

# **CORRECTIVE ACTION PLAN CAP02- 11222022**

## **19<sup>TH</sup> STREET AND STOUT STREET CONDEMNED RAIL H1-11222022**

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SUBMITTED PURSUANT TO  
4 CCR 723-7-7347(a)(III)  
FOR

723-7-7347(d)(I) HAZARD RISK ASSESSMENT

THE REGIONAL TRANSPORTATION DISTRICT (RTD) - DENVER

March 6, 2023



## **CORRECTIVE ACTION PLAN (CAP) 4 CCR 723-7-7347**

**Pursuant to 4 CCR 723-7-7347 (a)(III) the Rail Transit Agency (RTA) shall develop a CAP for a hazard that meets a high-risk assessment code outlined in 4 CCR 723-7347(d)(I).**

### **SUMMARY OF HAZARD:**

On November 9, 2022, Maintenance of Way (MOW) crews performed a routine monthly preventative maintenance inspection of track identified as segment seven; this area is commonly referred to as the downtown loop. The MOW crews noted a negative superelevation and gauge widening condition. Due to being embedded track, in order to determine the cause, further investigation necessitated removal of the flangeway material to visualize subsurface structures. The MOW inspectors documented their measurements of the track and submitted the information through normal channels, with review by MOW supervisory staff who then elevated the information to senior MOW management on November 14, 2022. The same day, the acting manager of MOW requested that crews return to 19<sup>th</sup> and Stout to perform an enhanced inspection.

On November 15, 2022, the subsequent investigation revealed rail conditions that were below industry acceptable conditions for normal rail activities. MOW crews called for an immediate 3 mph speed restriction on approach to the curve, through the curve and out of the curve (entire train consist needed to be outside the curve limits). Due to the condition noted, a portion of the rail was classified as condemned.

### **EACH CAP AND ASSOCIATED HAZARD ANALYSIS SHALL, IN ACCORDANCE WITH:**

1. 4 CCR 723-7-7347(c)(I) - Identify the element or activity identified including the assigned tracking number.

RTD is reporting CAP02-11152022 pursuant to Decision No. C23-0061E. The most probable and contributing causal factors for the rail condition at the 19<sup>th</sup> and Stout streets curve deteriorating to the point of condemnation are:

- 1) Gaps in internal policies, procedures, and oversight. The Asset Management System and the Safety Management System are relatively new and maturing at different rates throughout the agency. Documentation and processes need to be developed to address this challenge.
- 2) The rail replacement program is not adequate to maintain a state of good repair within the downtown loop.
- 3) Asset management tracking is done by function and not by asset class.
- 4) Cross-department coordination on rail infrastructure replacement to ensure alignment with and accountability for the Transit Asset Management Plan (TAMP) and Public Transportation Agency Safety Plan (PTASP) is not optimized.

RTD assigned CAP tracking number: CAP02-11222022

2. **4 CCR 723-7-7347(c)(II) – Identify the actions to be taken by the RTA to minimize, control, correct, or eliminate the risks and hazards identified by the CAP.**

Final Actions—Mature the Asset Management System, specifically for Light Rail Infrastructure

- Develop and implement an Asset Class Strategy (ACS) for light rail infrastructure including all asset types and subtypes:





- An asset inventory documented in a system of record
  - Renewal and replacement strategies, schedules and shutdown strategy, preventative maintenance programs documented in a system of record
  - Equipment and tools necessary to deliver renewals, replacements, and maintenance
  - Materials and parts necessary to deliver renewals, replacements, and maintenance
  - Inventory of agreements that require the agency to renew, replace, or maintain third-party assets
  - The workforce needed to effectively execute the ACS
  - Enhance asset tracking and evaluation criteria to include areas in the light rail infrastructure that have known accelerated wear, deterioration, or corrosion.
  - Evaluate the cross-department coordination procedures for rail infrastructure replacement to ensure alignment and accountability with the approved TAMP and PTASP
    - The current management approach to rail infrastructure, which is done by function and not holistically by asset class contributed to the underlying issues observed in the investigation.
    - Operations and maintenance staff coexist within a singular department and are managed by the same leader and engineering (renewals, replacements, and project management) is housed within another department overseen by another leader. necessitating the need for enhanced communication, coordination and collaboration.
  - Integrate Operational Risk Management (ORM) and Safety Assurance into the decision-making process for asset renewals.
3. **4 CCR 723-7-7347(c)(III) - Identify the interim measures the RTA plans to implement to prevent recurrence before the final corrective actions are implemented.**

#### Interim Actions

- Utilize ORM assessments as part of the asset information (data) used to make prioritizations for asset renewals
- Evaluate downtown rail replacement project, including revising conditional assessments of the remaining sections, to update the prioritization of replacements scheduled
- Evaluate industry track standards, including Federal Railroad Administration (FRA) standards, to determine whether a more robust classification method exists to document wear
  - This will be in addition to an age-based strategy; the end goal will be an Age-Minus strategy where age is the primary driver, and any other wear indicator will accelerate the schedule
- Conduct asset management bypass process training at the asset steward level, including assistant general managers, superintendents, senior managers, and managers
  - The bypass process was created to account for emergent conditions requiring immediate attention that are not documented in the TAMP, including documentation of the situation and risk assessments completed to determine whether to move forward with the work.



**4. 4 CCR 723-7-7347(c)(IV) - Identify/provide the CAP implementation schedule.**

<b>CAP Implementation Schedule</b>			
<b>Type</b>	<b>Corrective Action</b>	<b>Target Date</b>	<b>Date Complete</b>
Interim	Utilize ORM assessments as part of the asset information (data) used to make prioritizations for asset renewals	June 30, 2023	
Interim	Evaluate downtown rail replacement project, including revised conditional assessments of the remaining sections to update the prioritization of replacements scheduled	June 30, 2023	
Interim	Evaluate industry track standards, including FRA standards, to determine whether a more robust classification method exists to document wear.	June 30, 2023	
Interim	Conduct asset management bypass process training at the asset steward level, including assistant general managers, superintendents, senior managers, and managers.	June 30, 2023	
Final	Develop an ACS for light rail infrastructure including all asset types and sub types	June 30, 2024	
Final	Enhance the tracking and evaluation criteria for areas in the light rail infrastructure that have known accelerated wear, deterioration, or corrosion.	June 30, 2024	
Final	Evaluate the cross-department coordination procedures for rail infrastructure replacement to ensure alignment and accountability with the approved TAMP and PTASP.	June 30, 2024	

**5. 4 CCR 723-7-7347(c)(V) - Identify the method(s) the RTA will use to validate the effectiveness of the corrective measures.**

The Asset Management Accountability Team and the Safety Leadership Committee will monitor progress on completion of these corrective actions. Additionally, the number of urgent or emergent repairs to the light rail infrastructure will be evaluated as an indicator of effectiveness.

**6. 4 CCR 723-7-7347(c)(VI) - Identify the individual, including position title, responsible for the CAP implementation.**

The RTD individual responsible for implementing this corrective action is Assistant General Manager, Rail Operations. This effort will be monitored by RTD's Leadership Safety Committee under the direction of the Accountable Executive and the Chief Safety Officer/Senior Manager, Safety and Environmental Compliance.



**7. 4 CCR 723-7-7347(c)(VII) - Identify any specific actions required by the Commission.**

The RTD will await any specific actions required by the Public Utilities Commission related to this CAP.

A handwritten signature in black ink that reads "Daniel H. McClain".

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Dan McClain  
Chief Safety Officer/Senior Manager, Safety and Environmental Compliance

March 6, 2023  
Date





## RISK ANALYSIS Hazards Identified

**CAP No: CAP02-11222023**

**Complete below hazard analysis table as it relates to the above referenced CAP.**

Item	Hazard Description	Hazard Cause	Hazard Effect	Hazard Category and Probability	Hazard Resolution/Reduction
1	Rail degradation resulting in train derailment in populated area on 19 <sup>th</sup> and Stout.	Gauge widening, negative superelevation and rail head flow separation	Derailment	1B  Reduced to 3B with interim corrective actions	Temporary operations under 3 mph restrictions as noted above with 24/7 MOW Flagger control; additionally, a Track Maintainer conducts a visual inspection after each train passes through the area

To determine the appropriate severity category as defined in Table I for a given hazard at a given point in time, identify the potential for death or injury, environmental impact, or monetary loss. A given hazard may have the potential to affect one or all these three areas.

**TABLE I: SEVERITY CATEGORIES**

Enter CAP Severity Category: 1

SEVERITY CATEGORIES		
Description	Severity Category	Mishap Result Criteria
Catastrophic	1	Could result in one or more of the following: death, permanent total disability, irreversible significant environmental impact, or monetary loss equal to or exceeding \$10M.
Grave	2	Could result in one or more of the following: permanent partial disability, injuries or occupational illness that may result in hospitalization of at least three personnel, reversible significant environmental impact, or monetary loss equal to or exceeding \$1M but less than \$10M.
Significant	3	Could result in one or more of the following: injury or occupational illness resulting in one or more lost workday(s), reversible moderate environmental impact, or monetary loss equal to or exceeding \$100K but less than \$1M.
Modest	4	Could result in one or more of the following: injury or occupational illness not resulting in a lost workday, minimal environmental impact, or monetary loss less than \$100K.
Negligible	5	Could result in one or more of the following: no injuries or occupational illness, no environmental impact, minor public inconvenience, or nuisance or monetary loss less than \$25K.



**TABLE II: PROBABILITY LEVELS**

Probability is defined as the likelihood of the number of times that a specific event will occur during the planned life expectancy of a system. A risk probability may be derived from the analysis of a transit system’s operating experience, evaluation of RTD safety historical data, or the analysis of reliability and failure data. Probability is categorized as Frequent, Probable, Remote, Improbable or Highly Improbable.

Enter CAP Probability Level:     B    

PROBABILITY LEVELS			
Description	Level	Specific Individual Item	Fleet or Inventory
Frequent	A	Likely to occur often in the life of an item.	Continuously experienced.
Probable	B	Will occur several times in the life of an item.	Will occur frequently.
Remote	C	Likely to occur sometime in the life of an item.	Will occur several times.
Improbable	D	Unlikely, but possible to occur in the life of an item.	Unlikely, but can reasonably be expected to occur.
Highly Improbable	E	So unlikely, it can be assumed occurrence may not be experienced in the life of an item.	Unlikely to occur, but possible.

Probability is defined as the likelihood of the number of times that a specific event will occur during the planned life expectancy of a system. A risk probability may be derived from the analysis of a transit system’s operating experience, evaluation of RTD safety historical data, or the analysis of reliability and failure data. Probability is categorized as Frequent, Probable, Remote, Improbable or Highly Improbable.

**TABLE III: RISK ASSESSMENT MATRIX**

Enter CAP Risk Assessment:     High    

RISK ASSESSMENT MATRIX					
Severity	Catastrophic (1)	Severe (2)	Serious (3)	Limited (4)	Negligible (5)
Frequent (A)	High	High	Serious	Medium	Medium
Probable (B)	High	High	Serious	Medium	Moderate
Remote (C)	Serious	Serious	Medium	Moderate	Low
Improbable (D)	Medium	Medium	Moderate	Low	Low
Highly Improbable (E)	Medium	Moderate	Low	Low	Low

Risk Level	Acceptability	Resolution Requirement
High	Unacceptable	Correction required
Serious	Undesirable	Correction may be required, decision by management
Medium	Acceptable with review	With review and documentation by management
Moderate	Acceptable	With review
Low	Acceptable	No action needed

