

State Highway Needs Assessment

NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

2021



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State Highway Needs Assessment

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In 1988, the Nebraska State Legislature assigned the task of annually reporting the needs of the state highway system to the Nebraska Department of Transportation (NDOT). Since that time, NDOT has made yearly progress identifying and addressing the dynamic needs of an evolving state highway system.

To address Nebraska's needs, each year NDOT determines how much of the construction program will be dedicated to **Asset Preservation, System Modernization & Operation**, and **Capital Improvement**. These decisions are made based on the condition of the existing system, project deliverability, and revenue projections, and are reflected in the annual [Nebraska Surface Transportation Program \(STP\) book](#). The STP book holds revenue forecasts, the one-year construction program, the five-year planning program, and a summary of changes made since the last book was published. The list of projects under construction can be found in the STP book posted on the NDOT website at dot.nebraska.gov/media/115251/fy-2022-program-book.pdf.

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.

On the Cover

Work on the Accelerated Bridge Construction project west of Laurel on Highway 20.

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2021

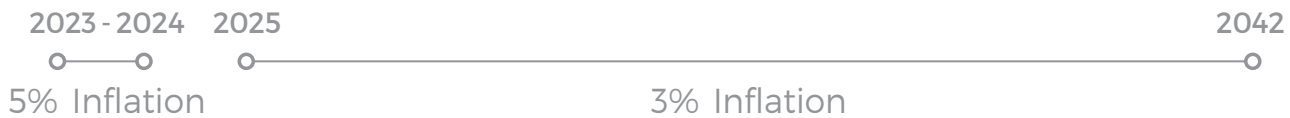
**State Highway
Needs Assessment**

Executive Summary

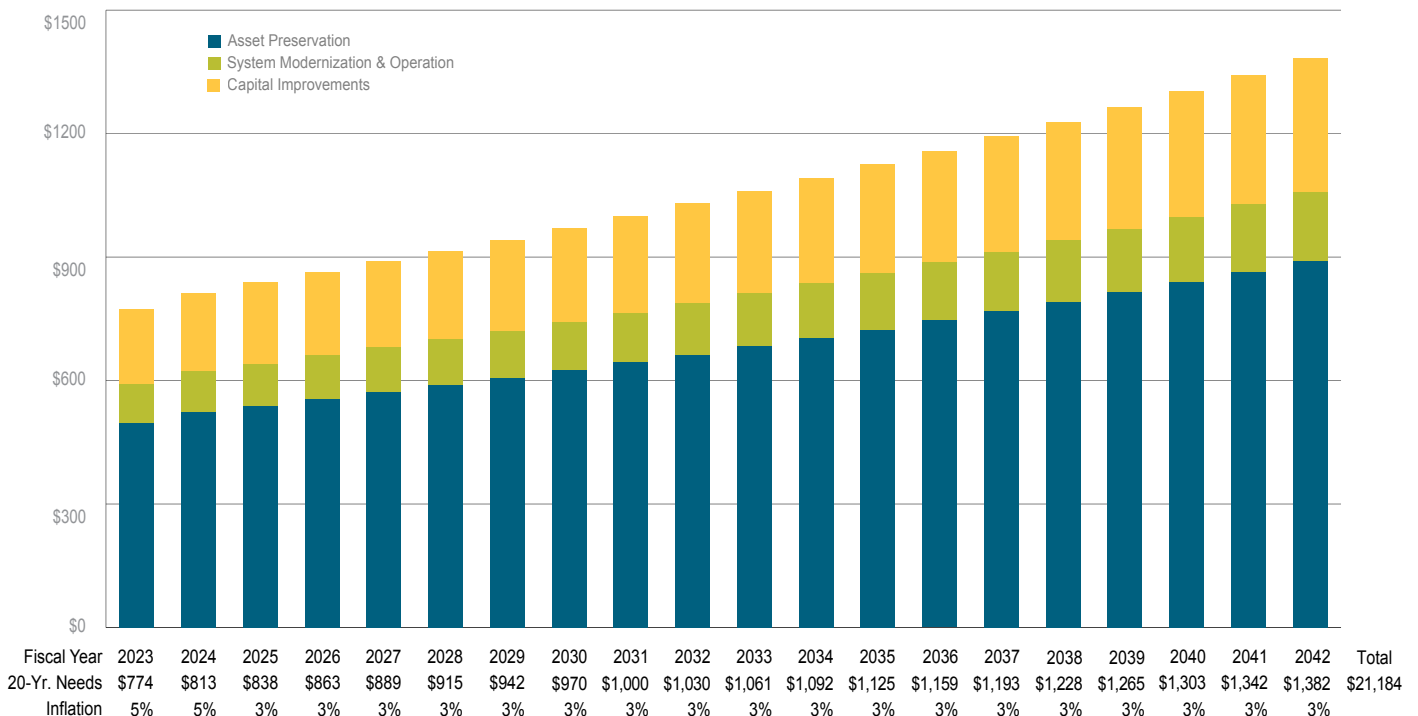
This report identifies the needs for the next 20 years at \$14.8 billion in today's dollars. With inflation applied at 5% for fiscal year 2023-2024 and 3% for the remaining 18 years, over the next 20 years the total cost of the 2021 needs is estimated at \$21.2 billion.

\$14.8B
2023

\$21.2B
2042



2021 State Highway System Inflated Needs in Millions



Summary of Needs



Asset Preservation

Maintenance to improve and extend the life of existing assets.

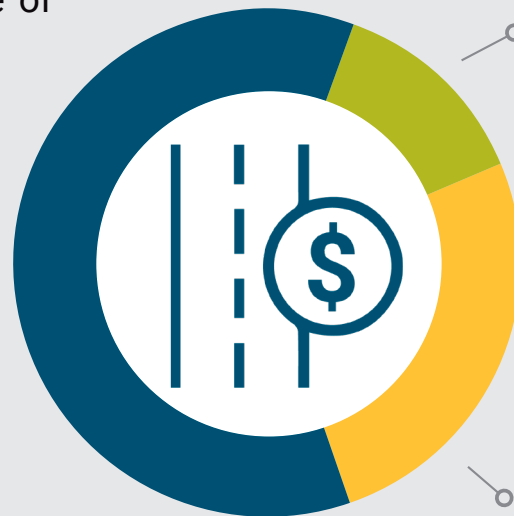
\$9.5B



System Modernization & Operation

Safety, geometric, or mobility upgrades that do not add capacity.

\$1.8B



Capital Improvements

Add capacity or support economic growth.

\$3.5B

Asset Preservation

20-YEAR
PROJECTED NEEDS

\$9.5B

Many factors affect pavement and bridge preservation needs, including previous work, environmental conditions, traffic volumes and loads, and yearly maintenance. NDOT 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.



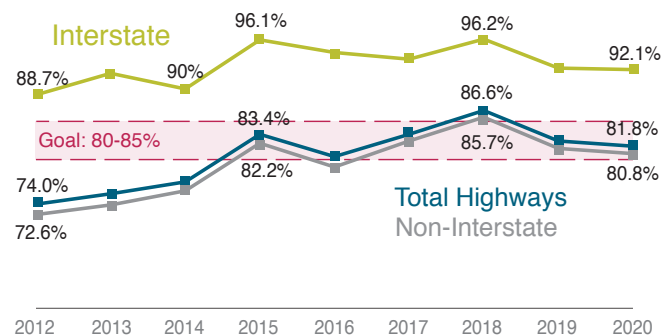
PAVEMENT PRESERVATION

\$8.6B

The entire State Highway System's pavement condition is evaluated each year using the Nebraska Serviceability Index (NSI), which measures factors such as cracking, faulting, rutting, and ride quality.

These factors are then used in a formula that calculates the overall condition of the roadways for an NSI rating, which is then used in a benefit/cost analysis tool to identify the right preservation treatment at the right time.

Percent of Miles at Least "Good" (NSI ≥ 70)



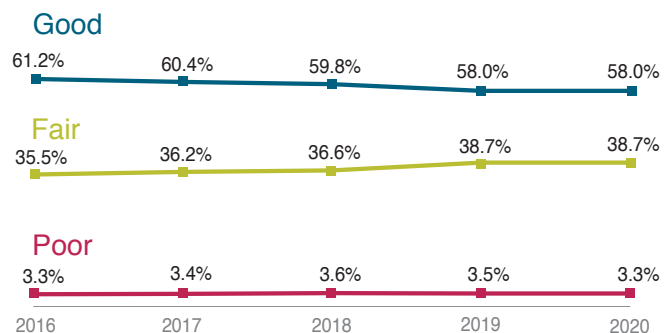
BRIDGE PRESERVATION

\$865M

Nebraska's state bridges are inspected for safety and condition rating, typically every two years. Preservation includes preventative maintenance, repair, re-decking, rehabilitation, and replacement of bridges that meet the required width.

NDOT also does more systematic preservation to keep 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.

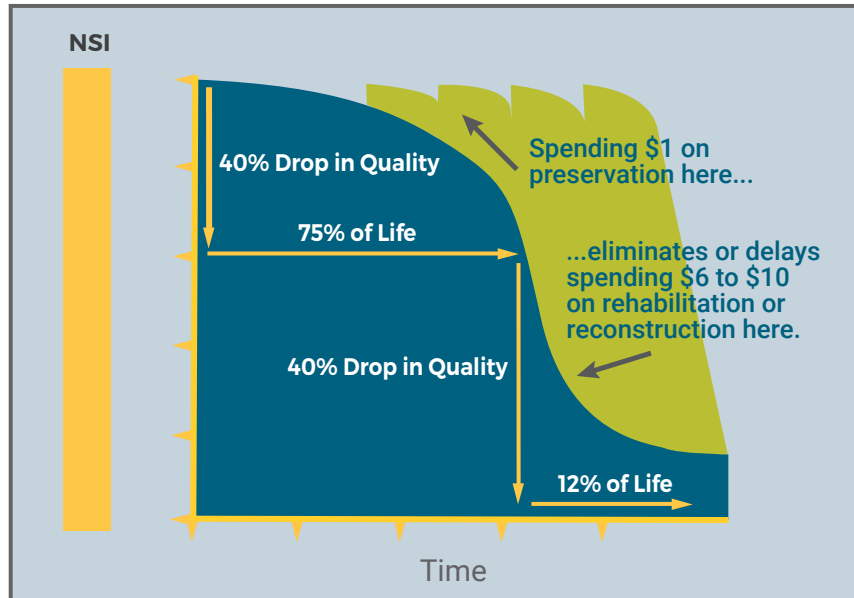
Percent of State-Owned Bridges in Good, Fair or Poor Condition



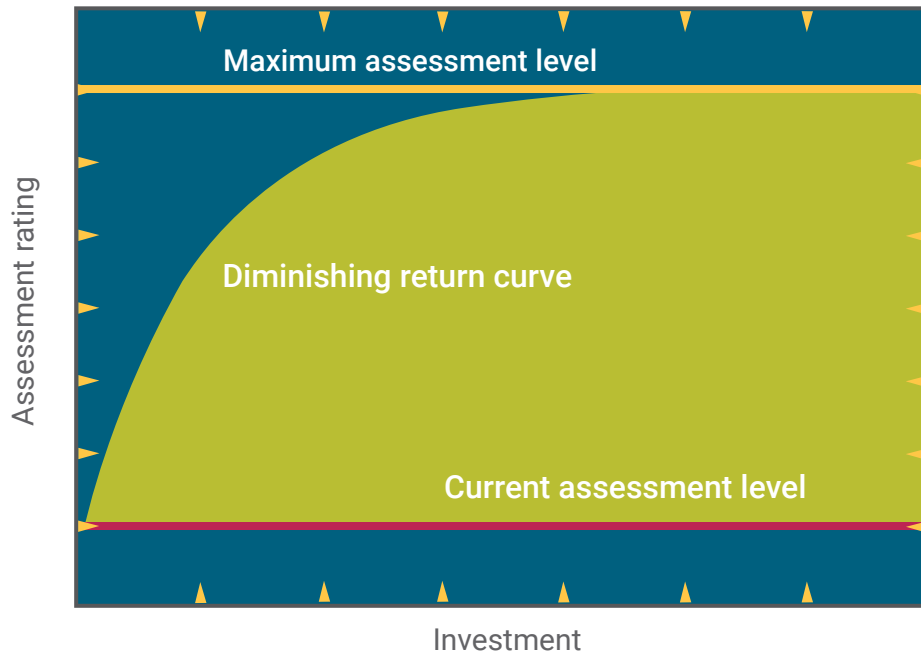
Bridge Inspection Considerations

- Condition
- Deterioration rate
- Age
- Traffic
- Cost/benefit

Pavement Performance Curve



Diminishing Returns



These charts show that investing in pavements and bridges in the early stages of their life allow us to use less costly treatments while providing a high level of service/condition. Additionally, we also realize that there is a "sweet-spot" maintaining our pavements and bridges to maximize the benefit.

System Modernization & Operation

20-YEAR
PROJECTED NEEDS

\$1.8B

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.



ROADWAY MODERNIZATION

\$1.1B

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

Roadway modernization needs are compiled and updated annually by calculating the construction costs, including resurfacing and right-of-way costs.

Modernization needs for rural intersections, to include approximately 39 miles of state-owned and operated gravel highways, are determined by the need to improve intersections due to high-traffic volumes and documented crash histories.

The costs to bring these roadways up to current standards are based on annual construction costs, in addition to the costs to remove deficiencies and modernize systems such as cameras, message boards, and fiber optics, as well as lighting and traffic signal needs.

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

<p>36,000 & greater <i>(six or more lanes warranted)</i></p> <p>10,000 - 35,999 <i>(four lanes warranted)</i></p> <ul style="list-style-type: none"> • 12' surfaced lane width • Outside shoulder 8' of the 10' shoulder paved • Inside shoulder 3' of the 5' shoulder paved 	<p>4,000 - 9,999</p> <ul style="list-style-type: none"> • 12' surfaced lane width • 8' shoulder width w/6' paved <p>2,000 - 3,999</p> <ul style="list-style-type: none"> • 12' surfaced lane width • 6' shoulder width w/2' paved <p>Stopping sight distance</p> <ul style="list-style-type: none"> -No vertical crest curve >20 mph below posted speed limit -No vertical sag curve >25 mph below posted speed limit 	<p>750 - 1,999</p> <ul style="list-style-type: none"> • 12' surfaced lane width • 3' shoulder width <p>Under 750</p> <ul style="list-style-type: none"> • 11' surfaced lane width • 2' shoulder width <p>Stopping sight distance</p> <ul style="list-style-type: none"> -No vertical crest curve >20 mph below posted speed limit -Existing vertical sag curve condition allowed
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RAIL CROSSING AND RURAL TRANSIT MODERNIZATION

\$462M

The at-grade rail crossing needs include all passive-warning device locations with an exposure factor of 3,000 or greater.

The Federal Transit Administration (FTA) defines a rural area as one with a population of less than 50,000 people that has not been designated in the most recent decennial census as an “urbanized area.”

The term “transit” refers to public transportation and specialized transportation for the elderly and disabled.

For the purposes of this needs estimate, only the transit needs for rural areas are considered with the exception of proposed, scheduled Lincoln-Omaha intercity bus services and metro area vanpool subsidies.



BRIDGE MODERNIZATION

\$217M

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.

Rural Transit Modernization Needs



Operating Assistance – Costs associated with direct operation of rural transit systems (*including intercity bus*).



Vehicles – Cost of expanding and replacing an aging fleet of transit vehicles. Priority for replacement will be vehicles that have met or exceeded their useful life benchmark as defined in NDOT’s Transit Assessment Management Plan.



Capital Facility Construction – Cost of constructing or remodeling transit-related buildings for bus storage and office space. Assumes two capital construction projects per year, 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 NDOT and subrecipients of state and federal funds.



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. Cost projection assumes the program will grow to approximately 100 vans.



Intercity Bus Program – Cost of subsidizing existing intercity bus service. NDOT is required to spend at least 15% of our rural apportionment on intercity bus service.

Capital Improvements

20-YEAR
PROJECTED NEEDS

\$3.5B

Capital improvement needs are associated with those projects that add highway capacity and provide infrastructure for economic development.



ROADWAY EXPANSION

\$3.3B

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.**

Needs are determined as follows:

- Costs for projects selected for design and construction under Build Nebraska Act (BNA) and Transportation Innovation Act (TIA) between 2020 and 2033 are determined using historical material and project costs, planned length, and scope.
- Costs for expanding the interstate to six lanes between Lincoln and Grand Island includes all pavement, interchanges, and bridge work. 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 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 capacity needs for cities with a population greater than 5,000,

are determined by identifying roads with a fair-to-poor pavement condition and average daily traffic (ADT) that requires additional lanes.

- The urban-bridge needs are extracted from the bridge needs program output and are included in this category.
- The costs for planning and research to investigate new strategies and to develop the projects mentioned above also are included.
- Costs of implementing the Metro Area Travel Improvement Study (MTIS) which was completed in 2019.



GRADE SEPARATIONS

\$157M

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

Recently Addressed Needs*



Asset Preservation

- I-80, Hampton to Henderson - *Resurfacing*
- I-80, Grand Island Area Bridges - *Repairs*
- I-129, S. Sioux City - *Resurfacing*
- Hwy. 66, Ashland Viaduct - *Bridge Overlay with Guardrail*
- Hwy. 61 Chase/Perkins Co. Line - *Resurf. including Shoulders*
- Hwy. 25, Trenton North - *Resurf. with Rail Crossing Replacements*
- Hwy. 30, Columbus E. & N. - *Resurfacing*



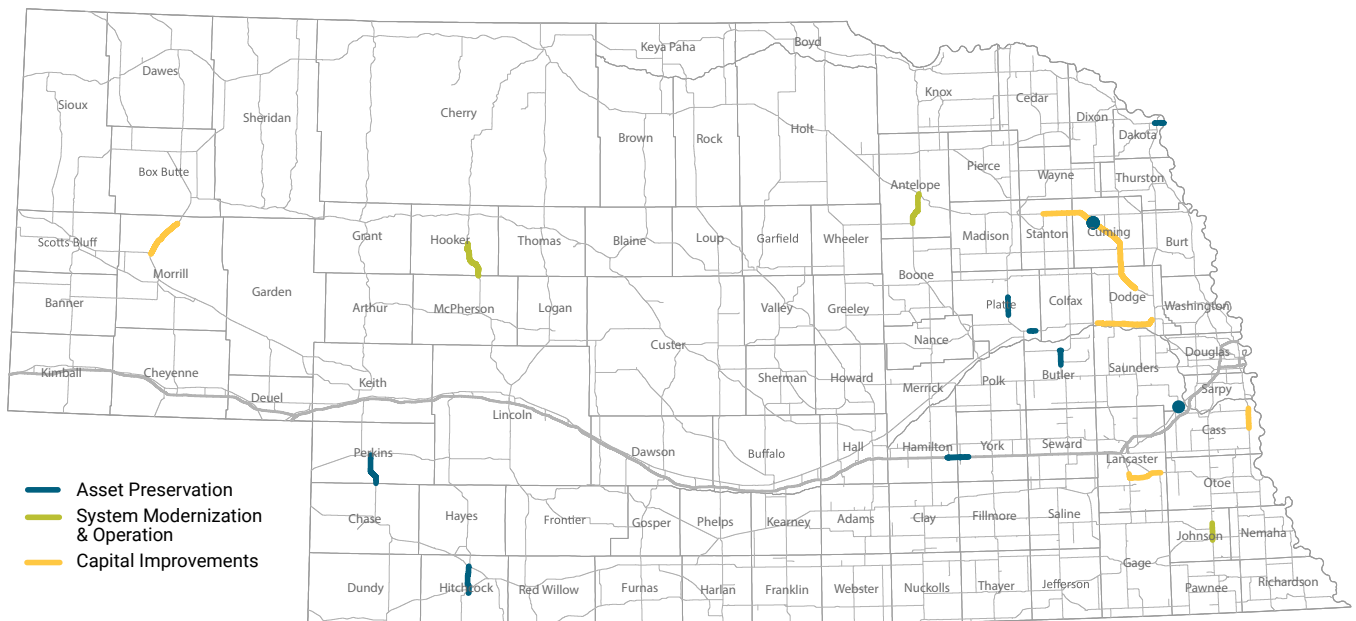
System Modernization & Operation

- Hwy. 50, Tecumseh North - *Pavement Reconstruction with Shoulder Widening & Surfacing*
- Hwy. 13, Pierce NW - *Resurfacing with Surfaced Shoulders*
- Hwy. 97, Tryon to Mullen - *Resurfacing with Widened Roadway & Shoulders*



Capital Improvements

- Hwy. 275, Scribner to West Point Expressway - *Expanding to 4-lane corridor*
- Hwy. 30, North Bend to Fremont Expressway - *Construction of new 4-lane corridor*
- Hwy. 2, Lincoln South Beltway - *Construction of new 4-lane bypass*
- Hwy. 385, L62A North High Priority Corridor Expansion - *Expanding to 4-lane segment*
- Hwy. 75, Murray to Plattsmouth Expressway Expansion - *Expanding to 4-lane segment*



*This page displays a limited sample set meant to illustrate statewide project Needs recently retired, it is not a complete list of Needs addressed.

