program Management Office (PMO), a consultant to the Illinois Tollway, for the years 2017 through 2026.

Table 13: Move Illinois Program – Estimated Program Expenditures

Year	Move Illinois Program Estimated Program Expenditures (1) (Million)
2012	\$108.2
2013	\$502.2
2014	\$886.7
2015	\$1,239.2
2016	\$985.2
2017	\$866.0
2018	\$1,181.8
2019	\$1,311.6
2020	\$1,092.6
2021	\$835.6
2022	\$926.3
2023	\$727.5
2024	\$1,565.1
2025	\$1,433.9
2026	\$611.1
Total	\$14,273.0

Notes:

- (1) From time to time, the Illinois Tollway may receive reimbursements under various intergovernmental agreements. Estimated program expenditures does not assume credit for such reimbursements with the following exceptions:
- For completed years (2012-2016) the totals are net of reimbursements received under various intergovernmental agreements
 - A credit of \$300 million is assumed for the Elgin O'Hare Western Access Corridor (EOWA). The program anticipates contributions from local, federal and other sources valued at approximately \$300 million in years 2017-2023 for interchange and access improvements.

4.0 Move Illinois Project

The basis for *Move Illinois: The Illinois Tollway Driving the Future* was a capital needs analysis performed by Illinois Tollway staff and consultants that included a comprehensive assessment of the current and future physical and operational characteristics of the entire Illinois Tollway system. Previous long-range plans were reevaluated, the needs of communities and stakeholders were catalogued and new technology and transit opportunities were explored.

This evaluation became the foundation of the new capital program, which will provide additional capacity, relieve congestion and meet the needs of the traveling public and the businesses and communities served by the Illinois Tollway into the next decade and beyond.

Bond proceeds and Illinois Tollway revenues will be used to fund *Move Illinois*. The following describes the projects that make up the overall *Move Illinois* Program, which projects may be funded in whole or in part with bond proceeds.

The PMO has developed a variety of methods for verifying the various types of estimates. The Consulting Engineer believes that the cost tracking and estimating practices presently used by the PMO for *Move Illinois* are appropriate.

The Consulting Engineer relied on the PMO to provide the scopes of work and estimates of construction costs. It should be noted that under the Consulting Engineer contract, cost estimating services are provided to the Illinois Tollway and are directed by the PMO. The Consulting Engineer provided the PMO with annual costs associated with major maintenance for segments of the system required before reconstruction or rehabilitation projects are implemented. These costs are included in the Bridge and Ramp Repairs and other projects described within this section.

The project construction costs (for projects other than Systemwide Improvements) and durations were developed by the PMO and are predicated, at the time of this report, on the following basic assumptions:

1. Project construction will be in general conformance with past Illinois Tollway practices;
2. Construction scope and schedule shall be as described below;
3. Construction costs are escalated to the mid-point of construction;
4. Escalation rate is 5% APR, compounded annually, unless noted otherwise, and
5. No unforeseen conditions / circumstances or unusual price escalation not currently identified will occur.

Specific elements of the *Move Illinois* Program discussed in this report are described in the following sections.

4.1 Jane Addams Memorial Tollway (I-90)

Kennedy Expressway to Elgin Toll Plaza – Reconstruct / Add Lane

Length: 25.0 miles

Project Description: Reconstruct & widen from six to eight lanes.

Project benefits:

- Provide congestion relief by expanding the roadway from six to eight lanes.
- Provide median lane and median shoulder widening in each direction.
- Improve safety and mobility throughout the corridor.

- Reduce annual maintenance costs.
- Improve ride quality and traffic flow by replacing 50+ year-old pavement.
- Upgrade to current standards and operational requirements.

Construction Period: 2013-2016

Total Cost (Escalated): \$1,501.6 million

The estimated project cost was adjusted from \$1,467.7 million in the 2016 Consulting Engineer's Report due to utility relocation delays and associated schedule recovery.

Elgin Toll Plaza to IL Route 47 – Reconstruct / Add Lane

Length: 7.5 miles

Project Description: Reconstruct & widen from four lanes to six lanes.

Project benefits:

- Provide congestion relief by expanding the roadway from four to six lanes.
- Provide median lane and median shoulder widening in each direction.
- Improve safety and mobility throughout the corridor.
- Reduce annual maintenance costs.
- Improve ride quality and traffic flow by replacing 50+ year-old pavement.
- Upgrade to current standards and operational requirements.

Construction Period: 2013-2015

Total Cost (Escalated): \$202.9 million

The estimated project cost was adjusted from \$210.3 million in the 2016 Consulting Engineer's Report due to the contract closeout process.

IL Route 47 to I-39 – Reconstruct / Add Lane

Length: 29.0 miles

Project Description: Reconstruct & widen from four to six lanes.

Project benefits:

- Provide congestion relief by expanding the roadway from four to six lanes.
- Provide median lane and median shoulder widening in each direction.
- Improve safety and mobility throughout the corridor.
- Reduce annual maintenance costs.
- Improve ride quality and traffic flow by replacing 50+ year-old pavement.
- Upgrade to current standards and operational requirements.

Construction Period: 2013-2015

Total Cost (Escalated): \$482.0 million

The estimated project cost was adjusted from \$485.7 million in the 2016 Consulting Engineer's Report due to the contract closeout process.

Kennedy Expressway to I-39 – Transit Accommodation

Length: 61.5 miles

Project Description: Miscellaneous improvements to allow future transit accommodation that are contracted as part of the roadway and bridge reconstruction and widening projects. The costs of median lane widening and median shoulder widening to accommodate transit are included in the section costs above. This widened cross section could be used for future operational improvements. SMART technology initiatives are also included within the main roadway sections above.

Project benefits:

- Allows operation of a Bus Rapid Transit (BRT) system (by others)
- Allow for accommodation of rail transit in the future (by others)
- Provides basic infrastructure for lane management of transit and Illinois Tollway system users

Construction Period: 2013-2015 (Note: Transit Accommodation construction timeline includes those forecasted in main roadway sections above)

Total Cost (Escalated): \$0.9 million

No adjustment from the 2016 Consulting Engineer's Report.

Kennedy Expressway to I-39 – ROW Acquisition

Length: 61.5 miles

Project Description: Acquire right-of-way and easements necessary for roadway and bridge reconstruction and widening.

Project benefits:

- Allows projects to move forward with optimal design elements

Construction Period: 2012-2016

Total Cost (Escalated): \$13.5 million

The estimated project cost was adjusted from \$18.4 million in the 2016 Consulting Engineer's Report due to less than anticipated number of land acquisition parcels needing to be acquired.

Kennedy Expressway to I-39 – Utility and Fiber Optic Relocation

Length: 61.5 miles

Project Description: Relocate Illinois Tollway owned fiber optic and private utilities to accommodate roadway and bridge reconstruction and widening.

Project benefits:

- Allows projects to move forward with optimal design elements
- Maintains Illinois Tollway fiber optic continuity
- Modernize utilities crossing Illinois Tollway right-of-way as necessary

Construction Period: 2012-2016

Total Cost (Escalated): \$155.4 million

The estimated project cost was adjusted from \$135.8 million in the 2016 Consulting Engineer's Report due to refinement in scope and to account for work completed to date for the various utility projects, fiber optic relocations and NSMJAWA water main relocation.

Kennedy Expressway to I-39 – Bridge and Ramp Repairs

Length: 61.5 miles

Project Description: Reconstruct or rehabilitate crossroad bridges and ramps.

Project benefits:

- Upgrade to current standards and operational requirements
- Preserve and maintain the crossroad structures and ramps
- Reduce maintenance costs

Construction Period: 2013-2026

Total Cost (Escalated): \$19.7 million

No adjustment from the 2016 Consulting Engineer's Report.

4.2 Tri-State Tollway (I-94/I-294/I-80)

95th Street to Balmoral Avenue – Reconstruct

Length: 22.3 miles

Project Description: Reconstruction of existing eight lanes and capacity enhancement from widening.

Project benefits:

- Improve ride quality and traffic flow by replacing 50+ year-old pavement
- Better accommodate current and future traffic demand with the addition of a flex lane
- Improved operations at the I-290 interchange
- Improvements at I-55 to reduce mainline congestion

- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2019-2025

Total Cost (Escalated): \$3,624.2 million

The estimated project cost was adjusted from \$1,864.5 million in the 2016 Consulting Engineer's Report due to additional costs associated with the widening and reconstruction of the mainline roadway as well as the operational improvements of I-290 system interchange.

Edens Spur – Reconstruct

Length: 5.0 miles

Project Description: Reconstruct existing four lanes of pavement.

Project benefits:

- Improve ride quality and traffic flow by replacing 50+ year-old pavement
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2018-2020

Total Cost (Escalated): \$102.2 million

No adjustment from the 2016 Consulting Engineer's Report.

Bishop Ford Expressway to Russell Road – Bridge and Ramp Repairs

Length: 78.0 miles

Project Description: Reconstruct or rehabilitate crossroad bridges and ramps.

Project benefits:

- Upgrade to current standards and operational requirements
- Preserve and maintain the crossroad structures and ramps
- Reduce maintenance costs

Construction Period: 2012-2026

Total Cost (Escalated): \$ 379.7 million

The estimated cost was adjusted from \$311.1 million in the 2016 Consulting Engineer's Report due to additional needs associated with the later construction period of the widening and reconstruction of the Central Tri-State Corridor.

Bishop Ford Expressway to Russell Road – ROW Acquisition

Length: 78.0 miles

Project Description: As necessary during reconstruction or repair projects, will provide right-of-way and easements for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements

Construction Period: 2015-2021

Total Cost (Escalated): \$184.0 million

The estimated cost was adjusted from \$3.0 million in the 2016 Consulting Engineer's Report due to additional acquisition needs associated with the widening and reconstruction of the Central Tri-State Corridor.

Bishop Ford Expressway to Russell Road – Utility and Fiber Optic Relocation

Length: 78.0 miles

Project Description: As necessary during reconstruction or repair projects, will provide relocation of fiber optic and private utilities for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements
- Maintains Illinois Tollway fiber optic continuity
- Modernizes utilities crossing Illinois Tollway right-of-way as necessary

Construction Period: 2017-2021

Total Cost (Escalated): \$147.3 million

The estimated cost was adjusted from \$9.0 million in the 2016 Consulting Engineer's Report due to additional utility needs associated with the widening and reconstruction of the Central Tri-State Corridor.

4.3 Veterans Memorial Tollway (I-355)

I-55 to Boughton Road, Collector-Distributor Roads, North Avenue to Army Trail Road – Mill, Patch, and Overlay

Length: 17.5 miles

Project Description: Rehabilitate remaining original (1992) I-355 pavement between I-55 and Army Trail Road. Add safety improvements throughout.

Project benefits:

- Preserve and maintain the existing pavement
- Improve ride quality and traffic flow
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2013

Total Cost (Escalated): \$19.8 million

No adjustment from the 2016 Consulting Engineer's Report.

I-55 to Army Trail Road – Mill, Patch, and Overlay

Length: 17.5 miles

Project Description: Second rehabilitation of the original I-355 pavement between I-55 and Army Trail Road.

Project benefits:

- Preserve and maintain the existing pavement
- Improve ride quality and traffic flow
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2018-2019

Total Cost (Escalated): \$260.6 million

The cost was adjusted from \$185.1 million from the 2016 Consulting Engineer's Report due to changing the scope to add a fourth lane in both directions on I-355 between IL 56/I-88 and IL 38. Adding a fourth lane in this segment would improve traffic operations at some of the highest daily traffic volumes per lane on the entire Illinois Tollway system. The schedule was adjusted from completing bridge repairs in 2018-2019 and then resurfacing the roadway in 2023 to completing all work from 2018-2019. In addition, funding for the bridge and ramp repairs in 2018-2019 from the Bridge and Ramp Repairs program have been moved into this project.

I-80 to Army Trail Road – Bridge and Ramp Repairs

Length: 30.0 miles

Project Description: Reconstruct or rehabilitate crossroad bridges and ramps.

Project benefits:

- Upgrade to current standards and operational requirements
- Preserve and maintain the crossroad structures and ramps
- Reduce maintenance costs

Construction Period: 2017, 2019, 2023, 2024, 2025 and 2026

Total Cost (Escalated): \$84.6 million

The estimated cost was adjusted from \$292.0 million in the 2016 Consulting Engineer's Report. The Des Plaines River Valley bridge rehabilitation/preservation was moved from 2026 to 2017.

Also the funds for the Veterans Memorial rehabilitation in 2019 was moved into the corridor funding.

I-80 to Army Trail Road – ROW Acquisition

Length: 30.0 miles

Project Description: As necessary during reconstruction or repair projects, will provide right-of-way and easements for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements

Construction Period: 2018

Total Cost (Escalated): \$0.5 million

No adjustments from 2016 Consulting Engineer's Report.

I-80 to Army Trail Road – Utility and Fiber Optic Relocation

Length: 30.0 miles

Project Description: As necessary during reconstruction or repair projects, will provide relocation of fiber optic and private utilities for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements
- Maintains Illinois Tollway fiber optic continuity
- Modernizes utilities crossing Illinois Tollway right-of-way as necessary

Construction Period: 2016-2017

Total Cost (Escalated): \$1.0 million

The estimated cost was adjusted from \$2.0 million in the 2016 Consulting Engineer's Report due to refined cost estimates and the addition of a fourth lane in both directions between I-88/IL 56 and IL 38.

4.4 Reagan Memorial Tollway (I-88)

York Road to I-290 - Reconstruct

Length: 1.5 miles

Project Description: Reconstruct existing four and six lanes of pavement.

Project benefits:

- Improve ride quality and traffic flow by replacing 50+ year-old pavement
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2018-2019

Total Cost (Escalated): \$61.5 million

The estimated cost was adjusted from \$49.7 million in the 2016 Consulting Engineer's Report due to widening portions of the roadway to allow for a standard outside shoulder as well as a westbound auxiliary lane that was not included in the original scope of work.

East-West Connector Road Between I-294 and I-88 – Reconstruct

Length: 3.7 miles

Project Description: Reconstruct existing four lanes of pavement.

Project benefits:

- Improve ride quality and traffic flow by replacing 50+ year-old pavement
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2018

Total Cost (Escalated): \$19.8 million

This estimated project cost was adjusted from \$20.0 million in the 2016 Consulting Engineer's Report due to refined design cost estimates.

IL Route 251 to IL Route 56 – Mill, Patch, and Overlay

Length: 38.1 miles

Project Description: Rehabilitate existing four lanes of pavement.

Project benefits:

- Preserve and maintain existing pavement
- Improve ride quality and traffic flow
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2018-2019

Total Cost (Escalated): \$199.1 million

The estimated project cost was adjusted from \$158.7 million in the November 2015 Consulting Engineer's Report due to the inclusion of bridge and ramp repairs along with reconstruction between IL 56 and IL 38.

Aurora Toll Plaza to IL Route 59 – Mill, Patch, and Overlay

Length: 5.5 miles

Project Description: Rehabilitate existing six lanes of pavement.

Project benefits:

- Preserve and maintain existing pavement
- Improve ride quality and traffic flow
- Reduce annual maintenance costs
- Upgrade to current standards and operational requirements

Construction Period: 2014, 2020

Total Cost (Escalated): \$44.6 million

No adjustment from the 2016 Consulting Engineer's Report.

U.S. Route 30 to I-290 – Bridge and Ramp Repairs

Length: 96.5 miles

Project Description: Reconstruct or rehabilitate crossroad bridges and ramps.

Project benefits:

- Upgrade to current standards and operational requirements
- Preserve and maintain the crossroad structures and ramps
- Reduce maintenance costs

Construction Period: 2013 and 2019-2026

Total Cost (Escalated): \$51.6 million

The cost was adjusted from \$56.1 million in the 2016 Consulting Engineer's Report due to variations in unit prices and refinement of the cost estimates.

U.S. Route 30 to I-290 – ROW Acquisition

Length: 96.5 miles

Project Description: As necessary during reconstruction or repair projects, will provide right-of-way and easements for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements

Construction Period: 2016-2017

Total Cost (Escalated): \$1.2 million

No adjustments from 2016 Consulting Engineer's Report.

U.S. Route 30 to I-290 – Utility and Fiber Optic Relocation

Length: 96.5 miles

Project Description: As necessary during reconstruction or repair projects, will provide relocation of fiber optic and private utilities for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements
- Maintains Illinois Tollway fiber optic continuity
- Modernizes utilities crossing Illinois Tollway right-of-way as necessary

Construction Period: 2018

Total Cost (Escalated): \$0.6 million

The cost was adjusted from \$5.5 million in the 2016 Consulting Engineer's Report due to refined cost estimates. Construction start was modified from 2016 to 2018.

4.5 Systemwide Maintenance Facilities

Maintenance Facilities – Reconstruct / Relocate / Rehabilitate

Locations:

- M-1 (Alsip) – Reconstruct
- M-3 (Park Ridge) – Reconstruct
- M-5 (Schaumburg) – Reconstruct
- M-6 (Marengo) – Reconstruct
- M-7 (Rockford) – Reconstruct
- M-8 (Naperville) – Reconstruct / Relocate
- M-11 (DeKalb) – Rehabilitate
- M-12 (Dixon) - Rehabilitate

Project Description: Reconstruct, relocate or rehabilitate aging maintenance facilities.

Project benefits:

- Optimize maintenance operations to meet expanded system needs
- Reduce annual facilities maintenance costs

Construction Period: 2013-2025

Total Cost (Escalated): \$329.0 million

The cost was adjusted from \$390.0 million in the 2016 Consulting Engineer's Report due to competitive construction bidding and refined cost estimates. The M-4 Facility will remain in place since a suitable relocation site has not been identified and therefore has been deferred to outside of the capital program.

4.6 Systemwide Improvements

Infrastructure Renewal – Bridge, Pavement, Drainage and Safety Appurtenance Repairs

Length: N/A

Project Description: Annual Bridge, pavement, drainage & safety appurtenance repairs and upgrades which are not included in the major corridor improvements.

Project benefits:

- Preserve and maintain existing infrastructure
- Upgrade to current standards and operational requirements

Construction Period: 2012-2026

Total Cost (Escalated): \$730.5 million

The estimated project cost was adjusted from \$765.4 million in the 2016 Consulting Engineer's Report due to several preservation projects experiencing less deterioration than anticipated and those assets have maintained a state of good repair.

Infrastructure Enhancements – Business Systems and Toll Collection Upgrades

Length: N/A

Project Description: Business System and Information Technology upgrades, including toll collection systems and related software to keep pace with and incorporate best practices.

Project benefits:

- Optimize all toll collection operations

Construction Period: 2013-2026

Total Cost (Escalated): \$110.2 million

No adjustments from 2016 Consulting Engineer's Report.

Infrastructure Enhancements – IT and Intelligent Transportation Systems (ITS) Upgrades

Length: N/A

Project Description: Intelligent Transportation Systems (ITS) upgrades, including communications tower replacements, and related software to keep pace with and incorporate best practices

Project benefits:

- Ensure reliability of communication network
- Improve traffic and incident management

Construction Period: 2012-2026

Total Cost (Escalated): \$167.9 million

No changes from 2016 Consulting Engineer's Report.

Non-Roadway Projects

Length: N/A

Project Description: Annual Miscellaneous capital expenditures including transponders, vehicles, computers, and other items that are critical to the Illinois Tollway's day-to-day operations.

Project benefits:

- Maintain the state-of-good-repair
- Modernize the current systems

Construction Period: 2017-2026

Total Cost (Escalated): \$885.4 million

The estimated project cost was adjusted from \$909.5 million in the 2016 Consulting Engineer's Report.

Access Expansion – Service Interchanges

Length: N/A

Project Description: Source of matching funds for construction of two service interchanges in accordance with the Illinois Tollway Interchange Policy.

Project benefits:

- Construct interchanges on the existing system.
- Provide economic benefit to the region

Construction Period: 2012-2019

Total Cost (Escalated): \$111.5 million (Illinois Tollway Commitment)

The estimated project cost was adjusted from \$110.5 million in the 2016 Consulting Engineer's Report.

Toll Collection Upgrades – Plaza Modifications for Electronic Tolling Upgrades

Length: N/A

Project Description: Implement mainline and ramp plaza modifications to accommodate electronic toll collection upgrades.

Project benefits:

- Reduce operational and maintenance costs
- Reduce environmental impacts
- Improve operational efficiency

Construction Period: 2016-2026

Total Cost (Escalated): \$276.8 million

No adjustments from 2016 Consulting Engineer's Report.

Program Support

Length: N/A

Project Description: Program management, project management, technical and administrative service contracts.

Project benefits:

- Program management to execute projects efficiently and to manage budget and schedule

Construction Period: 2012-2026

Total Cost (Escalated): \$339.4 million

The estimated project cost was adjusted from \$315.3 million in the 2016 Consulting Engineer's Report due to refined cost estimates.

Utility and Fiber Optic Relocation

Length: 0.0 miles

Project Description: As necessary during reconstruction or repair projects, will provide relocation of fiber optic and private utilities for improvements.

Project benefits:

- Allows projects to move forward with optimal design elements
- Maintains Illinois Tollway fiber optic continuity
- Modernizes utilities crossing Illinois Tollway right-of-way as necessary

Construction Period: 2014-2018

Total Cost (Escalated): \$9.7 million

No adjustments from the 2016 Consulting Engineer's Report.

4.7 I-294 / I-57 Interchange

Tri-State Tollway (I-294) / I-57 Interchange – New Ramps, Structures and Toll Plazas

Length: N/A

Project Description: Construct the new system interchange at I-294 and I-57, as well as the 147th Street ramps.

Project benefits:

- Provide economic benefit to the region.
- Add access between two major interstates.

Construction Period: 2012-2014

Total Cost (Escalated): \$115.0 million (Illinois Tollway Commitment)

No adjustments from the 2016 Consulting Engineer's Report.

Tri-State Tollway (I-294) / I-57 Interchange – New Ramps and Structures

Length: N/A

Project Description: Construct new ramps to complete system interchange at I-294 and I-57.

Project benefits:

- Provide economic benefit to the region.
- Add access between two major interstates.

Construction Period: 2024-2026

Total Cost (Escalated, 4% APR): \$181.6 million (Illinois Tollway Commitment)

The estimated project cost was adjusted from \$258.4 million in the 2016 Consulting Engineer's Report due to refined construction cost estimates and less than anticipated escalation.

Tri-State Tollway (I-294) / I-57 Interchange – ROW Acquisition

Length: N/A

Project Description: Acquire right-of-way and easements necessary for roadway and bridge reconstruction and widening.

Project benefits:

- Allows project to move forward with optimal design elements

Construction Period: 2013-2017 and 2020-2023

Total Cost (Escalated): \$12.0 million

No changes in cost from 2016 Consulting Engineer's Report..

Tri-State Tollway (I-294) / I-57 Interchange – Utility and Fiber Optic Relocation

Length: N/A

Project Description: Relocate Illinois Tollway owned fiber optic and private utilities to accommodate roadway and bridge reconstruction and widening.

Project benefits:

- Allows projects to move forward with optimal design elements
- Maintains Illinois Tollway fiber optic continuity
- Modernizes utilities crossing Illinois Tollway right-of-way as necessary

Construction Period: 2013-2015 and 2022-2024

Total Cost (Escalated, 4% APR): \$25.3 million

No adjustment from the 2016 Consulting Engineer's Report.

4.8 Elgin O'Hare / Western Access

EOWA: IL 390 From US 20 to IL 83 – Roadway and Bridge Construction

Length: 10 miles

Project Description: Repairs to existing IL 390 (formerly Elgin O'Hare Expressway) from US 20 to IL 53; Widening of the existing IL 390 between IL 19 and IL 53; Construction of new four lane (with auxiliary lanes) facility from slightly west of IL 53 to IL 83.

Project benefits:

- Provide economic benefit to the region.
- Improve travel efficiency – reduce congestion on the local street network.
- Provide access to the west side of O'Hare Airport.
- Facilitate multimodal opportunities.

Construction Period: 2013-2017

IL 390 Cost (Escalated): \$971.0 million

The estimated cost for the IL 390 project was \$966.0 million for purposes of the 2016 Consulting Engineer's Report. The minor increases are due to approved changes and closeout reconciliation (credits and quantity adjustments). These minor increases do not change the overall EOWA cost.

EOWA: I-490 South Leg From I-294 to Western Access Interchange – New Roadway Construction

Length: 7.7 miles

Project Description: Construction of a new four lane facility from the extension of IL 390 to I-294 to the south, including O'Hare ramp connections.

Project benefits:

- Provide economic benefit to the region.
- Improve travel efficiency – reduce congestion on the local street network.
- Provide access to the west side of O’Hare Airport.
- Facilitate multimodal opportunities.

Construction Period: 2016-2025

I-490 South Leg Cost (Escalated): \$1,838.0 million

The estimated cost for this portion of the I-490 project for purposes of the 2016 Consulting Engineers Report was \$1,617.0 million. The increases are attributed to increased scope at the IL 390 at I-490/O’Hare interchange (Western Access Interchange) including additional ramp construction and associated mainline improvements, design refinements and associated cost efficiencies. The Illinois Tollway added \$200.0 million in funding to EOWA via shifts in Move Illinois programming. The bulk of this funding is assumed for the South Leg construction.

EOWA: I-490 North Leg From Western Access Interchange to I-90 – New Roadway Construction

Length: 3.1 miles

Project Description: Construction of a new four lane facility from north of the Western Access Interchange to I-90, including collector – distributor roadways along I-90.

Project benefits:

- Provide economic benefit to the region.
- Improve travel efficiency – reduce congestion on the local street network.
- Provide access to the west side of O’Hare Airport.
- Facilitate multimodal opportunities.

Construction Period: 2016-2025

I-490 North Leg Cost (Escalated): \$790.0 million

The estimated cost for this portion of the I-490 project for purposes of the 2016 Consulting Engineers Report was \$816.0 million. The decreases are primarily attributed to reallocation of scope to adjacent corridors. For example, the entire Western Access Interchange is now fully accounted for in the I-490 South Leg cost.

EOWA Funding By Others – The EOWA corridor funding sources assume consists of \$3.299.0 billion of funding by the Illinois Tollway and \$300.0 million of funding by other sources. Funding by other sources is expected to include local government contributions in the form of grants and in-kind contributions including land and right-of-way (ROW), design, utility and materials. Commitments for approximately half of the assumed funding from other sources has been obtained.

Total EOWA Cost (Escalated, 4% APR): \$3,599.0 million

4.9 IL Route 53 Extension / Other Planning Studies

IL Route 53 Extension / Other Planning Studies – New Routes

Length: N/A

Project Description: Planning studies for the extension of IL Route 53 from Lake-Cook Road north into Lake County and for other routes as determined by the Board of Directors.

Project benefits:

- Study and preparation of planning studies including Environmental Impact Statements.

Construction Period: N/A

Total Cost (Escalated): \$121.1 million

No adjustment from the 2016 Consulting Engineer's Report.

4.10 System Growth

Based upon the described improvements, specifically the projects that increase capacity on the mainline, add interchange ramps and add mainline elements, the total lane-mile system is expected to grow by 17.1% from 2012 through 2027. This growth includes one project included in the CRP that was completed in 2012. The following table depicts how the Illinois Tollway system will grow throughout the implementation of the *Move Illinois* Program. All lanes (mainline, auxiliary, ramps and toll plaza manual lanes) are included. The basis of these values was a comprehensive survey by the Consulting Engineer and Illinois Tollway staff to use GPS to record the entire system. These surveys were completed in 2009 and 2010. Ongoing inspections, including in 2016, have continued to refine the information. As project plans for the Elgin O'Hare Western Access and other projects that will add lane-miles are progressed in design, and ultimately constructed, these values may change in future versions of this and/or other reports.

Table 14: Growth of the Illinois Tollway System as Measured by Lane Miles

Tollway Route	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Tri-State Mainline	669.4	669.4	674.6	674.6	674.6	674.6	674.6	674.6	674.6	674.6	674.6	674.6	674.6	717.9	717.9	717.9
Tri-State Ramps and Plaza Lanes	117.1	117.1	124.0	126.6	125.8	125.8	125.8	125.8	125.8	125.8	125.8	129.6	137.6	143.8	143.8	143.8
Jane Addams Memorial Mainline	402.2	402.2	469.1	469.1	533.9	533.9	533.9	533.9	533.9	533.9	533.9	533.9	533.9	533.9	533.9	533.9
Jane Addams Memorial Ramps and Plaza Lanes	68.1	71.8	71.8	73.4	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8
Ronald Reagan Memorial Mainline	474.5	474.5	474.5	474.8	474.8	474.8	474.8	474.8	474.8	474.8	474.8	474.8	474.8	474.8	474.8	474.8
Ronald Reagan Memorial Ramps and Plaza Lanes	54.1	54.1	54.9	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2	56.2
Veterans Memorial Mainline	197.9	197.9	197.9	197.9	198.7	198.7	198.7	198.7	198.7	198.7	198.7	198.7	198.7	198.7	198.7	198.7
Veterans Memorial Ramps and Plaza Lanes	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6	65.6
Elgin-O'Hare / Western Access Mainline	0.0	0.0	0.0	0.0	36.3	52.5	52.5	63.1	64.3	77.5	79.5	79.5	79.5	86.9	86.9	86.9
Elgin-O'Hare / Western Access Ramps	0.0	0.0	0.0	0.0	13.9	19.6	19.6	26.1	29.6	41.1	42.0	42.0	42.0	43.0	43.0	43.0
Total lane Miles	2048.9	2052.6	2132.4	2138.2	2258.6	2280.5	2280.5	2297.6	2302.3	2327.0	2329.9	2333.7	2341.7	2399.6	2399.6	2399.6
% Increase - Annual	0.0%	0.2%	3.8%	0.3%	5.3%	1.0%	0.0%	0.7%	0.2%	1.1%	0.1%	0.2%	0.3%	2.4%	0.0%	0.0%
% Increase - Aggregate	-	0.2%	4.0%	4.3%	10.2%	11.3%	11.3%	12.1%	12.4%	13.6%	13.7%	13.9%	14.3%	17.1%	17.1%	17.1%

5.0 Congestion-Relief Program – “Open Roads for a Faster Future”

In September 2004, the Illinois Tollway approved a comprehensive plan to modernize and rebuild the 45-year old (in 2004) system of roadways to reduce congestion and improve service for its customers. The Congestion-Relief Program (CRP) – Open Roads for a Faster Future – included rebuilding or restoring nearly all of the Illinois Tollway system, providing congestion relief by converting mainline toll plazas to barrier-free open road tolling, widening many miles of existing roads, and extending I-355 12.5 miles south from I-55 to I-80 in Will County.

Throughout the duration of the program, the Illinois Tollway has delivered numerous improvements:

- Customers have realized the time-saving benefits of open road tolling at all 22 mainline plazas – completed in less than 22 months.
- Customers have benefited from a newly rebuilt and widened South Tri-State Tollway (I-294/I-80) from IL Route 394 to 95th Street, and on the North Tri-State Tollway (I-294/I-94) from Balmoral Avenue to Russell Road.
- The Reagan Memorial Tollway (I-88) has been widened and reconstructed from York Road to IL Route 59 and from the Aurora Toll Plaza to Deerpath Road. The section of I-88 from US Route 30 to IL Route 251 was rubblized to make the existing pavement a base to support new full depth asphalt pavement.
- The section of the Jane Addams Memorial Tollway (I-90) from the Cherry Valley Interchange to Rockton Road was reconstructed and widened with full depth asphalt pavement. These improvements included a reconfigured interchange at I-90 and I-39, and the removal of the Cherry Valley Toll Plaza.
- Completion of the 12.5 mile extension of the Veterans Memorial Tollway (I-355). Additionally, a four-mile section of I-355 from 75th Street to I-88 was widened and resurfaced.

All of these improvements represent more than 118 miles of reconstructed roadways, modernized tolling facilities, and capacity and operational enhancements. Other sections of the Illinois Tollway system have also undergone rehabilitation and resurfacing to bring the 286-centerline mile system into a state of good repair.

As of June 30th, 2017, the CRP was approximately 99% complete. Portions of the reconstruction and widening segments described within the Jane Addams Memorial Tollway in the *Move Illinois* Program are CRP expenditures that are reflected in the below summary.

The following tables summarize the projects that make up the CRP.

Table 15: Congestion-Relief Program - Summary of Work

Tri-State Tollway (I-94/I-294/I-80)

Need	Project	Scope	Length (miles)	Construction Period	Total Cost (millions)	Construction Status
Reconstruct / Congestion Relief	Reconstruct / Add Lane	I-394 to 167 th Street (MP 0.0 to 5.4)	5.4	2005-2006	\$277.8	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	159 th Street to 95 th Street (MP 6.3 to 17.6)	12.2	2007-2009	\$425.8 (\$425.7)*	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Balmoral Avenue to Dempster Street (MP 40.2 to 44.5)	4.3	2006-2009	\$310.8	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Dempster Street to Lake Cook Road (MP 44.5 to 52.9)	8.4	2007-2010	\$290.9	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Half Day Road to IL Route 137 (MP 56.5 to 64.4)	7.9	2007-2009	\$230.2 (\$231.4)*	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	IL Route 137 to Russell Road (MP 64.4 to 78.5)	14.1	2007-2009	\$257.6	Complete
Resurface	Diamond Grind	Edens Spur to Half Day Road (MP 53.0 to 56.5)	3.5	2012-2013	\$4.4	Complete
Rehabilitate / Resurface	Rehabilitate / Resurface	95 th Street to Balmoral Avenue (MP 17.6 to 40.2)	22.3	2012-2013	\$105.1	Complete
Rehabilitate / Resurface	Rehabilitate / Resurface	Edens Spur (MP 25.0 to 30.0)	5.0	2010-2011	\$16.7	Complete
Regional Growth	Interchange Improvement	I-294 / I-57 Interchange Inter-Agency Project	-	2012-2014	\$19.6 (\$19.1)*	Partial Project Funding Remains in CRP

* Total Cost values adjusted from 2016 Consulting Engineer's Report.

Jane Addams Memorial Tollway (I-90)

Need	Project	Scope	Length (miles)	Construction Period	Total Cost (millions)	Construction Status
Reconstruct / Congestion Relief	Interchange Improvement	IL Route 39 / I-90 Interchange (MP 17.5)	-	2008-2009	\$69.4 (\$68.4)**	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Newburg Road to Rockton Road (MP 2.7 to 17.0)	14.3	2008-2009	\$201.9	Complete
Reconstruct / Congestion Relief – Portion of Overall Reconstruction Effort	Reconstruct / Add Lane	Kennedy Expressway to IL Route 53 (MP 68.0 to 78.9)	10.9	2015-2016	\$140.5* (\$145.3)**	Previous resurfacing eliminated due to planned reconstruction. These projects constitute a portion of the overall efforts for reconstruction of this segment.
Rehabilitate / Resurface and Reconstruct / Congestion Relief – Portion of Overall Reconstruction Effort	Rehabilitate / Resurface and Reconstruct / Add Lane	IL Route 53 to Elgin Toll Plaza (MP 54.4 to 68.0)	14.4	2011 (Partial Resurfacing) 2015-2016 (Reconstruction and Widening)	\$100.6* (\$100.9)**	A portion of the previous resurfacing was eliminated due to planned reconstruction. Resurfacing occurred between Barrington Road and Elgin Toll Plaza. Remaining funds constitute a portion of the overall efforts for reconstruction of this segment.
Reconstruct / Congestion Relief – Portion of Overall Reconstruction Effort	Reconstruct / Add Lane	Elgin Toll Plaza to Sandwald Road (MP 45.0 to 54.4)	9.4	2015-2016	\$12.4*	Previous resurfacing eliminated due to planned reconstruction. These projects constitute a portion of the overall efforts for reconstruction of this segment.
Rehabilitate / Resurface and Reconstruct / Congestion Relief – Portion of Overall Reconstruction Effort	Rehabilitate / Resurface and Reconstruct / Add Lane	Sandwald Road to Newburg Road (MP 29.2 to 45.0)	27.9	2011 (Partial Resurfacing) 2015-2016 (Reconstruction and Widening)	\$61.5* (\$62.3)**	Portions of the previous resurfacing were eliminated due to planned reconstruction. Resurfacing occurred between Shattuck Road and Genoa Road. Remaining funds constitute a portion of the overall efforts for reconstruction of this segment.
Regional Growth	Interchange Improvement	East Riverside Interchange Inter-Agency Project*	-	2008-2009	\$9.1 - Tollway Contribution	Complete
Reconstruct / Congestion Relief	Design for Reconstruct / Add Lane	Kennedy Expressway to Newburg Road – Design Only (MP 17.0 to 78.9)	-	2006-2013	\$14.6	Partial. Remaining design efforts are included within reconstruction and widening projects.

* CRP funds for I-90 utilized as part of Jane Addams Memorial Tollway reconstruction and widening projects described in Move Illinois.

** Total cost value adjusted from 2016 Consulting Engineer's Report

Reagan Memorial Tollway (I-88)

Need	Project	Scope	Length (miles)	Construction Period	Total Cost (millions)	Construction Status
Reconstruct / Congestion Relief	Reconstruct / Add Lane	York Road to IL Route 83 (MP 137.0 to 139.2)	2.2	2007-2009	\$174.7	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	IL Route 83 to Finley Road (MP 131.9 to 137.0)	5.1	2008-2009	\$94.0	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Finley Road to Washington Street (MP 126.5 to 132.2)	5.7	2006-2009	\$217.4	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Washington Street to IL Route 59 (MP 122.9 to 126.5)	3.6	2004-2005	\$45.9	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Aurora Toll Plaza to Deerpath (MP 114.3 to 117.5)	3.2	2007-2009	\$133.6	Complete
Reconstruct / Congestion Relief	Reconstruct / Add Lane	Deerpath to IL Route 56 (MP 113.3 to 114.3)	0.7	2012	\$11.6	Complete
Reconstruct	Rubblize / Resurface	IL Route 251 to US Route 30 (MP 44.2 to 76.2)	32.0	2005	\$47.6	Complete
Resurface	Resurface	Deerpath to IL Route 251 (MP 76.2 to 114.3)	38.1	2012	\$64.2	Complete
Resurface	Resurface	IL Route 251 to US Route 30 (MP 44.2 to 76.2)	32.0	2015-2017	\$205.7 (\$213.1)*	Complete

* Total cost value adjusted from 2016 Consulting Engineer's Report due to additional scope for shoulder reconstruction.

Veterans Memorial Tollway (I-355)

Need	Project	Scope	Length (miles)	Construction Period	Total Cost (millions)	Construction Status
Resurface / Congestion Relief	Resurface / Add Lane	75 th Street to I-88 (MP 15.5 to 20.0)	4.5	2008-2009	\$70.6 (\$70.4)*	Complete
Rehabilitate / Resurface	Rehabilitate / Resurface	I-55 to Army Trail Road (MP 12.3-15.5 & 20.0-29.8)	13.0	2010	\$56.3	Complete
Regional Growth	South Extension	South Extension (I-55 to I-80)	12.5	2005-2007	\$718.9 (\$718.8)*	Complete

* Total cost value adjusted from 2016 Consulting Engineer's Report.

Open Road Tolling

Need	Project	Scope	Length (miles)	Construction Period	Total Cost (millions)	Construction Status
Reconstruct / Congestion Relief	Reconstruct	Mainline Reconstruct / Cash Lane Modifications	0.0	2005-2007	\$713.0	Complete

Systemwide Improvements

Need	Project	Scope	Length (miles)	Construction Period	Total Cost (millions)	Construction Status
Reconstruct / Rehabilitate Bridges	Bridge Improvements	Bridge Improvements	Systemwide	2005-2016	\$147.7 (\$141.1)*	Ongoing
Reconstruct / Rehabilitate Plazas	Plaza Improvements	Plaza Improvements	Systemwide	2005-2012	\$14.2	Complete
Interchange Improvements	Interchange Improvements	Interchange Improvements	Systemwide	2005-2016	\$40.6 (\$41.2)*	Complete
Various Systemwide Needs	Environmental / Program Mgmt & Miscellaneous	Systemwide	Systemwide	2005-2016	\$158.4 (\$159.1)*	Complete
Reconstruct / Rehabilitate Pavements	Pavement Improvements	Pavement Improvements	Systemwide	2005-2016	\$247.9 (\$252.7)*	Complete

* Total cost value adjusted from 2016 Consulting Engineer's Report.

There are a number of modifications to the above project estimated costs from the 2016 Consulting Engineer's Report. In some cases, there are adjustments due to project closeout. Additional changes are due to refined estimates as project scopes are created.

No additional bond issue proceeds are required for the completion of the CRP, as revenue resources will be utilized.

The table below summarizes the annual funds required to complete the CRP projects. This table is based on information provided by the PMO.

Table 16: Congestion-Relief Program - Estimated Program Expenditures

Year	Congestion-Relief Program Estimated Program Draws (Million)
2005-2016	\$5,661.0
2017	\$48.0
2018	\$2.0
Total	\$5,711.0

Notes:

- a. Numbers may not add to total due to rounding. The CRP is expected to be deemed substantially complete in 2017.

- b. Under the CRP program, Tollway has received \$107.4 million of state and local reimbursements from 2005 through August 2017. Credit for such reimbursements is not included in the above expenditures.

6.0 Estimated Renewal and Replacement Deposits

Section 204(1)(4) of the Indenture, provides that the Consulting Engineer shall provide estimates of Renewal and Replacement Deposits. The Renewal and Replacement Deposit is the “amount budgeted for deposit to or projected for deposit to the Renewal and Replacement Account for Renewal and Replacement Expenses, other than such budgeted or projected amounts which the Illinois Tollway has determined will be available for Renewal and Replacement Expenses from the System Reserve Account, the Improvement Account, or from the proceeds of authorized borrowings or from installment purchases or leases.”

The table below provides estimates of Renewal and Replacement Deposits for each of the fiscal years 2017 through 2031. The Renewal and Replacement Deposits are based upon the following information provided to the Consulting Engineer prior to the issuance of this report:

- Estimated capital expenditures of \$50.0 million for the execution of the remainder of the Congestion-Relief Program in 2017-2018 as described in Section 5,
- Estimated capital expenditures of \$14,273.0 million for the execution of *Move Illinois* Program as described in Sections 3 and 4 with approximately \$3,721.5 million spent through 2016,
- The finance plan provided to the Consulting Engineer by the Illinois Tollway, which anticipates that the remainder of the Congestion-Relief Program will be funded entirely with Illinois Tollway revenue,
- The finance plan provided to the Consulting Engineer by the Illinois Tollway, which currently anticipates that the *Move Illinois* Program will be paid for with approximately \$5.8 billion of bond proceeds and approximately \$8.5 billion of Illinois Tollway revenue,
- The below deposits are assumed to be funded by revenues and to be used for Renewal and Replacement expenditures.

The Consulting Engineer utilizes information provided by the Illinois Tollway and PMO for the development of the Renewal and Replacement Deposit estimates. The estimates are developed based upon the independent review of information available at the time of the issuance of this report. The Consulting Engineer provides an annual letter to the Illinois Tollway indicating the recommended deposit amount for the following year, pursuant to the requirements of Section 710.1 of the Trust Indenture. The Consulting Engineer reassesses the amount of the recommended deposit based upon projected balances, budgeted expenditures, projected future expenditures, and any other considerations or information at the time of the letter issuance. At that time, the Consulting Engineer will evaluate how changes in market conditions should be incorporated to produce a recommendation that varies from the below or other estimated deposits.

Estimated Renewal and Replacement Deposits will fund portions of the CRP and *Move Illinois* Programs. The Trust Indenture requires projections for five years beyond the “in-service” date of the project.

Table 17: Estimated Annual Renewal and Replacement Deposits

Year	Renewal and Replacement Deposits
2017	\$420,000,000
2018	\$420,000,000
2019	\$420,000,000
2020	\$420,000,000
2021	\$420,000,000
2022	\$300,000,000
2023	\$300,000,000
2024	\$330,000,000
2025	\$330,000,000
2026	\$480,000,000
2027	\$300,000,000
2028	\$300,000,000
2029	\$300,000,000
2030	\$300,000,000
2031	\$300,000,000

7.0 Operating Expenses

Operating Expenses are the expenses that the Illinois Tollway will incur in the normal course of business for operation, maintenance and repairs of the Illinois Tollway System. Operating expenses do not include debt services; the Illinois Tollway's debt service obligations are not discussed in this report.

7.1 Historic Expenses

In 2015 and 2016, the Illinois Tollway's organizational structure consisted of 14 primary functions including: Administration, Business Systems (formerly Open Road Tolling / Violations Enforcement), Communications, Diversity & Strategic Development, Engineering, Executive/Board of Directors, Finance, Information Technology, Inspector General (Investigations), Internal Audit, Legal, Procurement, Illinois State Police, and Toll Operations. The following table identifies by primary function, the actual Operating Expenses for the Illinois Tollway in 2015 and 2016.

Table 18: Operating Expenses by Illinois Tollway Primary Function

Department	2015 Actual Expenditures	2016 Actual Expenditures
Administration	\$3,957,858 / 1.3%	\$3,900,561 / 1.2%
Business Systems	\$61,882,126 / 20.7%	\$69,406,205 / 22.4%
Communications	\$1,299,294 / 0.5%	\$1,407,229 / 0.4%
Diversity & Strategic Development	\$1,492,139 / 0.5%	\$2,119,143 / 0.7%
Engineering	\$73,996,871 / 24.8%	\$72,523,921 / 23.5%
Executive/Board of Directors	\$1,503,387 / 0.5%	\$1,423,517 / 0.5%
Finance	\$44,293,327 / 14.9%	\$44,249,861 / 14.3%
Information Technology	\$11,480,381 / 3.8%	\$14,681,328 / 4.8%
Inspector General	\$817,564 / 0.3%	\$920,124 / 0.3%
Internal Audit	\$775,697 / 0.3%	\$748,653 / 0.2%
Legal	\$1,615,312 / 0.5%	\$1,449,603 / 0.5%
Procurement	\$4,325,090 / 1.4%	\$4,660,069 / 1.5%
State Police	\$31,778,084 / 10.6%	\$31,196,618 / 10.1%
Toll Operations	\$59,262,034 / 19.9%	\$60,552,024 / 19.6%
Total	\$298,479,165	\$309,238,857

The existing Illinois Tollway system to be maintained and operated includes 290.7 miles of limited access highways featuring a toll collection system incorporating mainline plazas and ramp plazas with the combined use of I-PASS, automatic coin collection and manual lanes. The system has been expanded to include the 12.5 mile extension of the Veterans Memorial Tollway; the widening of existing routes; and the construction of additional interchanges, all as part of the CRP. Additional improvements under the *Move Illinois* Program will add additional

capacity on existing routes, create new routes within the Illinois Tollway system and will introduce additional locations of all electronic tolling, where no cash or coins are collected.

7.2 Illinois Tollway Operating Expenses by Department

Each department has a defined operating budget that is prepared by both the specific department and the Illinois Tollway's Finance Department. Quarterly expenditures are carefully monitored to ensure compliance with the budget and to identify revisions that need to be made either in the current calendar year, or for the following year budget preparation.

Department expenses are fairly static and are generally influenced by the budgeted and actual headcounts within the department, as well as some minor annual fluctuations of material, utility or contract costs. The Illinois Tollway strives to manage to their overall and department budgets. Salary and Wage adjustments, required retirement contributions, and inflationary factors are the main variables on a year over year basis. Individual department budgets and overall budget line items may vary from one year to the next due to equipment refresh or operational changes. Four departments are influenced by dynamic factors that change from year to year that warrant special analysis.

Toll Operations

The Illinois Tollway Operations Department is responsible for manual toll collection, which includes the collection and counting of all manually collected toll revenue along with cash handling. Maintenance of Illinois Tollway buildings is also managed within Toll Operations. The headcount for Toll Operations has decreased substantially as the Open Road Tolling projects have opened and the total number of manned toll lanes has been reduced. The number of budgeted positions within the department has dropped over 32% between 2008 and 2017, from 833 to 564. The need for lane walkers was eliminated and staffing has been reduced and has become more flexible (part-time and seasonal workers) as ORT and I-PASS usage matures with changes to toll rates, transponder penetration, transponder usage from other states and other factors. In addition, the Illinois Tollway has begun adjusting staffing levels so that there may not be any collectors at low usage time periods (most notably during overnight hours on the rural plazas on the Jane Addams and Reagan Memorial Tollways).

Expenses related to Toll Operations are primarily variable based upon the active number of employees there are within the department. Employee costs make up almost 87% of the total department cost in the 2017 budget. As staffing levels have adjusted downward, the salary and wage costs are reduced, even considering wage adjustments. Retirement costs have increased, which have negated salary and wage cost reductions. Since 2009, budgeted salary and wage costs for Toll Operations have declined 2.5%, but budgeted retirement costs as a percentage of salary and wage costs have increased 75% during the same period. Total personnel costs have increased approximately 16% since 2009.

The Illinois Tollway has opened three interchanges that are fully electronic and additional interchanges are planned. The planned Elgin O'Hare Western Access roadways are expected to be exclusively electronic. Although the trend continues that a larger volume of transactions are and will be electronic, the Illinois Tollway has not identified a time when eliminating cash collection will be viable or appropriate. Other toll agencies have shifted to 100% electronic collection, but the Illinois Tollway currently believes that negatives may outweigh the positives. Reduced revenues due to persistent violators and issues with license plate recognition may not allow the eliminated costs of cash collection to be recouped. The Illinois Tollway will continue to study industry trends to evaluate options in the future.

Business Systems

The Business Systems Department is responsible for the operation and maintenance of the electronic tolling system hardware and software which also includes collecting toll revenue from toll violators and assessing fines and imposing sanctions. The department monitors the contracts and performance of the structure surrounding the Electronic Tolling System known as Open Road Tolling. Additionally, Business Systems provides support through the Customer Call Center which acts as a single point of contact for all customer calls that relate to I-PASS, violations processing and missed toll services.

Business Systems expenses are primarily variable due to the number of transactions and amount of revenue collected from customers. Due to the toll rate increases that became effective January 1, 2012 and January 1, 2015-2017, the overall department budget has increased by 82% between 2011 and the budget year 2017.

As discussed above regarding Toll Operations, no timetable has been set for eliminating cash collection. There should be the expectation that I-PASS usage increases, especially with cash rates continuing to be double the I-PASS rate. Increased I-PASS transactions, along with traffic and revenue enhancement due to natural growth, increased capacity due to roadway widening, and substantial added vehicles due to roadway openings will drive up costs within the Business Systems Department.

Engineering

The Engineering Department is responsible for the planning, design, construction, operation and maintenance of the Illinois Tollway system. Additionally, Engineering coordinates with community groups, government agencies and planning organizations on transportation and land-use policy. This department oversees annual inspections of the pavement, bridges and drainage systems, as well as the overall day-to-day maintenance of the Illinois Tollway's fleet and roadway system.

The Engineering Department oversees three areas of operation:

- Design – Project plans and specifications are prepared for various construction and maintenance activities according to the capital improvement program schedule.
- Construction – Implements the construction phase of projects by ensuring quality construction and keeping them on schedule and within budget.
- Maintenance / Traffic – Maintains the roadway system by keeping roads clean, well lit, and safe in all weather conditions; managing incidents; and informing motorists of traffic and travel concerns.

As of September 2017, the Engineering Department had an actual headcount of 563 employees, with approximately 92% of the employees within the Maintenance / Traffic unit. The improvements made as part of the CRP and the Move Illinois Program affect the Engineering Department two major ways.

- Additional engineers within design and construction units are required to administer the design and construction phases of the projects. The majority of this work has and will be performed by consulting engineers under contract with the Illinois Tollway, including the PMO and other firms serving as Design Section Engineers (DSE's) and Construction

Managers (CM's). These costs are included within the CRP and Move Illinois Program budgets.

- Maintenance and Traffic units staffing will increase as the system length and number of lane miles grow. Staff will be augmented within the majority of the groups due to additional traffic and the system growth.

Table 19: Growth in Illinois Tollway System

Year	Centerline Miles	Mainline Lane-Miles	Ramp Lane-Miles	Total Lane-Miles*
2012	286.0	1743.9	305.0	2048.9
2013	286.0	1743.9	308.7	2052.6
2014	286.0	1816.1	316.3	2132.4
2015	286.0	1816.4	321.8	2138.2
2016	290.7	1918.3	340.3	2258.6
2017	296.3	1934.5	346.0	2280.5
2018	296.3	1934.5	346.0	2280.5
2019	298.1	1945.1	352.5	2297.6
2020	298.1	1943.3	359.0	2302.3
2021	298.1	1959.5	367.5	2327.0
2022	298.1	1961.5	368.4	2329.9
2023	298.1	1961.5	372.2	2333.7
2024	299.9	1961.5	380.2	2341.7
2025	303.3	2012.2	387.4	2399.6
2026	303.3	2012.2	387.4	2399.6
2027	303.3	2012.2	387.4	2399.6

* Due to rounding, mainline plus ramp lane-miles does not always equal total lane miles

The Maintenance / Traffic unit is subdivided into the following groups (staffing levels as of September 2017):

- Roadway Maintenance had 375 staffed positions working from the 11 maintenance facilities. They are responsible for activities such as roadway sweeping; litter collection; snow and ice control; minor pavement, guardrail, fence and bridge work; drainage system upkeep; roadside landscaping; traffic channelization; and motorist aid.
- Fleet Maintenance had 64 staffed positions and is responsible for the maintenance of all Illinois Tollway vehicles.
- Sign Shop had 18 staffed positions.
- Roadway Electric had 14 staffed positions.
- Traffic Operations had 15 staffed positions in the traffic operations center.
- Dispatch had 32 staffed positions and dispatches services in response to calls for motorist aid.

Maintenance / Traffic uses a database called the Maintenance Management System (MMS), an internal cost management tool, for tracking cost approximations associated with the Roadway Maintenance group and the Roadway Signage and Lighting activities of the Traffic Operations group. . The Illinois Tollway provides the Consulting Engineer with year-end reports derived

from MMS. On a percentage basis, the leading major activities in 2016 were snow and ice control (28%), roadside litter control (18%) and general maintenance (16%).

Per the Illinois Tollway, staffing levels at maintenance facilities have been closely tied to the snow and ice control program because of the high level of service goals established by the Illinois Tollway. Although snow and ice control are a seasonal activity, staff are hired on a permanent basis rather than as temporary or seasonal help. Snow and ice control staff members are prohibited from using vacation time during winter. Historically, the staffing level needed for snow and ice control has been relatively equal to the needs for maintenance work throughout the year. In addition, other staff, including a portion of the building maintenance employees in the Toll Operations Department, is trained to be available for snow and ice control functions.

Finance

The Finance Department covers a variety of internal and external roles within the Illinois Tollway. The majority of the cost items that are included within the department are fairly consistent. Risk Management is a small division within Finance that funds the costs for Worker's Compensation Insurance and Employee Group Insurance for the Illinois Tollway. These two insurance items totaled \$38.4 million in 2016, which constitutes over 86% of the Finance Department costs and approximately 13% of total Illinois Tollway expenditures. Insurance costs may vary in the future due to changes in premiums, staffing levels, self-insurance requirements and other factors.

7.3 Estimated Illinois Tollway Operating Expenses

From information received from the Illinois Tollway, overall, salary and wage costs are projected to escalate to account for annual wage adjustments required by collective bargaining. The staffing level for Engineering is projected to increase as additional lane mileage is added as part of the *Move Illinois* Program, although some engineering positions are assumed to be eliminated at the conclusion of the program due to the lack of design and construction. Operational services staffing levels are projected to remain flat. Business Systems costs are expected to increase substantially over the study period due to transponder usage, increased toll rates (including the 2015-2107 toll rate increases for commercial vehicles) and increases in traffic. The Business Systems costs include both the transaction processing and the bank charges for account replenishment, video tolling charges and violation payments. The inflation rate utilized for non-labor expenditures is 3.0%.

From other information received from the Illinois Tollway, Retirement and Pension contributions, as a percentage of Salary and Wages, have risen significantly in recent years. For the State fiscal years ended June 30, 2013, 2014, 2015, 2016, 2017 and 2018, the employer contribution rates set by the State Employees' Retirement System (SERS) were 37.987%, 40.312%, 42.339%, 45.568%, 45.568% and 54.013%, respectively. On October 31, 2017, SERS preliminarily lowered the employer contribution rate for the second half of State fiscal year 2018 to 47.432% and preliminarily set the employer contribution rate for State fiscal year 2019 at 51.614%. For purposes of projecting operating costs, the 54.013% employer contribution rate in effect as of the date of this report is assumed for future periods.

The Trust Indenture requires projections for five years beyond the "in-service" date of the project. Based on the information above, the Consulting Engineer has projected Operating Expenses, as defined in the Trust Indenture, for each of the fiscal years 2017 through 2031 as provided in the table below.

Table 20: Estimated Operating Expenses

Year	Operating Expenses (\$M)	Annual Increase
2017	\$336.3	
2018	\$352.5	4.84%
2019	\$366.2	3.88%
2020	\$381.9	4.29%
2021	\$395.9	3.65%
2022	\$410.8	3.77%
2023	\$427.7	4.13%
2024	\$443.9	3.78%
2025	\$462.5	4.18%
2026	\$484.6	4.77%
2027	\$502.2	3.64%
2028	\$520.2	3.59%
2029	\$538.6	3.53%
2030	\$557.6	3.53%
2031	\$577.6	3.53%

The estimates for Operating Expenses prepared by the Consulting Engineer and included in this report have an average growth per year of approximately 3.9% between 2017 and 2031. There are many factors that will dictate what the actual Operating Expenses experienced by the Illinois Tollway will be, and the Consulting Engineer cannot predict the outcome of these factors. The Consulting Engineer has compared the assumptions and forecasts provided by the Illinois Tollway against the proposed system expansion and operational changes and find them to be reasonable. Thus, these forecasts and assumptions have been included in the Consulting Engineer's analysis. However, the Consulting Engineer cannot predict unforeseen circumstances or unusual price escalations that are not currently identified and known; thus, the estimates above may vary from actual expenses.

8.0 Conclusion

This report complies with Section 204.1.(4) of the Amended and Restated Trust Indenture Effective March 31, 1999. It provides the estimates for Operating Expenses and Renewal & Replacement Deposits for five years beyond the in-service date (through 2031). It also provides the estimated cost of construction and the schedule of completion for the projects (as developed by the Illinois Tollway's PMO and reviewed for reasonableness by the Consulting Engineer) included in the Illinois Tollway's Congestion-Relief Program and *Move Illinois* Program that may be partly or wholly funded from bond proceeds. Current professional practices and procedures commensurate with the scope of work and schedule of the Consulting Engineer's work were used in the development of this report.

The Illinois Tollway and PMO have had great success in delivering the CRP in a timely fashion and under budget. This success is continuing as the Illinois Tollway proceeds with major construction of *Move Illinois* Program projects in 2017, the sixth year of the *Move Illinois* Program. The cost estimates utilized for the compilation of costs for the program follow standard industry practices and contain appropriate contingency factors based upon level of completeness of the design. All project costs are escalated appropriately to the estimated mid-point of construction. At this time, the overall estimate of the cost of the *Move Illinois* Program at \$14.27 billion appears reasonable.

This report is solely for the use of the Illinois Tollway for inclusion in the Preliminary Official Statement dated November 9, 2017 for the Illinois Tollway's issuance of Toll Highway Senior Revenue Bonds, 2017 Series A and is subject to the limitations described within the Official Statement, such as those with respect to forward looking statements, which are incorporated within this report. The Consulting Engineer, is not, and has not been, a municipal advisor as defined in Federal law (such as the Dodd-Frank Wall Street Reform and Consumer Protection Act) to the Illinois Tollway and does not owe a fiduciary duty pursuant to Section 15B of the Securities Exchange Act of 1934 to the Illinois Tollway with respect to the information and material contained in this report. The Consulting Engineer is not recommending and has not recommended any action to the Illinois Tollway.

Market conditions and unforeseen events beyond the control of the Consulting Engineer, the PMO, or the Illinois Tollway may affect the implementation and cost of the *Move Illinois* Program and the future Operating Expenses of the Illinois Tollway as detailed herein. The Consulting Engineer presumes that the PMO will continually monitor the *Move Illinois* Program and will make adjustments to the scopes and schedules of projects in order to control the cost of the overall program. On an annual basis, the Consulting Engineer's recommendation for the Renewal and Replacement deposit will reflect consideration of adjustments to the *Move Illinois* Program by the PMO. Any party reviewing this report must take the above factors into consideration.