Appendix B2. Project Setting and Description of Alternatives

1.0 Project Setting

Interstate 270 (I-270) is a 6.5-mile-long controlled-access interstate highway with two through lanes in each direction, providing connections with U.S. Highway 36 (US-36) and Interstate 25 (I-25) on the western end and Interstate 70 (I-70) at the eastern end, that serves the northern and eastern Denver metropolitan communities (Figure 1-1). I-270 is a key link to the Denver International Airport and large business clusters from the energy, manufacturing, and freight distribution centers, and is a major truck corridor, providing access to adjacent industrial areas. Between I-25 and I-70, I-270 has partial interchanges at I-76, York Street, Vasquez Boulevard, and Quebec Street. The posted speed limit on the freeway is 55 miles per hour. The highway crosses over both the Union Pacific Railroad (UPRR) and BNSF Railway, as well as the South Platte River, Clear Creek, Burlington Ditch, and it parallels Sand Creek and the Sand Creek Greenway and Trail system.

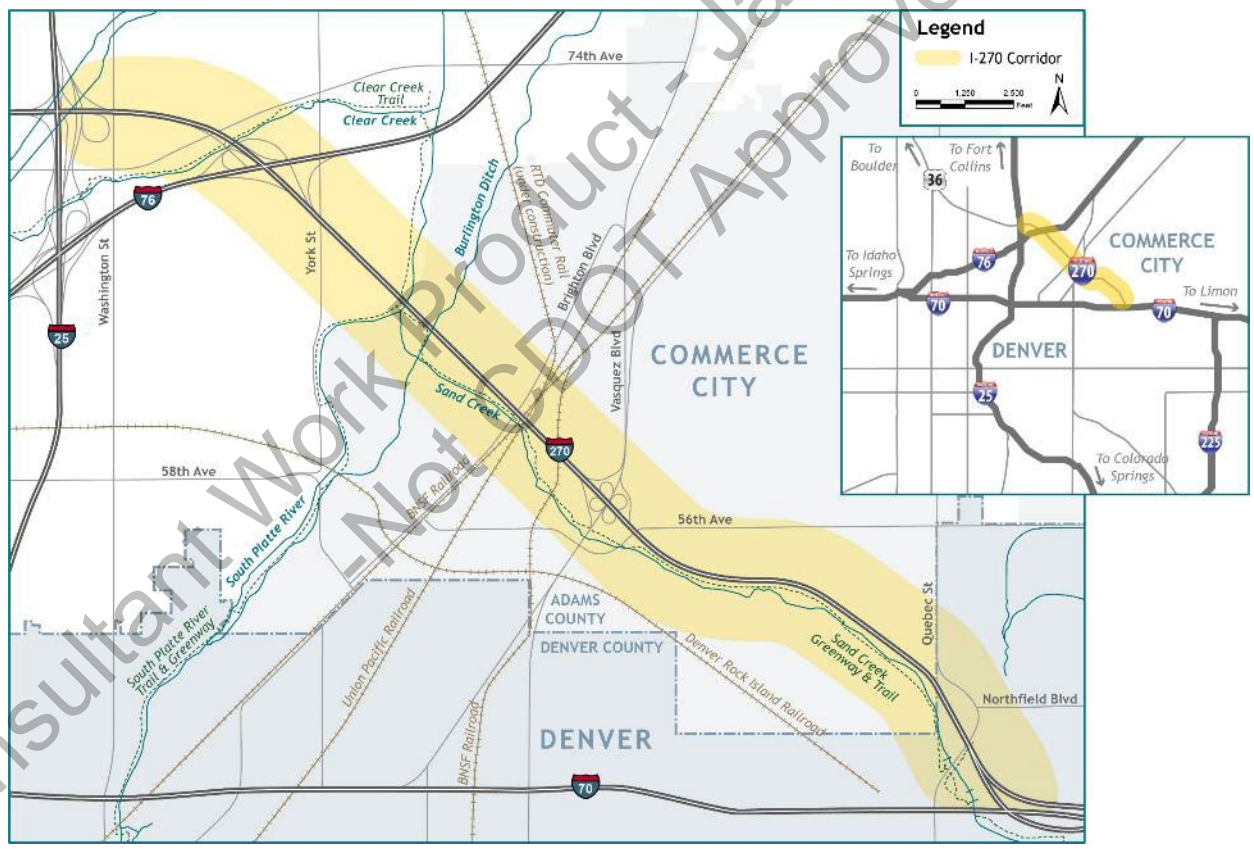

Figure 1-1. Project Location
Source: Jacobs

2.0 Description of the Proposed Action

The Proposed Action includes mainline, interchange, bridge, wall, drainage, multimodal, and intelligent transportation system (ITS) improvements that would modernize the I-270 corridor and directly address the corridor's needs. These improvements would improve safety, traffic operations, travel time reliability, and freight movements while updating the aging infrastructure nearing the end of its service life. The full Proposed Action mapbook is included as Appendix B3 to the Environmental Assessment (EA).

2.1 Mainline I-270

The Proposed Action roadway template consists of the following (Figure 2-1):

- One 10- to 12-foot-wide inside shoulder (each direction).
- One 12-foot-wide express lane (each direction), which would be added as an inside lane for the majority length of I-270 between I-25 and I-70.
- Two 12-foot-wide general purpose lanes (each direction) with an additional 4-foot-wide buffer added between the general purpose and express lanes.
- One 12-foot-wide eastbound auxiliary lane connecting the York Street and Vasquez Boulevard interchanges.
- One 12-foot-wide westbound auxiliary lane connecting the I-76 and Vasquez Boulevard interchanges.
- One 12-foot-wide westbound auxiliary lane connecting the Vasquez Boulevard and Quebec Street interchanges.
- One 12-foot-wide typical outside shoulder width (both directions).

Figure 2-1 and Figure 2-2 show the proposed typical sections.

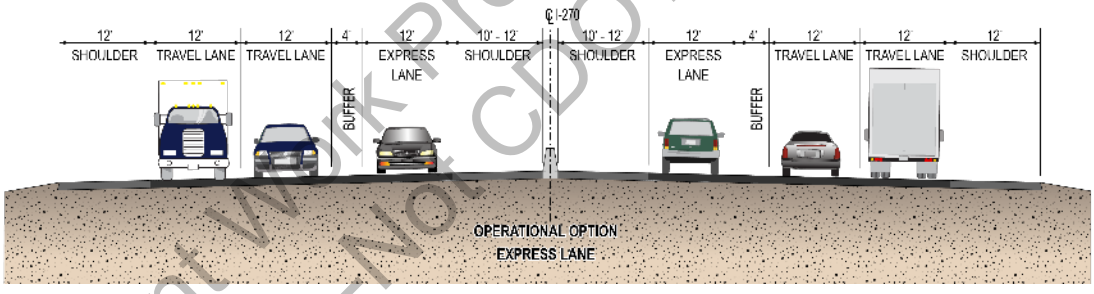

Figure 2-1. Typical Roadway Section without Auxiliary Lane
Source: Jacobs

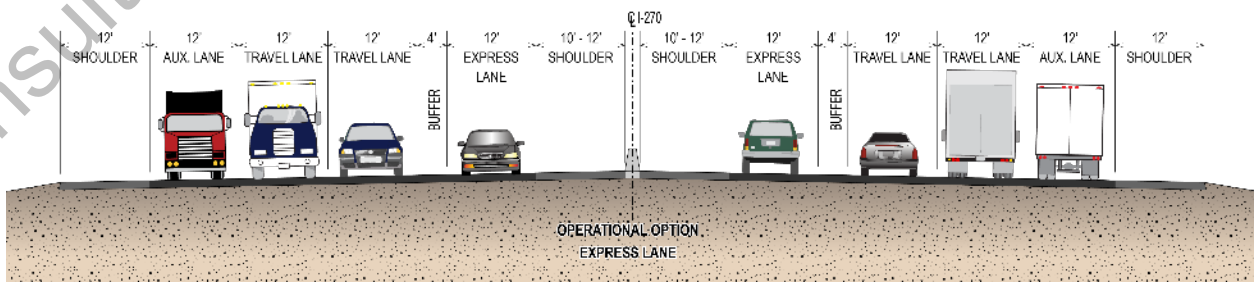

Figure 2-2. Typical Roadway Section with Auxiliary Lane
Source: Jacobs

Where I-270 crosses York Street, the inside shoulders would expand to approximately 24 feet in both directions of I-270 to accommodate future direct connect ramps with I-76. Shoulder striping would delineate 12-foot-wide shoulders with the additional 12 feet being preserved for the future direct connect ramps.

Because some areas of I-270 were originally constructed on top of landfills, settlement over time has created an uncomfortable roller-coaster effect for drivers, pavement warping, and cracking. The Proposed Action would stabilize the full roadway prism to ensure the reconstructed interstate is not impacted by the same landfill settlement issues in the future.

Most of the highway's asphalt pavement is in poor condition and deteriorating and would be replaced as part of the Preferred Alternative. However, isolated sections of concrete pavement that still have serviceable life would be kept in place and only widened to accommodate the wider roadway section.

2.2 Interchanges and Local Street Improvements

The Proposed Action would improve three interchanges between the I-25 and I-70 interchanges and replace 12 bridges along the I-270 corridor. Each of the interchange locations are discussed in the following sections moving from east to west along the corridor.

2.2.1 I-270/I-76 Interchange

In the eastbound direction, a new collector ramp system is proposed that would consolidate the merging ramps from both directions of I-76 (Figure 2-3). The collector ramp system would be barrier-separated from I-270 and, once the ramps merge, it would transition into an auxiliary lane that would continue east to Vasquez Boulevard. In the York Street area, the westbound I-270 to I-76 ramps would undergo a minor (approximately 25-foot) shift to the north at the diverge point to accommodate the widened roadway template. The westbound exit ramps for I-76 would be separated from the York Street exit ramp, and the exit ramps for I-76 would feature a dual-lane exit.

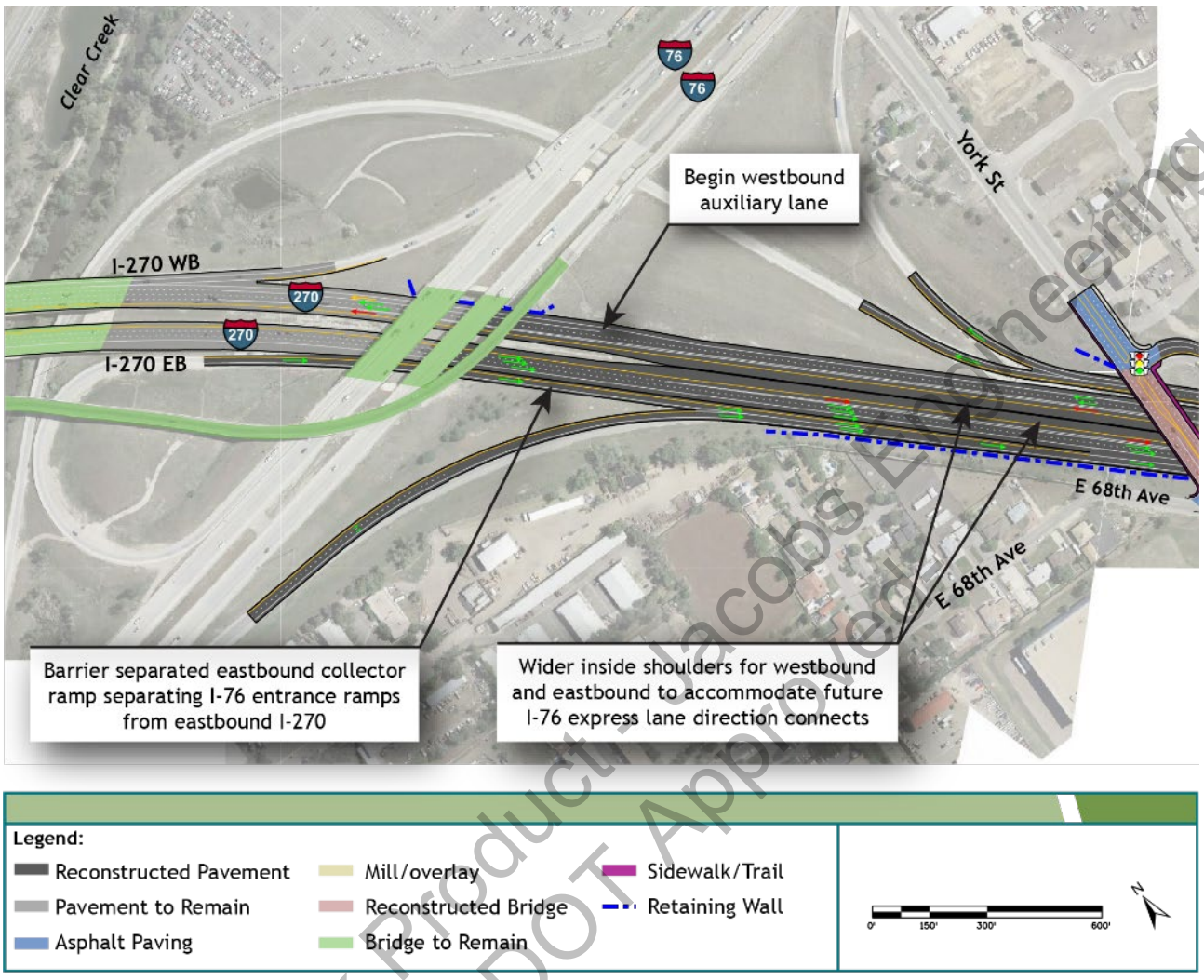

Figure 2-3. I-270/I-76 Interchange
Source: Jacobs

2.2.2 I-270/York Street Interchange

Between York Street and the South Platte River bridge, the westbound I-270 off-ramp would undergo a minor (approximately 15-foot) shift to the north, flattening the curve radius and allowing for expansion of the I-270 mainline (Figure 2-4). The westbound exit ramp for York Street would be exclusive to York Street and would begin after crossing the westbound I-270 bridge over the South Platte River. In the eastbound direction, the York Street/I-270 on-ramp would be shifted to the south about 50 feet and lengthened approximately 1,050 feet then would merge into the eastbound auxiliary lane before crossing the bridge over the South Platte River.

For a distance of approximately 1,000 feet where it crosses over I-270, York Street would be widened by an estimated 36 feet to accommodate four 12-foot travel lanes with a 16-foot center-turn lane median, an attached 10-foot-wide multi-use path along the eastern side, and a 5-foot-wide reconstructed sidewalk along the western side. This wider York Street template would tie into improvements currently planned as a separate project as part of the *Adams County Transportation Plan* (Adams County 2012). Where East 68th Avenue intersects York Street (southern side of the bridge and western side of York Street), the intersection would be signalized.

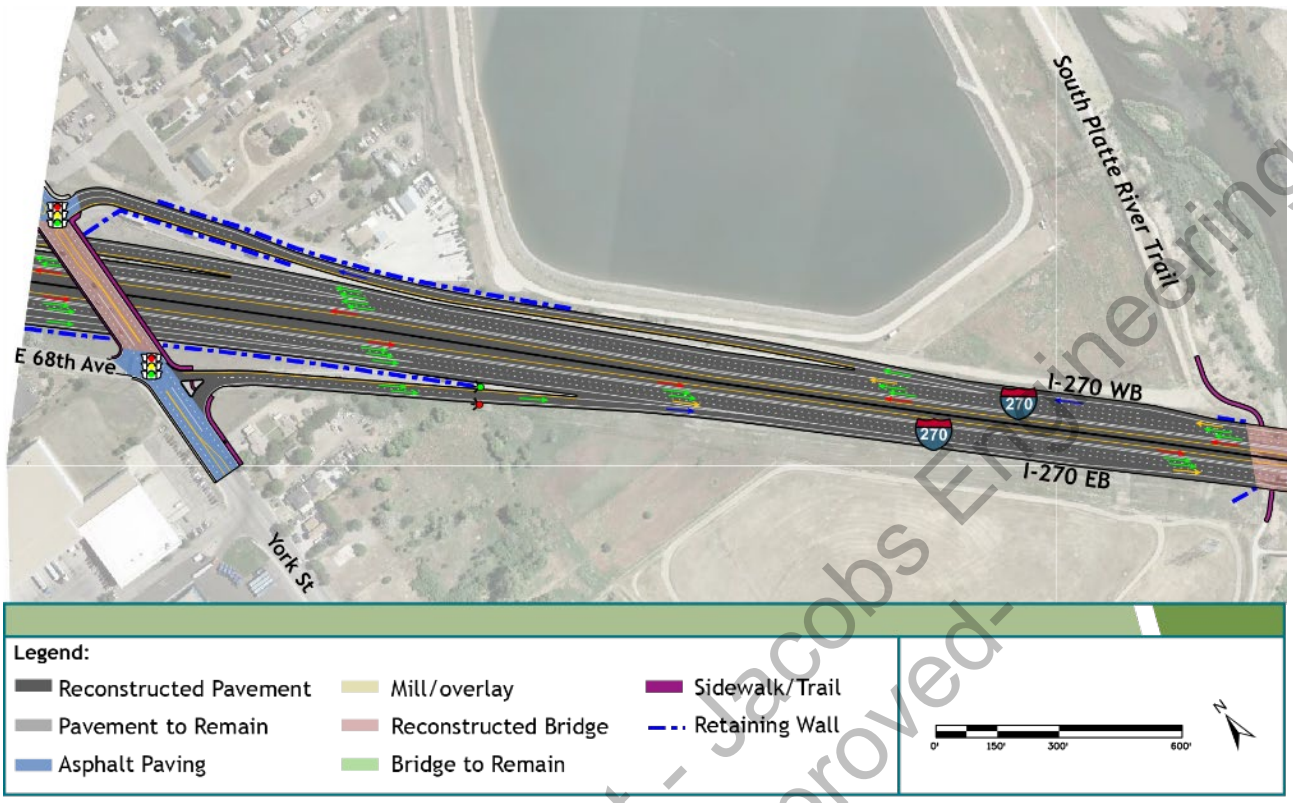

Figure 2-4. I-270/York Street Interchange
Source: Jacobs

2.2.3 I-270/Vasquez Boulevard Interchange

The I-270/Vasquez Boulevard interchange would be reconfigured by removing the westbound I-270 to southbound Vasquez Boulevard and eastbound I-270 to northbound Vasquez Boulevard exit loop ramps. Those movements would be provided via new signalized turbo tee-intersections at new ramp terminal locations along Vasquez Boulevard (Figure 2-5). A new ramp would also connect northbound Vasquez Boulevard to eastbound I-270, a movement not currently provided by the existing interchange configuration. This new eastbound ramp and the reciprocal westbound ramp (in the northwest quadrant) would be widened to provide a truck/transit bypass lane for the peak period ramp metering. Through the I-270 and Vasquez Boulevard interchange, a new 10-foot-wide off-street trail and sidewalk network would connect the East 56th Avenue sidewalk and Sand Creek Greenway Trail to the sidewalk along northbound Vasquez Boulevard. The off-street trail would pass under the eastern side ramps via concrete box culverts providing grade separation from the roadways.

2.2.4 I-270/East 56th Avenue Crossing

Nearby, where East 56th Avenue crosses beneath I-270 immediately east of the I-270/Vasquez Boulevard interchange, the East 56th Avenue curve at Eudora Street would be widened and flattened to enhance the roadway geometry and improve sight lines around the curve (Figure 2-5).

The sidewalk along the western side of East 56th Avenue would be brought up to an 8-foot width. On the eastern side of 56th Avenue, a 4-foot on-street bike lane and attached 6-foot-wide sidewalks would be provided under the new I-270 bridge, and a new 8-foot-wide sidewalk would be constructed and extended over to the Dahlia Trailhead at the northern end of the East 56th Avenue bridge over Sand Creek. A new 10-foot wide sidewalk would connect the East 56th Avenue sidewalk to the existing sidewalk on Eudora Street, East 56th Avenue north of the interchange, and to the new off-street trail through the Vasquez Boulevard interchange.

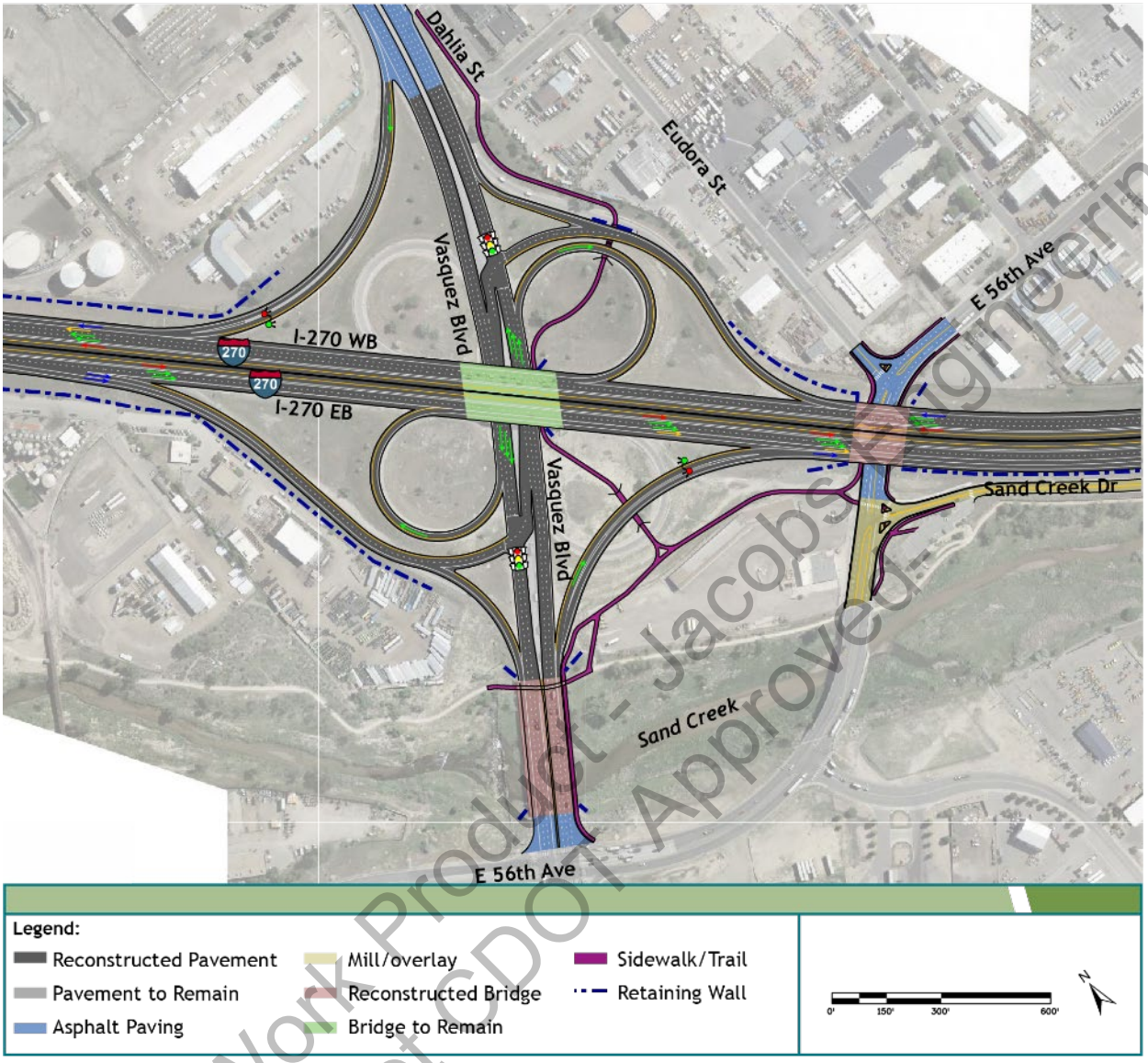

Figure 2-5. I-270/Vasquez and I-270/East 56th Avenue Interchanges
Source: Jacobs

2.2.5 I-270/Quebec Street Interchange

Finally, farther to the east, the I-270/Quebec Street interchange would still operate as a half-movement interchange (Figure 2-6). However, the eastbound deceleration lane for the Quebec Street exit ramp would be lengthened by 2,500 feet. The westbound entrance ramp from Quebec Street would be shifted north approximately 10 feet to account for the new template width.

The Proposed Action does not preclude direct connections for use by the express lanes on I-25, I-70, I-76, or US-36 identified in the *Colorado Express Lane Master Plan* (CHPTE 2020). The I-270/I-70 direct connects are being planned but would require future realignment of I-70 and additional bridges over Sand Creek. As described in the EA, the I-270 Corridor Improvements project has independent utility and meets the stated needs without the I-270 direct connections at I-25, US-36, I-76, and I-70.

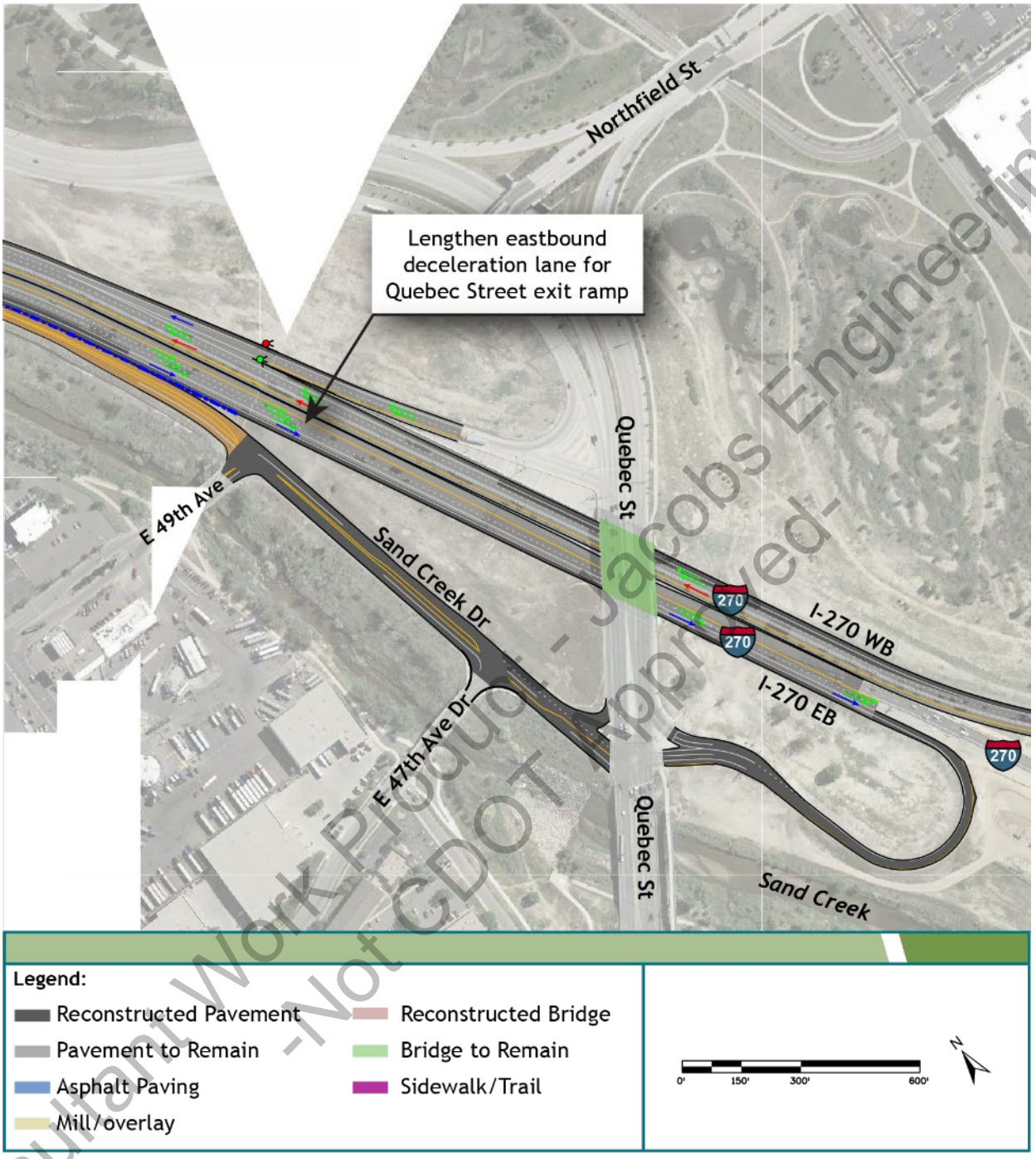

Figure 2-6. I-270/Quebec Street Interchange
Source: Jacobs

2.3 Bridges

Beginning at the western end of the corridor, the I-270 bridges over Washington Street and Clear Creek are wide enough to accommodate the widened Proposed Action roadway template and remain within their service lives; therefore, these would not be replaced or widened. The existing I-76 bridges over I-270 in this area are long enough to span the I-270 roadway and do not require modification or replacement. The existing I-270 bridge over Vasquez Boulevard is wide enough for the proposed

template width and would not be replaced or widened. The following bridges would be replaced as part of the Proposed Action:

- York Street over I-270
- Both the eastbound and westbound mainline bridges over the South Platte River
- Both the eastbound and westbound mainline bridge over the Burlington Ditch
- The westbound mainline bridge over Brighton Boulevard and the BNSF/UPRR railroad tracks
- The westbound mainline bridge over East 60th Avenue and the BNSF railroad tracks

To accommodate the widened interstate roadway, the collector ramp that originates at the I-270/I-76 interchange, and the wider York Street, the existing two-span York Street bridge would be replaced with a new two-span bridge structure approximately 25 feet wider than the existing bridge. The existing York Street bridge is rated structurally deficient.

Continuing eastward, both bridges over the South Platte River are structurally deficient (that is, there are elements of the structure that need to be monitored or repaired) and would be replaced with a single structure that is approximately 50 feet wider than the existing bridges. The bridges over Burlington Ditch/ O'Brien Canal would be replaced with structures approximately 30 feet wider than the existing bridges. The westbound and eastbound bridges over the ditch are both rated structurally deficient.

Where I-270 crosses Brighton Boulevard, East 60th Avenue, and the BNSF and UPRR railroad tracks, the existing three-span bridge structures would be replaced with a single, two-span structure that is approximately 50 feet wider than the existing structures that also span the railroads. I-270 also passes over East 60th Avenue and the BNSF tracks just east of the Brighton Boulevard/railroad crossing. For this single bridge, the two-span structure would span the entire railroad right-of-way and would be constructed approximately 60 feet wider than the existing structures. Both westbound structures over the tracks are rated structurally deficient. At I-270 over East 56th Avenue, a new bridge structure would be required to accommodate the widened I-270 roadway template and the new northbound Vasquez Boulevard to eastbound I-270 on-ramp.

Where Vasquez Boulevard crosses Sand Creek immediately south of the I-270 interchange, the existing bridge would be replaced with a new bridge widened approximately 15 feet to accommodate a wider southbound shoulder and a new 10-foot-wide sidewalk along the eastern side. The new sidewalk would also provide connectivity from south Vasquez Boulevard to the north of I-270 through the interchange.

2.4 Retaining Walls

Walls to contain fill or cut slopes may be required in several locations throughout the corridor to avoid and minimize impacts to adjacent properties and environmental resources. Retaining walls would vary in height from approximately 5 feet to 30 feet. Retaining walls are anticipated in several areas throughout the project; dimensions are approximate and subject to refinement during final design.

- 2,000 feet along eastbound I-270 from the I-76 on-ramp to approximately the York Street on-ramp
- 5,500 feet along westbound I-270 York off-ramp
- 850 feet along eastbound I-270 approaching Brighton Boulevard
- 850 feet along westbound I-270 west of Brighton Boulevard
- 2,100 feet encircling the embankment between the bridges over the railroads
- 1,560 feet along eastbound I-270 and the Vasquez Boulevard exit ramp
- 715 feet along westbound I-270 west of the westbound Vasquez on-ramp
- 260 feet at the I-270 bridge over 56th Avenue
- 1,165 feet along eastbound I-270 east of 56th Avenue
- Other miscellaneous walls required to separate I-270 eastbound from Sand Creek Drive

Retaining wall locations are shown in the mapbook included in Appendix B3.

2.5 Permanent Water Quality

To meet CDOT's Municipal Separate Storm Sewer System Program and local water quality requirements and to capture stormwater runoff from the expanded roadway template, the existing system of inlets and outfalls would be completely replaced with a series of extended detention basins and concrete basins. Nine permanent water quality control measures, consisting of seven extended detention basins and two concrete basins, would be constructed. The *Water Quality Technical Memorandum* (Appendix A9 of the EA) provides details on the size and location of permanent water quality control measures. Permanent water quality control measure locations are shown in the mapbook included in Appendix B3.

2.6 Intelligent Transportation System and Electrical Infrastructure

The Proposed Action would include ITS infrastructure to improve driver communication and pedestrian warning and maximize the effectiveness of the highway infrastructure improvements. ITS improvements likely would include the following elements:

- Variable message signs
- High-intensity activated crosswalk signals
- Traffic cameras
- Ramp metering
- Weather monitoring station
- Tolling infrastructure for the express lane

The I-270 corridor is a key for facilitating electrical infrastructure that would provide the power needed to run businesses, homes and other electrical needs into the future. The Proposed Action would not preclude the ability to provide the necessary underground duct banks to convey safe power to end users. In addition, a corridor-wide roadway lighting assessment would be done to implement Smart Lighting. Smart lighting infrastructure would provide an environmentally friendly design by enabling adaptive lighting. Smart lighting, which is LEED certified, can implement adaptive light intensity based on traffic density, power needs and even weather conditions.

2.7 Staging Area Locations

Staging areas would be needed for materials, equipment, and access during construction of the Proposed Action. Approximately 12 acres total of staging area are anticipated at the following locations:

- I-270/Vasquez Boulevard interchange
- North of I-270 just east of the Sand Creek Drive railroad junction
- North of I-270 just west of the Quebec Street interchange and south of North Quebec Street
- I-270/I-76 interchange area

3.0 Description of No Action

The No Action Alternative is the condition where CDOT would not proceed with the Proposed Action. The No Action Alternative is defined as including ongoing highway and bridge maintenance and isolated pavement reconstruction. The ongoing maintenance would include activities that CDOT routinely performs on I-270 as part of its maintenance program. These activities include mill and overlay, crack sealing, maintenance of drainage and water quality structures, and guardrail replacement or repair as warranted. The No Action Alternative would not meet the Purpose and Need for the project, but it is carried forward as a baseline for comparison with the Proposed Action.

4.0 References

Adams County. 2012. *Adams County Transportation Plan*. https://www.adcogov.org/sites/default/files/2776.pdf

Colorado Department of Transportation (CDOT). 2020. *Colorado Express Lane Master Plan*. Final. Prepared by Colorado HPTE. February. https://www.codot.gov/programs/expresslanes/assets/elmp-final-report.pdf/

Colorado High Performance Transportation Enterprise (CHPTE). 2020. *Colorado Express Lane Master Plan*. February.