



ROCKRIDGE BART STATION

ALTERNATIVES ANALYSIS

Contents

1.0 Background and Existing Conditions	4
1.1 Existing AC Transit Bus Service at Rockridge BART	4
1.2 Splitting Line 51 at Rockridge BART	6
1.3 Station Location	6
1.4 Station Access	7
1.5 Line 51A/Line 51B Transfer	7
1.6 Results of the Split	8
1.7 Improving the Transfer between Line 51A & Line 51B	9
2.0 Problem Statement	12
3.0 Goals and Objectives	12
4.0 Near Term Alternatives	14
4.1 Connection Protection	14
4.2 Interlining Line 51A and 51B	14
4.3 Combining Line 51A and 51B Into a Single Line with Pulse Point	17
4.4 Routing Lines 51A and 51B onto Keith Ave/Presley Way/Miles Ave	18
5.0 Preliminary Long-Term Alternatives	21
5.1 Alternative A: Off-Street Transit Center (East Side Parking Lot)	22
5.2 Alternative B: Off-Street Bus Stops (East Side Internal Roadway)	25
5.3 Alternative D: Extended Bus Stop Along East Side of College Avenue	Error! Bookmark not defined.
6.0 Feasibility Analysis	31
7.0 Alternatives Analysis	32
7.1 Factors Considered	32
7.2 Scoring of Alternatives	34
8.0 Staff Recommendation	34
8.1 Near-Term Recommendation	34
8.2 Long-Term Recommendation	35
9.0 No-BUILD ComPARISON	35
9.1 Near-Term Preferred Alternative: Interlining Line 51A and 51B Along College Avenue with Connection Protection (Estimated Cost: None)	35

9.1 Long-Term Preferred Alternative: Off-Street Transit Center - East Side Parking Lot (Estimated Cost: \$8M).....	37
APPENDIX A.....	39
Description and High-Level Review of Alternative C: On-Street Transit Center Along East Side of College Avenue	39
APPENDIX B.....	43
Description and High-Level Review of Alternative E: Off-Street Transit Center (West Lot).....	43
APPENDIX C.....	47
Scoring Matrices.....	47

1.0 BACKGROUND AND EXISTING CONDITIONS

In 2006, the Alameda-Contra Costa Transit District (AC Transit or District) began a comprehensive service evaluation for Line 51 – its highest ridership route at the time – to evaluate service levels and reliability. The study was conducted using extensive data analysis and observations; and included a series of recommendations to improve Line 51's performance.

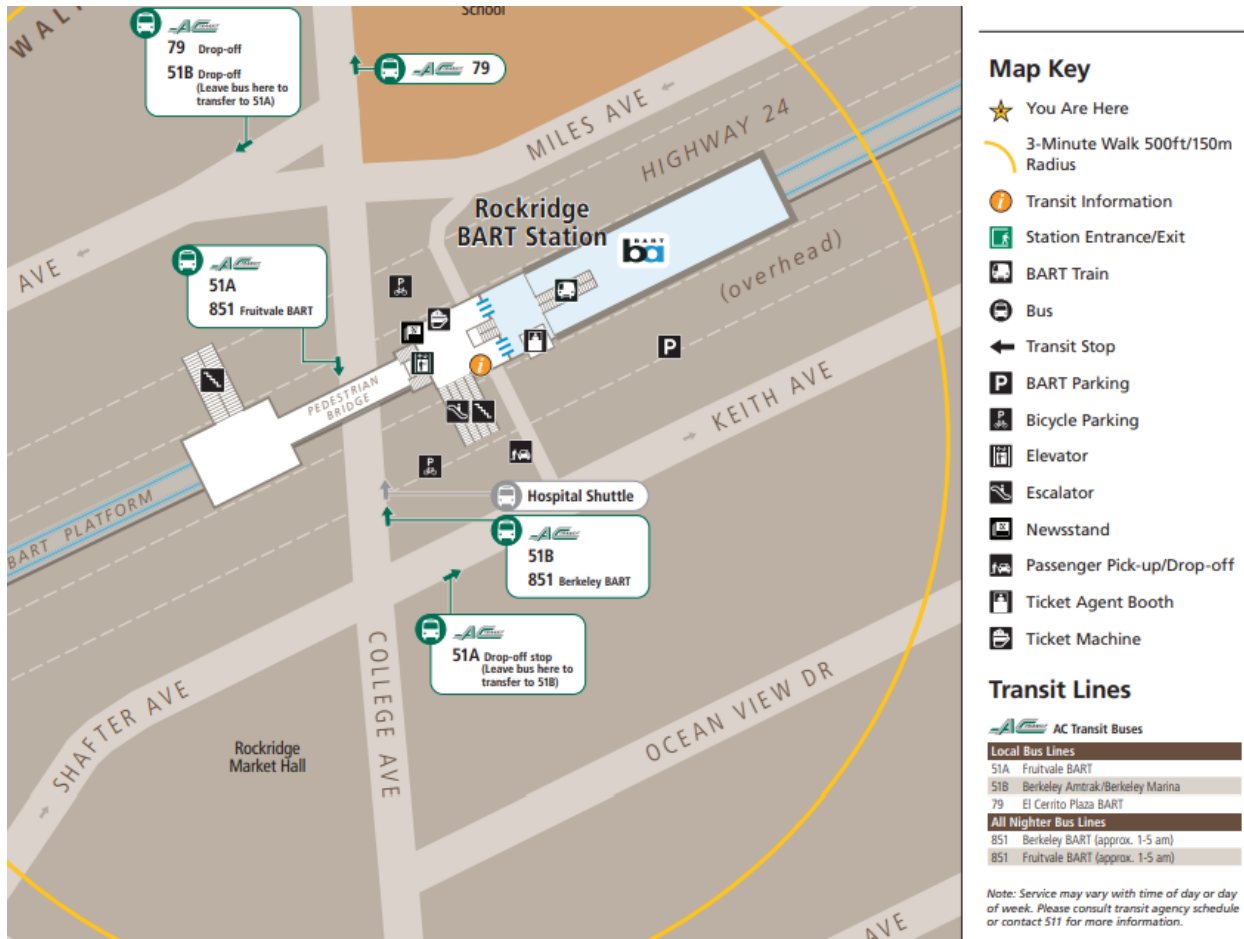
The study was used to secure \$10 million in funding through the Metropolitan Transportation Commission's Transit Performance Initiative (TPI) program. The TPI program funded less intensive capital projects aimed at improving operations and customer experience. In addition, staff implemented a key recommendation in the study to divide Line 51 into two routes – lines 51A and 51B – that would connect at the Rockridge Bay Area Rapid Transit (BART) station.

This report summarizes staff's analysis leading up to the decision to split the route, subsequent benefits and impacts, and alternatives to address transfer concerns between the resulting 51A and 51B bus lines.

1.1 Existing AC Transit Bus Service at Rockridge BART

The Rockridge BART Station is served by AC Transit lines 51A, 51B, 79 and 851. It is used as a route terminal for lines 51A, 51B and 79. Ridership data from 2019 estimates that over 950 riders per weekday get off near the Rockridge BART Station and nearly 1,100 riders get on. Exhibit 1 is a map detailing AC Transit bus stops surrounding the station.

Exhibit 1 - Rockridge BART Transit Stops



Line 51A (Fruitvale BART- Rockridge BART)

Line 51A approaches the Rockridge BART Station heading north along College Avenue, turning right onto Keith Avenue, then making a left onto Presley way, a left onto Miles Avenue, and finally a left onto College Avenue. There is space for two Line 51A buses to stage along College Avenue if bus operators continually pull forward prior to the following bus arriving. Due to Line 51A making the left-turn off of Miles Avenue, it's not possible for Line 51A to utilize the curb closest to Miles Avenue as a bus stop, reducing the amount of space available for buses along the east side of the street.

The final bus stop for Line 51A approaching the Rockridge BART Station is located along Keith Avenue, just east of College Avenue. Riders looking to transfer to Line 51B do so by getting off at this stop and traveling across Keith Avenue. After riders alight along Keith Avenue, the bus operates out-of-service to the start of the southbound trip along the west side of College Avenue.

Line 51B (3rd & University/Berkeley Marina- Rockridge BART)

Line 51B approaches the Rockridge BART Station heading south along College Avenue, turning right onto Miles Avenue, then making a left onto Forest Street, a left onto Shafter Avenue, and finally a left onto College Avenue. There is space for two Line 51B buses to stage along College Avenue if bus operators

continually pull forward prior to the following bus arriving. Other shuttles use this area for pick-up and drop-offs and cause potential conflicts between services. Due to Line 51B making the left-turn off of Miles Avenue, it's not possible for Line 51B to utilize the curb closest to Keith Avenue as a bus stop, reducing the amount of space available for buses along the east side.

The final bus stop for Line 51B approaching the Rockridge BART Station is located along Miles Avenue, just west of College Avenue. Riders looking to transfer to Line 51A do so by getting off on Miles Avenue at College Avenue, then crossing Miles Avenue.

Line 79 (El Cerrito Plaza- Rockridge BART)

Line 79 approaches the Rockridge BART Station heading south along College Avenue, turning right onto Miles Avenue, then making a left onto Forest Street, a left onto Shafter Avenue, and finally a left onto College Avenue. Line 79 does not stop along College Avenue between Keith Avenue and Miles Avenue, and instead drops off riders just north of Miles Avenue, in front of Claremont Middle School. There is space for two Line 79 buses to stage along College Avenue if bus operators continually pull forward prior to the following bus arriving.

1.2 Splitting Line 51 at Rockridge BART

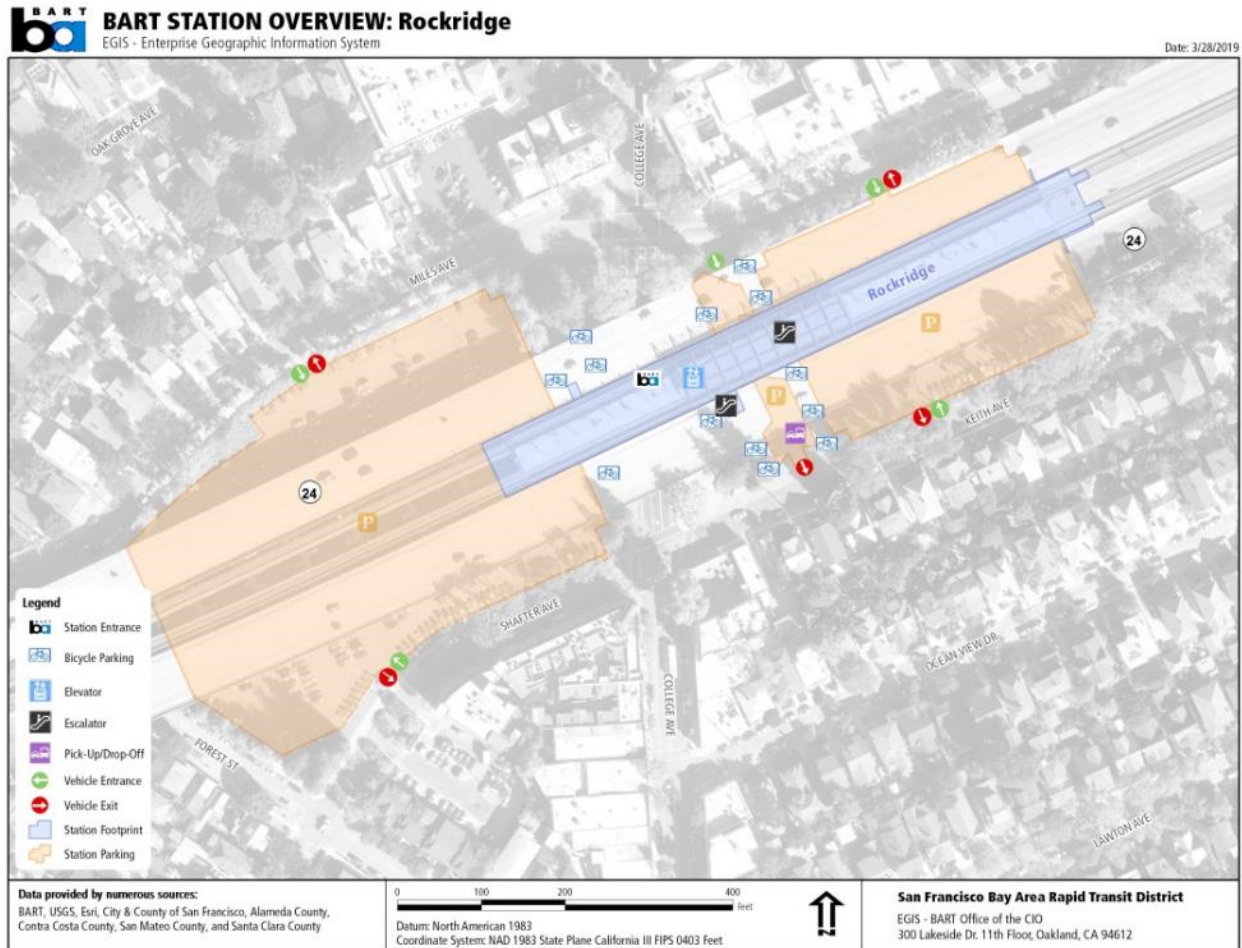
The portion of Line 51 along College Avenue north of the Rockridge BART Station into Berkeley was identified as a segment where a significant amount of delay/variability in the schedule could be attributed. The 2006 study recommended the line be split to resolve these issues.

In March 2010, the District split the route into two smaller routes (Line 51B covering the northern half and Line 51A covering the southern half) with the goal of increasing reliability on segments in Alameda and Downtown/North Oakland and Berkeley. The Rockridge BART Station was selected as the location for the split because it provided a logical method to turn buses around via either Keith Avenue or Miles Avenue, kept the layover location along the route, and required only four minutes to turn around each bus. This option was also the most cost effective of the three options considered (Downtown Oakland and the Macarthur BART Station being the other two) as it only increased the peak vehicles required to operate the lines by two, whereas the other options added four and nine buses, respectively.

1.3 Station Location

The Rockridge BART Station is located in Oakland with portions of the station on each side of College Avenue, between Keith Avenue and Miles Avenue. The main lobby, fare gates and public restrooms are located on the east side of College Avenue. Exhibit 2 details the location of the station in addition to various access points into the station.

Exhibit 2 - Rockridge BART Station Overview



1.4 Station Access

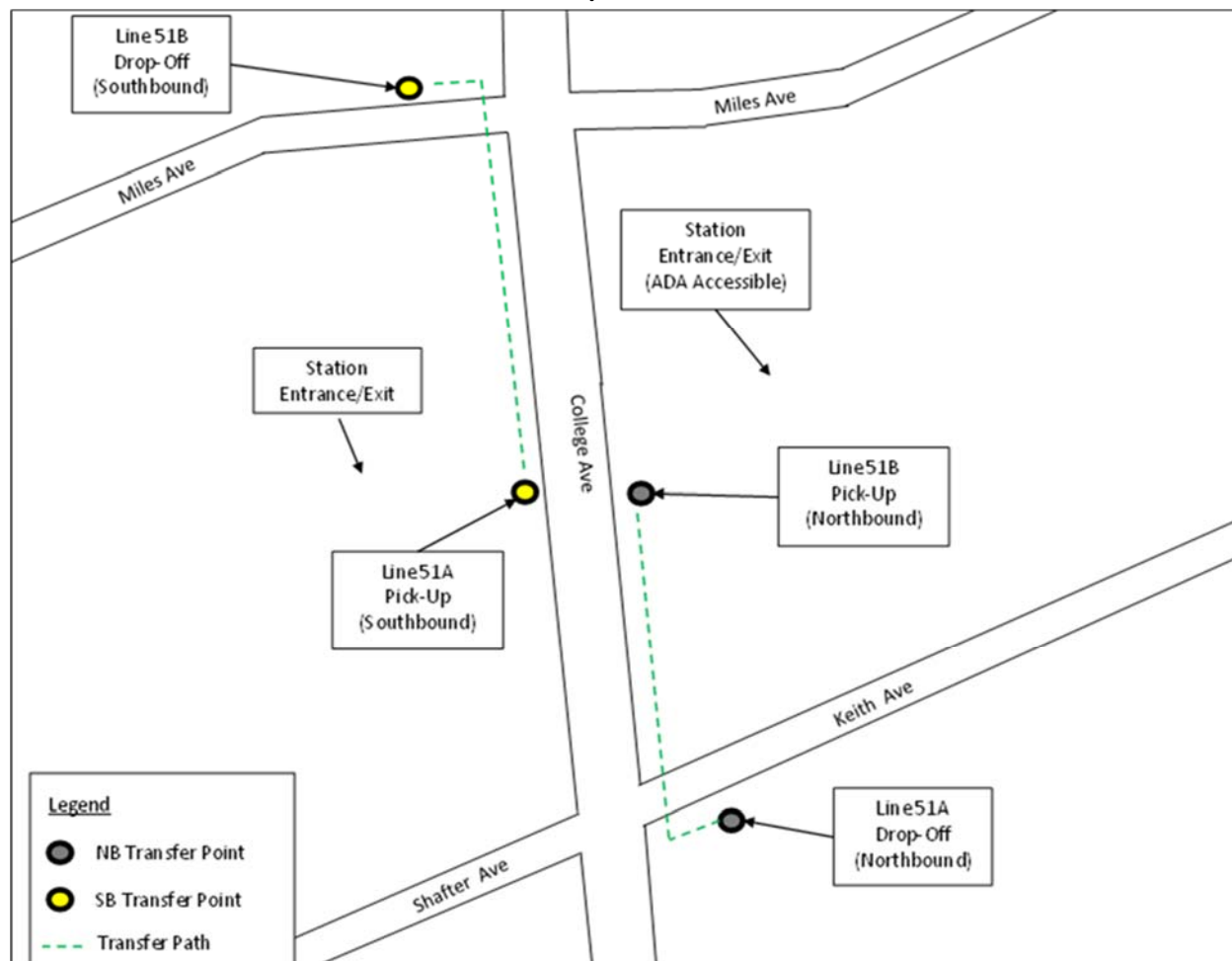
A pedestrian overpass provides a connection between the two sides of the station, eliminating the need to cross College Avenue. However, the pedestrian overpass is not ADA accessible (The station was built about 20 years before passage of the Americans with Disabilities Act). A stairwell provides access to the pedestrian bridge from street level on the west side. A second stairwell provides access from the pedestrian bridge to the station lobby on the east side. Escalators and elevators that provide access between the BART station lobby and street level are also located on the east side of College Avenue. ADA access to the station is critical for AC Transit riders transferring to BART.

1.5 Line 51A/Line 51B Transfer

As part of splitting Line 51 at the Rockridge BART Station, staff worked with the City of Oakland to implement bus stops along Miles Avenue and Keith Avenue, for lines 51B and 51A, respectively. Riders are able to alight the bus on either line just prior to looping around to College Avenue in the opposite direction, eliminating the need to cross College Avenue to catch a connecting bus. Riders on Line 51A would cross Keith Avenue at College Avenue to catch Line 51B, while riders on Line 51B would cross Miles Avenue at College Avenue to catch Line 51A. Both intersections where passengers need to cross the street

are signalized. Exhibit 3 details the path that riders take to transfer between lines 51A and 51B or vice versa.

Exhibit 3 - Line 51A/Line 51B Transfer Points



1.6 Results of the Split

From a reliability standpoint, the split of Line 51 has been a success. The 2006 study identified segments along the corridor that had significant delays. Many segments were located north of Rockridge BART Station, resulting in major sources of delay along the original line being isolated to Line 51B. This allowed Line 51A – the longer of the two routes – to increase its On-Time Performance (OTP). OTP increased from around 55 percent to above 70 percent on both routes, in line with District OTP goals.

From a transfer standpoint, the transfer between the two routes led to numerous complaints, particularly from the senior and disability communities. Riders didn't like having to wait for the pedestrian signal to cross the street, potentially missing their connecting bus or train. Transfers were also impacted by either the incoming bus running late or the outgoing bus running late, resulting in riders waiting longer than expected.

In addition, a vocal group of residents along Keith Avenue opposed the travel of AC Transit buses along Keith Avenue early on, citing noise and vehicle pollution concerns on top of the existing issues created by Highway 24 and the BART trains.

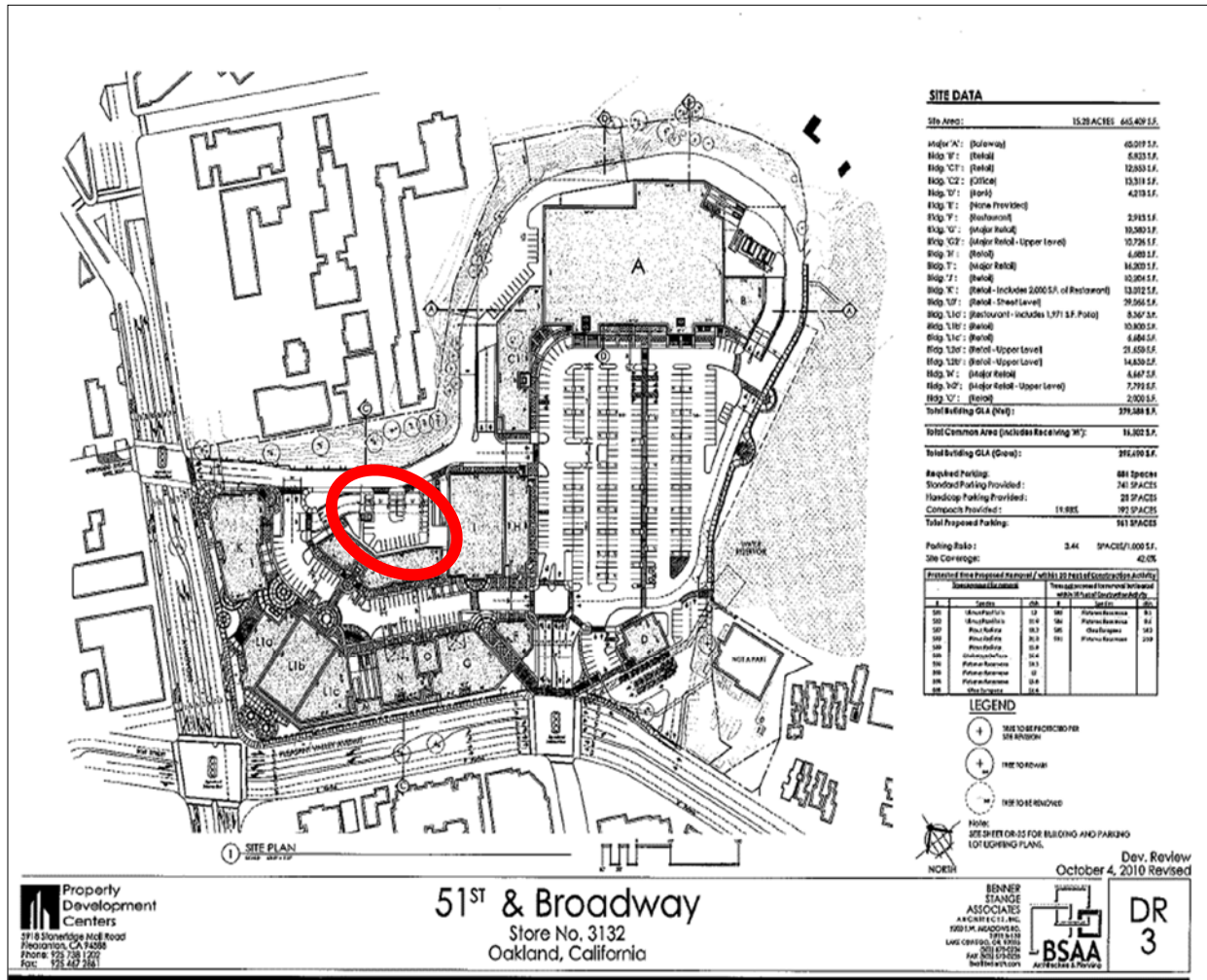
1.7 Improving the Transfer between Line 51A & Line 51B

Over the past 10 years, staff have investigated multiple large-scale alternatives to improve the transfer between lines 51A and 51B and appease local residents, including building a transit center within the Rockridge Shopping Center, operating within the Rockridge BART Station, and changes to the existing route structure. A summary of alternatives is below.

Rockridge Shopping Center

In early 2011, at the request of Oakland City Councilmember Jane Brunner, staff investigated an alternate transfer location that was not considered during the initial 2006 study. At the time, the Rockridge Shopping Center at the northeast corner of Broadway and Pleasant Valley Avenue was in the early stages of redevelopment. The idea was to investigate what modifications were necessary to incorporate a transit center within the site. Exhibit 4 is a site plan of the development that staff reviewed.

Exhibit 4 - Rockridge Shopping Center Site Plan



Staff determined 28 parking spaces would need to be removed, a loading zone for one of the buildings would need to be eliminated, and the footprint of one of the buildings would need to be reduced to allow for a small transit center. This proposal was ultimately rejected by the developer.

Rockridge BART Station

Between 2011 and 2013, staff investigated using the internal roadway immediately east of the station escalators at the Rockridge BART Station. Staff determined that operating along this internal roadway and under the station plaza would require excavation and major grading due to the low vertical clearance (9' 9") as well as modifications to the entrance/exit driveways. Exhibit 5 is a photo of the internal roadway.

Exhibit 5 - Internal Roadway at Rockridge BART Station (looking south)



Changes to local streets (Miles Avenue/Keith Avenue) would also be required if buses were to enter the internal roadway from either direction. This option was deemed cost prohibitive at that time. Riders would still have to cross the internal roadway to transfer or access the BART station under this proposal.

Extending Routes/Overlapping Service

Another alternative that has been discussed over the years has been an extension of Line 51B into downtown Oakland. By overlapping services, passengers could transfer at any bus stop along the corridor where both lines stop.

Extending Line 51B at its current 12-minute frequency would cost approximately \$2 million per year. If service levels on Line 51B were to also increase from every 12 minutes to every 10 minutes (matching Line 51A), an additional \$500,000 (\$2.5 million total) would be required.

Ideally, service levels for both lines would match, with their schedules staggered. This would provide 5- to 6-minute headways along Broadway between the Rockridge BART Station and downtown Oakland.

Staff would also need to work with the City of Oakland on acquiring additional layover space in downtown Oakland for two Line 51B buses to layover.

This option has not been implemented due to the additional operating costs required. An extension of Line 51B would likely have to be incorporated into a bus network redesign with the added resources coming from the reduction of other services within the District's service area.

2.0 PROBLEM STATEMENT

Based on an analysis of existing conditions and previous efforts to examine the transfer issue at the Rockridge BART Station, staff developed the following problem statement to summarize the issue to resolve:

Riders transferring between routes at a common terminal should be able to do so quickly, conveniently, and safely. The operator of the departing bus should be able to easily identify that a connecting bus is arriving.

The District has been fielding complaints from bus riders about the inconvenience of transferring between lines 51A and 51B since the implementation of the two routes in 2011. Riders have voiced concerns about having to walk across a street to catch their connecting bus, long transfer wait times due to buses operating off schedule, and missing connections due to bus operators being unaware of transferring riders when pulling away.

There have also been complaints regarding the restroom access at the Rockridge BART Station. Line 51A buses stage along the west side of College Avenue. Restrooms at the station are located in the station lobby along the east side of College Avenue.

Continuing to operate in this manner will likely result in additional customer complaints and difficult transfer connections between lines 51A and 51B, degrading the customer experience for riders trying to ride through on College Avenue.

Understanding that there are potential tradeoffs to improving this transfer, staff will identify potential solutions that bring lines 51A and 51B terminals closer together while still preserving direct access to the Rockridge BART Station for both customers and bus operators.

3.0 GOALS AND OBJECTIVES

The District's vision, mission statement, and core values help shape the goals and objectives of this investigation.

Based on the District's vision and core values, the following study goals were developed:

- Provide a transfer experience between Line 51A and Line 51B that is safe, reliable, fast, and pleasant.
- Maintain or improve reliability of lines 51A and 51B.
- Deliver bus service that promotes the health and safety of our customers, employees, and the general public.
- Maintain regional transit connections.

Staff has identified objectives that will help reach these goals. Exhibit 6 details the objectives associated with each of the study goals.

Exhibit 6 - Project Goals and Objectives

Goal: Provide a transfer experience between Line 51A and Line 51B that is safe, reliable, fast, and pleasant	Objective 1: Eliminate the need to cross a city street in order to make the connection between lines 51A and 51B.
	Objective 2: Reduce the travel time required to transfer between lines 51A and 51B.
	Objective 3: Schedule bus trips so a bus is not scheduled to arrive at the same time a connecting bus is scheduled to leave.
	Objective 4: Provide amenities for riders (seating, real-time signage, lighting) to improve customer comfort and assurance while waiting for a connecting bus.
Goal: Maintain or improve reliability of lines 51A and 51B.	Objective 1: Reduce the distance and time required to turn-around buses at the Rockridge BART Station.
	Objective 2: Reduce the travel distance and wait time for customers transferring between lines 51A and 51B.
Goal: Deliver bus service that promotes the health and safety of our customers, employees, and the general public.	Objective 1: Locate layover locations for Line 51 and 51B as close to restroom facility as possible.
	Objective 2: Eliminate the need to cross a city street to make the connection between lines 51A and 51B.
	Objective 3: Locate Line 79 closer to the Rockridge BART Station entrance and eliminate need to cross a city street to connect to BART.
Goal: Maintain or improve connection between AC Transit buses and BART	Objective 1: Place buses near BART entrance
	Objective 2: Coordinate arrival/departure times of low frequency buses with BART arrival/departure times.

4.0 NEAR TERM ALTERNATIVES

Staff investigated alternatives that could be implemented in the short-term that would address the issue with the current transfer. Each alternative has varying degrees of impacts on schedule reliability, ease of transferring and operator restroom access.

4.1 Connection Protection

Connection Protection is an application that is part of the District's HASTUS scheduling software that could be beneficial in improving the transfer experience between lines 51A and 51B. In conjunction with the automatic vehicle location system, the system informs the bus operator through the on-board Transit Control Head (TCH) that a connecting bus is requesting a hold. The operator could then either accept or deny the request through the TCH, and potentially wait for incoming transferring riders.

The system is not currently being used between any of the District's bus routes. A pilot program of the system was conducted in 2019 between lines 10 and 99, which provided the District with feedback on how the system operated and aspects that needed to be improved. An update to the system is currently in development and may be ready by fall 2022.

One implementation requirement is that the bus lines that have their schedules "connected" will need to operate out of the same bus division. Line 51A is operated out of Division 4 while Line 51B is operated out of Division 2. If the District decides to implement Connection Protection between these two lines, both routes would come out of Division 2, with Line 57 moved to Division 4.

4.2 Interlining Line 51A and 51B

Interlining is the term used when a bus assigned to a bus line changes to another bus line during the course of the day. By interlining lines 51A and 51B at the Rockridge BART Station, the transfer between the two routes can be significantly improved both spatially and temporally. Interlining would eliminate looping around the perimeter of the BART parking lots to turn buses around. This creates a reduction in vehicle miles traveled, emissions and passenger transfer time. No looping also removes concerns from the surrounding neighborhood over buses traveling off of College Avenue.

Line 51B would approach the Rockridge BART Station via southbound College Avenue and stop along the westside of College Avenue, where Line 51A currently has bus stop and layover. Riders would get off Line 51B and transfer to a Line 51A bus waiting to depart. If there was no Line 51A waiting in the stop, riders would board the next Line 51A bus, which, most of the time, would be the bus from which they had just alighted.

The transfer from Line 51A to Line 51B would be similar. Line 51A would approach the Rockridge BART Station via northbound College Avenue and stop along the east side of College Avenue, where Line 51B currently has a bus stop and layover. Riders would get off the Line 51A bus and transfer to a Line 51B bus

waiting to depart. If there was no Line 51B waiting in the stop, riders would board the next Line 51B bus, which, most of the time, would be the bus from which they had just alighted.

In terms of reliability, interlining bus lines doesn't come without a cost. Major sources of delay occurring along one route could negatively impact another route and vice versa. If Line 51B is delayed coming into the Rockridge BART Station, the bus may not leave on-time as Line 51A if there is not enough recovery/layover time.

Each line would still be provided recovery time at the end of line. Recovery time is in place to ensure each trip can leave the terminal on time. The minimum amount of recovery time is calculated by taking 10% of the one-way running time of the trip operated and adding four minutes. The recovery time will help mitigate some of the delays from one line to another but may not be enough to offset substantial delays. The amount of time a bus is laying over also has an impact on the space requirements at a layover location. The current bus stop set up along either side of College Avenue is not long enough for a bus to be stopped at the back end of the bus stop and have a second bus pull around without the tail of the bus sticking into the roadway.

In order to address the lack of bus stop space on the west side of College Avenue, the taxi zone would need to be relocated to allow for the existing bus stop to be extended. By interlining lines 51B and 51A, the curb space immediately south of Miles Avenue, where a taxi zone is located, would be used by buses. Exhibit 7 is a photo of the taxi zone on the west side of College Avenue, just south of Miles Avenue.

Exhibit 7 - Taxi Zone on West Side of College Avenue



Although northbound Line 51A buses would approach the Rockridge BART Station from College Avenue, the curb space nearest Keith Avenue could not be used by buses due to a raised concrete planter installed along the face of curb. In order to address the lack of space on the east side, the passenger loading zone would need to be relocated. Exhibit 8 is a photo of the existing passenger loading zone along the east side of College Avenue, just north of the bus stop.

Exhibit 8 - Passenger Loading Zone on East Side of College Avenue



While the connection between lines 51A and 51B would improve with this alternative, the connection to the Rockridge BART Station is improved for some and made worse for others. Line 51A riders will be dropped off closer to the Rockridge BART Station entrance, where Line 51B riders are dropped off today. Line 51B riders will, however, be dropped off along the west side of College Avenue and will need to cross College Avenue to use an ADA accessible entrance. Riders that do not require an ADA accessible entrance may choose to use the stairs that lead to the pedestrian walkway into the Rockridge BART Station main concourse.

Service levels on lines 51A and 51B do not currently match, with the two lines operating every 10 minutes and 12 minutes respectively during the peak periods. In order to interline the routes and have a consistent transfer, both lines need to operate at the same headway. Operating both lines at Line 51A's headway would cost approximately \$500,000, whereas decreasing Line 51A's headway to match Line 51B could save approximately \$1 million, but also a level of service impact.

A major benefit of this solution is the elimination of buses looping around the BART parking lots to start trips in the opposite direction.

4.3 Combining Line 51A and 51B Into a Single Line with Pulse Point

For decades, the majority of streets that lines 51A and 51B operate on were covered by a single line - Line 51 - that ran from Broadway and Blanding Avenue in Alameda to 3rd Street and University Avenue in Berkeley. Reinstating Line 51 would address the transfer issue and increase through-ridership, as riders passing through Rockridge BART Station would no longer have to get off one bus to catch another. In addition, as with the interline solution above, this solution creates the simplest route with no looping to turn buses around.

In terms of reliability, re-combining lines 51A and 51B doesn't come without cost. Major sources of delay occurring along the Line 51B portion of the route could negatively impact the Line 51A-portion of the route and vice versa. It should be noted that when Line 51 was split into two routes, the individual routes were both extended – Line 51A into Fruitvale BART and Line 51B into the Berkeley Marina on selected trips. Combining these two routes would create a line that is longer than the original Line 51 (between 13.6 and 14.5 miles one-way, depending on where the northern terminal is located). Historically, longer routes have been harder to manage, with on-time performance numbers lower than shorter routes.

To address some of the potential reliability issues, staff recommends adding a pulse point at the Rockridge BART Station. A pulse point is a scheduling strategy where buses are scheduled to arrive to a timepoint at one time and then scheduled to leave the same point at another. Staff recommends scheduling this pulse point to last between 3 to 4 minutes. Anything more would inconvenience riders that were already on board prior to the pulse point. If buses are on time, they would wait in the bus stop for a few minutes. If they are running late due to delays in the earlier part of the trip, the extra time will help them get back on schedule. In addition, keeping a 14-mile route on-time requires active line management both through the District's Clever communications system and in-person supervision, similar to how the District manages the Tempo Bus Rapid Transit line.

Each line would still be provided ample recovery time at the end of the line. Recovery time is in place to ensure each trip can leave the terminal on time. The minimum amount of recovery time is calculated by taking 10% of the one-way running time of the trip operated and adding four minutes. Layover time would be calculated based on the entire length of the trip with consideration to achieve optimal reliability.

The amount of time a bus is laying over has an impact on the space requirements at a layover location. Additional layover space may need to be allocated to the route at all three terminals- Fruitvale BART, Berkeley Amtrak (3rd & University) and the Berkeley Marina if all three terminals are included in the final route design.

The connection to the Rockridge BART Station is improved for some and made worse for others. Northbound riders will be dropped off closer to the Rockridge BART Station entrance, where Line 51B

riders are dropped off today. Southbound riders will, however, be dropped off along the west side of College Avenue and will need to cross College Avenue to use an ADA accessible entrance. Riders that do not require an ADA accessible entrance may choose to use the stairs that lead to the pedestrian walkway into the Rockridge BART Station main concourse.

Combining the lines would also have an impact on restroom access for these two lines. Buses would no longer have a long recovery time scheduled at Rockridge BART Station. Operators will need consistently available restroom access at Fruitvale BART, Berkeley Amtrak, and Berkeley Marina. Fruitvale BART has a new bus operator restroom that recently opened. Bathroom access at the Berkeley Marina is poor with no option at the end of line that is open consistent with the operational hours of the current Line 51B. Restroom access near Berkeley Amtrak is non-existent. The lack of restroom options at both of these locations would need to be addressed if lines 51A and 51B were to be combined.

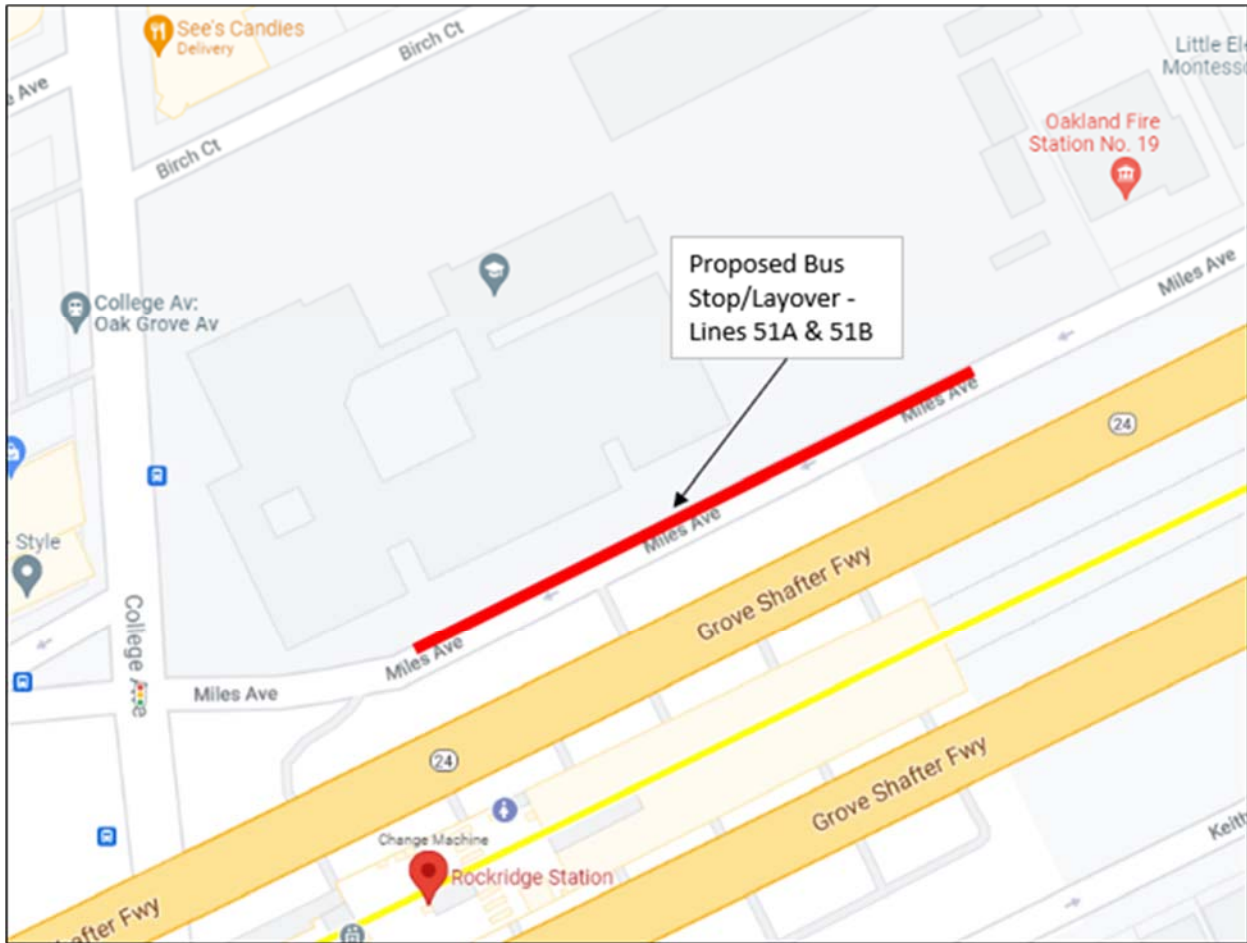
Service levels on lines 51A and 51B do not currently match, with the two lines operating every 10 minutes and 12 minutes respectively during the peak periods. Operating the entire corridor at Line 51A's headway will cost additional resources, whereas decreasing headways could have a cost savings but also a level of service impact.

If the District were to pursue interlining or combining lines 51A and 51B, staff would consider if revised routing was necessary to shorten lines, maintain reliability and improve restroom access.

4.4 Routing Lines 51A and 51B onto Keith Ave/Presley Way/Miles Ave

Another alternative to improving the Line 51A/Line 51B transfer involves re-routing the Line 51B turn-around as a way to allow riders to transfer between Line 51A and Line 51B within the same block. Line 51B would approach the Rockridge BART Station via College Avenue, left Keith Avenue, left Presley Way, and then left Miles Avenue to a new layover/bus stop area just east of College Avenue. Exhibit 9 is a map detailing where the proposed bus stop and layover would be located.

Exhibit 9 - Proposed Bus Stop/Layover Area Along Miles Avenue, East of College Avenue



Line 51A would continue to operate via northbound College Avenue, right Keith Avenue, left Presley Way, and then left Miles Avenue to the new layover/bus stop area. This routing will increase bus service along Keith Avenue, Presley Way and Miles Avenue from six buses per hour to 11 buses per hour.

Line 51A currently has a bus stop along Keith Avenue, just east of College Avenue. This bus stop would be used by riders trying to get to the Rockridge BART Station on both lines 51A and 51B. Line 51B riders would need to cross Keith Avenue to transfer to the Rockridge BART Station, just as Line 51A riders do so today. Exhibit 10 is a photo of the bus stop.

Exhibit 10 - Existing Bus Stop along Keith Avenue at College Avenue



The bus stop would need to be lengthened to allow for Line 51B buses to make the left turn from southbound College Avenue onto Keith Avenue. In order to allow multiple buses to stop along Keith Avenue at once, the District would need to acquire additional bus stop space. At a minimum, parking in front of two residential properties would need to be eliminated.

Riders transferring from the Rockridge BART Station to Line 51B would need to cross Miles Avenue. Riders transferring from the Rockridge BART Station to Line 51A would either continue to cross College Avenue to get to the bus stop along the west side of College Avenue or cross Miles Avenue to the new layover/transfer location.

The new bus stops/layover space along Miles Avenue would need to accommodate four buses- two Line 51A buses and two Line 51B buses. The curb space along Miles Avenue is alongside Claremont Middle School, where school pick-ups and drop offs occur. The existing passenger loading zone, yellow loading zone and 4-hour time-restricted parking spaces (11) would all need to be relocated/eliminated. There are also a few unused curb cuts that would need to be filled in.

In terms of reliability, keeping the two routes independent of each other has the least impact. Any delays along one line won't have a direct effect on the other line.

The revised turn-around for Line 51B is about ¼ mile longer, adding about 1-2 minutes to the overall running time of the route. This additional running time will either come from existing recovery time or will require additional resources.

Locating the terminal along Miles Avenue would also have an impact on restroom access for these two lines. The proposed bus stops along Miles Avenue are much further from the BART concourse than the existing bus stop along the eastside of College Avenue. This adds additional travel time for Line 51B bus operators needing to access the restrooms within the station. Bus operators would also now have to cross Miles Avenue to get to the restroom. Line 51A bus operators would no longer have to cross College Avenue, but instead would need to cross Miles Avenue. The Line 51A bus stop would be placed east of the Line 51B bus stops, increasing the travel time for bus operators to get to the restrooms.

5.0 PRELIMINARY LONG-TERM ALTERNATIVES

Staff reviewed the existing site conditions and conducted a high-level review of the following long-term alternatives (A-E):

- A. Off-Street Transit Center (East Side Parking Lot)-** A small transit center with four sawtooth bus bays would be constructed within the BART parking lot east of College Avenue.
- B. Off Street Bus Stops (East Side Internal Roadway)-** Two bus stops would be created along an internal roadway east of the station escalator.
- C. On-Street Transit Center (East Side of College Avenue)-** Four saw-tooth bus bays would be created along the east side of College Avenue, between Keith Avenue and Miles Avenue. Consider using a turntable just north of Keith Avenue to turn Line 51B buses around.
- D. Extended Bus Stop (East Side of College Avenue) with Supervision staff-** The existing bus stop along the east side of College Avenue, between Keith Avenue and Miles Avenue, would be extended by narrowing the existing sidewalk. Due to the limited amount of space, additional staff would be required on-site to manager operator layovers and move buses forward.
- E. Off-Street Transit Center (West Side Parking Lot) -** A small transit center with four saw-tooth bus bays would be constructed within the BART parking lot west of College Avenue, either near Miles Avenue or Shafter Avenue.

Each alternative was developed to a point where the bus routing and approximate bus stop location for each line that serves the Rockridge BART Station was identified. Pros and cons were identified to determine if there were any fatal flaws with any of the alternatives.

After considering the pro and cons of each alternative, staff eliminated Option C (Saw-Tooth bays along the East Side) and Option E (West Side Transit Center). Details regarding Option C and Option E can be found in Appendix A and Appendix B, respectively.

Staff eliminated Option C due to concerns that the configuration will lead to collisions between cars and buses. Generally, this design is used in a transit center where cars are not allowed and speeds are 5-10

miles per hour, not within the public right-of-way with cars travelling between 25-30 miles per hour. An on-street saw-tooth configuration is not something that has been used within the District's service area. In addition, the introduction of a turntable will require a new curb cut along College Avenue with buses exiting onto College Avenue across a sidewalk that is heavily used by pedestrians.

Staff eliminated Option E because it would drop riders on lines 51A and 51B across the street from the BART fare gates, adding significant time to their trips. The station entrance/exit located on the west side is not ADA accessible. Riders with mobility issues that need to transfer to BART or other bus lines would need to go through the transit center and use the sidewalk along Shafter Avenue or Miles Avenue to cross College Avenue.

The remaining three options (A, B and D) are described in further detail below.

5.1 Alternative A: Off-Street Transit Center (East Side Parking Lot)

The original concept for this alternative was to create a small transit center, consisting of two bus platforms with two sawtooth bays on each platform within the BART parking lot east of College Avenue. One platform would be used by Line 51A and the other by Line 51B. Riders transferring between those two lines would need to walk from one platform to another.

The original concept was deemed infeasible after reviewing the site constraints. The existing parking lot aisle is approximately 60' wide by 270' long. There is also a vertical constraint along the west side of the parking lot, caused by the station escalator, reducing the available width even further near the center of the lot.

Staff determined that by limiting the transit center use to only 40-ft buses, four saw-tooth bays could be constructed linearly, along the east side of the lot.

Disabled parking, permit parking, and motorcycle parking within the parking lot would need to be relocated. Exhibit 11 is photo of the existing parking lot area.

Exhibit 11 – Rockridge BART Station Parking Lot- Eastside (looking north)



All buses would enter the transit center from Keith Avenue. A new entrance driveway located off Keith Avenue would be required for buses turning into the transit center. Exhibit 12 is a photo of where the new driveway would be located.

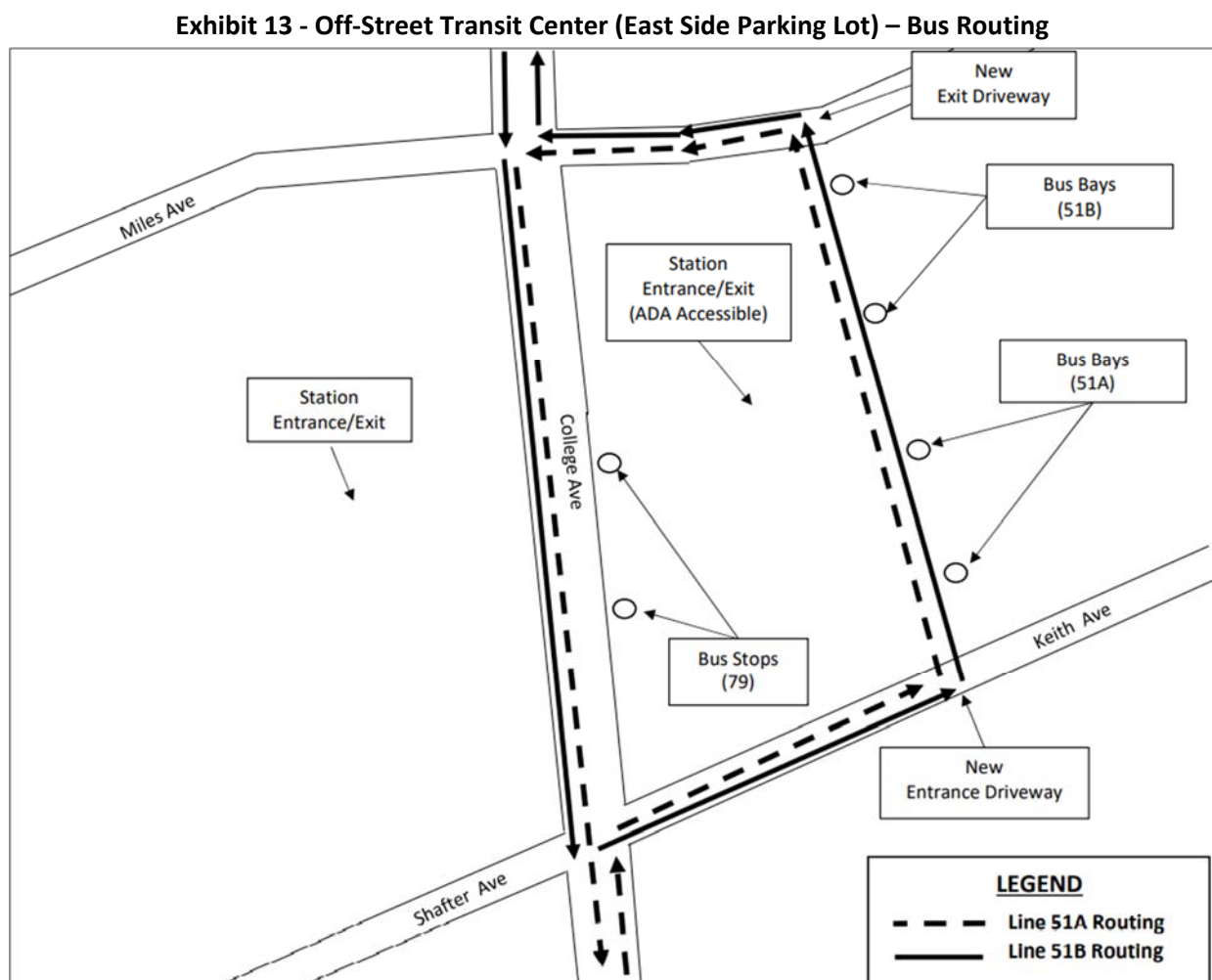
Exhibit 12 - Proposed Entrance Driveway Along Keith Avenue



All buses would exit onto Miles Avenue. A new exit driveway off Miles Avenue would also be required for buses exiting onto Miles Avenue.

Line 51B approaching Rockridge BART Station would operate via southbound College Ave, left Keith Avenue, left into the new driveway, terminating at the transit center. Northbound Line 51B buses would make the left onto Miles Avenue, then right onto College Avenue.

Line 51A buses approaching Rockridge BART Station would operate via northbound College Avenue, right Keith Avenue, then left into new driveway, terminating at the transit center. Southbound Line 51A buses would make the left onto Miles, then left onto College Avenue. Exhibit 13 details the bus routing for lines 51A and 51B under this proposal.



This alternative meets many of the project objectives as it improves the connection between lines 51A and 51B, reduces the number of riders needing to cross the street to get to BART and frees up curb space along College Avenue to be able to relocate Line 79 closer to BART and the other bus services.

Although the bus stop moves onto BART property, it does shift the riders further away from the BART entrance. Riders on both lines would need to walk through the transit center and BART internal roadway to transfer to BART or Line 79 and vice versa.

This alternative involves obtaining approvals from multiple agencies, including BART, the City of Oakland and Caltrans. Exhibit 14 highlights some of the pros and cons of this alternative.

Exhibit 14 - Off-Street Transit Center (East Side Parking Lot) - Pros & Cons

Off-Street Transit Center (East Side Parking Lot)	
Pros	Cons
• Easy to transfer between 51A & 51B	• High cost
• Reduced turn-around time for Line 51A and 51B	• Impacts disabled parking spaces
• Close to BART escalator/elevator	• Impacts motorcycle parking
• Line 79 can drop-off/pick up closer to BART	• Impacts permit parking
• Easier to turn left onto Miles	• Bus riders would need to walk through transit center and BART internal roadway to transfer to BART and Line 79.
	• Multi-year approval/implementation process

5.2 Alternative B: Off-Street Bus Stops (East Side Internal Roadway)

A long bus platform would be constructed along an internal roadway just east of the station escalator, providing space for at least two buses (51A). The roadway would need to be lowered at least 3 feet to provide sufficient clearance for standard buses. If the District wanted to operate double-decker buses along this roadway, the roadway would need to be lowered a total of 5-6 feet. Exhibit 15 is a photo of the warning sign detailing the maximum vehicle height above the roadway.

Exhibit 15 - Rockridge BART Station Internal Roadway Clearance Sign



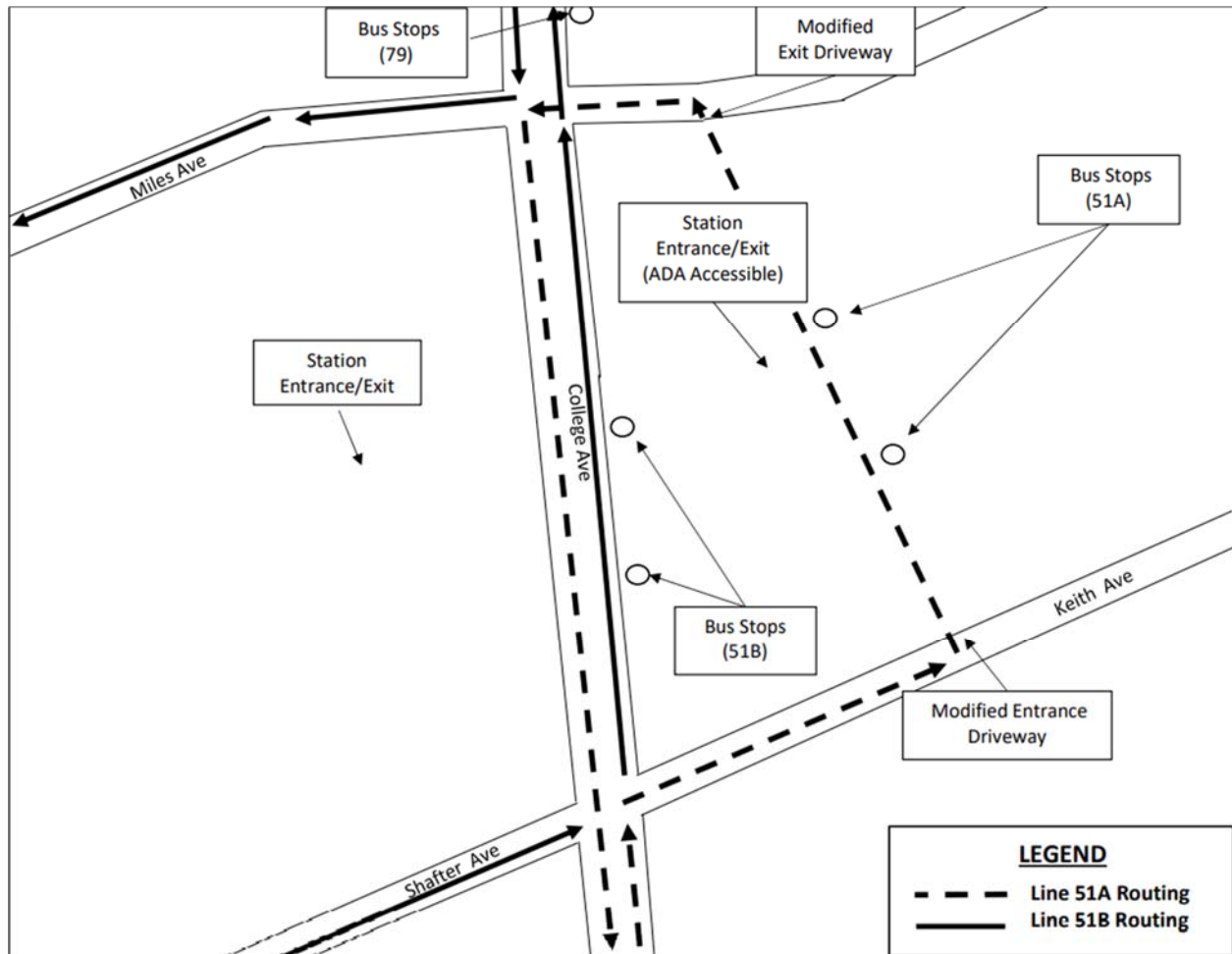
Taxi stops and Attended Vehicle parking spaces would need to be relocated. The direction of the internal roadway would also need to be reversed. The existing exit driveway along Keith Avenue would need to be modified for buses to enter the transit center. The existing entrance driveway off Miles Avenue would need to need to be modified to allow for buses exiting onto Miles Avenue. Exhibit 16 is a photo of the existing driveway onto Miles Avenue.

Exhibit 16 - Driveway from Miles Avenue into Rockridge BART Station Internal Roadway



Line 51B buses would continue operating as they do today, via southbound College Avenue, right Miles Avenue, left Forest Street, left Shafter Avenue, left College Avenue. Line 51A buses approaching Rockridge BART Station would operate via northbound College Avenue, right Keith Avenue, left driveway into internal roadway to the new bus stop. Southbound Line 51A buses would make the left onto Miles Avenue, then left onto College Avenue. Exhibit 17 details the bus routing for lines 51A and 51B under this proposal.

Exhibit 17 - Off-Street Bus Stops (East Side Internal Roadway) - Bus Routing



This alternative meets many of the objectives of this project. Bringing Line 51A onto BART property, east of College Avenue, improves the connection between lines 51A and 51B as well as reduces the number of riders needing to cross a city street to get to BART.

Operationally, due to the proposed exit of the Rockridge BART Station roadway onto Miles Avenue being close to College Avenue, it may be difficult to turn left on Miles Avenue and then make a left or right turn onto College Avenue. Exhibit 18 highlights some of the pros and cons of this alternative.

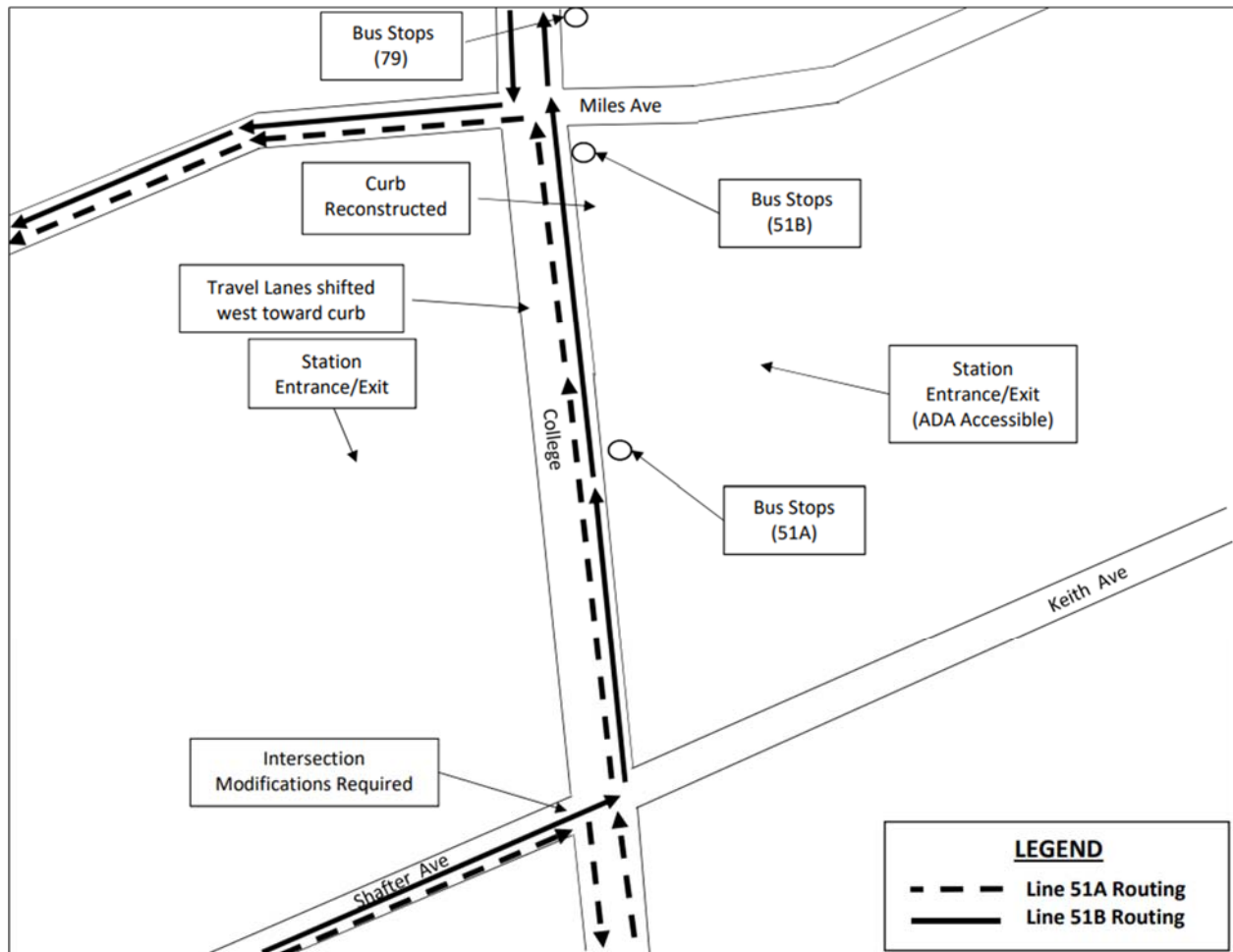
Exhibit 18 - Off-Street Transit Center (East Side Internal Roadway) - Pros & Cons

Internal Roadway (East Side)	
Pros	Cons
• Improved transfer between 51A & 51B	• Difficult to turn left onto Miles
• Line 51A moves closer to BART escalator/elevator	• Bus riders would need to walk across internal roadway to transfer to/from Line 51A
• Does not impact disabled parking	• Line 51A riders would need to walk across internal roadway to get to BART
• Does not impact motorcycle parking	• Line 79 has to remain in front of Claremont Middle School
• Does not impact permit parking	
• Reduced turn-around time for Line 51A	• Multi-year approval/implementation process

5.3 Alternative D: Extended Bus Stop Along East Side of College Avenue

The existing bus stop along the east side of College Avenue, between Keith Avenue and Miles Avenue, would be extended. The existing curb line along the east side of College Avenue would be straightened out in order to accommodate the additional space allocated to buses. Two separate bus stops would be created (51A, 51B). Each bus stop, however, would not be long enough to have buses pulling around each other (i.e., a second Line 51A bus needed to pull around a Line 51A bus laying over in the bus stop). In order to operate both Line 51A and 51B within the proposed area, AC Transit staff would be required to continually move buses forward, between 12 to 15 hours per weekday. The intersection of Shafter Way and College Avenue would also need to be modified to allow for Line 51A buses to make the right-turn from Shafter Avenue onto College. Shafter Way would likely be narrowed to one lane near College Avenue with the sidewalk along the southside of Shafter being widened into a plaza. Exhibit 19 details the bus routing for lines 51A and 51B under this proposal.

Exhibit 19 - Extended Bus Stop (East Side of College Avenue) - Bus Routing



This alternative meets many of the objectives of this project. Bringing Line 51A and Line 51B together along the east of College Avenue not only improves the connection between lines 51A and 51B but reduces the number of riders needing to cross the street to get to BART.

The added cost of having to hire at least two new staff persons to move vehicles forward is something that needs to be considered as it will continue in perpetuity. Keeping lines 51A and 51B along College Avenue also keeps Line 79 in front of Claremont Middle School, which is less than optimal.

This alternative involves obtaining approvals from multiple agencies, including BART, the City of Oakland and Caltrans. Exhibit 20 highlights some of the pros and cons of this alternative.

Exhibit 20 - Extended Bus Stop (East Side of College Avenue) - Pros & Cons

Extended Bus Stop Along East Side of College Avenue	
Pros	Cons
• Easy to transfer between 51A & 51B	• Added staff cost for life of project
• Line 51A drop off/pick-up moves closer to BART escalator/elevator	• Line 51A may have difficulty merging into left turn pocket at Miles Avenue
• Does not impact disabled parking	• Line 79 has to remain in front of Claremont Middle School
• Does not impact motorcycle parking	• Lengthy review/approval/implementation process
• Does not impact permit parking	• Impacts trees along east side of College Avenue
	• Impacts passenger loading zone
	• Sidewalk narrowed on east side

6.0 FEASIBILITY ANALYSIS

The following options were investigated in further detail for constructability:

- **A. Off-Street Transit Center (East Side Parking Lot)-** A small transit center with four sawtooth bus bays would be constructed within the BART parking lot east of College Avenue.
- **B. Off Street Bus Stops (East Side Internal Roadway)-** Two bus stops would be created along an internal roadway just east of the station escalator.
- **D. Extended Bus Stop (East Side of College Avenue) with Supervision staff-** The existing bus stop along the east side of College Avenue, between Keith Avenue and Miles Avenue, would be extended by narrowing the existing sidewalk. Due to the limited amount of space, additional staff would be required on-site to manage layovers and move buses forward.

Two of the three alternatives (A and D) were determined to be constructable, with minimal concern for any unknowns. The BART Internal Roadway option (B), however, does present some major challenges.

The lowering of the roadway is significant due to the potential underground utilities located just below the surface of the roadway. There are also a number of freeway columns located along the roadway. Both of these factors will likely increase costs of the project. At this point, there are still many unknowns associated with this option.

From a coordination and timing perspective, projects that require coordination and approvals from multiple agencies may take longer to build. BART would require, at a minimum, structural, traffic flow, security, and safety evaluations, adding time and cost to this alternative. Option A mostly involves BART and Caltrans, with the City of Oakland being involved due to the driveways.

Preliminary cost estimates were prepared for each option. Exhibit 21 summarizes that results of our review.

Exhibit 21- Cost Estimate

Project Description	Constructable	Agencies Involved	Timeline	Capital Cost Estimate	Operating Cost Estimate*	Total Cost
A. Off-Street Transit Center (East Side Parking Lot)	Yes	BART, Caltrans, City of Oakland	2-3 years	\$8M	\$0	\$8M
B. Off Street Bus Stops (East Side Internal Roadway)	Unknown	BART, Caltrans, City of Oakland	2-3 years	>\$10M	\$0	>\$10M
D. Extended Bus Stop (East Side of College Avenue) with staff	Yes	City of Oakland; Caltrans	1-2 years	\$2.5M	\$10M	\$12.5M

*Costed over 25-year period for active line management. Costs do not include maintenance costs, which would be needed for all three options.

7.0 ALTERNATIVES ANALYSIS

Staff carried the three alternatives from the feasibility analysis above into the final alternatives analysis to determine a recommendation. The alternatives analysis is a scoring index format with multiple factors weighted differently.

7.1 Factors Considered

The three remaining alternatives were compared based on the following factors:

- Bus to Bus Transfer Convenience (20%).** Bus to Bus Transfer Connectivity makes up one-fifth of the entire score. This criterion is weighted heavily due to the volume of complaints staff has received about the transfer between lines. It takes into consideration the aspects of the alternative that determine how easy it is to transfer between buses at the Rockridge BART Station. This includes the distance riders have to walk between lines as well as time delays caused by having to wait for pedestrian signals. Alternatives that provide better transfers between Line 51A and Line 51B, and vice versa, will score higher than ones that improve the transfer to less frequent service such as to Line 79. Scoring for this criterion comprises the following items:
 - Travel Distance (10%)
 - Pedestrian Crossings (10%)

- **Service Reliability (20%).** Service Reliability makes up nearly one-fifth of the entire score. This criterion considers the aspects of the alternative that impact the reliability of the line. This includes the differences in running time associated with turning the bus around at the Rockridge BART Station, the proximity of the bus layovers to the operator restroom located within the BART station as well as any delays associated with queue back-ups at signals. Impacts to service reliability on the high frequency bus lines will have a larger negative impact on scoring. Scoring for this criterion comprises the following items:
 - Operator Restroom (8.0%)
 - Turn-Around Running Time (8.0%)
 - Potential Delays (4.0%)
- **Safety (20%).** Safety also makes up one-fifth of the entire score. This criterion is weighted heavily as safety considers the aspects of the alternative that impact the safety of riders, non-riders, and employees. This includes whether or not riders have to cross a street to transfer between bus lines or BART, the proximity of the layover locations to the operator restroom located within the BART station, whether the layovers are on-street or off-street as well as any impacts to bus operations. Scoring for this criterion comprises the following items:
 - Operator Restroom (6.0%)
 - Location of Lay-over (4.0%)
 - Pedestrian Crossings (6.0%)
 - Visibility Issues (4.0%)
- **Regional Connectivity (16%).** Regional Connectivity makes up 16% of the total score. The Rockridge BART Station is major destination on the lines and should be considered when looking to make major changes to bus stops at/near the station. This criterion considers the aspects of the alternative that impact the transfer between BART and AC Transit bus service. This includes the distance required to travel from BART to each bus line and vice versa, the time associated with making the connection as well as any time delays or safety issues caused by having to cross a street to make the connection. None of the alternatives significantly degrade regional connectivity to a point where crossing a city street is required. Scoring for this criterion comprises the following items:
 - Travel Distance (8.0%)
 - Pedestrian Crossings (8.0%)
- **Community (8%).** Community comprises 8% of the total score. This criterion looks at the how the alternative impacts the community. This includes parking impacts, sidewalk narrowing, or tree removals.
- **Cost (16%).** Cost makes up 16% of the total score. This criterion looks at the capital and operating costs of the alternative. This includes the cost to construct the facility, any cost savings from changes to running time as well as any staffing additional staffing needs.
 - Capital Cost (8.0%)
 - Operating Costs (8.0%)

Based on the goals of the project, Bus-to-Bus Transfer Convenience, Service Reliability and Safety have been given more importance than Regional Connectivity, Community and Cost.

7.2 Scoring of Alternatives

Staff developed a list of evaluations questions that would help score each alternative. Each question was given a percentage of the points allotted to each criterion. Information about how staff scored each variable can be found in the Appendix C. Based on staff analysis, the Off-Street Transit Center within the East Parking Lot option scored the highest, followed by the Extended Bus Stop Along the East Side of College Avenue option. Exhibit 22 ranks the three options based on highest score to lowest score.

Exhibit 22 - Score of Alternatives

Rank	Option	Description	Score
1	A	Off-Street Transit Center (East Side Parking Lot)	81.37
2	D	Extended Bus Stop (East Side of College Avenue) with additional staff	76.30
3	B	Off Street Bus Stops (East Side Internal Roadway)	71.81

8.0 STAFF RECOMMENDATION

Based on the stated goals of the project and our evaluation of each alternative presented in the report, staff is recommending implementing an interim short-term solution as a way to immediately address rider concern and continue to work toward implementing changes that can improve both the rider experience and bus operations.

8.1 Near-Term Recommendation

In order to address the transfer issues in the near-term, staff is recommending interlining lines 51A and 51B at the Rockridge BART Station for the following reasons:

- Line 51A and 51B are able to maintain their existing route lengths. As mentioned earlier in the report, shorter routes are easier to manage from an operations standpoint.
- Maintains recovery time at the Rockridge BART Station which can help mitigate delays.
- Layover will occur at the Rockridge BART Station where operator restrooms are available.
- Riders will be able to transfer between buses that are adjacent to each other.
- The transfer will occur along College Avenue, close to the Rockridge BART Station entrance.
- Minor community impacts (the passenger loading zones will need to be relocated)

This option has the least impact on the community and has the best chance to maintain the previous gains made to the reliability of the lines 51A and 51B corridors by splitting the former Line 51.

Staff also recommends implementing the Connection Protection application on lines 51A and 51B once it is approved for use to optimize the transfer experience.

8.2 Long-Term Recommendation

All three long-term alternatives have scores that were very similar, all falling within 10 percentage points of each other. With that said, staff recommends Alternative A - Off-Street Transit Center (East Side Parking Lot) for the following reasons:

- Allows for at least four bus bays.
- Allows riders to transfer between lines 51A and 51B easily.
- Eliminates need for Line 51A riders to cross a city street.
- Shortens the turn-around for Line 51A.
- Brings Line 51A terminal closer to the BART station.
- Frees up space for Line 79 terminal to be relocated between Keith Avenue and Miles Avenue, closer to BART.
- Doesn't impact bike lanes along College Avenue.
- Minimal on-street parking impacts.
- Frees up space in front of Claremont Middle School.
- Doesn't require changes to Shafter Avenue.
- No operational concerns identified.

However, it's critical to note this alternative also requires further engineering investigation for feasibility and would require a significant source of capital funding that has not been identified and may never become available. It is likely the near-term alternative is the best option for the foreseeable future.

9.0 NO-BUILD COMPARISON

Each preferred alternative was compared to the existing condition in the following categories that affect bus service: Bus to Bus Transfer, Reliability, Safety and Regional Connectivity

9.1 Near-Term Preferred Alternative: Interlining Line 51A and 51B Along College Avenue with Connection Protection (Estimated Cost: None)

Bus to Bus Transfer

Interlining lines 51A and 51B along College Avenue will significantly improve the transfer experience for passengers between local bus services at Rockridge BART. Passengers transferring between lines 51A and 51B will no longer have to walk across any streets. Passengers transferring from Line 51A to Line 79 will only have to cross Miles Avenue. Travel distance and time is reduced for passengers transferring between lines 51A and 51B as well as from Line 51A to Line 79.

The addition of Connection Protection will reduce the occurrences of buses leaving the stop right before rider from a connecting bus are arriving.

Reliability

Overall, there could be a significant negative impact on reliability by the preferred alternative. Delays occurring along the Line 51A corridor that exceed the allowable layover/recovery time will impact Line 51B service reliability and vice versa.

The elimination of the need to turn-around near Rockridge BART Station will have a positive effect on reliability, the environment and the community as it will shorten southbound Line 51B and northbound Line 51A trips by approximately two minutes. This time could potentially be added to recovery time.

Restroom access plays a role in the reliability of a line. Bus operators on northbound Line 51A trips will have a longer walk to the new bus operator restroom, while bus operators on southbound Line 51B trips will have a shorter walk to the new bus operators' restroom. Overall, the proposed changes to restroom access should not have an impact on service reliability of the two lines.

Safety

Overall, safety is improved under the preferred near-term alternative. Riders transferring between lines 51A and 51B will no longer have to walk across any streets. Riders transferring from Line 51A to Line 79 will only have to cross Miles Avenue.

Line 51A riders transferring to BART will be dropped off closer to the main (ADA accessible) entrance and will no longer have to cross Keith Avenue. Line 51B riders transferring to BART will be dropped off along the west side of College Avenue, further away from the main (ADA accessible) BART entrance. Line 51B riders that cannot use the pedestrian walkway will need to cross College Avenue at Keith Avenue or Miles Avenue. BART riders transferring to AC Transit service will board at the same stops as today.

Restroom access plays a role in the health and safety of bus operators. Bus operators on northbound Line 51A trips will have a longer walk to the new bus operator restroom, while bus operators on southbound Line 51B trips will have a shorter walk to the new bus operators' restroom.

Regional Connectivity and Convenience

The bus to BART connection is improved on Line 51A and made worse on Line 51B. Line 51A riders are dropped off closer to BART's main (ADA accessible) entrance, reducing their travel time to get to BART. Line 51A riders will no longer have to cross Keith Avenue to transfer to BART.

Line 51B riders are dropped off further from BART's main (ADA accessible) entrance. Line 51B riders will have an increase in travel time to get to BART. Riders not able to use the pedestrian walkway will have to cross College Avenue at either Keith Avenue or Miles Avenue.

9.1 Long-Term Preferred Alternative: Off-Street Transit Center - East Side Parking Lot (Estimated Cost: \$8M)

Bus to Bus Transfer

Building an off-street transit center will significantly improve the transfer experience for passengers between local bus services at Rockridge BART Station. Passengers transferring between lines 51A and 51B will no longer have to walk across any city streets. Passengers transferring from Line 51A to Line 79 will only have to cross the internal roadways with BART property.

Travel distance and time is reduced for passengers transferring between lines 51A and 51B as well as between lines 51A and 79.

Reliability

Overall, there could be a negative impact on reliability by the preferred alternative.

The shorter turn-around near the Rockridge BART Station will have a positive effect on reliability as it will shorten southbound Line 51B and northbound Line 51A trips by approximately one minute. This time could potentially be added to recovery time.

Restroom access plays a role in the reliability of a line. Bus operators on northbound Line 51A trips will have a much longer walk to the new bus operator restroom, while bus operators on southbound Line 51B trips will have a slightly longer walk to the new bus operator restroom. Overall, the proposed changes to restroom access could have an impact on service reliability of the two lines, as bus operators will either have to walk farther or use alternative restroom options within the BART station.

Safety

Overall, safety is improved under the preferred alternative.

Riders transferring between lines 51A and 51B will no longer have to walk across any city streets. Riders transferring from lines 51A or 51B to Line 79 will only have to travel across an internal roadway within BART property.

Line 51A riders transferring to BART will no longer have to cross Keith Avenue. They will, however, need to travel from the transit center across an internal roadway within BART property to get to the main entrance. BART riders transferring to Line 51A will no longer need to cross College Avenue and instead walk across an internal roadway to the transit center. Line 51B riders transferring to BART will also have to travel from the transit center, across an internal BART roadway, to get to the main entrance. BART riders transferring to Line 51B will need to walk across an internal roadway to the transit center.

Restroom access plays a role in the health and safety of bus operators. Bus operators on northbound Line 51A trips will have a significantly longer travel time to the new bus operator restroom than they do today,

including having to travel across College Avenue. Bus operators on Line 51B trips will also have a slightly longer walk to the new bus operator restroom than they do today.

Regional Connectivity and Convenience

The bus to BART connection is improved on Line 51A and made slightly worse on Line 51B. Line 51A riders are dropped off closer to BART's main (ADA accessible) entrance, reducing their travel time to get to BART. Line 51A riders will no longer have to cross Keith Avenue to transfer to BART.

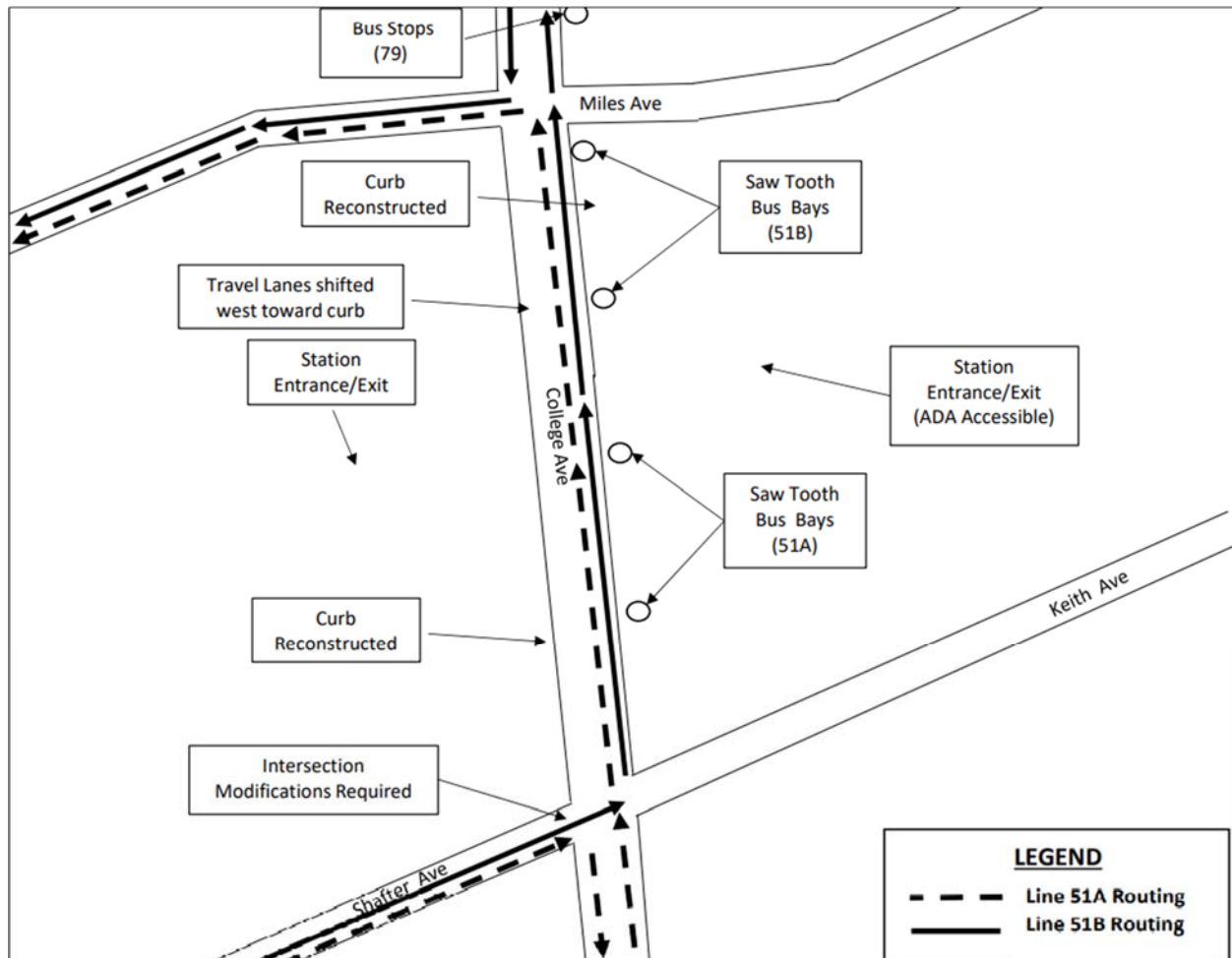
Line 51B riders are dropped off farther from BART's main (ADA accessible) entrance. Line 51B riders will have a slight increase in travel time to get to BART's main (ADA accessible) entrance.

APPENDIX A

Description and High-Level Review of Alternative C: On-Street Transit Center Along East Side of College Avenue

This proposal would create four sawtooth bus bays along the east side of College Avenue, between Keith Avenue and Miles Avenue. The existing curb line along the east side of College Avenue would be straightened in order to accommodate the additional space allocated to buses. The existing curb line along the west side of College Avenue would be straightened in order to shift all travel lanes to the west by at least 3 feet, providing a buffer between the travel lanes and the on-street sawtooth bus bays. Roadway striping would need to be transitioned back south of Keith Avenue and north of Miles Avenue. The intersection of Shafter Way and College Avenue would also need to be modified to allow for Line 51A buses to make the right turn from Shafter Avenue onto College Avenue. Shafter Way would likely be narrowed to one lane near College Avenue with the sidewalk along the southside of Shafter being widened into a plaza. Exhibit 19 details the bus routing for lines 51A and 51B under this proposal.

Exhibit A1 - On-Street Transit Center (East Side of College Avenue) - Bus Routing



This alternative meets many of the objectives of this project. Bringing Line 51A and Line 51B together along the east of College Avenue not only improves the connection between the two lines, but it also reduces the number of passengers needing to cross the street to get to BART.

While this alternative does provide benefits, staff is concerned this configuration will lead to collisions between cars and buses. Generally, this design is used in a transit center where cars are not allowed and speeds are 5-10 miles per hour, not within the public right-of-way with cars travelling between 25-30 miles per hour. An on-street sawtooth configuration is not something that has been used within the District's service area.

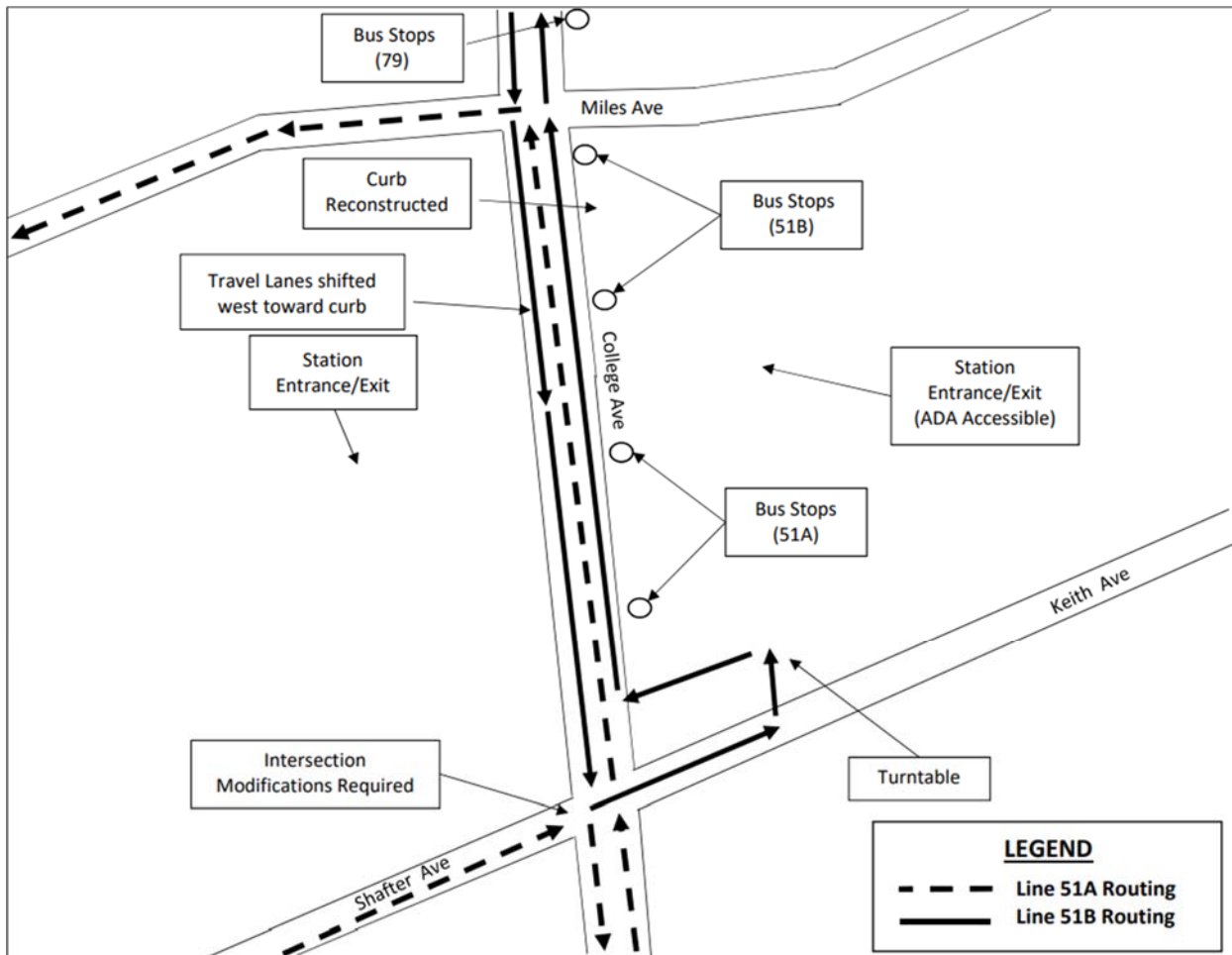
From a coordination and timing perspective, this alternative involves obtaining approvals from multiple agencies, including BART, the City of Oakland and Caltrans. Exhibit A2 highlights some of the pros and cons of this alternative.

Exhibit A2 - On-Street Transit Center (East Side College Avenue) - Pros & Cons

On-Street Transit Center (East Side of College Avenue)	
Pros	Cons
• Easy to transfer between 51A & 51B	• Difficult to turn buses 51A buses around
• Line 51A drop off/pick-up moved closer to BART escalator/elevator	• Saw-tooth configuration reduces visibility of auto traffic for bus operator
• Does not impact disabled parking	• Relatively high speeds next to saw-tooth bus bays not typically seen in transit center.
• Does not impact motorcycle parking	• Line 79 has to remain in front of Claremont Middle School
• Does not impact permit parking	• Line 51A may have difficulty merging back into left turn pocket at Miles Avenue
	• Line 51A moved further away from new operator restroom.
	• Impacts trees along east side of College Avenue
	• Forces bikes to relocate to west side of College Avenue between Keith Avenue and Miles Avenue.
	• Sidewalks narrowed on both sides of College Avenue
	• Impacts passenger loading zone
	• Impacts 5-10 parking spaces along west side of College Avenue, north of Miles Avenue
	• Impacts 2-3 parking spaces along west side of College Avenue, south of Keith Avenue
	• Striping along College Avenue between Keith Avenue and Miles would need to be reconfigured.
	• Lengthy review/approval/implementation process

One variation of this alternative added a turntable near the north east corner of College Avenue & Keith Avenue, allowing Line 51B to turn around without using Miles Avenue/Forest Street/Shafter Avenue. A turntable for transit allows a vehicle to turn around on its route without looping through streets to do so. An example of this is the end of the line of the San Francisco Cable Car line at Market Street and Powell Street. Exhibit A3 details the bus routing for lines 51A and 51B under this proposal.

Exhibit A3 - On-Street Transit Center (East Side of College Avenue) with Turntable - Bus Routing



The introduction of a turntable provides both pros and cons. On one hand, it would allow Line 51B to make a shorter loop to turn-around. On the other hand, buses will require a new curb cut along College Avenue and will be exiting onto College Avenue across a sidewalk that is heavily used by pedestrians. Exhibit A4 highlights some of the pros and cons of this alternative.

Exhibit A4 - On-Street Transit Center (East Side College Avenue) with Turntable - Pros & Cons

On-Street Transit Center (East Side of College Avenue) with Turntable	
Pros	Cons
• Easy to transfer between 51A & 51B	• Difficult to turn Line 51A buses around
• Line 51A drop off/pick-up moved closer to BART escalator/elevator	• Saw teeth configuration may reduce visibility of auto traffic for bus operator
• Does not impact disabled parking	• High speeds next to saw teeth bus bays not typically seen in transit center.
• Does not impact motorcycle parking	• Line 79 has to remain in front of Claremont Middle School
• Does not impact permit parking	• Impacts trees along east side of College Avenue
• Does not impact permit parking	• Sidewalks narrowed on both side of College Avenue
• Reduced turn-around time for Line 51B	• Striping along College Avenue between Keith Avenue and Miles would need to be reconfigured
	• Conflict between pedestrians and buses exiting along College Avenue
	• Line 51A moved further away from operator restrooms

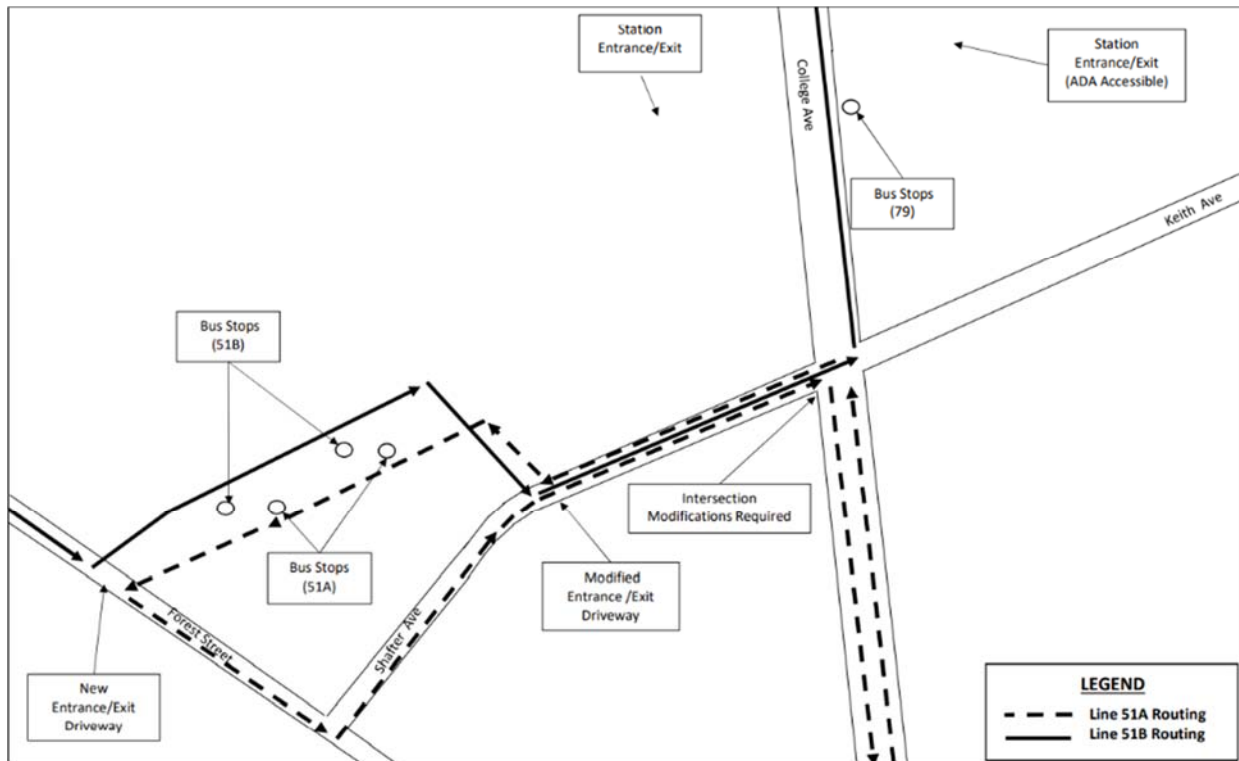
APPENDIX B

Description and High-Level Review of Alternative E: Off-Street Transit Center (West Lot)

A small four sawtooth-bay transit center would be constructed within the BART parking lot west of College Avenue, either near Shafter Avenue or Miles Avenue.

If located near Shafter Avenue, the transit center would feature a single bus island with two bays on each side, providing space for at least four buses (51A x2; 51B x2). Approximately 50 parking spaces would be eliminated. A new exit driveway off would also be required for buses existing onto Forest Street. An existing driveway off of Shafter Avenue would need to be modified. The intersection of Shafter Way and College Avenue would also need to be modified to allow for Line 51A buses to make the right-turn from Shafter Avenue onto College Avenue. Shafter Way would likely be narrowed to one lane near College Avenue with the sidewalk along the southside of Shafter being widened into a plaza. Exhibit B1 details the bus routing for lines 51A and 51B under this proposal.

Exhibit B1 - Off-Street Transit Center (West Side Parking Lot/Off Shafter Avenue) – Bus Routing



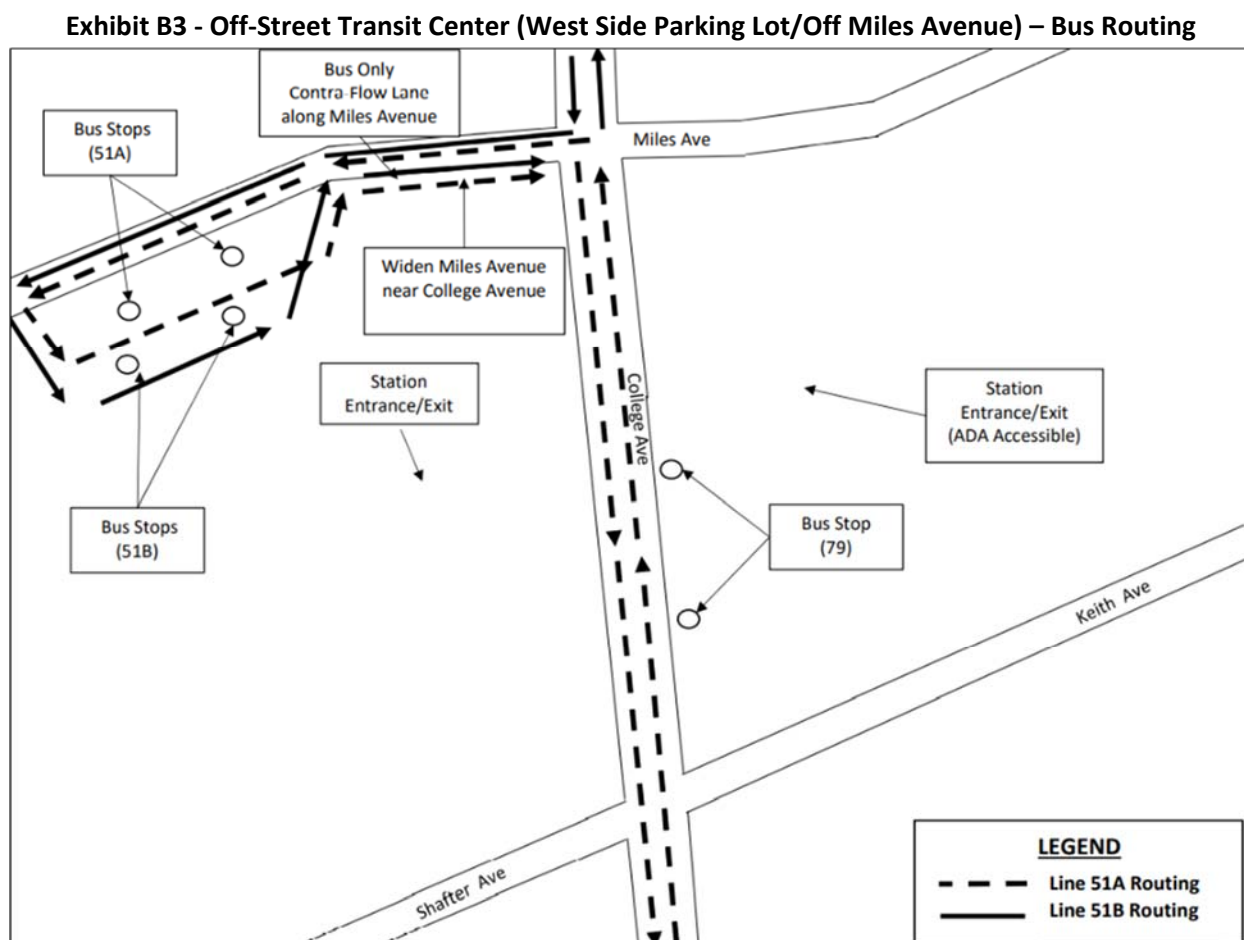
This alternative improves the connection between line 51A and 51B by placing the buses on a single island platform. Curb space is freed-up along College Avenue between Keith Avenue and Miles Avenue, allowing Line 79 to be relocated closer to BART. Line 51A would also benefit from a shorter turn-around.

Although this alternative moves Line 51A and Line 51B onto BART property, it does move the customers across the street from the BART fare gates, adding significant time to their trip. The station entrance/exit located on the west side is not ADA accessible. Passengers on both lines with mobility issues would need to walk through transit center and use the sidewalk along Shafter Avenue to cross College Avenue in order to transfer to BART and Line 79. Exhibit B2 highlights some of the pros and cons of this alternative.

Exhibit B2 - Off-Street Transit Center (West Side Parking Lot/Off Shafter Avenue) - Pros & Cons

Off-Street Transit Center (West Side Parking Lot/Off Shafter Avenue)	
Pros	Cons
• Easy to transfer between 51A & 51B	• Further from BART escalator/elevator
• Line 79 can drop-off/pick up closer to BART	• Significant time added for Line 51A/Line 51B passengers connecting to/from BART
• Reduced turn-around time for Line 51A	• Significant time added for Line 51A/51B passengers connecting to/from Line 79
• Line 51B moved closer to operator restrooms.	• Line 51A moved further away from operator restrooms

If located near Miles Avenue, the transit center would feature islands, each with two bays, providing space for at least four buses (51A x2; 51B x2). Approximately 60 to 70 parking spaces would be eliminated. New entrance and exit driveways off Miles Avenue would also be required for buses entering and exiting onto Miles Avenue. Miles Avenue would have a short contra- flow lane along Miles Avenue to allow buses to exit onto Miles Avenue and quickly access College Avenue. The intersection of Miles Avenue and College Avenue would also need to be modified to allow for Line 51A and Line 51B buses to turn from eastbound Miles Avenue onto College Avenue. Exhibit 25 details the bus routing for lines 51A and 51B under this proposal. Exhibit B3 details the bus routing for lines 51A and 51B under this proposal.



This alternative improves the connection between line 51A and 51B by placing the buses within an off-street transit center. Curb space is freed-up along College Avenue between Keith Avenue and Miles Avenue, allowing Line 79 to be relocated closer to BART. Both Line 51A and Line 51B would also benefit from a shorter turn-around.

Although this alternative moves Line 51A and Line 51B onto BART property, it does move the customers across the street from the BART fare gates, adding significant time to their trip. The station entrance/exit located on the west side is not ADA accessible. Passengers on both lines with mobility issues would need

to walk through transit center and use the sidewalk along Shafter Avenue to cross College Avenue to transfer to BART and Line 79. Exhibit B4 highlights some of the pros and cons of this alternative.

Exhibit B4 - Off-Street Transit Center (West Side Parking Lot/Off Miles Avenue) - Pros & Cons

Off-Street Transit Center (West Side Parking Lot/Off Miles Avenue)	
Pros	Cons
• Easy to transfer between 51A & 51B	• Further from BART escalator/elevator
• Line 79 can drop-off/pick up closer to BART	• Significant time added for passengers connecting to/from BART
• Reduced turn-around time for Line 51A and Line 51B	• Significant time added for passengers connecting to/from Line 79
• Line 51B moved closer to operator restrooms	• Line 51A moved further away from operator restrooms

APPENDIX C

Scoring Matrices

Exhibit C1 – Summary of Scoring

	Connectivity (20%)		Reliability (20%)			Safety (20%)				Regional Connectivity (16%)		Community (8%)				Cost (16%)		Total (100%)
	Walking Distance	Street Crossings	Operator Restroom Proximity	Turn-Around Time	Potential Delays	Operator Restroom Proximity	Street Crossings	On-Street Layover	Vehicle Visibility	Walking Distance	Street Crossings	Parking	Bike Lanes	Sidewalks/ Trees	BART Impacts	Capital	O & M	
Max Points	12.5	12.5	10.0	10.0	5.0	7.5	7.5	5.0	5.0	10.0	10.0	5.0	2.0	2.0	1.0	10.0	10.0	125
A. Off-Street Transit Center (East Side Parking Lot)	10.9	10.8	2.5	6.0	2.5	1.9	6.1	4.5	5.0	5.0	6.8	3.1	2.0	2.0	0.4	2.5	10.0	82.03
B. Off Street Bus Stops (East Side Internal Roadway)	7.5	7.1	2.0	6.0	1.9	1.5	5.1	3.5	5.0	6.5	8.0	3.1	2.0	2.0	0.6	0.0	10.0	71.81
D. Extended Bus Stop (East Side of College Avenue) with additional staff	11.7	10.0	4.0	6.0	2.5	3.0	6.1	2.5	2.5	6.5	8.8	1.9	2.0	0.3	1.0	7.5	0.0	76.30

	Connectivity (20%)		Reliability (20%)			Safety (20%)				Regional Connectivity (16%)		Community (8%)				Cost (16%)		Total (100%)
	Walking Distance	Street Crossings	Operator Restroom Proximity	Turn-Around Time	Potential Delays	Operator Restroom Proximity	Street Crossings	On-Street Layover	Vehicle Visibility	Walking Distance	Street Crossings	Parking	Bike Lanes	Sidewalks/ Trees	BART Impacts	Capital	O & M	
Max Points	12.5	12.5	10.0	10.0	5.0	7.5	7.5	5.0	5.0	10.0	10.0	5.0	2.0	2.0	1.0	10.0	10.0	125
A. Off-Street Transit Center (East Side Parking Lot)	10.9	10.8	2.5	6.0	2.5	1.9	5.4	4.5	5.0	5.0	6.8	3.1	2.0	2.0	0.4	2.5	10.0	81.37
B. Off Street Bus Stops (East Side Internal Roadway)	7.5	7.1	2.0	6.0	1.9	1.5	5.1	3.5	5.0	6.5	8.0	3.1	2.0	2.0	0.6	0.0	10.0	71.81
D. Extended Bus Stop (East Side of College Avenue) with additional staff	11.7	10.0	4.0	6.0	2.5	3.0	6.1	2.5	2.5	6.5	8.8	1.9	2.0	0.3	1.0	7.5	0.0	76.30

Exhibit C2 – Bus to Bus Connectivity Scoring

Bus to Bus Connectivity Questions (20%)	A. Off street TC- East Side Lot		B. Off street BS- East Side Internal Roadway		D. Extended bus stop along East side with staff		Max Score
	Answer	Score	Answer	Score	Answer	Score	25.00
Do Line 51A riders have a shorter/longer walk to transfer to Line 51B?	Much shorter	4.16	same	2.08	Much shorter	4.16	4.16
Do Line 51A riders have a shorter/longer walk to transfer to Line 79?	Shorter	0.78	Shorter	0.78	Much shorter	1.04	1.04
Do Line 51B riders have a shorter/longer walk to transfer to Line 51A?	Much shorter	4.16	Shorter	3.12	Much shorter	4.16	4.16
Do Line 51B riders have a shorter/longer walk to transfer to Line 79?	Same	0.52	Same	0.52	Shorter	0.78	1.04
Do Line 79 riders have a shorter/longer walk to transfer to Line 51A?	Shorter	0.78	Same	0.52	Shorter	0.78	1.04
Do Line 79 riders have a shorter/longer walk to transfer to Line 51B?	Same	0.52	Same	0.52	Shorter	0.78	1.04
Do Line 51A riders have to cross a street to transfer to Line 51B?	No	4.16	No	4.16	No	4.16	4.16
Do Line 51A riders have to cross a street to transfer to Line 79?	Two Internal Roadways	0.62	One internal roadway , One street	0.21	Yes	0.42	1.04
Do Line 51B riders have to cross a street to transfer to Line 51A?	No	4.16	One street	1.67	No	4.16	4.16
Do Line 51B riders have to cross a street to transfer to Line 79?	Two Internal Roadways	0.62	One street	0.42	Yes	0.42	1.04
Do Line 79 riders have to cross a street to transfer to Line 51A?	Two Internal Roadways	0.62	One internal roadway , One street	0.21	One Street	0.42	1.04
Do Line 79 riders have to cross a street to transfer to Line 51B?	Two Internal Roadways	0.62	One street	0.42	Yes	0.42	1.04
		21.75		14.62		21.70	24.98
Score By Variable							
Street Crossing (10%)		10.82		7.08		9.99	12.49
Transfer Distance (10%)		10.93		7.54		11.71	12.49

Exhibit C3 – Reliability Scoring

Reliability Questions (20%)	A. Off street TC- East Side Lot		B. Off street BS- East Side Internal Roadway		D. Extended bus stop along East side with staff		Max Score
	Answer	Score	Answer	Score	Answer	Score	25
Does the project place the Line 51A layover closer or further to the operator restroom facility?	Much Further	0	Much Further	0	Further	1	4.0
Does the project place the Line 51B layover closer or further to the operator restroom facility?	Further	1	Further	1	Same	2	4.0
Does the project place the Line 79 layover closer or further to the operator restroom facility?	Closer	1.5	Same	1	Same	1	2.0
Does the project increase /decrease delays to transit due to queues of cars?	No	1.25	Minor	0.6	No	1.25	2.5
Is the loop Line 51B takes to turn around shorter, longer or the same?	Same	2	Same	2	Same	2	4.0
Is the loop Line 51A takes to turn around shorter, longer or the same?	Shorter	3	Shorter	3	Shorter	3	4.0
Is the loop Line 79 takes to turn around shorter, longer or the same?	Same	1	Same	1	Same	1	2.0
Does the project add/reduce signal delay?	Same	1.25	same	1.25	Same	1.25	2.5
		11		9.9		12.5	25
Score By Variable							
Operator Restroom Proximity (8.0%)		2.5		2		4.0	10.0
Running Time Difference (8.0%)		6.0		6		6.0	10.0
Delays (4.0%)		2.5		1.9		2.5	5.0

Exhibit C4 – Safety Scoring

Safety Questions (20%)	A. Off street TC- East Side Lot		B. Off street BS- East Side Internal Roadway		D. Extended bus stop along East side with staff		Max Score
	Answer	Score	Answer	Score	Answer	Score	25.0
Does the project place the Line 51A layover closer or further to the operator restroom facility?	Much Further	0.0	Much Further	0.0	Further	0.8	3.0
Does the project place the Line 51B layover closer or further to the operator restroom facility?	Further	0.8	Further	0.75	Same	1.5	3.0
Does the project place the Line 79 layover closer or further to the operator restroom facility?	Closer	1.1	Same	0.75	Same	0.8	1.5
Does the project reduce/improve visibility of auto traffic for bus operators?	Improve	5.0	Improve	5.0	Same	2.5	5.0
Does the project remove or maintain on-street layovers on Line 51A?	Remove	2.0	Removes	2.0	Maintains	1.0	2.0
Does the project remove or maintain on-street layovers on Line 51B?	Removes	2.0	Maintains	1.0	Maintains	1.0	2.0
Does the project remove or maintain on-street layovers on Line 79?	Maintains	0.5	Maintains	0.5	Maintains	0.5	1.0
Do Line 51A riders have to cross a street to transfer to Line 51B?	No	0.8	one internal roadway	0.7	No	0.8	0.8
Do Line 51A riders have to cross a street to transfer to Line 79?	two internal roadway	0.2	one internal roadway, one street	0.1	one street	0.3	0.4
Do Line 51A riders have to cross a street to transfer to BART?	two internal roadway	0.5	one internal roadway	0.7	No	0.8	0.8
Do Line 51B riders have to cross a street to transfer to Line 51A?	No	0.8	one internal roadway	0.7	No	0.8	0.8
Do Line 51B riders have to cross a street to transfer to Line 79?	two internal roadway	0.2	one street	0.2	one street	0.2	0.4
Do Line 51B riders have to cross a street to transfer to BART?	two internal roadway	0.5	No	0.8	No	0.8	0.8
Do Line 79 riders have to cross a street to transfer to Line 51A?	two internal roadway	0.2	one internal roadway, one street	0.1	one street	0.2	0.4
Do Line 79 riders have to cross a street to transfer to Line 51B?	two internal roadway	0.2	one street	0.2	one street	0.2	0.4
Do Line 79 riders have to cross a street to transfer to BART?	No	0.4	one street	0.2	one street	0.2	0.4
Do BART riders have to cross the street to transfer to Line 79?	No	0.4	one street	0.2	one street	0.2	0.4
Do BART riders have to cross the street to transfer to Line 51A?	two internal roadway	0.5	one internal roadway	0.7	No	0.8	0.8
Do BART riders have to cross the street to transfer to Line 51B?	two internal roadway	0.5	No	0.8	No	0.8	0.8
		16.8		15.1		14.1	24.9
Score By Variable							
Operator Restroom Proximity (6.0%)		1.9		1.5		3.0	7.5
On- Street Conflicts (4.0%)		4.5		3.5		2.5	5.0
Vehicle Visibility (4.0%)		5.0		5.0		2.5	5.0
Pedestrian Safety (6.0%)		5.4		5.1		6.1	7.4

Exhibit C5 – Regional Connectivity and Convenience Scoring

Regional Connectivity and Convenience Questions (16%)	A. Off street TC- East Side Lot		B. Off street BS- East Side Internal Roadway		D. Extended bus stop along East side with staff		Max Score
	Answer	Score	Answer	Score	Answer	Score	20
Do bus BART riders have a shorter/longer walk to transfer to Line 51A?	Shorter	1.5	Much shorter	2.0	Much shorter	2.0	2
Do bus BART riders have a shorter/longer walk to transfer to Line 51B?	Longer	0.5	Same	1.0	Same	1.0	2
Do bus BART riders have a shorter/longer walk to transfer to Line 79?	Shorter	0.8	Same	0.5	Same	0.5	1
Do Line 51A riders have a shorter/longer walk to transfer to BART?	Same	1.0	Shorter	1.5	Much shorter	1.5	2
Do Line 51B riders have a shorter/longers walk to transfer to BART?	Longer	0.5	Same	1.0	Same	1.0	2
Do Line 79 riders have a shorter/longer walk to transfer to BART?	Shorter	0.8	Same	0.5	Same	0.5	1
Do BART riders have to cross the street to transfer to Line 79?	No	1.0	One street	0.4	One street	0.4	1
Do BART riders have to cross the street to transfer to Line 51A?	two internal roadway	1.2	internal roadway	1.6	No	2.0	2
Do BART riders have to cross the street to transfer to Line 51B?	two internal roadway	1.2	No	2.0	No	2.0	2
Do Line 79 riders have to cross the street to transfer to BART?	No	1.0	One street	0.4	One street	0.4	1
Do Line 51A riders have to cross the street to transfer to BART?	two internal roadway	1.2	internal roadway	1.6	No	2.0	2
Do Line 51B riders have to cross the street to transfer to BART	two internal roadway	1.2	No	2.0	No	2.0	2
		11.8		14.5		15.3	20
Score By Variable							
Walking Distance (8.0%)		5.0		6.5		6.5	10.0
Street Crossing (8.0%)		6.8		8.0		8.8	10.0

Exhibit C6 – Community Impact Scoring

Community Impact Questions (8%)							Max Score
	A. Off street TC- East Side Lot		B. Off street BS- East Side Internal Roadway		D. Extended bus stop along East side with staff		10.00
	Answer	Score	Answer	Score	Answer	Score	
Does project impact trees within sidewalk?	No	0.66	No	0.66	Two large trees on east side	0.00	0.66
Does project impact sidewalk width?	No	0.66	No	0.66	Yes. On the east side.	0.33	0.66
Does the project remove parking along city streets?	Yes. Three 4-hour parking spaces on Miles.	2.50	No	2.50	Four parking spaces along Shafter Avenue; passenger loading along east side of College Avenue.	1.88	2.50
Does the project add parking along city streets?	Yes. One space along west side of College and three in front of Claremont MS.	0.63	Yes. Four spaces along west side of College Avenue; one space along Keith Avenue at College	0.63	One space along Keith Avenue at College	0.00	2.50
Does project impact striping/bike lanes along College Avenue	No	2.00	No	2.00	No	2.00	2.00
Does the project require change to College/Shafter corner to allow right turns by buses? Impacts businesses.	No	0.66	No	0.66	Yes	0.00	0.66
Does the project impact BART's disabled parking	Relocated	0.00	No	0.20	No	0.20	0.20
Does the project impact BART's motorcycle parking	Relocated	0.00	No	0.20	No	0.20	0.20
Does the project impact BART's permit parking?	Relocated	0.00	No	0.20	No	0.20	0.20
Does the project impact BART's TAXI parking?	No	0.20	Relocated	0.00	No	0.20	0.20
Does the project impact BART's Attended Parking parking?	No	0.20	Relocated	0.00	No	0.20	0.20
		7.51		7.71		5.21	9.98
Score By Variable							
Parking (4.0%)		3.13		3.13		1.88	5.00
Bike Lane/Strping Impacts (1.6%)		2.00		2.00		2.00	2.00
BART Parking (0.8%)		0.40		0.60		1.00	1.00
Trees, Sidewalks, Business (1.6%)		1.98		1.98		0.33	1.98