Burnham Yard Transportation Planning Study Final Report

Colorado Transportation Investment Office



Colorado Department of Transportation



Contents

	Page No.
1.0 1.2 1.3 1.4 1.5	,
2.0 2.2 2.3 2.4	
3.0 3.2 3.3 3.4 3.5 3.6	Alignment Concepts
4.2	3
5.0	References

Figures

Figure 1.	Study Area Map	2
	Burnham Yard Project Timelines	
Figure 3.	Stakeholder Engagement Framework	3
Figure 4.	CML Freight Rail Range of Alignment Options	6
Figure 5.	RTD Light Rail Transit Range of Alignment	
	Options	8
Figure 6.	Front Range Passenger Rail- Range of	
	Alignment Options 1	1
Figure 7.	UP Market Lead Line- Range of Alignment	
	Options	3

Acronyms and Abbreviations

BNSF Burlington Northern Santa Fe

CCD City and County of Denver

CDOT Colorado Department of Transportation

CML Consolidated Main Line

Core Team Burnham Yard Transportation Study Core Team

CTIO Colorado Transportation Investment Office

DUS Denver Union Station

FRPR Front Range Passenger Rail

P3 Office State of Colorado's Public-Private Partnership Office

LRT Light Rail Transit

P3 Public-Private Partnership

RTD Regional Transportation District

Study Burnham Yard Transportation Study

TOD Transit Oriented Development

UP Union Pacific Railroad

1.0 INTRODUCTION

1.2 Study Overview

The Colorado Transportation Investment Office (CTIO) conducted this Burnham Yard Transportation Study (study) in conjunction with the Colorado Department of Transportation (CDOT). The study explored options for rail corridor development through the area and alignments for freight, passenger, and light rail lines.

Purchased in 2021, CTIO acquired the Burnham Yard property from the Union Pacific Railroad (UP) because of the property's potential to improve mobility through central Denver and along the Front Range. This study performed a first step toward understanding how to optimize the location of rail lines based on engineering analysis, impacts, and benefits to surrounding transportation infrastructure, stakeholder input, and a scan of environmental impacts. Determining the location of rail lines allowed the rest of the Burnham Yard property to advance through site planning to assess redevelopment opportunities, infrastructure needs, and integration into the surrounding neighborhoods.

This study was the first step in the process and is expected to be followed by more comprehensive land use planning and environmental processes.

1.3 Study Area

The study area lies in central Denver, approximately between four of Denver's main road arteries: I-25, Colfax Avenue, Speer Boulevard, and Alameda Avenue. The Burnham Yard 58-acre property resides in the northeast portion of the study area. As shown in Figure 1, the crescent-shaped property is approximately 1 mile long and extends from 13th Avenue (at its northern extent) to Fourth Avenue (at the south). Reaching a maximum width of approximately 0.20 mile between 8th Avenue and 9th Avenue, RTD's light rail lines run on the east side of the site, as does the UP market lead line. Freight rail on the Consolidated Main Line (CML) is aligned along the western edge of the study area, with a mixture of commercial and industrial properties between it and the Burnham Yard site.

1.4 Vision

A vision was developed to define the accomplishments upon the completion of the study.

1.4.1 Study Vision

The Burnham Yard Transportation Planning study will recommend one or more track layout alternatives for the relocation of the Consolidated Main Line (CML), expansion of RTD light rail, and provision of Front Range Passenger Rail (FRPR) (alignment, station, and supporting facilities) within Burnham Yard and the surrounding areas.

COLFAX AVE Colfax at Auraria W Light Rail 13TH AVE LINCOLN MARIPOSA ST 10TH AVE 8TH AVE Mariposa LRT 6TH AVE **LEGEND** Freight Rail Light Rail Burnham Yard Site

Figure 1. Study Area Map

1.5 Prior and Concurrent Planning Efforts

A comprehensive review of prior plans relevant to the Burnham Yard area was conducted. These are listed in the References section of this document. In addition to complete planning efforts, the study also anticipated coordination with these concurrent planning efforts.

1.5.1 P3 Office Burnham Yard Project

The purpose of the P3 Office Burnham Yard Project was to develop a vision and master plan that is community centered and regionally focused, for the future development of Burnham Yard. The P3 Office Burnham Yard Project was being directed by the State of Colorado's Public-Private Partnership Office (P3 Office). The project included two public meetings and the development of a market analysis and equity study. That planning effort has paused at the time of publication of this report.

1.5.2 CCD Small Area Planning Study

Separate from the development of Burnham Yard's rail corridor, the City and County of Denver (CCD) is expected to lead a planning process to ensure that the surrounding community's priorities are identified and used to inform any future redevelopment projects.

1.5.3 Planning Process

Figure 2 presents the planning process for the Burnham Yard property anticipated at the beginning of the study. Based on the findings presented in Section 4.0, the next steps have changed.

Figure 2. Burnham Yard Study Timelines



2.0 STAKEHOLDER ENGAGEMENT

2.2 Overview

The key stakeholders for the study included representatives from local, state, and federal agencies, railroad companies, registered neighborhood organizations, local businesses, and elected offices. These representatives informed their networks of information on the study and provided input from their networks to the study.

The study used an equity lens in both the implementation of engagement activities, as well as the evaluation of alternatives.

Figure 3 presents the framework for the stakeholder engagement for the study.

2.3 Agency and Stakeholder Coordination

2.3.1 Burnham Yard Core Team

The study included the engagement of a Burnham Yard Core Team (Core Team) to provide the study team with stakeholder and local agency coordination and guidance. The Core Team was asked to inform their respective organizations' executive levels for support and guidance. The Core Team included representatives from:

• Colorado Transportation Investment Office

- CDOT Division of Transit and Rail
- CDOT Executive Management Team
- CDOT Region 1
- Colorado Department of Personnel and Administration
- CCD Community Planning and Development
- CCD Department of Transportation and Infrastructure
- Colorado Office of Economic Development and International Trade
- Regional Transportation District (RTD)
- Burlington Northern Santa Fe (BNSF)
- Union Pacific Railroad

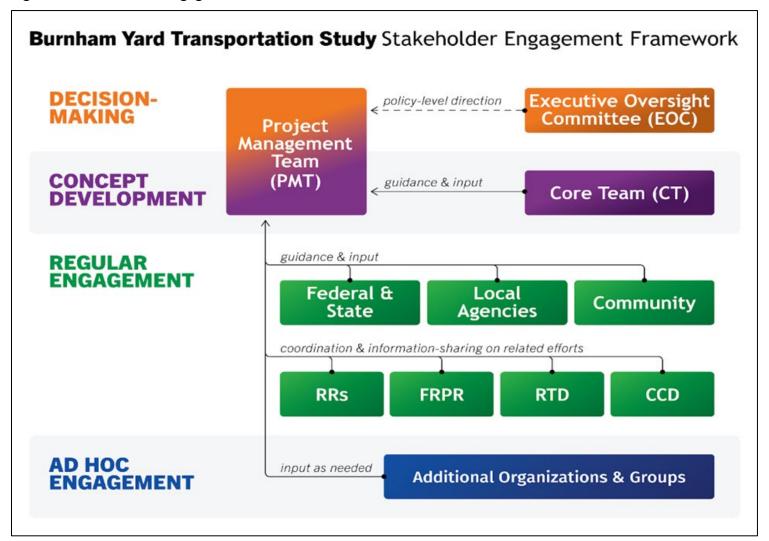
2.3.2 Executive Oversight Committee

The Executive Oversight Committee was composed of senior management from CTIO and CDOT and served to provide policy direction to the study.

2.3.3 Front Range Passenger Rail

Coordination with Colorado Front Range Passenger Rail included staff representatives' monthly involvement as members of the Core Team. Additional meetings were held to confirm the future needs of passenger rail in the Burnham site.

Figure 3. Stakeholder Engagement Framework



2.3.4 Railroad Coordination

Coordination with freight railroads and RTD throughout the initial phase of Burnham Yard planning included railroad representatives' monthly involvement as members of the Core Team and separate meetings with BNSF and UP staff to solicit feedback about alignment alternatives. Freight railroads were clear about service requirements, preferences, issues, and anticipated additional processes for future steps and approvals.

2.4 Public Involvement

2.4.1 Community Stakeholder Interviews

During visioning and concept development, the study team conducted stakeholder interviews. The interviews were conducted with:

- Elected officials
- Government agencies
- State agencies
- Departments and agencies within CCD
- Businesses
- Advocacy Groups
- Registered Neighborhood Organizations

The interviews focused on community and equity issues. The input from the interviews was used in the development and evaluation of concepts and alternatives.

2.4.2 Information Sessions

The study team hosted two Information Sessions for stakeholders. All groups and individuals that were offered an invitation for an interview in the early stages of the study received an invitation to the Information Sessions. The Information Sessions included an open house-style meeting with information stations and boards followed by a presentation delivered by the study team. At the end of the Information Sessions, the attendees completed surveys to gauge their level of support for various alternatives.

2.4.3 Website

The website for the study, hosted on CDOT's website, was the primary platform for public information on the study. The website can be found at this address:

www.codot.gov/projects/studies/burnham-yard-study.

3.0 ALIGNMENT CONCEPTS

The range of alignment concepts considered options for how to align tracks for the CML, add additional tracks for RTD light rail, serve FRPR, and maintain the UP market lead line. These modal alignments could be located on the property's east side, west side, or split between both sides—and the tracks themselves could be at-grade (i.e., ground-level), elevated above grade, or depressed below grade. Options for the CML also included leaving it in its current alignment south of 6th Avenue or shifting it slightly eastward to allow

flexibility for potential future ramp reconfigurations that would improve to traffic operations on I-25.

Through engagement with the Core Team and stakeholders, the following goals were identified to guide the review of alignment options.

- Access and Network Provide for reasonable access to transportation facilities while enhancing mobility by providing operational improvements and transportation choices.
- **Community** Support community plans and aspirations for the site.
- **Safety** Address existing and future safety and operational needs.
- **Environment** Avoid, minimize, and mitigate adverse effects to neighborhoods.
- **Implementation** Provide a cost-effective solution that can be implemented.

Multiple rail alignment concepts, including consideration of roadway crossing treatments, were developed and reviewed. An iterative process mixed and matched different alignment combinations for the four modes. This process included extensive agency involvement through the Core Team.

The outcome was an understanding of the issues relevant to each mode and identification of the most promising elements.

3.2 Consolidated Main Line Freight Rail

3.2.1 General Assumptions

Through the study area between Alameda and Colfax, the CML has two mainline through tracks, plus a siding track between about Ellsworth Avenue and 13th Avenue (Alignment A in Figure 4). Equivalent capacity must be maintained.

No new at-grade crossings can be added; in contrast a reduction of safety risks is a goal.

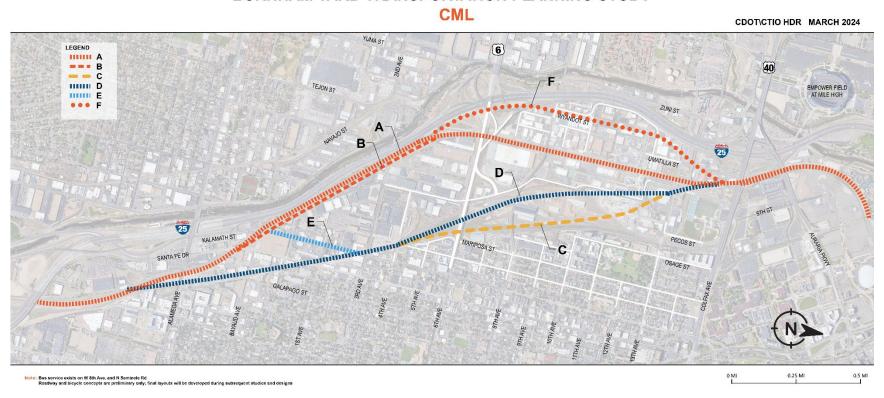
Access to the Kountry lead line (which connects to the CML near 6th Avenue) must be maintained.

3.2.2 Horizontal Alignment Options

Shifting the CML to the east, south of 6th Avenue along its current alignment, was identified as an option (Alignment B in Figure 4). This would allow for future implementation of improved ramps serving I-25, thereby improving traffic operations and safety.

Figure 4. CML Freight Rail Range of Alignment Options

BURNHAM YARD TRANSPORTATION PLANNING STUDY



Relocating the CML away from its current alignment was considered:

- Alignments alongside the current RTD flyover and either the east or west sides of Burnham Yard (Alignments C and D in Figure 4) were noted to have closer proximity of noise, vibration, and other negative impacts near the existing residential neighborhood, and also would create a large barrier between the existing neighborhood and the Burnham Yard property.
- A new alignment from approximately Bayaud Avenue along Kalamath Street into and through the Burnham Yard (Alignment E in Figure 4) was considered but would create a new isolated island between barriers.
- A new alignment closer to I-25, from 6th Avenue to Colfax Avenue (Alignment F in Figure 4), was considered but not reviewed in detail. This would allow a more holistic longterm redevelopment of a large area surrounding Burnham Yard.

3.2.3 Vertical Options

Trenching the CML was considered:

- Trenching along its current alignment was found to have high cost and little gain.
- Trenching the CML along the current RTD alignment (together with RTD in the trench) was understood to 1) increase the proximity of noise, vibration, and other negative impacts to the existing residential neighborhood,

and 2) create a wide barrier between the existing neighborhood and the Burnham Yard property.

3.3 RTD Light Rail Transit

3.3.1 General Assumptions

Currently RTD has two tracks in the study area, between Broadway & I-25 and Colfax. A long-term need identified by RTD is the addition of two more tracks (for a total of four) to address capacity needs. This part of the Light Rail Transit (LRT) system is a bottleneck, as two 2-track lines join from both the south at Broadway and I-25 (the southwest and southeast lines) and the north at Colfax [lines to Denver Union Station (DUS) and downtown Denver].

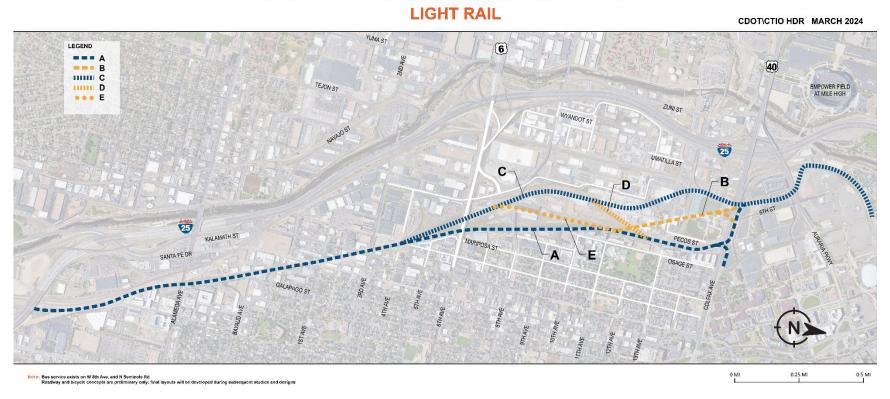
3.3.2 Horizontal Alignment Options

Retaining the existing LRT alignment and adding two new LRT tracks immediately west of the existing LRT tracks on the east side of Burnham Yard (Alignments A or B in Figure 5):

- This would support businesses and residential Transit
 Oriented Development (TOD) investments that are already
 in place.
- Four LRT tracks with at-grade crossings would introduce new safety risks for pedestrians, bicyclists, and vehicles, and may not be allowed by the Public Utilities Commission.

Figure 5. RTD Light Rail Transit Range of Alignment Options

BURNHAM YARD TRANSPORTATION PLANNING STUDY



 Grade separations of select roads into the Burnham Yard property—overpasses or underpasses—would be long structures to allow for the approach grades, and not be conducive to the neighborhood and new development.

A new LRT alignment on the west side of Burnham Yard (Alignments C or D in Figure 5):

- It would allow seamless integration of the Burnham Yard property on the east with the existing neighborhood and street grid.
- It would negatively impact the existing TOD near the 10th and Osage Station. A new station on the west would necessitate a 600-foot walk from the existing station.
- Accessing the downtown tracks from the west side of Burnham Yard would alleviate the existing sharp curve under the Colfax viaduct.
- Accessing the DUS and downtown tracks from the west side of Burnham Yard would introduce a complex wye configuration near the W-Line bridge structure and the Colfax viaduct.

A new LRT alignment through the center of Burnham Yard (Alignment E in Figure 5):

 It would allow potential use of a historic property (Building 4) as an enclosed station for LRT. However, it would bifurcate the Burnham Yard property, complicate access to the Mariposa LRT maintenance facility, and move the stations away from existing Transit Oriented Development (TOD) properties.

3.3.3 Vertical Options

Trenching the LRT in its current alignment on the east side of Burnham (Alignment A in Figure 5) was considered:

- It would allow short and level bridge crossings between the existing neighborhood and the Burnham Yard property.
- It would require vertical pedestrian access (stairs and elevators) to the platform.
- It could incorporate a grassy slope(s), to improve the aesthetics and introduce a linear green space.
- It would require a complex drainage system in an environmentally damaged area and introduce other maintenance issues.
- Access to the Mariposa LRT Maintenance Facility would require a ramp to/from the trench on the north side (and retain the existing at-grade track on the south side).

3.3.4 Mariposa Maintenance Facility

RTD's Mariposa LRT Maintenance Facility is adjacent to the current RTD tracks (Alignment A in Figure 5) between 6th Avenue and 8th Avenue. The Mariposa Maintenance Facility serves as the heavy maintenance facility for the RTD LRT fleet. Its location allows staging additional LRT trains to serve high ridership events in downtown, such as games, concerts, and parades.

- Relocating the facility would be expensive, and not favored by RTD.
- Maintaining a staging track in this vicinity is critical for RTD game day operations.
- LRT tracks to the Mariposa facility on both the north and the south currently do not involve an at-grade crossing and alternatives that would add one could be problematic.

3.4 Front Range Passenger Rail

Initially, the project team investigated the feasibility of two dedicated tracks for FRPR and space for and access to a station. After review and consideration, FRPR may not have stand-alone needs in the Burnham Yard area beyond the ability to share track use of the CML with the freight lines. However, considerations for alignments and a station can be useful in case unforeseen circumstances change the overall plan for Burnham Yard.

3.4.1 Station Proximity to Denver Union Station

From previous front range passenger rail studies, DUS generates significantly better ridership for that service than Burnham Yard is expected to due to its more centralized downtown location, existing transit-oriented development, and connectivity with RTD Commuter and Light rail lines and Amtrak. For these reasons, previous studies and current efforts focus on DUS as the primary FRPR station location for Denver.

There is a need for a secondary station in Denver that provides parking (there is no parking available to transit patrons at DUS). Broadway and I-25 and other existing rail stations north and south of downtown are better options for a FRPR Park-n-Ride station.

Front Range Rail design criteria limit secondary station locations that are not closer than 3 route-miles to another primary or secondary station. Estimates of distance between Burnham and DUS place distances between 2.25 and 3.1 miles.

3.4.2 Trackage Needs

Separate dedicated track(s) for FRPR are not necessary at this point in time within Burnham Yard, in expectation of FRPR operating on shared tracks with UP and BNSF throughout the Front Range. Train operations for passenger rail will be coordinated on the freight lines.

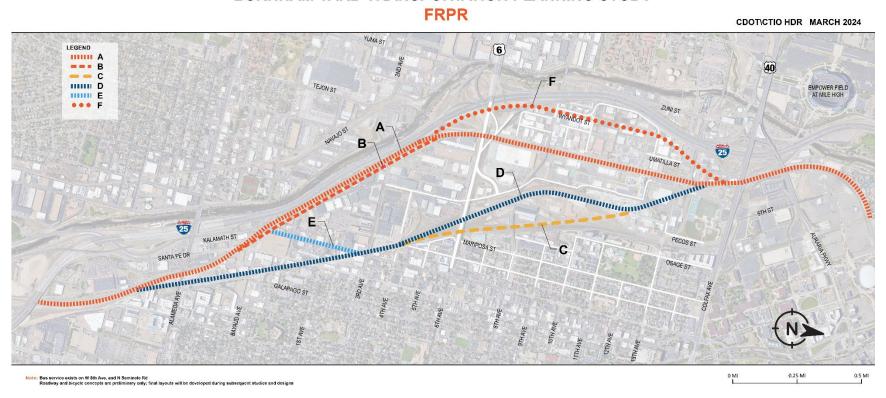
Therefore, the alignment for FRPR is coincident with the CML.

3.4.3 Alignment Options

An alignment using the current CML corridor (Alignments A and B in Figure 6) would not be conducive to a FRPR station, due to its distance from Burnham Yard, the barrier presented by Denver Water between the CML and the Burnham property, and the lack of intuitive connectivity to the LRT station and other area transit.

Figure 6. Front Range Passenger Rail- Range of Alignment Options

BURNHAM YARD TRANSPORTATION PLANNING STUDY



Several FRPR alignment concepts (Alignments C, D, and E in Figure 6) could require curves through the Burnham property because of the need to connect rail lines between the north and south ends of the property. Alignments with slow gradual curves are desired to allow faster train speeds.

FRPR stated a need to avoid designing a proposed/future platform on a curve (due to stringent gap requirements between the platform and the railcar to allow level boarding for Americans with Disabilities Act access). The minimum length for a FRPR platform is 700 feet; the long-term need is 1000 feet.

• Alignment F in Figure 6 would have the same issues as described above for Alignment A.

3.5 UP Market Lead Line

3.5.1 General Assumptions

The UP Lead connects to the CML and serves private industrial customers in the area.

Maintaining connectivity to UP customers was requested by UP.

Maintaining north-south connectivity was requested by UP.

3.5.2 Alignment Options

Moving the UP Lead away from its current alignment (Alignment A in Figure 7) would reduce impacts to residents and reduce it as a barrier between the current neighborhood and the Burnham Yard property.

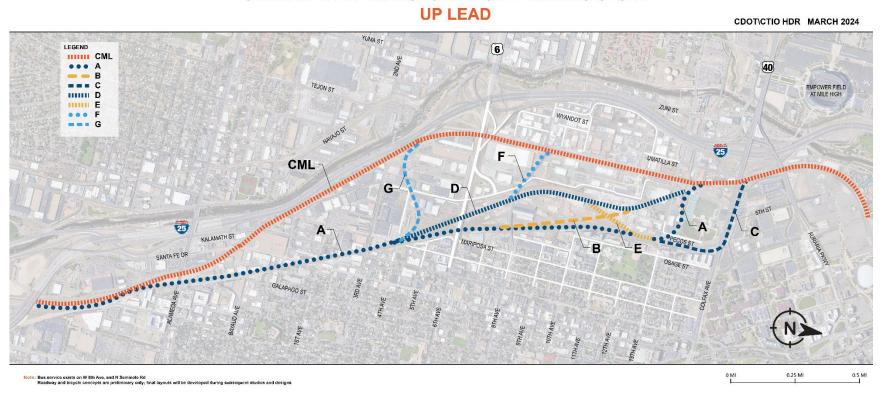
- Alignments B and C in Figure 7 present other options for connecting to the CML on the north.
- Moving the UP Lead to the west side of Burnham Yard is a viable option (Alignments D or E in Figure 7).

There are other viable options for a new connection between the CML to the UP customers:

- Along 8th Avenue to the west side of Burnham Yard (Alignment F in Figure 7) and the market lead wye track, which is near 4th Avenue and Osage Street.
- Along 4th Avenue (Alignment G in Figure 7) to the market lead wye track, which is near 4th Avenue and Osage Street.

Figure 7. UP Market Lead Line- Range of Alignment Options

BURNHAM YARD TRANSPORTATION PLANNING STUDY



3.6 Other Infrastructure and Environmental Analysis

3.6.1 13th Avenue

Currently, 13th Avenue has at-grade crossings with RTD LRT, UP market lead, and the CML, with about 1,400 feet between the LRT/UP crossing just west of Osage Street and the CML crossing near Tejon Street.

The UP, BNSF, and RTD would like to reduce the safety risks of their rail lines crossing 13th Avenue at-grade.

Alignment options where LRT is aligned adjacent to the CML would allow a shorter 13th Avenue overpass/underpass.

3.6.2 8th Avenue

Currently, the 8th Avenue viaduct spans approximately 3,200 feet between Mariposa Street and Vallejo Street.

The City would like to shorten the viaduct so that 8th Avenue is integrated into the street grid in Burnham Yard. 8th Avenue must remain grade separated from the CML west of the Burnham Yard property.

8th Avenue at-grade on the east side of Burnham Yard near Navajo Street would introduce a grade crossing with the existing LRT through tracks. Options for LRT that do not introduce an at-grade crossing are preferred. In addition, 8th Avenue at-grade on the east side of Burnham Yard near Navajo Street would introduce a grade crossing with the LRT track into the Mariposa Maintenance Facility.

3.6.3 Santa Fe and Kalamath

Santa Fe Drive and Kalamath Street form a one-way pair between downtown Denver and US 85/I-25 to the south metro area. Existing traffic data shows the multi-lane roads each serve about 10,000 vehicles a day.

Currently, these roads have at-grade crossings with the CML. There is a long-standing goal for these to become grade-separated crossings to enhance safety and traffic operations.

3.6.4 Environmental Analysis

Beyond the alignment observations, an extensive environmental review was carried out by the study team, the findings of which were incorporated into a detailed report. The report included a review and discussion of the following:

- Existing Conditions
- Noise and Vibration assessment and measurements
- Hazardous Materials
- Historic Resources
- Right of Way Analysis
- Qualitative Air Quality

4.0 FINDINGS

4.2 Findings

In summary, this study yielded the following main findings:

4.2.1 Consolidated Main Line

After looking at several different horizontal and vertical alignments through the Burnham Yard site, none provided enough additional benefit to consider a new CML alignment. However, there would be additional benefit if either grade separation or other at-grade safety improvements could be provided where the CML crosses 13th Avenue, Santa Fe Drive, and Kalamath Street.

4.2.2 Light Rail and UP Market Lead

In coordinating with RTD in the fall of 2024, they communicated that recent (post-COVID) planning efforts have indicated there is no longer a need to preserve space for two more light rail tracks through this area. A reduction in forecast ridership and a spreading of that ridership demand over longer AM and PM peak times resulted in RTD determining that the additional tracks will not be needed in the future. Therefore, RTD is not motivated to participate in the removal or relocation of the UP market lead.

CDOT and CTIO remain interested in the removal or relocation of the UP market lead for two primary reasons. First, with these heavy rail tracks removed and only the two

existing LRT tracks in place on the east side of the site, it is possible to pursue connecting one or more streets of the east west grid with at-grade access across the LRT tracks into Burnham Yard. This will create opportunities for an increased number of redevelopment options available on the property. Second, removal of the UP lead track will improve overall multimodal safety in the area by eliminating at grade heavy rail crossings on 13th Avenue, Rio Court and Shoshone St.

4.2.3 Front Range Passenger Rail

After considering additional tracks and station locations for FRPR, the study team determined that it was most likely that FRPR would be able to operate on the CML and would likely not need separate tracks through this study area. The land use of Burnham Yard will determine if a FRPR station or stop is warranted in this area. There are a few locations where that could be possible.

5.0 REFERENCES

2006 TOD Strategic Plan-from CCD-CPD: https://ctod.org/pdfs/2006TODStrategicPlanDenver.pdf

2021 Burnham Yard Purchase and Sale Agreement: https://www.codot.gov/programs/ctio/agenda-item-documents/2021-agenda-item-documents/2021-agenda-item-documents/2021-agenda-item-documents/2021/3a-burnham-yard-cdot-and-hpte-iaa-and-memo.pdf

Baker Neighborhood Plan:

https://www.denvergov.org/content/dam/denvergov/Portals/646/documents/planning/Plans/Baker_Neighborhood_Plan.pdf

Blueprint Denver: <a href="https://www.denvergov.org/Government/Agencies-Departments-Offices-Departments-Departments-Offices-Departments-Offices-Departments-Offices-D

Burnham Yard White House Tour PPT: Source to follow

2017 Burnham Yards Research Report-by Historic Denver: https://historicdenver.org/wp-content/uploads/2020/03/Burnham-yards-Research-Report-Spring-2017.pdf

2018 Colorado Freight and Passenger Rail Plan-by CDOT: https://www.codot.gov/programs/transitandrail/assets/plans-studies-reports/statewidetransitplan/2018-colorado-freight-and-passenger-rail-plan.pdf

2019 Colorado Freight Plan- by CDOT: https://www.codot.gov/performance/assets/march-2019-colorado-freight-plan.pdf

Decatur Federal Station Area Plan: https://www.denvergov.org/files/assets/public/v/1/community-planning-and-development/documents/planning/plans/decatur_federal_station_area_plan.pdf

Denver City Council Freight Railroad Safety Study Briefing: Source to follow

Denver Comprehensive Plan: <a href="https://denvergov.org/Government/Agencies-Departments-Offices-Departme

Downtown Urban Design Standards and Guidelines: https://denvergov.org/Government/Agencies-Departments-Offices/Agencies-Departments-Offices/Agencies-Departments-Offices/Departments-Offices-Directory/Community-Planning-and-Development/Denver-Zoning-Code/Urban-Design-Review-Design-Standards-and-Guidelines

I25 Broadway Station Area Plan: https://www.denvergov.org/files/assets/public/v/1/community-planning-and-development/documents/planning/plans/i25-broadway-station-area-plan.pdf

2023 Joint Transportation Committee Front Range Passenger Rail-by FRPR: https://leg.colorado.gov/sites/default/files/images/joint_transportation_committee_frpr.pdf

La Alma Lincoln Park Design Guidelines: https://www.denvergov.org/files/assets/public/v/3/community-planning-and-development/documents/landmark-preservation/design-review-and-guidelines/la_alma_lincoln_park_design_guidelines_english.pdf

Littleton Station BNSF Crash Report: https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/488/hq200904.pdf

Metro Vision—by DRCOG: https://indd.adobe.com/view/bc3ce7aa-3e79-4f11-8eb6-9e1c20b4472a

2014 TOD Strategic Plan: https://www.denvergov.org/files/assets/public/v/1/transit-oriented-development/documents/tod_strategic_plan_executive_summary.pdf

Valverde Neighborhood plan:

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