



E-470 Public Highway Authority

2023 Annual Certification

Final



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2023 E-470 Annual Certification Report

Prepared for the E-470 Public Highway Authority by Short Elliott Hendrickson Inc. (SEH)

1 Introduction

1.1 Purpose of Report

The E-470 Public Highway Authority's (the Authority) bond covenants require an Annual Certification, which consists of an independent consultant inspecting the Authority's assets and providing a written report summarizing the inspection results. The completion of this process keeps the Authority in compliance with the applicable requirements of the bond documents and allows for a "fresh" set of eyes to look at the Authority's assets and identify areas of concern or items needing specific attention.

Each asset evaluated receives a numerical score from 0-100 as defined in the Authority's Numerical Scoring System (NSS). This scoring system provides a repeatable method to measure asset conditions and provides a scientific method for measurement of quality and the Authority's performance of maintenance of their assets. With such a system, results can be compared to previous years and over time the scores can be tracked.

The report, as outlined by the Authority, will include the following:

- 1) Inspection results identifying if completed portions of the tollway have been maintained appropriately as outlined in the NSS.
- 2) Review of the Authority's annual budget to assess the estimated cost of maintenance and improvements needed for the upcoming fiscal year.
- 3) Discussion of upcoming safety initiatives for improvement of the tollway.

1.2 Budget

The Authority's annual budget addresses road maintenance and improvements in both the Operating and Capital portions of the budget. Furthermore, the Authority maintains a Capital Improvement Fund as a sub-account within the General Surplus Fund. The Capital Improvement Fund had a balance of \$304,238,327.11 to fully fund the 2023 capital budget of \$226,750,000. See Section 3 for Roadway and Maintenance Budget details.

1.3 Overview

The E-470 Public Highway, described further in Section 1.4, has been, and continues to be, maintained in good working order and safe operating condition. The Authority has an established Asset Management System, which in part is used to monitor assets by conducting specific scheduled inspections to identify deficiencies before potential failure of the asset occurs or the deficiencies increase in severity. This proactive approach has greatly aided the Authority in correcting minor problems and performing preventative maintenance, thus preventing larger

problems in the future, and prolonging the life of their assets. This approach has proven to be cost-effective as well, since preventative measures mitigate the chance of failure of an asset, which could pose a danger to the public with potential liability issues.

Capital Improvement Projects have been completed or are scheduled, which address both current and future maintenance and operation issues. The improvement projects will be finished before traffic increases impact the level of service to the tollway customers. This approach has enabled The Authority to maintain levels of service standards below industry standards. In turn, customers are always provided safe and reliable method of travel.

The findings noted in this report are based on the Authority's NSS to assess and identify the level of maintenance being achieved. The corridor continues to receive ongoing, outstanding maintenance. The capacity, safety upgrades, and operational enhancements are on a scale that exceeds other highways in Colorado. The safety features on the corridor have been, and continue to be, upgraded to provide the customer a safer and quicker option for a travel route than either the Interstate or State Highway System.

The Authority continues to reinvest in their corridor with several improvements that were completed in recent years or are ongoing, as well as setting the stage for future projects.

1.4 E-470 Public Highway Description

E-470 was originally constructed as a 47-mile long 4-lane toll road and was designed and constructed to Interstate Highway standards. The first portion of the toll road opened in 1991 and the final portion opened in 2003 traversing the eastern limits of the Denver metro area as shown in Figure 1-1. Since the tollway's original construction, an additional through lane has been added in each direction to create a 6-lane highway between the south I-25 interchange and the I-70 interchange.

Lane Miles: The tollway consists of 299 lane miles of roadway which includes through lanes, climbing lanes, ramps, interchanges, and auxiliary lanes. The Authority completed an additional 16 lane miles through roadway widening between Quincy Ave and I-70 in 2020, widening this length to three lanes in each travel direction. Similarly, The Authority is overseeing an ongoing mainline widening project between I-70 and 104th Ave which began in the early fall of 2022.

Interchanges: There are a total of 24 interchanges with five freeway-to-freeway interchanges located at north I-25, I-76, Peña Boulevard, I-70, and south I-25. The remainder of the interchanges are with arterial streets and consist of mostly standard interstate diamond interchanges. Six of the interchanges are non-tolled and located at north I-25, I-76, Peña Boulevard, I-70, Parker Road, and south I-25.

Tolling: The tollway was designed and constructed as a "closed" system in that every vehicle using the tollway pays a toll, either at an entry point, an exit point, or through one of the five mainline toll plazas. On July 4th, 2009, the tollway was converted to an all-electronic tolling facility. Tolls are now collected using ExpressToll accounts with transponders or through license plate tolling. On January 1st, 2020, toll rates were frozen for the third time for ExpressToll customers, and the first time for LicensePlateToll customers on E-470. During the COVID-19 pandemic downturn and recovery period, the Authority's Board of Directors approved an extension of current 2020 toll rates through 2021. In November 2021, the Board of Directors unanimously approved yearly toll

reductions starting on January 1, 2022. The toll rates and future toll rate reductions will be subject to annual E-470 Board of Director approval due to the recent economic uncertainty.

Facilities: There are five mainline toll plazas along the tollway located at following mile points: 2.5 (Plaza A), 15.5 (Plaza B), 22.5 (Plaza C), 30.0 (Plaza D), and 40.0 (Plaza E). These plazas consist of an overhead canopy structure to house the license plate cameras and electronic toll collection system hardware, along with administrative buildings.

Near Plazas A, C, D, and E, the Authority also maintains maintenance facilities (“support sites {MSS}”), which provide areas for storage and distribution of snow removal chemicals, granular materials, and plow truck deployment for winter weather. The support site near Plaza C also houses a Central Maintenance Facility (CMF), which provides garage space, wash bays, and additional garage storage space for plow truck maintenance and repair.

The Authority Headquarters Facility (AHF), located near the midpoint of the corridor at the Stephen D. Hogan/6th Parkway Interchange, provides office space for Authority and toll operations contractor staff. This facility houses the heart of all electronic Toll Collection System hardware and software. The AHF includes a Traffic Management Center with 24-hour surveillance of all activities on the tollway, including traffic flow, road conditions, toll collection system monitoring, and accident/incident response.

Toll Plaza C and the CMF properties have been sold to private developers in the past several years. Toll Plaza C is no longer under the control of The Authority, while The Authority will remain in the CMF until 2024, at which time a new CMF will be opened adjacent to the AHF.

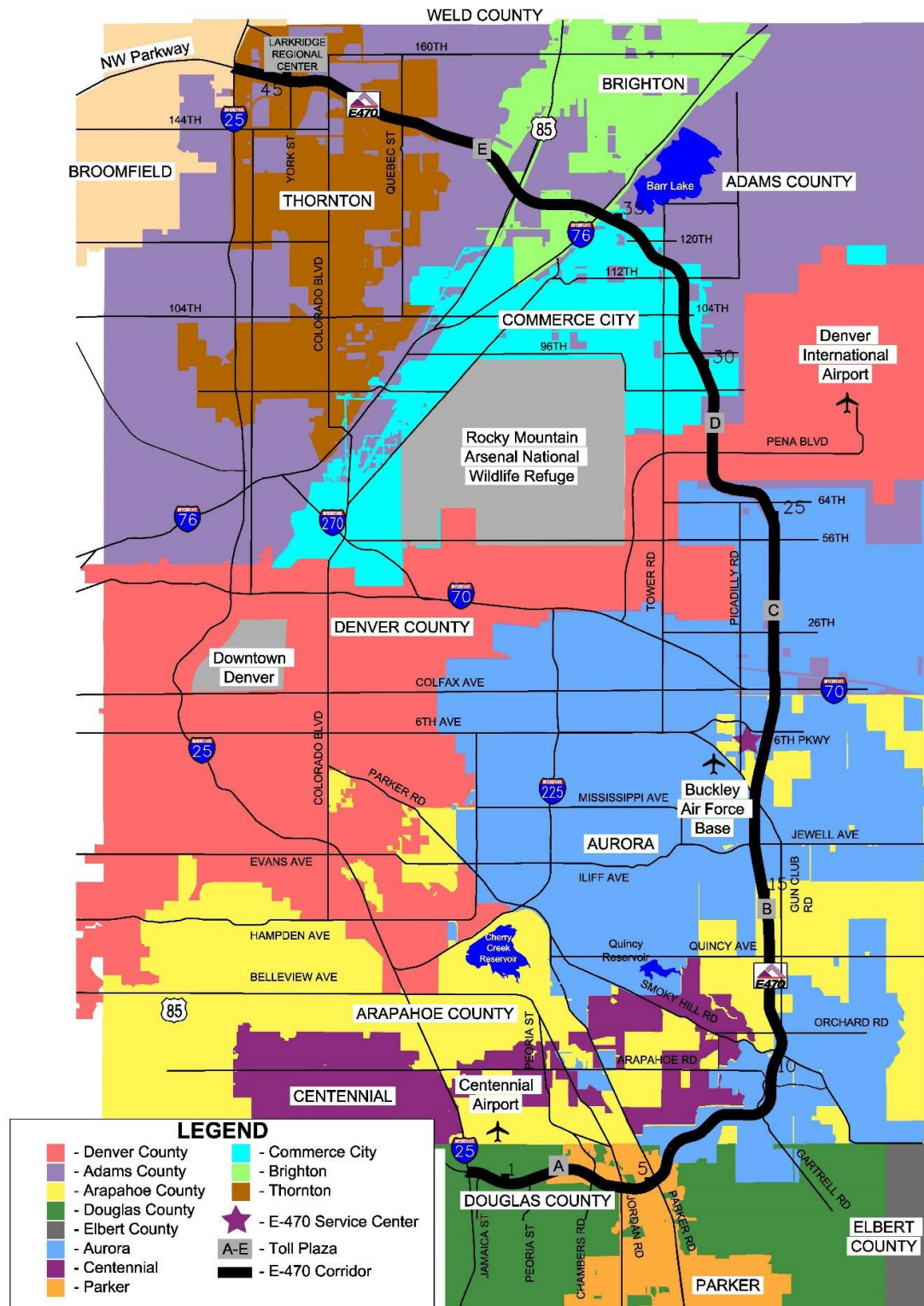


Figure 1-1 – E-470 Mainline Map

1.5 Improving the Tollway

The Authority continues to be proactive in responding to traffic and revenue studies by planning and developing to avoid predicted low values for future Level of Service (LOS) ratings. The Authority has set a standard of LOS C or better for its facility. This high LOS standard is set and maintained to ensure that customers are provided reliable service with minimal delays at all hours of all days throughout the year. The 2020 E-470 Master Plan contains a table that summarizes the proposed timeline of mainline segments that will need to be widened to maintain the desired LOS throughout the corridor through 2040.

On May 21st, 2020, the Authority signed a multi-million-dollar long term contract with Electronic Transaction Consultants (ETC), one of the United States' leading intelligent transportation system and service providers. Within this contract, ETC will deliver and operate its next generation roadside tolling system, RiteSuite™. Some features of this advanced software include enhanced vehicle detection, separation, and classification; redundant toll collection equipment; and upgraded digital video audit system. Implementing this state-of-the-art system will help E-470 continue to grow and expand services to their customers; and efficiently monitor the health and performance of toll collecting equipment. Toll Plaza E is currently being used as a test site for this technology, which is planned to be fully installed by the end of 2023.

In March of 2021, the Authority completed a roadway widening project adding a third travel lane between Quincy Avenue and I-70. These eight miles now feature expanded bridge structures, upgraded interchange traffic signals, improved drainage assets, fresh pavement, and expansion to the High Plains Trail. Signalization of the southbound Quincy ramp terminals was completed with this widening project.

A Hazardous Materials Route Data and Analysis report was prepared for the E-470 Public Highway Authority to determine whether the E-470 corridor is a feasible route for the transportation of hazardous materials. In August 2020, the Authority's Board of Directors approved proceeding with the petition process based on a HAZMAT Route Analysis. This study compared E-470 to neighboring HAZMAT routes and analyzes environmental, safety, traffic, physical roadway characteristics, and social environmental data. E-470 officially became a HAZMAT route on April 1st, 2022.

The 2020 Master Plan also outlines future interchange improvement needs. The Authority has partnered with Commerce City to install new traffic signals at E-470 and East 120th Avenue. The new signals enhance safety for all turning movements at the ramp intersections and help keep people moving in this growing area. The Authority provided \$550,000 in funding for the construction of these signals.

The Authority continues to pursue agreements and work with local municipalities to strengthen system connectivity between E-470 and surrounding roadways. After listening to the community's concerns, the Authority is partnering with the City of Aurora to improve visibility and facilitate safer left turns from the E-470 ramp intersections at Gartrell Road. In late 2023, temporary traffic signals are scheduled to be installed at these intersections with the Authority providing about \$1.2M for construction. Additionally, the City of Aurora is facilitating the widening of the Gartrell Bridge over E-470.

A recently completed Structure Selection Report identified future need for a new Aurora Parkway bridge over the E-470 corridor. This bridge will carry the proposed extension of Aurora Parkway over E-470 in Douglas and Arapahoe Counties.

The ongoing widening project from I-70 to 104th Avenue will include new interchanges at 38th Avenue and 48th Avenue. The Authority executed an agreement with the Aerotropolis Regional Transportation Authority to jointly fund the construction of the new diamond interchange at 38th Avenue mentioned above. The new interchange will provide access to and from Aurora Highlands, a 3,150-acre master planned development that will add a projected 32,000 residents.

In addition to roadway facility improvements, E-470 strives to improve transit through promoting electric vehicles. The Authority offers two Chargepoint “DC Fast Charge” electric vehicle (EV) charging units (4 vehicle spaces) free of charge to the public. These fast-charging stations offer two types of plug-ins: CHAdeMO and SAE combo cords. These EV charging units are located at the E-470 headquarters building at 22470 E. Stephen D. Hogan Parkway.

1.6 Public Communications

The Authority uses social media as a tool to educate and communicate with its customers. Videos are created quarterly to provide updated and timely information to the public. In addition, the Authority uses this communication channel to inform the traveling public of current and future construction projects on or near E-470 that may impact the customer’s travel. The following is the E-470 Facebook link which shows many of the videos created by the E-470 Communications Team aimed at keeping the customers informed: <https://www.facebook.com/E470PHA>.

The E-470 website (<https://www.e-470.com>) also has vast amounts of information available to the public including general information about the tollway, toll calculator, maps, current widening projects updates, a history of the tollway, road advisories, safety tips, contests and promotions, and customer feedback. The Authority sends out a Quarterly Newsletter via email to its customers and is also active on Twitter/X ([@e470RoadUpdates](https://twitter.com/e470RoadUpdates)).

1.7 Safety Initiatives

The Authority continues to focus on safety initiatives to address known and potential problem areas throughout the corridor. Ongoing initiatives include:

- In August 2019, the Authority Board of Directors unanimously approved the Colorado State Patrol 5-year (2019-2024) Patrol Services and Safety Enforcement contract. The Authority has been contracting law enforcement services with the Colorado State Patrol for the past 28 years.
- The Authority provides roadside assistance for drivers in distress for free across the entire 47-miles of E-470 highway. The E-470 Roadside Assistance Team is available 24 hours a day, 7 days a week to help with vehicle trouble and to clear debris and hazards from the road.
- The Authority strives to upgrade facility W-beam guardrail to meet the latest CDOT standards. As large portions of the existing guardrail are damaged, it is replaced with the newest CDOT-compliant W-beam guardrail. New construction projects all upgrade the guardrail to the newest standard as well.

- The Authority performs Cable Rail repairs and upgrades annually. Beginning in July of 2022, The Authority has installed new cable barrier along the corridor as part of performed safety studies conducted prioritizing safety projects based on cost/benefit basis. The selected locations include various on and off ramps of interchanges along E-470, as well as in the median to protect a large overhead sign monotube foundation.
- To protect drivers and wildlife, E-470 utilizes deer fencing on long stretches of the corridor. Between Parker Road and Smoky Hill Road, deer vs. vehicle incidents were reduced from 15 to 5 per year after installation of deer fence. As future road widening projects occur, deer fence continues to be installed to reduce vehicle-wildlife accidents.
- The program “Alive at 25” provides drivers ages 15 to 24 a half-day driver education course to prevent traffic violations, collisions, and fatalities.
- The E-470 Transportation Safety Foundation is an affiliated non-profit organization that raises its own funds, awarding transportation safety grants to support teen driving education, seat belt safety, transportation services, safety for seniors and youth, and car seat safety programs.
- In 2020, speed radar signs just north of 64th Avenue were installed to address a higher-than-average number of accidents at an approaching horizontal curve.
- The Authority installed high visibility “WRONG WAY” signs at all E-470 off ramps. The flashing signs and accompanying pavement arrows alert drivers of the direction of travel on these ramps.
- The Authority has been striping all facilities with 6” wide lane markings for all new construction and restriping projects since 2020. This replaces 4” striping in an effort to increase visibility. All mainline striping is now 6” wide.

1.8 Independent Engineer Statement

This report was prepared by Short Elliott Hendrickson Inc., which is an independently owned professional engineering firm licensed to provide engineering services in Colorado.

2 Annual Maintenance Inspection

2.1 Overview of Annual Maintenance Inspection

The consultant responsible for preparing this report is also responsible for the inspection of most of the assets listed in Section 2.1.1, unless the asset is inspected by a third party to ensure compliance with industry standards. The inspections consist primarily of visual inspection, with others utilizing non-destructive testing techniques. The Authority has provided a Numerical Scoring System (NSS) to standardize the results, which can be used in future years to provide a trend analysis. Using the NSS, the inspections for each major and minor asset are categorized as follows:

- 90 to 100 – Excellent Condition
- 80 to 89.9 – Good Condition
- 70 to 79.9 – Average Condition
- 60 to 69.9 – Below Average Condition
- 0 to 59.9 – Poor Condition

2.1.1 Inspection Categories

- Major Assets
 - Roadway Pavement
 - Bridges
 - Lighting
 - Drainage
 - Guardrail, Cable Rail and Barrier
 - Buildings
- Secondary Assets
 - Signing
 - Striping
 - Delineators
 - Native Seeded Areas
 - Fencing
 - Embankment Protectors
- Additional Assets
 - Variable Message Signs
 - Overhead Sign Structures
 - Irrigation and Plant Maintenance
- Traffic Services
 - Safety
 - Litter Control

2.1.2 Evaluation Criteria

Each inspection category was scored according to the Authority's NSS. Any areas of concern were classified under three levels of evaluation. The criteria for the levels of evaluation are:

Level One – Immediate Requirements

Level One items require immediate attention and should be addressed as quickly as possible. Immediate notification of Level One findings is provided to the Authority. Items in this category include posing potential safety hazards, creating excessive maintenance, or possessing the potential to be a liability. They also include items with a NSS value below the minimum requirements established for each major and secondary asset.

Level Two – Short-Term Requirements

Level Two items are not in need of immediate attention but are not up to standards and should be included in the upcoming maintenance program to be addressed within a year of discovery.

Level Three – Long-Term Requirements

Level Three items are items in current good condition and do not require any major maintenance within the next year but should be monitored for deterioration in the next two to four years.

2.2 Major Assets

2.2.1 Roadway Pavement

The Authority contracts with a third-party to conduct a pavement condition assessment in accordance with ASTM 6433-99 for smoothness and pavement distress. Two types of pavements are used on E-470, Hot Mix Asphalt (HMA) on the mainline and ramp gore areas and Portland Cement Concrete Pavement (PCCP) on the ramps and approaches to the toll plazas. Projected traffic, revenue studies, and data from the International Roughness Index (IRI) and the Pavement Condition Index (PCI) are used to plan five to eight years of renewal and replacement projects on E-470.

Hot Mix Asphalt

The latest available third-party pavement analysis was conducted in the summer of 2021. This test yielded a an **overall IRI of 66 in/mi**. Based on a 2019 Federal Highway Administration (FHWA) report, roughly 60% of Colorado's interstate miles had an IRI rating below 95 in/mi (a lower number constitutes a smoother ride). The PCI assesses visible signs of deterioration in the roadway and provides a number from 0 to 100, with 100 representing pavement in excellent condition. **The 2021 pavement analysis resulted in a PCI of 83.7, which is considered good condition.**

No further pavement testing was performed in 2022 or 2023. The Authority acknowledges this gap in testing, so this report defaults scoring to the value identified at the time of the last performed test. From extensively driving the corridor and visually assessing the pavement during the 2023 Annual Certification process, SEH agrees that pavement remains in good condition. No

field observations during inspections indicate that the pavement condition has deteriorated below the condition it was at the time of this latest analysis.

Portland Cement Concrete Pavement

The Portland Cement Concrete Pavement (PCCP) is located on the ramps and toll plaza approaches and therefore does not get assessed in the pavement analysis report. The Authority strives to repair or replace portions of PCCP before it has failed; however, PCCP that has failed is quickly reconstructed. For repairs, such as longitudinal cracks, the Authority uses cross-stitching as an effective repair method. No substantial deterioration or damage was observed during the latest provided inspections.

2.2.2 Bridges

Each year, the Authority contracts with an independent consultant for the bridge inspections in accordance with the Federal Highway Administration's National Bridge Inspection Standards (NBIS). The Authority maintains 102 bridges, approximately half of which are inspected one year, and the remaining bridges are inspected the following year, providing the required two-year cycle for bridge inspections per the NBIS. Some culverts are part of the inspections and are inspected on a 4-year cycle. The NBIS defines a bridge as any structure that has a clear span or opening of at least 20 feet along the centerline of the roadway, including culverts that meet these criteria. Thus, some concrete box culverts are considered "bridges" per this definition.

Fifty-nine (59) bridges and culverts located in Segment IV were inspected in July and August 2023. Only minor preventative repair or maintenance items were recommended. No major structural or safety concerns were identified. Numerous bridges were found to have minor repairs made, including re-coating of bridge rails, sealing of asphalt cracks, or an entire new asphalt overlay as in the case of the Washington Street overpass.

A Sufficiency Rating is automatically calculated through the inspection database for each bridge, which rates the overall structural and functional adequacy of the bridge on a 0-100 scale. **The inspected bridges were found to be in an overall excellent condition with an average sufficiency rating of 93.8.** Table 2-1 summarizes the individual sufficiency ratings for the bridges inspected in 2023. Note that non-vehicular bridges do not receive a sufficiency rating, thus are shown as "N/A".

Table 2-1 – 2023 Structures Inspected and Sufficiency Rating

Structure Number	Facility Carried	Feature Intersected	Sufficiency Rating
E-470-120TH1CBC	120TH AVENUE	Third Creek	80.6
E-470-34.08A	E-470 NB	120th Avenue	90.4
E-470-34.08B	E-470 SB	120th Avenue	91.6
E-470-34.42A	E-470 NB	O'Brian Canal	96.0
E-470-34.42B	E-470 SB	O'Brian Canal	94.9
E-470-34.42D	E-470 RAMP D	O'Brian Canal	99.4
E-470-34.63A	E-470 NB	Buckley Road	97.3

Structure Number	Facility Carried	Feature Intersected	Sufficiency Rating
E-470-34.63B	E-470 SB	Buckley Road	97.3
E-470-34.79A	E-470 NB	Burlington Ditch	98.4
E-470-34.79B	E-470 SB	Burlington Ditch	97.3
E-470-35.28D	E-470 RAMP C	Relocated Third Creek	99.8
E-470-35.34D	E-470 RAMP C	BNSFRR, Cameron Drive	98.8
E-470-35.44A	E-470 NB	I-76, BNSFRR	96.8
E-470-35.44B	E-470 SB	I-76, BNSFRR	96.0
E-470-35.46D	E-470 RAMP G	Relocated Third Creek	99.8
E-470-35.92CBC	E-470	Local Drainage	78.1
E-470-36.27C	SABLE ROAD/SH-2	E-470	94.7
E-470-37.07A	E-470 NB	Second Creek	94.9
E-470-37.07B	E-470 SB	Second Creek	94.4
E-470-37.30CBC	E-470	Local Drainage	81.3
E-470-37.72C	E-470 CONNECTOR	US-85	99.9
E-470-37.83A	E-470 NB	US-85, UPRR, FULTON DITCH	94.1
E-470-37.83B	E-470 SB	US-85, UPRR, FULTON DITCH	91.3
E-470-38.38C	US 85 CONNECTOR	E-470	95.9
E-470-38.47C	BRIGHTON BLVD	E-470	95.8
E-470-38.97A	E-470 NB	South Platte River	91.5
E-470-38.97B	E-470 SB	South Platte River	91.5
E-470-39.51A	E-470 NB	Riverdale Road and Ditch	97.6
E-470-39.51B	E-470 SB	Riverdale Road and Ditch	97.6
E-470-39.94CBC	E-470	Toll Access Tunnel E	97.2
E-470-41.30CBC	E-470	Todd Creek Tributary	81.6
E-470-41.57C	QUEBEC STREET	E-470	98.9
E-470-42.33CBC	E-470	Local Drainage	81.6
E-470-42.45CBC	E-470	Local Drainage	81.6
E-470-42.61A	E-470 NB	Holly Street	96.6
E-470-42.61B	E-470 SB	Holly Street	85.5
E-470-43.04C	SIGNAL DITCH	E-470	N/A
E-470-43.66C	COLORADO BLVD	E-470	96.7
E-470-44.11C	UNION PACIFIC RR	E-470	N/A
E-470-44.62CBC	E-470	Local Drainage	81.6
E-470-44.83A	E-470 NB	York Street	97.6
E-470-44.83B	E-470 SB	York Street	97.6

Structure Number	Facility Carried	Feature Intersected	Sufficiency Rating
E-470-44.98A	E-470 NB	Big Dry Creek	97.6
E-470-44.98B	E-470 SB	Big Dry Creek	97.6
E-470-44.98C	E-470 ON RAMP B	Big Dry Creek	100.0
E-470-44.98E	E-470 OFF RAMP D	Big Dry Creek	100.0
E-470-45.65CBC	E-470	Sack Creek	71.5
E-470-45.87C	WASHINGTON STREET	E-470	97.1
E-470-45.98CBC	E-470	Bull Canal	81.6
E-470-46.36D	I-25 RAMP D	I-25, E-470 ML, RAMPS	99.9
E-470-46.39D	E-470 RAMP F	I-25, NWP	99.5
E-470-BULLNCBC	BULL CANAL	Local Drainage	N/A
E-470-BULLSCBC	BULL CANAL	Local Drainage	N/A
E-470-I25NACBC	RAMP A	Local Drainage	99.5
E-470-I25NCCBC	RAMP C	Local Drainage	99.5
E-470-RIVERCBC	RIVERDALE RD/DITCH	Local Drainage	97.8
E-470-UPCBC	UP RAILROAD	Local Drainage	N/A
E-470-WASHNCBC	WASHINGTON STREET	Local Drainage	98.3
E-470-WASHSCBC	WASHINGTON STREET	Local Drainage	96.2

2.2.3 Lighting

The Authority maintains approximately 1,450 lights and strives to keep 95% of the lights working at any given time. The Authority conducts a lighting inspection no less than once a month with its own personnel and keeps records as to how many high mast lights are working or not working, but this does not assess the structural components of the lights. A complete structural verification of eighty-one (81) high mast lights was completed at the interchange of I-25 (South), at Plazas A, B, C, D, E, and at the interchange of Peña Boulevard in 2022. These high mast lights will be inspected again in 2027.

A random selection of 145 lights (10%) were inspected for bolt tightness, weld conditions, rust, cracks, flaking paint, and erosion around the poles. **The detailed light inspection confirmed the lights are in excellent operating condition with the average individual light achieving a score of 99.5.** We found no loose anchor bolts during inspection. Rust, weld, or paint issues were present on 20 light poles at the time of inspection. It was noted for informational purposes that 23 of the electrical access panel doors or plates had missing or misaligned/warped bolt holes.

A nighttime driving inspection was conducted to inspect the working conditions of all 1,450 lights and one point, out of 100, was deducted for every 14, or portion thereof, lights not working. **This inspection found 11 lights with at least one bulb burnt out, resulting in a score of 99.0.** Based on the NSS, a total numerical score from 0-100 is calculated for the average score of working lights

and the average score of the randomly inspected poles and bases. **The overall condition of the lights was found to be in excellent condition with an average score of 99.27.**

2.2.4 Drainage

The Authority maintains 59 box culverts, which are inspected every two to four years depending on their structural condition. The frequency is determined by the culvert's clear opening as described in Section 2.2.2. The Authority also maintains 160 reinforced concrete pipe culverts. For the Annual Certification, a random sample of 10 concrete box culverts and 15 reinforced concrete pipe culverts are inspected for sediment, trash, tumbleweeds, and capacity.

No culverts were found to have sediment greater than 4", and two culverts were found to have tumbleweeds impacting the water flow. Trash was present in only one of the pipes, which seemed significantly blocked with a combination of trash and sediment. See **Figure 2-1** for an example of major tumbleweed blockage, and **Figure 2-2** for a picture of the fully underwater pipe that appeared blocked. **Overall, the box culverts are in excellent condition with an average score of 99.20. The reinforced concrete pipes were also in the excellent condition range at an average of 93.33. Both drainage assets combined averaged a 96.27**



Figure 2-1 – Box Culvert with Significant Tumbleweed and Trash Build-Up at MP 33.55



Figure 2-2 – RCP Underwater, Appearing Clogged at Time of Inspection at MP 38.45

2.2.5 Guardrail, Cable Rail, and Barrier

The Authority maintains three types of barriers, 217,500 feet of median cable rail, 108,500 feet of W-beam guardrail, and 4,000 feet of concrete Jersey barrier.

Since a small percentage of the barrier total is concrete Jersey barrier, and the concrete can be damaged and still perform to its full capacity, no score will be associated with the concrete barriers. However, a visual inspection of the concrete barrier was conducted and no substantial damage that requiring replacement was noted.

Guardrail

An initial driving inspection of all the W-beam guardrail was conducted to note any areas of visual damage to the systems. The Authority strives to repair any significant damage to W-beam within one week. A second visual inspection of all the barriers was conducted within three weeks to provide the Authority a sufficient period of repair. No significant damage was noted during the first driving inspection. Based on these, inspections, the authority has an overall score of 100 for this aspect of guardrail inspections.

Twenty random locations of W-beam guardrail were selected for a detailed visual inspection in accordance with the NSS, where thorough inspection of the posts and W-beam for missing or broken bolts, posts out of plumb, and areas exhibiting significant distress was performed. **Figure 2-3** showcases minor guardrail damage observed during the on-foot inspections; this was not deemed significant enough damage to require immediate replacement. **Figure 2-4** highlights typical damage observed to individual wooden posts. Isolated damaged posts do not warrant replacement unless further damage is inflicted on the adjacent structure. **The results of the detailed inspection found the guardrail to be in excellent condition with an average score of 99.85. The overall average score of the guardrail driving and field inspections is excellent with a score of 99.93.**



Figure 2-3 – Minor Guardrail Damage Observed



Figure 2-4 – Typical Guardrail Post Damage

Cable Rail

Although cable rail can be damaged and still be functional, the Authority strives to repair cable rail as soon as possible after any significant damage occurs to minimize accident severity in the case of a secondary accident at the same location. There was no location where damage was noted during the first inspection for cable rail. This results in a score of 100 for the driving portion of the cable rail inspection.

In addition to repairing any loose cables, the Authority's roadway contractor provides tension tests for the cable rail throughout the corridor. The tension tests provided by the Authority show that most of the sections tested met or exceeded the required tension design loads.

Twenty 200-foot sections of cable rail were randomly selected for a detailed visual inspection deducting points for any significant damage, posts out-of-plumb by more than two inches, and rust. **The overall condition found in the detailed inspection is excellent with an average score of 100. The overall average score of the cable rail driving and field inspections is excellent with a score of 100.**

2.2.6 Buildings

Two types of buildings are maintained by the Authority according to the NSS – large buildings and ramp buildings. There are eight large buildings which include four Toll Plazas (TP A, TP B, TP D, and TP E), three Maintenance Support Sites (MSS A, MSS D, and MSS E), and the Authority Headquarters Facility (AHF). All large buildings are inspected annually along with 10 of the 32 ramp buildings, selected at random, for the Annual Certification inspection. Toll Plaza C (TPC) and the Central Maintenance Facility (CMF) were sold in 2020 and are being leased to the Authority. These properties are no longer under the Authority’s control and therefore are no longer inspected as part of the Annual Certification process.

To quantify the overall state of the buildings, a balanced score card is used that summarizes the score for each building’s major components. Each component of the buildings was scored on a 100-point scale and the average of the applicable components were used for the overall building health score. The average building scores are shown in the **Table 2-2**.

Table 2-2 – Buildings Balanced Scorecard – Buildings Summary

Component	TPA	TPB	TPD	TPE
Exterior	96	100	98	99
Interiors	99	100	100	99
Tunnels	97	96	99	100
Mechanical Equipment	98	98	97	98
Average	97.50	98.50	98.50	99.00

Component	MSSA	MSSD	MSSE
Exterior	99	99	98
Interiors	94	100	100
Barns	98	97	97
Mechanical Equipment	96	97	98
Average	96.75	98.25	98.25

Component	AHF	Ramps
Exterior	99	99.7
Interiors	100	100
Mechanical Equipment	98	100
Average	99.00	99.90

Large Buildings

The major components of the large buildings include building exterior, building interior, HVAC systems, mechanical components within the buildings, and the underground tunnels at the Toll Plazas. Buildings were inspected for, but not limited to, cracks larger than ¼", visible leaks, water damage, voids larger than ½" in masonry walls, structural damage, vandalism, and mold/mildew. Inspections of the HVAC equipment is supplied by a specialized independent HVAC contractor to generate a condition assessment to be used in the Annual Certification.

The following summarizes the findings and scoring of the large buildings:

- MSS A: The building is in excellent condition with an **overall rating of 96.75**. No Level One findings. Water damage and discoloration to the ceiling and walls in two different locations were considered Level Two. Minor cracking was observed on the interior wood beams in four separate locations were noted as Level Three, along with discoloration to plywood paneling was also observed in two separate areas.
- TP A: The building is in excellent condition with an **overall rating of 97.50**. No Level One findings. Several leaks in the door and window seals were deemed Level Two, as well as rust observed on the HVAC system, which should be closely monitored. Unrepaired cracks in the tunnels were deemed Level Three findings. General settling of the foundation was measured at 1.5 inch was also considered a Level Three finding.
- TP B: The building is in excellent condition with an **overall rating of 98.50**. No Level One findings were noted. One Level Two finding was standing water of greater than ¼ inch in depth observed in the tunnel facility, which was accompanied by clogged floor drains. The Level Three finding was observed cracks in the tunnel roof.
- Authority Headquarters Facility (AHF): The AHF is in excellent condition with an **overall rating of 99.00**. There were no Level One or Two findings. Only one Level Three finding was discovered, minor spalling on the exterior of the building.
- TP D: The building is in excellent condition with an **overall rating of 98.50**. No Level One findings were noted and the only Level Two finding was standing water of greater than ¼ inch in depth observed in the tunnel facility. Two Level Three findings were observed on the building exterior: a small gap in the roofing, as well as foundation settling measured at 1 inch.
- MSS D: The building is in excellent condition with an **overall rating of 98.25** with the following Level Three findings: spalling on the concrete piers and multiple locations of damage or discoloration to plywood paneling/sheeting on the building exterior. Figure 2-5 below is an example of the plywood damage observed.
- TP E: The building is in excellent condition with an **overall rating of 99.00**. There were no Level One or Two findings. The only Level Three finding was soffit peeling on the exterior of the building and maintenance support site.

- MSS E: The building is in excellent condition with an **overall rating of 98.25**. There were no Level One or Two findings. The Level Three findings were cracks in the wood beams, and damage and discoloration to plywood paneling/sheeting on building exterior.



Figure 2-5 – MSS D – Observed Plywood Damage

For the mechanical HVAC components within the buildings, an Asset Condition Report is typically prepared summarizing equipment into the rating categories of Good, Fair, Critical, or Not Rated. Some of the different items rated throughout the buildings include air conditioning units, exhaust fans, pumps, rooftop units, and water heaters. The Authority contracts with independent contractors to inspect and maintain other mechanical systems. SEH received reports for some, but not all, of the Authority facilities and display the results the following table:

Table 2-3 – Mechanical Components/HVAC Certifications

P.M. Type	Frequency	Certifying Entity	Latest Inspection Completed	2023 Certification Status
Fire Extinguishers	Annually	ETG Fire	August 2023	Current
Fire Suppression (sprinklers)	Annually	Siemens	July 2023	Current
Smoke Detectors	Annually	ETG Fire	August 2023	Current
Fire Control Panel	Annually	ETG Fire	August 2023	Current
Backflows	Annually	Siemens	May 2023	Current
HVAC	Monthly*	Haynes Mechanical	October 2023	Current
Elevators	Annually	MEI Total Elevator Solutions	May 2023	Current

* - Inspections take place monthly and are discussed with The Authority twice per year

Ramp Buildings

Ten ramp buildings were randomly selected from the 32 total under Authority control. No Level Three or Level Two issues were observed during the ramp building inspections. There were two Level Three findings discovered. The southbound 6th/Stephen D Hogan Parkway off-ramp building exhibited cracked bricks on the exterior. At the northbound Quincy Avenue off-ramp building, ponding water was observed around the outside of the building. **Table 2-4** summarizes the ramp buildings inspected and where deficiencies were observed. **Overall, the ramp buildings are in excellent condition with an average score of 99.70.**

Table 2-4 – Ramp Building Inspection Results

Ramp Building	Damage to Exterior Bricks	Damage to Interior Bricks	Voids in Mortar	Ponding Water
(NB) Off-ramp from E-470 to Quincy Ave.				X
(NB) On-ramp from Jewell Ave. to E-470				
(NB) On-ramp from 64 th Ave. to E-470				
(NB) On-ramp from 96 th Ave. to E-470				
(NB) On-ramp from Colorado Blvd. to E-470				
(SB) Off-ramp from E-470 to York St.				
(SB) Off-ramp from E-470 to Quebec St.				
(SB) Off-ramp from E-470 to 120 th Ave.				
(SB) Off-ramp from E-470 to 6 th Pkwy	X			
(SB) Off-ramp from E-470 to Chambers Rd.				

Overall Buildings Summary

Table 2-5 summarizes the average scores of the large and ramp buildings, as well as the comparison to last year's scores:

Table 2-5 – Building Scores Summary

Building	2023 Average Score	2022 Average Score
TP A	97.33	94.50
MSS A	97.00	94.25
TP B	98.67	91.75
Authority Headquarters Facility (AHF)	99.50	94.00
MSS D	98.67	95.75
TP D	99.00	95.50
TP E	99.33	98.75
MSS E	98.33	95.25
Ramps	99.70	97.67

2.3 Secondary Assets

2.3.1 Signing

The Authority maintains approximately 4,000 signs and aim to keep 95% in good condition at all times. This is defined as signs with no damage, that are secure, straight facing oncoming traffic, and have good retro-reflectivity and readability during both day and night.

Forty signs were chosen randomly for inspection. Each sign was assessed for secureness to post and base. Points were deducted for signs that were bent, unclean, out-of-plumb by more than 1 inch per 4 feet of height, and/or unreadable during daytime or nighttime conditions. Three signs were found to be loose at the panel attachment or base. Three signs were found to be out of plumb and three signs were found to be partially bent. **Figure 2-6** below displays an out of plumb sign which is a result of a loose connection from sign base to post.

The most significant sign observation was that the 45mph exit warning sign at northbound (NB) 96th Avenue was found unreflective during testing. These equipment readings were confirmed during our nighttime drive, where the sign was unreadable. While no other NB 96th Avenue signs were on the random selection inspection list, the inspection team noted that almost all the signs in the vicinity of this exit ramp had low to no reflectivity and were difficult to read during the night inspection drives. The inspection team strongly recommends that all the signs in this area be replaced. The Authority confirms that these 9th Ave signs will be replaced as part of the ongoing widening project. **Figure 2-7** below displayed the location of this sign relative to the exit ramp.

The majority of inspected signs were clean, plumb, secure, and had sufficient retro-reflectivity readings. **All signs were readable during the day. The overall condition of the signs is excellent with an average score of 97.98.**



Figure 2-6 – Out of Plumb Sign near NB Jewell Avenue



Figure 2-7 – Nonreflective Exit Sign at NB 96th Avenue

2.3.2 Striping

Approximately 1,350,000 linear feet of roadway striping is maintained by the Authority. For the inspection, five separate, random, one-mile mainline sections of roadway in each direction were visually inspected for nighttime visibility. The Authority contracts with an outside consultant to measure the retro-reflectivity of all the striping using a Laserlux retroreflectometer. The recorded measurements will be compared to the visual spot check. If the retro-reflectivity is measured less than 100 cd/lx/m², 50 points will be deducted from that mile section score. It is also recommended that striping stretches with a reading less than 100 cd/lx/m² mandate restriping. **Visually, the striping is in excellent condition with an overall score for pavement markings of 100.**

Retroreflectivity testing was performed in June of 2023, resulting in an overall value of 295 cd/lx/m² for the entire tollway, up from 249 cd/lx/m² in fall of 2022.

2.3.3 Delineators

The Authority maintains approximately 6,000 delineators, with approximately 20 delineators per mile section of road, and targets for 80% to be in good condition. Five separate, random, one-mile mainline sections of delineators in each direction were visually inspected for straightness (measuring out-of-plumb by more than four inches), nighttime visibility of yellow and white reflective squares, and number of delineators knocked down or missing. **Based on the random sections inspected the overall condition of the delineators is excellent with a score of 91.40.**

2.3.4 Native Seeded Areas

Ten randomly selected 100-foot x 100-foot areas were inspected out of the approximately 1,200 acres of native seeded area maintained by the Authority. The areas were inspected for bare spots larger than two square feet and erosion greater than two inches deep. **The overall condition is average with an average score of 93.20.**

Heavy rain events in recent months have caused many areas along the E-470 corridor to experience higher than normal storm water runoff, which in turn create areas of erosion. Figures 2-8 and 2-9 below display erosion and sediment areas observed.



Figure 2-8 – Erosion Between NB Jamaica On Ramp and Mainline



Figure 2-9 – Large Rain Runoff Area at SB Peña Blvd Off Ramp

2.3.5 Fencing

Three main types of fencing are maintained by the Authority, Right of Way (ROW) fence, snow fence, and deer fence. Twenty locations of ROW fencing, fifteen locations of snow fencing, and fifteen locations of deer fence were randomly selected for inspection. Fences were inspected for structural soundness, no openings or breaks in the fabric, plumbness of posts, secure attachments of fence to the posts, and fabric being intact to the required height. Some minor fabric deficiencies with the snow fence locations were found, but no major areas of concern were observed during the 2023 corridor inspections. **The overall condition of the fencing is excellent with an average score of 98.50.**

2.3.6 Embankment Protectors

Similar to the previously detailed culvert inspections, embankment protectors (EPs) are inspected for debris and depth of erosion at the discharge location. Fifteen (15) embankment protectors out of the seventy maintained by the Authority were randomly selected for inspection. Three out of the 15 embankment protectors inspected had openings restricted by at least 50%. Two showed signs of erosion at either the inlet or outlet end. One location of note was the EP at the SW corner of the Tower Road bridge; this EP pipe has a crack at the midpoint joint through which water is escaping and causing hillside erosion and exposing the pipe. Figure 2-10 below showcases this exposed pipe. **The overall condition of this asset is good, with an average score of 84.13.**



**Figure 2-10 – Tower Road Bridge SW Corner
Embankment Protector Erosion**

Additional Assets

2.3.7 Variable Message Signs

At the time of inspection, all the 12 Variable Message Signs (VMS) signs along the E-470 corridor were operational and providing drivers with informative and necessary information for safe travel. VMS are used to warn of accidents, closed lanes and of adverse road conditions resulting from inclement weather.

2.3.8 Overhead Sign Structures

The Authority has an independent consultant inspect overhead signs every five years. In addition, the Authority Roadway Maintenance staff inspects each overhead sign structure for loose or missing anchor bolt nuts and checks the welds at the base of overhead sign structure yearly as part of an Asset Management Program. The 4-year inspections are performed in accordance with the “Colorado Signs, Signals, and High-Mast Lights Inventory and Inspection Manual” published by CDOT. Thirty-four (34) overhead sign structures in Segment IV were inspected in 2022 and those in Segments I, II, and III were inspected in 2021. These signs will be inspected again in 2026 and 2025, respectively.

2.3.9 Irrigation and Plant Maintenance

The Authority has multiple water sources for irrigation and plant maintenance along the tollway. Irrigation is used at the Toll Plazas, Maintenance Support Sites and the Authority Headquarters Facility. From Milepoints 0.0 to 5.0, the Authority works with Meridian Metropolitan District for its irrigation water needs. From Milepoint 5.0 to 34.0, the Authority has agreements with public and private agencies as well as the use of an Authority-owned well near Toll Plaza D. From Milepoint 34.0 to 46.0, water from the Todd Creek Farms Metro District is utilized.

The Authority has a dead plant removal inspection twice a year: during spring and fall. Plant maintenance is an ongoing activity.

2.4 Traffic Services

2.4.1 Safety

As previously mentioned in the Safety Initiatives Section, The Authority provides free 24/7 roadside assistance to motorists on E-470. Services include, but are not limited to, aid with flat tires, gas, oil and radiator refills, and battery jumps. E-470’s Communications Center has full camera coverage and continually monitors the tollway for incidents or distressed vehicles to coordinate Roadside Assistance vehicles toward locations of need.

Road advisories are posted on social media, such as Facebook and Twitter/X, for current conditions. The Authority also provides access to view the live cameras on E-470 on their website to allow customers to see the current conditions.

The Authority launched the Transportation Safety Foundation in 2001 to promote public safety, transportation safety, and driver education. “Alive at 25” is a program provided by the Foundation one Saturday a month as an early driving intervention course for drivers aged 15-24 to help

prevent traffic violations, collisions, and fatalities. Another portion of the Foundation is the grant program, which awards up to eight \$2,500 grants to nonprofits and tax-exempt government entities in Colorado. The funds for the Transportation Safety Foundation are raised separately from the E-470 toll revenue.

2.4.2 Litter Control

Road debris and litter is removed daily by the Authority's maintenance crew and Roadside Assistance crew in between calls. Cleanup of the road was witnessed regularly during the inspections for the Annual Certification. E-470 is well maintained and has an excellent appearance.

2.4.3 Snow and Ice Removal

The Authority monitors E-470 for weather conditions and uses strategically placed weather stations and pavement sensors to be proactive for inclement weather. Two outside professional forecasting firms are also utilized to provide advanced notifications of storm systems. One proactive measure is the Authority's use of liquid magnesium chloride prior to snow or ice conditions. When conditions require, the Authority will also use dry road salt as necessary. Snow plowing efforts are contracted and organized and coordinated by the Authority's maintenance staff. Plowing is prompt and E-470 is normally cleared before the adjoining highways.

2.5 Findings

Notable findings are summarized in **Table 2-6** and the overall NSS condition scores are summarized in **Table 2-7**. The definitions of the three levels of findings are repeated below for reference:

Level One – Immediate Requirements

Level One items require immediate attention and should be addressed as quickly as possible. The Authority is immediately notified of Level One findings. Items in this category include posing potential safety hazards, creating excessive maintenance, or possessing the potential to be a liability. They also include items with a NSS value below the minimum requirements established for each major and secondary asset.

Level Two – Short-Term Requirements

Level Two items are not in need of immediate attention but are not up to standards and should be included in the upcoming maintenance program to be addressed within a year of discovery.

Level Three – Long-Term Requirements

Level Three items are items currently in good condition and do not require any major maintenance within the next year but should be monitored for deterioration in the next two to four years.

Table 2-6 – Summary of 2023 Findings

Level	Asset Type	Location	Description of Finding
One	Drainage	RCP at MP 38.45 NB side (between bridges)	Pipe is fully submerged and appeared blocked at time of inspection. Further investigation should be performed to determine level of blockage and if area drainage is functioning correctly.
One	EPs	SB SW corner of Tower bridge	Mid-pipe joint is cracked and leaking water, causing hillside erosion. Outlet is approximately 25% blocked with debris.
One	Signing	45MPH Exit Sign at 96 th off ramp traveling NB	Sign is not reflective and not readable at night. 96 th Avenue NB Off-Ramp area signs appear in need of replacement.
Two	Buildings	MSS A	Water damage and discoloration to the ceiling and walls.
Two	Buildings	TP A	Leaks in the doors and window seals. Rust on the HVAC system.
Two	Buildings	TP B	Standing water of greater than ¼ inch in depth in the tunnel facility, along with clogged drains.
Two	Buildings	TP D	Standing water of greater than ¼ inch in depth in the tunnel facility.
Two	Delineators	NB MP 19 to 20	At least five delineators missing, mostly on the inside shoulder.
Two	Delineators	NB MP 32 to 33	At least six delineators missing.
Two	Delineators	SB MP 7 to 6	Eight delineators missing or knocked down, mostly along the outside shoulder.
Two	Delineators	NB MP 20 to 19	Three delineators missing and one broken in half.
Two	Delineators	NB MP 27 to 26	Eight delineators missing or knocked down between both shoulders.
Two	Delineators	NB MP 42 to 41	At least five delineators missing from the inside shoulder.
Two	Drainage	CBC at MP 33.55	Significant tumbleweed buildup both in the box and at the outlet.
Two	EPs	NB SW corner of Jordan Rd bridge	Outlet is approximately 60% blocked with debris.
Two	EPs	NB NE corner of Jewell Ave bridge	Outlet is approximately 50% blocked with debris.
Two	EPs	NB NE corner of 64 th Ave bridge	Outlet is approximately 50% blocked with debris.

Level	Asset Type	Location	Description of Finding
Two	Fence	SB at MP 29	All three bands of snow fence fabric have come loose for the entire length of the fence inspected.
Two	Lights	Numerous locations throughout inspections	Open back panels and hatches, with exposed wiring.
Two	Lights	Numerous locations throughout inspections	Ill-fitting bolt holes, meaning openings for water to penetrate light bases.
Two	NSAs	NB SE of Jamaica Street	Significant erosion between 2" and 12" deep.
Two	NSAs	NB Between Gartrell off ramp and Mainline	Moderate erosion and bare patches.
Two	NSAs	SB south of Peña Blvd off ramp	Extensive sediment runoff and erosion of vegetation.
Two	Signing	NB Jordan Road on ramp	Hospital sign is not securely attached and is out of plumb.
Two	Signing	SB NW of Brighton Road	Exit 38 sign is not securely attached and out of plumb.
Two	Signing	SB 104 th Ave on ramp	Ramp Merge sign is out of plumb.
Two	Signing	NB I-70 on ramp	Ramp Merge sign is out of plumb.
Three	Buildings	MSS A	Minor cracking on the interior wood beams. Discoloration to plywood paneling.
Three	Buildings	TP A	Unrepaired cracks in the tunnel. General settling of the foundation (1.5 inch).
Three	Buildings	TP B	Cracks in the tunnel roof.
Three	Buildings	AHF	Minor spalling on the building exterior.
Three	Buildings	TP D	A small gap in the roofing. Foundation settling measured at 1 inch.
Three	Buildings	MSS D	Spalling on the concrete piers. Damage or discoloration to plywood paneling/sheeting on the building exterior.
Three	Buildings	TP E	Soffit peeling on the exterior of the main building and support site structures.

Level	Asset Type	Location	Description of Finding
Three	Buildings	MSS E	Cracks in the wood beams. Damage and discoloration to plywood paneling/sheeting on the building exterior.
Three	Buildings	Ramp (NB) Off-ramp from E-470 to Quincy Ave	Ponding water around the building exterior.
Three	Buildings	Ramp (SB) Off-ramp from E-470 to 6th Pkwy.	Several cracked bricks.
Three	Drainage	CBC at MP 32.56	Moderate tumbleweed buildup both in the box and at the outlet.
Three	EPs	SB SW corner of 88 th Ave bridge	Outlet is approximately 15% blocked with debris.
Three	EPs	NB NE corner of Hampden Ave bridge	Outlet is approximately 20% blocked with debris.
Three	EPs	NB SW corner of 112 th Ave bridge	4 inches deep erosion measured at the outfall.
Three	EPs	SB NW corner of Sable Blvd bridge	6 inches deep erosion measured at the outfall.
Three	EPs	NB SE corner of Second Creek bridge	7 inches deep erosion measured at the outfall.
Three	Fence	SB at the Jordan Road on ramp	One of the bands of snow fence fabric is loose and slack along the inspection length.
Three	Guardrail	Median at Second Creek bridge	Five damaged posts and post connectors.
Three	Guardrail	NB Smoky Hill off ramp	Several Splintered posts and minor W-Beam damage.
Three	Lights	Numerous Locations	Smashed or missing bolt covers
Three	NSAs	SB SE of Quebec Street	Moderate erosion and bare patches.
Three	Signing	NB near Buckley Road bridge	Hospital sign letter is starting to fade.
Three	Signing	NB Peña Blvd off ramp	Airport This Exist Sign lettering is starting to fade.

Table 2-7 – Numerical Scoring System Summary

	Inspection Category	2023	2022	Asset Condition
Major Assets	Roadway Pavement (PCI)	83.7	83.7	Good
	Bridges	93.8	90.9	Excellent
	Lighting	99.3	96.0	Excellent
	Drainage	96.3	96.1	Excellent
	Guardrail and Cable Rail			
	-Guardrail	99.9	100	Excellent
	-Cable Rail	100	100	Excellent
	Buildings	98.4	95.3	Excellent
Secondary Assets	Signing	98.0	98.1	Excellent
	Striping	100	100	Excellent
	Delineators	91.4	98.9	Excellent
	Native Seeded Areas	93.2	79.5	Good
	Fencing	98.5	98.1	Excellent
	Embankment Protectors	84.1	98.9	Excellent

3 Roadway and Maintenance Budget

3.1 Roadway and Maintenance Budget

The Authority continues to allocate funds appropriately for the maintenance of the corridor. The Engineering and Roadway Maintenance Department's 2022 Budget Summary for Roadway Specific Expenses is shown in **Table 3-1**.

Table 3-1 – 2023 Roadway and Maintenance Expenses

Roadway and Maintenance Expenses	2023 Budget
Vehicle Expenses - Fuel	\$160,000
Electrical Repairs	\$95,000
General Landscape Maintenance	\$60,000
Mowing & Irrigation	\$100,000
Drainage Maintenance	\$55,000
Shouldering	\$40,000
Pavement Maintenance	\$125,000
Structure Maintenance	\$50,000
Roadway Maintenance	\$578,000

Snow Removal	\$4,587,000
Roadway & Engineering Support	\$504,000
Land Management Support	\$167,600
Legal Support	\$75,000
Total Roadway Specific Expenses	\$6,596,600

3.2 Fiscal Year Roadway and Maintenance Budget

The 2023 budget for the proper maintenance and repair appears to be adequate based on the required historical expenditures and the very good condition of the tollway.

When additional repairs become necessary, the Authority has a Capital Improvement Fund, which is available for unusual or immediate maintenance needs as well as future capital improvements.

The Authority also maintains a Five-Year Capital Projects Budget, as shown in **Table 3-2**. This includes interchange improvements, pavement resurfacing, and future construction projects such as widening to 6 lanes from I-70 to 104th Avenue, and 104th Avenue to I-76.

Table 3-2 – Five-Year Capital Projects Budget Summary

Project Category	2023 Budget	2024 Estimate	2025 Estimate	2026 Estimate	2027 Estimate
Renewal and Replacement	\$39,343,000	\$22,634,000	\$8,770,000	\$9,075,000	\$7,485,000
Construction Projects	\$186,907,000	\$139,962,000	\$104,582,000	\$81,600,000	\$98,032,000
Other Capital Requirements	\$500,000	\$100,000	\$50,000	-	-
Total Capital Expenditures	\$226,750,000	\$162,696,000	\$113,402,000	\$90,675,000	\$105,517,000

4 Summary

The Authority continues to maintain and improve the tollway at a very high standard. Out of the 12 major and secondary assets, **10 are rated in Excellent condition**. The Authority continues to address any immediate concerns in a timely manner and remains responsive when concerns are brought to their attention. Our interactions suggest that The Authority appropriately allocates their resources and funding to maintain their assets in an overall excellent condition.

The Authority maintains operations during ever-changing circumstances surrounding workplace commuting and daily travelers. The Authority continues to show prudent financial management of the roadway asset while pushing forward towards rider quality and connectivity improvements.



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