

CENTRAL PLATTE VALLEY METROPOLITAN DISTRICT

MILLENNIUM BRIDGE 2021 INSPECTION REPORT

OCTOBER 25, 2021



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MILLENNIUM BRIDGE 2021 INSPECTION REPORT

PREPARED FOR: CENTRAL PLATTE VALLEY METROPOLITAN DISTRICT

PREPARED BY: WSP USA



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QUALITY MANAGEMENT

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SIGNATURES

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SUBCONSULTANTS

Cable and Anchorage Inspection Collins Engineers, Inc.

Cable Force Testing BDI

EXECUTIVE SUMMARY

WSP USA, Inc. (WSP) performed a principal inspection of the Millennium Bridge for the Central Platte Valley Metropolitan District on August 11th, 2021. The work has been conducted under WSP contract number 30901187.00. The scope of the inspection, as described in the contract, includes a review of all existing and previous design, construction, as-built, rehabilitation, maintenance and inspection reports and drawings, and a thorough visual inspection and documentation of the condition of each structural component on the bridge. The inspection was performed in accordance with the National Bridge Inspection Standards (NBIS), the AASHTO Manual for Bridge Evaluation, 3rd Edition and the Central Platte Valley Metropolitan District Millennium Bridge Operation and Maintenance Manual (O & M) under the leadership of a trained and certified Bridge Inspection Team Leader per NBIS. Additionally, all work was completed according to the requirements of the Occupational Safety and Health Administration (OSHA) and the Society of Professional Rope Access Technicians (SPRAT).

Under the direction of WSP engineers, inspection of the mast, cables and anchorages was conducted via roped access by Collins Engineers under a subcontract agreement. Summary results from the mast, cable and anchorage inspection are discussed herein. The detailed report submitted by Collins Engineers can be found in Appendix 1.

Forces in the stay cables were measured using the Taut Cable Vibration Method by Bridge Diagnostics, Inc. (BDI) under a subcontract agreement through Collins Engineers. Cable tension results are provided and assessed in the Inspection Notes section. The Cable Force Testing Report submitted by BDI is included in Appendix 2.

Portions of the substructure and the underside of the bridge are located directly over or adjacent to RTD light rail tracks and the Consolidated Main Line railroad tracks. Inspection access to these areas was achieved by utilizing a drone to record images and photographs. A drone pilot with Collins Engineers documented the drone footage and provided the images to WSP for evaluation. Based on the observations of the inspection, the bridge is in good condition overall, and is determined to be safe for public use. Many of the deficiencies documented in the 2007, 2010, and 2017 inspection reports were also observed during the 2021 inspection, however a few items have been addressed through maintenance and repairs since 2017. Components with new or worsening deterioration were also noted and are included in the Summary of Recommendations. As noted in previous reports, these items do not pose an immediate threat to the safety of the bridge, but should be considered to be addressed during future maintenance.

SUMMARY OF FINDINGS

CABLES

- Cable inspection by Collins Engineers found cables and anchorages to be in good condition with minor deficiencies.
- Gaps in exterior wires of cables and cable undulations, similar to past cable inspections.
- Bottom anchor connection deficiencies include hairline cracking in pedestals, minor swage pullout and minor areas of chipped paint and corrosion on anchorage tabs.
- Top anchorage connections have isolated areas of chipped paint with minor corrosion.
- Cable tension testing by BDI found slightly lower tensions in majority of cables compared with 2017 report.

SUPERSTRUCTURE

- In good overall condition.
- Scuff marks on overlay surface.
- Areas of corrosion on stay-in-place (SIP) steel deck forms.
- Minor to moderate corrosion on webs of edge beams along top of deck surface.
- Moderate soot buildup from railroad exhaust on members over railroad.
- The superstructure paint is generally in good condition. Minor rusting in areas of top flanges of exposed beams. Superstructure members below elevator platforms show moderate corrosion and rust staining.
- Pigeon droppings on top of OCS panels.
- Area of paint coating failure on bottom rail of protection fencing at southeast corner.

SUBSTRUCTURE

- Areas of minor efflorescence, rust staining and hairline cracking typical on abutment wall faces.
- Back face of Abutment 3 has surface scaling, map cracking and area of delamination.
- Backstay cable pedestals have scuff marks and minor scaling of coating.
- Mast paint in good condition with minor paint chips.
- Moderate corrosion on bolts and around base plate of mast bearing.
- Cover plates on mast pedestal have lost coating, bare and rusted surfaces.
- Paint deteriorating and rusting on stair support beams below several treads due to water flowing towards the back of the treads.
- One Macalloy rod has slight sag, no changes from previous reports noted.
- Corrosion and pack rust on Macalloy turnbuckle and bottom pin connection.
- Minor corrosion on bottom supports of city side elevator and park side stair structure.
- Pedestals in good condition.

BEARINGS

- In good overall condition.
- Paint coating in good condition, no chipping or rusting noted.

- Plate distortion on Bearing 1 that is noted in previous inspection reports could not be confirmed.
- Bearing pedestals at Girders 1 and 6 have moderate cracking and spalling.
- Isolated areas of pigeon droppings.

EXPANSION JOINTS

- Park side expansion device is new and in good condition.
- City side compression joint seal leaking.

DRAINAGE

- One deck drain partially clogged.
- Drain pipe outlets have moderate to heavy corrosion at tops.

CITY SIDE STAIRS

- Efflorescence and rust staining under top landing and mid-landing.
- Bike ramp has areas where the coating has worn off.
- Pedestrian railing has heavy corrosion along base plates.
- Diagonal crack remains in maintenance room brick from previous inspection.
- Rust staining on steel members below elevator platform.

PARK SIDE STAIRS

- In good condition overall.
- New paint coating in good condition. A few areas of minor rusting around support base plates.
- Installation of new vertical support columns has mitigated the vibrations previously felt in stairs.
- Most of paint on elevator platform surface has worn off.
- Vertical crack in masonry wall has been repaired.
- At elevator platform connection to bridge, slotted holes are locked up with pack rust preventing movement.