

2016 State Highway Needs Assessment

NEBRASKA

Good Life. Great Journey.

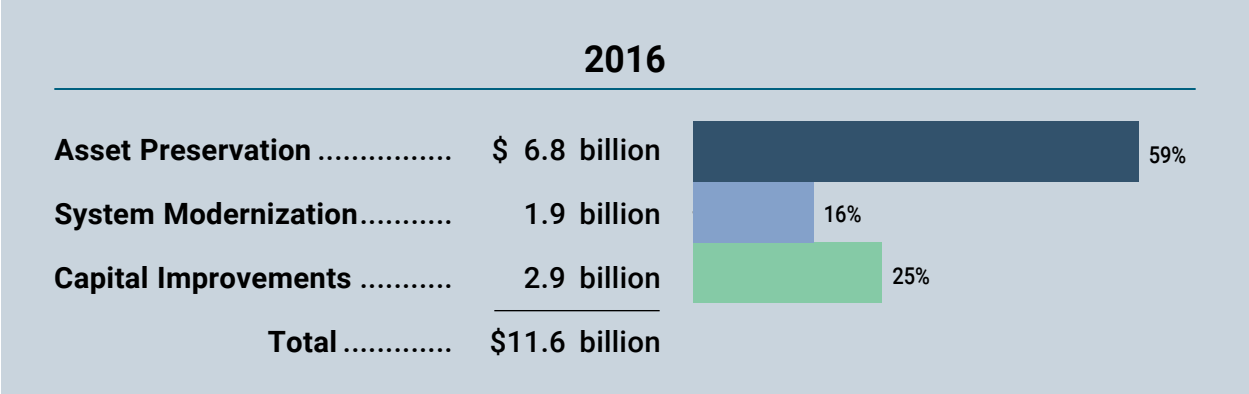
DEPARTMENT OF ROADS



Pete Ricketts
Governor

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Director

Summary 20-Year Needs

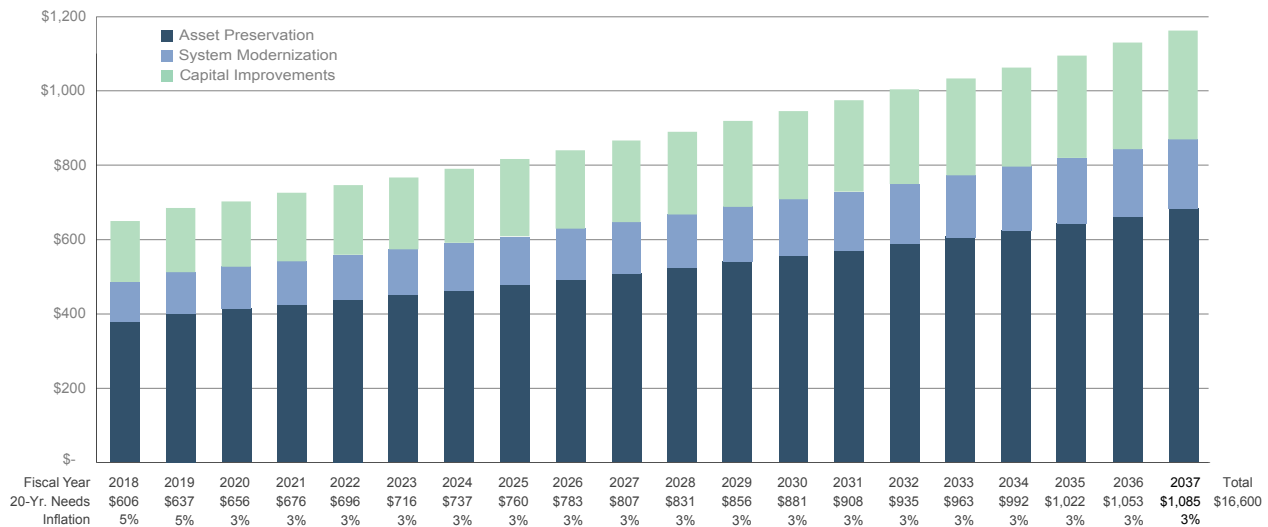


Executive Summary

The "2016 State Highway System Needs Assessment" report identifies current needs for the next 20 years at \$11.6 billion, in today's dollars. With inflation applied at 5 percent for FY-2018 and FY-2019, and 3 percent for the remaining 18 years, over the next 20 years the total cost of the 2016 needs are estimated at \$16.6 billion. The funds available in FY-2018 are estimated to be approximately \$500 million.

Current and Projected Needs

2016 State Highway System
Inflated Needs in Millions

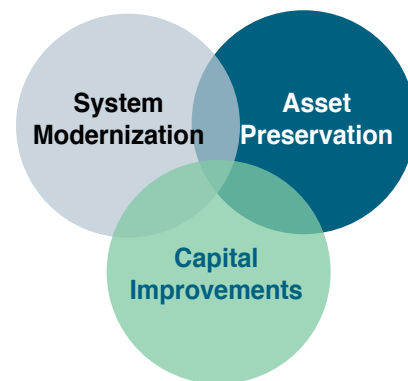


Introduction

In 1988, the Nebraska State Legislature assigned the task of annually reporting on the needs of the State Highway System to the Nebraska Department of Roads (Neb.Rev.Stat. 39-1365.02). Since that time, the Department has made steady progress identifying and addressing the dynamic needs of the State Highway System.

The needs of the State Highway System are divided into three categories:

- **Asset Preservation** – Maintenance of the system
- **System Modernization** – Safety, geometric, or mobility improvements that do not add capacity to the roadway
- **Capital Improvements** – Improvements that add capacity or support economic growth



Some highway projects may have aspects that fall into more than one category or all three; however, no costs were double counted in this report. See pages 3-6 for a brief description of how the needs are determined for each category.

Changes since 2015

NDOR has rewritten the book on capital improvement project selection in 2016. A listening campaign, and new process known as StEEP (Stakeholder. Engineering. Economics. Priorities.) was used to prioritize candidates which better reflects the connection between transportation investments and the economy, and recognizes local buy-in from communities. More than 2,000 Nebraskans participated in the process that identified more than \$8 billion in potential transportation projects for future funding consideration. All candidates were evaluated for their economic and engineering performance and were given an overall performance score. Projects were selected based on performance scores and other important considerations such as geographic inclusion, corridor completion, previous investments, progress on expressway and high priority corridors, interstate or expressway connectivity, and available supplemental funding. This year, 20 capital improvement projects were selected for either construction or design and are included in the Needs calculation.

Approximately \$360 million in system modernization costs not included in previous reports were added to the needs. These costs are associated with converting existing at-grade highway to highway intersections to rural interchanges. The candidates for these locations are high speed rural intersections, not urbanized areas. These candidates may be selected over the next 20 years based on projected traffic volumes and documented crash history.

Future Needs

Needs for system modernization will change for the 2017 Needs Assessment. These changes will be based on the new Nebraska Administrative Code, Title 428, Rules and Regulations of the Board of Public Roads Classifications and Standards, which went into effect May 17, 2016. The new code will make changes to the standards shown in the sidebar on page 5.

The Metro Area Travel Improvement Study (MTIS) is currently underway to develop an initial “Vision” of a multi-modal transportation plan concept that meets the 2040/2050 year traffic needs in the Omaha Metro Area. Phase 1 of the three-phase study has been completed which documents how the existing system is performing. Phase 2, which will develop alternatives to meet the 2040/2050 traffic demands, is expected to be completed in 2017. Phase 3, which will detail preferred alternatives and costs, is expected to be completed in 2018.

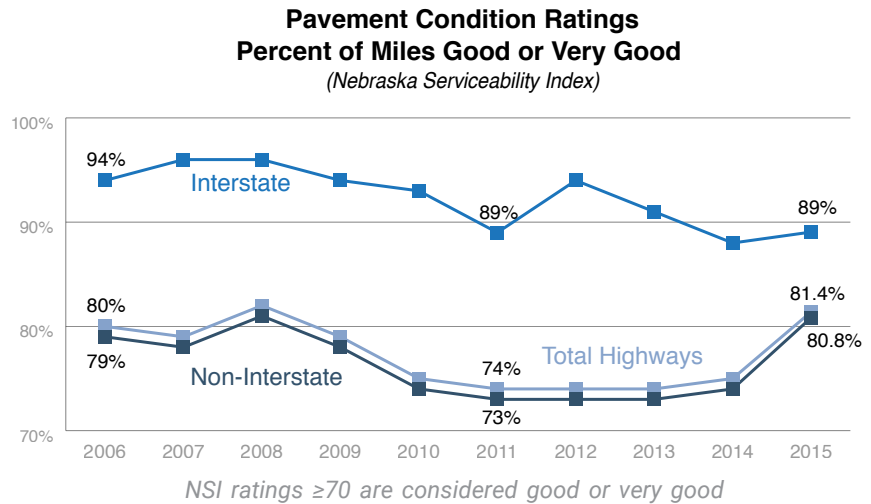
Asset Preservation

Asset preservation is the ongoing work required to maintain the highway system in a good condition. Many different factors affect the number of miles and bridges needing to be addressed; including the previous year’s work, extreme environmental conditions, traffic volumes, traffic loads, and yearly maintenance. The Department continues to explore new technology and materials that may lead to improved pavement and bridge performance and may also extend the life of pavements and bridges.

The projected 20-year asset preservation needs, in 2016 dollars, are estimated to cost \$6.8 billion and include the following:

Pavement Preservation - \$6.1 billion

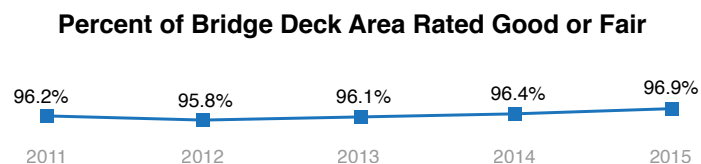
The entire State Highway System is rated each year in order to evaluate its overall pavement condition. Distress factors such as cracking, faulting, rutting, and ride quality are inserted into formulas that have been developed to calculate the overall condition of the roadway, called the Nebraska Serviceability Index (NSI). This NSI rating is then used in a pavement optimization program to identify the 20-year pavement restoration needs. This pavement optimization program includes a benefit/cost analysis, annual pavement deterioration rates, and the capability to calculate the cost to maintain the State Highway System at a specified pavement condition level. The cost to replace interstate pavements as they reach the end of their service life is included in this category.



Bridge Preservation - \$700 million

Similar to pavements, bridges are inspected for safety and condition. Every bridge in Nebraska is inspected at least once every two years. NDOR uses a bridge needs program that takes into consideration factors such as condition, deterioration rate, age, traffic, and cost/benefit to determine when to apply the proper treatments at the proper times. Preservation includes preventative maintenance, repair, re-decking, rehabilitation, and replacement of bridges that meet the required width. Bridges continually deteriorate so bridge needs are not static but change yearly. NDOR is doing more systematic preservation such as asphalt overlays with waterproof membranes, expansion joint replacements, and thin epoxy/polymer overlays to keep our good bridges in good condition for longer periods of time.

The timing of solutions for bridge needs varies, but efforts are made to plan bridge construction at the same time as the adjacent pavement and road construction.



System Modernization

System modernization is associated with roadway improvements that do not increase capacity. These needs are associated with deficiencies such as pavement width, shoulder width, vertical curves, and bridge width. Interstate roadway or bridge deficiencies, as defined by Nebraska's minimum design standards, are included in the needs assessment. The non-interstate rural system modernization needs are defined using the standards shown in the sidebar on the next page.

The projected 20-year system modernization needs, in 2016 dollars, for the interstate, rural, and municipal highways are estimated to cost \$1.9 billion and include the following:

Roadway Modernization - \$1.39 billion

Roadway modernization describes changes made to existing roadways to correct certain deficiencies. Such changes as widening lanes and shoulders, straightening curves, and cutting down hills make roadways safer to travel.

All contract and as-built plans are reviewed to ensure that the Department's database contains the most current geometric information. The roadway system modernization needs are compiled by calculating the construction costs, including resurfacing and right-of-way costs, required to correct the deficiency. These costs are updated annually. The state currently operates and maintains approximately 39 miles of gravel highways. The costs to surface and bring these roadways up to current standards are based on annual construction costs.

Modernization needs for rural intersections are determined by the need to improve intersections due to high traffic volumes and a documented crash history. The costs associated with these needs are based on the average cost per intersection improvement times the number of intersections that would either meet the 20-year traffic volume or crash history criteria.

In addition to the costs to remove deficiencies, costs for other roadway improvements, such as lighting and traffic signal needs, are determined based on an average of previous years' costs.

Rail Crossing and Rural Transit Modernization - \$280 million

The rail at-grade crossing needs include all passive warning device locations with an exposure factor (defined as the number of trains multiplied by the number of vehicles) of 3,000 or greater.

The Federal Transit Administration defines a rural area as one encompassing a population of less than 50,000 people that has not been designated in the most recent decennial census as an "urbanized area." "Transit" refers to transportation for the general public and specialized transportation for the elderly and disabled. This needs estimate covers the transit needs for rural areas and also the proposed Lincoln-Omaha service and metro area vanpool service.

- **Operating Assistance** – Costs associated with direct operation of rural transit systems (including intercity bus) and projected cost of operating a scheduled Lincoln-Omaha route.

Criteria to identify non-interstate roadway geometric deficiencies are grouped into six Average Daily Traffic (ADT) categories.

Future ADT

36,000 & greater
(six lanes warranted)

10,000 - 35,999
(four lanes warranted)

- 12' surfaced lane width
- Outside shoulder
8' of the 10' shoulder will be paved
- Inside shoulder
3' of the 5' shoulder will be paved

4,000 - 9,999

- 12' surfaced lane width
- 8' shoulder width w/6' paved shoulder
- Stopping sight distance
No vertical crest curve equal to or less than 50 mph

2,000 - 3,999

- 12' surfaced lane width
- 6' shoulder width w/2' paved shoulder
- Stopping sight distance
No vertical crest curve equal to or less than 50 mph

750 - 1,999

- 12' surfaced lane width
- 3' shoulder width
When segment is in the Sandhills,
4' shoulder width w/2' paved shoulder
- Stopping sight distance
No vertical crest curve equal to or less than 40 mph

Under 750

- 11' surfaced lane width
- 2' shoulder width
When segment is in the Sandhills,
a 4' shoulder width w/2' paved
shoulder will be used.
- Stopping sight distance
No vertical crest curve equal to or less than 40 mph

- **Vehicles** – Cost of expanding and replacing an aging fleet of transit vehicles. Includes projected costs to purchase large buses for future, scheduled Lincoln-Omaha routes.
- **Capital Facility Construction** – Cost of constructing or remodeling transit-related buildings for bus storage and office space. Assumes ten capital construction projects at an average cost of \$800,000 each.
- **Consultant Services** – Costs associated with procuring the services of content area experts to provide technical assistance and professional development opportunities to NDOR and subrecipients. Includes an ongoing partnership with the University of Nebraska at Omaha and continued consultant involvement in the Statewide Mobility Management project.
- **Technology** – Costs associated with securing hardware and software for scheduling, dispatching, ridesharing, and data collection.
- **Rideshare Programs** – Includes subsidized vanpool projects in the metro and rural areas.

Bridge Modernization - \$230 million

Modernization needs for bridges are determined by the need to widen bridges and remodel bridge rails to meet current standards. The costs associated with these needs are based on the bridge's condition at the time of improvement and can include remodeling bridge railings, widening an existing bridge, or replacing a bridge with a wider bridge.

Capital Improvements

Capital improvement needs are associated with those projects that add vehicle capacity or provide infrastructure for economic development. The projected 20-year capital improvements needs, in 2016 dollars, are \$2.9 billion, and include the following:

Roadway Expansion - \$2.7 billion

Roadway expansion is a broad category which includes costs for future bypasses, new roads, interchanges, additional lanes, upgrading freeways, and the completion of the expressway system. The needs associated with roadway expansion were determined as follows:

- The costs for projects selected for design and construction under Build Nebraska Act (BNA) and Transportation Innovation Act (TIA) between 2018 and 2033 are determined using historical material and project costs, planned length and scope.
- The six-lane interstate needs are determined by projecting when the traffic density will reach level-of-service (LOS) D, as defined in the Highway Capacity Manual. Costs for interstate expansion include all pavement, interchanges and bridge work for six lanes between Lincoln and Grand Island.
- The urban capacity needs, for cities with a population greater than 5,000, are determined by identifying those roads with a NSI below 60 (fair to poor) and average daily traffic (ADT) that requires additional lanes. Costs for the widening or reconstruction of urban state highways are based on historical cost per mile values which are then used to calculate the needs. The urban bridge needs are extracted from the bridge needs program output and are included in this category.
- Costs for planning and research to investigate new strategies and to develop the projects mentioned above are also included.

Grade Separations - \$200 million

These needs include all on-system, at-grade railroad crossings that are expected to warrant a grade separation due to a projected exposure factor of 75,000 or greater within the next 20 years.

NDOR Mission Statement

We provide the best possible statewide transportation system for the movement of people and goods.

