IMPLEMENTATION REPORT

The Illinois Tollway's Implementation of INVEST

Prepared for

U.S. Department of Transportation
Federal Highway Administration

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Illinois Tollway
2700 Ogden Avenue
Downers Grove, Illinois 60515-1703
630-241-6800
Fax 630-241-6105

INTRODUCTION

Rebuilding and Expanding the Illinois Tollway in a More Sustainable Manner

The Illinois Tollway is committed to making sustainability part of everything we do, from planning and design to construction, to maintenance and operation of our 286-mile system of toll roads and bridges throughout Northern Illinois. This commitment is key to our goal to make our 15-year, $12 billion capital program, *Move Illinois: The Illinois Tollway Driving the Future*, the "cleanest and greenest program" in the agency's history.

Launched in 2012, *Move Illinois* is the largest capital program in the agency's history. The program has provided the Illinois Tollway an opportunity to minimize the environmental impact of roadway construction by leveraging the latest innovations to reduce, recycle and reuse materials. Such efforts to protect our natural environment help to reduce costs and increase the social benefits to the communities we serve, even as we continue to rebuild and widen existing facilities and make other improvements systemwide.

Our steadfast commitment to the conservation of resources and our investments in innovative green technologies together serve as a solid foundation to support the principles of sustainability. However, because the benefits of these measures cannot easily be quantified, a mechanism for measuring the progress of our sustainability efforts is of vital importance – not just for the Illinois Tollway, but also for other transportation agencies looking for ways to implement or improve their sustainability initiatives.

It's with that in mind that the Illinois Tollway is proud to report on our first year of implementing the INVEST (Infrastructure Voluntary Evaluation Sustainability Tool) program. We have found the INVEST program developed by the Federal Highway Administration (FHWA) to be a robust sustainability measurement tool for evaluating and improving our efforts to not only minimize the environmental impacts of the Tollway system, but also to measure its influence on the regional economy and to maximize the efficiency of our planning, operations and maintenance functions.

The implementation of INVEST followed years of internal efforts to reduce the environmental impact of Tollway construction projects. It quickly became clear to Tollway staff that adapting INVEST to fit the requirements of the Tollway's capital program and ongoing procedures was the optimal tool for evaluating and tracking our progress over time.

The first year of this process engaged Tollway staff and officials at every level and in every department, as well as our design and construction partners and local stakeholders. It is this comprehensive approach that makes this effort not only effective, but also a sound investment. With the "heavy lifting" of developing this new program now complete, our team can focus on utilization

Illinois Tollway

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2700 Ogden Avenue
Downers Grove, Illinois 60515-1703
630-241-6800
Fax 630-241-6105

and delivering results for our 1.5 million daily drivers and the local communities we serve throughout Northern Illinois.

We are especially pleased that many components of the Tollway's version of INVEST have been applied to the FHWA's updated versions now posted on its website and will eventually be made available to similar agencies (i.e., non-federal funded agencies) nationwide. The Illinois Tollway is known as an innovative and responsible steward of this major public asset and adapting this federal sustainability tool for local use, which prioritizes regional objectives, further solidifies the Tollway's position as a leader among its peers.

INVEST will contribute to the Illinois Tollway's overarching goal to consistently reduce costs without sacrificing quality and efficiency and, in fact, will strengthen both.

Sincerely,

Greg M. Bedalov
Tollway Executive Director

Sincerely,

Paul D. Kovacs
Tollway Chief Engineer

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Acronyms and Abbreviations

ACEC	American Council of Engineering Companies
BCA	benefit-cost analysis
CCM	Corridor Construction Manager
CM	Construction Manager
CMAP	Chicago Metropolitan Agency for Planning
CRCP	continuously reinforced concrete pavement
CRP	Congestion-Relief Program
CSC	Construction Substantial Completion
DCM	Design Corridor Manager
DSE	Design Section Engineer
EIA	Economic Impact Analysis
EOWA	Elgin O'Hare Western Access
FHWA	Federal Highway Administration
GEC	General Engineering Consultant
HMA	hot-mix asphalt
IDOT	Illinois Department of Transportation
I-LAST	Illinois - Livable and Sustainable Transportation Rating System and Guide
INVEST	Infrastructure Voluntary Evaluation Sustainability Tool
IRTBA	Illinois Road and Transportation Builders Association
LCCA	life cycle cost analyses
MPO	metropolitan planning organization
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OM	Operations and Maintenance
ORT	Open Road Tolling
PCC	portland cement concrete
PD	Project Development
PINS	Project INVEST Scorecard
PITF	Project INVEST Tracking Form
PLN	Pre-Conceptual Planning
PRE	Pre-Construction Meeting
SP	System Planning

Executive Summary

The Illinois Tollway is integrating the Federal Highway Administration's (FHWA) Infrastructure Voluntary Evaluation Sustainability Tool (INVEST) program throughout its projects and processes. The Illinois Tollway is using all three INVEST modules to improve the sustainability of its 15-year, $12 billion capital improvement program, *Move Illinois*. This report summarizes the work performed to initiate the implementation of INVEST and complete baseline and preliminary evaluations. In addition to the evaluation results, this report documents best practices, lessons learned and comments for FHWA on INVEST.

1.1 INVEST Summary

The Illinois Tollway has been actively managing its environmental program for many years, increasing efforts to "Build Green" since the agency launched its 10-year capital program, the Congestion-Relief Program, in 2005. In 2014, the Tollway launched a comprehensive program to address not only environmental sustainability, but also the Tollway's influence on regional economic development. This report documents the first year of the Illinois Tollway's implementation of the INVEST program, developed by the FHWA and adapted to fit the needs of the Illinois Tollway.

1.1.1 About INVEST

INVEST is a Web-based self-evaluation tool that enables transportation agencies to assess the sustainability of their projects and systems as a whole. INVEST includes three modules: System Planning, which is focused on long-range issues; Project Development, which examines the fine detail of roadway design and construction; and Operations and Maintenance, which addresses how roadways and facilities are managed after construction. Each module offers dozens of best practices that, when documented, accumulate points toward the ultimate goal of a rating in the INVEST program.

The Tollway has customized the FHWA's INVEST program in several areas. The Tollway's version allows the encouragement of local priorities that are not generally applicable on federally-funded projects, such as regional materials and local hiring. To better fit the INVEST program to its structure, the Illinois Tollway added supplements to existing criteria and added new criteria, as well. This modified version is not only applicable to the Illinois Tollway, it will also be made available to similar agencies in other states upon completion.

1.1.2 Key Accomplishments

In order to know whether progress is being made toward sustainable objectives, the Illinois Tollway first needed to document its starting point. To do this, baseline scores were developed for the System Planning and for the Operations and Maintenance modules. In the Project Development module, 22 roadway projects completed between 1998 and 2012 were evaluated.

<u>System Planning</u>

The results of the baseline System Planning evaluation indicated that the Illinois Tollway has increased its sustainability since the year 2000, and is meeting or exceeding the INVEST criteria in the following areas:

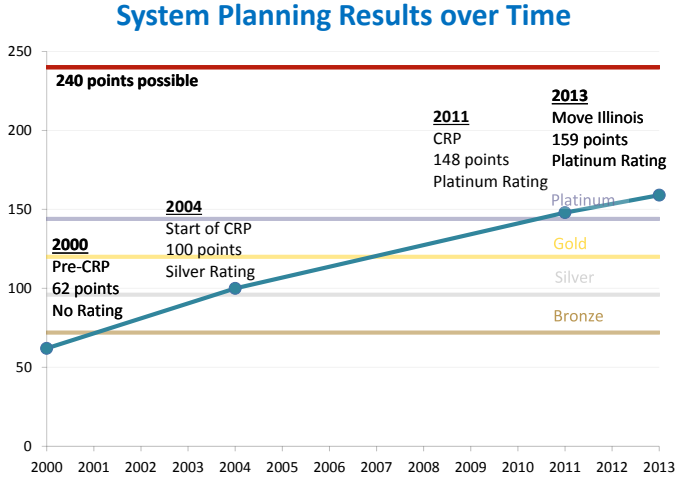

Figure 1. System Planning Results over Time

- Integrating social, economic and environmental sustainability in its planning efforts
- Leveraging technology to improve capacity and efficiency of operations
- Coordinating Operations and Maintenance with Project Development, resulting in a more efficient delivery of Tollway projects

Operations and Maintenance

The results of the baseline Operations and Maintenance (OM) evaluation indicated that the Illinois Tollway has increased its sustainability since the year 2000, and is meeting or exceeding the INVEST criteria in the following areas:

- Fleet vehicle fuel efficiency and use
- Safety management
- Pavement and bridge asset management
- Road weather management
- Transportation management and operations

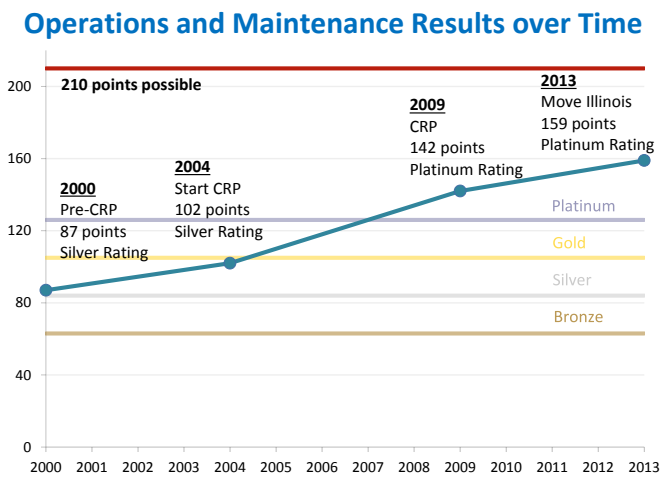

Figure 2. Operations and Maintenance Results over Time

Project Development

The evaluation process in this module was more complex than in System Planning and OM. While the driving public may see roadway construction as a single entity, the Tollway understands that it is comprised of multiple projects within a larger corridor. INVEST was applied to individual projects to generate an assessment, or snapshot of sustainability, at various points in Tollway history. INVEST was used to score Tollway projects at three key points: (1) projects prior to 2004, (2) projects from 2004-2011 (the Congestion-Relief Program) and (3) completed projects from 2012-2014, the first two years of the ongoing *Move Illinois* Program. The graph and table below shows the average baseline score for projects under each capital program. Because the available points per construction project vary the results are shown as an average percentage of available points for all projects scored.

Table 1. Pre-INVEST Project Baseline and *Move Illinois* Scores

Capital Program	Number of Projects Scored	Avg. % Total Points Achieved per Project
Pre-CRP	1	9%
CRP	21	20%
Move Illinois	15	44%

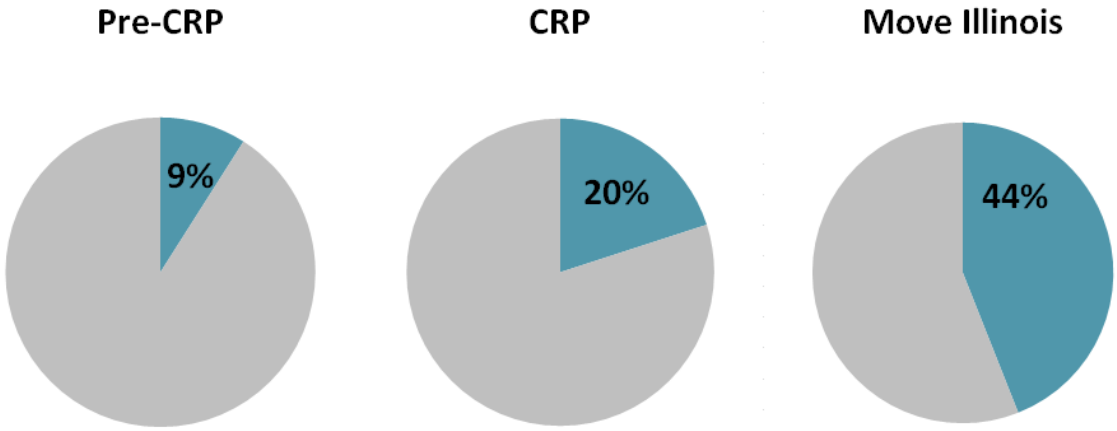

Figure 3. Average of Project Development Points Achieved as Percentage of the Total Available Points

The pie charts in Figure 3 show that out of the total points that were available for the type of projects that were scored; the Tollway has been increasing the overall percentage of points achieved over time. The improvement over time is also impressive as the volume of work that the Tollway is accomplishing in the *Move Illinois* Program includes a greater amount of lane-miles re-constructed as compared to Pre-CRP and CRP.

The first year of implementation, when the INVEST managers met with design teams, produced strong evidence that the Tollway has already become proficient with some of the INVEST criteria, ranking these among the key accomplishments in this module:

- Intelligent Transportation Systems (ITS): All new ITS elements are state-of-the-art and contribute significantly to roadway safety and efficient movement of vehicles.
- Site vegetation and habitat: The Tollway has a long-standing commitment to protection and enhancement of habitat areas and consistently features native and low-maintenance plant species in its landscapes.
- Recycled content: The design mixes for roadway materials (concrete, asphalt, bedding and backfill) routinely include recycled content.
- Construction equipment emission reduction: The Tollway's requirements for these pollution sources already meet the INVEST criteria.

1.1.3 Conclusion

INVEST is well on its way to being fully utilized on all aspects of the Illinois Tollway, from its overall planning efforts, to its daily operations and on construction sites. The baseline scores completed in the past year clearly indicate that adopting INVEST has been a logical step on the journey to sustainability. The use of this informative tool will hasten the momentum already at work and will make the combined efforts of management, designers and contractors more efficient. The end result is not only a self-funding agency that is a responsible steward of toll revenues, providing safe and effective mobility, but also a champion of the regional economy and its interconnected environment, and a national leader in the transportation industry.

SECTION 2

Background and Introduction

The Illinois Tollway is integrating the Federal Highway Administration's Infrastructure Voluntary Evaluation Sustainability Tool program throughout its projects and processes. The Illinois Tollway is using all three INVEST modules to improve the sustainability of its 15-year, $12 billion capital improvement program, *Move Illinois*. This report summarizes the work performed to initiate the implementation of INVEST and complete baseline and preliminary evaluations. In addition to the evaluation results, this report documents best practices, lessons learned and comments for FHWA on INVEST.

2.1 About INVEST

INVEST is the FHWA's Web-based self-evaluation tool of sustainability best practices that enables transportation practitioners to evaluate the sustainability of their projects and programs using one of three modules that evaluate the following:

- **Projects**. The Project Development (PD) module of INVEST focuses on project-specific planning, design and construction activities. This module contains 29 project-focused criteria.
- **System Planning.** The System Planning (SP) module of INVEST focuses on systemwide, long range transportation and comprehensive planning activities. This module contains 17 criteria focused on an agency's system level planning processes, practices, policies and procedures.
- **Operations and Maintenance Program.** The Operations and Maintenance (OM) module of INVEST focuses on administration, internal operations, maintenance and operations activities. This module contains 14 criteria focused on an agency's internal administration, as well as the operations and maintenance of its transportation infrastructure.

The use of INVEST is voluntary and was designed to educate and offer support to agencies with interest in incorporating sustainable practices into their highway programs.

The current version of INVEST is located at www.sustainablehighways.org and the criteria descriptions and online tool are available to anyone who registers on the site. Each criterion narrative is one- to five-pages long and contains a description of the goal, sustainability linkage to the triple bottom line, scoring requirements and scoring sources. The online tool allows users to create and evaluate projects and programs using the INVEST criteria. All information uploaded to the site is private and confidential to that registered user. At the same time, each registered user can choose to share information on scoring by printing scorecards or through the use of the "collaborate" feature, which allows the user to invite others to view or edit scores. The FHWA does not have access to this information.

2.2 About the Illinois Tollway

The Illinois Tollway is a user-fee system that receives no state or federal funds for maintenance and operations. The agency maintains and operates 286 miles of interstate tollways in 12 counties in Northern Illinois, including the Reagan Memorial Tollway (I-88), the Veterans Memorial Tollway (I-355), the Jane Addams Memorial Tollway (I-90) and the Tri-State Tollway (I-94/I-294/I-80).

2.3 Illinois Tollway Capital Improvement Programs

Over the years, the Illinois Tollway has implemented capital improvements and maintenance work through an annual budget. Since 2004, the Tollway has implemented two major capital improvement programs. The first was the Congestion-Relief Program (CRP), which was approved by the Illinois Tollway's Board of Directors in September 2004 and is nearing completion. The current major capital program that was approved by the Illinois Tollway's Board of Directors in August 2011 is *Move Illinois*.

2.3.1 Congestion-Relief Program

In 2004, the Illinois Tollway launched its $5.8 billion Congestion-Relief Program - *Open Roads for a Faster Future*. This program:

- Reduced travel times by converting the system to open road tolling
- Completed construction of the long-awaited south extension of I-355 into Will County
- Rebuilt and restored a large portion of the system
- Added lanes to reduce congestion

2.3.2 Move Illinois

In 2011, the Illinois Tollway completed a comprehensive 18-month review and public discussion of the agency's needs for its existing system and opportunities to improve regional mobility. As a result of the public input and discussion, the Illinois Tollway's Board of Directors adopted the 15-year, $12 billion capital program, *Move Illinois: The Illinois Tollway Driving the Future*.

Move Illinois is addressing the needs of the existing Illinois Tollway system, as well as:

- Rebuilding and widening the Jane Addams Memorial Tollway (I-90) as a 21st century, state-of-the-art corridor linking Rockford to O'Hare International Airport
- Constructing a new, all-electronic interchange connecting the Tri-State Tollway (I-294) to I-57
- Building the new, all-electronic Elgin O'Hare Western Access Project
- Planning studies for the Illinois Route 53/120 Project and other emerging projects

Move Illinois will improve mobility, relieve congestion, reduce pollution and link economies across Northern Illinois. Further, *Move Illinois* will be the "cleanest and greenest" program in the Illinois Tollway's history by seeking to minimize the environmental impact of new roadway construction by reducing, recycling and reusing materials.

The *Move Illinois* Program is projected to create as many as 120,000 permanent jobs and add $21 billion to the economy. The Illinois Tollway is committed to ensuring that this region remains competitive with other metropolitan areas in the U.S. and around the world, unlocking the economic potential of the region for years to come.

The *Move Illinois* Program is funded by bonds and toll revenue generated through a toll rate increase for passenger vehicles in 2012, and a previously approved increase for commercial vehicles that began in 2015.

Figure 4 shows key points, corridors and projects included in the *Move Illinois* Program.

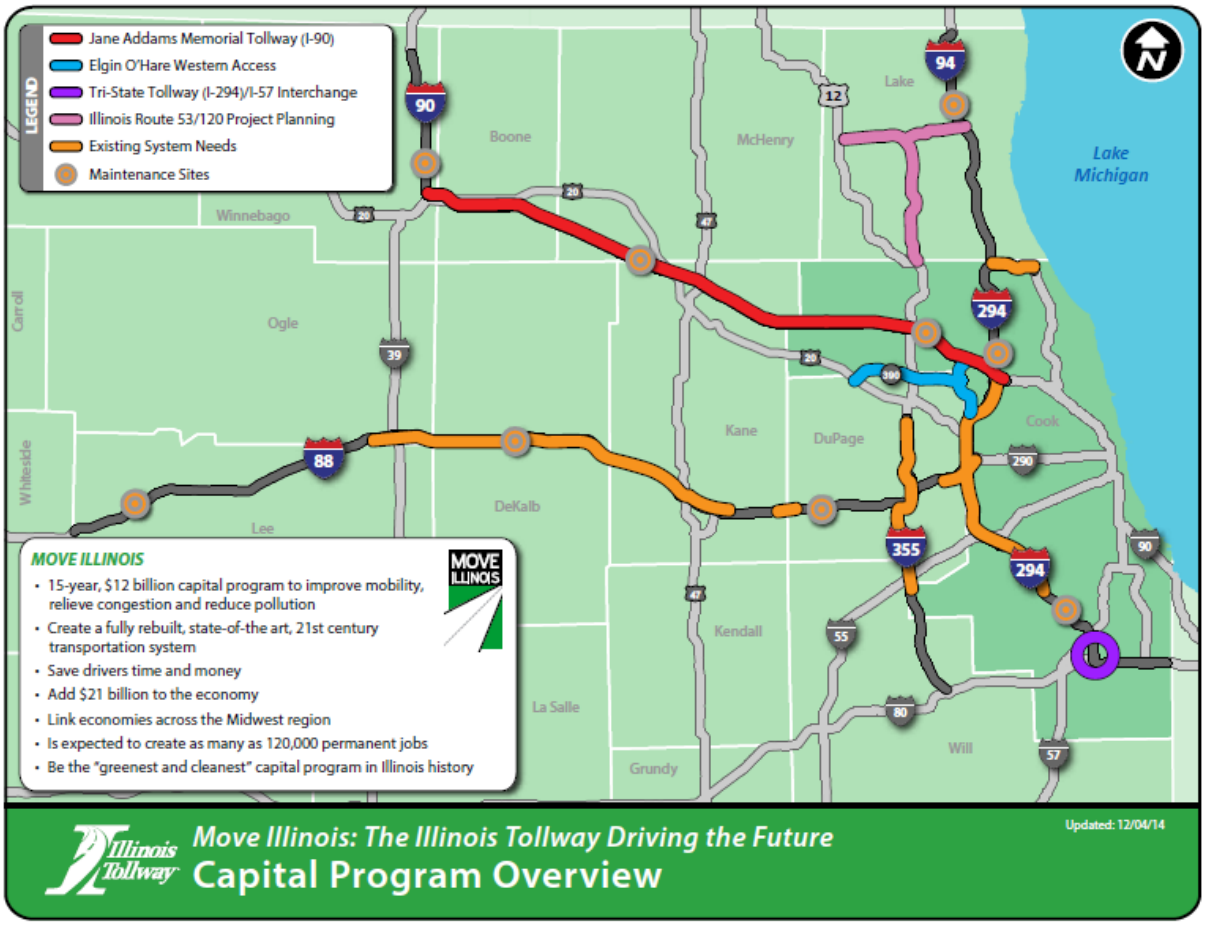

Figure 4. *Move Illinois* Program Overview
Key points, corridors and projects included in the Move Illinois Program.

2.4 Illinois Tollway Functions

This section describes how System Planning, Operations and Maintenance and Project Development work at the Illinois Tollway.

2.4.1 System Planning

System Planning is a coordinated effort between the Illinois Tollway and the Chicago Metropolitan Agency for Planning (CMAP), the local metropolitan planning organization (MPO). CMAP provides baseline transportation planning information for the region, which the Illinois Tollway refines as needed for specific planning studies. In addition, CMAP is wholly responsible for regional transportation demand management strategies and air quality. Illinois Tollway staff performed the majority of corridor planning work, with some assistance from the consultant community.

2.4.2 Operations and Maintenance

The Illinois Tollway is responsible for the operations and maintenance of its facilities and has staff and equipment to perform the management, maintenance and operations of its infrastructure.

2.4.3 Project Development

Projects at the Illinois Tollway typically start with a corridor planning study, which is performed by the Illinois Tollway with some consultant assistance. Once preliminary design starts, most projects are grouped by corridor for which a Design Corridor Manager (DCM) is retained from a consultant firm to provide planning, design and management services, and to oversee corridorwide planning and design. These corridors are broken into design sections, which are subdivided parts of the corridor designated by geography.

Each design section is assigned a Design Section Engineer (DSE) from consulting firms to provide planning, design and management services for design sections. The DSEs within a corridor report to the DCM, who is responsible for coordinating efforts throughout the corridor. Finally, design sections may be broken into different projects, or design packages, which address specific areas (e.g., the median or eastbound-only lanes) or disciplines (e.g., noise walls, bridge or retaining walls).

2.5 Sustainability and INVEST at the Illinois Tollway

The Illinois Tollway has a history of implementing projects that are more sustainable than typical projects of similar scope and scale. In the *Move Illinois* Program, the Tollway set a goal to focus on sustainability and searched for a tool to implement on its projects and program.

The Illinois Tollway chose the FHWA's INVEST as a foundation for its own sustainability implementation program based on thorough research and evaluation of numerous existing sustainability rating tools. INVEST was found to meet the needs of the Illinois Tollway and be advantageous to use as it is fully developed, covers the complete project life cycle, is industry tested, provides an objective standard with which to measure the Illinois Tollway's sustainability accomplishments and is a self-evaluation tool that does not require third-party auditing.

2.6 FHWA INVEST Implementation Grant

The FHWA awarded the Illinois Tollway a $150,000 INVEST implementation grant in 2013 for the Tollway to use FHWA's INVEST and provide feedback to FHWA on the tool, criteria and implementation of the tool.

- **Illinois Tollway projects.** The Illinois Tollway committed to using INVEST to evaluate several completed projects to create a historic baseline of sustainable practices in project development (project-specific planning, design and construction) and will evaluate active projects to determine the integration of sustainability best practices. INVEST was used to evaluate completed baseline projects, which were all performed prior to the *Move Illinois* Program. For active *Move Illinois* projects, INVEST will be used to aid sustainability within the Elgin O'Hare Western Access Project, the Jane Addams Memorial Tollway (I-90) Rebuilding and Widening Project (eastern and western segments) and some systemwide rehabilitation projects.
- **Illinois Tollway programs.** In addition to evaluating active *Move Illinois* project development, the Illinois Tollway evaluated its historic project development, system planning and operations and maintenance programs. These evaluations will allow the Tollway to recognize and quantify its current sustainable best practices from what was done in the past, and to integrate more sustainable decisions and practices into future programs. Use of INVEST will enable the Illinois Tollway to learn more about sustainable practices, track and assess progress against these practices, make informed decisions about sustainability tradeoffs and communicate highway sustainability goals and benefits to the public. As part of the grant, Illinois Tollway projects and/or Illinois Tollway processes and programs may be selected by FHWA as best practices or case studies to aid other transportation agencies in their sustainability efforts.

The following scope of work was negotiated with FHWA per the FHWA grant.

Task 1 Project Development Module

1.1 The Illinois Tollway used INVEST to assess the sustainability of a set of 18 completed transportation projects in order to:

- Set a baseline achievement level and identify criteria typically achieved and use this information to set targets for future projects, to include both specific criteria that the agency would like to accomplish and target achievement levels that can demonstrate increased implementation of sustainability practices.
- To identify the baseline, completed projects were selected to represent the Illinois Tollway. Projects selected varied by size, location and type; all scorecards are represented at least one time in the set of 18 completed projects; bridge projects may be evaluated with a custom scorecard. Selected programs consisted of:
  - Previous annual programs (1998-2003)
  - Congestion-Relief Program (CRP) (2004-2011)
  - *Move Illinois* (2012 to present)
- Identify institutional and other barriers that may be preventing implementation of sustainable practices.
- Identify best practices and case studies that can be shared with FHWA.
- Collect feedback on the INVEST criteria and tool for FHWA.

1.2 The Illinois Tollway intends to use INVEST to assess and improve the sustainability of the major transportation projects in the agency's 15-year, $12 billion *Move Illinois* Program. Toward this goal, the Illinois Tollway completed 18 PD scorecards from in-progress major roadway construction projects using all scorecards at least one time in order to:

- Develop a best practice approach for implementing INVEST throughout the planning and design phases of in-progress projects
- Ongoing projects will likely be scored at 30 percent design (where the most opportunity to affect sustainability of a project occurs), final design (to capture the designer's intent) and after construction (to assess the completed project as constructed); for the purposes of this scope, only one of these assessments will be completed for each project evaluated
- Identify potential changes to business practices to ease the incorporation of sustainability into projects
- Identify and optimize the number of sustainable practices implemented on projects
- Identify best practices and case studies that can be shared with FHWA
- Collect feedback on the INVEST criteria and tool for FHWA

Task 2 System Planning Module

2.1 The Illinois Tollway will use INVEST to evaluate its long range planning and capital program development processes in order to:

- Set a baseline against which future planning process improvements can be measured

To identify the baseline, the Illinois Tollway's system planning practices were evaluated covering the following programs and dates:

- Previous annual programs (1998-2003)
- Congestion-Relief Program (CRP) (2004-2011)
- *Move Illinois* (2012 to present)

While most system planning criteria are relevant, some criteria do not fall under the responsibility of the Illinois Tollway; instead they fall under the responsibility of CMAP. For these criteria, the Illinois Tollway will seek to engage CMAP in order to:

- Identify opportunities to improve the sustainability in the System Planning program
- Identify best practices that can be shared with FHWA
- Collect feedback on the INVEST criteria and tool for FHWA

Task 3 Operations and Maintenance Module

3.1 The Illinois Tollway will use INVEST to evaluate its Operations and Maintenance program to:

- Set a baseline against which future Operations and Maintenance sustainability practice improvements can be measured; baselines for years 2000, 2004 and 2009 were established for comparison to future annual evaluations

To identify the baseline, the Illinois Tollway's Operations and Maintenance practices were evaluated covering the following programs and dates:

- Previous annual programs (1998-2003)
- Congestion-Relief Program (CRP) (2004-2011)
- *Move Illinois* (2012 to present)

- Identify opportunities to improve the sustainability of the Operations and Maintenance program
- Identify best practices that can be shared with FHWA
- Collect feedback on the INVEST criteria and tool for FHWA

Task 4 Final Report

4.1 In this task, work performed in Tasks 1, 2 and 3 were summarized and provided to FHWA in a report that discusses the Illinois Tollway's efforts and findings. The following information is included in the final report:

- Summary of work performed, parties involved and roles and responsibilities
- Lessons learned and subsequent changes implemented to address issues identified
- Sustainability improvements identified, including applicable case studies and best practices (including cost analyses)
- Recommendations for future actions by the Illinois Tollway and FHWA
- Recommendations on improving INVEST and adding to the state of the practice
- One draft and one final report will be prepared in a way that allows early publication of lessons learned and case studies for FHWA use

SECTION 3

INVEST Implementation

3.1 Implementation Planning Process

The initial scope of work was the result of a brainstorming meeting with the Illinois Tollway, the Illinois Tollway's pavement management consultant (Applied Research Associates Inc.) and the INVEST consultant (CH2M HILL Inc.). After the notice to proceed, larger brainstorming sessions were conducted. The Illinois Tollway instituted an INVEST team consisting of the Tollway, its general engineering consultant [GEC (AECOM)] and the INVEST consultant. The INVEST team is responsible for measuring sustainability in Project Development, System Planning and Operations and Maintenance. Brainstorming sessions were conducted to discuss how these functions would be undertaken, which criteria were expected to be the most applicable and what issues should be considered as implementation planning was undertaken.

SP, OM and PD teams, consisting of Tollway subject matter representatives and the GEC, provided more information to assist in implementation plan development. The following three issues were identified as areas that would need more attention during implementation planning:

- The discussion of applicable SP criteria led to questions about how this module should be scored given the overlap in responsibilities between CMAP and the Illinois Tollway.
- Locally, the industry and agencies developed an initial sustainability rating system called I-LAST. The PD team determined that investigation of the compatibility between I-LAST[1] and INVEST was needed to ensure that the program that was implemented by the Illinois Tollway would sufficiently "cover" both tools without requiring parallel assessments, and satisfy the needs of the local industry.
- The PD team described the process for scoring at a corridor level and then breaking a corridor into design sections, and then further into smaller projects containing specific areas of work or specific disciplines of work.

3.2 Annual and Project-Based Implementation

There are two overlapping processes that must be followed in the management of the Illinois Tollway INVEST program:

- The larger overall process is the "Annual Process."

The Annual Process is calendar-based, includes Illinois Tollway-wide activities and will be performed by the INVEST team.

The Annual Implementation Process for each module is described further in Sections 3.3.3 (SP module), 3.4.4 (PD module) and 3.5.2 (OM module).

The steps in the Annual Process are shown in Figure 5 on the following page.

- The second process, relevant only for the PD module, is the "Project Process".

The PD module feeds information into the Annual Process, but is based on the project schedule and includes project-specific activities; the project process will be managed by the INVEST team.

[1] I-LAST is a sustainability performance metric system developed by the Illinois Department of Transportation in conjunction with the Illinois Transportation Roadbuilders Association (IRTBA) and the American Council of Engineering Companies – Illinois Chapter (ACEC-Illinois). See Section 2.4.2 for additional details.

This process is defined by the Illinois Tollway's *INVEST Project Development Manual* and summarized in Section 3.4.4.

Figure 5. Annual Program Implementation Steps
Applies to SP, PD and OM Module INVEST Implementation.

3.3 System Planning Implementation

3.3.1 Introduction

System Planning is the first step in the life cycle of a transportation project. This is where an agency's systemwide network is analyzed and assessed to identify projects that will improve the safety, capacity, access, operations or other key features of the system.

This module focuses on performing system-level analyses in a manner that contributes to the overall sustainability of the network and the individual projects programmed in this phase. The SP criteria are primarily written for the scoring of an agency's fiscally constrained long-range transportation plan, which is considered to include the agency's transportation planning process, project selection criteria, the transportation improvement plan or state transportation improvement plan and project programming. However, other transportation planning documents, such as a unified planning work program, corridor plans and/or related plans (e.g., modal plans, visioning plans, etc.) may also be scored, as appropriate. INVEST strives to seek a balance between providing structure and allowing for flexibility. Therefore, where a requirement seems vague or open to interpretation, it is often done intentionally. This allows agencies the flexibility to score their transportation planning activities in a way that best meets their unique context and situation.

The SP module contains 17 criteria listed in Section 3.3.2, combined into a single scorecard.

3.3.2 CMAP Participation

The discussion of applicable SP criteria led to questions about how this module should be scored given the overlap in responsibilities between CMAP and the Illinois Tollway. Table 2 shows the agency responsible for the processes described in each criterion.

Table 2. System Planning Criteria Responsibility

Shows the agency responsible for the processes in each SP criterion.

Criterion	Agency Responsible
SP-01: Integrated Planning: Land Use and Economic Development	CMAP, Illinois Tollway participates or uses data
SP-02: Integrated Planning: Natural Environment	CMAP, Illinois Tollway participates or uses data
SP-03: Integrated Planning: Social	CMAP, Illinois Tollway participates or uses data
SP-04: Integrated Planning: Bonus	CMAP, Illinois Tollway participates or uses data
SP-05: Access and Affordability	Illinois Tollway
SP-06: Safety Planning	Illinois Tollway
SP-07: Multimodal Transportation and Public Health	CMAP, Illinois Tollway participates or uses data
SP-08: Freight and Goods Movement	Illinois Tollway
SP-09: Travel Demand Management	Illinois Tollway
SP-10: Air Quality	CMAP and Illinois Tollway shared responsibility
SP-11: Energy and Fuels	Illinois Tollway
SP-12: Financial Sustainability	Illinois Tollway
SP-13: Analysis Methods	CMAP and Illinois Tollway shared responsibility
SP-14: Transportation Systems Management and Operations	Illinois Tollway
SP-15: Linking Asset Management and Planning	Illinois Tollway
SP-16: Infrastructure Resiliency	Illinois Tollway
SP-17: Linking Planning and NEPA	Illinois Tollway

Based on this assessment, it was determined that the most comprehensive score would be gained by asking for CMAP's participation. Further, it was decided that each criterion would be scored with modified rationale if CMAP was responsible or shared responsibility for the criterion subject area. In these cases, the Illinois Tollway scored the criteria as if it performed the action if both agencies were collaborating financially, contributing data to the process or using data from the process in question.

3.3.3 System Planning Evaluation Teams

The System Planning program was evaluated by the Illinois Tollway environmental lead, the INVEST consultant and subject matter representatives from CMAP and the Illinois Tollway (including consultants).

3.3.4 Annual System Planning Implementation Process

This section documents the steps necessary to implement INVEST for Illinois Tollway System Planning and identifies the responsible parties and timing for each step and the timing of each step.

Step 1. Training

a. Description: Provide training to subject matter expert reviewers (internal staff) to describe the System Planning criteria and the process of evaluating the Illinois Tollway's System Planning program. The agenda for Illinois Tollway quarterly meetings with consultants should include INVEST.
b. Responsibility:
    i. 2013 and 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway
c. Timing: as needed

Step 2. Goal Setting

a. Description: Set specific achievement goals and opportunities to improve, based on the evaluation performed in the prior year and analysis of that evaluation.
b. Responsibility:
    i. 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway
c. Timing: Annually in late winter/early spring

Step 3. Evaluation

a. Description: Perform an INVEST evaluation of the SP module. This includes facilitating a workshop of subject matter representatives from the Illinois Tollway, consultants and CMAP to work through and score the Illinois Tollway's performance against each of the SP criteria.
b. Responsibility:
    i. 2013 and 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway Environmental/Planning
c. Timing: Annually in late winter/early spring each year, set a goal based on previous year's evaluation

Step 4. QA/QC of Evaluation

a. Description: Perform a quality control and assurance review of the INVEST evaluation to ensure consistency in scoring criteria year-to-year and accuracy of the system.
b. Responsibility: third party
c. Timing: Immediately after annual evaluation

Step 5. Analysis of Evaluation and Identify Opportunities to Improve

a. Description: Review the INVEST evaluation and identify opportunities for improving the sustainability of the Illinois Tollway's System Planning program in conjunction with Illinois Tollway leadership staff, and consistent with the goals set in Step #2.

b. Responsibility: The INVEST team with and Illinois Tollway (Planning)
c. Timing: Concurrent with QA/QC of evaluation

Step 6. Implementation of Opportunities for Improvement

a. Description: Manage the implementation and execution of activities planned in Step 5
b. Responsibility: The INVEST team and Illinois Tollway (Planning)
c. Timing: Ongoing, with periodic re-evaluations

Step 7. Reporting

a. Description: Summarize the scores, evaluation and results of the INVEST implementation process in a concise one- to two-page report with high visual content.
b. Responsibility: Illinois Tollway GEC with input and review by Illinois Tollway (Planning)
c. Timing: Reporting for all three modules will occur annually.

3.4 Project Development Implementation

3.4.1 Introduction

Project Development is the second step in the life cycle of a transportation project. This is where specific projects conceptualized and programmed in the System Planning processes are planned, designed and constructed.

The Project Development module includes criteria that span the entire project development process from early planning, alternatives analysis, environmental documentation, preliminary and final design and construction. Although the criteria span all phases of project development, including construction activities, the criteria are written so the owner has control over the decisions and actions necessary to meet all of the criteria. For the construction phase, this can typically be done by incorporating elements in the project plans and specifications.

The PD module of the FHWA's current program contains 29 criteria organized into five fixed and one custom scorecard. While these criteria are all focused on project development, FHWA recognizes that not all criteria are applicable to all projects; therefore, different combinations of these criteria were used to create scorecards for different types of projects in both rural and urban settings.

In addition to FHWA's INVEST system, the Illinois Tollway worked with its INVEST consultant to identify which I-LAST criteria are included in INVEST and to identify I-LAST best practices that are not. To incorporate criteria not included in INVEST, eight additional Illinois Tollway-specific criteria were added, as well as supplemental information for existing INVEST criteria. Illinois Tollway supplements were developed for 10 FHWA INVEST criteria to incorporate best practices of sustainability important to the Illinois Tollway and to the local industry. The FHWA's current version of the INVEST PD module has been modified to fit the needs of a non-federally funded agency like the Illinois Tollway. In order to accommodate these changes, the Illinois Tollway developed its own Project Development Manual, a copy of which can be found in Appendix A.

3.4.2 I-LAST and INVEST Comparison

The PD team determined that investigation of the compatibility between I-LAST and INVEST was needed to ensure that the program implemented would sufficiently cover both tools without requiring parallel assessments.

3.4.2.1 Background

According to the 2.02 version of I-LAST:

> *I-LAST is a sustainability performance metric system developed by the Joint Sustainability Group of the Illinois Department of Transportation (IDOT), the American Council of Engineering Companies (ACEC) and the Illinois Road and Transportation Builders Association (IRTBA). The intent is that this rating system and guide will be revised as the state of the art evolves – utilizing the input of industry users.*
>
> *The I-LAST Construction Practices Section was drafted by a task force comprised of various contractor and supplier members from the IRTBA Green Council. The mission of the Green Council is to establish IRTBA as a leader in promoting sustainable, sensible, and innovative environmental objectives and practices.*
>
> *The purpose of I-LAST is fourfold:*
>
> - *Provide a comprehensive list of practices that have the potential to bring sustainable results to highway projects.*
> - *Establish a simple and efficient method of evaluating transportation projects with respect to livability, sustainability, and effect on the natural environment.*
> - *Record and recognize the use of Sustainable Practices in the transportation industry.*
> - *Encourage the use of innovative and experimental sustainable concepts.*

I-LAST is important to the Illinois Tollway for a variety of reasons, including:

- The three developers, IDOT, ACEC-Illinois and IRTBA, are key stakeholders on most of the Illinois Tollway's projects and have an expectation that their contributions to I-LAST will be incorporated into major projects in the state.
- I-LAST provides specific sustainable practices that are geographically relevant to Illinois Tollway projects that are not necessarily provided within INVEST v1.0/1.1.
- Whereas INVEST v1.0/1.1 assumes that all federally required processes are already followed (and, therefore, omitted from INVEST because they are not "above-and-beyond" requirements and standard practice), I-LAST includes some of these sustainable practices (e.g., related to noise abatement). This is a significant difference because Illinois Tollway projects do not generally include federal funds.

3.4.2.2 Comparison of INVEST and I-LAST

The INVEST consultant prepared a line-by-line comparison of INVEST v1.0 and I-LAST version 2.02 (I-LAST v2.02) and confirmed that much of the material currently included in I-LAST v2.02 is also included in INVEST v1.0. Both systems have the goal of recognizing and encouraging sustainable practices within transportation.

INVEST v1.0 and I-LAST v2.02 are complimentary in how their basic building blocks fit together. INVEST v1.0 is based upon criteria that cover specific topic areas and is focused on achieving sustainable outcomes and results rather than giving credit for using specific sustainable practices. INVEST v1.0 describes some, but not all, potential sustainable practices that will accomplish the outcomes desired without giving credit for using them unless the outcomes were accomplished. In contrast, I-LAST v2.02 is a checklist-type sustainability rating tool that gives credit for using specific sustainable practices. The two tools are complimentary in that the sustainable practices included in I-LAST v2.02 can be used to demonstrate potential methods to achieve the INVEST v1.0 criteria.

One of the Illinois Tollway's important goals during the design of its INVEST program was to consider how I-LAST v2.02 could be incorporated so that using INVEST would cover relevant elements of I-LAST v2.02, and performing an evaluation of projects using both tools would not require additional work to cover different topic areas. Because some I-LAST v2.02 sustainable practices relevant to the Illinois Tollway were not represented in INVEST v1.0, the Illinois Tollway modified its INVEST program to include these best practices so duplicate scoring is not necessary. In addition to these modifications, edits have been made to incorporate criteria that were excluded from INVEST but are applicable to non-federally funded, as well as local interface elements, often associated with Illinois Tollway projects.

In addition, in reviewing INVEST v1.0 and discussing its development with FHWA, the Illinois Tollway and its INVEST consultant identified several criteria and/or sustainable practices within criteria that were relevant to the Illinois Tollway but were left out of INVEST v1.0. (One example of a missing INVEST v1.0 criterion is related to the use of permeable pavements.)

The creation of 10 Tollway supplements and eight new criteria were developed to ensure that missing sustainable practices from I-LAST v2.02, and topics omitted from INVEST v1.0, were included in the Illinois Tollway's INVEST program. These approaches are described below.

As a result of these necessary additions, the Illinois Tollway elected not to use the FHWA INVEST online tool to evaluate projects and instead developed the Illinois Tollway's version of an evaluation scorecard. Project evaluations are to be performed using the tools described in the Illinois Tollway's *INVEST Project Development Manual* and available through the Illinois Tollway.

3.4.2.3 Illinois Tollway-Specific Supplements to INVEST Criteria

In the first approach, if achieving an I-LAST v2.02 sustainable practice and/or other relevant sustainable practice is consistent with and would help achieve an existing INVEST criterion, it was added as a supplement that amends the INVEST v1.0 criterion.

The intent of these supplements is to provide additional sustainable practices that can help a project team achieve points within an INVEST criterion; however, these supplements are not an exhaustive list of best practices or solutions. Project teams are urged not to be constrained to using only the solutions mentioned; ingenuity and innovation are highly encouraged.

Table 3 lists the Illinois Tollway-specific supplements and which criterion each one modifies. Appendix A contains the Illinois Tollway *INVEST Project Development Manual* which includes Tollway-specific supplements to INVEST v1.0 criteria. In addition, the *INVEST Project Development Manual* that can be downloaded from the Illinois Tollway's website, at http://www.illinoistollway.com/doing-business/construction-engineering/manuals.

Table 3. Illinois Tollway-Specific Supplements

Illinois Tollway-Specific Supplement	Summary of Supplement
PD-07 Habitat Restoration	Provides examples of restorative features from I-LAST v2.02.
PD-09 Ecological Connectivity	Provides examples of restorative features from I-LAST v2.02.
PD-10 Pedestrian Access	Provides examples of features that meet the four factors from I-LAST v2.02.
PD-13 Freight Mobility	Adds a scoring element from I-LAST v2.02.
PD-17 Energy Efficiency	Provides examples to reduce lighting and examples to reduce energy consumption from I-LAST v2.02.
PD-18 Site Vegetation	Provides additional scoring elements related to vegetation and irrigation from I-LAST v2.02.

PD-19 Reduce and Reuse Materials	Provides examples of soil stabilization methods from I-LAST v2.02.
PD-20 Recycle Materials	Adds scoring elements from I-LAST v2.02.
PD-21 Earthwork Balance	Adds scoring elements from I-LAST v2.02.
PD-24 Contractor Warranty	Removes this criterion from Illinois Tollway consideration.

3.4.2.4 Illinois Tollway-Specific INVEST Criteria

The second approach considers groups of I-LAST v2.02 sustainable practices and/or other relevant information not represented within INVEST v1.0 criteria. These best practices are grouped into Illinois Tollway-specific criteria and written similarly, in both format and content, to INVEST v1.0 criteria. For the most part, these custom criteria are pertinent to the Illinois Tollway as well as to other local or non-federally funded agencies.

Table 4 summarizes the Illinois Tollway-specific INVEST criteria that were added. Appendix A contains the Illinois Tollway *INVEST Project Development Manual,* which includes the Illinois Tollway-specific criteria. In addition, the *INVEST Project Development Manual* can be downloaded from the Illinois Tollway's website, at http://www.illinoistollway.com/doing-business/construction-engineering/manuals.

Table 4. Illinois Tollway-Specific Criteria

INVEST Criterion	Summary of Criterion and Comments
PD-50T: Alignment Selection	Modeled after I-LAST v2.02. Provides credit for minimizing or avoiding impacts or enhancing features of forested tracts, prime farmland and socioeconomic resources. Provides credit for minimizing right-of-way takes and using brownfields.
PD-51T: Visual Aesthetics	Modeled after I-LAST v2.02 Context-Sensitive Design. Provides credit for adding, minimizing or avoiding impacts, or enhancing scenic views; obstructing objectionable or distracting views; incorporating context-appropriate design features; and for addressing bridge and structural aesthetics.
PD-52T: Noise Abatement	Noise Abatement was omitted from INVEST because it is required for federally funded projects. Modeled after I-LAST v2.02, this criterion provides credit for installing specialized noise barriers, incorporating TSM methods to reduce traffic noise, providing a buffer zone to adjacent receptors, constructing quiet pavements and providing plantings or sight screens to adjacent receptors.
PD-53T: Reduce, Reuse and Recycle Materials (Design)	Modeled after I-LAST v2.02 approach of giving credit for allowing sustainable practices to reduce, reuse and recycle pavements in design, as well as selecting the sustainable practices in construction.
PD-54T: Light Pollution	Modeled after Greenroads v1.5. Provides credit for installing fixtures that are dark sky compliant and that shield adjacent receptors from light pollution.
PD-55T: Regional Employment	Regional Employment cannot be used on federally funded projects and was omitted from INVEST as a result. Modeled after Greenroads v1.5. This criterion provides credit for incentivizing and using regional labor for projects.
PD-56T: Permeable Pavement	Modeled after Greenroads v1.5. Provides credit for installing permeable pavements.
PD-57T: Innovations	Provides credit for integrating innovative materials and methods. Must be approved by INVEST technical manager(s).

3.4.3 Corridors, Sections and Projects

The Illinois Tollway determined, after several iterations, that the best approach to scoring corridors and sections was to first evaluate the corridor and then use that information to evaluate individual sections within the corridor. This is the best approach because planning occurs at the corridor level and the DCM is responsible for coordination of corridorwide design consistency, which often includes corridorwide design studies (e.g., pavement design, drainage design or earthwork balancing approach). This information is, therefore, best evaluated by the DCM and then provided to the DSE for section-specific scoring. For stand-alone projects that are not part of a corridor, the scorecard is developed by the DSE. In either case, when the design scorecard is complete, the scorecard is passed from the DSE to the Construction Manager (CM) who is responsible for finalizing an as-built scorecard for each project after construction is completed.

The Illinois Tollway's *INVEST Project Development Manual* includes scorecards with both corridor-level and project-level evaluations shown side-by-side and instructions for the section evaluation based on the corridor-level evaluation. Additionally, the design and as-constructed scores can be compared to show what was anticipated versus what has been built.

3.4.4 Project Evaluation Teams

Each project (corridor or design section) was evaluated by a team that included the Illinois Tollway Project Manager; the DCM or DSE; the discipline leads for roadway, structures, drainage, illumination, landscaping, traffic and other relevant design elements; the Corridor Construction Manager (CCM) or CM; and the INVEST team.

3.4.5 Annual Project Development Implementation Process

This section describes the steps necessary to implement the PD module and identifies the responsible parties and timing for each step.

Step 1. Training

a. Description: Provide training to subject matter representatives (i.e., CM, DSE, internal staff) regarding the Project Development criteria and the process of evaluating the Illinois Tollway's projects. The agenda for Illinois Tollway quarterly meetings with consultants should include INVEST.
b. Responsibility:
    i. 2013 and 2014: INVEST consultant
    ii. Beyond 2014: The INVEST team and Illinois Tollway
c. Timing: as needed, likely once per year

Step 2. Goal Setting

a. Description: Set specific achievement goals and opportunities for improvement, based on the evaluation performed in the prior year and analysis of that evaluation.
b. Responsibility:
    i. 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway
c. Timing: Annually in late winter/early spring

Step 3. Identify Projects for Evaluation

a. Description: Identify, inform and monitor all projects, including corridors and design sections, in the *Move Illinois* Program that should be evaluated. It is anticipated that this will include projects with a construction cost of $10 million or more.
b. Responsibility:
    i. 2013 and 2014: The INVEST team with Illinois Tollway
    ii. Beyond 2014: Illinois Tollway GEC with Illinois Tollway
c. Timing: In coordination with the design schedule and master plan cost estimates

Step 4. Evaluation of Projects in *Move Illinois*

a. Description: Manage the Illinois Tollway's program to ensure that INVEST evaluations are performed for projects, including corridors and design sections, identified in Step 3. Projects will be reviewed at the completion of the pre-conceptual planning, 30 percent design, 95 percent design and construction substantial completion.
b. Responsibility: The Illinois Tollway GEC responsibilities include monitoring the evaluations and issuing notices to all DCMs, CCMs, DSEs and CMs when their scoring is due, and following up on all late submittals. All partially completed scorecards will be managed throughout each year and consolidated as a complete scorecard at the end of each project's substantial completion. INVEST responsibilities will be added to the agenda of every *Move Illinois* preconstruction meeting. The primary reviewers of Illinois Tollway management (Illinois Tollway Environmental and Illinois Tollway Materials) will review and work with the Illinois Tollway GEC to finalize the scores for each project.
    i. 2013 and 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway management
c. Project-Specific Evaluation Responsibilities:
    i. DCM, CCM, DSE and CM responsibilities for scoring to be defined in each Professional Services Bulletin (PSB).
    ii. The scorecards for both the design and construction phases of each project are to be created, distributed and collected by the Illinois Tollway GEC as each project progresses, and then ultimately consolidated by the Illinois Tollway GEC.
    iii. DCMs and DSEs will designate personnel responsible for scoring at the start of each job. Goals will be set by the DSE and then reviewed by appropriate Illinois Tollway parties for approval. Specific criteria applicable to the project will be scored when the design is completed.
    iv. CCMs and CMs designated personnel will be responsible for scoring at the end of their project.
    v. As projects reach the 95 percent design stage, as well as construction substantial completion, scorecards will be forwarded by the Illinois Tollway GEC to the primary reviewers at Illinois Tollway management (Illinois Tollway Environmental and Illinois Tollway Materials) for each criterion that applies to the project being scored. All finalized scores for all *Move Illinois* projects (single project, design section and full corridor) are to be approved by Illinois Tollway management before being released to the public through Illinois Tollway Communications.
d. Timing: ongoing per project schedules

Step 5. QA/QC of Evaluation

a. Description: Perform quality control on select projects and quality assurance review of the INVEST project evaluations to ensure consistency in scoring criteria year-to-year, and accuracy of the system. Use QA/QC process to resolve issues or questions arising on project evaluations.
b. Responsibility: third party
c. Timing: Throughout the year, as project evaluations are completed

Step 6. Programmatic Analysis of Evaluations and Identify Opportunities to Improve

a. Description: Review the INVEST project (corridor and design section) evaluations to identify opportunities for improving the sustainability of the Illinois Tollway's Project Development program. This will be conducted in conjunction with Illinois Tollway leadership staff and consistent with the goals set in Step #2.
b. Responsibility: The INVEST team and Illinois Tollway
c. Timing: Annually after reporting is completed

Step 7. Implementation of Opportunities for Improvement

a. Description: Manage the implementation and execution of activities planned in Step 5.
b. Responsibility: The INVEST team and Illinois Tollway
c. Timing: Ongoing, with re-evaluations periodically

Step 8. Reporting

a. Description: Summarize the scores, evaluations and results of the INVEST implementation process in a concise one- to two-page report with high visual content. Reporting on projects should include the achievement levels for all projects, design sections and corridors that were substantially completed in the previous year. Reports should be reviewed by designated Illinois Tollway personnel before being finalized. When finalized and approved, the report that summarizes the annual scores, design section scores when the section is completed or a corridor score when the corridor is fully completed shall be submitted by the Illinois Tollway GEC to Communications for distribution to the Illinois Tollway Board of Directors and public.
b. Responsibility: Illinois Tollway GEC with input and review by Illinois Tollway
c. Timing: Reporting for Project Development will occur annually.

3.4.6 Project-Based Implementation Process

3.4.6.1 Project-Based Implementation Process Steps

Figure 6 shows the progression of a project through the project development phases and the required submittals for each phase. The Illinois Tollway's *INVEST Project Development Manual* describes these activities and steps in more detail.

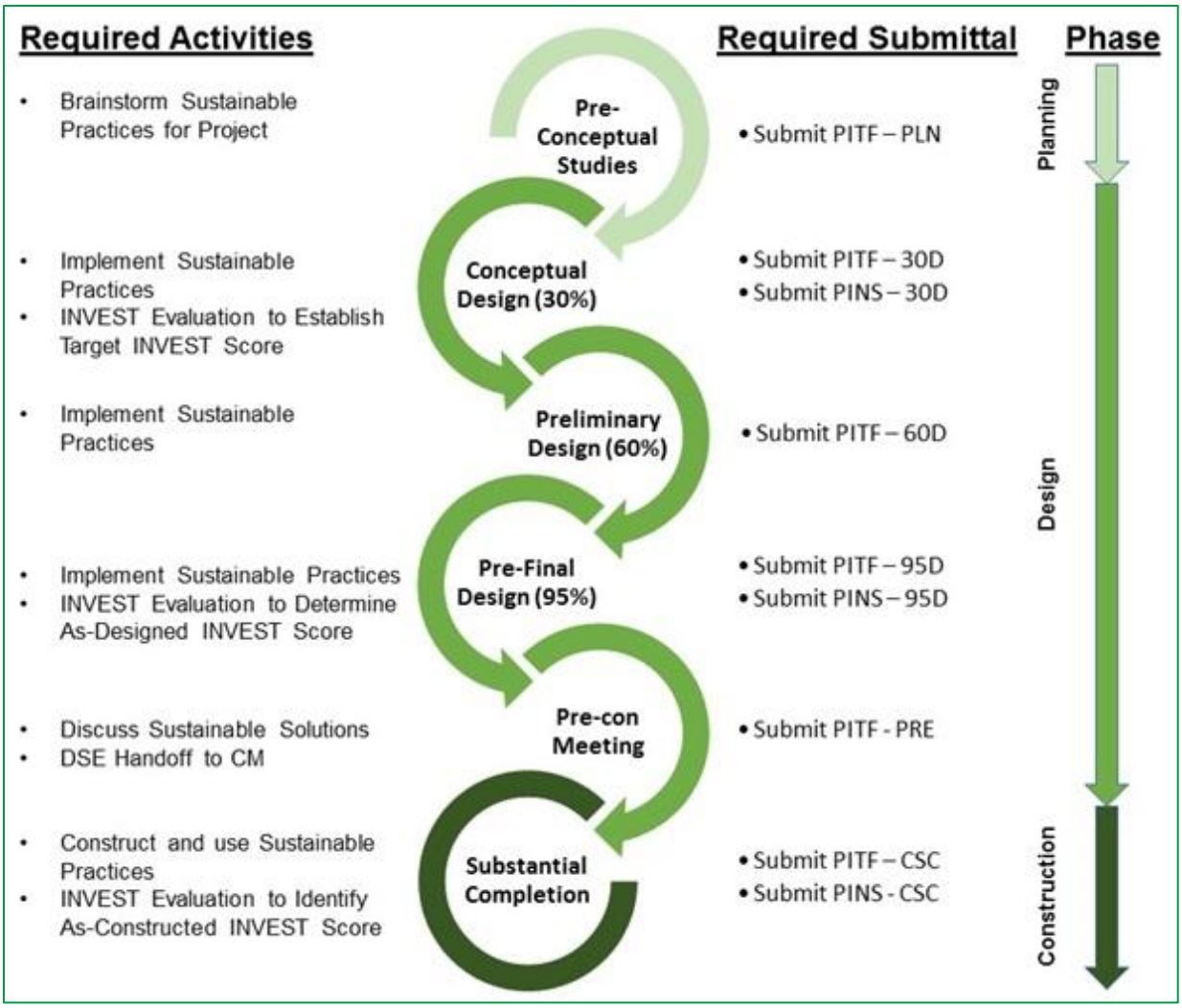

Figure 6. INVEST Activities by Phase

Shows the Illinois Tollway's INVEST activities occurring in each phase of a project.

3.4.6.2 Modifications to Existing Illinois Tollway Manuals

Design Section Engineer's Manual

The Illinois Tollways *Design Section Engineer's Manual* was modified to include a discussion of the INVEST program, requirements for implementation and references to the Tollway's *INVEST Project Development Manual*.

Construction Manager's Manual

The Illinois Tollway's *Construction Manager's Manual* was modified to include a discussion of the INVEST program, requirements for implementation and references to the Illinois Tollway's *INVEST Project Development Manual*.

3.4.6.3 INVEST Project Development Manual

Purpose and Use

The purpose of the Illinois Tollway *INVEST Project Development Manual* (hereafter called the manual) is to prescribe the Illinois Tollway's method of implementing INVEST throughout the Project Development

process in order to produce more sustainable projects, and to measure sustainable results and progress on projects.

The manual provides instructions, as well as Illinois Tollway-specific supplements and criteria, to FHWA's INVEST v1.0. The Illinois Tollway-specific supplements and criteria are intended to further describe sustainable practices and outcomes possible for projects that do not have federal funding and that may fit a regional or local context better than a statewide focus. As such, the details in the manual are applicable for many non-Department of Transportation (DOT) agencies, and their use of the manual is encouraged.

Process

Figure 7 shows the general steps that comprise the method used to implement the Illinois Tollway's INVEST program throughout the Project Development process, including planning, design and construction. These steps are discussed in detail in Article 2.4.2 of the manual.

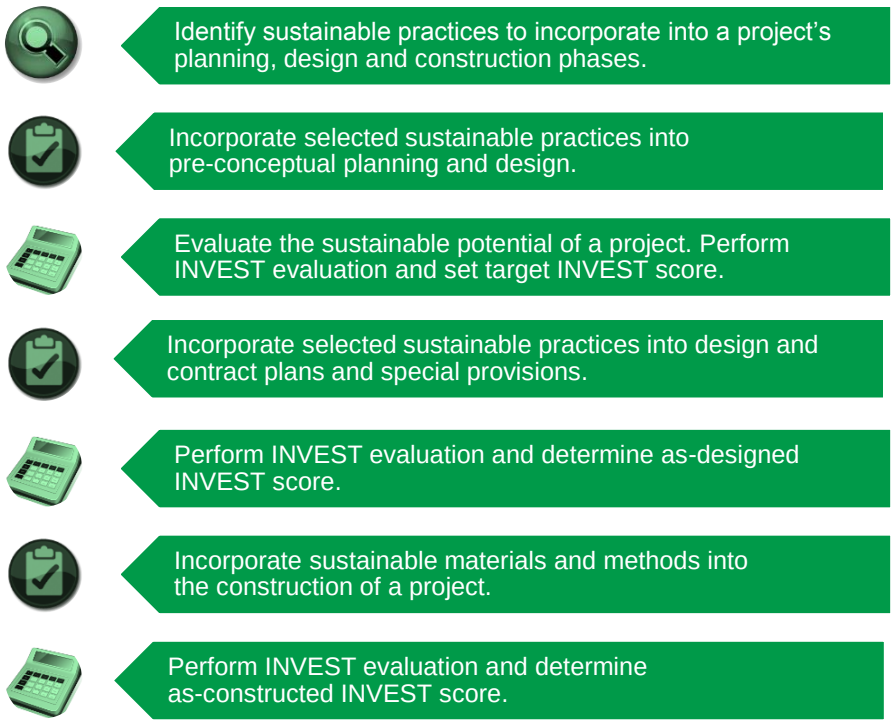

Figure 7. INVEST Implementation Process

Output

The Illinois Tollway's Project Development module requires the use of two Excel-based tools and submittals at multiple milestones throughout the design and construction phases of the projects. The **Project INVEST Scorecard** (PINS) is to be used to evaluate projects in lieu of the FHWA INVEST v1.0 online tool in order to incorporate the Illinois Tollway-specific supplements and criteria included in the manual. The second tool is the **Project INVEST Tracking Form (PITF)**, which is designed to facilitate the tracking and incorporation of specific sustainable practices (activities, features or processes that promote sustainability) into projects throughout the planning, design and construction phases.

Benefits

Implementation of INVEST will contribute to increasing the sustainability of projects and will facilitate measurement of the Illinois Tollway's progress toward the *Move Illinois* Program being the "cleanest and greenest" program in Illinois Tollway history. It will also aid the Illinois Tollway with:

- Evaluating past and present sustainability performance
- Setting a baseline against which future improvements can be measured
- Measuring progress in sustainability performance

Sustainable Focus

The use of the tools, methods and deliverables required in the *INVEST Project Development Manual* should not overshadow the Illinois Tollway's primary goal: **to increase the sustainability of Illinois Tollway projects.**

Figure 8. Illinois Tollway's Sustainability Focus

- Identifying and integrating sustainable practices
- Identifying institutional and other barriers that may be preventing implementation of sustainable practices
- Reporting sustainability performance consistently to stakeholders

3.5 Operations and Maintenance Implementation

3.5.1 Introduction

Operations and Maintenance is the third step in the life cycle of a transportation project. This is where infrastructure planned, designed and constructed in prior steps is operated and maintained; data collected and new project needs identified are passed back to the System Planning step to complete the life cycle of projects.

This module focuses on performing system-level operations and maintenance activities in a manner that contributes to the overall sustainability of the highway network. The OM criteria are primarily written for the scoring of an agency's internal and system operations, as well as asset management and maintenance activities performed on the agency's infrastructure. INVEST strives for a balance between providing structure and allowing for flexibility. Therefore, where a requirement seems vague or open to interpretation, it is often done intentionally. This allows agencies the flexibility to score their activities in a way that best meets their unique context and situation.

The OM Module contains 14 criteria combined into a single scorecard.

3.5.2 Operations and Maintenance Evaluation Teams

The Operations and Maintenance program was evaluated by the Illinois Tollway Operations and Maintenance lead, the INVEST consultant and subject matter representatives from the Illinois Tollway (including consultants).

3.5.3 Annual Operations and Maintenance Implementation Process

This section documents the steps necessary to implement INVEST for Illinois Tollway Operations and Maintenance, and identifies the responsible parties and timing for each step.

Step 1. Training

a. Description: Provide training to subject matter representatives regarding the Operations and Maintenance criteria and the process of evaluating the Illinois Tollway's Operations and Maintenance program. The agenda for Illinois Tollway quarterly meetings with consultants should include INVEST.
b. Responsibility:
    i. 2013 and 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway
c. Timing: as needed

Step 2. Goal Setting

a. Description: Set specific achievement goals and opportunities to improve based on the evaluation performed in the prior year, and analysis of that evaluation.
b. Responsibility:
    i. 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC and Illinois Tollway

c. Timing: Annually in late winter/early spring

Step 3. Evaluation

a. Description: Perform an INVEST evaluation of the OM Module. This includes facilitating a workshop with subject matter representatives from the Illinois Tollway and, where beneficial, consultants to work through and score the Illinois Tollway's performance against each of the OM criteria.
b. Responsibility:
    i. 2013 and 2014: INVEST consultant
    ii. Beyond 2014: Illinois Tollway GEC, Illinois Tollway Operations and Maintenance and Illinois Tollway Environmental/Planning
c. Timing: Late winter/early spring each year, set a goal based on previous year

Step 4. QA/QC of Evaluation

a. Description: Perform a quality control and assurance review of the INVEST evaluation to ensure consistency in scoring criteria year-to-year and accuracy of the system.
b. Responsibility: third party
c. Timing: Immediately after annual evaluation

Step 5. Analysis of Evaluation and Identify Opportunities to Improve

a. Description: Review the INVEST evaluation and identify opportunities for improving the sustainability of the Illinois Tollway's Operations and Maintenance program, in conjunction with Illinois Tollway leadership staff and consistent with the goals set in Step #2.
b. Responsibility: INVEST team and Illinois Tollway
c. Timing: Concurrent with QA/QC of evaluation

Step 6. Implementation of Opportunities for Improvement

a. Description: Manage the implementation and execution of activities planned in Step 5.
b. Responsibility: INVEST team and Illinois Tollway
c. Timing: Periodically

Step 7. Reporting

a. Description: Summarize the scores, evaluation and results of the INVEST implementation process in a concise one- to two-page report with high visual content.
b. Responsibility: Illinois Tollway GEC with input and review by Illinois Tollway (Maintenance and Operations)
c. Timing: Reporting for all three modules will occur annually.

Sustainability in System Planning

4.1 Baseline Scores

To provide a baseline measurement of the sustainability of the Illinois Tollway's System Planning program, the Illinois Tollway used the INVEST v1.0 System Planning module to score four baseline years. Figure 9 shows the evaluation year, corresponding capital improvement program, total score and achievement rating for each of these four years. The results indicated that the Illinois Tollway has made steady progress on sustainability over the 13 years evaluated, and that the total scores in recent years are highly accomplished, achieving a platinum rating in 2011 and 2013.

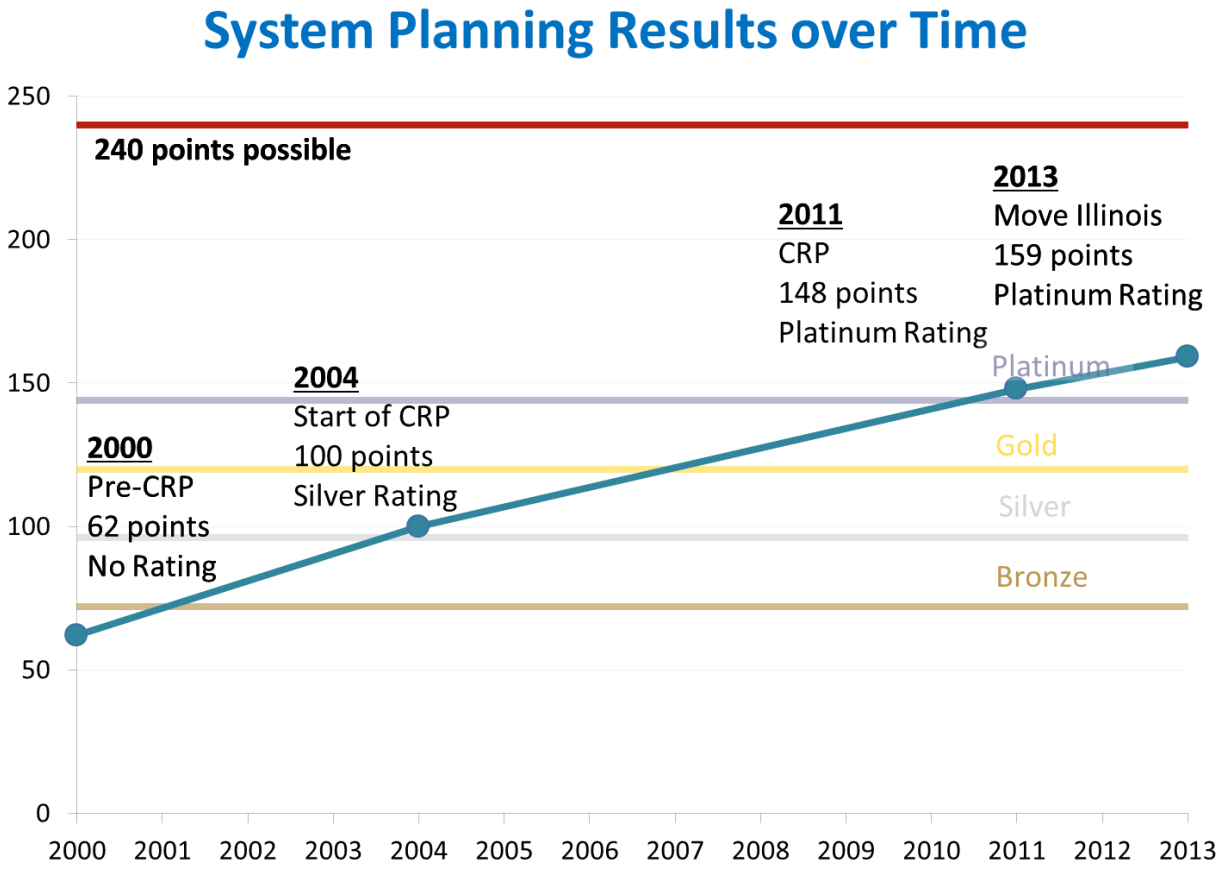

Figure 9. System Planning Baseline Results

The evaluation team included subject matter representatives for each of the criteria from the Illinois Tollway, CMAP and several consultants. As a first step, differences between the capital improvement programs for each of the baseline years evaluated were discussed, and key characteristics of each year evaluated were summarized. The teams evaluated one criterion at a time, question by question, scoring all four baseline years. This process worked well for several reasons:

- The discussion of baseline years and the corresponding capital improvement program characteristics helped refresh the scoring team's memories of when specific actions took place.

- Scoring one criterion at a time for all of the baseline years allowed the teams to evaluate the programs together and helped provide quality control of the scores as the team determined in which years specific actions were implemented at the Illinois Tollway.
- Team scoring worked well to refresh the memories of long-time employees so that scoring was accurate.
- Scoring one criterion at a time allowed for time management of key staff as different team members were needed to score different criteria.

The scoring team used a spreadsheet-based scorecard to track the scores, comments, best practices and potential opportunities to improve in a single spreadsheet so that side-by-side scoring and comments could be tracked. The completed spreadsheet is included in Appendix B. The criteria-by-criteria scores are shown in Table 5 along with a total for each baseline year, the percentage of available points achieved and the achievement level rating accomplished for each year.

Table 5. System Planning Baseline Scores by Criteria

Criteria	Title	Available Points	2000	2004	2011	2013
SP-01	Integrated Planning: Economic Development and Land Use	15	6	7	12	12
SP-02	Integrated Planning: Natural Environment	15	3	7	10	10
SP-03	Integrated Planning: Social	15	7	12	12	12
SP-04	Integrated Planning: Bonus**	10	0	0	0	0
SP-05	Access & Affordability	15	2	2	15	15
SP-06	Safety Planning	15	3	6	9	10
SP-07	Multimodal Transportation and Public Health	15	0	3	7	7
SP-08	Freight and Goods	15	3	9	11	11
SP-09	Travel Demand Management	15	1	2	2	6
SP-10	Air Quality	15	2	6	8	8
SP-11	Energy and Fuels	15	2	4	4	4
SP-12	Financial Sustainability	15	13	15	15	15
SP-13	Analysis Methods	15	2	2	8	8
SP-14	Transportation Systems Management & Operations	15	3	4	9	15
SP-15	Linking Asset Management and Planning	15	7	11	11	11
SP-16	Infrastructure Resiliency	15	0	0	0	0
SP-17	Linking Planning and NEPA	15	8	10	15	15
	System Planning Score:	**240**	**62**	**100**	**148**	**159**
	Percentage:		**26%**	**42%**	**62%**	**66%**
	Rating:		None	Silver	Platinum	Platinum

** not included in total available points

4.2 Best Practices

The Illinois Tollway scored highly on several criteria, demonstrating industry leadership in the following areas:

- Integrating planning with the three principles of the “triple bottom line of sustainability” (social, economic and environmental)
- Leveraging available technologies to improve capacity and efficiency of operations
- Coordinating Operations and Maintenance with Project Development, which is positively affecting efficiency of delivery of Illinois Tollway projects

Table 6 shows best practices recognized during the System Planning evaluation process.

Table 6. Best Practices in System Planning by Criteria

Criterion	Title	Best Practices in System Planning
SP-02	Integrated Planning – Natural Environment	• Illinois Tollway takes a systematic approach to all water crossings, providing natural bottom waterways/ natural substrate waterway crossings. The western segment of the Jane Addams Memorial Tollway (I-90) Rebuilding and Widening Project is a great example. It received a regional permit for more than 30 miles of improvements using minimizing techniques such as steepening side slopes, shortening the size and length of culverts and using guardrails. • An example of an excellent project that went above and beyond is the Illinois Tollway's agreement to help fund restoration of a nature preserve site in Elgin Fox River Country Day School, a multimillion dollar wetland and natural area project that was done in partnership with the city of Elgin and the Forest Preserve District of Kane County, the Conservation Foundation and Max McGraw Wildlife Foundation (which is adjacent to the school property). The Illinois Tollway collaborated with the State Geologic Survey and the State Nature Preserve Commission to preserve this property. This 23-acre preserve will protect the balance of a surviving forested fen community and a restored calcareous seep wetland (both considered imperiled globally.) The site was dedicated as the Fox River Forested Fen Nature Preserve in May 2014. • Consultant staff conducts monthly evaluations against performance standards and meets with maintenance staff to educate staff on the functionality of the BMPs. • Examples of project level above-and-beyond implementation included partnering with local agencies to actively meet wetland mitigation requirements, rather than simply writing a check to another company to handle the mitigation requirements. • The Illinois Tollway installed bioswales to improve water quality and determine different design efficiencies along the north Tri-State Tollway (I-294). In coordination with the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers, the Illinois Tollway implemented 12 miles of bioswales and is monitoring same to identify which designs are most effective. • The Illinois Tollway has project-level metrics for threatened and endangered species and wetland mitigation and monitoring and reports on progress. There are intergovernmental agreements with the Illinois Department of Natural Resources for various performance and monitoring standards.
SP-07	Multimodal Transportation and Public Health	• The Illinois Tollway follows the Complete Streets Public Act, 095-0665, which took effect July 1, 2007. This act states that bicycle and pedestrian ways shall be given full consideration in the planning and development of transportation facilities, including the incorporation of such modes into state plans and programs. It is not clear if the Illinois Tollway is subject to this act. However, the agency complies with the law. Examples include construction of the new Elgin O'Hare Western Access (EOWA), a project that will improve freight operations and provide connectivity to O'Hare International Airport and the I-355 South Extension, both of which will include bike paths. • The new EOWA roadway also will accommodate a transit corridor in the middle of the Elgin O'Hare corridor. Additionally, the plans provide accommodations for shoulder riding busses.
SP-08	Freight and Goods Movement	• The EOWA Project has separated Metra commuter rail from freight, which will improve freight travel time reliability (though was not necessarily the reason for doing so).There is room for improvement, however, for system-level implementation and with policy drivers to provide clear direction and intent; therefore, there are no performance measures for this.
SP-14	Transportation Systems Management and Operations	• The ITS plan is very specifically a TSM and O plan, not just ITS. • I-90 smart work zone concept of operations • Incident management performance measures

4.3 Opportunities to Improve

As the baseline System Planning scores indicate, the Illinois Tollway has established a position of leadership amongst its peers in the transportation industry. With continued focus on its System Planning module, the Illinois Tollway will not only streamline its own processes, but also demonstrate for other agencies how roadway planning can be conducted more effectively and efficiently. That said, the Illinois Tollway has identified the following general areas for improvement:

- Continue coordination with CMAP to positively affect sustainability of analysis methods, air quality and travel demand management in the region and at the Illinois Tollway
- Improve focus on the reduction of energy
- Focus on infrastructure resiliency of Illinois Tollway facilities

Table 7 outlines more specific improvement opportunities identified in the System Planning module.

Table 7. Opportunities to Improve System Planning by Criteria

Criterion	Title	Opportunities to Improve System Planning
SP-01	Integrated Planning – Land Use and Economic Development	• Develop a process to monitor against the performance measures identified in the capital program and document the achievement of its goals and objectives. For example, having contractors provide the Illinois Tollway with data on jobs created.
SP-02	Integrated Planning – Natural Environment	• Establish performance measures and monitor progress against the performance measures.
SP-03	Integrated Planning – Social	• Establish performance measures and monitor progress against the performance measures.
SP-04	Integrated Planning – Bonus	• Include language in planning documents consistent with sustainability practices moving forward; i.e., relate practices back to the “triple bottom line” upon which sustainability is based (social, economic and environmental). Sustainability is part of the process, but it is not currently articulated as such in plans.
SP-07	Multimodal Transportation and Public Health	• Develop performance measures and then monitor and document progress against the measures.
SP-08	Freight and Goods Movement	• Develop performance measures and then monitor and document freight mobility and reliability progress against the measures.
SP-10	Air Quality	• Continue and enhance coordination with CMAP on air quality goal setting, analysis and measurement and monitoring of progress.
SP-13	Analysis Methods	• CMAP would entertain a recommendation to formalize the technical ad hoc committees that currently review the travel demand modeling tools.
SP-15	Linking Asset Management and Planning	• The Illinois Tollway does use BCA. However, it is not a formalized process. Develop a recommendation to formalize the process.
SP-16	Infrastructure Resiliency	• Establish a GIS-based system-level assessment of potential hazards and then identify locations of vulnerability. Additionally, establish a recommendation to do a vulnerability assessment and consider the hazard consequences for some of its planned, programmed and existing facilities throughout the transportation system.

4.4 Lessons Learned

The following lessons were learned while implementing the System Planning program:

- For System Planning, it is important to coordinate between the infrastructure owning agency and MPO to ensure that all questions can be answered.
- The process of scoring the System Planning program and the discussion was as important to the process as the scores.
- It is important to identify key discipline leads that can score the criteria in a workshop.
- It is important to invite staff (or prior staff) with institutional knowledge to answer questions when scoring baseline years.
- When scoring multiple baseline years, the early discussion of the differences between the years being evaluated was exceptionally helpful when scoring the criteria.
- This process takes time; plan 45 to 60 minutes per criterion and have a strong facilitator.
- The discussion happens quickly; it would have been helpful to have an audio recording of the conversation to capture best practices and opportunities to improve, as it was difficult to record this information during the meeting.
- Expect follow-up to the meeting to fill in gaps; some questions were not resolved in the meeting.
- A session after the scoring workshop with the primary contact for each criterion helped QA/QC the scores.
- Staff want to award too many or too little points to themselves at times; it takes a strong facilitator who is very familiar with INVEST to manage the discussion and adjudicate the responses.

4.5 Recommendations for FHWA to Improve INVEST SP Module

Comments were transmitted to FHWA on April 9, 2014, for consideration in the development of Versions 1.1 and 1.2 of INVEST. A table summarizing the comments can be found in Appendix C.

SECTION 5

Sustainability in Project Development

This section reviews the two categories of projects that the Illinois Tollway has evaluated to date. The first category is a group of 22 baseline construction projects that were completed between 1998 and 2012. The second category includes all initial and ongoing projects from the *Move Illinois* Program.

5.1 Projects Evaluated

This section lists the projects that were evaluated by the Illinois Tollway and describes the evaluation processes of both categories of evaluated projects.

5.1.1 Baseline Projects Evaluated

Table 8 lists the 22 baseline projects evaluated by the Illinois Tollway. These projects have construction completion dates of 1998 – 2012 and were constructed before the INVEST rating system was adopted by the Illinois Tollway. Initially, ARA, one of the Illinois Tollway's consultants, performed an examination of documents available in the Tollway's online document controls system and the archived job boxes containing the paper files for the projects. ARA completed preliminary scores for the elements for which they could find evidence and then the INVEST team reviewed the initial evaluations and added scoring information for more criteria based on discussions with the Illinois Tollway (e.g., we knew that the Illinois Tollway's approach to PD-06: Tracking Environmental Commitments does not meet the INVEST criterion).

Table 8. Baseline Projects Evaluated

Contract No.	Corridor	Project Type and Description	Location Description	Construction Completed	Capital Program	Pavement Type
0723	I-88	Widening and reconstruction	Illinois Route 59 to Aurora Toll Plaza (Plaza 61)	1998	Pre-CRP	PCC
5061	I-90	Roadway resurfacing	Close to U.S. Route 20 to Illinois Route 31	2004	CRP	HMA
5115	I-294	Mainline roadway widening and reconstruction northbound	Devon Avenue to past Touhy Avenue	2007	CRP	PCC
5151	I-90	Bridge No. 611 replacement	Close to U.S. Route 20	2006	CRP	BRIDGE
5198	I-88	Roadway reconstruction	Illinois Route 59 to Naperville Road	2004	CRP	PCC
5228	I-94	Southbound roadway reconstruction and widening	Illinois Route 176 to Buckley Road (Illinois Route 137)	2008	CRP	PCC
5337	I-90	Roadway and bridge reconstruction	Devon Avenue Toll Plaza (Plaza 17)	2005	CRP	BRIDGE
5339	I-90	Plaza 1 - open road tolling	South Beloit Toll Plaza (Plaza 1)	2006	CRP	HMA
5372	I-88	DeKalb Plaza 66 relocation and DeKalb Plaza 67 reconstruction	Annie Glidden Road to Shabbona Road	2006	CRP	HMA

Contract No.	Corridor	Project Type and Description	Location Description	Construction Completed	Capital Program	Pavement Type
5459	I-88	Roadway rehabilitation, rubblization* and resurfacing	Station 2349+48 to Station 4032+50	2005	CRP	HMA
5460	I-88	Roadway rehabilitation, rubblization* and resurfacing	Station 2349+48 to Station 4032+50 and DeKalb West Toll Plaza	2005	CRP	HMA
5461	I-88	Eastbound roadway reconstruction and widening	Deerpath Road to North Lake Street	2008	CRP	BRIDGE
5494	I-88	Westbound reconstruction and widening	Finley Road to Illinois Route 83	2008	CRP	PCC
5541	I-90	Grading and drainage, rubblization*, pavement widening and bridge substructure widening	Illinois Route 173 to Cherry Valley Interchange	2009	CRP	HMA
5542	I-90	Roadway and bridge reconstruction eastbound	South Beloit Toll Plaza (Plaza 1) to Illinois Route 173	2008	CRP	HMA
5624	I-88	Roadway reconstruction (Two-lift)	Reagan, MP 113.2 - 114, Roadway Reconstruction	2012	CRP	PCC
7706	I-355	I-355 South Extension crossroad bridges	Throughout corridor	2006	CRP	BRIDGE
7710	I-355	I-355 South Extension	Station 430+00 to Station 505+19.50	2007	CRP	PCC
7711	I-355	I-355 South Extension paving and bridge improvements	Stevenson Expressway (I-55) and I-355 interchange	2006	CRP	BRIDGE
7713	I-355	I-355 South Extension	Station 505+19.50 to Station 596+00	2006	CRP	PCC
8939	I-80/I-294	Roadway and bridge reconstruction and widening	Illinois Route 394 to Center Street	2005	CRP	PCC
8972	I-294	Northbound roadway and bridge reconstruction and widening	Kedzie Avenue to 135th Street	2009	CRP	BRIDGE

*Rubbilization: The process of destroying the structure of a concrete pavement in place, then using the "rubble" at the current roadway location rather than as construction waste.

5.1.2 *Move Illinois* Projects Evaluated

Table 9 lists the 17 completed and ongoing *Move Illinois* projects evaluated by the Illinois Tollway. Most (15) of these projects had construction completion dates of 2013 and 2014 and two of the 17 are ongoing projects that were evaluated at approximately the 30 percent design level. The Illinois Tollway and its GEC performed preliminary evaluations of the completed projects in collaboration with the DCMs and CCMs. The INVEST consultant performed a review of each of these scores to ensure consistency in scoring assumptions. The Illinois Tollway and the INVEST team met with the DSEs and

project discipline leads for the two in-design projects and completed scorecards in workshops. The INVEST team then reviewed these for consistency with the 15 completed projects and adjusted notes and scores as needed. Scores for the two in-design projects became the projects' target INVEST scores to which the projects will strive to accomplish.

Table 9. *Move Illinois* Project Evaluated

Contract No.	Corridor and Project Description	PINS Form	Construction Completed	Pavement Type
4000	I-90 Interchange with Illinois Route 47	CSC	2013	PCC
4040	EOWA – Arlington Heights Road to Lively Boulevard	30% Design	2017	HMA
4041	EOWA - Lively Road to Illinois Route 83	30% Design	2016	HMA
4070	I-90 western segment : Kishwaukee River Bridge, eastbound	CSC*	2013	Bridge
4072	I-90 western segment: eastbound Mill Road to Genoa Road	CSC*	2013	HMA
4073	I-90 western segment: eastbound Genoa Road to Anthony Road	CSC*	2013	HMA
4074	I-90 western segment: eastbound Anthony Road to U.S. Route 20	CSC*	2013	HMA
4075	I-90 western segment: eastbound U.S. Route 20 to Illinois Route 47	CSC*	2013	HMA
4076	I-90 western segment: eastbound Illinois Route 47 to Union Pacific Railroad	CSC*	2013	HMA
4077	I-90 western segment: eastbound Union Pacific Railroad Bridge and mainline pavement to Elgin Toll Plaza (Plaza 9)	CSC*	2013	HMA
4115	I-90 western segment: westbound Union Pacific Railroad Bridge and mainline pavement to Elgin Toll Plaza (Plaza 9)	CSC*	2014	HMA
4124	I-90 western segment: westbound Illinois Route 47 to Union Pacific Railroad	CSC*	2014	HMA
4126	I-90 western segment: westbound Anthony Road to U.S. Route 20	CSC*	2014	HMA
4133	I-90 western segment: westbound Genoa Road to Anthony Road	CSC*	2014	HMA
4134	I-90 western segment: westbound Mill Road to Genoa Road	CSC*	2014	HMA
4136	I-90 western segment: westbound U.S. Route 20 to Illinois Route 47	CSC*	2014	HMA
4137	I-90 western segment: Kishwaukee River Bridge, westbound Mill Road to east of KRB - includes mainline	CSC*	2014	HMA

CSC-Construction substantial complete

5.1.3 Corridors Evaluated

Table 10 shows the three corridors evaluated as part of the INVEST Implementation. To score each corridor, the Illinois Tollway and the INVEST team met with the DCM, CCM, and project discipline leads and evaluated and discussed the corridors at length. Afterward, the INVEST team reviewed the scores for consistency and summarized the results and the Illinois Tollway reviewed the innovative criteria descriptions.

Table 10. Corridor Evaluations Completed

Corridor	Corridor Name
I-90 eastern segment	Jane Addams Memorial Tollway
I-90 western segment	Jane Addams Memorial Tollway
EOWA	Elgin O'Hare Western Access

The corridor scores included a note for each criterion that stated how design sections were scored relative to the corridor score (e.g., "All sections use this score" or "Sections score independently based on unique features"). These scores are now available to assist the Illinois Tollway with scoring the remaining projects in each corridor and are being provided to the DSEs for their use in leading INVEST evaluations for their sections, and to the DCMs within their corridors.

5.2 Project Scores

5.2.1 Total Scores

Table 11 summarizes the scores for the 22 baseline and for the 17 completed and ongoing *Move Illinois* projects evaluated. Scores for baseline projects are shown first and range from 11 points to 39 points. The 17 *Move Illinois* projects follow, with a scoring range from 56 to 88 points, with one bronze rating, 13 silver ratings and three gold ratings in the group. The *Move Illinois* scores are preliminary and will be finalized through Illinois Tollway management.

Table 11. Baseline and Preliminary *Move Illinois* Project Scores[1]

Project Information		Scorecard Summary			
Contract No.	Project Description	Scorecard	Total Score	Percentage Total Points	Rating[2]
723	I-88, Illinois Route 59 to Aurora Toll Plaza (Plaza 61)	Urban Basic	12	9%	none
5061	I-90, close to U.S. Route 20 to Illinois Route 31	Paving	11	15%	none
5115	I-294, Devon Avenue to past Touhy Avenue	Urban Extended	33	21%	none
5151	I-90, close to U.S. Route 20	Rural Basic	13	12%	none
5198	I-88, Illinois Route 59 to Naperville Road	Urban Extended	22	14%	none

Project Information		Scorecard Summary			
Contract No.	**Project Description**	**Scorecard**	**Total Score**	**Percentage Total Points**	**Rating[2]**
5228	I-94, Illinois Route 176 to Buckley Road (Illinois Route 137)	Urban Extended	35	22%	none
5337	I-294, Devon Avenue Toll Plaza (Plaza 17)	Urban Basic	30	23%	none
5339	I-90, South Beloit Toll Plaza (Plaza 1)	Rural Basic	26	23%	none
5372	I-88, Annie Glidden Road to Shabbona Road	Rural Basic	18	16%	none
5459	Station 2349+48 to Station 4032+50	Paving	17	23%	none
5460	I-88, Station 2349+48 to Station 4032+50 and DeKalb West Plaza	Paving	17	23%	none
5461	I-88, Deerpath Road to North Lake Street	Urban Extended	17	11%	none
5494	I-88, Finley Road to Illinois Route 83	Urban Extended	28	18%	none
5541	I-90, Illinois Route 173 to Cherry Valley Interchange	Urban Extended	39	25%	none
5542	I-90, South Beloit Toll Plaza (Plaza 1) to Illinois Route 173	Urban Extended	31	19%	none
5624	I-88, –close to Illinois Route 56, roadway reconstruction	Rural Extended	33	23%	none
7706	I-355, several bridge improvements	Rural Basic	19	17%	none
7710	Station 430+00 to Station 505+19.50	Rural Extended	27	19%	none
7711	I-355, Stevenson Expressway (I-55) and I-355 interchange paving and bridge improvements	Urban Extended	29	18%	none
7713	Station 505+19.50 to Station 596+00	Urban Extended	26	16%	none
8939	I-80/I-294, Illinois Route 394 to Center Street	Urban Extended	33	21%	none
8972	I-294, Kedzie Avenue to 135th Street	Urban Extended	30	19%	none
4000	I-90 Interchange with Illinois Route 47	Urban Extended	88	55%	Gold
4040	EOWA – Arlington Heights Road to Lively Boulevard	Urban Extended	80	50%	Gold[3]
4041	EOWA - Lively Boulevard to Illinois Route 83	Urban Extended	84	53%	Gold[3]
4070	I-90 western segment: Kishwaukee River Bridge, eastbound	Urban Extended	56	35%	Bronze
4072	I-90 western segment: eastbound Mill Road to Genoa Road	Urban Extended	64	40%	Silver

Project Information		Scorecard Summary			
Contract No.	**Project Description**	**Scorecard**	**Total Score**	**Percentage Total Points**	**Rating[2]**
4073	I-90 western segment: eastbound Genoa Road to Anthony Road	Urban Extended	70	44%	Silver
4074	I-90 western segment: eastbound Anthony Road to U.S. Route 20	Urban Extended	69	43%	Silver
4075	I-90 western segment: eastbound U.S. Route 20 to Illinois Route 47	Urban Extended	71	45%	Silver
4076	I-90 western segment: eastbound Illinois Route 47 to Union Pacific Railroad	Urban Extended	66	42%	Silver
4077	I-90 western segment: eastbound Union Pacific Railroad Bridge and mainline pavement to Elgin Toll Plaza (Plaza 9)	Urban Extended	71	45%	Silver
4115	I-90 western segment: westbound Union Pacific Railroad Bridge and mainline pavement to Elgin Toll Plaza (Plaza 9) (includes Sleepy Hollow Road and Union Pacific Railroad bridges)	Urban Extended	73	46%	Silver
4124	I-90 western segment: westbound Illinois Route 47 to Union Pacific Railroad	Urban Extended	66	42%	Silver
4126	I-90 western segment: westbound Anthony Road to U.S. Route 20	Urban Extended	71	45%	Silver
4133	I-90 western segment: westbound Genoa Road to Anthony Road	Urban Extended	69	43%	Silver
4134	I-90 western segment: westbound Mill Road to Genoa Road	Urban Extended	64	40%	Silver
4136	I-90 western segment: westbound U.S. Route 20 to Illinois Route 47	Urban Extended	71	45%	Silver
4137	I-90 western segment: Kishwaukee River Bridge, westbound Mill Road to east of KRB, includes mainline	Urban Extended	74	47%	Silver

1. The *Move Illinois* project scores are preliminary scores and subject to change

2. Ratings use the same percentages as INVEST v1.0 (i.e., 30%, 40%, 50% and 60%).

3. Achievement level based on 30% Design.

5.2.2 Scores by Criterion

Each of the baseline and *Move Illinois* projects evaluated were scored using the extended scorecard initially and then the appropriate scorecard was applied to derive the percentage and achievement ratings. Appendix D contains a table of the 22 baseline and 17 *Move Illinois* projects and their scores by criteria. These scores are discussed in more detail in Section 5.4.

5.3 Corridor Scores

Table 12 shows the scores for each of the three *Move Illinois* corridors evaluated. Each of these corridors scored in the gold achievement level range.

Table 12. Preliminary *Move Illinois* Corridor Scores by Criteria[1]

Criterion	Title	Available Points	I-90 East Corridor Score	I-90 West Corridor Score	EOWA Corridor Score
PD-01	Economic Analyses	5	0	0	0
PD-02	Life-Cycle Cost Analyses	3	2	2	1
PD-03	Context-Sensitive Project Development	5	5	5	5
PD-04	Highway and Traffic Safety	10	1	1	1
PD-05	Educational Outreach	2	2	2	2
PD-06	Tracking Environmental Commitments	5	0	0	0
PD-07	Habitat Restoration[2]	3	3	3	3
PD-08	Stormwater	9	5	4	8
PD-09	Ecological Connectivity[2]	3	3	3	3
PD-10	Pedestrian Access	2	1	0	2
PD-11	Bicycle Access	2	1	1	2
PD-12	Transit and HOV Access	5	3	3	3
PD-13	Freight Mobility[2]	7	7	2	4
PD-14	ITS for System Operations	5	5	5	5
PD-15	Historical, Archaeological and Cultural Preservation	3	0	0	0
PD-16	Scenic, Natural or Recreational Qualities	3	0	0	0
PD-17	Energy Efficiency[2]	8	3	3	3
PD-18	Site Vegetation[2]	3	3	3	3
PD-19	Reduce and Reuse Materials[2]	8	8	3	6
PD-20	Recycle Materials[2]	8	7	7	3
PD-21	Earthwork Balance[2]	3	1	2	1
PD-22	Long-Life Pavement Design	5	0	0	0
PD-23	Reduced Energy and Emissions in Pavement	3	0	3	0
PD-24	Contractor Warranty[2, 3]	-	-	-	-
PD-25	Construction Environmental Training	1	0	0	1
PD-26	Construction Equipment Emission Reduction	2	2	2	2
PD-27	Construction Noise Mitigation	2	0	0	2

Criterion	Title	Available Points	I-90 East Corridor Score	I-90 West Corridor Score	EOWA Corridor Score
PD-28	Construction Quality Control Plan	5	5	5	5
PD-29	Construction Waste Management	3	0	0	0
PD-50T	Alignment Selection (Illinois Tollway-Specific)	6	0	0	5
PD-51T	Visual Aesthetics (Illinois Tollway-Specific)	5	2	1	4
PD-52T	Noise Abatement (Illinois Tollway-Specific)	5	0	4	0
PD-53T	Reduce, Reuse and Recycle Materials (Design) (Illinois Tollway-Specific)	12	7	7	8
PD-54T	Light Pollution (Illinois Tollway-Specific)	3	2	2	2
PD-55T	Regional Employment (Illinois Tollway-Specific)	3	0	0	0
PD-56T	Permeable Pavement (Illinois Tollway-Specific)	2	0	0	0
PD-57T	Innovations (Illinois Tollway-Specific)[4]	9	6	9	7
	Total Project Development Score	**159**	**84**	**82**	**91**
	Achievement Level		**Gold**	**Gold**	**Gold**

1. The *Move Illinois* project scores are preliminary scores and subject to change

2, There is an Illinois Tollway-specific supplement for this criterion.

3. Not used at the Illinois Tollway.

4. Not included in total available points because these are considered a bonus.

5.4 Analysis of Scores

5.4.1 Performance by Criterion

Table 13 summarizes the Illinois Tollway's performance on each criterion and provides the average score accomplished in the baseline projects, *Move Illinois* projects and *Move Illinois* corridors evaluated.

Table 13. Analysis of Illinois Tollway Project and Corridor Scores by Criteria

Criterion	Title	Available Points	Average Score	Analysis of Criterion Scoring
PD-01	Economic Analyses	5	0.0	Illinois Tollway typically performs EIA at corridor-level during planning and project programming or at the project level for stand-alone project but does not perform a BCA; therefore, did not earn any credit.
PD-02	Life-Cycle Cost Analyses	3	1.0	The Illinois Tollway typically performs an LCCA on the pavement section alternatives and at times performs one on the bridge alternatives. However, most of the drainage features are prescriptive from the Drainage Design Manual and an LCCA may not provide additional value.
PD-03	Context-Sensitive Project Development	5	3.3	Most scoring elements are typically met on Illinois Tollway projects, except creating public champions which must be

Criterion	Title	Available Points	Average Score	Analysis of Criterion Scoring
				considered on a project-by-project basis. Newer projects earned higher scores.
PD-04	Highway and Traffic Safety	10	0.5	Based largely on the AASHTO *Highway Safety Manual*, 1st edition, published in 2010, an evolving practice of predicting and modeling future accidents instead of looking at past statistical data. All projects were initiated before 2010 and won't typically earn this credit.
PD-05	Educational Outreach	2	1.4	Most of the scoring requirements related to public and agency involvement were accomplished at a corridor level on newer projects; it was difficult to find evidence on older projects.
PD-06	Tracking Environmental Commitments	5	0.0	The Illinois Tollway does not have a tracking system in place and the best practices did not carry from planning through to maintenance.
PD-07	Habitat Restoration**	3	1.1	Depends on the project alignments and types. The Illinois Tollway has some best practices demonstrated in this area.
PD-08	Stormwater	9	3.0	The Illinois Tollway performed well with respect to using BMPs and LID techniques. Newer projects are treating and managing more runoff, but older projects typically did not meet the minimum amount of runoff treated or managed.
PD-09	Ecological Connectivity**	3	1.3	Depends on the project alignments and types. The Illinois Tollway had some projects that performed well here.
PD-10	Pedestrian Access	2	0.5	Pedestrian facilities typically on crossroad bridges. However, did not always meet safety, comfort, connectivity and aesthetics and environment factors to qualify for credit.
PD-11	Bicycle Access	2	0.3	Bicycle facilities typically on crossroad bridges. However, did not always meet safety, comfort, connectivity and aesthetics and environment factors.
PD-12	Transit and HOV Access	5	1.4	Transit and HOV access are not priorities for the Illinois Tollway and would reduce their revenues. More thought on newer projects.
PD-13	Freight Mobility**	7	1.4	Mostly obtained points for restricting truck air braking in Illinois Tollway supplement.
PD-14	ITS for System Operations	5	2.8	The Illinois Tollway performed very well on this criterion on newer projects.
PD-15	Historical, Archaeological and Cultural Preservation	3	0.0	Illinois Tollway projects do not typically meet prerequisites.
PD-16	Scenic, Natural or Recreational Qualities	3	0.0	Illinois Tollway projects do not typically meet prerequisites.
PD-17	Energy Efficiency**	8	1.5	The Illinois Tollway started requiring LED installation in 2012, after many of the projects were designed. Newer projects scored better.
PD-18	Site Vegetation**	3	2.0	Design guidelines determined in planning and design. Includes native, non-invasive and non-toxic species, as well as maintenance and watering issues.

Criterion	Title	Available Points	Average Score	Analysis of Criterion Scoring
PD-19	Reduce and Reuse Materials**	8	3.0	Typically obtained credit for industrial byproducts (fly ash) and rubblization. Newer projects testing more sustainable options and earned more points, but sometimes didn't meet the criterion thresholds with test areas.
PD-20	Recycle Materials**	8	4.0	Typically obtained credit for RAP/RCA. Newer projects scored better.
PD-21	Earthwork Balance**	3	1.0	Evidence of balance within 10 percent was difficult to find. Newer projects performed better. Illinois Tollway supplement to reuse topsoil was generally earned.
PD-22	Long-Life Pavement Design	5	2.0	Illinois Tollway is typically designing HMA for 35-37 years (just shy of the 40 years required). PCC typically earned credit.
PD-23	Reduced Energy and Emissions in Pavement	3	0.3	There are no Energy Star certified concrete plants in the Chicagoland area. Points were typically earned for warm-mix asphalt, which is being used on shoulders on newer projects. However, they often didn't meet the minimum threshold to get credit.
PD-24	Contractor Warranty** (1)	-	-	Extended pavement warranties are not within Illinois Tollway policy and this criterion was excluded from consideration.
PD-25	Construction Environmental Training	1	0.1	Not currently required by Illinois Tollway; is an opportunity on ongoing corridors.
PD-26	Construction Equipment Emission Reduction	2	1.5	Illinois Tollway Standard Specification 107.37: Construction Air Quality earns all points in the table except those related to larger hauling vehicles.
PD-27	Construction Noise Mitigation	2	0.1	Not currently required by Illinois Tollway; is an opportunity on ongoing projects.
PD-28	Construction Quality Control Plan	5	3.7	The Illinois Tollway's Quality Control Program Manual meets this criterion.
PD-29	Construction Waste Management	3	0.0	Not currently required by Illinois Tollway; is an opportunity on ongoing corridors.
PD-50T	Alignment Selection†	6	0.5	Illinois Tollway earned credit for reducing right-of-way takes and reducing impacts to socioeconomic resources on some projects. This is dependent on alignments.
PD-51T	Visual Aesthetics†)	5	0.5	On newer projects, earned credit for obstructing objectionable views, on crossroads for matching community context-sensitive design elements, and for aesthetics on bridges and walls.
PD-52T	Noise Abatement†	5	0.5	Quiet pavements rarely used and didn't get credit; did get credit for site screening.
PD-53T	Reduce, Reuse and Recycle Materials (Design) †	12	5.2	Often earned credit for allowing RAP/RCA, allowing industrial by-products and allowing subgrade pavement reduction techniques.
PD-54T	Light Pollution†	3	0.9	Newer projects are full cut-off and meet the scoring requirements.
PD-55T	Regional Employment†	3	0.0	The Illinois Tollway's I-WORK Program would meet the criteria, but it wasn't used on any of the projects evaluated.

Criterion	Title	Available Points	Average Score	Analysis of Criterion Scoring
PD-56T	Permeable Pavement†	2	0.0	Permeable pavements were used on some projects, but did not meet the minimum threshold requirements in the criterion.
PD-57T	Innovations†	9	3.0	The Illinois Tollway demonstrated strong innovative best practices. See Section 5.4.2 for more information.

** Indicates there is an Illinois Tollway-specific supplement for this criterion.

† Indicates this is an Illinois Tollway-specific criterion

5.4.2 Best Practices

Table 14 shows best practices recognized in the scoring of the three *Move Illinois* corridors mentioned in Section 4.1.3, the baseline projects and *Move Illinois* projects discussed above.

Table 14. Best Practices from Project and Corridor Scores by Criteria

Criterion	Title	Best Practices in Sustainable Project Development
PD-01	Economic Analyses	• The Illinois Tollway typically performs an EIA at the corridor-level during planning and project programming or at the project level for stand-alone projects.
PD-07	Habitat Restoration**	• On the western segment of the I-90 Corridor, the Illinois Tollway acquired the Fox River Day School property and, as part of their mitigation, is protecting the forested fen on this Illinois Natural Areas Inventory site. As a results of the enhancements on this site, it has been designated as a full dedicated nature preserve. • The I-90 western segment includes the installation of a snake hibernaculum at the Orland South Mitigation site, which is above and beyond the required mitigation.
PD-08	Stormwater	• On the EOWA Project, the Illinois Tollway had a unique approach to meeting FAA requirements for vegetation type and open waters (all detention has to drain in 48 hours or be covered by wire or netting to prohibit nesting birds). The DCM modeled each basin to check drawdown time and when it was within 1 foot or so of the bottom, they designed a rock layer on the bottom to "hide" standing water from nuisance birds. • On the EOWA Project, for the first flush, a geogrid was designed for the bottom of detention ponds to prevent silting of the rock layer on bottom of ponds. • On the EOWA Project, the Illinois Tollway developed a corridorwide master plan to reduce annual chloride in the watershed by 4,860 tons; provided adjacent communities with training and equipment and reduced Illinois Tollway deicing to reduce chloride runoff to water bodies. Program also includes data collection and annual reassessment of the program. • On the EOWA Project, the Illinois Tollway developed a corridorwide master plan for BMPs in the early planning phase. • On I-90 eastern segment, an open-bottom, oversized detention box was used to promote infiltration in areas where sandy/gravely soils are expected. This is the “Inline Infiltration Box” detail proposed by the DCM and contained within the I-90 eastern segment BMP toolbox. • On the I-90 eastern segment, the Illinois Tollway is developing a sand filter catch basin for use as a test/pilot project.
PD-12	Transit and HOV Access	• On the EOWA Project, the Illinois Tollway accommodated for future transit in the median (transit ROW reservation - will accommodate BRT or LRT). To do this, the shoulders were widened from 4 to 12', the rumble strip was reduced, a grade of 2 percent was used and the shoulder pavement section (and 14' inside lane allows 2' buffer) was increased.

Criterion	Title	Best Practices in Sustainable Project Development
PD-14	ITS for System Operations	• The Illinois Tollway demonstrates extensive use of available technologies to improve incident management, safety and operational efficiency.
PD-17	Energy Efficiency**	• The Illinois Tollway started requiring LED installation in 2012. • On the I-90/Illinois Route 47 Project, there are four buildings on the site. Geothermal heating/cooling was installed on the two larger buildings that feed the two smaller buildings, a trellis was designed for shading and the buildings were constructed with white roofs to reduce heat transfer. These electrical consumption initiatives were monitored after installation so that they could be compared with the adjacent (baseline) interchange to quantify actual savings.
PD-18	Site Vegetation**	• The Illinois Tollway has strong vegetative management planning that includes native, non-invasive and non-toxic species, as well as maintenance and watering issues.
PD-19	Reduce and Reuse Materials**	• The Illinois Tollway leverages progressive investigation and use of methods to reduce and reuse materials including rubblization, subbase stabilization and the use of industrial by-products.
PD-20	Recycle Materials**	• The Illinois Tollway leverages progressive investigation and use of methods to recycle, reduce and reuse materials including tires, RAP, RCA and shingles. Often the Illinois Tollway didn't get credit for these methods because they didn't meet minimum scoring thresholds.
PD-21	Earthwork Balance**	• The EOWA Corridor prepared a Corridor Earthwork Management Plan that consisted of stockpiling and reusing materials. • The Illinois Tollway is proactive balancing earthwork on projects and between projects.
PD-26	Construction Equipment Emission Reduction	• Illinois Tollway Standard Specification 107.37: Construction Air Quality earns all points in the table except those related to larger hauling vehicles.
PD-28	Construction Quality Control Plan	• The Illinois Tollway's Quality Control Program Manual meets this criterion.
PD-50T	Alignment Selection†	• On EOWA, the eastern segment is a new Tollway roadway. The Tollway utilized existing local roads where possible in order to reduce environmental and socioeconomic impacts.
PD-53T	Reduce, Reuse and Recycle Materials (Design) †	• The Illinois Tollway leverages progressive investigation and use of methods to reduce and reuse materials, including rubblization, subbase stabilization and the use of industrial by-products. • The Illinois Tollway leverages progressive investigation and use of methods to recycle, reduce and reuse materials including tires, RAP, RCA and shingles. Often the Illinois Tollway didn't get credit for these methods because they didn't meet minimum scoring thresholds.
PD-56T	Permeable Pavement†	• The I-90/Illinois Route 47 Project used permeable pavements on shoulders.
PD-57T	Innovations†	• The Illinois Tollway used innovative bridge materials and methods including stainless steel bridge reinforcement to extend bridge deck life, high-performance bridge deck concrete throughout and jointless bridge decks using integral abutment designs on the western segment of the I-90 Corridor. • On the EOWA Project, the Illinois Tollway used innovative paving materials and methods including composite concrete pavement (first massive application of RAP used in concrete pavement mixes), allowing limestone extensions in cements in the corridor and using a two-lift method for placing pavements. • Geothermal heating/cooling systems were installed in support buildings, thereby

Criterion	Title	Best Practices in Sustainable Project Development
		lowering utility costs. A study was designed to compare utility costs of these buildings with comparable buildings to quantify the savings and help determine if the Illinois Tollway wants to adopt geothermal systems for other structures. • Developed corridor master plan to reduce annual chloride in watershed by 4,860 tons; provided adjacent communities with training and equipment, reduced Illinois Tollway deicing. Program also includes data collection and annual reassessment of the program.

** Indicates there is an Illinois Tollway-specific supplement for this criterion.

† Indicates this is an Illinois Tollway-specific criterion

5.4.3 Opportunities to Improve

Table 15 shows opportunities to improve that were recognized in the scoring of the three corridors mentioned in Section 5.1.3, the baseline projects and the *Move Illinois* projects discussed above.

Table 15. Opportunities to Improve: Project Development Module

Criterion	Title	Opportunities to Improve Sustainability in Project Development
PD-01	Economic Analyses	• The Illinois Tollway should consider performing a BCA when warranted to help support justification of improvements given their social, economic and environmental impact.
PD-02	Life-Cycle Cost Analyses	• The Illinois Tollway may want to consider performing an LCCA of differing bridge types to support their preferred selection of types used. This would provide an objective rationale for the investment in one bridge type over another in certain circumstances. • Likewise, the Illinois Tollway may want to consider performing an LCCA of preferred stormwater solutions to add support to the justification for selecting each method.
PD-04	Highway and Traffic Safety	• This criterion is based largely on the AASHTO *Highway Safety Manual*, 1st edition, published in 2010, an evolving practice of predicting and modeling future accidents instead of looking at past statistical data. The Illinois Tollway should examine the Highway Safety Manual and requirements and incorporate the practices that add value to the Illinois Tollway's processes.
PD-06	Tracking Environmental Commitments	• The Illinois Tollway should develop an official environmental commitments tracking system (see OM-06) that records and ensures that commitments made from planning through maintenance are monitored and completed.
PD-08	Stormwater	• The Illinois Tollway should examine the scoring requirements for runoff treatment and management and ensure that their program meets the rigor of this criterion.
PD-10	Pedestrian Access	• When designing pedestrian facilities, the Illinois Tollway should ensure that safety, comfort, connectivity and aesthetics and environment factors are thoroughly considered.
PD-11	Bicycle Access	• When designing bicycle facilities, the Illinois Tollway should ensure that safety, comfort, connectivity and aesthetics and environment factors are thoroughly considered.
PD-12	Transit and HOV Access	• The Illinois Tollway has the opportunity to consider more transit and HOV solutions in its corridors.
PD-22	Long-Life Pavement Design	• Illinois Tollway is typically designing HMA for 35-37 years and could modify this to a minimum of 40 years to meet the rigor of this criterion.

Criterion	Title	Opportunities to Improve Sustainability in Project Development
PD-25	Construction Environmental Training	• The Illinois Tollway has the opportunity to require this by standard specification.
PD-27	Construction Noise Mitigation	• The Illinois Tollway has the opportunity to require this by standard provision on projects with sensitive receptors adjacent to the roadway.
PD-29	Construction Waste Management	• The Illinois Tollway has the opportunity to require this by standard specification.

5.5 Lessons Learned

The following lessons were learned while implementing the Project Development module:

- The process of scoring the Project Development program and the resulting discussions were as important to the process as the scores.
- It is important to identify key discipline leads that can score the criteria in a workshop. With some planning, staff can be brought in to participate in different scoring criteria at different times.
- This process takes time; plan four to eight hours for the preliminary workshop.
- The discussion happens quickly; it would have been helpful to have an audio recording of the conversation to capture best practices and opportunities to improve as it was difficult to record this information during the meeting.
- Expect follow-up to the meeting to fill in gaps; some questions were not resolved in the meeting.
- A session after the scoring workshop with the primary contact for each criterion helped QA/QC the scores.
- With this new tool, DSEs and CMs tend to give too many points or too little points to the project at times; it takes a strong facilitator who is very familiar with INVEST to manage the discussion and adjudicate the responses.

It is important to look at the agency's process for project development and align the scoring to that process. For example, the Tollway looks at the project early to set a target score, then later to set an as-designed score and, finally, at construction substantial completion, to get an as-constructed score. Each of these scores is helpful in revisiting the project and updating scores as needed.

5.6 Recommendations for FHWA to Improve INVEST PD Module

Comments were transmitted to FHWA on April 9, 2014, for consideration in the development of Versions 1.1 and 1.2 of INVEST. A table summarizing the comments can be found in Appendix C.

Sustainability in Operations and Maintenance

6.1 Baseline Scores

To provide a baseline measurement of the sustainability of Illinois Tollway's Operations and Maintenance program, the Tollway used the INVEST v1.0 Operations and Maintenance module to score four baseline years. Figure 10 shows the evaluation year, corresponding capital improvement program, total score and achievement rating for each of these four years. The results indicated that the Illinois Tollway has made steady progress on sustainability over the 13 years evaluated, and that the total scores in recent years are highly accomplished; the Tollway achieved a platinum rating in both 2009 and 2013.

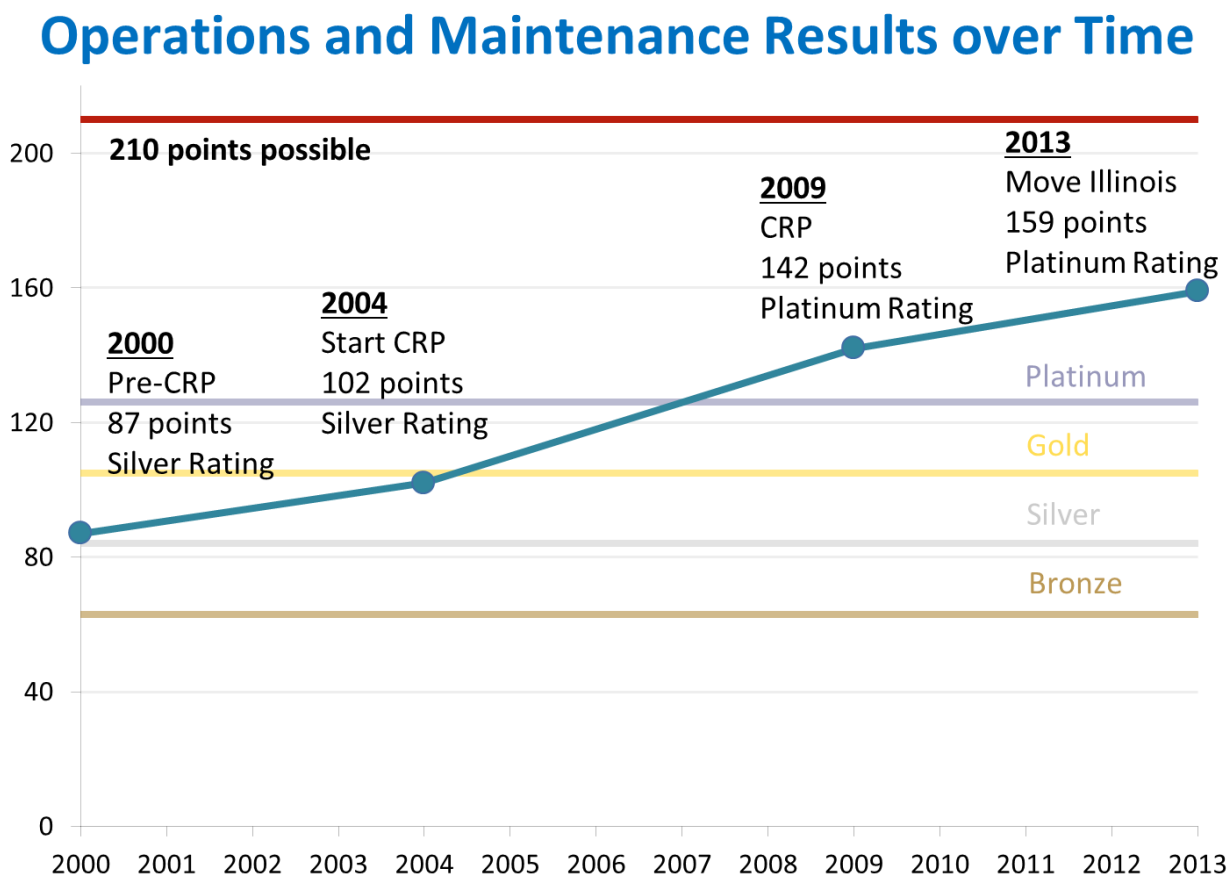

Figure 10. Operations and Maintenance Baseline Results

The evaluation team included subject matter representatives for each of the criteria from the Illinois Tollway and several consultants. As with the System Planning scoring, differences between the capital improvement programs for each of the baseline years were discussed and summarized. The teams then proceeded to evaluate one criterion at a time, question by question, scoring all four baseline years. This process worked well for several reasons:

- The discussion of baseline years and the corresponding capital improvement program characteristics helped refresh the scoring team's memories of when specific actions took place.
- Scoring one criterion at a time for all of the baseline years allowed the teams to evaluate the programs together and helped provide quality control of the scores as the team determined in which years specific actions were implemented at the Illinois Tollway.
- Team scoring worked well to refresh the memories of long-time employees so that scoring was accurate.
- Scoring one criterion at a time allowed for time-management of key staff as different individuals were needed to score different criteria.

The scoring team used a spreadsheet-based scorecard to track the scores, comments, best practices and potential opportunities to improve in a single spreadsheet so that side-by-side scoring and comments could be tracked. The completed spreadsheet is included in Appendix E. The criteria-by-criteria scores are shown in Table 16, along with a total of each baseline year, the percentage of available points achieved and the achievement level rating accomplished for each year.

Table 16. Operations and Maintenance Baseline Scores by Criteria

Criteria	Title	Available Points	2000	2004	2009	2013
OM-01	Internal Sustainability Plan	15	0	0	4	5
OM-02	Electrical Energy Efficiency and Use	15	0	0	7	12
OM-03	Vehicle Fuel Efficiency and Use	15	7	7	9	15
OM-04	Reuse and Recycle	15	9	11	11	11
OM-05	Safety Management	15	10	10	12	12
OM-06	Environmental Commitments Tracking System	15	0	0	0	0
OM-07	Pavement Management System	15	10	14	14	15
OM-08	Bridge Management System	15	1	1	15	15
OM-09	Maintenance Management System	15	8	8	13	13
OM-10	Highway Infrastructure Preservation and Maintenance	15	9	9	11	11
OM-11	Traffic Control Infrastructure Maintenance	15	2	4	4	8
OM-12	Road Weather Management Program	15	14	14	15	15
OM-13	Transportation Management and Operations	15	11	12	15	15
OM-14	Work Zone Traffic Control	15	6	12	12	12
Operations and Maintenance Score:		**210**	**87**	**102**	**142**	**159**
Percentage:			**41%**	**49%**	**68%**	**76%**
Rating:			Silver	Silver	Platinum	Platinum

6.2 Best Practices

The Illinois Tollway scored highly on several criteria, demonstrating industry leadership in the following areas:

- Fleet vehicle fuel efficiency and use
- Safety management
- Pavement and bridge asset management
- Road weather management
- Transportation management and operations

Table 17 shows best practices recognized during the OM evaluation process.

Table 17. Best Practices in Operations and Maintenance by Criteria

Criterion	Title	Best Practices in Operations and Maintenance
OM-01	Internal Sustainability Plan	• The 2009 Governor's Executive Order 11 is an excellent example of endorsement of senior executives. • Illinois Tollway has electric vehicle charging stations at its headquarters and at several oases locations for alternative fuel commuters (Tollway employees and customers).
OM-02	Electrical Energy Efficiency and Use	• Goals for energy reduction and use of renewable energy certificates contained in Executive Order 11 promote the use of alternative energy vehicles.
OM-03	Vehicle Fuel Efficiency and Use	• The Illinois Tollway is actively testing new fuels (E85 and biodiesel) in its fleet vehicles.
OM-05	Safety Management	• The Illinois Tollway has a traffic and incident management team that includes OM, state patrol, planning and engineering staff. This team meets monthly to discuss safety issues, including current incidents and upcoming events and proactively looks for and constructs mitigating improvements.
OM-08	Bridge Management System	• The Illinois Tollway is following a model of pavement preservation. It has allocated a portion of the budget for the program over the next 50 years for preservation or rehabilitation of pavements. Maintenance is performed as a capital project. The Illinois Tollway follows a 50-year maintenance schedule on all bridges within the system. The program is maximizing preventative and predictive actions as maintenance can do very little bridge work.
OM-12	Road Weather Management Program	• The Illinois Tollway has a tracking program during the deicing process on the roadway and can immediately determine whether to add or reduce the amount of salt being laid. • The Illinois Tollway has empowered operators to make decisions on the spot, training them and trusting that they have the best information to make decisions.

6.3 Opportunities to Improve

Similar to its scores in the System Planning module, the Illinois Tollway's OM scores indicate that the Tollway is a leader in the transportation industry. With continued focus on specific elements within the OM module, the Illinois Tollway can establish and maintain a robust measurement and verification system resulting in a more efficient and effective operation over the long term. That said, the Illinois Tollway has identified the following general areas for improvement:

- Develop Comprehensive Internal Sustainability Plan (CISP) and roll out with employee training
- Expand energy reduction plan to include renewable energy certificate goals from State of Illinois Executive Order 11 and align the "green team" to promote energy reduction goals
- Expand office and OM recycling efforts and quantify goals and performance
- Develop an Environmental Commitments Tracking System and require its use by Operations and Maintenance
- Expand vehicle technologies for maintenance management

Table 18 outlines more specific improvement opportunities and aligns the opportunities by criterion.

Table 18. Opportunities to Improve Operations and Maintenance by Criteria

Criterion	Title	Opportunities to Improve Sustainability in Operations and Maintenance
OM-01	Internal Sustainability Plan	• Develop CISP consistent with Executive Order 11 and with measures and components per criterion. • Develop performance metrics for plan, then measure, monitor and report progress annually. • Provide employee training on the CISP and INVEST.
OM-02	Electrical Energy Efficiency and Use	• Expand energy reduction plan to include renewable energy certificate goals from Executive Order 11. • Align green team to promote energy reduction goals.
OM-04	Reuse and Recycle	• Quantify recycling goals for office and OM waste. • Measure recycling per goals, monitor and report progress annually. • Consider assembling into a single plan for office and OM waste, if it adds value to the Illinois Tollway to combine.
OM-05	Safety Management	• Look at Highway Safety Manual (2010) and statistically sound approaches described within. Determine if making changes would add value to Illinois Tollway's process.
OM-06	Environmental Commitments Tracking System	• Develop an Environmental Commitments Tracking System per this criterion and the Illinois Tollway's needs and require its use. • Develop compliance goals and then measure, monitor and report progress annually.
OM-09	Maintenance Management System	• Proceed with upgrade to modern system, automate integration with PMS. • Expand vehicle technologies. • Leverage Maintenance Quality Assurance Process.
OM-10	Highway Infrastructure Preservation and Maintenance	• Address sustainability more directly in plan. Call it sustainability and discuss specific actions that improve the sustainability of the plan.
OM-11	Traffic Control Infrastructure Maintenance	• Address sustainability more directly in plan. Call it sustainability and discuss specific actions that improve the sustainability of the plan. • Consider consolidating into a single plan if that adds value to the Illinois Tollway.
OM-14	Work Zone Traffic Control	• Research and consider innovative contracting methods that would influence better WZTC methods or less exposure to traffic. These need not be design-build (e.g., lane rental or allowing contractor to suggest innovative approaches).

6.4 Lessons Learned

The following lessons were learned while implementing the Operations and Maintenance program (and are closely aligned to the System Planning Lessons Learned):

- The process of scoring the Operations and Maintenance program and the resulting discussions were as important to the process as the scores.
- It is important to identify key discipline leads that can score the criteria in a workshop.
- It is important to invite staff (or prior staff) with the institutional knowledge to answer questions when scoring baseline years.
- When scoring multiple baseline years, the early discussion of the differences between the years being evaluated was exceptionally helpful when scoring the criteria.

- This process takes time; plan 30 to 45 minutes per criterion for OM staff and have a strong facilitator.
- The discussion happens quickly; it would have been helpful to have an audio recording of the conversation to capture best practices and opportunities to improve as it was difficult to record this information during the meeting.
- Expect follow-up to the meeting to fill in gaps; some questions were not resolved in the meeting.
- A session after the scoring workshop with the primary contact for each criterion helped QA/QC the scores.
- With this new tool, staff tend to give too many points or too little points the organization at times; it takes a strong facilitator who is very familiar with INVEST to manage the discussion and adjudicate the responses.

6.5 Recommendations for FHWA to Improve INVEST Operations and Maintenance Module

Comments were transmitted to FHWA on April 9, 2014, for consideration in the development of Versions 1.1 and 1.2 of INVEST. A table summarizing the comments can be found in Appendix C.

SECTION 7

Web-Based Tool

7.1 Illinois Tollway's Use of the Web-Based Tool

Throughout this program, the Illinois Tollway leveraged offline spreadsheets to evaluate projects for the following reasons:

- System Planning – Used a spreadsheet (Appendix B) that contains the SP module scores, comments, best practices and opportunities for improvement
- Project Development – Used Excel-based scorecards because the Illinois Tollway added criteria and supplements to the INVEST v1.0 criteria
- Operations and Maintenance – Used a spreadsheet (Appendix C) that contains the OM module scores, comments, best practices and opportunities for improvement

However, at the same time, the Illinois Tollway INVEST consultant used the FHWA's INVEST online tool to capture scores so that comments could be provided, as appropriate, to FHWA.

7.2 Recommendations for FHWA to Improve INVEST

Comments were transmitted to FHWA on April 9, 2014, for consideration in the development of Versions 1.1 and 1.2 of INVEST. A table summarizing the comments can be found in Appendix C.

SECTION 8

Next Steps

Now that the Illinois Tollway has established a Project Development baseline performance, the agency will be evaluating and improving the sustainability of in-progress projects that are part of the $12 billion *Move Illinois* Program and as part of any future Tollway capital programs. The Illinois Tollway will also be making programmatic improvements identified through the INVEST System Planning and Operations and Maintenance module evaluations. These activities should proceed following the processes outlined in this report.

FHWA released a Version 1.1 update to INVEST in April 2015. This version provided no changes to scoring requirements and consisted mostly of formatting changes. The Illinois Tollway scorecard form was updated in March 2015 to include the scoring changes in INVEST v1.1.

FHWA will release Version 1.2 of INVEST, which contains significant scoring changes in the tool. In many cases, the Illinois Tollway's scores will increase based on the FHWA response to the Tollway's questions. Therefore, it will be important to update the Illinois Tollway's scorecard to incorporate INVEST Version 1.2 and determine if the Tollway wants to proceed with an offline tool. Further, INVEST Version 1.2 could be considered for projects already scored because the scoring changes may be advantageous to the Illinois Tollway in some instances.