

Lee Road Traffic Study & Corridor Plan

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Steering Committee

- Joyce Braverman, City of Shaker Heights, Planning
- Ann Klavora, City of Shaker Heights, Planning
- Tania Menesse, City of Shaker Heights, Economic Development
- D. Scott Lee, City of Shaker Heights, Police
- Ryan Noles, NOACA
- Mahmoud Al-Lozi, NOACA
- Maribeth Feke, Greater Cleveland Regional Transit Authority
- Valerie Webb, Greater Cleveland Regional Transit Authority
- Melinda Bartizal, Ohio Department of Transportation District 12
- John Motl, Ohio Department of Transportation District 12
- Carmella Williams, Moreland on the Move Neighborhood Association
- Vicki Elder, Moreland on the Move Neighborhood Association
- Willa Walker, Lomond Association
- Dar Caldwell, Shaker LaunchHouse
- Ron Lloyd, RDL Architects
- Margaret Kavorias, RDL Architects
- David Lewis, Lewis Electronics
- Ryan McKenzie, Bicycle Advocate

1 Executive Summary

1.1 Introduction and Background

The purpose of the Lee Road Traffic Study and Corridor Plan is to:

- 1) Improve transportation access and circulation for all modes along Lee Road, and,
- 2) Improve the character of the commercial district south of Chagrin Road through streetscape enhancements.

The desired outcome of the study is to develop a planning framework to guide development in Lee Road commercial district and support bicycle and pedestrian improvements along the corridor. The Plan provides recommendations for traffic and pedestrian improvements along the corridor, intersection transitions, bike lanes and connections to the existing and planned non-motorized network, and streetscape renovations for the section south of Chagrin.

Lee Road currently functions essentially as a four-lane roadway, with two northbound and two southbound travel lanes. The study began with the evaluation of potential conversion of Lee Road to a three-lane roadway, with single northbound and southbound travel lanes and a two-way left turn lane in the center of the roadway. The Lee Road corridor is comprised of three segments as it traverses Shaker Heights, each with unique character and characteristics:

North/Residential: The section from the Cleveland Heights border at North Park to City Hall is predominantly single-family residential.

Middle/Civic and Commercial: This section of Lee Road starts at City Hall and the Police Department/Municipal Court Building and continues south to Chagrin Boulevard.

South/Commercial: The section of Lee Road extends from Chagrin Boulevard south to the city's boundary at Scottsdale Boulevard.



Lee Road north of Shaker Boulevard



Lee Road at Van Aken Boulevard



Lee Road south of Lomond

1.2 Stakeholder & Community Engagement

The Lee Road study was grounded in a three-tiered community engagement program that consisted of the Steering Committee, a focus group of stakeholders for the south section of Lee Road, and the general public.

1.3 Traffic Study & Lane Reconfiguration Plan

The purpose of the traffic study was to evaluate the feasibility of converting Lee Road from the existing configuration which functions generally with four travel lanes to a three lane roadway with a single travel lane in the northbound and southbound directions and a two-way left turn lane in the center. The expectation was that at least portions of Lee Road would function acceptably, given the performance of Lee Road to the north, in Cleveland Heights, with its 3-lane configuration.

The traffic study included all signalized intersections from Fairmount Boulevard in Cleveland Heights south to Scottsdale Boulevard at Shaker Heights' southern border.

The traffic analysis shows that a 3-lane roadway is expected operate at acceptably (at Level of Service D or better) in both the northern and southern sections of the corridor. As such, to the north of Van Aken and south of Chagrin, Lee Road would consist of a single travel lane in each direction with a center turn lane to provide refuge for left turning vehicles.

Reconstructing the north and south sections of Lee Road to this 3-lane cross-section is expected to improve overall safety for traffic operations as well as enhance the quality of life for all of the users of the corridor by enabling the provision of bicycle-friendly accommodations.

1.4 Pedestrian & Bicycle Improvement Plan

The study includes recommendations to enhance bicycle and pedestrian accommodations for Lee Road. General accommodations include removal of encroaching vegetation, providing adequate visibility at intersections, and installing bike parking at recommended locations. Corridor and intersection-specific enhancements include provisions of bicycle treatments to better accommodate bicycle travel while remaining within the existing right-of way. This includes wide shoulders (North Section), sharrows (Middle Section) and dedicated bike lanes (South Section). Recommendations for east-west connectivity include intersection improvements, bikeway connections, and reconfiguration of some intersections. Provision of count-down pedestrian signal heads and other improvements related to ADA-compliance are recommended.

1.5 Streetscape Plan

The streetscape plan provides ideas for improvements to the corridor that reflect the residential, civic, and urban accent characteristics found in Shaker Heights. The streetscape plan provides ideas to improve the quality of facilities and appearance of the corridor for all users in a variety of traditional and modern styles.

1.6 Recommendations Summary

An overview of the recommendations to enhance the Lee Road corridor is listed below.

- Configure Lee Road as 3-lane roadway between City's north boundary (near North Park) and City Hall, and between Lomond and Scottsdale; modify signal phasing and timing, as appropriate. Retain existing roadway configuration on Lee Road between City Hall and Lomond.

- Bicycle facilities:
 - Provide 3 ft wide striped shoulder on Lee Road between City boundary (near North Park) and City Hall.
 - Paint sharrows (shared use lane markings) in outside travel lanes on Lee Road between City Hall and Lomond.
 - Provide dedicated bike lanes on Lee Road between Lomond and Scottsdale.
 - Provide east-west bikeways at South Park (multi-use trail and sharrows), South Woodland (bike lanes or wide shoulders) and Aldersyde (sharrows).
 - Provide bike connection to Lomond neighborhood at Scottsdale.
- Reconfigure intersections:
 - South Woodland/Lee
 - Kenyon at Chagrin-Kenyon/Lee
 - Lomond/Lee
 - Scottsdale/Lee
- Conduct safety study at Van Aken/Lee.
- Enhance pedestrian accommodations (including ADA treatments).
 - Install crosswalk with raised median at Hampstead.
 - Add crosswalks, curb ramps and countdown pedestrian signals
- Remove encroaching vegetation along sidewalks for pedestrian access and travel; improve sight distance at intersection corners, as needed, for pedestrian-vehicle visibility.
- Near term streetscape opportunities south of Chagrin: moveable planters, signage, & wayfinding, off-street parking resource, street tree program, business association (volunteer basis), rotating art.
- Create gateway at Scottsdale/Lee intersection with intersection realignment.
- Create streetscape enhancement in vacated area at Lomond/Lee intersection (NE corner) with intersection realignment
- Future vision south of Chagrin:
 - Access management plan to consolidate curb cuts
 - Shared-use parking lot on city-owned parcel; sustainable stormwater management opportunity
 - Redevelopment strategies on parcels with insufficient depth, such as parcel consolidation on the east side of Lee and on the west side of Lee south of Nicholas (parcel depth issue); incorporate strategy to require buildings along the street and parking in the rear with shared drives
 - Conduct study to evaluate opportunities to relocate school bus yard
 - Develop strategy to market west side lots
 - Connect to adjacent neighborhoods east and west of Lee Road
- Assemble recommendations and prepare master plan for South Section that addresses long term vision
- Establish policy to promote redevelopment (Zoning and Land Use, Incentives, BID or TIF District).
- Developers Forum to promote area and connect interested parties.

In a market with a glut of opportunity, such as greater Cleveland, it is important that the city of Shaker Heights implement programs and present opportunities to developers, such as those suggested above, that entice them to consider the south section of Lee Road as their preferred choice for redevelopment projects.

1.7 Implementation Plan

Completion of the Lee Road Traffic Study and Corridor Plan provides an actionable plan to improve Lee Road through a combination of short-term projects and longer-term, bigger picture improvements that make the Lee Road corridor a safer, more efficient, and more attractive place.



2 Introduction

The purpose of the Lee Road Traffic Study and Corridor Plan is to:

- 1) Improve transportation access and circulation for all modes along Lee Road, and,
- 2) Improve the character of the commercial district south of Chagrin Road through streetscape enhancements.

The desired outcome of the study is to develop a planning framework to guide development in Lee Road commercial district and support bicycle and pedestrian improvements along the corridor. The Plan provides recommendations for traffic and pedestrian improvements along the corridor, intersection transitions, bike lanes and connections to the existing and planned non-motorized network, and streetscape renovations for the section south of Chagrin. The recommendations target the following seven primary objectives:

- Improve access, safety, and comfort for all users
- Add bicycle infrastructure and connections
- Enhance streetscape according to a comprehensive plan
- Raise quality and character of commercial area to reflect "Shaker character"
- Support existing businesses and future economic development
- Create city gateways
- Reduce environmental impacts

The Plan consists of four primary components:

- 1) Traffic study and lane reconfiguration plan
- 2) Pedestrian/bike improvement plan
- 3) Streetscape plan
- 4) Implementation plan and cost estimate

3 Background

This planning study presents an exciting opportunity to redefine the Lee Road corridor, one of Shaker Heights's few continuous north-south roadways within the city, and how it fits and functions within the Shaker Heights community. Particular attention is given to the commercial district located between Chagrin Boulevard and Scottsdale Boulevard to support and enhance the City's economic development, smart growth and sustainability goals.

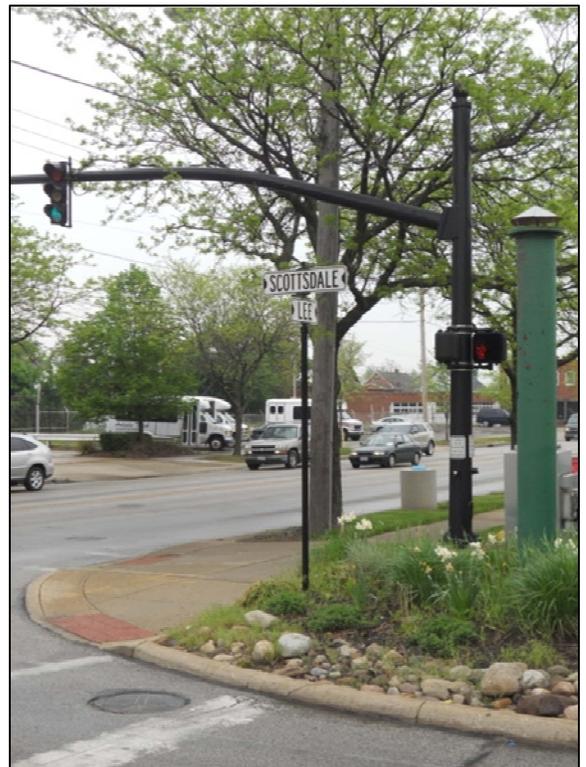
Cleveland Heights recently reconfigured Lee Road to three lanes through the city, with two travel lanes and a center turn lane, plus wide shoulders that serve as bike lanes. A traffic study was completed to assess the feasibility of carrying the three lane section on Lee Road through Shaker Heights.

Lee Road Corridor

The Lee Road corridor is comprised of three segments as it traverses Shaker Heights, each with unique character and characteristics.

North/Residential: The section from the Cleveland Heights border at North Park to City Hall is predominantly single-family residential. It is marked as two wide lanes, but each of those lanes carries two lanes of traffic so the roadway functions as four lanes (two northbound and two southbound travel lanes).

Middle/Civic and Commercial: This section of Lee Road starts at City Hall and the Police Department/Municipal Court Building and continues south to Chagrin Boulevard. In this segment, Lee Road is striped with four travel lanes plus turn lanes. This section of roadway feels quite wide and although there are sidewalks on both sides, on street parking in specified areas and it is being served by rail (RTA's Blue Line along Van Aken Boulevard) and bus transit, it is not very pedestrian friendly.



South/Commercial: The segment of Lee Road from Chagrin Boulevard south to the city's boundary at Scottsdale Boulevard carries four travel lanes (two northbound and two southbound) with sidewalks on both sides of the street. On street parking is not permitted. Properties on the east side of Lee Road are smaller, and are characterized by buildings set behind parking lots. There are multiple driveways and access points to the properties along the road. Businesses along this section of Lee Road have a history of high turnover; currently, there are a number of vacant buildings. According to the SIP, the "roadway design and traffic speeds act as barrier to pedestrian traffic and development opportunities. The redevelopment program for south Lee Road can transform it into an attractive gateway into the adjacent neighborhoods, helping to stabilize them." This section of Lee Road provides access to the Lomond neighborhood to the east and the Moreland neighborhood to the west. The corridor houses a mix of small commercial uses, as well as the Shaker Schools Bus Garage and the Shaker LaunchHouse business incubator. It is the city's hope that the businesses that are "grown" at the Shaker LaunchHouse will be able to relocate on Lee Road, into facilities that stand ready to accept these new businesses, creating a positive synergy and fostering economic health along the corridor.

Shaker Heights is well served by GCRTA's transit system along Lee Road. The Blue and Green Line light rail transit lines traverse the city, running east west along Van Aken Boulevard and Shaker Boulevard, respectively. Additionally, bus Routes 37 and 40 run on Lee Road. Route 14 (Kinsman) intersects Lee Road, traveling on Chagrin Boulevard from Warrensville/Van Aken west to E.66th Street and into downtown Cleveland.



Lee Road in Shaker Heights is nestled within a network that is conducive to bicycle and pedestrian use. Bicyclists and pedestrians may access existing off-road trails, suggested on-road bicycle routes, and GCRTA bus routes and light rail lines. In addition to safe routes of travel bicyclists and pedestrians are attracted to destinations with a reasonable distance to cycle and walk.

Planning for improvements along the south section of Lee Road must take into account existing constraints and build on existing positive aspects to create new opportunities for the corridor. The following constraints and positive aspects will be built into opportunities in the following chapters of this plan.

Constraints

- Utility poles
- Shallow lot depth (east side)
- Multiple ownership
- Multiple curb cuts
- No pedestrian crossings (2000 ft)
 - Lomond crossing is wide
 - Next is Scottsdale
- Tough pedestrian crossing
 - Roadway width & 4 lanes
- Individual parking for each lot
- Vacancies & high turnover
- Impervious surfaces
- Access management (parcelized)
- 4 lanes: no shelter for turning vehicles
- Business mix (types & structures)
- No restaurants
- No on-street parking
- Scale of street & impact on pedestrians
- RTA: number & location of bus stops

Positive aspects

- Healthy trees (Honey Locust)
- New sidewalks (east side)
- Accessible curb ramps (east & west)
- Deep, large lots on west side
- Adjacent residential neighborhood
 - Potential customers
- Anchor businesses
 - Shaker LaunchHouse, Lewis Electric, Firestone
- Vehicular traffic offering business viability
- Community involvement



4 Community Engagement

The Lee Road study was grounded in a three-tiered community engagement program that consisted of the Steering Committee, a focus group of stakeholders for the south section of Lee Road, and the general public. The community engagement program was founded on the idea that the community and the consultant team each have a role to play in the future of Lee Road. The Shaker Heights community, comprised of civic leaders, stakeholders, and interested residents, brought their ideas and interests while the consultant team supplied the toolbox – the technical input, analysis and ideas – that factored into the plan development process.

Stakeholders and Participants

Steering Committee

The Steering Committee included key decision-makers from the Shaker Heights community. This group was charged with providing overall direction to the Study, guiding its development, providing input, assessing issues, and rendering decisions as the project progressed. The Steering Committee included the following individuals and organizations:

- Joyce Braverman and Ann Klavora, City of Shaker Heights, Planning
- Tania Menesse, City of Shaker Heights, Economic Development
- D. Scott Lee, Shaker Heights Police
- Ryan Noles and Mahmoud Al-Lozi, NOACA
- Maribeth Feke and Valerie Webb, GCRTA
- Melinda Bartizal and John Motl, ODOT
- Carmella Williams and Vicki Elder, Moreland on the Move Neighborhood Association
- Willa Walker, Lomond Association
- Dar Caldwell, Shaker LaunchHouse
- Ron Lloyd and Margaret Kavorias, RDL Architects

- David Lewis, Lewis Electronics
- Ryan McKenzie, Bicycle Advocate

The consultant team staff members supplemented the Steering Committee as both meeting facilitators and technical resources. The Steering Committee met three times throughout the study.

Targeted Stakeholders

The second tier of community engagement for the study centered on involving a variety of stakeholders specifically interested in the development of the south section of Lee Road (from Chagrin to Scottsdale). These stakeholders included many members of the Steering Committee, the Shaker Heights Board of Education, the Greater Cleveland Regional Transit Authority, Citizens Bank, and the Shaker LaunchHouse.

The General Public

The final tier of community engagement for Lee Road is the general public. Members of the greater Shaker Heights community were invited to participate in public meetings; these meetings provided opportunities for citizens to provide feedback through questionnaires and verbal responses. Members of the general public had ample opportunity to make their voices heard as they were kept up to date on the project's purpose and progress. Public meetings were held to ensure early buy-in for the planning process and to solicit the public's vision for Lee Road relative to traffic operations, streetscape, and bicycle and pedestrian connectivity.

Two public meetings were held, one at the beginning and the other at the end of the planning process where the project team presented project issues and ideas to the public and solicited their feedback. The consultant team delivered formal presentations followed by question-and-answer sessions. The formal portion of each meeting was followed with additional one-

on-one conversation time, allowing for additional feedback on an individual basis, facilitating additional public comment without fear of censure.

Meetings and Workshops

This Study employed targeted meetings for each of the three tiers of community engagement. These meetings and workshops are described below.

Steering Committee Meetings

The Steering Committee met at three key points throughout the study:

- February 22, 2012: First Steering Committee meeting to discuss the project vision and goals, project overview, Steering Committee input, and project schedule.
- May 30, 2012: Steering Committee meeting to review the presentation and format for first public meeting.
- October 2, 2012: Steering Committee meeting to review progress, concepts, strategies, and next steps.

Stakeholder Workshop

The south section stakeholders came together on April 24, 2012 for a workshop to understand the pedestrian experience on the south section of Lee Road, review potential designs, and work together to develop concepts. The stakeholder workshop combined a walk-through of the south section Lee Road with a concept development workshop at the Shaker LaunchHouse.

During the walk-through, the focus group observed the roadway's characteristics and experienced the corridor as a pedestrian. The group also observed issues and opportunities associated with lot sizes, land use and zoning, tree sizes and types, building setbacks, vacancies, and traffic issues. The concept development portion of the meeting allowed a free flow of discussion for participants to determine priorities and key interventions. The results

of this workshop helped the consultant team refine the final streetscape concepts.



Steering Committee Meeting #3



Stakeholder workshop walking tour



Stakeholder workshop walking tour



Stakeholder concept development workshop

Public Meetings

Members of the public were invited to two public meetings:

- May 30, 2012: Public meeting to introduce the project and its components to the general public, and to solicit feedback and ideas from the public. The meeting used breakout groups to get focused feedback on traffic operations and analysis, bicycle and pedestrian connections, and streetscape.
- November 7, 2012: Final public meeting within the Shaker Heights Planning Commission meeting to present the draft plan.



Members of the public listen to the formal presentation at the first public meeting



Small-group discussions at the first public meeting



Individual discussions at a public meeting

5 Traffic Study & Lane Reconfiguration Plan

The purpose of the traffic study was to evaluate the feasibility of converting Lee Road from the existing configuration which functions generally with four travel lanes to a three lane roadway with a single travel lane in the northbound and southbound directions and a two-way left turn lane in the center. The expectation was that at least portions of Lee Road would function acceptably, given the performance of Lee Road to the north, in Cleveland Heights, with its 3-lane configuration.

Cleveland Heights recently converted Lee Road to a 3-lane roadway with one travel lane northbound and southbound plus a center turn lane. It was previously configured like Lee Rd in Shaker Heights, with two striped lanes that functioned as four narrow lanes. According to Richard Wong, Cleveland Heights' Director of Planning and Development, the reconfigured Lee Road is working beautifully. "Traffic crashes, most of which involved a moving vehicle hitting a stopped left-turning vehicle, have been reduced; vehicles can no longer accelerate and weave past slower vehicles; the separation between pedestrians and vehicles is increased and splashing has stopped; and bicyclists are using the striped shoulder."

The purpose of the traffic study is to assess the feasibility of a similar conversion of Lee Road. Vehicles traveling on Lee Road in Shaker Heights are not able to use all 4 lanes as travel lanes. Left turning vehicles at the many cross streets often block the inside lane, effectively converting the roadway to a 2-lane cross section with turn lanes at those intersections. There are 11 signalized and 3 stop-controlled intersections on the 2-mile section of Lee Road in Shaker Heights, presenting many opportunities for blockage of the inside

travel lanes. This regularly occurs at Shaker Boulevard, which is further complicated by the presence of the Green Line rail transit operations and the geometric complications created by the presence of the tracks. The left lane blockages increase the accident potential at these intersections. Conversion of the corridor to two travel lanes with a center turn lane (left turn lanes at intersections) and wide shoulders that act as bike lanes could improve operational safety with less impact on operational efficiency than may be expected.

Traffic counts were collected in early December 2011. The counts were used to assess traffic operations under the existing conditions, with the proposed conversion to a 3-lane roadway, and for the recommended reconfiguration of the Lee Road corridor.



Northbound Lee approaching transition to 3-lanes at North Park in Cleveland Heights



Southbound Lee, south of South Park



Lee Road 3-lane section in Cleveland Heights

The area evaluated for the traffic study begins on the northern end of the corridor at the intersection of Lee Road and Fairmount Boulevard. Although Fairmount Boulevard and North Park Boulevard are located in Cleveland Heights, they are included in the analysis due to their proximity and the effect that those signals have on corridor operations. The southern terminus of the traffic study is the intersection of Lee Road and Scottsdale Boulevard, at the southern border of Shaker Heights and the City of Cleveland. A total of twelve signalized intersections along Lee Road are included in the traffic study.

- Fairmount Boulevard
- North Park Boulevard
- South Park Boulevard
- Shaker Boulevard
- South Woodland Road
- Parkland Drive
- Aldersyde Drive
- Van Aken Boulevard
- Library/Shaker Town Center
- Chagrin Boulevard -Kenyon Road
- Lomond Boulevard
- Scottsdale Boulevard

The traffic analysis evaluates traffic operations in the existing condition and traffic operations with potential improvements. Peak hour traffic operations

were assessed based upon levels of service (LOS) and average delays.

The results of the existing conditions analysis were used to set a benchmark to assess performance of the proposed improvement scenarios. This was followed by an analysis of proposed future conditions.

The traffic data was analyzed using Synchro Version 8, a microsimulation traffic model, to determine the traffic performance and operational efficiency of each intersection. The results of the analysis include the approach delay (measured in seconds) level of service, and volume-capacity (v/c) ratio for each movement, as well the approach delay and level of service by approach and overall intersection delay for both the AM and PM Peak Hours. Average delay is an indication of the expected delay that would typically be experienced in each intersection approach lane, on the total approach, or at the entire intersection. Level of service (LOS) is a grading scale based upon average delay, with LOS A representing free-flow conditions, LOS E representing operational capacity, and LOS F being over-capacity.

The specific delay thresholds for both signalized and unsignalized intersections are provided by the Transportation Research Board in the Highway Capacity Manual and are given in Table 1. A v/c ratio that is less than 1.0 indicates that the lane is operating below capacity. A v/c ratio of 1.0 indicates that the lane is operating at capacity and a v/c greater than one indicates over-capacity conditions.

Table 1: Highway Capacity Manual Levels of Service

LEVEL OF SERVICE (LOS)		
LOS	Signalized Intersection	Unsignalized Intersection
	Average Delay (sec/veh)	Average Delay (sec/veh)
A	$x < 10$	$x < 10$
B	$10 < x < 20$	$10 < x < 15$
C	$20 < x < 35$	$15 < x < 25$
D	$35 < x < 55$	$25 < x < 35$
E	$55 < x < 80$	$35 < x < 50$
F	$80 < x$	$50 < x$

5.1 Existing Conditions

Lee Road does not display typical commuter peak period directional traffic pattern trends. A typical commuter corridor would display a distinct directional flow higher in one direction during the AM peak hour, with the mirroring opposite directional preference during the PM peak hour. Directionally, Lee Road is nearly balanced between northbound and southbound flows during both the AM and PM peak hours.

5.2 Proposed 3-Lane Configuration

Conversion of Lee Road to a 3-lane roadway would change the existing configuration from generally two travel lanes in each direction to one travel lane in each direction with a center two-way left turn lane. The analysis results indicated that this conversion is feasible in the northern and southern sections. Conversion of the middle section, between Van Aken and Chagrin, would result in over-capacity conditions during peak hours.

5.3 Recommended Configuration

The recommended reconfiguration of Lee Road consists of a 3-lane roadway north of

City Hall and south of Lomond, with geometrically appropriate transitions between those sections and the middle section, which would remain in its existing condition. The traffic analysis results for the existing and recommended conditions are shown in Table 2.

Since redevelopment of the southern section is a consideration, a very general analysis was conducted to look at the amount of growth in traffic that could be accommodated within the corridor. The analysis evaluated the amount of increase in traffic in the southern section that could be tolerated before performance was unacceptable at the corridor intersections by modifying the growth percentage. This value was determined to be an approximate 25% growth in overall traffic volume. This analysis assumed that the existing distribution of traffic would be maintained and the 25% growth was distributed according to those existing patterns.

Implementation of bike lanes on Lee Rd. would require a prohibition of on-street parking in sections where the width does not adequately support both the parking and the bike lanes.

RECOMMENDATIONS

The Lee Road corridor is an important north-south connector within Shaker Heights and for the surrounding region. It provides one of three roadways within the city to accommodate all travel modes, including pedestrians, bicyclists, motorists, and transit riders. It connects neighborhoods to schools, transit, and community services, and has the potential to bring a strong economic engine to the community in the south section.

Based on the results of the traffic analysis, a 3-lane roadway is expected operate at acceptably (at Level of Service D or better) in both the northern and southern sections

of the corridor. As such, to the north of Van Aken and south of Chagrin, Lee Road would consist of a single travel lane in each direction with a center turn lane to provide refuge for left turning vehicles.

Reconstructing the north and south sections of Lee Road to this 3-lane cross-section is expected to improve overall safety for traffic operations as well as enhance the quality of life for all of the users of the corridor by enabling the provision of bicycle-friendly accommodations. With implementation of the recommended 3-lane roadway, additional changes to roadway configuration and signal operations are recommended at:

- Fairmount Boulevard Intersection: Provide protected only eastbound and westbound left turn phases (lead/lag) with simultaneous through movements to improve intersection operations. The signal currently operates with split phasing for the eastbound and westbound approaches.
- Shaker Boulevard Intersection: Provide northbound and southbound lead/lag protected only left turn phasing to accommodate the proposed 3-lane roadway. This is a necessary change due to the modified roadway cross-section. Because this intersection is bisected by RTA's Green Line, the northbound and southbound left turn movements will occupy the same pavement in the middle of the intersections (where the left turn

crosses the tracks); simultaneous left turns cannot be accommodated.

- South Woodland Road Intersection: Reconfigure the east and west legs of the intersection to provide two approach lanes (exclusive left, through/right) and one downstream receiving lane. These modifications would narrow the pedestrian crossing distance across Woodland and remove the opportunity for downstream "jockeying" that occurs on the far sides of the intersection where the two existing receiving lanes merge to one.
- Chagrin Boulevard Intersection: Convert Kenyon to one-way southeast to improve intersection operations. This would create an "enter only" condition to Kenyon at the Chagrin/Lee intersection, allowing vehicles to enter Kenyon from the intersection; vehicles would exit the area via one of several alternate routes. This modification would improve intersection operations and it would significantly reduce the pedestrian crossing distance across Kenyon.

Additionally, a more thorough safety analysis and further study should be conducted for the Lee/Van Aken intersection based on the high number of crashes and ranking by NOACA as the 7th highest crash intersection in the region.

Table 2: Capacity Analysis Results for Existing and Recommended Conditions

AM PEAK LOS Delay	Fairmount	North Park	South Park	Shaker	S. Woodland	Parkland	Aldersyde	Van Aken	Library- Heinen's	Chagrin	Lomond	Scottsdale
Existing	C	C	B	C	C	B	B	D	A	C	A	B
	33	20	14	30	21	15	11	44	3	25	5	11
Recommended	C	C	B	D	C	B	B	D	A	C	A	B
	30	20	13	41	22	15	14	45	4	21	4	10

6 Pedestrian & Bicycle Improvement Plan

As one of the only north-south connector roads in Shaker Heights, Lee Road must function acceptably for bicycles and pedestrians as well as motorized vehicles.

6.1 General Accommodations

The general accommodations for Lee Road are location-neutral policies and improvements that should be considered throughout the corridor. These accommodations have their roots in the study's traffic analysis, field observation, and stakeholder input as well as prior planning efforts. In general, these accommodations are focused on making biking and walking a visible part of Lee Road's transportation system.

Shaker Heights is proud of its tree-lined streets and lush vegetation. However, at many locations this vegetation encroaches on sidewalks, effectively halving or even eliminating safe pedestrian spaces. Encroaching vegetation should be routinely removed from sidewalks along the corridor to provide a clear, safe pedestrian conveyance.

Similarly, enhancing visibility at intersections will make travel along Lee Road safer for bicyclists and pedestrians. Removing corner obstructions will enable pedestrians and bicyclists to see around corners and be seen by cars.

Additionally, in order to encourage bicycling, there needs to be a secure place for riders to leave their bicycles. Inverted U-style bicycle parking should be installed at key activity nodes, including at the two light rail transit stations on the Lee Road corridor as well as other locations. Bicycle parking is recommended at:

- Shaker RTA Station (Green Line)
- Van Aken RTA Station (Blue Line)

- Shaker Heights City Hall
- Shaker Heights Police Station
- Lomond Boulevard (reclaimed streetscape area)
- Scottsdale Boulevard (reclaimed streetscape area)



Sidewalk encroachments make pedestrian movements difficult.



Poor sidewalk visibility reduces safety of pedestrians, bicyclists, and cars at conflict points.

6.2 Enhancements by Corridor Section and Intersection

Recommendations include bicycle and pedestrian accommodations along and across the Lee Road corridor, as described below. In addition, the City should install powerhead loop detectors as part of their signal maintenance program to improve bicycle detection at intersections.



On-road bicycle facilities provide a more friendly space for bicycling while simultaneously reducing pedestrian/bicycle conflicts on sidewalks. Bicycle-friendly treatments are recommended along the length of Lee Road. The specific facility types are based on fitting within the available right-of-way without having to move the existing curbs.

North Section (Fairmount Boulevard to City Hall/Van Aken Boulevard)

The north section of Lee Road features a three foot wide marked shoulder on both northbound and southbound sides of the road, mirroring the configuration of Lee Road in Cleveland Heights. This bicycle facility provides an attractive on-road bicycling option that fits in with the less dense character and smaller total right-of-way in this segment.

Middle Section (Library/Town Center to Lomond Boulevard)

This section of the Corridor features shared-lane markings, or sharrows, in both directions on the outside travel lanes. Sharrows are appropriate for this segment of the corridor as they provide cyclists with positioning in the shared lane of traffic, alert vehicles of the potential presence of bicyclists, and encourages predictability of bicycle movements on a shared roadway.

South Section (Lomond Boulevard to Scottsdale Boulevard)

The south section of the Corridor employs dedicated bike lanes on both northbound and southbound sides of the road. Having a striped bike lane provides a safe travel space for bicycle travel and eliminates the need for cars to navigate around bicyclists.

Additionally, installation of countdown pedestrian signal heads is recommended. These signal heads provide pedestrians with a countdown of how many seconds remain before the pedestrian phase ends. These signal heads are considered safer and more helpful as they are easy-to-understand and allow pedestrians to make smarter, safer decisions as to when to begin crossing a street.

Intersections targeted for this enhancement include:

- South Park
- Shaker Boulevard
- Parkland Drive
- Aldersyde Drive
- Van Aken Boulevard
- Library/Town Center
- Chagrin Boulevard
- Lomond Boulevard
- Scottsdale Boulevard



Countdown pedestrian signal heads help make safer pedestrian crossings
(Source: [www. http://guide.saferoutesinfo.org](http://guide.saferoutesinfo.org))



Location 1: South Park

Pedestrian/bicycle connection, Horseshoe Lake to Nature Center at Shaker Lakes

- Construct multi-use trail on north side of South Park
- Provide sharrows on South Park
- Add crosswalk to north side of intersection
- Provide two curb ramps on SE corner
- Add countdown pedestrian signal heads

Location 2: Shaker Boulevard

Transit transfer area (bus and rail)

- Provide two curb ramps on northeast, northwest, southwest, and southeast corners
- Add countdown pedestrian signal heads

Location 3: South Woodland

- Reconfigure intersection to better organize east-west traffic flow and reduce north-south pedestrian crossing distance
- Treat South Woodland as east-west bikeway with bike lanes/wide shoulders

Location 4: Parkland Drive

Connection to Shaker Heights High School

- Provide two curb ramps on each corner
- Add countdown pedestrian signal heads

Location 5: Aldersyde Drive

Connection to Shaker Heights High School

- Add sharrows on Aldersyde
- Provide two curb ramps on each corner
- Add countdown pedestrian signal heads

Location 6: Van Aken Boulevard

Transit transfer area (bus and rail)

- New transit station to be constructed
- Add countdown pedestrian signal heads
- Recommend future study to address crash history

Location 7: Library/Town Center

- Add crosswalk on south side; provide curb ramps
- Add countdown pedestrian signal heads

Location 8: Chagrin Boulevard

Transit transfer area

- Convert Kenyon Boulevard to one-way, entering toward southeast from the intersection of Chagrin Boulevard and Lee Road to reduce pedestrian crossing distance and improve operational efficiency for vehicles
- Add countdown pedestrian signal heads

Location 9: Lomond Boulevard

- Realign westbound approach by reducing pavement area; this will reduce roadway width and north-south pedestrian crossing distance
- Add north side crosswalk; provide curb ramps
- Add countdown pedestrian signal heads

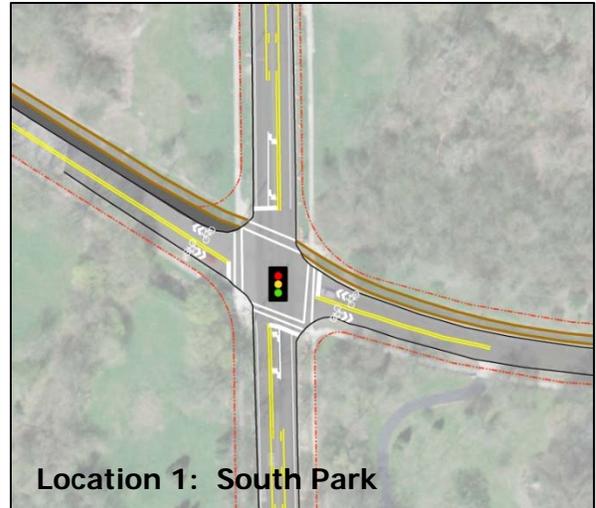
Location 10: Hampstead Boulevard

- Add mid-block crosswalk on north side of intersection

Location 11: Scottsdale Boulevard

Southern Gateway

- Modify east-west approaches to reduce pedestrian crossing distance
- Provide bike connection east to Avalon
- Add countdown pedestrian signal heads



Location 1: South Park

Lee/South Park proposed multi-use trail



Location 8: Chagrin Blvd

Proposed reconfiguration of Kenyon



Location 3: South Woodland

Proposed reconfiguration of Lee/Woodland



Location 9: Lomond Blvd

Proposed reconfiguration of Lee/Lomond



7 Streetscape Plan

Lee Road, between Chagrin Boulevard and Scottsdale Boulevard is occupied by a mixture of office, retail and commercial land uses. Large buildings on deep lots are distributed along the western side of the street while small structures on small lots with parking in the front yard line the east side. A dominant feature of this segment is the high number of existing curb cuts (18 on the west side; 29 on the east side). This is reflective of a time when planning and design were dominated by the automobile. The number of curb cuts in combination with four travel lanes creates an unsafe condition for pedestrian and non-motorized traffic. In addition, this corridor contains a tremendous amount of above and below ground utility infrastructure which complicates planned improvements. The uninviting pedestrian environment bears no relation to the quality of the public space at Shaker Square. Impervious pavement dominates the corridor, affecting stormwater quality and adding to the urban heat island. Additionally, the Lee Road entry from Cleveland does not represent the character associated with Shaker Heights.

The efforts for this segment of the Lee Road corridor are intended to reestablish the Shaker Heights character as a gateway into the community. This part of the plan looks at opportunities to enhance streetscape within the existing configuration of the roadway. The initial goal is to identify opportunities to enhance development along the corridor while maintaining existing facilities. Ultimately, potential redevelopment will serve to stimulate the economic viability of this corridor and will enhance the pedestrian experience as well as the vitality of adjacent neighborhoods.

Ideas are presented for the streetscape to match the characteristics found in each zone of the Lee Road Corridor. The following Figures 1 and 2 show the different

characteristics of each area that were taken into account to plan traffic improvements and streetscape designs.

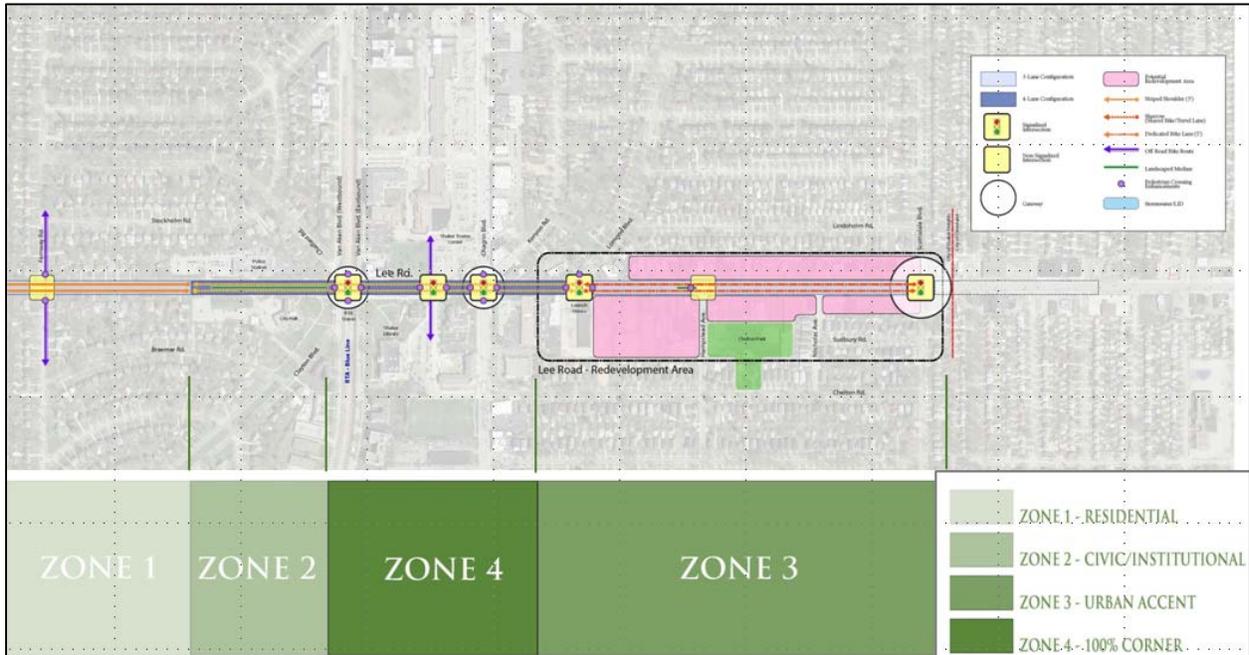


Fig 1 Lee Road Framework Plan



Fig 2 Lee Road South Section Framework Plan

Phase 1 Streetscape Improvements

The focus of the streetscape improvements is to remain within the limits of the existing right-of-way and curb lines. Phase 1 improvements rely primarily on two elements: 1) changes to the road cross section and 2) installation of planters in select locations along the corridor. The density of existing above and below ground utilities presents a serious constraint on any other types of improvements.

Lee Road Cross Section

Changes to the road cross section are discussed in prior sections. Reduction to two travel lanes with and center turn lane and the addition of north and south bike lanes will serve to calm traffic and improve non-motorized connectivity (Figs. 3, 4). Slowing vehicular traffic will also create a safer pedestrian environment especially with respect to crosswalk locations.

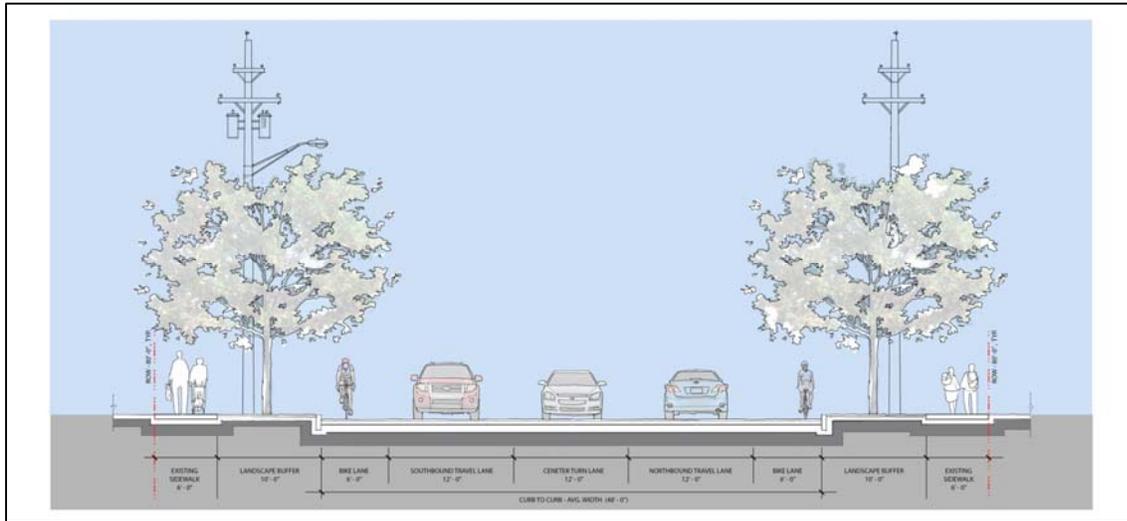


Fig 3 Lee Road: South Section Recommended Configuration (6 ft bike lane–12 ft SB lane–12 ft center lane–12 ft NB lane–6 ft bike lane)

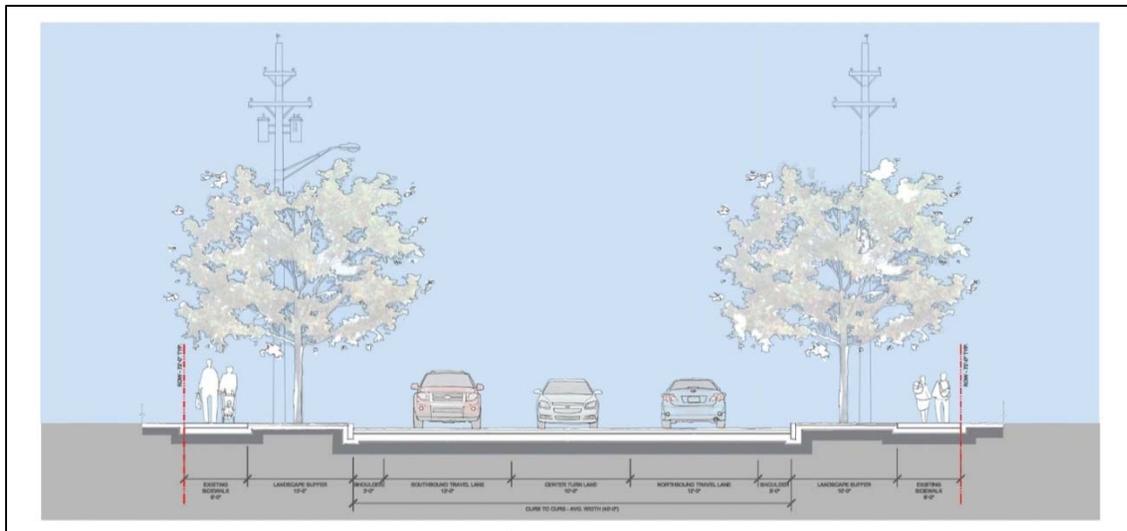


Fig 4 Lee Road: North Section Recommended Configuration (3 ft shoulder–12 ft SB lane–10 ft center lane–12 ft NB lane–3 ft shoulder)

Planters

It is suggested that movable planters be added as an inexpensive means to enhance the corridor. These planters could be of different sizes, colors and shapes and set in groups at locations where they will have the highest visual impact, such as the Scottsdale, Hampstead and Nicholas intersections.

In addition, connection of the Lee Road corridor to Chilton Park with signage is recommended to improve awareness of the important recreational asset.

Future Streetscape Improvements

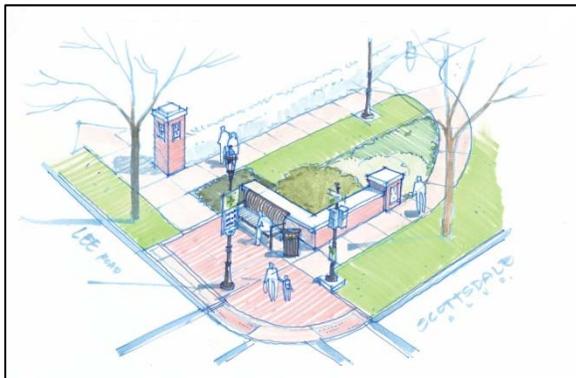
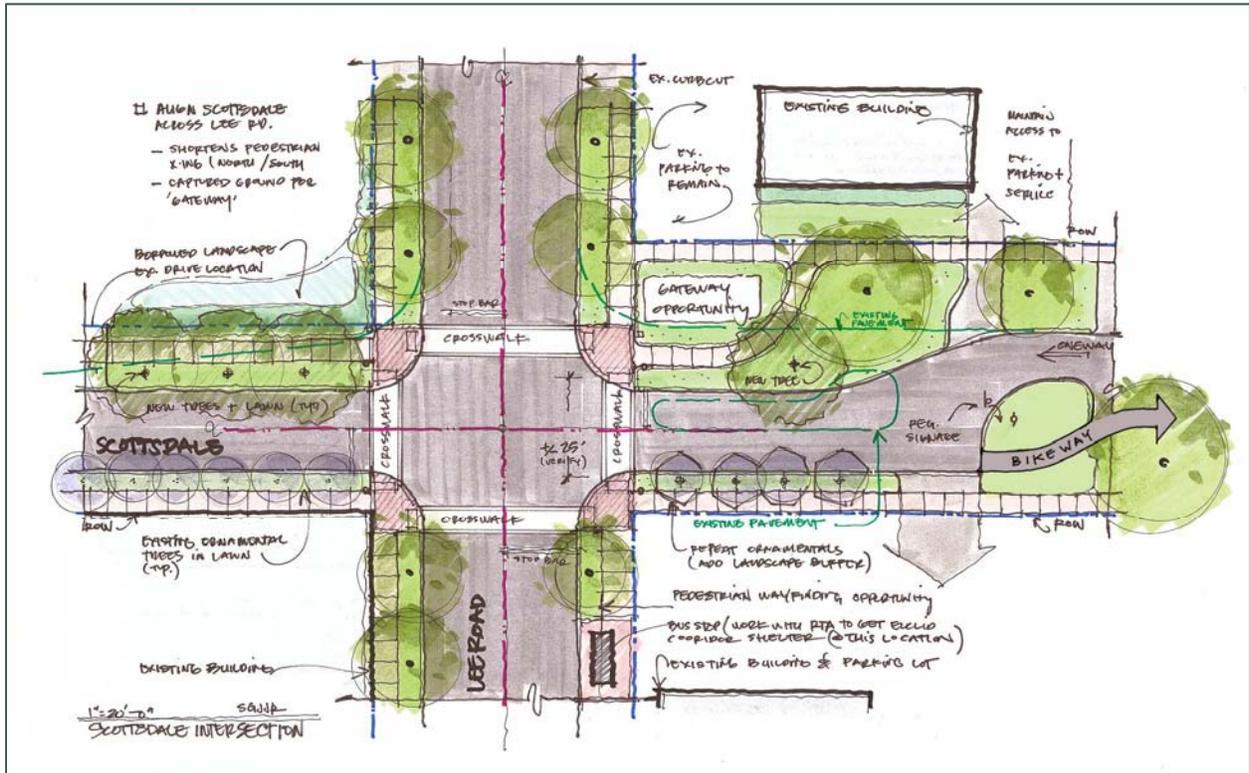
Future streetscape improvements include 1) reconstruction of the Scottsdale and Lomond intersections, 2) application of appropriate streetscape elements and 3) construction of a mid-block pedestrian crossing north of Hampstead.

Scottsdale and Lomond Intersection Reconstruction

The Scottsdale and Lomond intersections with Lee Road provide opportunities to improve both pedestrian safety as well as the pedestrian environment. Currently, the east and west legs of Scottsdale do not align across the intersection and contain excess pavement. Likewise, the Lomond intersection meets with Lee Road at an obtuse angle resulting in unnecessary pavement.

Aligning the east and west legs of Scottsdale allows for capture of significant areas in the northeast and northwest quadrants (Fig 5). These areas can be used to create a pedestrian plaza as well as to add more green space in the corridor. It also allows an opportunity to incorporate stormwater management in the form of either bioretention or an infiltration basin. This reconfiguration provides the additional benefit of shorter pedestrian crosswalks across Scottsdale.

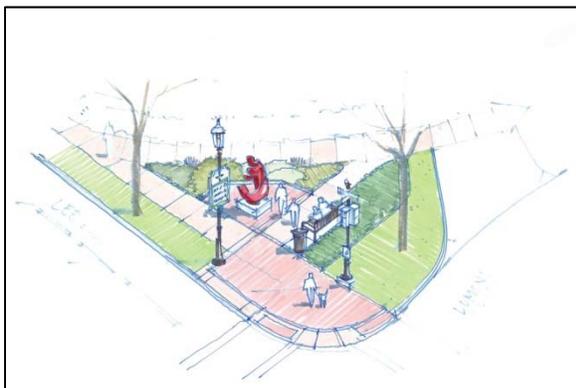
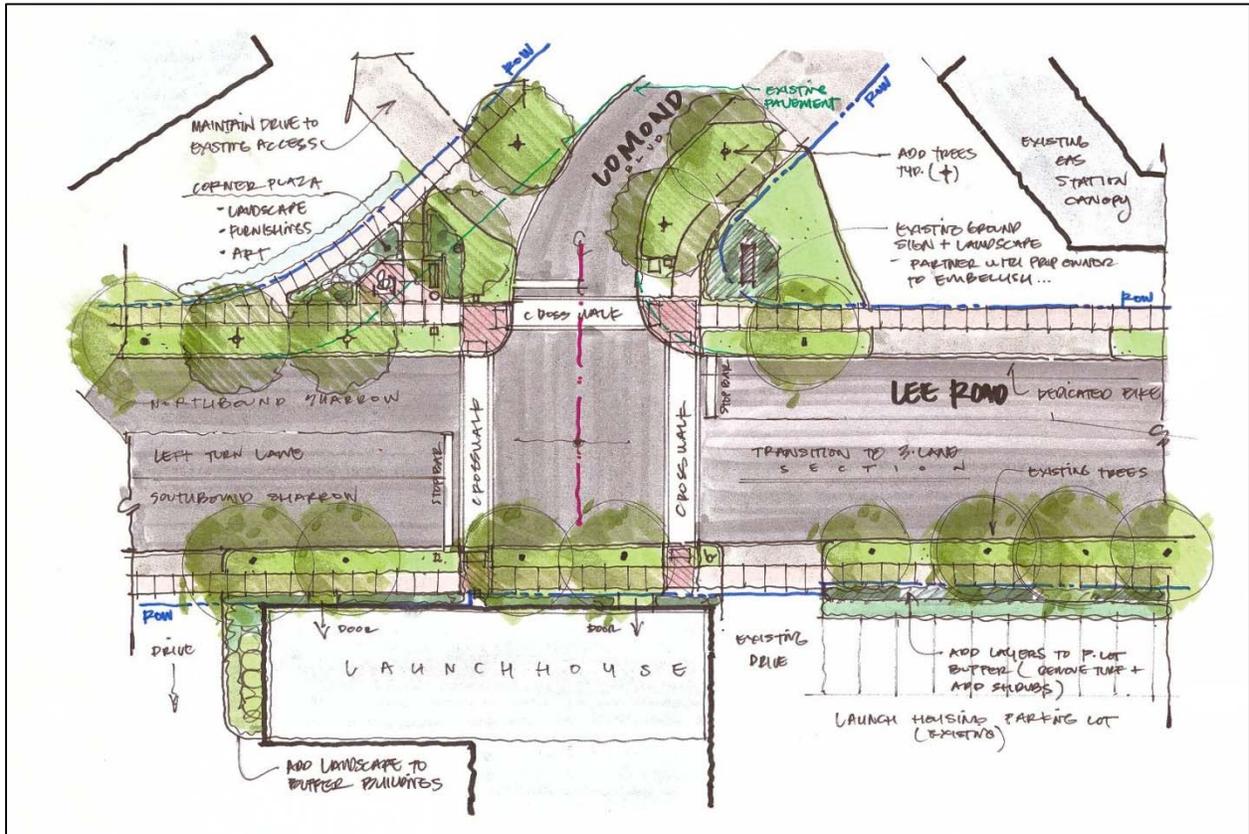
Fig 5 Lee/Scottsdale Concepts



Lomond can be reconfigured to meet Lee Road at a 90 degree angle allowing reuse of the northwest quadrant as a corner plaza including landscape, furnishings and

potentially public art (Fig 6). This reconfiguration also includes pedestrian crosswalks north and south of Lomond.

Fig 6 Lee/Lomond Concepts



Application of Streetscape Elements

A collection of streetscape elements should be designed with a specific character the brands this segment of the Lee Road corridor. This could include items such as benches, bollards, trash receptacles, planters, wayfinding and signage and

gateway features. These could be designed in a traditional style similar to much of the brick architecture common in Shaker Heights (Fig. 7) or in a more distinctive, modern style that would be unique to this area (Fig. 8).

Fig 7 Lee Road Traditional Streetscape Concepts

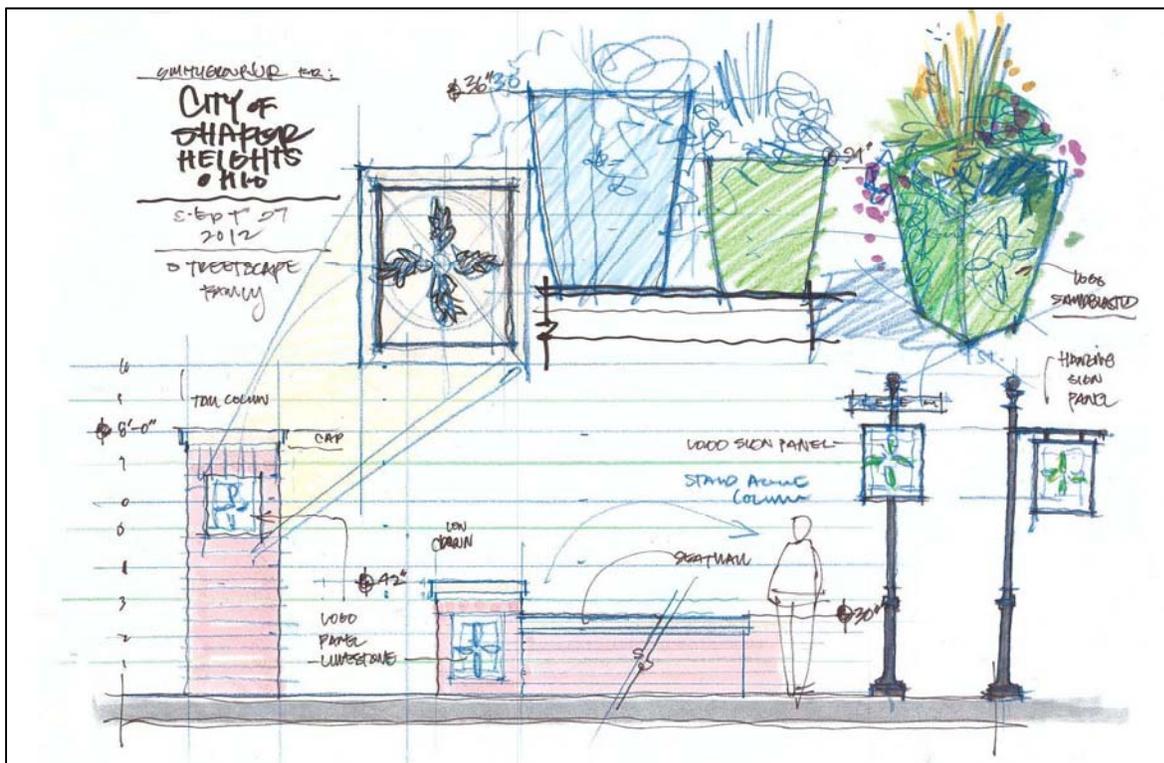
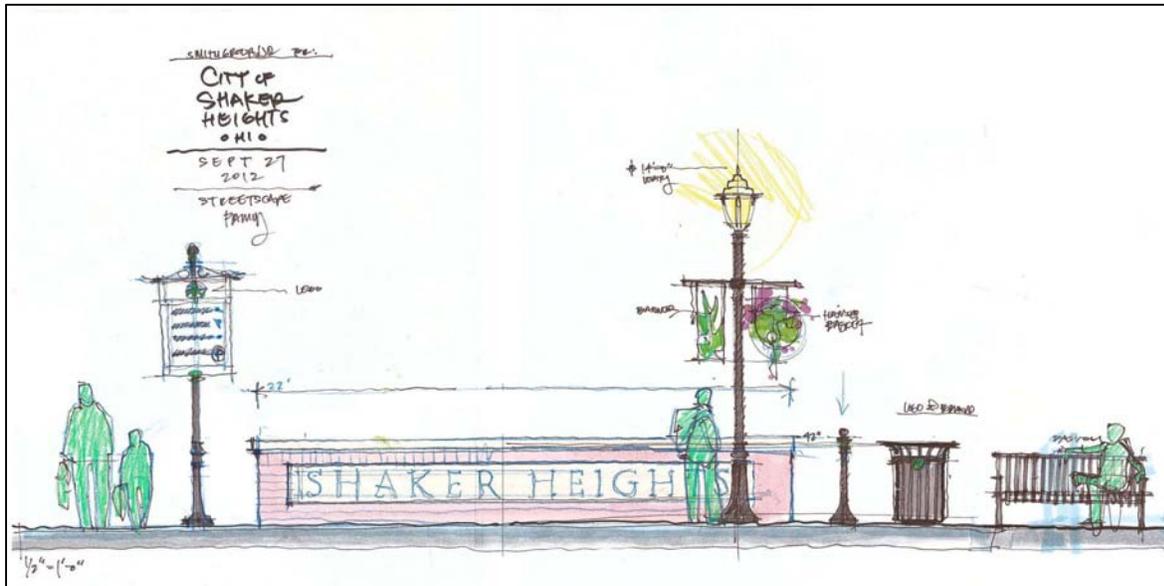
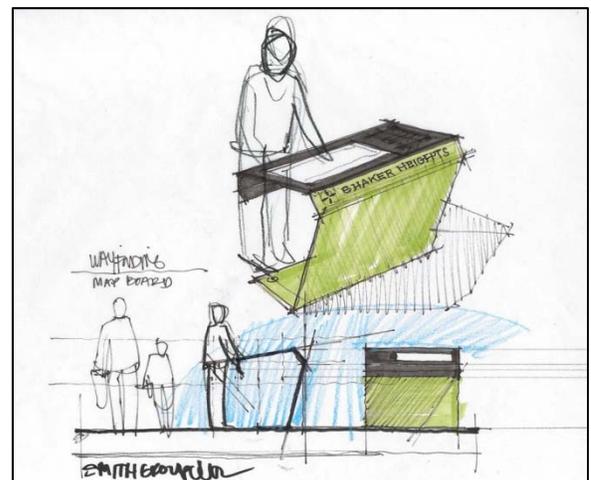
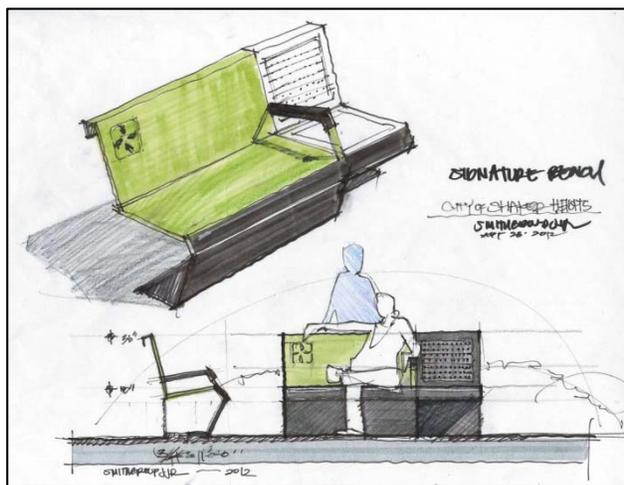
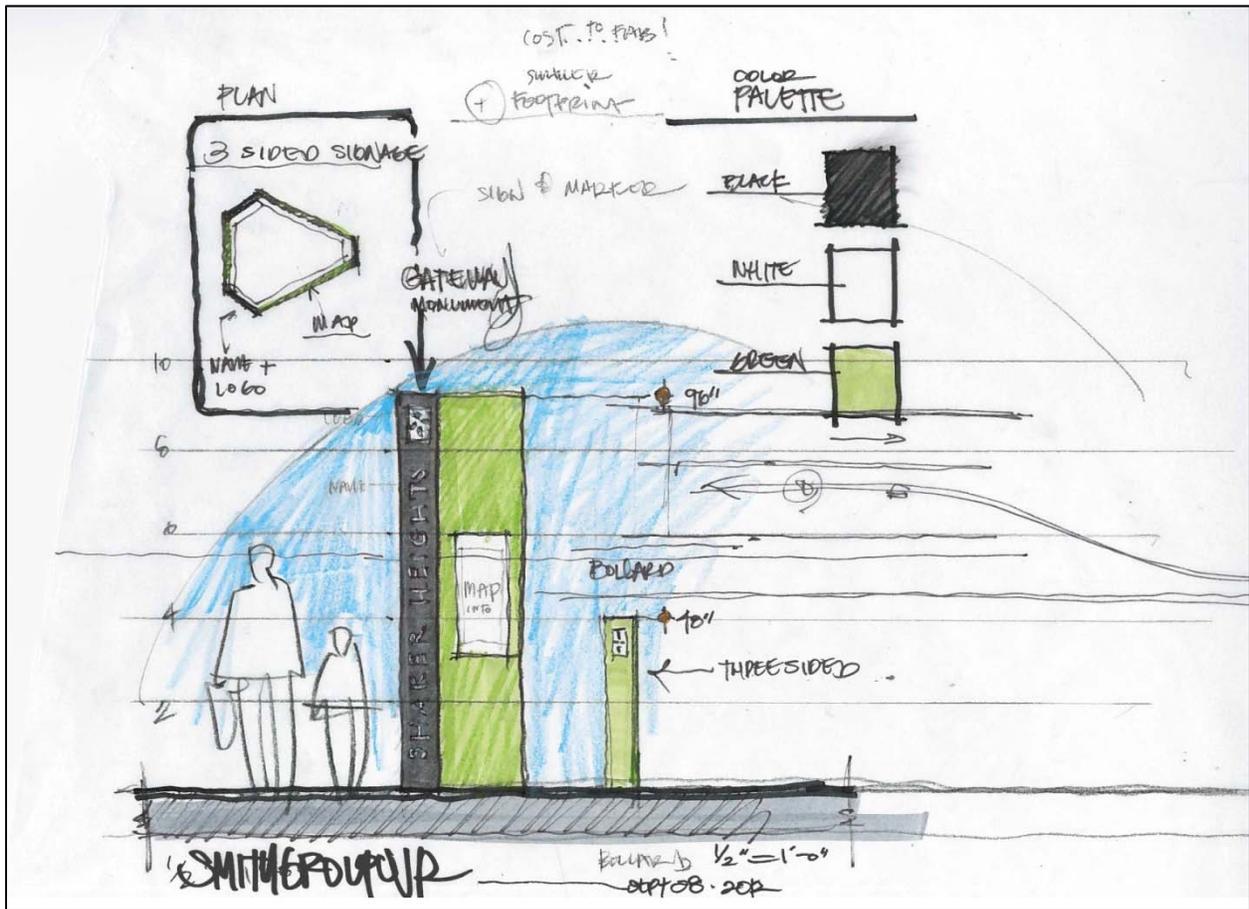


Fig 8 Lee Road Contemporary Streetscape Concepts



Mid-Block Pedestrian Crossing north of Hampstead

A mid-block crossing is proposed north of Hampstead to improve pedestrian

connectivity across Lee Road. It is recommended that a refuge island be included in the center of Lee Road to further improve pedestrian safety.

Future Vision for Lee Road south of Chagrin

While the streetscape improvements proposed above will allow for improved pedestrian safety and an enhanced aesthetic environment, it is unlikely that they will activate this segment of the Lee Road corridor to any great degree (Fig. 9). It is essential to decrease the impact of the automobile as a design element and to rely more heavily on a holistic redevelopment strategy in order to create a pedestrian-friendly atmosphere that would be an integral component of attracting economic redevelopment.

There are several action items that are required in order to achieve this vision: 1) reduce the number of curb cuts, 2) improve city-owned parcels on the east side of Lee Road to provide off-street parking, 3)

explore opportunities to consolidate the small parcels on the east side of Lee Road into developable footprints, 4) evaluate options to relocate the school bus yard and market the larger parcels on the west side of Lee Road as part of the redevelopment strategy, 5) explore opportunities for connections to neighborhoods east and west of Lee Road.

Curb Cuts

As noted above, there are 47 curb cuts in the segment of Lee Road between Chagrin and Scottsdale. These are especially overwhelming on the east side of the road. An access management plan needs to be developed with a detailed approach to consolidate existing curb cuts in an effort to create a safer environment for both motorists and pedestrians.

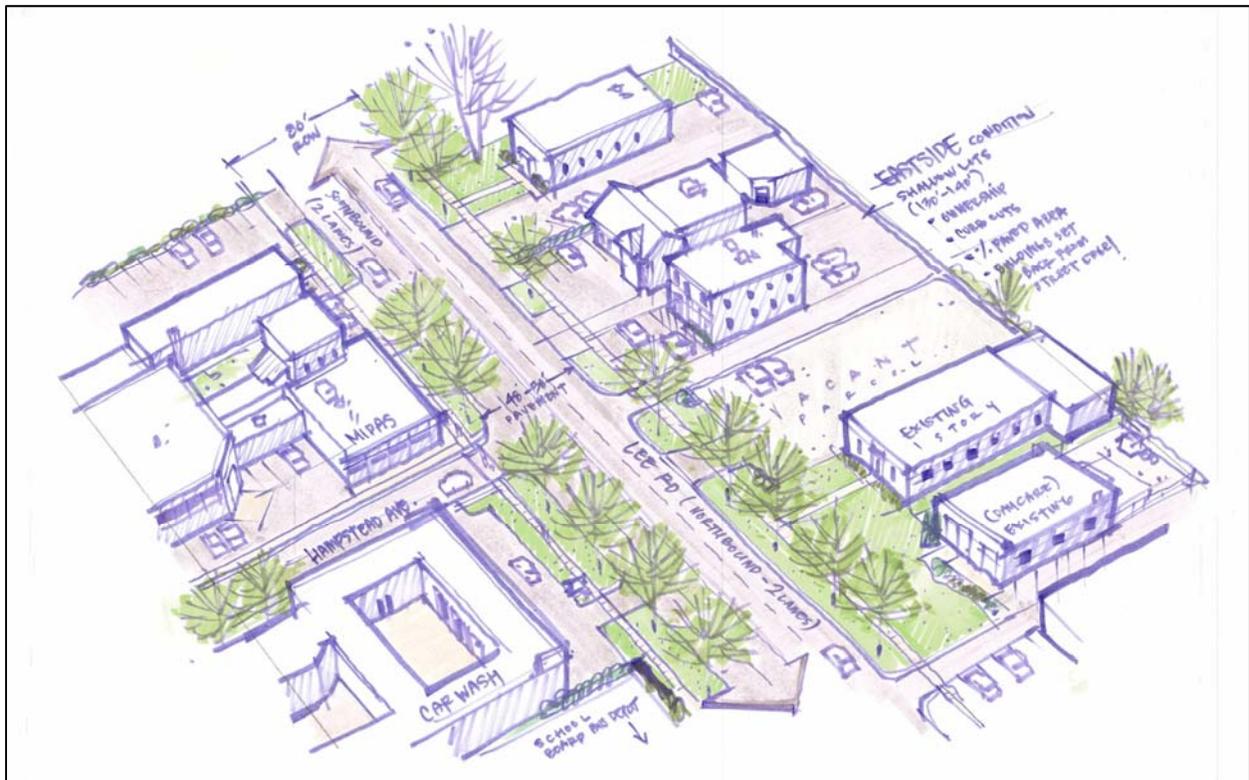


Fig 9 Lee Road: South Section Existing Development Pattern

Off Street Parking

The city should study the potential to provide shared, off-street parking on the parcel they currently own on the east side of Lee Road (Fig 10) as well as any other parcels they may acquire. While it is possible these could be considered temporary, an overall approach to parking

should be developed that is balanced to meet the needs of potential redevelopment.

Additionally, creation of shared, off-street parking lot(s) will present opportunities for implementation of sustainable stormwater management treatments.

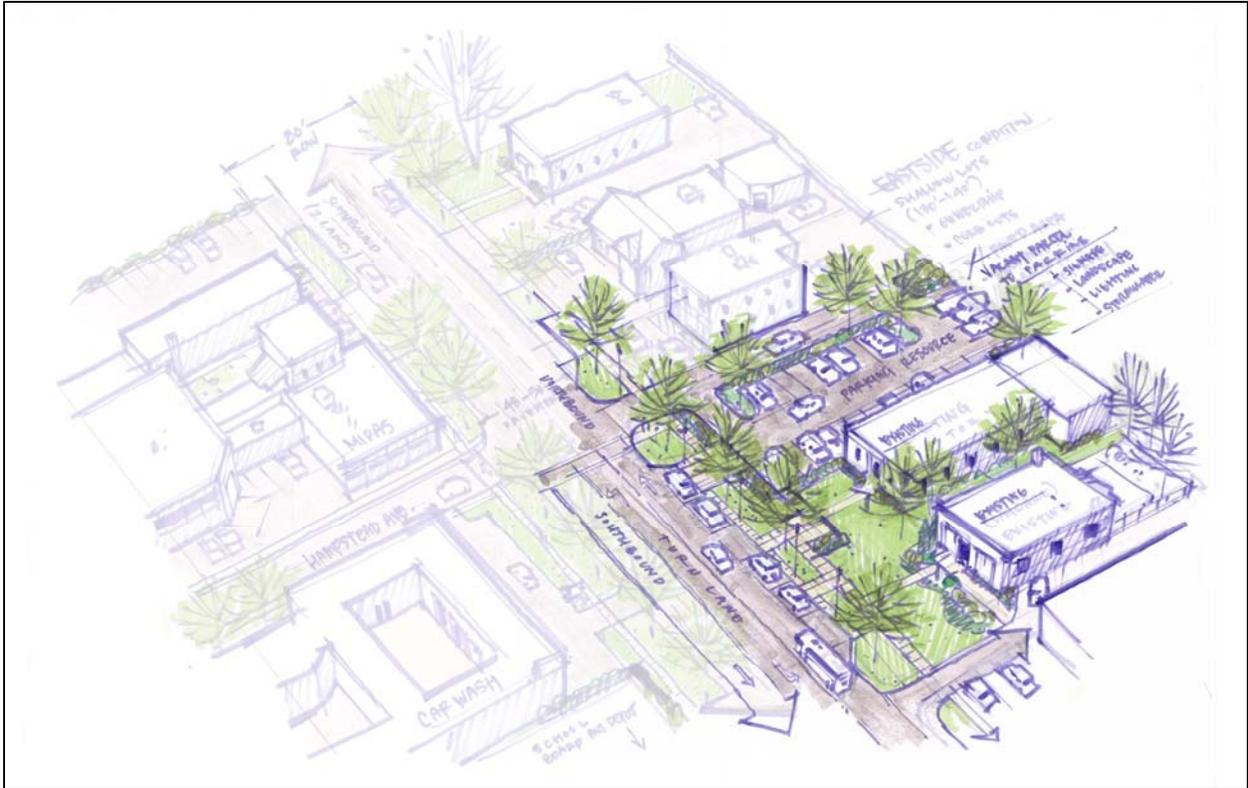


Fig 10 Lee Road: Proposed Shared-Use Parking on Available Lot

Parcel Consolidation

A strategy that considers consolidation of the small parcels on the east side of Lee Road should be developed that encourages creation of footprints attractive to potential

developers. This strategy should require new building facades on the street with parking in the rear and shared drives (Fig. 11).

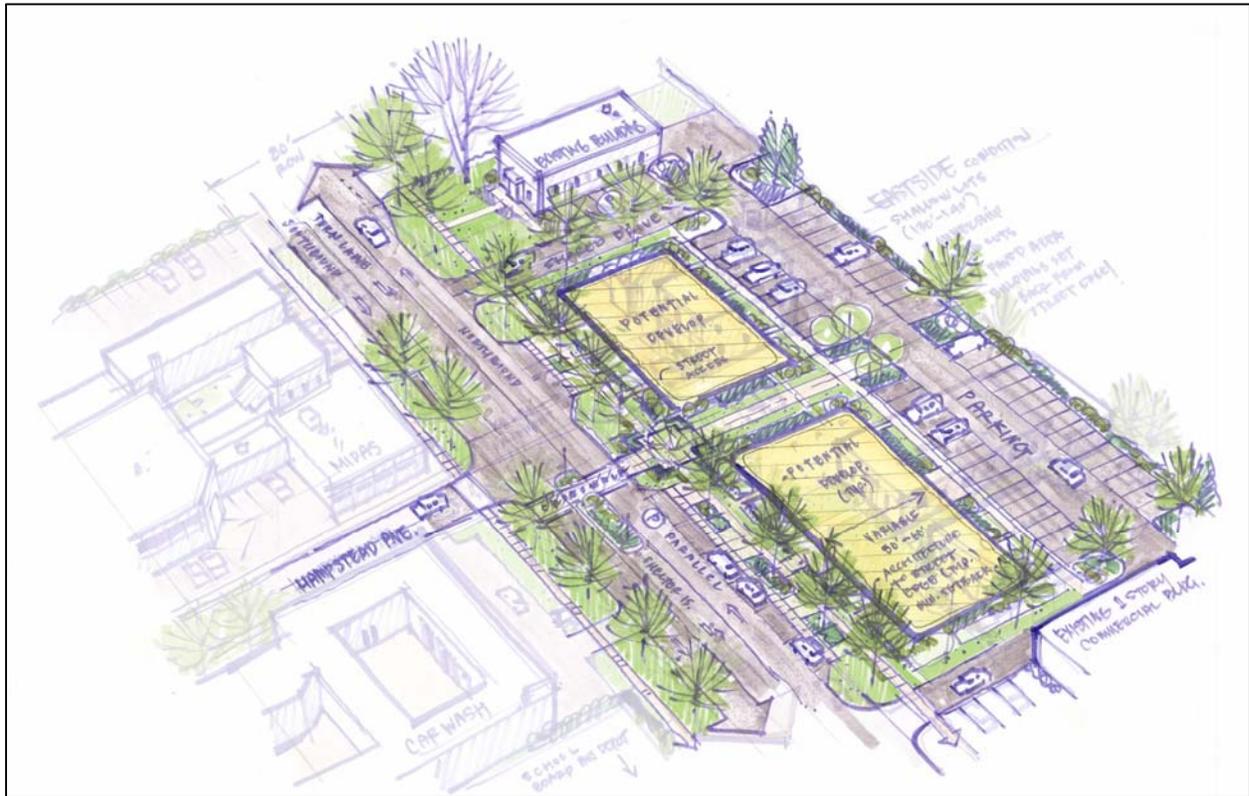


Fig 11 Lee Road: Potential East Side Development with Parking in Rear

West Side Parcels

A study should be conducted to evaluate opportunities to relocate the school bus yard on Lee Road. This is a significant property that has tremendous potential in

the redevelopment strategy for this corridor. In parallel with that, a strategy to market the west side lots should be developed (Fig. 12, 13).

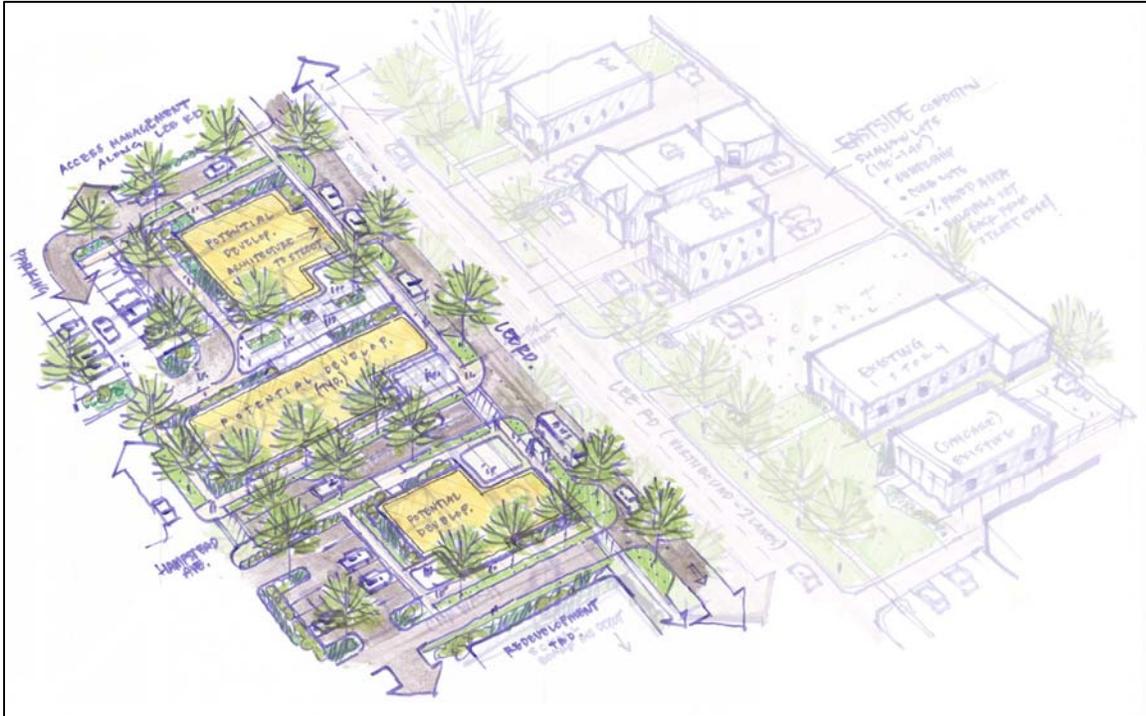


Fig 12 Lee Road: Potential West Side Development

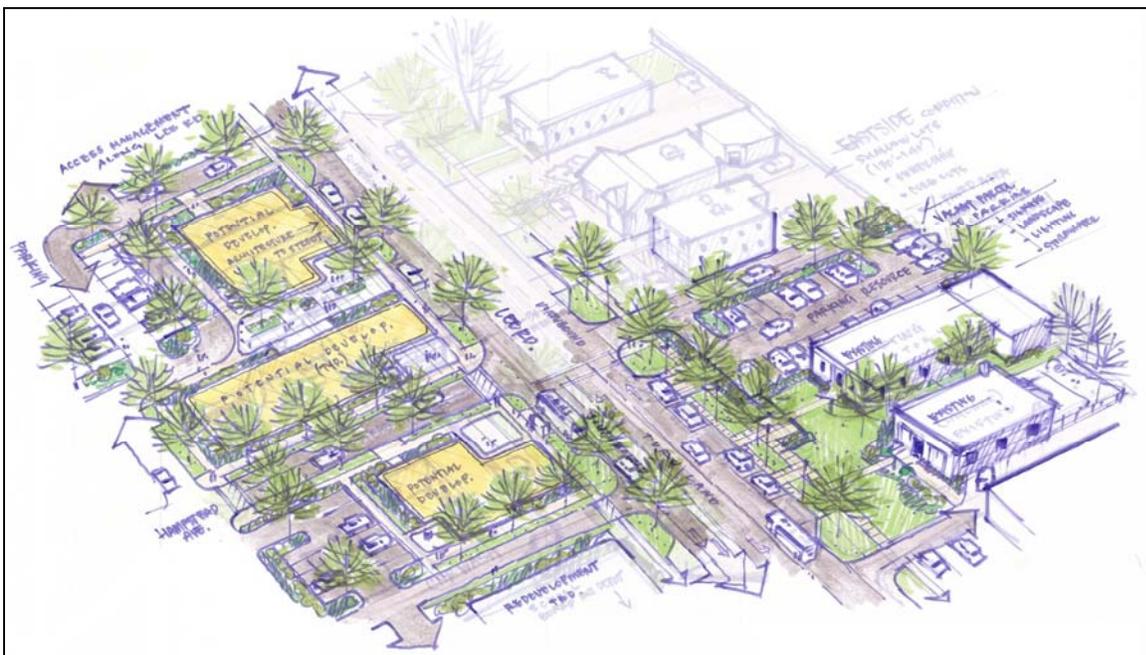


Fig 13 Lee Road: Potential West Side Development and East Side Shared-Use Parking

A graphic representation of the vision for these concepts is provided in Fig 14. As these strategies are implemented and the economic environment along the segment

of Lee Road improves, opportunities for connections to adjacent neighborhoods east and west of Lee Road should be explored.

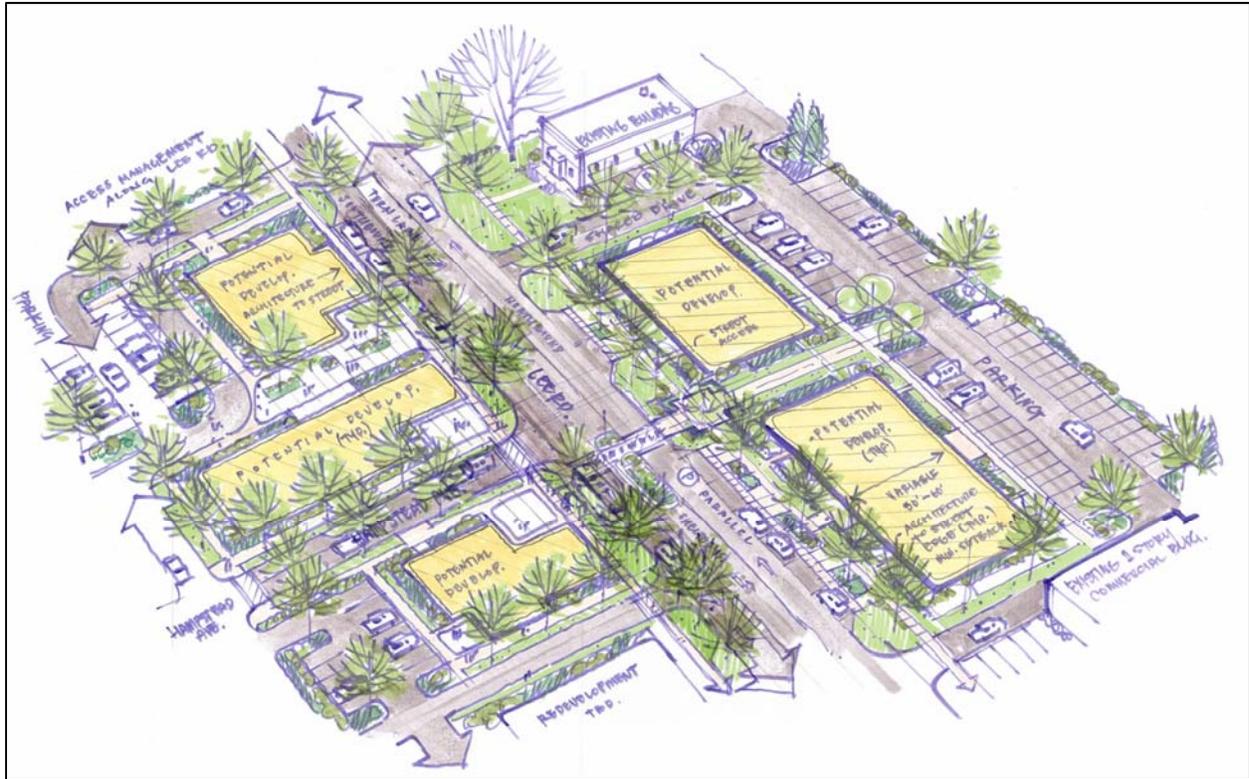


Fig 14 Lee Road: Potential East and West Side Development

8 Implementation Plan

Completion of the Lee Road Traffic Study and Corridor Plan provides an actionable plan to improve Lee Road through a combination of short-term projects and longer-term, bigger picture improvements that make the Lee Road corridor a safer, more efficient, and more attractive place.

Potential Funding Sources

A series of funding opportunities at the state and federal level have been identified for the components of the Lee Road Traffic Study and Corridor Plan:

- Federal Highway Administration
 - Surface Transportation Program (STP)
 - Transportation Enhancement Activities (TEAs, STP set-aside)
 - Hazard Elimination and Railway-Highway Crossing Programs
 - Federal Community Development Block Grant Program (CDBG)
 - Congestion Mitigation and Air Quality Improvement Program (CMAQ)
 - Safe Routes to School (SRTS)
 - Job Access and Reverse Commute Grants
 - Recreational Trails program funds
- Federal Transit Program
 - Urbanized Area Formula Grants
 - Capital Investment Grants and Loans
- State and Community Highway Safety Grants
- ODOT Safety Program
- Local Capital Improvement Program
- Recreational Trails Program
- Clean Ohio Trails Fund
- Bikes Belong Grant Program
- National Institutes of Health

Estimated Project Costs

The table below provides planning-level cost estimates for corridor roadway, pedestrian-bicycle, and streetscape improvements contained within the public right-of-way. These are planning-level estimates based on Ohio Department of Transportation cost

estimating data. Removal of vegetation and other obstructions to address walkability along the sidewalks and sight distance at intersections is considered property owner responsibility.

The visionary ideas for redevelopment outside the right-of-way should be pursued with a detailed analysis of the corridor that incorporates an access management plan and a land use/zoning study to further develop concept to redefine the south section of Lee Road. Access management issues significantly reduce the ability to implement consistent streetscape improvements and safe accommodations for motorized and non-motorized travel modes. It is important to address access management in developing the streetscape plan for Lee Road south of Chagrin.

RECOMMENDED IMPROVEMENT	ESTIMATED COST
RECONFIGURE LEE ROAD CORRIDOR Convert Lee Road to 3-lanes north of Van Aken and south of Lomond; includes new/repainted pavement markings throughout the corridor; includes wide shoulders (North Section) and bike lanes (South Section)	\$250,000
STREETSCAPE, INTERSECTIONS & MEDIAN Enhancements along corridor within right-of-way, gateway treatments, intersection enhancements at Kenyon, Lomond, Scottsdale; reconstruction of South Woodland, Kenyon, Lomond and Scottsdale intersections and construction of Hampstead median	\$2,000,000
OTHER BICYCLE ENHANCEMENTS South Park multi-use trail between Horseshoe Lake and Nature Center at Shaker Lakes, and bike racks at recommended locations	\$535,000
PEDESTRIAN AMENITIES and ADA COMPLIANCE Countdown pedestrian signal heads and curb ramps at recommended locations	\$130,000
SUBTOTAL	\$2,915,000
ENGINEERING DESIGN, ENVIRONMENTAL INVESTIGATIONS AND NEPA DOCUMENT	\$625,000
SUBTOTAL	\$3,540,000
INFLATION (2015 construction)	\$450,000
TOTAL	\$3,990,000

Source: Ohio Department of Transportation cost data.

Notes:

1. Planning level construction cost estimates include 30% contingency, per industry standard.
2. Cost estimates assume no right-of-way and/or utility impacts.
3. Bicycle treatments for South Park, South Woodland and Aldersyde corridors (sharrows, shoulders, or bike lanes) are not included.
4. South Park multi-use trail does not include cost for any structures.
5. Streetscape enhancements can include a range of options with associated range of costs at this planning stage; the higher end of the range is reflected in the estimate. It does not include access management improvements (driveway consolidation, improvements outside of right-of-way, etc.) and other costs for land side developments. A comprehensive design plan is necessary to completely and accurately reflect streetscape costs.
6. 13.1% inflation is based on ODOT inflation rates and assumes construction in 2015.