

EAST VINE/LEMAY INTERSECTION REALIGNMENT PROJECT DEVELOPMENT REPORT



PREPARED FOR



PREPARED BY



EAST VINE/LEMAY INTERSECTION REALIGNMENT PROJECT DEVELOPMENT REPORT

SEPTEMBER 12, 2014

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EXECUTIVE SUMMARY

Project Description

The Lemay Avenue realignment and intersection improvements would construct a new arterial facility and intersection slightly to the east of the existing Lemay Avenue alignment. This realignment allows for a number of interim and ultimate solutions that include new at-grade intersections or overpass/underpass of the railroad and existing E. Vine Drive.

The realignment relieves several issues that currently constrain the existing alignment and intersection, which allows for the major project improvements and benefits to be achieved.



Project Improvements and Benefits

The project will address the following primary needs:

Safety: The project will improve safety and reduce risks for pedestrians, cyclists, vehicles and the railroad. The existing crossing intersection has averaged thirteen crashes per year between 2010 and 2012 and does not fully comply with new safety standards for crossings with vehicles, bicycles and pedestrians.

Neighborhood Connectivity: The project will improve multi-modal and neighborhood connectivity by establishing safer and more connected pedestrian/cyclist options and by providing an appropriately scaled roadway network and access points that are less impacted by heavier arterial traffic.

Traffic Congestion: The project will reduce traffic delays that significantly impacts mobility when trains are operating at the existing crossing.

Project Planning

The intersection improvements and realignment of Lemay Avenue at East Vine Drive is a vital capital improvement project resulting from and evolving through decades of planning efforts that address the existing infrastructure deficiencies, neighborhood impacts and future demands of a growing community. The realignment of Lemay Avenue first appeared on the City's Master Street Plan in the early 1980s. Subsequent planning efforts have confirmed and refined the concept.

Previous Planning Efforts that Provide Basis for Project

- ✓ City Plan (various versions)
- ✓ Transportation Master Plan (various versions)
- ✓ City of Fort Collins Master Street Plan
- ✓ Northside Neighborhoods Plan (2005)
- ✓ Mountain Vista Sub-Area Plan (2010)

Project Alternatives

Three alternatives have been identified through a scoping process with an initial overview of alternative characteristics and screening. Preliminary scoping includes constructability, costs, potential environmental impacts, and improving neighborhood connectivity.

Preliminary Alternatives Scoping Summary

	Realigned Lemay - At Grade	Realigned Lemay - Overpass	Realigned Lemay - Underpass
Primary Elements	Creates Realigned Lemay and a segment of proposed New Vine to current Arterial Standards, relocating intersection away from BNSF Crossing.		
	Removes existing at-grade crossing, constructing New Lemay crossing to current safety standards	Removes existing at-grade crossing, constructing a New Lemay overpass bridge over BNSF and existing E. Vine.	Removes existing at-grade crossing, constructing a New Lemay underpass with bridges for BNSF and existing E. Vine.
Permitting and Approval Risks	PUC approvals for new at-grade crossing uncertain. BNSF approvals required and will likely require relocation of switching yard.	General PUC and BNSF approvals required. Removes at-grade crossing risk.	General PUC and BNSF approvals required. Removes at-grade crossing risk, but may be disruptive to BNSF operations.
Environmental Considerations	General noise and construction impacts	Noise and visual impacts to the historic neighborhoods	High ground water table due to proximity to Dry Creek
Neighborhood Connectivity*	The ability to maintain a pedestrian and bicycle crossing at the existing crossing location is possible, but will require both PUC and BSNF approvals. Continue to explore all complimentary strategies for improving safety and connectivity.		
Construction Risks	Constructing new at-grade crossing while keeping BNSF operational will be difficult.	General construction risks. Timing of placing bridge girders over operational tracks.	Constructability of underpass in high groundwater, and constructing BNSF tracks is complex without a shoe-fly option.
Total Project Cost	\$23 to \$24 million	\$26 to \$27 million	\$40-\$41 million

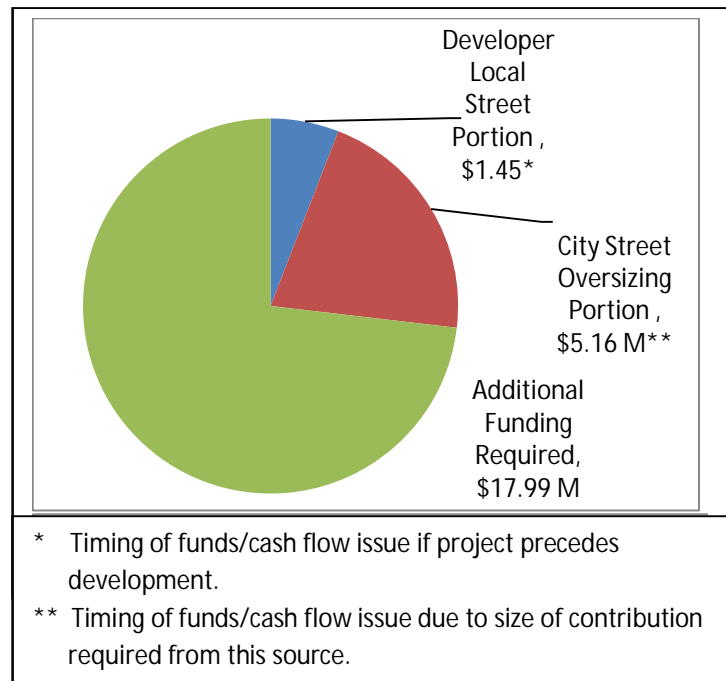
Funding

The project could use a combination of local and federal funding sources:

- Local: Sources include the potential future City sales tax for capital projects, developer street frontage obligations and street oversizing.
- Federal: Sources include the Highway Safety Improvement Program (HSIP) or Surface Transportation Program (STP), TIGER Discretionary Grant Program, and/or EDA Public Works and Economic Adjustment Assistance Programs.

Funding Scenario Example: The Realigned Lemay At-Grade Alternative Cost and Funding:

- Cost between \$24 to \$25 million.
- Funding approach could rely entirely on City funds as federal funds may be unreliable.
- The project could advance prior to full funding by advancing project design and development while other financing options for construction could be explored, such as bonds backed by sales tax revenues or federal program applications.



Project Development Next Steps

The next step in the process is to begin a more thorough data collection, preliminary design and funding evaluations that will address the following key questions:

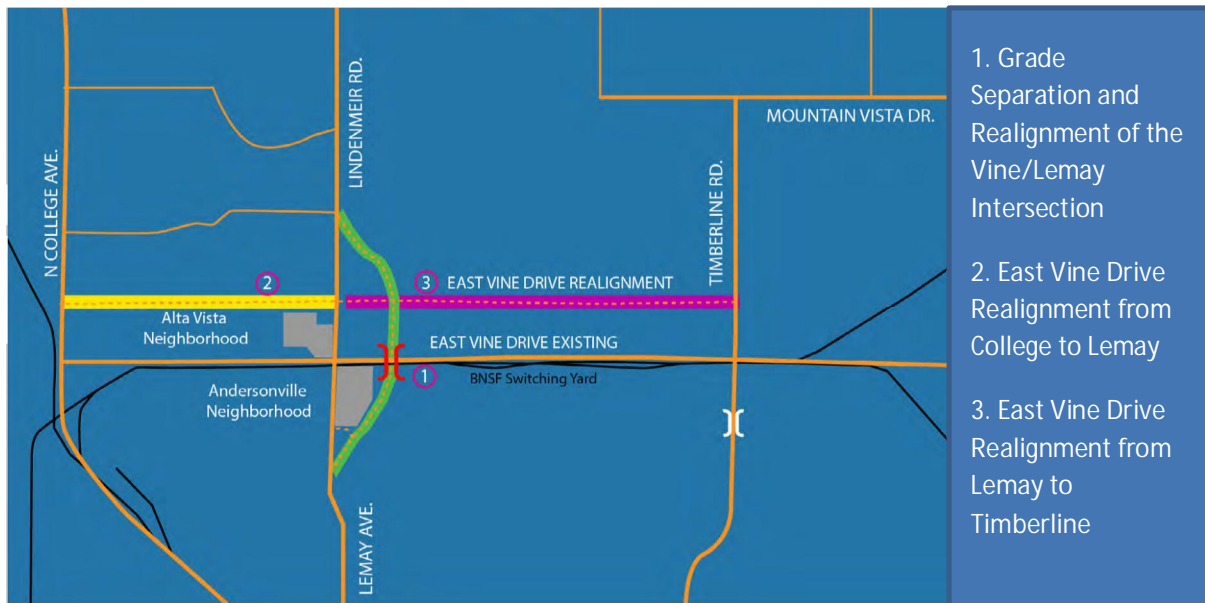
- Is the added long-term cost/benefit of realignment and grade separation necessary to address anticipated 2035 congestion and delay, or could a realignment and at-grade intersection be sufficient as a near-term solution that could then transition at a later date? Will a new at-grade crossing be allowed by the PUC and BNSF, and would BNSF consider switching yard relocation?
- Is the added cost of an underpass to address visual and noise impact issues appropriate when a lower cost overpass would result in similar traffic performance without the higher cost and risk concerns, such as drainage issues, caused by the underpass?
- Does the currently unknown cost of relocation of the railroad switching yard and its ability to reduce railroad crossing/switching-related system congestion justify the expenditure?
- Can the existing at-grade crossing of existing E. Vine and existing Lemay remain in a limited configuration for pedestrians/cyclists.

1. PROJECT BACKGROUND

1.1 Site Location

The existing East Vine Drive and Lemay Avenue intersection is located one-mile north east of downtown Fort Collins. Figure 1 presents a map showing the Lemay Avenue realignment (green) and associated roadway network improvements. Chapter 2 provides Lemay realignment details.

Figure 1 Proposed Lemay Avenue Realignment



1.2 Project Setting and Need

The intersection improvements and realignment of Lemay Avenue at East Vine Drive is a vital capital improvement project resulting from and evolving through decades of planning efforts that address the existing infrastructure deficiencies, neighborhood impacts and future demands of a growing community. The realignment of Lemay Avenue first appeared on the City's Master Street Plan in the early 1980s. Subsequent planning efforts have confirmed and refined the concept.

- City Plan (various versions)
- Transportation Master Plan (various versions)
- City of Fort Collins Master Street Plan
- Northside Neighborhoods Plan (2005)
- Mountain Vista Sub-Area Plan (2010)

East Vine Drive is a two lane road running parallel to the BNSF railroad tracks and Lemay Avenue is a two lane road serving as a north-south arterial one mile east of College Avenue. The intersection is controlled by a signal with an outdated at-grade crossing immediately south of the intersection. Significant delays to traffic and disruption to local connectivity when trains operated during the morning and evening commutes. The delays are compounded when BNSF is using the switching yard located just east of Lemay Avenue where trains travel back and forth across the crossing for switching operations.

Switching yard activities result in an average of 6 minutes of delay at the existing intersection. Without action/ improvements, delays will continue and the delay associated with the at-grade crossing will continue to rise. In 2035, traffic will operate at Level of Service (LOS) of F and train movements will cause traffic delays of up to 30 minutes at the intersection.

The intersection has averaged thirteen crashes per year between 2010 and 2012 and does not fully comply with new safety standards for crossing with vehicles, bicycles and pedestrians. There are no sidewalks on East Vine. East Vine has little to no shoulder with no sidewalk. Lemay has dedicated bike lanes and a detached sidewalk south of the crossing, there is a narrow shoulder and no sidewalks to the north.

Additional details about the project's purpose and need are provided in Section 2.2.

1.3 Funding for Transportation

Fort Collins has roadway construction standards and facility performance requirements that link additional vehicle trips generated from new development to completion of necessary roadway construction, including identification of funding commitments. This impact fee system requires private sector improvements including street oversizing requirements. The City's funding process also includes traditional municipal tax base mechanisms supplemented by a dedicated local "Building on Basics" (BOB) ¼ cent sales tax.

In order to appropriately allocate the City's financial resources, Fort Collins prioritizes planning improvements and uses a well-established Asset Management system to evaluate transportation infrastructure conditions to efficiently plan and maximize maintenance investments. At this time, the proposed improvements are too costly for immediate or short-term funding by the City or State of Colorado.

City of Fort Collins' policies create four primary challenges:

1. Careful management and expenditure of available local funding over time
2. Prioritization of local funding expenditures to optimize value and benefits under existing and future scenarios
3. Application of appropriate funding burdens on the City and land developers
4. Development of compelling arguments necessary to obtain other sources of funding when development needs and community benefits are beyond the means of local funding sources, and when development benefits have regional or statewide values and benefits.

Individual land development proposals, whether small, moderate, or large in scale, often face considerable road capacity development costs to comply with Fort Collins policies. In most instances, these costs are part of doing business in Fort Collins and necessary for new development to maintain the quality of life in Fort Collins and to pay their own way for added impacts to the street network. However, impact fee funds alone cannot always pay for the needed improvements and are not intended to be used to "fix" city-wide capacity and safety issues.

The City has standard metrics used in determining both the Developer Local Street and City Street Oversizing Portion. The costs for the Lemay Avenue portion of these improvements are presented in Section 2.7 of this report and details are provided in Appendix A.

Additional local funding could be provided based on the outcome of future elections, but additional local/federal funding mixes would be needed to get the project built. This may include the use of bonding since the improvements will likely occur before some local sources would be available (i.e. development fees, or property tax revenues associated with a TIF). Details are provided in Chapter 4 Project Funding and Finance Analysis.

2. LEMAY REALIGNMENT

2.1 Overview

The realignment of Lemay has been studied for many years as a way to address a variety of issues at the existing East Vine/Lemay intersection. Chapter 1 characterized the regional and local issues. Chapter 2 further defines the purpose and need for the realignment and describes potential alternatives, phasing considerations, environmental factors, costs and criteria for comparative evaluation of the alternatives.

2.2 Purpose and Need

The purpose of the proposed action is to improve existing and future safety, provide additional roadway capacity, increase property accessibility, address degraded facility conditions and make improvements to comply with new design standards to facilitate sustainable smart-growth and economic development objectives at the local, regional and state-wide level. The individual needs for the proposed action are described and supported in the following discussions. These discussions clarify why the improvement is needed, and why these improvements are needed now.

Safety

At-grade roadway/railroad crossings create a host of safety issues addressed by a variety of engineering solutions. The at-grade East Vine/Lemay/Burlington Northern Santa Fe (BNSF) railroad intersection has been in place for many years and does not fully comply with new safety standards involving interaction with vehicles, bicycles or pedestrians. The physical layout of the intersection, surrounding constraints and proximity to the Railroad Crossing results in an outdated and substandard design that results in safety risks.

The safety benefits resulting from the proposed action were evaluated using two methods:

1. Federal Railroad Administration (FRA) Web Accident Prediction System (WBAPS).
2. Methodology in the Highway Safety Manual, 1st Edition, described in section 4.4.2.13 "Excess Expected Average Crash Frequency with EB Adjustment."

The FRA Web Accident Prediction System estimates the number of train-motor vehicle crashes that can be expected with the current at-grade configuration. The Highway Safety Manual methodology estimates the number of expected multi-vehicle, single-vehicle, and pedestrian crashes at an intersection. The two results were summed to identify safety risks and to obtain benefit estimates.

The Federal Highway Administration has established crash cost estimates based on crash severity. Those values are published in the Highway Safety Manual (HSM) in 2001 dollars. Using the methodology described in the HSM to convert to current values the following cost values were used:

Fatal Crash = \$5,377,400
Injury Crash = \$84,100
Property Damage Only Crash = \$9,700

From 2010 through 2012 there was an average of thirteen crashes per year at the Lemay/Vine intersection.

Capacity

The existing roadway network at and near the existing East Vine/Lemay intersection is constrained by rail operations at grade crossings operations, and as a result is failing to meet current travel demands when trains cross Lemay and other north south routes in the area. The existing East Vine/Lemay intersection Level of Service (LOS) is rated B based on traffic volumes alone, but when freight rail operations occur, the intersection LOS falls to F.

The Highway Capacity Manual defines LOS for signalized and unsignalized intersections in relation to overall travel time delay, or delay associated with a particular movement through an intersection, as follows:

LOS Signalized Intersection	Unsignalized Intersection
A ≤10 seconds	≤10 seconds
B 10-20 seconds	10-15 seconds
C 20-35 seconds	15-25 seconds
D 35-55 seconds	25-35 seconds
E 55-80 seconds	35-50 seconds
F ≥80 seconds	≥50 seconds

LOS A through D is typically considered acceptable. LOS E and F are typically considered unacceptable.

The duration of the train movements is based on train lengths, speeds and local operations (switching). The train speeds are often relatively slow because many trains are switching tracks to access the BNSF yard where a switching station is located. The switching site is located just east of the intersection. Switching movements involve slow train speeds, and often require trains to change direction more than once. The result is blocked north/south roadway travel for extended periods.

The following problems occur when trains block the intersection:

- Local travel behavior and patterns change becoming inefficient adversely impacting other roads and intersections.
- North/south backups prevent neighborhood accessibility for extended periods.

- The street network is slow to recover. Long queues and delays linger for nearly a half hour after the train departs. This shows up as a near doubling of delay with a train compared to existing conditions on days when there isn't a train.

In the future, depending on the pace of the Mountain Vista Area development, congestion at the existing intersection will reach LOS F within 5 to 10 years based on traffic volumes alone

Further discussion regarding the recurring effects of the freight rail operations on the existing intersection LOS is described in the Lemay/Vine 235 Traffic Analysis Memorandum (See Appendix B).

Accessibility and Mobility

The traditional grid network in the established areas of Fort Collins does not extend into the project area. The only north/south roadways connecting completely through this area are US 287 (College Avenue), Timberline Road, Lemay Avenue and I-25. US Highway 287 is located one mile to the west of Lemay. Timberline is located over one mile to the east of Lemay. I-25 is almost three miles east of Lemay Avenue. More specifically, the roadway network and the lack of capacity along Vine Drive and Lemay Avenue and through the Vine/Lemay/BNSF intersection create long-term gaps in the regional roadway network.

Accessibility and mobility are important at the East Vine/Lemay intersection because the intersection provides an important freight rail operation into and out of Fort Collins and distinct opportunities for future bus transit operations that could connect this growing area to the City's emerging rapid transit network. In addition, the intersection provides a primary link for local neighborhood linkage and regional motorists and dedicated routes for cyclists in all directions. BNSF, bus transit, vehicle, bicycle and pedestrian accessibility and mobility are currently limited by intersection safety, capacity and existing roadway configuration and conditions.

An important BNSF railroad storage and switching yard is located approximately 2,000 feet east of the intersection. Facilities for pedestrians include formal cross walks at the intersection, but informal and substandard facilities to connect a recently constructed pedestrian pathway located on the west side of Lemay south of East Vine. No transit operations are in place in the area and no room is available for stops or stations without improvements.

Two neighborhoods are located immediately adjacent to the Lemay/BNSF intersection. The primary access to both of these neighborhoods is from Lemay and Vine. Access to both neighborhoods is frequently constrained by traffic congestion. The desire to keep some level of neighborhood connectivity through the existing at-grade crossing is acknowledged as being important and should be considered as the project develops.

Dedicated marked bicycle lanes exist along East Vine and Lemay, but terminate prior to the intersection in all directions.

Roadway Maintenance, Design Standards and Sustainability

Vine Drive and Lemay Avenue are in a poor state of repair characterized by deficient bridges, substandard conditions and accelerating deterioration caused by increasing truck and automobile volumes. Structures along Vine Drive are over 60 years old and the structures along Lemay Avenue are

over 45 years old. Two bridges along these roads are functionally obsolete due to inadequate width and are in a state of rapid deterioration. Neither roadway meets current City standards for their roadway designations or their existing and projected traffic volumes.

Pavement and bridge management systems are used by the City to determine the optimal time for surface treatment repairs and reconstruction based on minimizing life cycle costs. The Proposed Action has been prioritized through an infrastructure assessment and would be managed by the City's established system performance management tools. The infrastructure assessment characterizes investments that will reduce life cycle costs.

The existing at grade Vine/Lemay intersection fails to meet current design or performance standards. Existing intersection design deficiencies include:

- Level of Service F traffic operations
- Lack of auxiliary lanes
- Small turning radii requiring Jersey barriers for protection
- Lack of adequate facilities for pedestrians
- Inadequate drainage facilities
- Discontinuous bicycle lanes for cyclists

Fort Collins has a strong commitment to sustainable smart growth. The Proposed Action meets Fort Collins' sustainability program goals by providing convenient, healthy and sustainable multimodal transportation options for residents, workers and economically disadvantaged populations (non-drivers, senior citizens and persons with disabilities), in a manner that coordinates transportation and land use planning decisions that have been developed with public participation.

If no improvements are made in the near future, the existing sub-standard roadway network will continue to deteriorate and unmanageable congestion will increase. This delay and the related impacts will deter private sector investment and the expansion of existing economic enterprises and activity under both short-term and long-term scenarios. These conditions will make it difficult for the City to attract new enterprises, and may cause some enterprises to relocate entirely, fueling a cycle of economic downturn.

2.3 Alternative Descriptions

Five Proposed Action Alternatives are presented in the following discussions.

a. No Action Alternative

The No Action, or No Build, Alternative would maintain existing conditions at the East Vine/Lemay intersection. Other planned and funded improvements in the roadway network would be completed, but no changes to the intersection would be made. The No Action Alternative would not achieve the project's purpose or address any of the identified needs. The No Action Alternative is often used as a baseline condition for the other alternatives through the forecast year of 2035. The Project Development Report simply identifies this possibility, but does not analyze this alternative.

b. At-Grade Crossing Alternatives

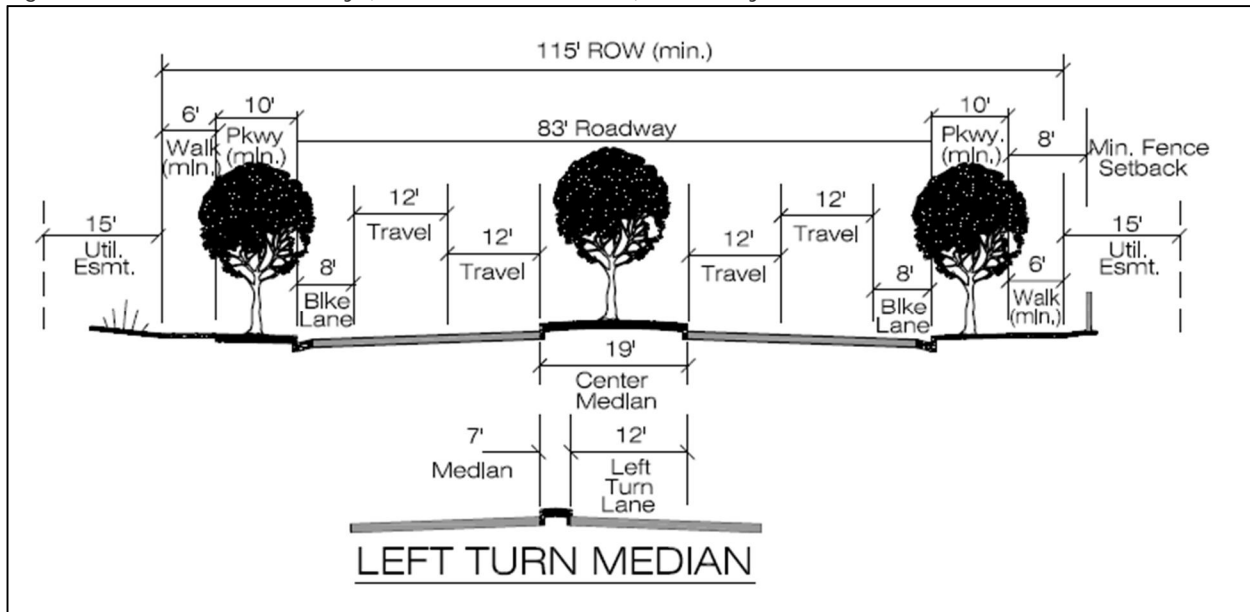
Existing Intersection Location Upgrades

The Existing Intersection Location Alternative involves making a broad range of improvements at the existing intersection of East Vine and Lemay. The primary improvements would involve

- Widening East Vine to the north to provide for two lanes, bike lanes and sidewalks in both directions. The minimum improved cross section would be 115 feet wide (four 12' lanes, two 8' bike lanes and two 6' sidewalks with 10' landscape buffer and a 19' center median) per the Larimer County Urban Street Standards.
- Widening Lemay to the east, west or east and west to provide for two lanes, bike lanes and sidewalks in both directions. The minimum improved cross section would be the same as Vine.
- The intersection would be increased in size to provide four 12' right turn lanes and four 12' left turn lanes that integrate into the median.
- Railroad crossing safety requirements set by the Colorado Public Utility Commission (PUC) would include safety gates across all lanes of Lemay on the north and south sides of Lemay and related improvements for cyclists and pedestrians.

The East Vine and Lemay (4-Lane Arterial Street) roadway cross section are the same (See Figure 2).

Figure 2 East Vine and Lemay (4-Lane Arterial Street) Roadway Cross Section



The footprint of these improvements creates substantial impacts primarily due to the following site development constraints:

- The proximity of private property and residences on the west side of Lemay north of East Vine and the proximity of private property and residences on the east of Lemay south of East Vine requires unavoidable Right of Way (ROW) acquisition and residential displacement in one or both of the locations. If the residences south of East Vine are protected, then the power lines

on the west side of Lemay south of East Vine and the landscape area with the path would be displaced. If the residences to the north of East Vine are protected, virtually all of the large trees and natural areas associated with Dry Creek (riparian and wetlands habitat) would be displaced. A skewed intersection to avoid residential displacement is not feasible given the presence and proximity of the railroad tracks.

- The proximity of private property and residences on the north side of East Vine and the fixed location of the railroad and its associated safety buffer on the south side of East Vine requires displacement of the residences on the north side of East Vine.
- If the required intersection improvements were made, traffic queues would block access points to the northern or southern neighborhood under normal traffic signal operations. The frequency and magnitude of this unavoidable effect would be increased when trains are present.

Based on these substantial and unavoidable impacts, the Existing Intersection Location was not advanced for further consideration.

Realigned At-Grade Intersection

The Realigned At-Grade Intersection Alternative is presented in Figure 3 on the following page with an example of an existing Arterial At-Grade Crossing shown in Figure 4. In summary, this alternative:

- Reroutes Lemay east around Andersonville, ties back in to old Lemay south of Conifer Street upgrades Lemay to 4-Lane Arterial per Master Plan and downgrading Old Vine and Old Lemay to Local Streets. The final disposition on the ultimate configuration of the existing crossing is not considered in this analysis and will be determined at a later stage. This applies to all of the build alternatives.
- Creates the new Vine Road from Old to Lemay through the realigned Lemay to a connector road south the Old Vine to a 4-lane Arterial Standard (per Transportation Master Plan).
- Closure of Old Vine east of Old Lemay to east of Dry Creek Crossing
- Installs new signalized intersection at New Vine and Lemay intersection.
- Creates collector access road from Old Vine Road to New Vine Road east of Dry Creek Crossing.
- Constructs access to Lemay realignment from Old Lemay and Buckingham Street.
- Constructs access from Alta Vista to New Vine Street at Old Lemay.
- Bike lanes and sidewalks will be installed on Both Vine Street and Lemay Avenue with sidewalks on the collector access road. The existing Old Vine road can be utilized as a trail access on either side of the crossing.
- Creates new at-grade crossing to current PUC Standards without having an intersection or pedestrian crossing of Lemay; however, a lack of PUC approval would prove to be fatal for this alternative
- Constructs a new box culvert for New Lemay at Dry Creek

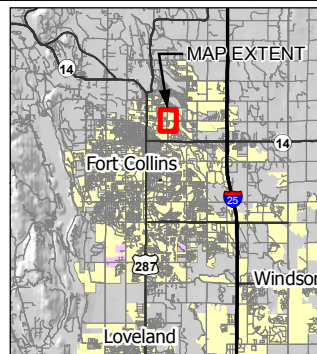


REALIGNMENT AT GRADE INTERSECTION ALTERNATIVE

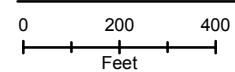
Legend

- | | | |
|----------------------------------|-----------------|------------------|
| At-Grade Alignment | Railroad | Utilities |
| Proposed Sidewalk | Parcel Boundary | Water |
| Limits of Temporary Improvements | Stream | Stormwater |
| | Ditch | Wastewater |

1. Existing crossing may need to be closed to get railroad concurrence on new overpass. Potential to remain open in limited capacity.



PROPOSED ALIGNMENT AT-GRADE



Date Modified: July 2, 2014
 Image Date: April 2011
 Projection: NAD 1983 UTM Zone 13
 Data Sources: ESRI, City of Ft. Collins, AECOM, US Census

Figure 3

Figure 4 Example Arterial At-Grade Crossing – W. Horsetooth Road



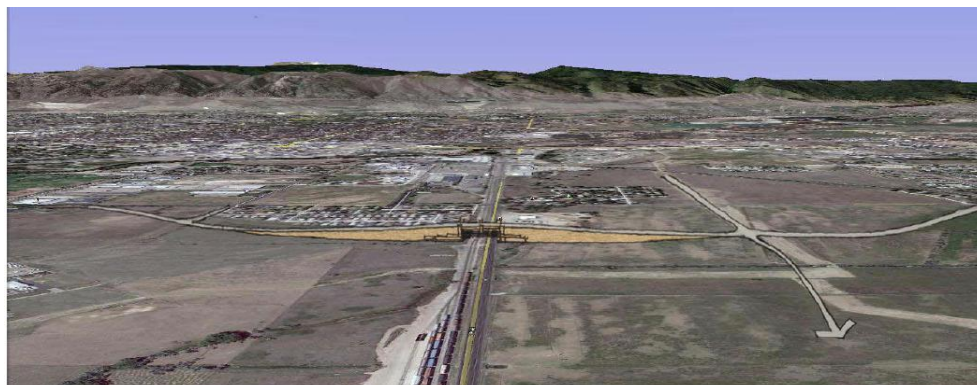
c. Grade Separated Alternatives

Realignment/Overpass

The Realigned/Overpass Alternative is presented in Figure 6, on the following page, with a contextual visualization shown in Figure 5 below. In summary, this alternative:

- Reroutes Lemay east around Andersonville, ties back in to old Lemay south of Conifer Street upgrading Lemay to 4-Lane Arterial per Master Plan and downgrading Old Vine and Old Lemay to Local Streets.
- Creates new Vine Road from Old Lemay to realigned Lemay, upgrading New Vine to 4-Lane Arterial per Transportation Master Plan.
- Installs a new signalized intersection at New Vine and Lemay intersection.
- Constructs access to Lemay realignment from Old Lemay and Buckingham Street.
- Constructs access from Alta Vista to New Vine Street at Old Lemay.
- Creates an overpass structure and fill walls that carry Lemay over the BNSF Tracks and Old Vine Road.
- Bike Lanes and sidewalks will be installed on Both Vine Street and Lemay Avenue.
- Constructs a new box culvert for New Lemay at Dry Creek.

Figure 5 Realigned/Overpass Visualization Rendering



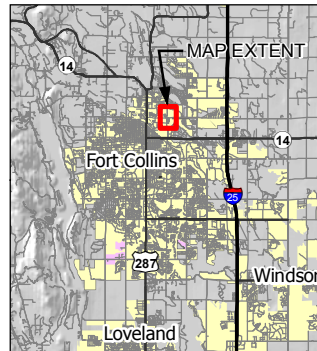


REALIGNMENT OVERPASS INTERSECTION ALTERNATIVE

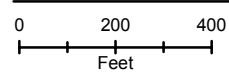
Legend

- Overpass Alignment
- Proposed Sidewalk
- ▲ Retaining Wall
- + Railroad
- Parcel Boundary
- Stream
- Ditch
- Utilities**
- Water
- Stormwater
- Wastewater

1. Existing crossing may need to be closed to get railroad concurrence on new overpass. Potential to remain open in limited capacity.
2. Old Vine to remain open until new Vine Connection to east is complete.. Possible to remain open in ultimate condition.



PROPOSED ALIGNMENT OVERPASS



Date Modified: July 2, 2014
 Image Date: April 2011
 Projection: NAD 1983 UTM Zone 13
 Data Sources: ESRI, City of Ft. Collins, AECOM, US Census

Figure 6

Realignment/Underpass

The Realigned/Underpass Alternative is presented in Figure 8 on the following page with an example underpass project shown in Figure 7 below. In summary, this alternative:

- Reroutes Lemay east around Andersonville, ties back in to old Lemay south of Conifer Street upgrading Lemay to 4-Lane Arterial per Master Plan and downgrading Old Vine and Old Lemay to Local Streets.
- Creates new Vine Road from Old Lemay to the realigned Lemay, upgrading New Vine to 4-Lane Arterial per Transportation Master Plan.
- Install new signalized intersection at New Vine and Lemay intersection.
- Construct access to Lemay realignment from Old Lemay and Buckingham Street
- Construct access from Alta Vista to New Vine Street at Old Lemay.
- Bike Lanes and sidewalks will be installed on Both Vine Street and Lemay Avenue with sidewalks.
- Construct water-tight walls on either side of Lemay due to the high groundwater table. The underpass cannot gravity drain, so a pump station would also be needed.
- Construction of a siphon to convey the dry creek flows under the Lemay underpass.
- Construct a BNSF bridge and Old Vine bridge over relocated Lemay.

Figure 7 Realigned/Underpass Example – Wadsworth Bypass Arvada, CO



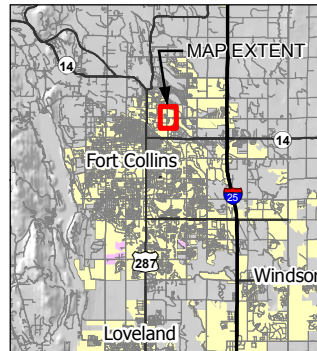


REALIGNMENT UNDERPASS INTERSECTION ALTERNATIVE

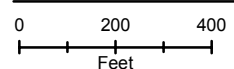
Legend

- | | | |
|---------------------|-----------------|------------|
| Underpass Alignment | Railroad | Water |
| Proposed Sidewalk | Parcel Boundary | Stormwater |
| Wall | Stream | Wastewater |
| | Ditch | |

- Existing crossing may need to be closed to get railroad concurrence on new overpass. Potential to remain open in limited capacity.
- Old Vine to remain open until new Vine Connection to east is complete. Possible to remain open in ultimate condition.



PROPOSED ALIGNMENT UNDERPASS



Date Modified: July 1, 2014
 Image Date: April 2011
 Projection: NAD 1983 UTM Zone 13
 Data Sources: ESRI, City of Ft. Collins, AECOM, US Census

Figure 8

2.4 Interim Improvements and Phasing

The following discussion addresses how the Build Alternatives could be constructed in phases. Each discussion describes feasible interim improvement sequences and characterizes the basic benefits of phased implementation.

Each Build Alternative could benefit from reduced freight rail operations or reduced delay from slow moving trains where the speeds are limited by the nearby location and operations of the BNSF railroad switching yard. Alternatives that would entirely relocate the Rail Alignment are not considered feasible and/or would be well beyond the scope of this analysis. However, alternatives that would reduce the effects of the train crossings by reducing travel delays and safety concerns for motorists, cyclists and pedestrians may be feasible. The primary possibility would be to work with BNSF to relocate the switching yard to a location beyond the Mountain Vista subarea plan boundaries. This phasing option is discussed first.

Switching Yard Relocation: Reduced Delay from Slow Moving Trains

Relocation of the BNSF switching yard to another location well away from the Vine/Lemay intersection would allow trains to pass through the area without speed reductions associated with switching yard operations. This change would substantially reduce traffic delays along Lemay north and south of East Vine. The public cost to relocate the switching station relocation would be substantial and could cost from between \$10 million to \$15 million dollars depending on the availability of land and yard development costs.

Realigned At-Grade Intersection

The Realigned At-Grade Intersection in itself could be an interim phase prior to Grade Separation. The construction activities for the Realigned At-Grade Intersection would require specific coordination activities with the railroad operations. The coordination activities primarily involve limiting impacts to railroad operations and construction of the at-grade crossing near the railroad tracks. Installation of track panels will be accomplished during limited windows, allowing train operations to continue. A shoe-fly is not likely a feasible or needed approach as the switch to the yard is immediately east of the crossing. Phasing and constructability is feasible for the at-grade intersection.

Realigned/Overpass

The Realigned/Overpass design could be accomplished in phases that involve construction of the Realigned At-Grade Intersection with or without relocation of the railroad switching station. These interim improvements could defer construction of the overpass.

When this alternative is constructed, the work will occur in phases to address site constraints. The constraints primarily involve railroad operations and construction of the overpass. Construction of the sub structure and piers will be out of BNSF ROW, but placing of the girders will need to be coordinated and conducted to limit impacts to railroad operations. Full closure of the line is not expected. Phasing and constructability is feasible for the Realigned/Overpass.

Realigned/Underpass

The Realigned/Underpass design could be accomplished in phases that involve construction of the Realigned At-Grade Intersection with or without relocation of the railroad switching station. These interim improvements could defer construction of the underpass.

When this alternative is constructed, the phasing of the underpass bridges will present substantial challenges. Construction of the roadway bridge will require full closure of Old Vine. Construction of the BNSF bridge may be cost prohibitive as the line will need to stay in operation. A shoe-fly will require nearly 1500 feet of length on either side of the crossing. This would shut down the existing at-grade crossing of Lemay and impact use of the storage yard. Additionally the shoe fly would need to be 25 feet from the mainline and there is not enough room without impacting Old Vine or the residents of Andersonville. Alternative approaches to build the bridge in-situ are costly and time intensive given the high water table. Phasing and constructability could be a fatal flaw for the Realigned/Underpass.

2.5 Transportation Performance Analysis

Safety

The Realigned at-Grade Intersection alternative would provide better at grade pedestrian and bicycle crossings at the new intersection. The new intersection would improve vehicle safety by meeting railroad/road intersection design requirements. By separating the Vine/Lemay intersection from the railroad crossing, the effects of overlapping conflicts and complexity that exists at the existing intersection and railroad crossing would be significantly reduced/eliminated. Maintaining an existing at-grade crossing in any configuration, regardless of mode, will still introduce conflicts that may not be deemed acceptable by regulatory agencies or the railroad.

The Realigned/Overpass Alternative would provide a safer grade separated route for pedestrians and cyclists crossing the railroad. The Realigned/Overpass Alternative is estimated to reduce the number of crashes by 52 percent on an annual basis resulting in an overall safety savings of \$174,572 per year or 4.35 million 2013 present value dollars.

The Realigned/Underpass Alternative would have the same safety benefits as the Realigned/Overpass Alternative, but would add the potential flood risk to access and safety if measures to pump water from the low point of the underpass were inoperable or ineffective during a flood event.

Capacity

As described in the Lemay/Vine 2035 Traffic Analysis Memorandum dated March 4, 2014 (Appendix B) and summarized in Table 1, the capacity benefits of the At Grade Alternative, without consideration of railroad operations, is substantial.

Table 1 Level of Service Conditions under No Build and At Grade Alternative Conditions (2035 - without Consideration of Railroad Operations)

PRIMARY INTERSECTION MOVEMENT	2035 NO BUILD ALTERNATIVE	2035 AT GRADE BUILD ALTERNATIVE
Northbound	F	A
Southbound	F	A
Eastbound	F	D
Westbound	D	D
OVERALL	F	B

Note:

- The year when LOS E is reached is dependent on when development occurs. With committed (approved but not built) developments, this threshold may be reached within 5 to 10 years.

The benefits of introducing the overpass and underpass alternatives are not as easily measured by the same intersection level-of-service metrics. Therefore, a brief analysis was conducted to measure the system effects that are caused by train crossing movements. Two train crossing scenarios were considered as follows:

Scenario 1-Thru Train Movement: This represents delays associated with a train crossing without using the switching yard resulting in a 3-minute train crossing time. This time is based on observations at other train crossing locations in the City including the Drake railroad crossing.

Scenario 2- Switching Train Movements: This represents delays associated with a train crossing that uses the switching yard resulting in a 6-minute train crossing time. This time was observed at the existing Vine/Lemay intersection.

Table 2 illustrates changes in system total delay, the number of vehicle trips disrupted and the system delay involved per vehicle using these scenarios. For additional details, refer to Appendix C.

Table 2 System Performance at PM Peak Hour under Various Scenarios

	Existing Conditions No Trains	Existing Conditions Switching Train Movement (Scenario 2)	2035 Conditions At Grade Alternative No Trains	2035 Conditions At Grade Alternative Thru Train Movement (Scenario 1)	2035 Conditions At Grade Alternative Switching Train Movement (Scenario 2)
Total Delay (Hours)	84.9	153.2	200.4	203.4	233.3
Vehicle- Trips	6,560	6,489	9,539	9,541	9,537
Seconds Per Vehicle Trip	46.6	85.0	75.6	76.7	88.1

Notes:

- Train blockage times were based on recent data from traffic signal preemption logs.
- 55 records were reviewed presenting an average duration train blockage of 6.1 minutes. This duration was used to represent the average time of a blockage associated with switching station impacts.
- 39 records were reviewed for locations away from the switching station. These records presented an average train blockage of 3.2 minutes. This duration was used to represent average time of blockage associated with crossings away from the switching station.
- Results are based on 30 runs of each scenario using the CORSIM model
- Roadway network impacts elsewhere were not identified.
- Existing conditions include the intersections of Lemay/Mulberry, Lemay/Magnolia, Lemay/Lincoln and Lemay/Vine (including RR delay). 2035 scenarios include the same intersections plus the delay at the railroad crossing which is no longer adjacent to the Lemay/Vine intersection.
- At Grade Alternative effects from the train are reduced as a result of added storage capacity i.e. 4-lanes on Lemay rather than just two lanes at the tracks and at adjacent intersections.
- A total delay cost from the trains would require converting the data from the p.m. peak hour to a daily estimate.

In summary:

- The new Vine/Lemay at-grade intersection that would be constructed north of the railroad crossing provides adequate capacity in the year 2035 and beyond, however the effects of train crossing at old Vine Avenue would remain a concern.
- The existing street network system is slow to recover from a train crossing event where the train utilizes the switching yard. By the year 2035, the lingering congestion effects in the street network system continues up to 30 minutes after the train crossing event. This doubling of system delay and long-lasting residual system effects further demonstrates the need to make improvements.
- The future effectiveness, year 2035, of the relocated at-grade crossing will greatly depend on whether the switching yard can be relocated or must stay:
 - If the switching yard is moved, system delays due to a train crossing event are negligible when compared to the delays encountered in the system without a train.
 - If the switching yard remains, system delays due to a train crossing event with switching movements are 16% higher than when the compared to the delays encountered in the system without a train.

Accessibility and Mobility

The benefits of moving the intersection to the east with the Realigned At-Grade Intersection Alternative would shift queues to locations that would eliminate neighborhood accessibility and mobility issues

The Realigned/Overpass and Realigned/Underpass Alternatives:

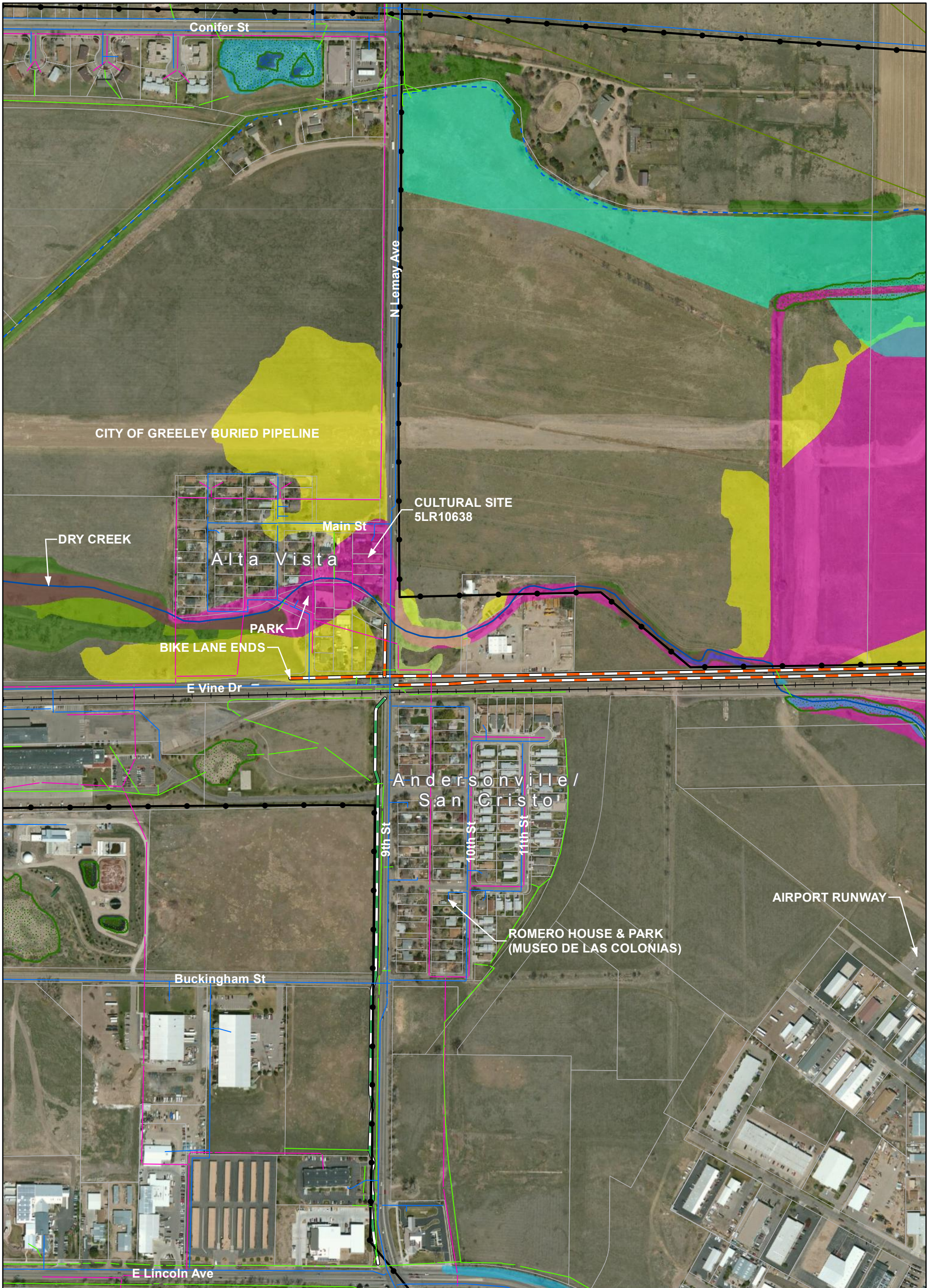
- Substantially enhance system interconnectivity and substantially reduce road and railroad delay.
- Improve access and mobility for all travel modes, local residents and motorists providing long-term, efficient access and mobility connecting Downtown Fort Collins, other community commercial districts, employment centers and other community resources while removing a constraint to future transit in the planning area.
- Create local streets and pedestrian conditions near the access points to the two nearby neighborhoods by relocating two major arterials providing the opportunity to maintain the local connectivity. Grade separation would improve congestion and provide better mobility for cyclists.

Roadway Maintenance and Design Standards

All of the Build alternatives would be designed and constructed to meet applicable roadway maintenance and design standards. The Build Alternatives would replace existing pavements with 30-year design life pavement. The inadequate bridges would be replaced with structures with a design life of 75 years. The new infrastructure will allow safe travel for automobiles, trucks, buses, cyclists and pedestrians while meeting estimated traffic demands through 2035.

2.6 Environmental Analysis: Key Impact Issues

The study area presents various environmental issues for consideration in relation to the three Build Alternatives. The following discussion characterizes these issues and potential effects. Figure 9 presents a map of the key environmental considerations.



LEMAY AVENUE REALIGNMENT

Legend

Transportation

- +— Railroad
- Bike Lane
- Community Path

Flood Zones

- 100-Year Floodplain
- Regulatory Floodway

Natural Habitat Areas

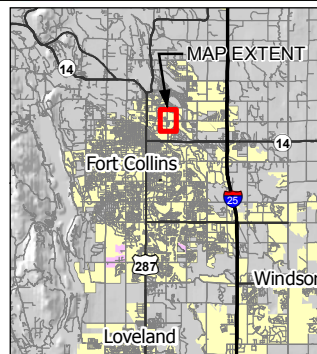
- Aquatic
- Emergent Wetland
- Native Upland Plains Forest
- Riparian Forest
- Wet Meadow

Utilities

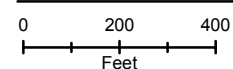
- Water
- Stormwater
- Wastewater
- Overhead Power Line

Parcel Boundary

- National Wetlands Inventory
- Stream
- Ditch



ENVIRONMENTAL CONSTRAINTS



Date Modified: May 8, 2014
 Image Date: April 2011
 Projection: NAD 1983 UTM Zone 13
 Data Sources: ESRI, City of Ft. Collins, AECOM, US Census, USFWS, NRHP, FEMA

Figure 9

Private Property Acquisition for Public Right of Way, Land Use Compatibility, Environmental Justice

The study area is composed of private property and City owned right of way for the local public street network. Agricultural, residential, and industrial land uses are present the study area. A church is located along Lemay at San Cristo Street. Residences include single family homes and some mobile homes.

The two neighborhoods in the study area are occupied primarily by Hispanic people and people with lower than average household incomes relative to other neighborhoods within the City of Fort Collins. The percentage of Hispanics in these neighborhoods exceeds 50 percent.

The existing right of way with along East Vine and Lemay (9th Street and Lindenmeier Road) is approximately 60 feet and 70 feet, respectively, in the vicinity of the East Vine/Lemay intersection.

Additional right of way would be needed to widen or realign either road. Realigning East Vine and Lemay would require acquisition of active farmland. A formal analysis of the loss of agricultural land would be needed. The overpass could present the potential for privacy effects by creating views of gardens and residential windows from the elevated roadway.

Aviation clear zone issues should be considered in relation to the private airport located southeast of the Andersonville/San Cristo neighborhood. Small airplanes and helicopters use or have used this airfield. Airplane takeoffs and/or landings would occur over the Lemay realignment. The height of the anticipated overpass and related lighting fixtures should be considered if potential aviation issues arise.

Pedestrian and Bicycle Paths and Lanes

A landscaped pedestrian path is located along the west side of Lemay south of East Vine. This path was created with development of an industrial property located west of San Cristo Street. Signed bicycle lanes are provided in all four directions from the East Vine/Lemay intersection. However, lane markings providing adequate room for cyclists end near the intersection. Widening of East Vine and Lemay along their existing alignments would require a future cross section of each roadway that provides for striped bicycle lanes.

Parks and Recreation Areas

Two parks are present in the study area. Alta Vista Park is centrally located within the Alta Vista neighborhood. Dry Creek flows through this park. Romero Park is centrally located in the Andersonville/San Cristo neighborhood near the Romero/10th Street intersection. Direct effects on these parks are not anticipated.

Air Pollutant Emissions, Dust and Odor

Existing motor vehicle emissions along East Vine and Lemay likely do not and probably would not in the future create pollutant concentrations in excess of the one-hour and eight-hour limits for carbon monoxide.

Construction period particulate matter (windblown dust) and construction equipment and vehicle exhaust emissions and odors could create nuisances at residences located within close proximity to

earthmoving, paving and other construction operations. These effects would be more pronounced for construction along East Vine and Lemay, but would occur with the Lemay realignment despite larger distances between the sources and receptors.

Noise

Noise levels at existing residential receptors at the existing intersection are relatively high due to motor vehicle volumes and railroad operations. Increasing vehicle volumes and speeds at peak hour in the future will increase noise levels.

Construction and post-construction activity would create higher noise levels at existing residential receptors along East Vine and Lemay. Based on future traffic volumes and vehicle speeds approaching and departing from the controlled intersection, the overall noise levels may approach applicable standards and reach levels that require mitigation analysis at immediately adjacent residences. Mitigation such as noise walls may be ineffective due to frequent breaks in the walls allowing for private property access.

Noise from the realignment options for Lemay would be similar during the construction period. Long-term motor vehicle noise at residences from the underpass design would be less than those associated with the at-grade and overpass option.

A noise analysis will be needed.

Visual Quality/Aesthetics

Visual quality and aesthetics is an important issue for the alternatives. A wider cross section along East Vine and Lemay would further urbanize the rural setting of the two existing neighborhoods by adding more pavement, reducing setbacks, and by displacing native trees and natural landscapes.

The underpass and overpass would also urbanize the setting. The overpass would add a new and substantial visual element to the landscape. The underpass would be less visible from nearby vantage points.

Water Resources and Wetlands

Dry Creek, a small surface water channel, is located in the study area. This channel provides habitat values for invasive Russian olive trees and other plant species. A small portion of this channel provides riparian habitat and may include wetlands and/or waters of the U.S. that are regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

Shallow groundwater is likely present in the study area, but the details within the study area are not fully defined.

Improvements to East Vine would not impact water resources, but widening of Lemay north of East Vine would impact the portion of the existing drainage channel associated with riparian habitat and possibly wetlands.

The overpass would likely disrupt the portion of the channel that does not provide much habitat value.

The underpass would likely encounter shallow groundwater and would require special facilities to address drainage and flooding standards.

Biological Resources

Most of the study area is currently developed. Agricultural, residential and industrial activities and facilities limit habitat values. Small undeveloped areas, fallow agricultural land and large trees provide some habitat value. The presence and absence of state and federally protected species and critical habitat values have not been checked, but substantial roadway improvement limitations of this type are not anticipated. However, Prairie dogs have established themselves in the open land on the west side of Lemay south of East Vine.

Chapter 6 of the City of Fort Collins Natural Areas Wildlife Management Guidelines provides prairie dog management guidelines. Widening of Lemay south of East Vine would have an incidental displacement effect on the existing colony in this location. Formal procedures outlined in the prairie dog management guidelines would be implemented to address this effect. The other alternatives are not expected to impact prairie dogs. All prairie dog findings would need to be checked prior to actual construction.

Migratory birds are protected under the Migratory Bird Treaty Act. Surveys would be needed prior to construction to protect migratory birds, especially in potential nesting areas.

Geology and Soils

The geology and soil conditions within the study area do not present substantial design or construction constraints. Typical geotechnical analysis and engineering design requirements for the overpass and underpass designs would be expected to resolve any limitations presented by existing geology and soil conditions.

Cultural Resources

The Andersonville/San Cristo and Alta Vista neighborhoods and individual properties within them have historical significance relative to City of Fort Collins and National Register of Historic Places criteria.

Although neither neighborhood is a designated historic district, numerous properties within them contribute toward that status, and two properties are eligible for listing in the National Register of Historic Places.

5LR10638 741 Lindenmeier Road

5LR10122 425 Tenth Street, Romero House, Museo del las Tres Colonias

See Figure 9, Refer to Appendix D for additional information.

No direct effects on either of the two properties eligible for listing would be expected. Fewer and less involved indirect effects from the realignment of Lemay would be expected due to the buffer distance between the new alignment and the neighborhoods. Additional consultation and coordination with the State Historic Preservation Officer (SHPO) will be needed.

Hazardous Materials

A Phase I Environmental Site Assessment has not been prepared. Based on basic site reconnaissance, the potential for hazardous materials to be present in soils and groundwater in the study area exists, but the probability of substantial issues that constrain the design or construction of alternatives due to health and safety risks or remediation costs is low. Septic tank leach field issues may be present where excavation is needed near residences.

Public Utilities and Services

A network of public utilities is present in the study area (See Figure 9). High voltage overhead power lines are present along a portion of Lemay south of East Vine. Lower voltage overhead lines service both neighborhoods. Water lines are present within the rights of way for East Vine and Lemay to serve both neighborhoods. A pipeline alignment constructed about 2009 is present in the study area. The alignment is shown in the base aerial used for Figure 9.

2.7 Cost Opinions

Probable cost opinions were developed for the alternatives and are shown in Appendix A. The total project costs include all of the construction costs, including mobilization and force accounts, Right-of-way acquisition, Project development, formalizing downgraded segments of Vine and Lemay to local streets, and construction management and inspection fees.

Table 3 identifies the overall costs and the primary items that determine the project costs.

Table 3 Build Alternative Total Project Cost Opinions

Relocated Build Alternative	Full Development Costs (2014 Dollars)	Primary Drivers of Cost
At-Grade	\$24 to \$25 Million*	<ul style="list-style-type: none"> • Likely Relocation of BNSF Yard \$10M ** • Roadway Improvements • Dry Creek Box Culvert • Railroad Crossing Equipment • Uncertainty in PUC process
Overpass	\$27 to \$28 Million	<ul style="list-style-type: none"> • Roadway Improvements • Dry Creek Box Culvert • Approach Fill and Walls • Bridge over BNSF and Old Vine
Underpass	\$41 to \$42 Million	<ul style="list-style-type: none"> • Roadway Improvement • Dry Creek Siphon Structure • Water-tight Cut Walls for Underpass • Railroad Bridge Construction on Active Line • Old Vine Bridge • Pump Station for Underpass Drainage

* (Approximately \$1.6 Million would involve temporary construction –to be removed if a grade separation was constructed as a later phase)

** Costs are planning level value, additional detail analysis is needed

Right-of-Way Acquisition Costs

Right of Way acquisition costs were based on recent property transfers in the project vicinity. The estimate for this project area included consideration of a variety of factors. Key issues for cost estimating included existing development dedications, likelihood of future development along the new alignments and current condition of the property.

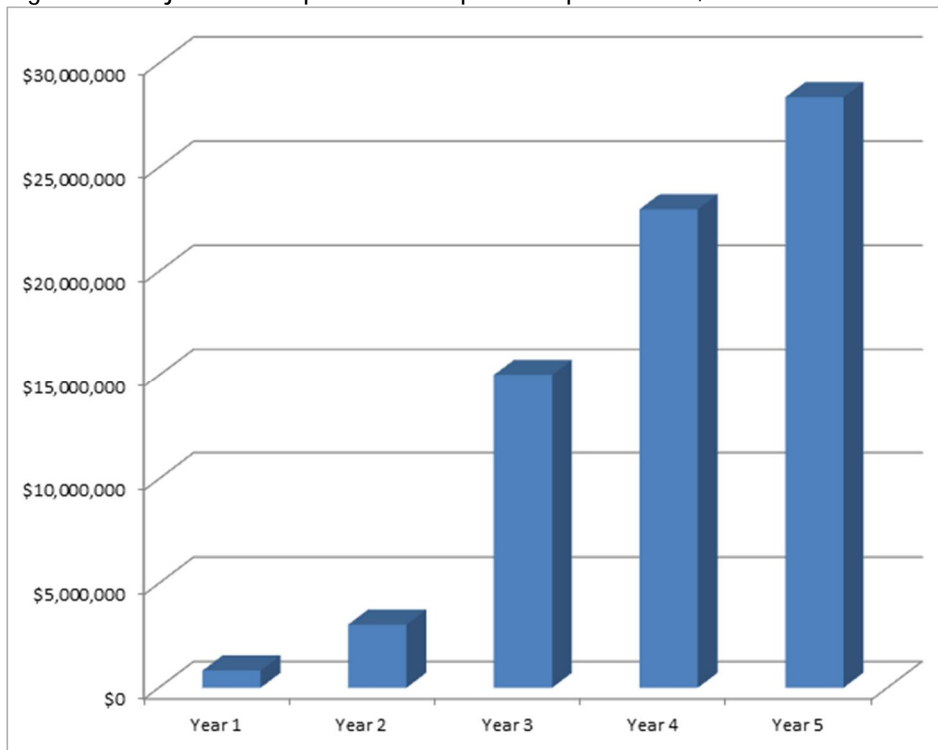
Project Development Costs

Project development costs were estimated at 12.5% of the estimate construction cost. These costs include additional early project planning, environmental processes and permits, and preliminary and final design

Project Expenditures over Time

The project expenditures would occur in three phases over what would likely be a five year period with planning and right of way acquisition occurring in the first year, final design in the second year, and two to three years of construction beginning in the third year. The graph presented in Figure 10 illustrates anticipated expenditures for the overpass alternative as an example for the five year period. This assumes a traditional design, bid, build delivery method and assuming no fiscal escalation. Alternative delivery methods, such as design-build, are not being considered at this time.

Figure 10 Project Development Anticipated Expenditures, S-Curve



2.8 Risk Analysis

The Proposed Action presents a variety of design, construction and regulatory risks. The follow discussion clarifies those risks at this point in the project development process.

Design and Construction Risks

Design risks include the possibility that early, conceptual layouts have flaws that necessitate costly or time consuming resolution efforts. One example of a design risk that may be problematic for the underpass alternative is the need for stormwater management under normal conditions and flood conditions. Normal conditions may necessitate costly equipment to keep the underpass dry, passable and safe, especially in winter. Flood conditions, likely to drive design considerations, may generate water conveyance and disposal problems that add to project construction and long-term operation and maintenance costs.

Construction risks include labor and material rate increases tied to market demand as the national and regional economies recovery, placing higher demands on both. This could escalate project budget estimates and result in project completion delays. Additional risks during construction could also involve encountering site issues such as high groundwater. This risk would be greatest for the underpass alternative.

Standard measures can be applied to address the anticipated design and construction risks.

Public Utility Commission Risks

The Colorado Department of Regulatory Agencies, Public Utility Commission (PUC) mission is to *"serve the public interest by effectively regulating utilities and facilities so that the people of Colorado receive safe, reliable, and reasonably-priced services consistent with the economic, environmental and social values of our state."* One of the PUC's responsibilities is to regulate railroad safety. State jurisdiction over railroad safety is extremely broad, however most areas have been preempted by the federal government. The PUC retains primary jurisdiction over all public highway-rail crossings, including opening, closing, upgrading, overpasses or underpasses, and the allocation of costs. All economic jurisdiction over railroads that are part of the national railroad system come under the jurisdiction of the Surface Transportation Board.

In accordance with 49 CFR Part 659 and CRS 40-18, the Colorado Public Utilities Commission has responsibility for the oversight of the safety and security of rail fixed guideway (RFG) systems within the state. While the authority of the Federal Regulations extends to RFG systems which have received or are receiving federal, the Colorado Statute grants this authority to any RFG system operating within the state, whether receiving federal funds or not.

The project development risks of the alternatives include potential time, delays and costs associated with:

- Design that complies applicable requirements
- Details needed to be developed for submittal the PUC
- Negotiations and supplements necessary to obtain all of the necessary PUC approvals
- Conditions associated with PUC approvals
- The possibility that the PUC will deny approval to a desired alternative, especially creating a new at-grade crossing given vehicle, pedestrian and cycling conditions expected in year 2035.

These risks can be managed through the use of experienced designers familiar with PUC requirements and demonstrating a successful record of approvals. However, recent actions by the PUC have shown a desire to grade separate train and arterial road crossings.

Railroad Risks

Roadway projects that relate to the interests of railroads experience various risks in addition to those associated with PUC risks. Railroads are private sector entities unlike public agencies and utilities. Railroads are not motivated to improve roadway operations and can solely focus on their own operational requirements.

Roadway projects that require physical changes to railroad tracks such as modifications at road/railroad crossings must obtain approval from railroad owner/operators. In addition, any work that occurs within or near their right of way having any direct or indirect effect on safety or operations requires railroad owner/operator approval. Each of the alternatives involves negotiations with BNSF and their final approval before the City can proceed, including discussions on options for keeping the existing at-grade crossing open to limited access.

These risks can be managed through the use of experienced designers familiar with BNSF safety and operation needs, and demonstrating a successful record of negotiations with BNSF.

Environmental Risks

The environmental evaluation, impact documentation and permitting processes for the Proposed Action present budget and schedule risks linked to known and unknown considerations. The environmental issues are described in Section 2.6. The environmental screening process for the alternatives is described in Section 2.9. The environmental impact documentation process is described along with other project development issues in Chapter 3.

The key environmental issues that present risks are manageable, but include:

- Noise impacts including a formal noise analysis and the potential for mitigation.
- Aesthetics and views into backyards and windows (privacy and visual quality issues).
- Flooding, stormwater management and drainage facilities
- Wetlands and migratory birds

- Cultural resources, indirect effects on two neighborhoods with historic elements
- Public controversy over potential effects and differences between the alternatives

The alternative screening, NEPA compliance and permitting processes each present risks. The screening process may be able to reduce the number of alternatives that need to be considered, but it may also introduce new alternatives or options that require evaluation. Various permits will be required. These permits, sensitive issues and seasonal restrictions (migratory bird nesting) may generate delays and/or added project costs.

These risks can be managed through the use of experienced NEPA consultants familiar with applicable NEPA process management strategies, including the use of upfront commitments to avoid, minimize and mitigate effects with the design that are subject to review under NEPA.

2.9 Alternative Comparison

Comparison of the Alternatives requires the development and use of evaluation criteria based on the project's purpose and need statements and the City of Fort Collins' "Triple Bottom Line" considerations. The purpose and need for the Proposed Action are described in Section 2.2. The Triple Bottom Line considerations involve sustainability principles and the need to balance social, economic and environmental impacts and outcomes.

A screening process typically involves different levels of comparison. Two levels of comparison are recommended for this project.

1. Feasibility-Level Criteria: Broad considerations and fatal-flaws
2. Concept-Level Criteria: Key considerations for comparative analysis

The following criteria provide a framework for future evaluation of the alternatives. At this stage, the criteria are presented as a set of primary qualitative and quantitative questions.

Feasibility-Level Criteria: Broad Considerations and Fatal-Flaws

The following Yes/No questions establish whether an alternative should be considered fatally flawed by not meeting fundamental project requirements. If an alternative subjected to these questions generates a yes answer to all of these questions, it should move forward for evaluation under the Concept-Level Criteria.

1. Does the alternative fully address motor vehicle, bicycle and pedestrian safety concerns?
2. Does the alternative meet applicable safety requirements for railroad operations?
3. Does the alternative provide adequate safety for residences in close proximity to adjacent roadways and the railroad?
4. Does the alternative address future capacity needs for an extended period (interim to 2035)?
5. Does the alternative address future community and local area accessibility and mobility needs?
6. Does the alternative adequately address existing neighborhood accessibility problems caused by traffic queues?
7. Does the alternative cause significant unavoidable environmental effects?
 - Require residential displacement that would substantially alter the character of existing neighborhoods?

- Adversely impact cultural resources (historic buildings or historic districts)?
- Adversely impact community facilities and/or neighborhood cohesion?
- Other?

Concept-Level Criteria: Key Considerations for Comparative Analysis

The following **Good/Fair/Poor** questions allow for a qualitative assessment of the relative merits of an alternative such that especially good alternatives are advanced and especially poor alternatives are eliminated from further, more detailed evaluation.

1. How well does the alternative address:
 - Motor vehicle and railroad conflicts?
 - Bicycle routes and cyclists needs for safe travel through the intersection?
 - Pedestrian routes and their need for safe travel through the intersection?
 - Railroad travel speeds?
 - Motor vehicle Level of Service in 2035?
 - Community mobility?
 - Neighborhood access?

2. How effectively are environmental effects of the alternatives avoided or minimized:
 - Private Property Acquisition for Public Right of Way?
 - Land Use Compatibility?
 - Environmental Justice?
 - Existing Pedestrian and Bicycle Paths and Lanes?
 - Parks and Recreation Areas?
 - Noise?
 - Visual Quality/Aesthetics?
 - Water Resources, Flooding and Drainage?
 - Biological Resources and Wetlands?
 - Geology and Soils?
 - Cultural Resources?
 - Hazardous Materials?
 - Public Utilities and Services?
 - Other?

3. How effective is the project:
 - Constructability?
 - Cost?
 - Intersection Performance (Delay) 2035?

The next phase of the project development process will include refining the alternatives and a full evaluation of them using the defined criteria. Table 4 and Table 5 present an initial evaluation of selected evaluation criteria.

Table 4 Feasibility-Level Criteria: Selected Broad Considerations and Fatal-Flaws (Yes/No)

SCREENING QUESTION/ ALTERNATIVE	Railroad Switching Station Relocation	Realignment At-Grade Intersection	Realignment Overpass	Realignment Underpass
Does the alternative fully address motor vehicle, bicycle and pedestrian safety concerns?	No	Yes	Yes	Yes
Does the alternative meet applicable safety requirements for railroad operations?	Yes	Yes	Yes	Yes
Does the alternative provide adequate safety for residences in close proximity to adjacent roadways and the railroad?	Yes	Yes	Yes	Yes
Does the alternative address future capacity needs for an extended period (interim to 2035)?	No	No	Yes	Yes
Does the alternative address future community and local area accessibility and mobility needs?	Yes	Yes	Yes	Yes
Does the alternative adequately address existing neighborhood accessibility problems caused by traffic queues?	No	Yes	Yes	Yes
Does the alternative avoid significant unavoidable environmental effects? <i>Require residential displacement that would substantially alter the character of existing neighborhoods?</i> <i>Adversely impact cultural resources (historic buildings or historic districts)?</i> <i>Adversely impact community facilities and/or neighborhood cohesion?</i> <i>Other?</i>	Yes	Yes	Yes	Yes

The key issues are:

- The switching yard relocation and the at grade alternative do not provide adequate capacity in 2035.
- The switching yard relocation does not address safety or neighborhood access
- The underpass has drainage, high water table, cost, constructability and risk issues relative to the overpass alternative.

Table 5 Concept-Level Criteria: Selected Considerations for Comparative Analysis (Good/Fair/Poor)

SCREENING QUESTION/ ALTERNATIVE	Railroad Switching Station Relocation	Realignment At-Grade Intersection	Realignment Overpass	Realignment Underpass
How well does the alternative address:				
Motor vehicle and railroad conflicts?	Fair	Fair	Good	Good
Bicycle routes and cyclists needs for safe travel through the intersection?	Fair	Fair	Good	Good
Pedestrian routes and their need for safe travel through the intersection?	Fair	Fair	Good	Good
Railroad travel speeds?	Fair	Fair	Good	Good
Motor vehicle Level of Service in 2035?	Poor	Fair	Good	Good
Community mobility?	Fair	Good	Good	Good
Neighborhood access?	Fair	Good	Good	Good
How effectively are environmental effects of the alternatives avoided or minimized:				
Private Property Acquisition for Public Right of Way	Good	Fair	Fair	Fair
Land Use Compatibility	Fair	Good	Fair	Good
Environmental Justice?	Fair	Good	Fair	Good
Existing Pedestrian and Bicycle Paths and Lanes?	Poor	Good	Good	Good
Parks and Recreation Areas?	Good	Good	Good	Good
Noise?	Fair	Fair	Fair	Good
Visual Quality/Aesthetics?	Good	Good	Fair	Good
Water Resources, Flooding, Drainage	Good	Good	Good	Poor
Biological Resources/Wetlands?	Good	Fair	Fair	Fair
Geology and Soils?	Good	Good	Good	Fair
Cultural Resources?	Fair	Good	Fair	Good
Hazardous Materials?	Good	Good	Good	Fair
Public Utilities and Services?	Good	Good	Good	Good
How effective is the project:				
Cost?	TBD	Good	Fair	Poor
Constructability and Risks?	Fair	Poor	Good	Poor
Intersection Performance (Delay) 2035?	Poor	Fair	Good	Good

Key Alternatives Benefits, Risks and Decision Drivers

The Realigned At-Grade Alternative:

- Will likely face higher PUC and Railroad approval risks as compared to the grade separated alternatives due to Lemay Avenue's designation as an Arterial roadway.
- Can manage train crossing delays to a comparable level as the grade separated options; however, to achieve this, delays must get down to a three-minute train crossing. The only way to achieve this is to relocate of the BNSF Yard, at a significant cost to the City of Fort Collins, nearly doubling the cost of constructing the At-Grade Alternative improvements.

The Realigned/Overpass and Realigned/Underpass Alternatives:

- Fully removes the conflicts and delays associated with the train crossing. Both the PUC and BNSF would find these alternatives safer and a low risk once completed
- Improves mobility for all travel modes by providing efficient access from northeast Fort Collins to Downtowns, other commercial districts, employment centers, and community resources while also removing a known constraint to future bus transit in the region.
- Improves local street and pedestrian conditions near the access points to the two nearby neighborhoods by relocating two major arterials and devolving the existing roads to local streets.
- The underpass alternative has a high ground water table due to the close proximity to Dry Creek; resulting in complex construction. Additionally, constructing the new BNSF bridge will be challenging while keeping the tracks operational (there is no viable shoe-fly option). These conditions result in high risk and expensive costs for construction, but do not create approval risks.
- The overpass option can be constructed over the existing tracks with limited impacts to BNSF operations using conventional construction techniques. These conditions result in low risk yet moderate costs for construct; however the bridge would be nearly 30 feet in the air and would require walls in some locations creating visual impacts for the adjacent neighborhood.

3. PROJECT DEVELOPMENT PROCESS AND SCHEDULE

3.1 Project Development Process

The City of Fort Collins project development process typically involves the following steps:

- Infrastructure Needs Assessment
 - Existing Conditions
 - Streetscape Requirements
 - Bicycle and Transit Mobility Needs
 - Traffic
 - Safety
 - Traffic Operations
 - Parking
- Public Input
- Development and Evaluation of Alternatives (Environmental Analysis, Compliance & Permitting)
- Selection of Preferred Alternative
- Preliminary Design: Evaluation of Design Options and Phasing/Prioritization, 30% Complete Plans
- Recommended Implementation Strategy
- Final Design/Construction

This Project Development Report is associated with the Infrastructure Needs Assessment step.

3.2 Preliminary Design Process

The Preliminary Design process involves refinement of conceptual designs, evaluation of alternatives and design options, and the development of initial phasing and prioritization plans. The preliminary design process is completed with delivery of 30% Complete Plans. The evaluation of alternatives frequently involves environmental clearance, compliance and documentation steps, including some environment permitting steps.

Some environmental permits and follow-up compliance occurs during the Final Design process. When federal facilities, resources, and/or decisions are required for project implementation, the National Environmental Policy Act (NEPA) applies. The Federal Highway Administration (FHWA) administers NEPA with support from the Colorado Department of Transportation (CDOT) and local governments. The applicable NEPA, environmental clearance and permit processes are described in Section 3.3. Details about the NEPA process are available in CDOT's NEPA Manual:

<http://www.coloradodot.info/programs/environmental/nepa-program/nepa-manual>

3.3 Environmental Process

NEPA Requirements and Documentation

As a result of the interagency partnerships forged during the project planning process and context-sensitive planning and design efforts, the City anticipates the applicable environmental compliance processes for the alternative will be straight forward. If the project obtains federal funding, the City

anticipates that a NEPA Categorical Exclusion (CatEx) process will be appropriate.

A CatEx may be possible after defining efforts to avoid, minimize and mitigate potential effects with design solutions and applicant commitments and coordinating with FHWA, CDOT Region 4 environmental staff and regulatory agencies.

A CatEx requires that the proposed action:

- Does not induce significant impacts to planned growth or land use for the area
- Does not require the relocation of significant numbers of people
- Does not have a significant impact on any natural, cultural, recreational, historic or other resource
- Does not involve significant air, noise or water quality impacts
- Does not have significant impacts on travel patterns
- Does not otherwise, either individually or cumulatively, have any significant environmental impacts, and are, therefore, excluded from the requirement to prepare an EA or EIS

In addition to these requirements, the proposed action should be well understood and not present substantial public controversy.

Based on the CDOT NEPA Manual, the overpass and underpass options may qualify for a "Non-Programmatic" Cat Ex as follows:

D3. Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings

A Non-Programmatic CatEx requires CDOT and FHWA approval. CDOT and FHWA have agreed on certain actions that are typically appropriate for this approach. These project types must meet the criteria for a CatEx in the Council on Environmental Quality (CEQ) regulations (CEQ, 40 CFR § 1508.4) and the evaluation criteria specified in Part A of the regulation (FHWA, 23 CFR § 771.117).

Prior to initiating a Non-Programmatic CatEx project, the *FHWA Non-Programmatic Categorical Exclusion Environmental Review Summary* form must be reviewed. If any of the following questions, which are included on page one of the form, can be answered in the positive, further investigation will be required in order to determine if a Non-Programmatic CatEx is appropriate for the project:

- If an Individual Clean Water Act Section 404 permit is required, does the USACE object to a CatEx class of environmental document?
- If the project adversely affects endangered or threatened species and/or their critical habitat, does the US Department of Interior Fish and Wildlife Service (USFWS) object to the CatEx class of environmental document?

Neither of these issues presents a process constraint for the overpass or underpass alternatives. However, the three items in bold text below should be evaluated carefully. The other issues should not present a process constraint.

- If a DOT letter of consent is required for easement, does the federal land management agency have unresolved issues with the environmental analysis?
- Is there any substantial controversy on environmental grounds?
- In addition, if any of the following questions, which are also included on page one of the *FHWA Non-Programmatic Categorical Exclusion Environmental Review Summary* form, can be answered in the positive and cannot be otherwise resolved by amending the planned action, the project should not be approved as a Non-Programmatic CatEx:
 - Are significant environmental impacts expected?
 - Are there any inconsistencies with the federal, state, or local law, requirement or administration determination relating to the environmental aspects of the action expected?
 - Does this project add additional capacity, as defined by NFRMPO as regionally significant?
 - Is there substantial construction on a new alignment?
 - Will the project significantly change traffic patterns?
 - Are there significant impacts expected to properties protected by Section 4(f) of the US DOT Act or Section 106 of the National Historic Preservation Act?
 - Is the right-of-way required significant because of its: size, location, use, or relationship to remaining property and abutting properties?
 - Is there a substantial noise increase (greater than 10 A-weighted decibels [dBA]) or noise levels greater than allowable by CDOT guidelines and mitigation is not reasonable and feasible?

The additional capacity and its regional significance can be addressed by citing the purpose of the improvements as one means of facilitating planned growth. The nature of the construction on the new alignment and the purpose of the project to improve traffic safety and circulation patterns can be explained the same way and can be supported by safety improvements from the railroad grade separation.

The CatEx process would be documented through the use of CDOT Standard Form 128 and supplement technical documentation (See Appendix D). CDOT Form 128 requires two signatures, one for the top portion and one for the bottom portion. Top portion (Parts A and B) involve investigating whether there are environmental areas of concern with regard to the project. The Top portion (Parts A and B) are usually needed for right-of-way plan authorization and obligation of funds for right-of-way acquisition unless these areas do not have important environmental impacts and if the right-of-way is being purchased with non-federal funds. The Bottom portion (Parts C, D, and E) are used for applicable environmental permits and for ensuring environmental commitments are in the final plans and specifications. The Bottom portion (Parts C, D, and E) needed for project advertisement and obligation of funds. The entire step by step process is described in Chapter 5 of CDOT's NEPA Manual.

Environmental Clearances and Permits

The following list identifies anticipated environmental clearances and permits for the overpass and underpass alternatives.

Top Half of 128

Air Quality Hot Spot Analysis
Noise
Hazardous Materials

Not Required
Required
Required (Initial Site Assessment)

<i>Threatened and Endangered Species Clearance Letter</i>	<i>Required</i>
<i>Wetland Delineation</i>	<i>Required</i>
<i>Paleontology</i>	<i>Required</i>
<i>Archaeology*</i>	<i>Required</i>
<i>History* **</i>	<i>Required</i>
<i>Historic Bridge</i>	<i>Required</i>
<i>4(f)</i>	<i>Not Required</i>
<i>6(f)</i>	<i>Not Required</i>

**Consultation and Coordination Literature Review)*

*** De minimis documentation*

Bottom Half of 128

<i>404 Permit</i>	<i>TBD</i>
<i>401 Certification</i>	<i>TBD</i>
<i>402 Certification</i>	<i>TBD</i>
<i>Construction Dewatering Certification</i>	<i>Required</i>
<i>Floodplains Development Permit</i>	<i>TBD</i>
<i>SB 40</i>	<i>Not Required</i>
<i>Wetland Finding</i>	<i>TBD</i>
<i>APCD Bridge/Structure Demo Permit</i>	<i>Not Required</i>
<i>Hazardous Materials (Phase II)</i>	<i>TBD</i>
<i>6(f) Completion</i>	<i>Not Required</i>

Completion of the environmental process allows the City to proceed with Right of Way acquisition and the Final Design and Construction process.

3.4 Final Design and Construction Process

The Final Design process typically involves development of the final plans, specifications and cost estimates, along with the necessary final permitting, right-of-way clearances, and utility relocation coordination. Project construction can be accomplished through a variety of delivery methods. The methods that could be considered include Design-Bid-Build, Design-Build, and CM/GC (Construction Manager at Risk). The construction delivery method for this project has not been identified. Each delivery method has trade-off advantages and disadvantages depending on the project characteristics. Determining the construction delivery method that is best suited for a project involves a number of project characteristics, including but not limited to:

- Construction Schedule
- Funding Availability Schedule
- Project Complexity
- Risks

4. Project Funding Strategies

This section discusses combinations of potential local and federal funding sources that could be pursued to advance the Vine/Lemay project and the potential issues associated with each strategy. Two project alternatives are considered in the funding approach analysis: 1) at-grade improvements and 2) a grade separated overpass. The analysis begins by summarizing the costs, funding gaps and timing issues, and potential sources to fill these gaps. Lastly, the pros and cons associated with the funding approach strategies are highlighted.

Given the extent of the Vine/Lemay project costs, it will require a combination of sources to advance the project. As a result, a political champion for the project will be needed in order to garner support at the local and regional levels to get the project funded. The strength of the support largely will be based on the project's potential benefits and impacts to the City as well as the larger region, which will need to be considered and shared with the public and potential funding partners. The competition for public funds (both local and federal) is significant, because there are many important projects out there but increasingly limited funds. As a result, the benefits and impacts associated with the Vine/Lemay project need to be effectively communicated with all potential funding partners, including City residents, which often requires a political champion.

Details of the various local funding sources and federal funding partners can be found in Appendix F.

4.1 Potential Funding Approach

This section summarizes potential funding approaches for the at-grade and overpass alternatives. These alternatives represent the range of potential funding that would be needed to construct improvements to the Vine/Lemay intersection, and as a result the range of potential funding sources that would be needed.

The focus in this section is on identifying potential sources and combinations of sources that could be used to fund the project. The issues associated with receiving funds in time to meet construction expenditures is a concern for the project; however, once the funding sources have been secured, these funds could be leveraged through TIFIA, Grant Anticipation Revenue Vehicles (GARVEEs), or other bonding mechanisms to get the funds needed up front for construction. These financing vehicles would allow the project to be constructed in a timely manner, while repaying the loan and/or bond issue over a specified time with future, committed revenue streams. As a result, the primary focus is on identifying sources of these revenue streams for the project.

Most Applicable Project Funding Sources

The local and federal sources of funds discussed in this chapter that are most applicable and realistic for the Vine/Lemay project include the following:

- Local: City Sales Tax (BOB or KFCG) - If the 0.25% BOB sales tax is extended, it would provide a source of potential funds for the Vine/Lemay project. In addition, approximately \$3.4 million in KFCG sales tax revenues (17%) are potentially available for other street and transportation needs. As a result, the funds would not be able to pay for the entirety of the project, but may be a viable source for the local match to federal funds.

- Federal: Highway Safety Improvement Program (HSIP) or Surface Transportation Program (STP) – These programs are part of the Federal-aid highway program annual appropriations. HSIP funding is specifically available for grade crossing improvements and removal of high-risk at-grade crossings under the Railway-Highway Crossing Program. In addition, the program funds projects that remove hazardous road locations or any project on a public road that is consistent with the State Strategic Highway Safety Plan (SHSP). STP provides flexible funding that may be used by states and localities for projects to preserve and improve the conditions and performance of any federal-aid highway, bridge, or tunnel project on any public road, pedestrian and bicycle infrastructure, and transit capital projects. The use of these funds will require gaining support at the regional MPO level to get the project included in the region's Transportation Improvement Program (TIP), as well the State Transportation Improvement Program (STIP). CDOT and the MPO are responsible for allocating federal-aid highway program funds to projects through the local TIP and state TIP. As a result, having a political champion to sell the benefits of the project will be particularly helpful in trying to secure these funds. *Due to the competition for these funds, it is estimated that the at-grade alternative would have trouble securing these funds, while the overpass alternative likely would not receive more than \$5 million; however, through continued project development and communication of project benefits, the overpass alternative could warrant the consideration of a larger funding share.*
- Federal: TIGER Discretionary Grant Program - The TIGER program is highly applicable to roads and rail, since its eligible categories include, among others, freight rail projects and any federally-eligible highway or bridge project. TIGER has been continued for six rounds to date and through the annual appropriations process. Future rounds depend either on year-to-year appropriations or the program's permanent authorization in the successor to MAP-21; the President's budget recommendation includes \$1.25 billion annually for four more years. The safety and economic development components of the overpass alternative fit nicely with TIGER's evaluation criteria due to the grade separation and removal of rail-highway conflicts; however, the competition for these funds is quite extensive. With additional local, committed funding sources, partnerships, and engineering, it would be worthwhile for the City to consider applying during future TIGER rounds. In urban areas, the minimum TIGER award is \$10 million dollars, and the most competitive TIGER projects tend to keep the local match at 50%; therefore, *the overpass alternative potentially could receive between \$10 million and \$14 million with a successful TIGER application.* It is not recommended that the at-grade alternative pursue TIGER funds, because it does not remove or reduce to opportunity for rail-highway conflicts as it is currently defined.
- Federal: EDA Public Works and Economic Adjustment Assistance Programs – These EDA Programs provide assistance to distressed communities to help them attract or expand businesses and generate long-term jobs. The project would be eligible under the programs because it proposes to improve an access road to a future commercial business center, thereby supporting employment growth in the region. *Recent average grant awards have been approximately \$1 million.* As a result, the grant program could provide supplemental revenues for the project but would not be able to provide a significant contribution. Applications are competitively evaluated in quarterly funding cycles (deadlines on March 14, June 13, and October 17) and decisions generally are made within 20 business days of the funding cycle deadline. An applicant may submit an application at any time to receive feedback on the application's competitive and technical merits. If this is an opportunity that the City would like to consider further, it is recommended that they take advantage of this ability to receive

feedback on their application to determine its likelihood of success as well as if there are additional components that would better position the project for an award.

In addition to these funding programs, the TIFIA program could be a mechanism for the overpass alternative to leverage future revenue streams from the City sales tax and/or future federal-aid highway program funds (HSIP or STIP). A TIFIA project must be reasonably anticipated to cost at least \$25 million for rural projects, and the definition of rural for TIFIA purposes includes cities of less than 250,000 population.¹ Therefore, only the overpass project would be eligible for the TIFIA program. While TIFIA's normal interest rate for secured loans can be as low as the rate on 30-year US Treasuries, 10% of TIFIA's budget authority is set aside for rural projects at reduced interest rates to as low as one-half the Treasury rate—offering the City a competitive opportunity to leverage any secured funding streams.

The potential mix of funding strategies for each alternative is discussed below.

At-Grade Alternative

The cost of the realignment of the at-grade Vine/Lemay intersection is estimated to be \$13.6 million from planning through construction. It is assumed that the time required to complete the project (including planning and engineering) would be approximately four to five years, with most of the costs associated with construction occurring during the last two years.

There are some vacant parcels north of Vine Drive on Lemay Avenue that, upon development, would be required to build portions of Lemay Avenue in conjunction with the Street Oversizing Program. The City has estimated the portion of the alternative's costs that could be funded by the City's Street Oversizing Program as well as the Developer's Local Street Portion (associated with access to several currently undeveloped sites), which are summarized in Table 6. While the Local Street Portion is directly tied to the development of the adjacent parcels, if the capital project came before the development of these parcels the money would have to come from another source. However, future receipt of the Local Street Portion could be used to pay back these funds over time.

Table 6 Estimated Local Developer and Street Oversizing Funds for the At-Grade Alternative (\$M)

Total Project Cost	\$ 24.60
Developer Local Street Portion	\$ 1.45
City Street Oversizing Portion	\$ 5.16
Amount Remaining to be Funded	\$ 17.99

Source: AECOM Cost Estimate (May 2014) and City Estimates of Street Portions

After the application of these local street portion/oversizing funds, nearly \$18 million in funding would still be required for the at-grade alternative. The funding approach analysis estimates that the remaining costs would have to be funded primarily through the City's sales tax, which could be feasible based on the current assumption that the City would only be able to provide \$5 million to \$10 million in sales tax revenues towards the project.

The options for funding the at-grade alternative with sources other than City funds are rather limited due to the current definition of this alternative. In order for the alternative to be competitive for other

¹ Fort Collins population is 144,000 according to Census 2010. See: <http://quickfacts.census.gov/qfd/states/08/0827425.html>

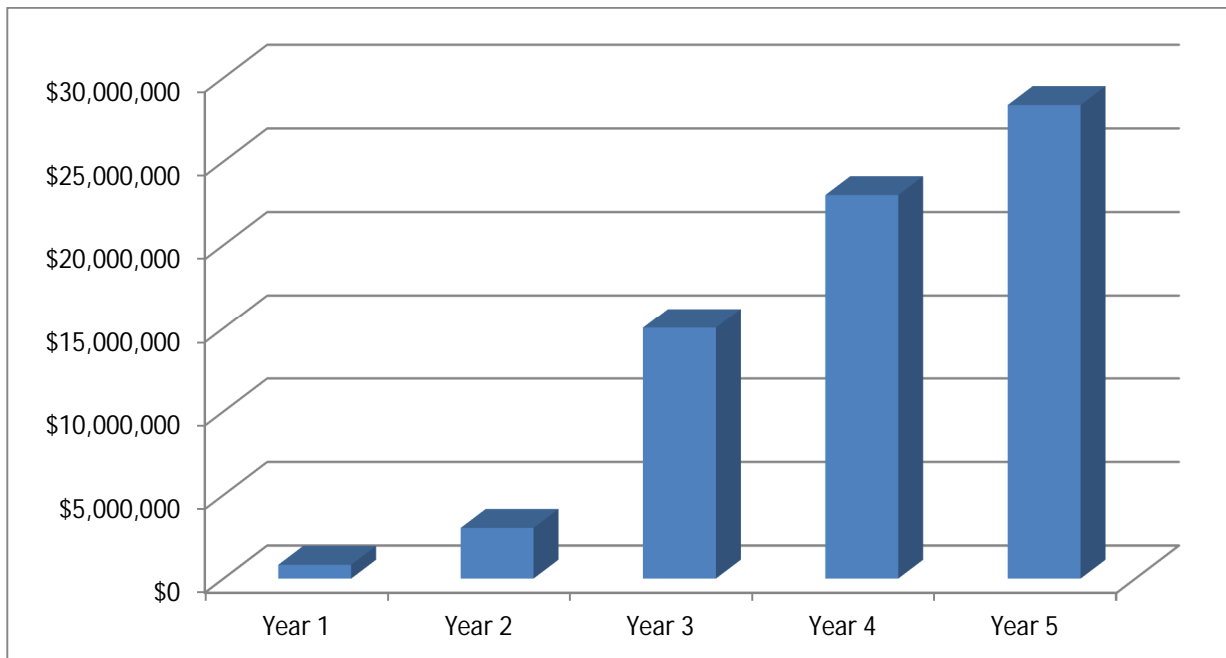
federal-aid highway funds or federal discretionary grants like HSIP, STP, and TIGER, train blockages must be reduced to create travel time savings, safety improvements, and emissions reduction benefits in the region. As this alternative is currently defined, it excludes relocating the rail yard that is the source of these blockages and provides limited opportunity to reduce the likelihood of rail-highway conflicts. As a result, the potential benefits associated with improved traffic flow during non-blocked time periods are not likely to be significant enough to gain the support of larger funding programs such as HSIP, STP, or TIGER.

In order to improve the competitiveness of the at-grade project, it is recommended that the City consider making the alternative a joint project with BNSF to move the rail yard and look for opportunities to improve BNSF operations with the implementation of the combined project. This could potentially reduce the number of trains blocking the grade crossing and improve the movement of freight in the region—generating significant community benefits in travel time savings, vehicle operating cost savings, safety improvements, and emissions reductions and making the project more attractive to the local voters, regional economic developers, and funding partners.

Overpass Alternative

The cost of the Lemay Avenue overpass alternative is estimated to be \$26.6 million from planning through construction. It is assumed that the time required to complete the project (including planning and engineering) would be five years, with most of the costs associated with construction occurring during the last two years, as shown in Figure 11.

Figure 11 Annual Construction Expenditure Flow for the Overpass Alternative



Source: AECOM

There are some vacant parcels north of Vine Drive on Lemay Avenue that, upon development, would be required to build portions of Lemay Avenue in conjunction with the Street Oversizing Program. The City has estimated the portion of the alternative's costs that could be funded by the City's Street Oversizing

Program as well as the Developer’s Local Street Portion (associated with access to several currently undeveloped sites), which are summarized in Table 7. While the Local Street Portion is directly tied to the development of the adjacent parcels, if the capital project came before the development of these parcels, the money would have to come from another source. However, future receipt of the Local Street Portion could be used to pay back these funds over time.

Table 7 Estimated Local Developer and Street Oversizing Funds for the Overpass Alternative (\$M)

Total Project Cost	\$ 27.60
Developer Local Street Portion	\$ 1.29
City Street Oversizing Portion	\$ 4.46
Amount Remaining to be Funded	\$ 21.85

Source: AECOM Cost Estimate (May 2014) and City Estimates of Street Portions

After the application of these local street portion/oversizing funds, an additional \$20.85 million in funding would still be required for the overpass alternative. The funding approach analysis estimates that the remaining costs potentially could be funded through a combination of the City’s sales tax, Federal HSIP/STP, TIGER, and EDA funds, due to the types of benefits and economic development impacts that could accrue to the City and larger region by removing the rail-vehicle conflicts through grade separation. While there is an opportunity for a greater variety of funding source for the overpass alternative, it is not recommended that the City pursue a wide variety of sources initially due to the complications associated with timing and getting commitments from multiple funding partners. If one funding partner backs out, the margin is tight enough that it is possible the City and remaining funding partners may not be able to make up the difference. As a result, it is recommended that the City pursue one additional federal funding source to fund a larger share of the project costs, such as TIGER.

A sample funding approach strategy is summarized in Table 8, assuming a TIGER award equal to 50% of the project’s costs. Given what is known about the proposed overpass alternative, the project has the potential to be competitive in the TIGER evaluation process due to its potential for significant travel time savings, vehicle operating cost savings, safety improvements, and emissions reductions associated with the grade separation, as well as the potential of the project to facilitate economic development and provide “ladders of opportunity” for regional job growth. If the TIGER award would be closer to \$10 million, the approach would still be viable given low contributions assumed from other federal funds.

Table 8 Potential TIGER Funding Strategy for the Remaining Overpass Alternative Costs (\$M)

Federal: TIGER	\$ 13.80
Local: City Sales Tax Cash (new BOB/KCFG)	\$ 7.00
Federal: HSIP/STP/EDA	\$ 1.05
Total	\$ 21.85

Even though it appears that the project would be competitive in the TIGER evaluation process, the success rate of applications is low due to the volume of competitive projects and the limited funding available. A political champion could help improve the project’s standing in the evaluation process, but there is never a guarantee of success. If the project is not successful in winning a TIGER grant, or if it is not available to the project, then another similarly large federal funding program will have to be aggressively pursued—potentially a combination of HSIP and STP funds. *If the City can contribute between \$5 to \$10 million towards the project from BOB/KCFG sales tax, then at least \$1185 to \$16.85*

million in other funds would still need to be secured. This is not a small amount; however, if the project is marketed correctly and the benefits fully explored and communicated, it is not impossible.

4.2 Pros and Cons Associated with the Funding Approach Strategies

The funding approaches considered for both alternatives highlight the major concern for the Vine/Lemay project: a large funding source is not readily or currently available to the City. The best source of local funds is the local option sales tax, which will need to be extended with a new voter referendum. Even with the passage of a new BOB sales tax, it is not likely to provide more than \$5-\$10 million towards the project, which means that between \$3 million and \$12 million in additional funds would still be needed to construct the project alternatives. These local funds would need to be secured before additional funding partners could be pursued to demonstrate local commitment to the project.

At-Grade Alternative

The at-grade alternative funding approach is relatively straightforward, as it would likely have to be funded entirely with City funds. The simplicity of the approach adds to the ease of getting it constructed due to limited project partners and requirements; however, there is also the greatest financial risk associated with this approach as it would be difficult for the City to fund it entirely from sales tax revenues. Any cost overruns or revenue shortfalls would need to be funded by the City.

This project also has greater timing issues in terms of the funds being available when construction costs occur. With the City as the primary source of funding (particularly as the Developer Local Street Portion is likely to occur at the end or after construction), the project may have to wait until all the sales tax revenues are available, which could take several years. If the City would like to advance the construction of the project before all funds are in hand, they will have to issue bonds backed by the BOB sales tax because Federal financing programs such as TIFIA would not be available to the at-grade alternative due to the lower cost and lower competitiveness of the project benefits. The City has not issued bonds backed by the BOB sales tax to date, but it has been discussed internally with City staff. The City would have to weigh the implications of leveraging future revenues for current projects, which may impact the City's ability to fund future projects.

Overpass Alternative

The overpass alternative has a higher cost, however, it also offers a more varied funding approach due to the opportunity to competitively pursue non-City funding, including Federal HSIP/STP, TIGER, and EDA funds. The alternative more closely aligns with regional goals for reduced rail-highway conflicts and improved access to economic development sites, which are attractive to regional and federal funding partners. The removal of rail-highway conflicts with the overpass alternative would result in significant travel time savings, vehicle operating cost savings, safety improvements, and emissions reductions associated with grade separation. While additional funding sources are available to the overpass alternative, it would still need to rely heavily on City sales tax revenues to construct the project due to the scale of the investment and the local match requirements associated with federal funds.

While there are several federal funding sources that the overpass alternative could pursue, it is recommended that the City begin by trying to attract funding from one larger federal program such as HSIP, STP, or TIGER. Initially pursuing one larger program would allow the City to minimize the difficulties associated with managing and getting firm commitments from numerous funding partners.

As the project moves through the planning and development process, additional beneficiaries and funding partners could be identified and pursued to fill in any remaining gaps in project funding. A political champion for the project also could help identify these additional beneficiaries and garner the necessary support at the local, regional, and federal levels. The benefits and impacts associated with the Vine/Lemay project will need to be effectively communicated with all potential funding partners, including City residents, and a strong political champion can help deliver this essential message.

The issues associated with receiving funds in time to meet construction expenditures is a concern for the alternative; however, it is not as great of a concern as the at-grade alternative. Once the funding sources have been secured, these local and federal funds could be leveraged through TIFIA, Grant Anticipation Revenue Vehicles (GARVEEs), or other bonding mechanisms to get the funds needed up front for construction. These financing vehicles would allow the project to be constructed in a timely manner, while repaying the low interest loan and/or bond issue over a specified time with future, committed revenue streams.

5. PROJECT DEVELOPMENT NEXT STEPS

The next step in the process is to begin a more thorough data collection, preliminary design and funding evaluations that will address the following key questions:

- Is the added long-term cost/benefit of realignment and grade separation necessary to address anticipated 2035 congestion and delay, or could a realignment and at-grade intersection be sufficient as a near-term solution that could then transition at a later date? Will a new at-grade crossing be allowed by the PUC and BNSF, and would BNSF consider switching yard relocation?
- Is the added cost of an underpass to address visual and noise impact issues appropriate when a lower cost overpass would result in similar traffic performance without the higher cost and risk concerns, such as drainage issues, caused by the underpass?
- Does the currently unknown cost of relocation of the railroad switching yard and its ability to reduce railroad crossing/switching-related system congestion justify the expenditure?
- Can the existing at-grade crossing of existing E. Vine and existing Lemay remain in a limited configuration for pedestrians/cyclists.

APPENDIX

- A. Construction Cost Estimates
- B. Lemay/Vine 2035 Traffic Analysis Memorandum
- C. Analysis of Vehicle Delay from Train Operations
- D. Cultural Resources in the Study Area
- E. CDOT Standard Form 128
- F. Project Funding and Finance Analysis

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APPENDIX A CONSTRUCTION COST OPINIONS

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**Comparative Cost Opinion
Realigning At-Grade Intersection Alternative**

Modified by AECOM					
9/2/2014 16:24	UNITS	QUANTITY	UNIT COST	TOTAL COST	
Removals General	SY	100,195	\$4	\$400,780	
<i>Railroad Apertenunces - Temporary</i>	EA	8	\$20,000	\$160,000	
<i>Track Panels - Temporary</i>	LF	120	\$1,000	\$120,000	
<i>Track Signalling - Temporary</i>	LS	1	\$150,000	\$150,000	
Intersection Signals	EA	1	\$240,000	\$240,000	
ABC (Class VI)	CY	10,060	\$25	\$251,500	
<i>ABC (Class VI) - Temporary</i>	CY	4,535	\$25	\$113,375	
Pavement	Ton	22,305	\$75	\$1,672,875	
<i>Pavement - Temporary</i>	Ton	10,055	\$75	\$754,125	
Sidewalk	SF	65,550	\$6	\$393,300	
<i>Sidewalk - Temporary</i>	SF	22,845	\$6	\$137,070	
Curb and Gutter	LF	19,985	\$20	\$399,700	
<i>Curb and Gutter - Temporary</i>	LF	10,044	\$20	\$200,880	
Culvert	LF	160	\$2,500	\$400,000	
Project Construction Bid Items				\$5,393,605	
	% RANGE		% USED	COST	
Project Construction Bid Items	Project Dependent		N/A	\$5,393,605	(A)
Contingencies (BNSF Complications)	(15% - 30%) of (A)		20.00%	\$1,078,721	(B)
ITS/Lighting	(6-10%) of (A+B) Default = 6%		6.00%	\$388,339.56	(C)
Drainage/Utilities	(3-10%) of (A+B) Default = 6%		10.00%	\$647,232.60	(D)
Signing and Striping	(1-5%) of (A+B) Default = 5%		4.00%	\$258,893.04	(E)
Construction Signing & Traffic Control	5 to 25% of (A+B) Default = 20%		15.00%	\$970,849	(F)
Mobilization	(4 to 10%) of (A+B+C+D+E+F) Default = 7%		7.00%	\$611,635	(G)
Total of Construction Bid Items	(A+B+C+D+E+F+G)			\$9,349,275	(H)
Force Account - Utilities	(1 to 2%) of (H) Default = 2%		2.00%	\$186,985	(I)
Force Account - Misc.	(10 to 15%) of (H) Default = 12%		10.00%	\$934,927	(J)
Subtotal of Construction Cost	(H+I+J)			\$10,471,188	(K)
Right of Way Acquisition and Easements	% of (H)		2.50%	\$261,780	(L)
Planning and NEPA	% of (H)		2.50%	\$261,780	(M)
Preliminary and Final Engineering	% of (H)		10.00%	\$1,047,119	(N)
Construction Management/Inspection	% of (H)		15.00%	\$1,570,678	(O)
Local Street Construction	LF	3600	\$300	\$1,080,000	(P)
Relocate Freight Switching Yard	LS			\$10,000,000	(Q)
Total Project Cost	(K+L+M+N+O+P+Q)			\$24,692,544	(R)

**Comparative Cost Opinion
Realingment Overpass Intersection Alternative**

Modified by AECOM					
9/2/2014 16:24	UNITS	QUANTITY	UNIT COST	TOTAL COST	
Removals General	SY	84,470	\$4	\$337,880	
Intersection Signals	EA	1	\$240,000	\$240,000	
Embankment	CY	124,636	\$10	\$1,246,360	
ABC (Class VI)	CY	11,360	\$25	\$284,000	
Pavement	Ton	25,190	\$75	\$1,889,250	
Sidewalk	SF	85,065	\$6	\$510,390	
Curb and Gutter	LF	23,025	\$20	\$460,500	
Bridge	SF	25,245	\$175	\$4,417,875	
Culvert	LF	230	\$2,500	\$575,000	
Retaining Walls (DH <= 10-FT)	SF	6,480	\$50	\$324,000	
Retaining Walls (DH >= 10-FT)	SF	10,145	\$100	\$1,014,500	
Project Construction Bid Items				\$11,299,755	
	% RANGE		% USED	COST	
Project Construction Bid Items	Project Dependent		N/A	\$11,299,755	(A)
Contingencies	(15% - 30%) of (A)		20.00%	\$2,259,951	(B)
ITS/Lighting	(6-10%) of (A+B) Default = 6%		3.50%	\$474,590	(C)
Drainage/Utilities (High groundwater complications)	(3-10%)of (A+B) Default = 6%		15.00%	\$2,033,956	(D)
Signing and Striping	(1-5%) of (A+B) Default = 5%		2.33%	\$315,941	(E)
Construction Signing & Traffic Control	5 to 25% of (A+B) Default = 20%		11.50%	\$1,559,366	(F)
Mobilization	(4 to 10%) of (A+B+C+D+E+F) Default = 7%		7.00%	\$1,256,049	(G)
Total of Construction Bid Items	(A+B+C+D+E+F+G)			\$19,199,608	(H)
Force Account - Utilities	(1 to 2%) of (H) Default = 2%		1.25%	\$239,995	(I)
Force Account - Misc.	(10 to 15%) of (H) Default = 12%		6.25%	\$1,199,976	(J)
Subtotal of Construction Cost	(H+I+J)			\$20,639,579	(K)
Right of Way Acquisition and Easements	% of (H)		1.25%	\$257,995	(L)
Planning and NEPA	% of (H)		2.50%	\$515,989	(M)
Preliminary and Final Engineering	% of (H)		10.00%	\$2,063,958	(N)
Construction Management/Inspection	% of (H)		15.00%	\$3,095,937	(O)
Local Street Construction	LF	3600	\$300	\$1,080,000	(P)
Total Project Cost	(K+L+M+N+O+P)			\$27,653,458	(Q)

**Comparative Cost Opinion
Realigning Underpass Intersection Alternative**

Modified by AECOM				
9/2/2014 16:24	UNITS	QUANTITY	UNIT COST	TOTAL COST
Removals General	SY	113,403	\$4	\$453,612
Intersection Signals	EA	1	\$240,000	\$240,000
Excavation	CY	88,025	\$15	\$1,320,375
ABC (Class VI)	CY	11,780	\$25	\$294,500
Pavement	Ton	26,120	\$75	\$1,959,000
Sidewalk	SF	72,635	\$6	\$435,810
Curb and Gutter	LF	24,330	\$20	\$486,600
Bridge	SF	9,240	\$200	\$1,848,000
Retaining Walls (DH <= 10-FT)	SF	6,235	\$150	\$935,250
Retaining Walls (DH >= 10-FT)	SF	34,320	\$250	\$8,580,000
Project Construction Bid Items				\$16,553,147
	% RANGE		% USED	COST
Project Construction Bid Items	Project Dependent		N/A	\$16,553,147
Contingencies (BNSF Complexities)	(15% - 30%) of (A)		30.00%	\$4,965,944
ITS/Lighting	(6-10%) of (A+B) Default = 6%		2.15%	\$462,660
Drainage/Utilities (+Sump pump and Siphon)	(3-10%) of (A+B) Default = 6%		25.00%	\$5,379,773
Signing and Striping	(1-5%) of (A+B) Default = 5%		1.50%	\$322,786
Construction Signing & Traffic Control	5 to 25% of (A+B) Default = 20%		7.00%	\$1,506,336
Mobilization	(4 to 10%) of (A+B+C+D+E+F) Default = 7%		7.00%	\$2,043,345
Total of Construction Bid Items	(A+B+C+D+E+F+G)			\$31,233,992
Force Account - Utilities	(1 to 2%) of (H) Default = 2%		0.80%	\$249,872
Force Account - Misc.	(10 to 15%) of (H) Default = 12%		4.00%	\$1,249,360
Subtotal of Construction Cost	(H+I+J)			\$32,733,224
Right of Way Acquisition and Easements	% of (H)		0.75%	\$245,499
Planning and NEPA	% of (H)		1.55%	\$507,365
Preliminary and Final Engineering	% of (H)		10.00%	\$3,273,322
Construction Management/Inspection	% of (H)		12.00%	\$3,927,987
Local Street Construction	LF	3600	\$300	\$1,080,000
Total Project Cost	(K+L+M+N+O+P)			\$41,767,397

(A)
(B)
(C)
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APPENDIX B LEMAY/VINE 2035 TRAFFIC ANALYSIS MEMORANDUM

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Planning, Development & Transportation

Traffic Operations
626 Linden
P.O. Box 580
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MEMORANDUM

TO: Dean Klingner Capital Projects Manger
FROM: Joe Olson, City Traffic Engineer *JPO*
DATE: March 4, 2014
RE: Lemay/Vine 2035 Analysis

Traffic Operations has reviewed the intersection of Lemay/Vine at its planned location north and east of its current location using year 2035 traffic volumes. With two through lanes in each direction plus right and left turn lanes on each approach the intersection is expected to function adequately.

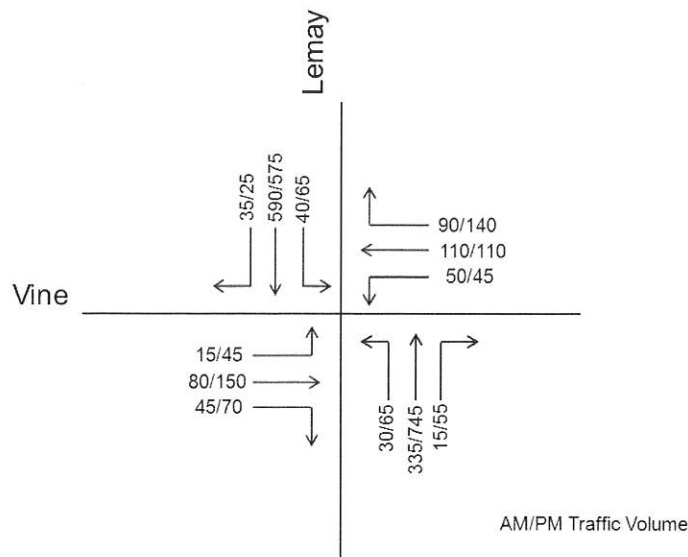
Existing Conditions

Lemay Avenue is a 2-lane arterial street running north-south that currently carries about 15,300 vehicles per day in the vicinity of Vine Drive. Vine Drive is a 2-lane arterial running east-west that currently carries about 5,600 vehicles per day in the vicinity of Lemay Avenue.

The signalized intersection of Lemay/Vine is constrained by Burlington Northern Santa Fe railroad tracks that run parallel to Vine on the south side of the street. Vine drive has one through lane and a left turn bay in each direction at the intersection. Lemay has one lane in each direction and no turn lanes -- primarily due to the proximity of the railroad tracks and adjacent properties that preclude the widening necessary to develop turn lanes.

The City Traffic Operations Department routinely collects peak hour turning movement counts at signalized intersections throughout the City. Figure 1 below shows the a.m. and p.m. peak hour volumes at the intersection.

Figure 1 – Lemay/Vine Existing Traffic Volumes



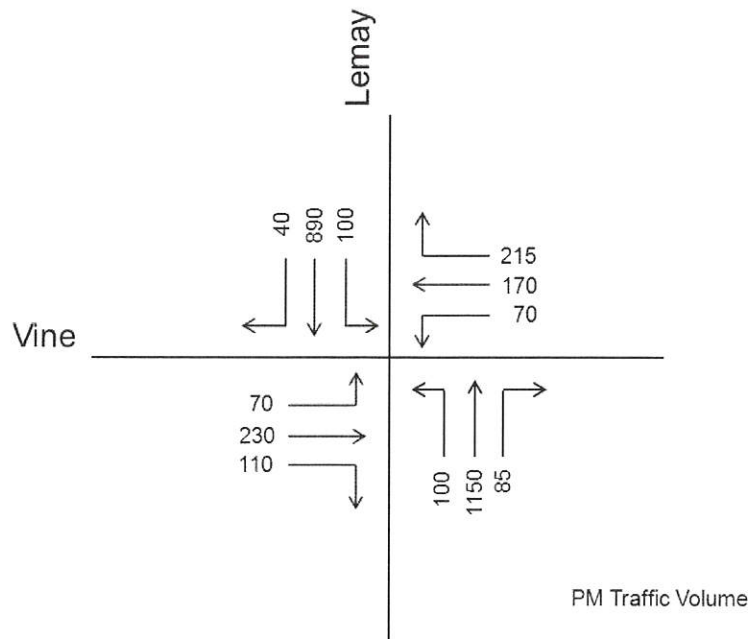
Inspection of the traffic volumes reveals that the p.m. peak hour represents “worst case” traffic volumes. Therefore, for this analysis, conditions during the p.m. peak were analyzed. Overall intersection Level of Service during the p.m. peak is currently B. A detailed operational analysis worksheet for existing conditions is included as an attachment to this memo.

Future Conditions

The Master Street Plan shows the intersection of Lemay and Vine moving north and east from its current location as a result of realignments of both Lemay (to the east) and Vine (to the north). Moving the intersection away from the Burlington Northern Santa Fe railroad track will allow for widening of each road to comply with the Master Street Plan that shows each as a future 4-lane arterial. It will also allow for the addition of left and right turn lanes at the intersection.

Staff investigated using the City’s travel demand model to forecast future volumes at the intersection. The model shows traffic volume growth on Vine of about 2% per year, however, the model does not show any significant growth in traffic volumes on Lemay. It is not clear why that is the case but it does not seem reasonable to assume no growth in the future with the expected build-out of the northeast part of the City. Historically, traffic volumes on arterial streets have increased at 1.4%/year. For the purposes of this analysis, a 2% per year growth rate was applied at the intersection to match the model forecast for Vine and to apply a conservatively high estimate on Lemay. Figure 2 shows 2035 volumes used for analysis.

Figure 2 – 2035 Projected PM Peak Traffic Volumes



Results and Conclusion

The table below summarizes the expected operations at Lemay/Vine for both a “No Build” option and for the planned relocation and widening of the intersection. As shown, without the widening, the intersection is expected to operate at Level of Service (LOS) F. However, if built as the intersection of two four lane arterials as planned the intersection will operate overall at an acceptable LOS B. Detailed analysis worksheets for each alternative are included as attachments.

Table 1 – 2035 Level of Service at Lemay/Vine

	No Build	Build Option
Northbound	F	A
Southbound	F	A
Eastbound	F	D
Westbound	D	D
Overall	F	B

HCM Signalized Intersection Capacity Analysis
127: Vine & Lemay

PM Existing
3/4/2014



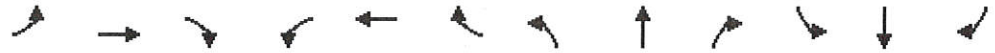
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	45	150	70	45	110	140	65	745	55	65	575	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	8	12	13	12	12	14	12
Total Lost time (s)	4.5	4.5		4.5	4.5			4.0			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.98			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.95		1.00	0.92			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1770	1956		1770	1879			1898			1965	
Flt Permitted	0.26	1.00		0.33	1.00			0.90			0.85	
Satd. Flow (perm)	488	1956		621	1879			1723			1672	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	158	74	47	116	147	68	784	58	68	605	26
RTOR Reduction (vph)	0	15	0	0	39	0	0	2	0	0	1	0
Lane Group Flow (vph)	47	217	0	47	224	0	0	908	0	0	698	0
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			2			4			3			5
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	20.9	20.9		20.9	20.9			88.6			89.1	
Effective Green, g (s)	21.9	21.9		21.9	21.9			89.6			90.1	
Actuated g/C Ratio	0.18	0.18		0.18	0.18			0.75			0.75	
Clearance Time (s)	5.5	5.5		5.5	5.5			5.0			4.5	
Vehicle Extension (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)	89	357		113	343			1287			1255	
v/s Ratio Prot		0.11			c0.12							
v/s Ratio Perm	0.10			0.08				c0.53			0.42	
v/c Ratio	0.53	0.61		0.42	0.65			0.71			0.56	
Uniform Delay, d1	44.4	45.1		43.4	45.5			8.1			6.4	
Progression Factor	1.00	1.00		1.00	1.00			0.64			1.00	
Incremental Delay, d2	13.5	5.2		6.9	7.0			2.6			1.8	
Delay (s)	57.8	50.3		50.2	52.5			7.8			8.2	
Level of Service	E	D		D	D			A			A	
Approach Delay (s)		51.6			52.2			7.8			8.2	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
127: Vine & Lemay

PM 2035 No Build
3/4/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕			↕	
Volume (vph)	70	230	110	70	170	215	100	1150	85	100	890	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	8	12	13	12	12	14	12
Total Lost time (s)		4.5		4.5	4.5			4.0			3.5	
Lane Util. Factor		1.00		1.00	1.00			1.00			1.00	
Frbp, ped/bikes		0.99		1.00	0.99			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.96		1.00	0.92			0.99			0.99	
Flt Protected		0.99		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1973		1770	1883			1899			1965	
Flt Permitted		0.50		0.34	1.00			0.81			0.70	
Satd. Flow (perm)		993		629	1883			1551			1386	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	242	116	74	179	226	105	1211	89	105	937	42
RTOR Reduction (vph)	0	11	0	0	38	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	421	0	74	367	0	0	1403	0	0	1083	0
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			2			4			3			5
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)		36.5		36.5	36.5			73.0			73.5	
Effective Green, g (s)		37.5		37.5	37.5			74.0			74.5	
Actuated g/C Ratio		0.31		0.31	0.31			0.62			0.62	
Clearance Time (s)		5.5		5.5	5.5			5.0			4.5	
Vehicle Extension (s)		6.0		6.0	6.0			6.0			6.0	
Lane Grp Cap (vph)		310		197	588			956			860	
v/s Ratio Prot					0.19							
v/s Ratio Perm		c0.42		0.12				c0.90			0.78	
v/c Ratio		1.36		0.38	0.62			1.47			1.26	
Uniform Delay, d1		41.2		32.1	35.2			23.0			22.8	
Progression Factor		1.00		1.00	1.00			1.03			1.00	
Incremental Delay, d2		180.8		3.4	3.5			215.7			126.0	
Delay (s)		222.0		35.5	38.7			239.4			148.8	
Level of Service		F		D	D			F			F	
Approach Delay (s)		222.0			38.2			239.4			148.8	
Approach LOS		F			D			F			F	

Intersection Summary

HCM Average Control Delay	180.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	143.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
127: Vine & Lemay

PM 2035 Intersection Buildout
3/4/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	70	230	110	70	170	215	100	1150	85	100	890	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	16	8	12	13	12	12	14	12
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0	3.5	3.5	3.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3897	1545	1770	3897	1349	1768	3657	1563	1770	3775	1555
Flt Permitted	0.61	1.00	1.00	0.52	1.00	1.00	0.28	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	1140	3897	1545	968	3897	1349	518	3657	1563	372	3775	1555
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	242	116	74	179	226	105	1211	89	105	937	42
RTOR Reduction (vph)	0	0	95	0	0	83	0	0	23	0	0	10
Lane Group Flow (vph)	74	242	21	74	179	143	105	1211	66	105	937	32
Confl. Peds. (#/hr)							2					2
Confl. Bikes (#/hr)			2			4			3			5
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm		Perm	Perm		Perm	Perm		Perm	Perm		Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	20.9	20.9	20.9	20.9	20.9	20.9	88.6	88.6	88.6	89.1	89.1	89.1
Effective Green, g (s)	21.9	21.9	21.9	21.9	21.9	21.9	89.6	89.6	89.6	90.1	90.1	90.1
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	4.5	4.5	4.5
Vehicle Extension (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	208	711	282	177	711	246	387	2731	1167	279	2834	1168
v/s Ratio Prot		0.06			0.05			c0.33			0.25	
v/s Ratio Perm	0.06		0.01	0.08		c0.11	0.20		0.04	0.28		0.02
v/c Ratio	0.36	0.34	0.08	0.42	0.25	0.58	0.27	0.44	0.06	0.38	0.33	0.03
Uniform Delay, d1	42.9	42.8	40.7	43.4	42.0	44.9	4.8	5.8	4.0	5.2	5.0	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.44	0.44	0.03	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.8	0.3	4.5	0.5	6.6	1.6	0.5	0.1	3.8	0.3	0.0
Delay (s)	45.8	43.6	41.0	47.9	42.6	51.5	3.7	3.0	0.2	9.0	5.3	3.8
Level of Service	D	D	D	D	D	D	A	A	A	A	A	A
Approach Delay (s)		43.3			47.6			2.9			5.6	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX C ANALYSIS OF VEHICLE DELAY FROM TRAIN OPERATIONS

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APPENDIX D CULTURAL RESOURCES IN THE STUDY AREA

The Andersonville/San Cristo and Alta Vista neighborhoods, along with the Buckingham neighborhood located outside of the study area, share a common heritage. Each is a product of the sugar beet industry, a Colorado economic empire that emerged after the turn of the twentieth century. These neighborhoods supplied laborers to the sprawling and towering sugar beet factory complex they encircled and to the beet fields that surrounded it.

In 2004, a Survey Report entitled "The Sugar Factory Neighborhoods: Buckingham, Andersonville, Alta Vista" was prepared. The survey inventoried 175 properties in the three Sugar Factory Neighborhoods. The following discussion summarizes the findings of the Survey Report.

Buckingham contained the most properties – 88. Andersonville had the smallest number at 38, and Alta Vista had 49. Only a few properties in Buckingham, Andersonville, and Alta Vista retain high enough levels of historical significance and physical integrity to be considered individually eligible for the National Register of Historic Places or the Colorado State Register of Historic Properties. Slightly more were found individually eligible as Fort Collins Landmarks. Moreover, just under half (48%) could be considered contributing to a potential district, but the percentage varies from neighborhood to neighborhood. The 1983 survey had determined that Buckingham and Andersonville lacked enough integrity to be considered National Register districts. However, this current survey determined that more than half of the properties in Buckingham and Andersonville contribute to their respective, potential districts. In 1983 the Alta Vista neighborhood was officially determined to be eligible for the National Register. But urban renewal programs in the mid and late 1980s significantly undermined the integrity of Alta Vista, leaving it with only 38.7% of properties contributing to a district.

Andersonville, when considered as a whole, retains sufficient integrity to be considered a National Register and a Fort Collins Landmark district; slightly more than half (52.6%) of the properties contribute to a district.

The Alta Vista neighborhood contains the northernmost collection of historic adobe structures in North America. This culturally and historically important neighborhood is one of the original groups of residences associated with the former sugar beet industry in Fort Collins, which was prosperous from the turn of the century through World War II. The neighborhood is eligible for designation as Fort Collins Landmark, and is eligible for listing in the National Register of Historic Places and the Colorado State Register of Historic Places.

Alta Vista, when considered as a whole, does not retain sufficient integrity to be considered a National Register and a Fort Collins Landmark district; only 38.7% of developed parcels contribute to a potential district. However, the original core of Great Western-constructed adobe houses remains relatively intact. Given the historical and architectural significance of this group of adobe houses, this report recommends the creation of a National Register and Fort Collins Landmark district of the 35 properties roughly bound by Main Street to the north, Martinez Street on the east, Lindenmeier Road to the west, and East Vine Drive to the south. This area contains 18 contributing properties (51.4%), including one, 741 Lindenmeier Road (5LR10635), found to be eligible for individual listing on the National Register.

Andersonville (District 5LR989)

Properties surveyed: 38

Contributing to a potential district: 20 (52.6%)

Eligible for listing on the National Register: 1

Eligible for listing as a Fort Collins Landmark: 1 (including NR property)

Not eligible / not contributing: 18 (47.4%)

Alta Vista (District 5LR990)

Properties surveyed: 49

Contributing to a potential district: 19 (38.7%)

Eligible for listing on the National Register: 1

Eligible for listing as a Fort Collins Landmark: 10 (including NR property)

Not eligible / not contributing: 30 (61.2%)

The following resources were identified as eligible for listing on the National Register of Historic Places:

5LR10638 741 Lindenmeier Road 741 Lindenmeier Road

5LR10122 425 Tenth Street, Romero House

The Lindenmeier Road property is significant under Criterion A for its association with the early development of the Alta Vista area and the sugar beet industry. Moreover, it is important for its relationship to German-Russian and Hispanics laborers, both of whom resided at this address. The property is also significant under Criterion C because it is an intact sugar beet workers' shanty with an accompanying and intact German-Russian outbuilding complex. Despite numerous additions and remodeling, the house still embodies the spirit of working-class vernacular architecture, growing organically with need and financial ability. Properties such as this one were commonplace in the Buckingham, Andersonville, and Alta Vista neighborhoods prior to massive urban renewal projects in the late 1970s and '80s. This is the only remaining property of this level of physical integrity in the Sugar Factory Neighborhoods. It should be considered individually eligible for the National Register of Historic Places, the Colorado Register of Historic Properties, and as a Fort Collins Landmark.



The Romero House provides the setting for the Museo del las Tres Colonias. This resource is located next to Romero Park.



Museo de las Tres Colonias

There are four defined purposes of the Museo:

1. The adobe historic house museum helps interpret family life in the tres colonias between 1927 and 1940.
2. The Museo offers education programs about contributions made by the Hispanic community.
3. Volunteers explain to visitors the significance of the sugar-beet industry to the Fort Collins community.
4. The Museo is the focal point for continuous celebration of Hispanic culture, and promotes acceptance, understanding, and social justice for all.

The Romero House property is significant under Criterion A for its association with the development of the Andersonville Neighborhoods, especially early Hispanic settlement. It is also significant under Criterion B for its association with John Romero, an early leader of the Hispanic Community in Fort Collins and an advocate of migrant workers' rights. The house is significant under Criterion C because it is the only adobe residence in Andersonville and one of the few remaining in the Fort Collins. It is particularly important because of the vivid archival records that explain its construction. This property is already listed as a City of Fort Collins Landmark and should be considered individually eligible for the National Register of Historic Places, and the Colorado Register of Historic Places.

Additional baseline information is available from the Fort Collins Landmark Preservation Committee and at the following websites:

<http://www.fcgov.com/historicpreservation/pdf/sugar-factory-doc.pdf>

<http://www.fcgov.com/historicpreservation/pdf/top20list.pdf>

<http://museodelastrescolonias.org/Museo/Museo.html>

APPENDIX E CDOT STANDARD FORM 128

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APPENDIX F PROJECT FUNDING AND FINANCE ANALYSIS

The following discussion identifies potential funding and financing strategies to complete the Vine/Lemay project in the short-term and that might be expanded as a program to address the larger City-wide Railroad grade crossing projects. The identified strategies do not provide a specific financial plan, but offer a framework for developing a future financial plan as the project continues to develop.

F.1 Local Funding and Financing Options

This section documents local funding and financing programs and identifies those most likely to be applicable to the Vine/Lemay project and any associated development resulting from the project. Each source is briefly discussed, the revenue levels and timing are outlined, and the programs are evaluated with respect to their ability to support the Vine/Lemay project.

The discussion first addresses traditional City transportation infrastructure funding sources and their current capacity to support the Vine/Lemay project, including:

- Street Oversizing Program
- City Sales Tax Revenues

In addition to the sources listed above, local financing opportunities for the Vine/Lemay project are considered, including:

- Tax Increment Financing (TIF)
- Leveraging Future Local Sales Tax Revenues
- Colorado State Infrastructure Bank (CO SIB)

The section concludes with a matrix that describes the most likely local funding or financing sources.

a. Overview of Traditional Local Sources

Traditionally, the City of Fort Collins has used development impact fees and the City's dedicated 0.25% sales tax revenues to fund infrastructure investments. This section provides an overview of these sources, their current capacity, and any issues associated with their use to fund a portion of the Vine/Lemay project.

Street Oversizing Program

The City's Street Oversizing Program helps ensure that funds for street widening projects are collected and distributed where and when they are needed. As part of the program, the City requires that developers pay impact fees for street costs associated with the traffic growth the development is expected to generate. The fees are collected Citywide and placed in the Street Oversizing Fund to be used Citywide and are not dedicated to specific projects.

The Street Oversizing Program only pays for the "oversized" portion of the street. Developers are required to dedicate right-of-way and construct their local access portion of arterials and collectors. Using broad percentages, the Street Oversizing Fund pays for 60% of arterial roadway costs, and

developers are required to construct and finance the remaining 40% (20% from either side) of the arterial abutting their property.

Fee Schedule and Revenues

The impact fee schedule is established each year and assessed based on the type of development and its size. For residential development, the fee is a fixed fee per dwelling unit by type of residence (single family, duplex, apartment, etc.) For commercial development, the fee is a per square foot cost based on the type of commercial use (shopping center, movie theater, day care, office, etc.) Since the City considers the benefits of street oversizing to be communitywide, the Transportation Impact Fee structure is uniform for all areas of the City. Residential building permits pay the established fee schedule; while 90% of the commercial and industrial developments use the independent fee calculation process based on the Traffic Impact Study submitted by the development.

Annual impact fee revenue depends on the number and size of projects that are issued building permits each year. For FY 2012, approximately \$3.2 million in transportation impact fee revenues were collected, and the average annual revenues for the last five years have been approximately \$2 million as shown in Table F1.

Table F1 Historic Transportation Impact Fee Revenues (FY 2008-FY2012)

	Annual Transportation Impact Fee Revenues
FY 2012	\$3,294,063
FY 2011	\$1,441,107
FY 2010	\$2,121,165
FY 2009	\$641,491
FY 2008	\$2,910,656
Average	\$2,081,696

Source: City of Fort Collins Comprehensive Annual Financial Reports, FY 2008 through FY 2012

Timing

The impact fee is paid by developers when they receive a City of Fort Collins building permit. For transportation projects involving Street Oversizing funding, the development property contributes funds and right-of-way dedication prior to construction, so funding is received up front. City projects are required to have all funding in place prior to bidding, so funding for the developers local access portion must be received. Developers typically complete their infrastructure and are reimbursed prior to the issuance of building permits. This is a cash flow management issue for the fund. Reimbursement agreements would exaggerate the cash flow issue that the Street Oversizing Fund normally has when reimbursing for improvements prior to issuing building permits by significantly delaying revenues.

Potential Issues for Vine/Lemay

There are state and local legislative limits on how impact fees may be used. Impact fees may not be used to correct existing deficiencies. The majority of the cost for the Vine/Lemay project would not be related to development impacts. Rather, the improvements are due to the following:

- Shortage in capacity and substandard infrastructure that existed prior to 1980; and
- Congestion due to current residents' increased VMT and regional (county) growth.

Additionally, the Street Oversizing Fee calculation did not include the Vine/Lemay grade separation. As a result, the use of the Street Oversizing Fund is not a viable option to pay for a portion of the Vine/Lemay project. However, there are some vacant parcels north of Vine Drive on Lemay Avenue that, upon development, would be required to build portions of Lemay Avenue in conjunction with the Street Oversizing Program.

City Sales Tax

The current local sales tax rate for the City of Fort Collins is 3.85%. Voters have dedicated portions of the local sales tax to funds that could be used to help pay for the Vine/Lemay capital project, including the 0.25% Building on Basics (BOB) program and the 0.85% Keep Fort Collins Great (KFCG) program.

The 0.25% BOB tax was passed by voters in 2005, to fund projects that improve the quality of life in Fort Collins, including projects such as the Museum/Discovery Science Center, Lincoln Center Renovation, Harmony Road, Intersection Improvements/Signals, North College Avenue, and Timberline Road. The BOB tax revenues have provided more than \$36 million toward total project costs of \$65 million, and provide operations and maintenance funds for the projects for seven years. The BOB tax expires on December 31, 2015, and an extension is proposed on the April 15, 2015 ballot.

The 0.85% KFCG tax was passed by voters in November 2010, and provides funding for projects through December 31, 2020. The KFCG tax revenues are allocated towards projects as follows:

- 33% for street maintenance and repair;
- 17% for other street and transportation needs;
- 17% for police services;
- 11% for fire protection and other emergency services;
- 11% for parks maintenance and recreation services; and
- 11% for community priorities other than those listed above, as determined by the city council.

Revenues

Sales tax revenue receipts depend on the volume of retail sales and the general economic condition of the City. For FY 2012, approximately \$6.6 million in BOB revenues were collected, while \$21.7 million in KFCG revenues were collected. The average annual BOB revenues for the last five years have been approximately \$5.8 million as shown in Table F2 below; however, the KFCG revenues have only been in place since FY 2011. The City Finance Department anticipates that future sales tax revenues will increase by approximately 2% per year.

Table F2 Historic Sales Tax Revenues for BOB and KFCG (FY 2008 through FY 2012)

	Annual 0.25% BOB Revenues (expires 12/31/2015)	Annual 0.85% KFCG Revenues (expires 12/31/2021)
FY 2012	\$6,638,228	\$21,752,164
FY 2011	\$5,816,587	\$19,818,263
FY 2010	\$5,611,156	na
FY 2009	\$5,191,310	na
FY 2008	\$5,567,128	na
Average	\$5,764,882	\$20,785,214

Source: City of Fort Collins Comprehensive Annual Financial Reports, FY 2008 through FY 2012

Timing

The selection of the BOB and KFCG projects generally starts about 18 months before the election. The selection process includes internal staff research and analysis along with input from the City Council. The City Council makes the final decision on which projects make the list. The larger projects generally are identified on the ballot; however, there are some cases where more flexible programs, such as arterial intersection improvements, pedestrian plan funds, bike plan funds, etc., are included. Similarly, the language of the KFCG tax allocates 17% to other street and transportation needs. To be included in these more flexible programs, the Vine/Lemay project would need to be involved in the two-year budget cycle, which will be underway in April for FYs 2015-2016.

Potential Issues for Vine/Lemay

The current BOB tax is 100% committed to current projects. There is a possibility that funds allocated in 2015 for “arterial intersection improvements” could be used for Vine/Lemay; however, these funds have been informally committed to other projects. In addition, the funds available for these arterial improvements are significantly less than the costs associated with the Vine/Lemay project. If the BOB tax is extended, it would provide a source of potential funds for the Vine/Lemay project. Similarly, the KFCG tax allocates some funding for capital transportation projects. The funding from this tax is approximately \$20 million per year; however, it is dedicated to certain types of investments, including 17% for other street and transportation needs (or approximately \$3.4 million per year). As a result, the funds would not be able to pay for the entirety of the project, but may be a viable source for the local match to federal funds.

b. Overview of Additional Local Financing Sources

It is clear that the cost of the Vine/Lemay project is too great for the project to be entirely funded by the City and State in the short-term. As a result, this section will explore potential local financing options available to fund the project, including but not limited to Tax Increment Financing (TIF), Colorado State Infrastructure Bank (CO SIB), and revenue bonds (backed by sales tax revenues).

Tax Increment Financing

The City of Fort Collins has established an Urban Renewal Authority (URA) to identify and revitalize areas of the City and to provide a funding mechanism to encourage redevelopment of these areas. The main funding tool is TIF generated through property taxes. TIF is a funding mechanism that takes advantage of anticipated increases in property values. The tax rates on property owners within the tax increment district are not raised, but rather the existing tax revenues remain dedicated to the jurisdiction and the tax revenues off of the property value increase are dedicated to a fund for the public improvements. TIF is a value capture mechanism in that it charges a fee on the incremental increase in value that results from the transportation investment.

Potential Issues for Vine/Lemay

The Vine/Lemay intersection is currently not within the boundaries of the City's North College URA. Given the current political environment surrounding the URA, as well as the fact that the surrounding lands are predominately agricultural and not redevelopment sites, the City has indicated that it is unlikely the area would be included within the URA boundaries. As a result, TIF is not considered a viable funding source for the Vine/Lemay project.

Leveraging Future Sales Tax Revenues

Bonds backed by future BOB or KFCG revenues could be issued to help advance the construction of the Vine/Lemay project, particularly given that the costs and funding needs are greater than the annual sales tax revenues available. The City has not issued bonds backed by the BOB sales tax to date, but it has been discussed internally with City staff.

Given the size of the annual BOB and KFCG tax revenues and the City's continued and committed capital project needs, it is unlikely that the bonding capacity would add enough revenue to get the project funded at the local level without additional revenues from other local or federal sources. In addition, when considering bonding, it is important for the City to weigh the implications of leveraging future revenues for current projects, which may potentially impact the City's ability to fund future projects.

Another opportunity for leveraging sales tax revenues includes the use of these revenues to repay low-interest loans from programs such as the Colorado State Infrastructure Bank, Transportation Infrastructure Finance and Innovation Act (TIFIA), or the Railroad Rehabilitation and Improvement Financing (RRIF) Program, which are described in greater detail in the sections that follow.

Colorado State Infrastructure Bank

State Infrastructure Banks (SIBs) were created in the 1990s as a mechanism for states to finance transportation projects. SIBs are similar to any other bank in that they can offer funds in the form of loans and credit assistance to public and private project sponsors. The banks are capitalized with federal funds and state matching funds from sources like local tax options and dedicated funds from local, state, and federal budgets. They also provide an opportunity to leverage private funds for public goods and create partnerships. In addition, multi-state banks have been created, typically for projects that cross state borders. The SIB, unlike a standard bank, is not-for-profit, and offers loans at low interest rates. To continue offering capital assistance, the SIBs rely on bonds, principal repayments, and interest and fees to generate additional funds for new projects.²

The Colorado SIB is a program that provides interest bearing loans, for a period of no longer than 10 years, to either private or public sponsors of public transit projects in the State of Colorado. It is a program designed to complement traditional Federal-aid transportation grants, thus providing projects in the State with greater flexibility in financing infrastructure projects.

In order for a project to qualify for a loan from the CO SIB, it must be one of the following:³

- Commission-authorized project: includes, but is not limited to, "planning, environmental impact studies, feasibility studies, engineering, construction, reconstruction, resurfacing, restoring, rehabilitation, or replacement of a public or private transportation facility within the state"
- Right of way acquisition: includes "the acquisition of real or personal property, or interests therein, for a public or private transportation facility within the state"
- Federal-aid project: includes "any highway, transit, aviation, rail, or other transportation project within the state that is eligible for financing or financial assistance under state or federal law"
- Maintenance project: includes any project that involves "maintenance, repair, improvement, or construction of any public or private highway, road, street, parkway, transit, aviation, or rail project within the state"
- Safety project: any project that involves "the acquisition, improvement, or construction of rights-of-way, bridges, tunnels, railroad-highway crossings, drainage structures, signs, guardrails, or protective structures within this state"

For a project to be eligible to receive a loan from the CO SIB, it is imperative that it does not include a facility or other transportation project that is limited to private use only. Additionally, the CO SIB has only set aside \$3.8 million in its highway account, which is the maximum loan amount available for a project.⁴

² Puentes, Robert, and Jennifer Thompson. "Banking on Infrastructure: Enhancing State Revolving Funds." The Brookings Institute, Sept. 2012.

³ Code of Colorado Regulations, 2 CCR 605-1 Rules and Regulation by the Colorado Department of Transportation for the Colorado State Infrastructure Bank, Rule III: Eligibility Requirements for Financial Assistance.

⁴ Based on a conversation with Will Ware at OFMB on March 19, 2014.

Potential Issues for Vine/Lemay

The projected costs of the Vine/Lemay project are significantly greater than the funding currently available in the CO SIB for highway projects. However, the source could help the City leverage existing local dedicated sales tax revenues at a low interest rate as the local match to federal funds. A CO SIB loan would allow the City to help finance the local portion of the project cost without the additional expenses associated with issuing bonds. Given the limited funding currently available in the CO SIB, the application would have to clearly meet all of the committee's criteria and objectives for highway projects.

c. Summary of Local Sources (Matrix)

Given the extent of the Vine/Lemay project costs, the City and State cannot fund the project in the immediate or short-term. However, in order to secure federal funding to advance the project, local funds will be required as match. Table F3 highlights the key components of the most viable local funding sources for the Vine/Lemay project. For each source it provides a description, discusses the eligibility criteria, average or typical funding levels/awards, and timing for application/receipt of funds. Table F3 is not a financial plan, but rather a menu of potential sources that could help provide a local match for the Vine/Lemay project in the short-term.

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Table F3 Summary of Local Funding and Financing Sources

Program	Description of Program	Eligibility Criteria	Evaluation Criteria	Funding Levels and Typical Award	Timeframe/Deadlines	Links to Materials
Dedicated Local Sales Tax Revenues	<p>The 0.25% Building on Basics (BOB) was passed by voters in 2005 and expires December 31, 2015. An extension is proposed for the April 14th ballot.</p> <p>The 0.85% Keep Fort Collins Great (KFCG) was passed by voters in November 2010 and expires December 31, 2020.</p>	<p>The BOB funds projects that improve the quality of life in Fort Collins, including roadway improvements.</p> <p>The KFCG allocates 17% of its revenues towards other street and transportation needs.</p>	<p>The selection of the BOB and KFCG projects generally starts about 18 months before the election. The larger projects generally are identified in the ballot; however, there are some cases where there is flexibility for types of projects such as arterial intersection improvements, pedestrian plan funds, bike plan funds, etc.</p>	<p>For FY 2012, approximately \$6.6 million in BOB revenues were collected, while \$21.7 million in KFCG revenues were collected.</p> <p>The average annual BOB revenues for the last five years have been approximately \$5.8 million</p>	<p>To be included in these more flexible programs, the Vine/Lemay project would need to be involved in the 2-year budget cycle, which will be underway in April for 2015-16.</p>	<p>http://www.fcgov.com/bob/</p> <p>http://www.fcgov.com/kfcg/</p>
Leveraging Future Local Sales Tax Revenues	<p>The City could potential issue bonds backed by future BOB (its potential extension) or KFCG sales taxes to fund projects in excess of annual revenues in the near-term.</p> <p>The City could also dedicate future BOB or KFCG revenues to repay low-interest federal or CO SIB loans.</p>	<p>The City has issued bonds, but has not done so with BOB revenues.</p>	<p>Additional discussions with City Finance Department would need to be held to discuss the potential bonding capacity and implications for future projects.</p>	<p>Would depend on the bond rating of the City, interest rate, and projected future sales tax revenues.</p>	<p>The timeframe for this financing source would be longer given that it would be a new financing structure for the City and has implications on planned use of future local dedicated sales tax revenues.</p>	
Colorado State Infrastructure Bank (CO SIB)	<p>The program provides low-interest bearing loans to public or private sponsors of public transportation projects to help fund transportation projects in Colorado.</p>	<p>Qualified projects include any commission-authorized project, right-of-way acquisition, federal-aid project, maintenance project, or safety project. Commission authorized projects include, but are not limited to, environmental impact studies, feasibility studies, engineering, construction, reconstruction, resurfacing, restoring, rehabilitation, or replacement of a public or private transportation facility within the state. Right-of-way acquisition is defined as "the acquisition of real or personal property, or interests therein, for a public or private transportation facility within the state". Federal projects include any highway, transit, aviation, rail, or other transportation project within the state that is eligible for financing or financial assistance under state or federal law. Maintenance project is one that is focused on maintenance, repair, improvement, or construction of any public or private highway, road, street, parkway, transit, aviation, or rail project within the state. Safety projects involve the acquisition, improvement, or construction of rights-of-way, bridges, tunnels, railroad-highway crossings, drainage structures, signs, guardrails, or protective structures within this state. The project must not include transportation facilities or other projects that will be restricted to private use.</p>	<p>Project shall be evaluated on the following criteria: the type of project, whether it is a public/private partnership, financial need, repayment source, security provisions or sponsor's potential to secure the loan, evaluation of financial ratios and project's current financial condition, the term of financial obligation(no more than 10 years), project viability, project benefits to the transportation system, and whether or not their project is in the TIP/STIP.</p>	<p>The committee determines the size of the loan based on the sponsor's ability to repay it within a specified period of time, regardless of cost of the project. Based on the committee's recommendation, the commission then sets the maximum amount of the loan that the project sponsor can get.</p> <p>Currently, \$3.8 million in CO SIB funding is available for highway projects at a 2.5% interest rate (for 3rd and 4th quarter of FY 2014).</p>	<p>The application process is on a rolling basis. The review process usually takes no longer than 2 months.</p> <p>The loan shall be repaid in no more than 10 years.</p>	<p>http://www.coloradodot.info/business/budget/colorado-state-infrastructure-bank-co-sib.html</p>

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F.2 Federal Funding and Financing Options

This section documents federal funding and financing programs and identifies those most likely to be applicable to the Vine/Lemay project and any associated development resulting from the project. Each program and its enabling legislation are briefly discussed, the funding levels are outlined, and the programs are evaluated with respect to their status and applicability.

The discussion first addresses the federal programs that are most applicable to the Vine/Lemay project. These are divided into United States Department of Transportation (USDOT) programs involving capital grants and those involving loans and other forms of financing assistance as well as a potential program from the Economic Development Administration's (EDA), including:

- USDOT Grant Programs (MAP-21)
 - Railway-Highway Crossings Program
 - Highway Safety Improvement Program (HSIP)
 - Surface Transportation Program (STP)
 - Transportation Investment Generating Economic Recovery (TIGER)
- USDOT Financing Programs (MAP-21)
 - Transportation Infrastructure Finance and Innovation Act (TIFIA)
 - Railroad Rehabilitation & Improvement Financing (RRIF)
- EDA Public works and Economic Adjustment Assistance Programs

Table F4 highlights the key components of the most viable federal funding and financing sources for the Vine/Lemay project. For each source it provides a description, discusses the eligibility criteria, average or typical funding levels/awards, and timing for application/receipt of funds. Table F4 is not a financial plan, but rather a menu of potential federal sources that could be used to help fund a portion of the Vine/Lemay project.

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Table F4 Matrix of Federal Funding and Financing Sources

Program	Federal Agency	Description of Program	Eligibility Criteria	Qualifying Aspects of Project	Funding Levels and Typical Award	Matching Requirements	Timeframe/Deadlines	Links to Materials
Railway-Highway Crossings Program	FHWA/FRA	The program funds safety improvements to reduce the number of fatalities, injuries, and crashes at public grade crossings. (1)	The Section 130 program funds are eligible for projects at all public crossings including roadways, bike trails and pedestrian paths. Fifty percent of a State's apportionment is dedicated for the installation of protective devices at crossings. The remainder of the funds apportionment can be used for any hazard elimination project, including protective devices. In accordance with 23 USC 130(i), the funds can be used as incentive payments for local agencies to close public crossings provided there are matching funds from the railroad. Also, in accordance with 23 USC 130(h), the funds can be used for local agencies to provide matching funds for State-funded projects. Typically Section 130 projects are funded at a 90% federal share, however certain projects under 23 USC 120(c)(1) allow for up to a 100% federal share. (1)	Project removes an at-grade rail crossing.	FY 2013: \$220M (\$3.16M apportioned to Colorado) FY 2014: \$220M (\$3.17M apportioned to Colorado) Each state's funding level is determined based on the following: 50% is based on the formula factors for the Surface Transportation Program (STP) as in effect the day before the enactment of MAP-21, and 50% based on the number of public railway-highway crossings	The Federal share is 90%	Not Described A State may use up to 2% of its railway-highway crossings funds for compilation and analysis of data for the required annual report to the Secretary on the progress that is being made implementing the program. Activities funded under this program are also eligible for funding under the broader HSIP eligibilities. The STP also includes eligibility for funding of railway-highway crossings projects.	http://www.fhwa.dot.gov/map21/factsheets/rhc.cfm http://safety.fhwa.dot.gov/xings/
Highway Safety Improvement Program (HSIP)	FHWA	The program seeks to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. (1)	A highway safety improvement project is any strategy, activity or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem. MAP-21 provides an example list of eligible activities, but HSIP projects are not limited to those on the list. \$220M of the HSIP program is set aside for the Railway-Highway Crossings program. Workforce development, training, and education activities are also an eligible use of HSIP funds. (1)	Project eliminates an at-grade rail crossing, thereby reducing the likelihood of safety incidents.	FY 2013: \$2.39B* (\$29.62M apportioned to Colorado) FY 2014: \$2.41B* (\$29.64M apportioned to Colorado) *Calculated as a sum of the estimated individual State HSIP apportionments	Except as provided in 23 U.S.C 120(c) and 130, the Federal share is 90%	Not Described From the State's HSIP apportionment, the following sums are to be set aside: -Railway-highway crossings -- \$220 million. -A proportionate share of funds for the State's Transportation Alternatives (TA) program. -2% for State Planning and Research (SPR).	http://safety.fhwa.dot.gov/hsip/ http://www.fhwa.dot.gov/map21/factsheets/hsip.cfm
Surface Transportation Program (STP)	FHWA	The program provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. (1)	Construction, reconstruction, rehabilitation, resurfacing, restoration, preservation, or operational improvements for highways, including designated routes of local access roads under 40 USC 14501. Replacement, rehabilitation, preservation, protection, and anti-icing/deicing for bridges and tunnels on any public road, including construction or reconstruction necessary to accommodate other modes. Highway and transit safety infrastructure improvements and programs, installation of safety barriers and nets on bridges, hazard eliminations, mitigation of hazards caused by wildlife, railway-highway grade crossings. Surface transportation planning. Intersections with high accident rates or levels of congestion. Construction and operational improvements for a minor collector in the same corridor and in proximity to an NHS route if the improvement is more cost-effective (as determined by a benefit-cost analysis) than an NHS improvement and will enhance NHS level of service and regional traffic flow.	Project proposes the construction of a bridge to grade-separate the rail from the road, thereby improving performance of both modes. The project is in the proximity of two NHS routes (SH 14 and US Route 287).	FY 2013: \$10.0B* (\$137.22M apportioned to Colorado) FY 2014: \$10.1B* (\$137.34M apportioned to Colorado) *Calculated as a sum of the estimated individual State HSIP apportionments	Determined in accordance with 23 USC 120, including a special rate for certain safety projects and a new provision for increased Federal share for projects incorporating Innovative Project Delivery. Exceptions to 23 USC 120 are provided for certain freight projects, workforce development, training, and education activities, and Appalachian development highway system projects.	Not Described 50% of a State's STP apportionment (after TA and SPR set-asides) is to be obligated in the following areas in proportion to their relative shares of the State's population: -Urbanized areas with population greater than 200,000 (this portion is to be divided among those areas based on their relative share of population) -Areas with population greater than 5,000 but no more than 200,000 (projects in these areas are to be identified for funding by the State in consultation with regional planning organizations, if any) -Areas with population of 5,000 or less The remaining 50% may be used in any area of the State.	http://www.fhwa.dot.gov/map21/factsheets/stp.cfm

Program	Federal Agency	Description of Program	Eligibility Criteria	Qualifying Aspects of Project	Funding Levels and Typical Award	Matching Requirements	Timeframe/Deadlines	Links to Materials
Transportation Investment Generating Economic Recovery (TIGER)	USDOT	<p>The program provides grants to surface transportation projects that will have a significant impact on the nation, a metropolitan area, or a region. Projects are awarded on a competitive basis based on the "primary" and "secondary" selection criteria outlined on the program's website.</p> <p>Applicants should be prepared to obligate grant funds by September 30, 2016.</p>	<p>Eligible projects include: highway or bridge projects under Title 23, U.S.C.; public transportation projects under Chapter 53 of Title 49, U.S.C.; freight rail projects; high speed and intercity passenger rail projects; and port infrastructure investments.</p> <p>Applicants must detail the benefits their project would deliver for five long-term outcomes: safety, economic competitiveness, state of good repair, livability and environmental sustainability. DOT also evaluates projects on their expected contributions to economic recovery, as well as their ability to facilitate innovation and new partnerships.</p> <p>Eligible applicants are State, local, and tribal governments including U.S. territories, transit agencies, port authorities, MPOs, and other political subdivisions of State or local governments.</p>	<p>Surface transportation improvements include grade-separating rail and road. Project provides user benefits by improving safety and removing congestion, thereby reducing emissions and travel times for users.</p>	<p>TIGER I: \$1.5B, average award \$29.4M TIGER II: \$600M, average award \$8M FY 2011: \$526.944M, average award \$11.5M FY 2012: \$500M, average award \$10.6M FY 2013: \$473.847M, average award \$9.1M TIGER 2014: \$600M</p> <p>Awards may not be less than \$10M (except in rural areas) and not greater than \$200M.</p>	<p>Projects are more competitive if they demonstrate funding support above a 20% match for urban areas and a 0% match for rural areas.</p>	<p>For TIGER 2014: April 28, 2014</p> <p>The President's budget proposal includes 4 years with \$1.25 billion annually.</p>	<p>http://www.dot.gov/tiger</p> <p>http://www.dot.gov/sites/dot.gov/files/docs/TIGER%202014%20NOFA_FINAL.pdf</p>
Transportation Infrastructure Finance and Innovation Act (TIFIA)	USDOT	<p>The program provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. TIFIA credit assistance provides improved access to capital markets, flexible repayment terms, and potentially more favorable interest rates than can be found in private capital markets or similar instruments. (1)</p>	<p>To qualify for TIFIA assistance, a project must meet the following criteria:</p> <ul style="list-style-type: none"> - Minimum project cost of \$50M, or minimum \$15M for ITS projects or minimum \$25M for rural projects - Federal funding cannot exceed 33% of eligible costs or the amount of senior debt if the TIFIA loan does not have an investment grade rating - Senior debt obligations must receive an investment grade rating - The project must have a dedicated revenue source to pledge as repayment on the TIFIA loan <p>Types of projects that are eligible for TIFIA assistance include: highway facilities, bridges, transit design and construction, passenger rail design and construction, public freight rail facilities, intermodal facilities, projects providing access to rail facilities, and port projects.</p>	<p>The project can be considered to be of regional significance, as it will provide for the future development of a commercial district and transit service to this important employment center.</p>	<p>Funding for credit subsidy: FY 2013: \$690M FY 2014: \$920M</p> <p>Based on historic subsidy costs, the budget authority could approximately support a lending capacity of FY 2013: \$6.9B FY 2014: \$9.2B</p> <p>Colorado has used the TIFIA program for 3 projects: - Denver Union Station, \$145.6 million TIFIA direct loan, funded by the 0.4 percent FasTracks sales and use tax - Eagle Project (RTD), \$280 million direct loan, funded by lien pledges on sales tax revenues - U.S. 36 Managed Lanes/BRT Project Segments 1 and 2, \$54 million TIFIA direct loan, repaid by toll revenues collected on the managed lanes</p>	<p>TIFIA offers three types of credit assistance: - Secured (Direct) Loans offers flexible repayment terms - Loan guarantees by the Federal government to institutional investors - Lines of credit to supplement project revenues</p>	<p>Estimated timeframe for initial review is 30 days. The estimated timeframe for creditworthiness review is 45-90 days. Estimated timeframe for approval is 90 days after receipt of application. Estimated timeframe for execution of a credit agreement is 60 days from the application approval date.</p>	<p>http://www.fhwa.dot.gov/ipd/tifia/</p> <p>http://www.fta.dot.gov/grants/12861.html</p>

Program	Federal Agency	Description of Program	Eligibility Criteria	Qualifying Aspects of Project	Funding Levels and Typical Award	Matching Requirements	Timeframe/Deadlines	Links to Materials
Railroad Rehabilitation & Improvement Financing (RRIF)	FRA	Under RRIF, loans and loan guarantees were issued to finance development of railroad infrastructure. (1)	<p>Funds could be used to acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings, and shops; refinance outstanding debt incurred for the purposes already listed; and develop or establish new intermodal or railroad facilities.</p> <p>Eligible borrowers included: railroads, states and local governments, government sponsored authorities and corporations, joint ventures that include at least one railroad, and limited option freight shippers who intend to construct a new rail connection. (1)</p>	The infrastructure project proposes to grade-separate the railroad from the road, and the RRIF financing can be used for infrastructure projects.	<p>The program is authorized to provide loans guarantees up to \$35 billion, with up to \$7 billion for projects benefiting railroads other than Class 1.</p> <p>33 loans have been executed at over \$1.7 billion, with loan agreements totaling nearly \$980 million.</p> <p>Colorado received a \$155 million loan in 2010 under the Denver Union Station Project Authority.</p>	<p>Direct loans could finance up to 100% of the project with repayment over 35 years and interest rates equal to the cost of borrowing to the government.</p> <p>The applicant must pay a fee of 1/2 of 1% of the loan amount to FRA for financing and legal reviews.</p>	FRA requires new applicants to attend an information session, submit a draft application, and then meet with FRA who will provide feedback on the draft application. Final applications are submitted, reviewed, and once approved, the loan conditions are negotiated and closed.	http://www.fra.dot.gov/Page/P0128
Public Works and Economic Adjustment Assistance Programs	EDA	Under the programs, grant funds are issued to provide investments that support construction, non-construction, technical assistance, and revolving loan fund projects. Grants and cooperative agreements are designed to leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities. The investments are aimed at supporting economic development, supporting job creation, and attracting private investment in economically distressed areas. (1)	<p>Projects must be located in a Region that meets EDA's distress criteria. Proposed projects should be consistent with an approved regional Comprehensive Economic Development Strategy (CEDS).</p> <p>Eligible organizations include a(n): district organization of a designated Economic Development District, Indian tribes, state/county/city or other political subdivision of a state, institution of higher education, public or private non-profit organizations.</p> <p>Beneficiaries of investments made under Public Works are those communities who satisfy one or more of the economic distress and/or "Special Need" criteria set forth in 13 C.F.R. § 301.3(a) and 13 C.F.R. § 300.3 to revitalize, expand, or upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify their local economies, and generate or retain long-term private sector jobs and capital investments.</p>	Project improves an access-road to a future commercial business center, which will support employment growth in the region.	<p>Public Works: FY 2012: \$111.6M FY 2013: \$112.3M FY 2014: \$40.5M (requested)</p> <p>The average size of a Public Works investment was \$1.4M in FY 2013.</p> <p>Economic Adjustment Assistance: FY 2012: \$50.1M FY 2013: \$50.4M FY 2014: \$66M (requested)</p> <p>The average award for the Economic Adjustment Assistance program was \$820,000 in FY 2013.</p>	<p>Typically 50%, but might vary. Projects may receive an additional amount, up to 30% of the project cost, based on the relative needs of the region, as determined by EDA.</p>	Applications are competitively evaluated in quarterly funding cycles (March 14, June 13, and October 17) and decisions generally are made within 20 business days of the funding cycle deadline. An applicant may submit an application at any time to receive feedback on the application's competitive and technical merits. (1)	<p>https://ofmpub.epa.gov/apex/watershedfunding/f?p=116:2:0::NO::P2_X_PROG_NUM,P2_X_YEAR:51,2014</p> <p>http://www.grants.gov/web/grants/view-opportunity.html?oppld=248297</p> <p>https://www.cfda.gov/index?s=program&mode=form&tab=step1&id=e5254fa16829e6a08d1c79126ec8d</p> <p>http://www.osec.doc.gov/bmi/budget/FY14CJ/EDA_FY_2014_CJ_Final_508_Compliant.pdf</p>
(1) Taken from website								
Notes:								
FY2013 Apportionments from http://www.fhwa.dot.gov/legsregs/directives/notices/n4510765/n4510765_t1.cfm								
FY2014 Apportionments from http://www.fhwa.dot.gov/legsregs/directives/notices/n4510770t1.cfm								

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F.3 Recommended Funding Approach Strategies

This section discusses combinations of potential local and federal funding sources that could be pursued to advance the Vine/Lemay project and the potential issues associated with each strategy. Two project alternatives are considered in the funding approach analysis: 1) at-grade improvements and 2) a grade separated overpass. The analysis begins by summarizing the costs, funding gaps and timing issues, and potential sources to fill these gaps. Lastly, the pros and cons associated with the funding approach strategies are highlighted.

Given the extent of the Vine/Lemay project costs, it will require a combination of sources to advance the project. As a result, a political champion for the project will be needed in order to garner support at the local and regional levels to get the project funded. The strength of the support largely will be based on the project's potential benefits and impacts to the City as well as the larger region, which will need to be considered and shared with the public and potential funding partners. The competition for public funds (both local and federal) is significant, because there are many important projects out there but increasingly limited funds. As a result, the benefits and impacts associated with the Vine/Lemay project need to be effectively communicated with all potential funding partners, including City residents, which often requires a political champion.

a. High Level Range of Potential Funding Approach Strategies

This section summarizes potential funding approaches for the at-grade and overpass alternatives. These alternatives represent the range of potential funding that would be needed to construct improvements to the Vine/Lemay intersection, and as a result the range of potential funding sources that would be needed.

The focus in this section is on identifying potential sources and combinations of sources that could be used to fund the project. The issues associated with receiving funds in time to meet construction expenditures is a concern for the project; however, once the funding sources have been secured, these funds could be leveraged through TIFIA, Grant Anticipation Revenue Vehicles (GARVEEs), or other bonding mechanisms to get the funds needed up front for construction. These financing vehicles would allow the project to be constructed in a timely manner, while repaying the loan and/or bond issue over a specified time with future, committed revenue streams. As a result, the primary focus is on identifying sources of these revenue streams for the project.

Most Applicable Project Funding Sources

The local and federal sources of funds discussed in this chapter that are most applicable and realistic for the Vine/Lemay project include the following:

- Local: City Sales Tax (BOB or KFCG) - If the 0.25% BOB sales tax is extended, it would provide a source of potential funds for the Vine/Lemay project. In addition, approximately \$3.4 million in KFCG sales tax revenues (17%) are potentially available for other street and transportation needs. As a result, the funds would not be able to pay for the entirety of the project, but may be a viable source for the local match to federal funds.
- Federal: Highway Safety Improvement Program (HSIP) or Surface Transportation Program (STP) – These programs are part of the Federal-aid highway program annual appropriations. HSIP funding is specifically available for grade crossing improvements and removal of high-risk

at-grade crossings under the Railway-Highway Crossing Program. In addition, the program funds projects that remove hazardous road locations or any project on a public road that is consistent with the State Strategic Highway Safety Plan (SHSP). STP provides flexible funding that may be used by states and localities for projects to preserve and improve the conditions and performance of any federal-aid highway, bridge, or tunnel project on any public road, pedestrian and bicycle infrastructure, and transit capital projects. The use of these funds will require gaining support at the regional MPO level to get the project included in the region's Transportation Improvement Program (TIP), as well the State Transportation Improvement Program (STIP). CDOT and the MPO are responsible for allocating federal-aid highway program funds to projects through the local TIP and state TIP. As a result, having a political champion to sell the benefits of the project will be particularly helpful in trying to secure these funds. *Due to the competition for these funds, it is estimated that the at-grade alternative would have trouble securing these funds, while the overpass alternative likely would not receive more than \$5 million;* however, through continued project development and communication of project benefits, the overpass alternative could warrant the consideration of a larger funding share.

- Federal: TIGER Discretionary Grant Program - The TIGER program is highly applicable to roads and rail, since its eligible categories include, among others, freight rail projects and any federally-eligible highway or bridge project. TIGER has been continued for six rounds to date and through the annual appropriations process. Future rounds depend either on year-to-year appropriations or the program's permanent authorization in the successor to MAP-21; the President's budget recommendation includes \$1.25 billion annually for four more years. The safety and economic development components of the overpass alternative fit nicely with TIGER's evaluation criteria due to the grade separation and removal of rail-highway conflicts; however, the competition for these funds is quite extensive. With additional local, committed funding sources, partnerships, and engineering, it would be worthwhile for the City to consider applying during future TIGER rounds. In urban areas, the minimum TIGER award is \$10 million dollars, and the most competitive TIGER projects tend to keep the local match at 50%; therefore, *the overpass alternative potentially could receive between \$10 million and \$14 million with a successful TIGER application.* It is not recommended that the at-grade alternative pursue TIGER funds, because it does not remove or reduce to opportunity for rail-highway conflicts as it is currently defined.
- Federal: EDA Public Works and Economic Adjustment Assistance Programs – These EDA Programs provide assistance to distressed communities to help them attract or expand businesses and generate long-term jobs. The project would be eligible under the programs because it proposes to improve an access road to a future commercial business center, thereby supporting employment growth in the region. *Recent average grant awards have been approximately \$1 million.* As a result, the grant program could provide supplemental revenues for the project but would not be able to provide a significant contribution. Applications are competitively evaluated in quarterly funding cycles (deadlines on March 14, June 13, and October 17) and decisions generally are made within 20 business days of the funding cycle deadline. An applicant may submit an application at any time to receive feedback on the application's competitive and technical merits. If this is an opportunity that the City would like to consider further, it is recommended that they take advantage of this ability to receive feedback on their application to determine its likelihood of success as well as if there are additional components that would better position the project for an award.

In addition to these funding programs, the TIFIA program could be a mechanism for the overpass alternative to leverage future revenue streams from the City sales tax and/or future federal-aid highway program funds (HSIP or STIP). A TIFIA project must be reasonably anticipated to cost at least \$25 million for rural projects, and the definition of rural for TIFIA purposes includes cities of less than 250,000 population.⁵ Therefore, only the overpass project would be eligible for the TIFIA program. While TIFIA's normal interest rate for secured loans can be as low as the rate on 30-year US Treasuries, 10% of TIFIA's budget authority is set aside for rural projects at reduced interest rates to as low as one-half the Treasury rate—offering the City a competitive opportunity to leverage any secured funding streams.

The potential mix of funding strategies for each alternative is discussed below.

At-Grade Alternative

The cost of the realignment of the at-grade Vine/Lemay intersection is estimated to be \$13.6 million from planning through construction. It is assumed that the time required to complete the project (including planning and engineering) would be approximately four to five years, with most of the costs associated with construction occurring during the last two years.

There are some vacant parcels north of Vine Drive on Lemay Avenue that, upon development, would be required to build portions of Lemay Avenue in conjunction with the Street Oversizing Program. The City has estimated the portion of the alternative's costs that could be funded by the City's Street Oversizing Program as well as the Developer's Local Street Portion (associated with access to several currently undeveloped sites), which are summarized in Table F5. While the Local Street Portion is directly tied to the development of the adjacent parcels, if the capital project came before the development of these parcels the money would have to come from another source. However, future receipt of the Local Street Portion could be used to pay back these funds over time.

Table F5 Estimated Local Developer and Street Oversizing Funds for the At-Grade Alternative (\$M)

Total Project Cost	\$ 24.60
Developer Local Street Portion	\$ 1.45
City Street Oversizing Portion	\$ 5.16
Amount Remaining to be Funded	\$ 17.99

Source: AECOM Cost Estimate (May 2014) and City Estimates of Street Portions

After the application of these local street portion/oversizing funds, nearly \$18 million in funding would still be required for the at-grade alternative. The funding approach analysis estimates that the remaining costs would have to be funded primarily through the City's sales tax, which could be feasible based on the current assumption that the City would only be able to provide \$5 million to \$10 million in sales tax revenues towards the project.

The options for funding the at-grade alternative with sources other than City funds are rather limited due to the current definition of this alternative. In order for the alternative to be competitive for other federal-aid highway funds or federal discretionary grants like HSIP, STP, and TIGER, train blockages must be reduced to create travel time savings, safety improvements, and emissions reduction benefits in the region. As this alternative is currently defined, it excludes relocating the rail yard that is the source of

⁵ Fort Collins population is 144,000 according to Census 2010. See: <http://quickfacts.census.gov/qfd/states/08/0827425.html>

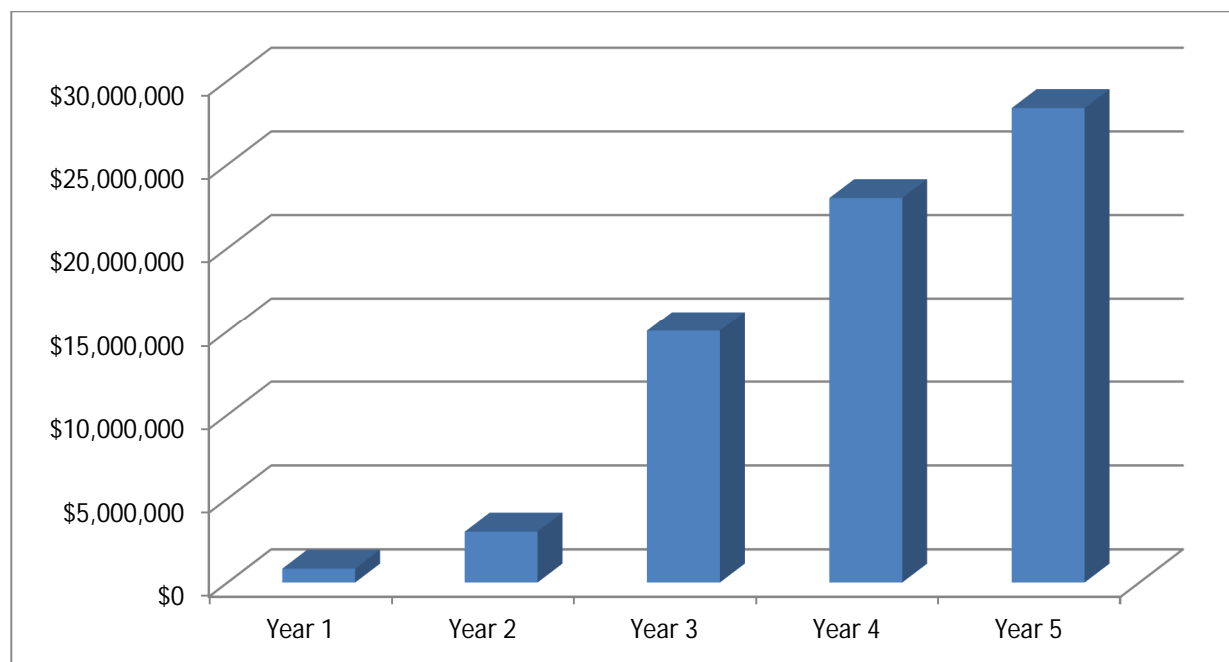
these blockages and provides limited opportunity to reduce the likelihood of rail-highway conflicts. As a result, the potential benefits associated with improved traffic flow during non-blocked time periods are not likely to be significant enough to gain the support of larger funding programs such as HSIP, STP, or TIGER.

In order to improve the competitiveness of the at-grade project, it is recommended that the City consider making the alternative a joint project with BNSF to move the rail yard and look for opportunities to improve BNSF operations with the implementation of the combined project. This could potentially reduce the number of trains blocking the grade crossing and improve the movement of freight in the region—generating significant community benefits in travel time savings, vehicle operating cost savings, safety improvements, and emissions reductions and making the project more attractive to the local voters, regional economic developers, and funding partners.

Overpass Alternative

The cost of the Lemay Avenue overpass alternative is estimated to be \$26.6 million from planning through construction. It is assumed that the time required to complete the project (including planning and engineering) would be five years, with most of the costs associated with construction occurring during the last two years, as shown in Figure F1.

Figure F1 Annual Construction Expenditure Flow for the Overpass Alternative



Source: AECOM

There are some vacant parcels north of Vine Drive on Lemay Avenue that, upon development, would be required to build portions of Lemay Avenue in conjunction with the Street Oversizing Program. The City has estimated the portion of the alternative's costs that could be funded by the City's Street Oversizing Program as well as the Developer's Local Street Portion (associated with access to several currently undeveloped sites), which are summarized in Table F6. While the Local Street Portion is directly tied to the development of the adjacent parcels, if the capital project came before the development of these

parcels, the money would have to come from another source. However, future receipt of the Local Street Portion could be used to pay back these funds over time.

Table F6 Estimated Local Developer and Street Oversizing Funds for the Overpass Alternative (\$M)

Total Project Cost	\$ 27.60
Developer Local Street Portion	\$ 1.29
City Street Oversizing Portion	\$ 4.46
Amount Remaining to be Funded	\$ 21.85

Source: AECOM Cost Estimate (May 2014) and City Estimates of Street Portions

After the application of these local street portion/oversizing funds, an additional \$20.85 million in funding would still be required for the overpass alternative. The funding approach analysis estimates that the remaining costs potentially could be funded through a combination of the City's sales tax, Federal HSIP/STP, TIGER, and EDA funds, due to the types of benefits and economic development impacts that could accrue to the City and larger region by removing the rail-vehicle conflicts through grade separation. While there is an opportunity for a greater variety of funding source for the overpass alternative, it is not recommended that the City pursue a wide variety of sources initially due to the complications associated with timing and getting commitments from multiple funding partners. If one funding partner backs out, the margin is tight enough that it is possible the City and remaining funding partners may not be able to make up the difference. As a result, it is recommended that the City pursue one additional federal funding source to fund a larger share of the project costs, such as TIGER.

A sample funding approach strategy is summarized in Table F7, assuming a TIGER award equal to 50% of the project's costs. Given what is known about the proposed overpass alternative, the project has the potential to be competitive in the TIGER evaluation process due to its potential for significant travel time savings, vehicle operating cost savings, safety improvements, and emissions reductions associated with the grade separation, as well as the potential of the project to facilitate economic development and provide "ladders of opportunity" for regional job growth. If the TIGER award would be closer to \$10 million, the approach would still be viable given low contributions assumed from other federal funds.

Table F7 Potential TIGER Funding Strategy for the Remaining Overpass Alternative Costs (\$M)

Federal: TIGER	\$ 13.80
Local: City Sales Tax Cash (new BOB/KCFG)	\$ 7.00
Federal: HSIP/STP/EDA	\$ 1.05
Total	\$ 21.85

Even though it appears that the project would be competitive in the TIGER evaluation process, the success rate of applications is low due to the volume of competitive projects and the limited funding available. A political champion could help improve the project's standing in the evaluation process, but there is never a guarantee of success. If the project is not successful in winning a TIGER grant, or if it is not available to the project, then another similarly large federal funding program will have to be aggressively pursued—potentially a combination of HSIP and STP funds. *If the City can contribute between \$5 to \$10 million towards the project from BOB/KCFG sales tax, then at least \$1185 to \$16.85 million in other funds would still need to be secured.* This is not a small amount; however, if the project is marketed correctly and the benefits fully explored and communicated, it is not impossible.

b. Pros and Cons Associated with the Funding Approach Strategies

The funding approaches considered for both alternatives highlight the major concern for the Vine/Lemay project: a large funding source is not readily or currently available to the City. The best source of local funds is the local option sales tax, which will need to be extended with a new voter referendum. Even with the passage of a new BOB sales tax, it is not likely to provide more than \$5-\$10 million towards the project, which means that between \$3 million and \$12 million in additional funds would still be needed to construct the project alternatives. These local funds would need to be secured before additional funding partners could be pursued to demonstrate local commitment to the project.

At-Grade Alternative

The at-grade alternative funding approach is relatively straightforward, as it would likely have to be funded entirely with City funds. The simplicity of the approach adds to the ease of getting it constructed due to limited project partners and requirements; however, there is also the greatest financial risk associated with this approach as it would be difficult for the City to fund it entirely from sales tax revenues. Any cost overruns or revenue shortfalls would need to be funded by the City.

This project also has greater timing issues in terms of the funds being available when construction costs occur. With the City as the primary source of funding (particularly as the Developer Local Street Portion is likely to occur at the end or after construction), the project may have to wait until all the sales tax revenues are available, which could take several years. If the City would like to advance the construction of the project before all funds are in hand, they will have to issue bonds backed by the BOB sales tax because Federal financing programs such as TIFIA would not be available to the at-grade alternative due to the lower cost and lower competitiveness of the project benefits. The City has not issued bonds backed by the BOB sales tax to date, but it has been discussed internally with City staff. The City would have to weigh the implications of leveraging future revenues for current projects, which may impact the City's ability to fund future projects.

Overpass Alternative

The overpass alternative has a higher cost, however, it also offers a more varied funding approach due to the opportunity to competitively pursue non-City funding, including Federal HSIP/STP, TIGER, and EDA funds. The alternative more closely aligns with regional goals for reduced rail-highway conflicts and improved access to economic development sites, which are attractive to regional and federal funding partners. The removal of rail-highway conflicts with the overpass alternative would result in significant travel time savings, vehicle operating cost savings, safety improvements, and emissions reductions associated with grade separation. While additional funding sources are available to the overpass alternative, it would still need to rely heavily on City sales tax revenues to construct the project due to the scale of the investment and the local match requirements associated with federal funds.

While there are several federal funding sources that the overpass alternative could pursue, it is recommended that the City begin by trying to attract funding from one larger federal program such as HSIP, STP, or TIGER. Initially pursuing one larger program would allow the City to minimize the difficulties associated with managing and getting firm commitments from numerous funding partners. As the project moves through the planning and development process, additional beneficiaries and funding partners could be identified and pursued to fill in any remaining gaps in project funding. A political champion for the project also could help identify these additional beneficiaries and garner the

necessary support at the local, regional, and federal levels. The benefits and impacts associated with the Vine/Lemay project will need to be effectively communicated with all potential funding partners, including City residents, and a strong political champion can help deliver this essential message.

The issues associated with receiving funds in time to meet construction expenditures is a concern for the alternative; however, it is not as great of a concern as the at-grade alternative. Once the funding sources have been secured, these local and federal funds could be leveraged through TIFIA, Grant Anticipation Revenue Vehicles (GARVEEs), or other bonding mechanisms to get the funds needed up front for construction. These financing vehicles would allow the project to be constructed in a timely manner, while repaying the low interest loan and/or bond issue over a specified time with future, committed revenue streams.