LOMA LINDA UNIVERSITY
HEALTH

Wholeness in Transportation

A Proposal for Loma Linda University Health
December 2015

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Special thanks to:

Institute for Community Partnerships
Institute for Health Policy and Leadership
The Wholeness Institute
Healthy Loma Linda
Inland Empire Biking Alliance
Loma Linda University Health Rideshare

Introduction

The Institutes for Community Partnership, Health Policy and Leadership, and Wholeness are pleased to submit this proposal for a comprehensive transportation plan to support LLUH in achieving its goal of modeling our unique approach to, and practice of, Wholeness. We seek to create a campus that distinctly puts to practice our education and research and models Wholeness for our region and the world. LLUH's academic prestige and heritage of health has garnered international recognition for health and longevity, yet to reflect such accolades, our physical campus environment has great need for strategic, health-oriented visioning, re-design and planning proccess. Our city and campus, while unique for its health status, has otherwise become homogenous within the poor planning decisions of the region.

As LLUH plans for the future, we must recognize the significant impact a thoughtfully planned campus can have on the health of our organization and community. In one of the most vehicle dependent areas of the world, we have the opportunity to write a different narrative. Many planning decisions affect community mobility (e.g. walking and biking), and subsequently the frequency with which those activities occur in a community. When a planning process undervalues these modes of transportation, it underinvests in these modes, which is a detriment to the overall transportation system diversity and efficiency.

This proposal is intended to outline the benefits of investing in the built environment and transportation and to describe more specific actions that should be undertaken in order to advance the organization beyond 2020.

Executive Summary

As LLUH plans for the future, we must recognize the significant impact a thoughtfully planned campus can have on the health of our organization and community. In one of the most vehicle dependent areas of the world, we have the opportunity to write a different narrative. Many planning decisions affect how people move from one place to another (e.g. walking and cycling), and subsequently the frequency with which those activities occur in a community. When a planning process focuses solely on automobile transportation, it underinvests in other modes, which is a detriment to the overall transportation system diversity and efficiency.

This proposal is intended to outline the benefits of investing in the mobility aspect of the built environment and to describe more specific actions that should be undertaken in order to advance the organization beyond Vision 2020.

Purpose

This proposal is intended to provide a set of recommendations based on best practice planning principles that focus on health as a design priority. This plan is intended to not only improve traffic and reduce parking and congestion issues, but to concurrently encourage active transportation.

Findings

Our city and campus, like the majority of Southern California, has embraced the automobile over active transportation mobility options such as walking and biking. While the automobile will inevitably continue to be an important mode of transportation, more cities and campuses are realizing the importance of improving their active transportation infrastructure. In order to create a more complete and safe transportation system on campus we must develop complimentary policies and procedures for:

- Parking
- Public transportation
- Active Transportation
- The Role of Nature

Parking

Parking is a well-known issue on and around our campus. Significant capital has been committed to alleviating the parking dilemma with new parking garages either under construction or scheduled to be developed within the coming years. Parking garages take up valuable real estate that could be put to better use for the organization and the community. Comprehensive and integrated policies and procedures for parking are needed.

As an example, converting 200 employees from vehicular dependency to other forms of transportation would reduce the need for those parking spaces. The cost of 200 structured parking spaces in Southern California is roughly $3.4 million, resources that could be reallocated within the organization.

Public Transportation

Aside from bus service lines such as OmniTrans, Riverside Transit Authority, and sbX, there are few other options for public transportation. In addition to the public bus lines, LLUH offers free local shuttles between and throughout LLUH campuses.

OmniTrans has been the predominant public transportation system in Loma Linda but has not been widely used due to irregular schedules, long travel times and gaps in destination connectivity. Students and employees rarely use it and heavily rely on personal cars.

Overlapping with OmniTrans bus service and connecting the LLUH Campus to the VA Hospital and destinations in San Bernardino, including the new Transit Center, sbX is the county's first express bus service that runs every 10 minutes during peak hours and every 15 minutes off-peak. State of the art environmentally-friendly buses have a number of features including convenient roll-on bicycle and wheelchair access.

Active Transportation

The Loma Linda community has a strong focus and commitment to preserving natural resources and engaging in walking and biking. While Loma Linda has the assets, there is great need for proper and safe transportation that is not dedicated solely to cars. Creating a safe bicycle and pedestrian network on the main LLUH Campus and between the LLUH campuses is desired, particularly given the need for student and staff transportation and current parking issues. In sync with preventive efforts of LLUH, focusing and investing in such initiatives encourages healthy and sustainable methods of transportation paving the way for LLUH and the city to become leaders as desirable places to live and work.

LLUH survey: In May 2015, a student-led community workshop was held at the City, where survey results were presented. Over 500 students, faculty, and staff responded to the survey with the following key results:

- 3 major themes emerged recognizing the need for: Infrastructure, Safety, and Rideability
- 56% of respondents do not feel safe riding on campus due to lack of bike lanes
- 37% of respondents avoid riding on campus due to no safe place to leave their bicycles.

Among highlighted desires for a more walkable campus is the need for shade and safer street crossings, including elements such as bulbouts that shorten the distance a pedestrian has to cover when crossing a street while also reducing car traffic.

The Role of Nature

In the summer months Loma Linda experiences temperatures 2-4^{o}F higher than in neighboring Redlands – a common result of large asphalted areas and little natural shade. Multiple workshops and LLUH focus groups have highlighted a strong call to action when it comes to LLUH trees and natural

resources. Concern from the employees, students, and the community indicated a lack of shade (trees are frequently cut down, especially mature trees), an unpleasant walking experience and a strong desire for environmental stewardship and leadership at LLUH.

Some of the benefits of incorporating and caring for trees within our built and natural environment:

- Trees cool and clean the air
- Trees provide much needed shade
- When planted along streets, trees act as a natural barrier between vehicles and pedestrians
- Increased property values
- Improved campus aesthetic

Possible Solutions

Parking

- Charge solo drivers an hourly (and variable) rate for parking
- Charge solo drivers for parking based on their distance from the workplace
- Reinvest parking revenue dollars into subsidizing healthier food options on campus, or any myriad of programs that might benefit the employee (e.g. concierge service, day care, car wash, etc.,)
- Use parking revenue to subsidize the bike share program, thus covering the costs of bicycles and maintenance
- Standardize development and parking policies for LLUH campus with the goal of future city integration

Public Transportation

- Transit pass benefits - pay the fare for individuals willing to commit to public transportation and who can provide validation of their efforts. sbX has provided LLUH with an opportunity for student and employee passes at approximately $25000 per year.
- Promotion of Zipcar - Launching in January 2015, LLU joined a number of other local universities by offering Zipcar service to students and staff who do not have a car or choose to bike, walk, or take public transit to campus. The Zipcar program has two dedicated cars on campus and has been on a steady growth trajectory through the year, despite little marketing.

Active Transportation

- Implement a Bike Sharing Program for the LLUH Campus. Systems such as Seattle Children's Hospital and Florida Hospital in Orlando have successfully installed bike sharing programs which are highly utilized. LLUH has the ideal campus size, geography, and weather for a similar bike sharing program.
- Re-align investment for proper design and infrastructure - Planting trees, constructing medians, and marking bike lanes are some of the initial steps that can be undertaken to improve the quality and safety of transportation and overall experience at LLUH.
- Create a master plan that includes a University Village. As a pedestrian-friendly town center serving the hospital, the university, and the community, it would be comprised of a diversity of local shops, businesses and services, healthy restaurants, transportation and living options for students, visitors, and employees.

- Implement a Complete Streets policy that would guide future LLUH development with a focus on moving people by all modes of transportation rather than cars alone.

The Role of Nature

- Develop LLUH Tree Policy and Protection Guidelines
- Form a LLUH Tree and Natural Resources Committee
- Conduct a thorough LLUH Tree Survey
- Form a LLUH Tree Sanctuary and Honorary Tree Program

Recommendations

It is our sincere desire to see LLUH achieve its goals for Vision 2020, but also to think and plan strategically about the success of our organization, city, and region beyond 2020. As such we recommend including this transportation plan proposal, or a revised version, in future planning and development decisions.

- Make Wholeness in Transportation a key fundraising initiative within the $15 million for the Wholeness Institute.
- Plan out measures to reduce overall demand for parking on campus by pursuing a goal that by 2025, 33% of all trips to LLUH be made by alternatives to single occupancy vehicles.
- Ensure that campus master planning is a fully engaging process with multiple stakeholders. (e.g. planning workshops that engage staff, faculty, students, residents and city representatives, etc.)
- Develop a Transportation Oversight Committee that focuses solely on strategic transportation issues and solutions such as the ones outlined in this proposal.
- Develop a Natural Resources Committee and guidelines that focus solely on strategic caretaking of trees and natural elements at LLUH, guided by proposed solutions such as the ones outlined in this proposal.
- Understanding the leadership of Andrews University in this field and the annual Urban Design Studio successes worldwide, send an RFP to Andrews University School of Architecture to carry out a charrette, develop plan drafts, final plan, publication and implementation guidance for a Campus Master Plan.
- Involving the Community Health Development initiative at LLUH, implement an evaluation tool for measuring the community health impacts of thoughtful health-oriented transportation and master planning.

The Objective

This proposal is intended to provide a set of recommendations based on current conditions at LLUH and best practice planning principles inclusive of health in planning and policy. This plan is intended to not only improve traffic and reduce parking and congestion issues, but to concurrently encourage active transportation such as walking and biking. Key areas of discussion within this proposal include the following:

Loma Linda - a Blue Zone legacy
Why should we plan for health?

Today's evidence is clear that the quality of people's physical, social, and mental health is profoundly shaped by the surrounding built environment. Healthy built environments are an essential piece of whole health.

We can and should be a local leader in health at all levels of planning and decision-making, including prioritizing the built environment of the LLUH campus and its supporting policies.

Loma Linda is not immune to the poor development and transportation policies of the region. Having a relatively young population with the median age of 33, Loma Linda's longevity factor is also not immune as healthy choices are increasingly becoming the difficult ones. We have an opportunity to shift the trend.

A good built environment, is inviting, memorable, cohesive, and health-promoting through intentional physical design.

1. The First Impression

As a world-class institution, LLUH is at the forefront of medical care with a globally recognized mission. Yet, we also have the duty to promote our values and awareness at home through all endeavours, including those of campus design, buildings, craftsmanship, and financial and environmental stewardship. The physical nature of LLUH's inception was described with vision and purpose for a healing environment, an aspect we need to carry beyond today and 2020. We have an opportunity to live out that vision through a comprehensive campus planning process, one that includes a health-promoting transportation plan as guidance for current and future development.

What do we want our front door to the world to look like? What does our physical campus express about our values, wholeness and healing?

View of existing conditions at the north campus entry.

View of potential streetscape improvements and a gateway along the north campus entry.

2. Parking



The amount of space required to transport the same number of people by car, bus, or a bicycle.
City of Münster, Germany planning office, 2001.

Parking at LLUH

9230 surface lot parking spaces

2741 parking structure spaces, **3** additional structures to be constructed

44+ acres in parking, or nearly half of campus' 97 acres

$11.5m in estimated land value dedicated to parking

$97.8m in estimated parking investment, or **$8200+** average per parking space, excluding planned structures or maintenance and staffing costs

Current situation

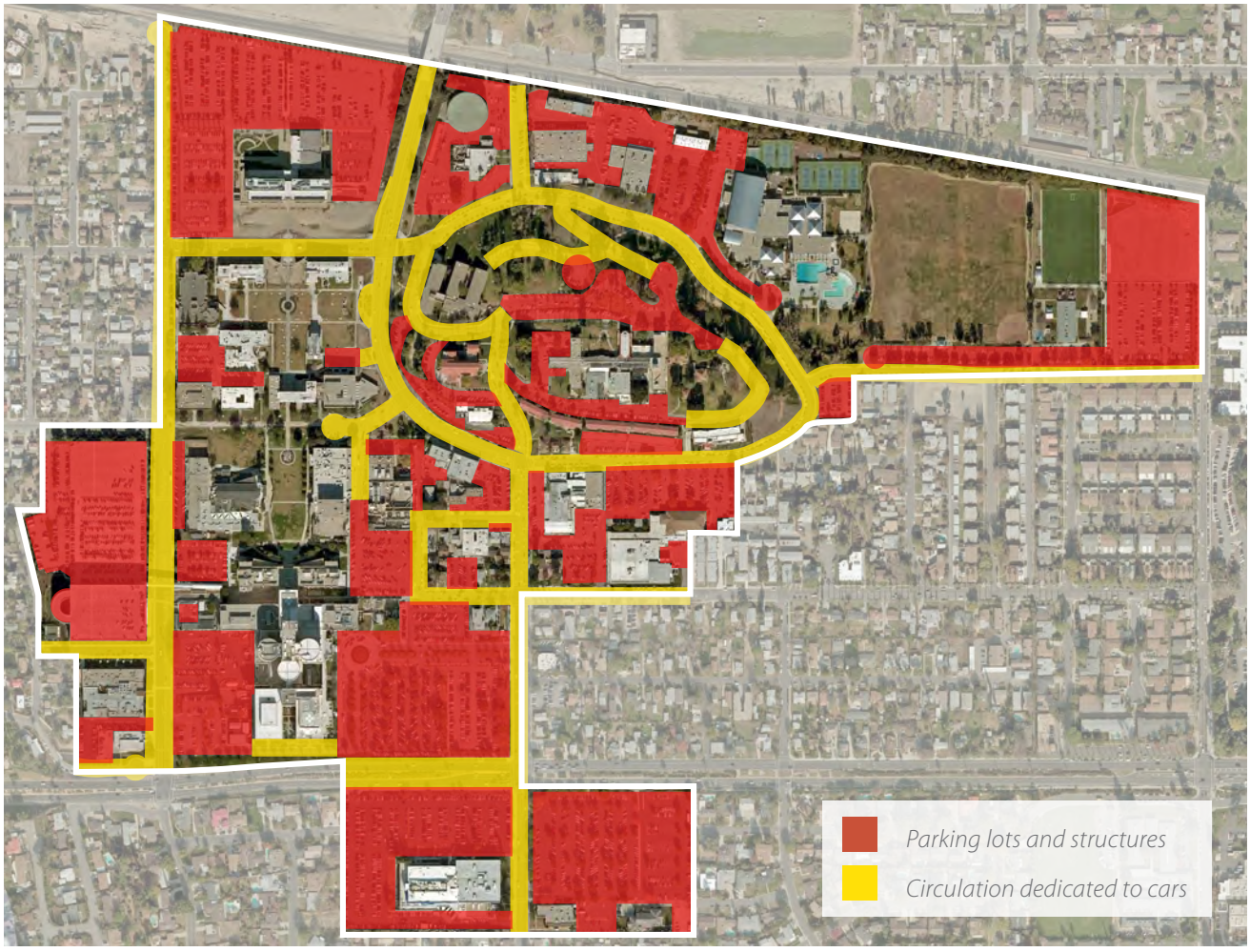
Parking is a well-known issue on and around our campus. Significant resources have been committed to alleviating the parking dilemma with new parking garages either under construction or scheduled to be developed in the coming years. Unfortunately, our current efforts encourage more people to drive because of the perceived availability of parking and wider roads which as studies show, will ultimately result in another shortage.

We induce demand for parking and subsequently traffic, when we do not charge the user or do not encourage alternative methods. Parking lots and garages take up valuable real estate that could be put to better use for the organization and the community. Comprehensive, integrated plans and policies for parking are needed.

Problem

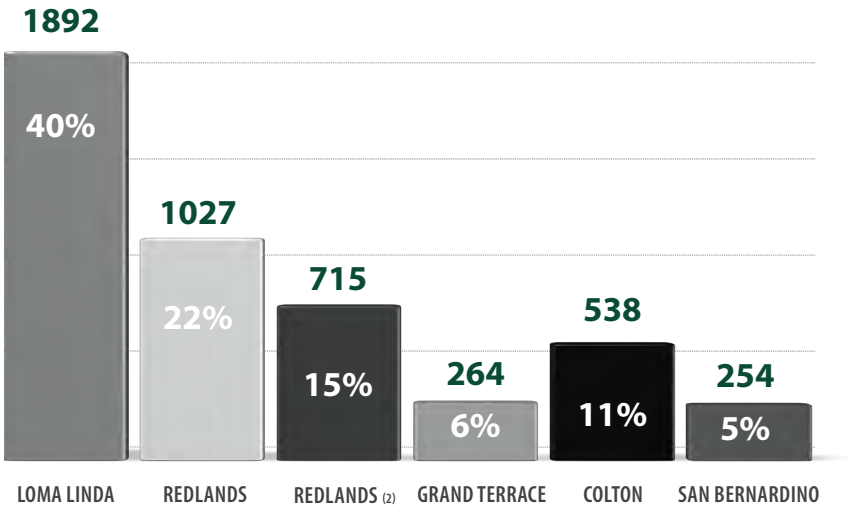
- LLUMC alone experiences over 21,000 *single occupancy* employee car trips per week, which averages out to over 1 million *single occupancy* trips annually (conservatively, as only by those reported through RideShare, not including LLU employees and students, patients or visitors).
- We have dedicated nearly half of our land and tens of millions of dollars to parking infrastructure and its' maintenance and yet we still have a parking problem. The recently completed seven level parking structure on Campus Street cost LLUH more than $17.1m to build and is dedicated primarily to employees, majority of whom live in or near Loma Linda.
- Parking lots and garages can increase traffic and thus emergency response times, contributed to the heat island effect, increase costs to LLUH and diminish value, character and aesthetic campus qualities.

The Fundamental Law of Road Congestion states that on a 1:1 relationship, new or widened roads will create new drivers resulting in the intensity of traffic staying the same. Not unlike parking capacity, every 10% in road capacity increase yields 10% increase in traffic[4].

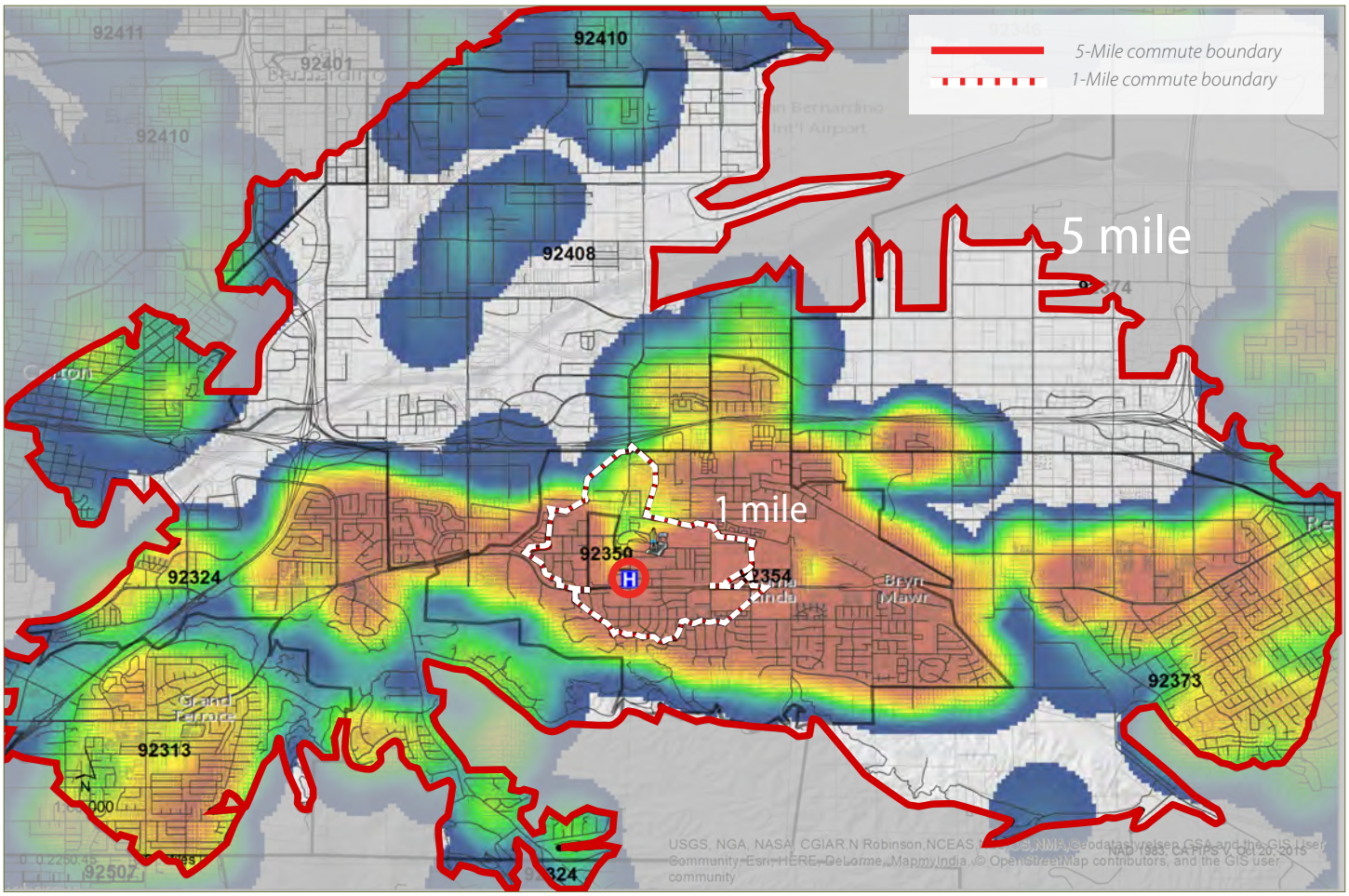


Valuable land area dedicated to parking and auto-circulation on the LLUH campus.

Data illustrated on this page shows the proximity of LLUH employees to work. Strategically reducing local solo car trips to campus and decreasing parking can greatly benefit the LLUH experience, the bottom line for health and active transportation, land use and financial expenditure.



Based on a sampling of 4600 employees, the greatest proportion reside within Loma Linda and neighboring Redlands. Source: LLUH Talent Management Services



Above: Employee Proximity 'Heat Map', showing the greatest concentration of employees who live within an approximate 1-mile commute and a 5-mile commute. Source: The Wholeness Institute

Possible Solutions

- **LLUH is recommended to pursue a goal that 33% of all trips to LLUH be made by alternatives to single occupancy vehicles.**
- Conservatively speaking, converting 200 LLUH employees from vehicular dependency to active transportation would reduce the need for those parking spaces. 200 structured parking spaces would cost at least $3.4 million, an investment that could be put to more strategic use elsewhere. In support of the economy, parking lots and structures should be limited and through a health-oriented approach serve only as a supporting role in transportation.

Did You Know?

200 structured spaces = approx **$20,000** per space

200 bicycles and storage = **$1,000** per employee

If LLUH charged **$5** flat fee per day for 2741 structured spaces (80% occupancy) = $10,964 per day or $3.4m annually or total of **$14.9m** revenue including surface lots.

- Charge solo drivers for parking based on their Vehicle Miles Traveled (VMT) to the workplace (e.g. employees living further away pay a standard rate, periodically adjusting fees in response to market changes, while employees living within walking or biking distance pay more). Employees who get to LLUH by bus, bicycle, carpool, vanpool, or on foot would receive a monthly Commuter Bonus in their paychecks. Employees who do not drive alone to work essentially receive a double incentive – earning the Commuter Bonus, and saving the cost of parking.
- Reinvest parking revenue dollars into health-oriented planning efforts, subsidize healthier food options on campus or any myriad of programs that might benefit the employee (e.g. concierge service, day care, car wash, etc.)
- Use parking revenue to subsidize the bike share program (outlined in section 4), thus covering enrollment, cost of bicycles, stations and maintenance, and initiatives such as the Loma Linda Bike Hospital.

3. Public Transportation

Current situation

Aside from bus service lines such as OmniTrans, Riverside Transit Authority, and sbX, there are few options for public transportation. Although improvement efforts are underway, there are still gaps and inconsistencies with some bus services in the region. In addition to the public bus lines, LLUH offers free local shuttles between and throughout LLUH campuses, but trips have been reduced.

Alongside OmniTrans bus service is sbX, the county's first express bus service. Running every 10 minutes, it connects LLUH to the VA Hospital and destinations in San Bernardino including the new Transit Center and the new LLUH Gateway College. State of the art environmentally-friendly buses have a number of features including convenient roll-on bicycle and wheelchair access.

With the recent opening of the San Bernardino Transit Center, the following public transportation options are now accessible with greater ease: sbX, 10 local and 2 express Omnitrans bus routes, Victor Valley Transit Authority, Mountain Transit, and soon to be completed Metrolink San Bernardino Line and the Redlands Passenger Rail Project. The Metrolink station at the San Bernardino Transit Center will allow for rail transportation to Los Angeles from Loma Linda via the sbX service.

Problem

OmniTrans has been the predominant public transportation system serving Loma Linda but has not been widely used due to irregular schedules, long travel times and gaps in destination connectivity. Students and employees rarely use it and heavily rely on personal cars. The new sbX line is addressing a number of these issues. However, aside from Rideshare benefits, there are few incentives for students or employees to utilize the current public transportation system.

Possible Solutions

Transit pass benefits

Pay the fare for individuals willing to commit to public transportation and who can provide validation of their efforts. sbX has provided LLUH with an opportunity for unlimited student bus passes at approximately $25,000 per year, based on LLU's student population. This program or similar options, perhaps supported by parking revenue funds, should be considered to help alleviate on-campus traffic. Increasing LLUH shuttle service and routes is also a benefit to the LLUH employees. Subsidizing public transit passes is much less than subsidizing parking costs.

Zipcar service

Launched in January 2015, LLU joined other universities by offering Zipcar service to students and staff who do not have a car or choose to bike, walk, or take public transit to campus. The Zipcar program has two dedicated cars on campus and has been on a steady growth trajectory through the year, despite little marketing.

Zipcar at LLUH currently has 104 members, reserving cars 3.2 times per month, which is higher than the national average of 2 times per month. The two Zipcars at LLUH reduce an estimated 90 personally owned vehicles from campus and for the 2014-2015 school year, it is estimated that LLU students who utilized the service helped reduce 143,676 lbs. CO_2 from entering the local air supply.

The service is available without cost to a limited number of LLU students, faculty and staff, or at $25 annual fee plus hourly rate at $7.50/hr (Gas and insurance are included). Currently, the service is utilized the most by students (56%), faculty or employees (33%) and the community (11%). Expanded marketing efforts are planned for 2016.

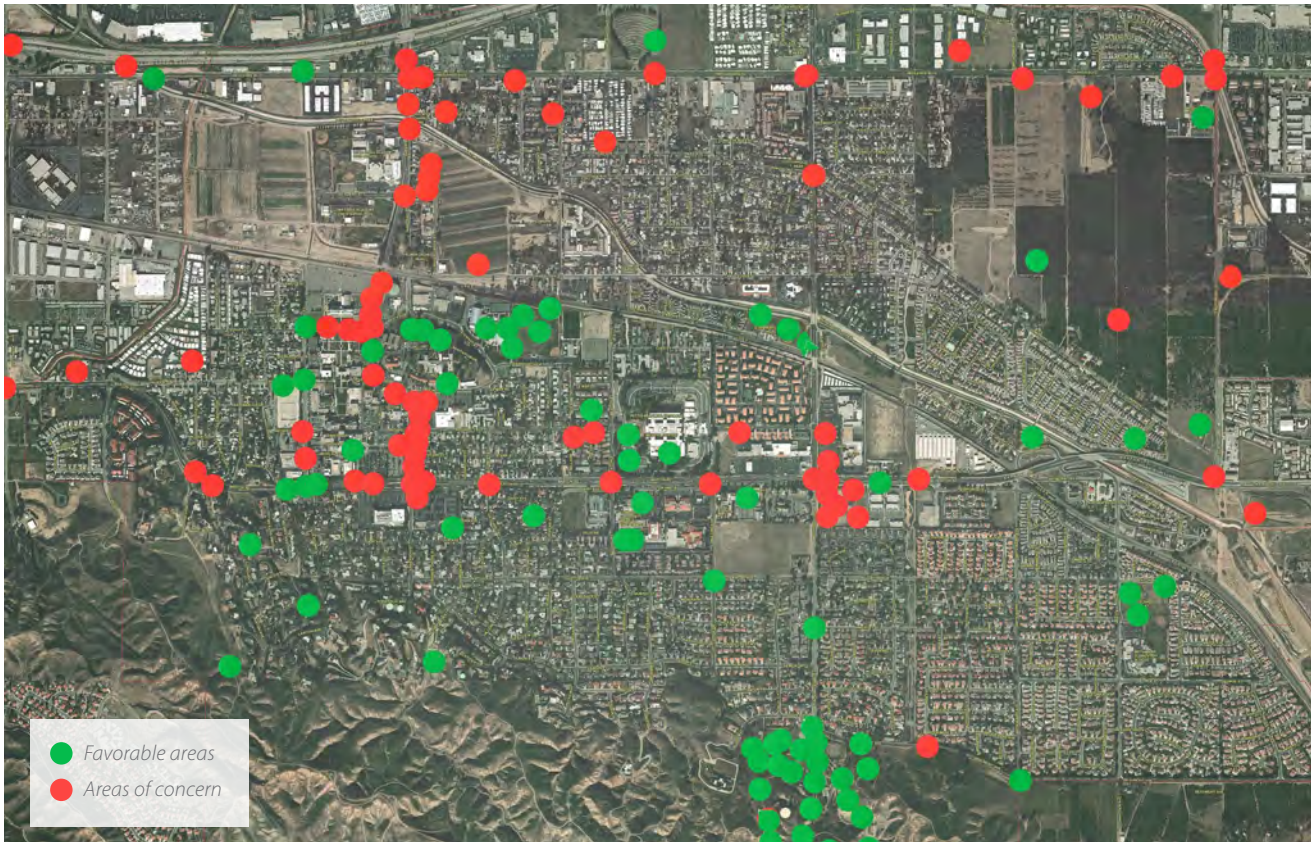
4. Active Transportation

Current situation

The Loma Linda community has a strong focus and commitment to preserving natural resources and engaging in walking and biking. The South Hills Preserve is an invaluable community resource supports many active programs that stem from LLUH. While Loma Linda has the assets, there is great need for proper and safe transportation that is not dedicated solely to cars. Leading the way, Rideshare at LLUH is the main program seeking to engage the employees in active transportation.

Creating a safe bicycle and pedestrian network on the main LLUH Campus and between the LLUH campuses can be a great asset, particularly given the diverse need for student and employee mobility options and the current parking issues.

In sync with preventive efforts of LLUH, focusing and investing on such initiatives encourages healthy and sustainable methods of transportation paving the way for LLUH and the city to become leaders as desirable places to live and work.



The majority of transportation and built environment areas of concern in the City of Loma Linda have been identified to be on the LLUH campus and its entry. Students, employees, city residents and visitors participated in this survey.

2012 Geographic Preference Survey, City of Loma Linda - a Healthy Loma Linda Initiative.

Problem

In May 2015, a student-led community workshop was held at the City, where LLUH bike survey results were presented. Over 500 students, faculty, and staff responded to a survey with the following key results:

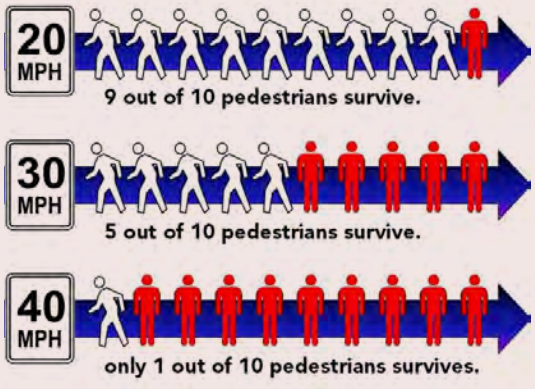
- 3 major themes emerged recognizing the need for better Infrastructure, Safety, and Rideability
- 56% of respondents do not feel safe riding on campus due to lack of bike lanes
- 37% of respondents avoid riding on campus due to no safe place to leave their bicycles.
- Among highlighted desires for a more walkable campus is the need for shade and safer street crossings, including elements such as bulbouts that shorten the distance a pedestrian has to cover when crossing. Additionally, slower traffic speeds are desired.

One of the most dangerous intersections on campus located at Anderson St. and Prospect Ave., is in critical need of re-design (not simply signage or traffic lights). Students, employees, visitors and campus security frequently report the dangers of this intersection, and unfortunately collisions occur often. As LLUH, we are to identify such conflict areas and provide a safe campus for our students, employees and visitors. Incidents are avoidable and proper road and infrastructure design is a proven and effective safety measure for pedestrians, cyclists and drivers.

Did You Know?

Speed kills, even when it's relatively low. One of the most dangerous intersections on campus (Anderson St. and Prospect Ave.) frequently experiences vehicle-pedestrian encounters. Road design dictates speed more than signage, and many campus streets and crossings are in urgent need of re-design that promotes safety and usability for non-motorized traffic.

Photo: A visiting physician was hit and thrown across the intersection in October 2015.



Possible Solutions

Vision Zero Initiative

Incorporated into master planning and design, pursue the distinct goal of having zero auto-related fatalities or injuries on the LLUH campus. An actionable item may be to ensure that all posted speed limits on campus are no faster than 25mph.

Bike Share at LLUH

Systems such as Seattle Children's Hospital and Florida Hospital in Orlando have successfully installed bike sharing programs which are highly utilized. Recognizing that cars are one of the most inefficient methods for moving through a campus, 77% of recently surveyed universities have responded that they have some type of a bike sharing program in an effort to either reduce parking, traffic congestion, or to provide the community alternative and healthy transportation options. A single car parking space is equivalent to approximately 15 bike parking spots. LLUH has the ideal campus size, geography, and weather for a similar bike sharing program.

Example of Florida Hospital's bike share program in Orlando. Photo: Dr. Jaecelle Guadiz

Complete Streets Policy

Working with the City of Loma Linda, implement a Complete Streets policy at Loma Linda University Health that would provide current and future campus growth with a vision and infrastructure that focuses on moving people rather than cars alone. Already undergoing major infrastructure changes, LLUH has the opportunity to shift from conventional road and parking design standards to more holistic approaches that promote health, character of place and increase methods and quality of travel. When we design our street in a conventional method to move cars as quickly as possible, we allow drivers to feel safe moving far faster than intended or appropriate for our community streets where people need and want to move safely. Unlike road design, signage does not dictate speed successfully. Funding is available for such projects but initiative and commitment are required.

"Complete Streets are designed to enable pedestrians, vehicles, and bicycles to co-exist within the same thoroughfare in a safe, comfortable, and convenient manner. Sidewalks are of sufficient width to allow multiple people to walk side-by-side. Tree lines provide shelter from the weather and provide a safety barrier from moving traffic. On-street parking enables convenience for automobiles and reinforces the safety barrier for pedestrians. Vehicular lanes are narrow enough to promote a design speed of 25 MPH, which makes crossing and on-street bicycle activity easy and safe." -Andrews University Master Plan[1]

Capacity of streets is not limited to cars alone and LLUH streets should be more than simply conduits for car travel.

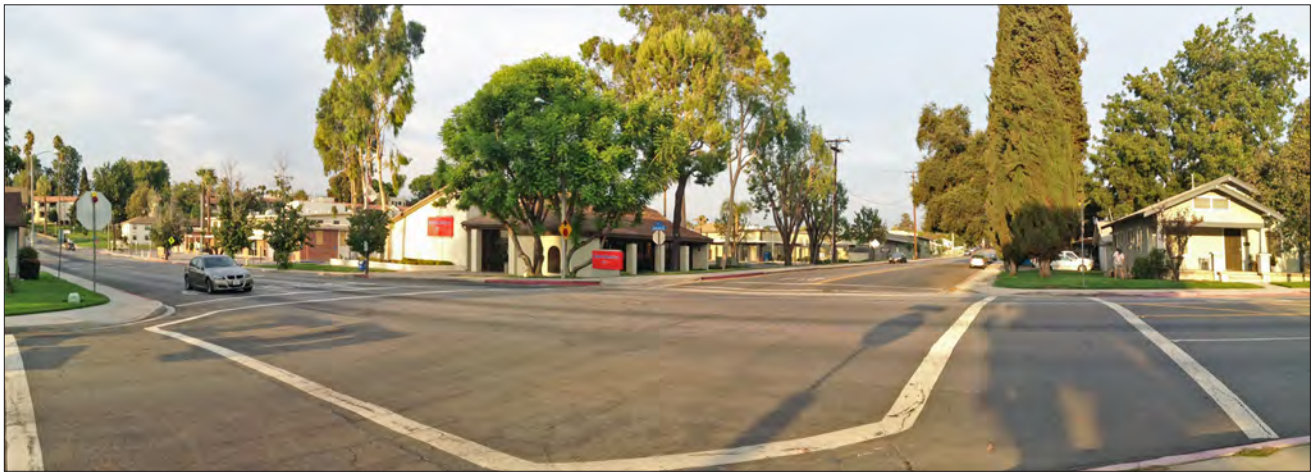
Example of Complete Streets elements that can be contextually tailored to specific parts of LLUH and Loma Linda.
Image: Crandall Arambula

Example 1: University Village

As LLUH grows and develops beyond 2020, it is important to not only address the streetscape improvements, but also to envision a central piece of the campus. As a pedestrian-friendly town center serving the hospital, the university, and the city, a *University Village* would potentially comprise of a diversity of local shops, LLUH businesses and services, healthy restaurants, and residential options for students, visitors, and staff.

This would eliminate the need for multiple trips outside of campus and town while keeping business local, reducing unnecessary congestion, and creating an environment and destination that will reflect the LLUH mission through its' built environment.

Potential location for a university village center



View of existing conditions at Anderson St. and Prospect Ave

A visionary illustration of what a university village could look like at the above intersection

5. The Role of Nature

Current situation

Our Institution was envisioned with the healing value of nature throughout the campus. As human beings, we seek a healing reprieve from the daily activities and this is especially true on a medical campus where patients often search for peace and comfort that can be found in natural settings. We have an opportunity to address this on our campus by strategically incorporating nature into our planning process, including transportation.

Problem

Multiple workshops and LLUH focus groups have highlighted a strong call to action when it comes to LLUH trees and natural resources. Concerns from the employees, students, and the community indicated a lack of shade and a pattern of its' removal (especially mature trees), an unpleasant walking experience, lack of natural barriers between cars and pedestrians and a strong desire for environmental stewardship and leadership at LLUH. These are vital supporting elements for active transportation.

Unfortunately the tree removal pattern on campus is not limited to construction projects.

Example of useful street trees providing share, a barrier to the street, and enhancing the aesthetics of a place.

Possible Solutions

When trees become part of the planning and preservation process, we can create safer walking environments by forming and framing visual walls and providing distinct edges to sidewalks allowing motorists to better distinguish between their environment and one shared with people, providing a better experience for both.

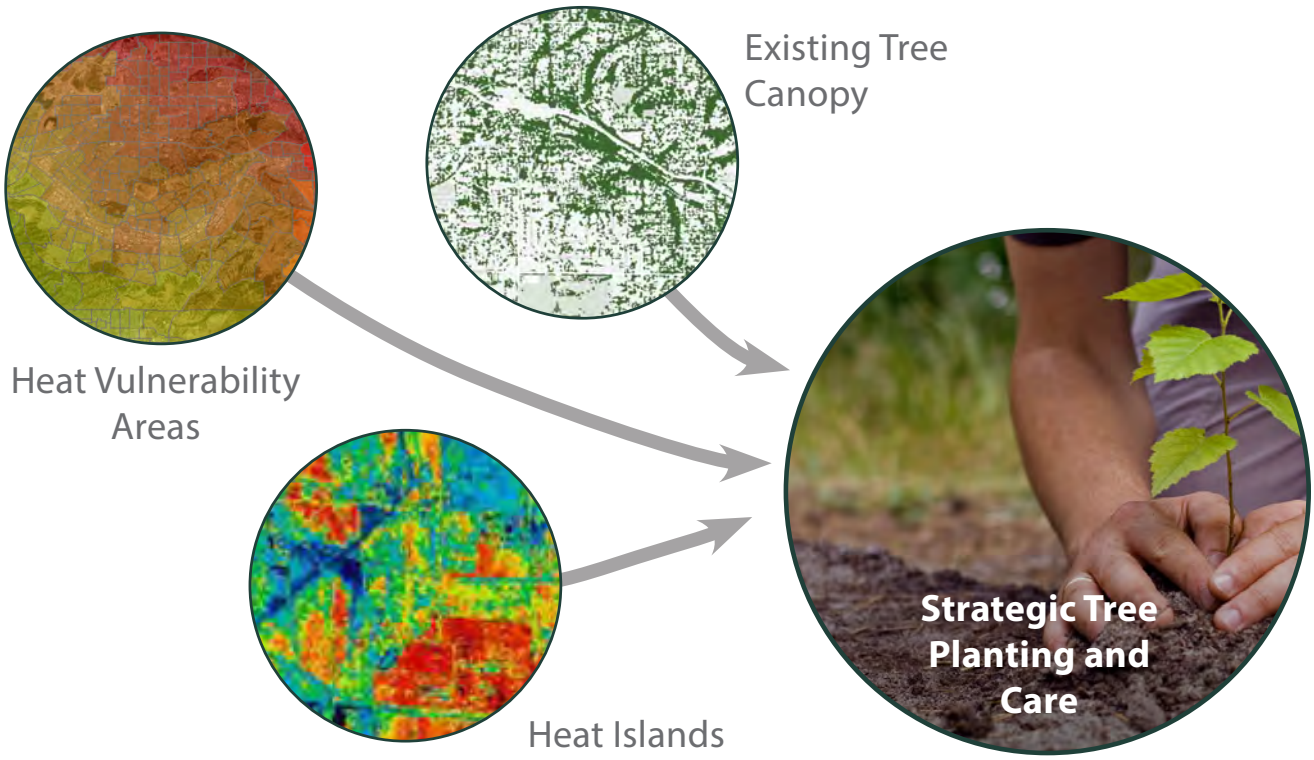
The benefits of trees are not limited to increases in safety, mental health, property values, or clean air alone. For example, in the hot summer months we experience 2-4°F higher temperatures in Loma Linda than in neighboring Redlands - a common result of large asphalted areas dedicated to parking without the natural shade expected from tree cover that is present in Redlands. The Urban Heat Island Index by CalEPA also demonstrates a similar difference betwen the towns.

LLUH Tree Policy and Protection Guidelines

Develop and adopt an LLUH Tree Policy and Protection Guideline manual that guides the planting, removal, preservation, and protection of all LLUH trees, working together with the City of Loma Linda on street tree planting and care.

LLUH Tree and Natural Resources Committee

Organize a diverse, strategically visionary and experienced committee that will guide any tree planting, removal and care, contractor assignment, provide and hear comments and recommendations, which would be parsed through the committee for consideration prior to any action. The importance of such committee is crucial to the health of our local natural environment and the support of physically active mobility, as is exemplified in the neighboring City of Redlands.



Strategic Tree Planting

With the expertise of community partners and our local resources (ESRI, City of Loma Linda, LLU students), survey all existing trees on the LLUH campus and gather specific data on Loma Linda's and region's heat vulnerability and tree coverage. As illustrated above, by combining data on existing tree canopy, areas of heat vulnerability and heat islands, LLUH and the City of Loma Linda can be regional leaders in utilizing data to prioritize tree planting and care in areas of greatest need and desirability. This can further be enhanced through an ongoing evaluation and research study on the environmental, transportation and experiential benefits at LLUH.

Did You Know?

Ellen G. White, one of LLUH founders, envisioned and wrote thoroughly on the importance of a healthful and a healing campus, particularly our natural environment and physical activity.

"Our Sanitariums are to be established in the most healthful surroundings." -SpTB03b 16.1

"...Underneath these (leafy) canopies patients were resting. The sick were delighted with their surroundings. While some worked, others were singing. There was no sign of dissatisfaction." -SpTB03a 10.1

Example of desired tree sanctuary and open space character. Claremont Graduate University.

LLUH Tree Sanctuary and Honorary Tree Program

Donating a tree, a grove or a park through the LLUH Honorary Tree Program can be a great way to honor the outstanding, heroic and beloved members of the LLUH family. It is a living and growing tribute that benefits the campus and the community at large and can be established with a dedicated LLUH Tree Sanctuary - an area strategically set aside for the preservation and stewardship. Planting trees will add beauty to our campus, support active transportation and add a healing character of place and the environment.

Street Trees

1) Spatially denote the pedestrian realm;

2) protect pedestrians from vehicles;

3) filter the sunlight and air;

4) soften the hardscape of buildings and concrete;

5) and help shape the streetscape and provide character to place.

Example 2: Streetscape Improvements along Anderson

Some of the most influential changes when improving an environment can be completed without major infrastructure changes such as planting street trees. Loma Linda experiences a warm summer climate with mild winters, both suited for year-round active transportation. The community and student body continually seeks out biking and walking as transportation options. The benefits of shade, narrower and safer streets and crossings, wider sidewalks, and welcoming building frontages are elements that are equally important in promoting such activities.

Above: Anderson Street at Prospect Ave., currently
Below: Same view after potential streetscape improvements with bulbouts and a pedestrian crossing refuge at the median.

Location of transformation view along Anderson St.

Planting trees, constructing a median, and marking bike lanes are some of the initial steps that can be undertaken to improve the quality and safety of transportation and overall experience at LLUH. Such improvements not only address the induced demand of many students driving through the campus, but also that of parking and as catalysts for increasing activity for the buildings lining the street.

Streetscape improvements often act as catalysts for further quality development and boost the local economy, aesthetics, character and identity of a place. With over one million visitors to the LLUH system, such improvements would be extremely beneficial to the community, visitors, and the LLUH campus. Additionally, as the area starts becoming a more desirable destination and the residents and developers begin to recognize the value of place, it will encourage development that's appropriate for the community, the university, and the town.

Current and Potential: Possible transformation of streetscape along Anderson Street.

Below: View of transformation looking east along Anderson St.

6. Engagement & Incentives

Current Situation

Rideshare, LLUH's leading incentive program for active transportation, struggles to reach requirements set by the South Coast Air Quality Management District (SCAQMD). Currently, in an organization with 13571 employees on the main LLUH campus, only 1.1% of people choose to walk or bike to work. The University paid a fine of $56,000 in 2014 and the Medical Center faces fines up to $150,000 if it not meet its AVR (Average Vehicle Ridership) of 1.5, which is currently at 1.1. However, our Rideshare program is well organized and would benefit from additional strategy and support.

Rideshare numbers for 3rd quarter 2015

	BIKE	WALK	BUS	PARKING ONLY	CARPOOL	VANPOOL	Totals
MEDICAL CENTER	35	39	18	49	161	6	**308**
CHILDREN'S HOSPITAL	7	4	1	4	40	0	**56**
HEALTH CARE	7	8	5	4	168	9	**201**
HEALTH SERVICES	2	4	0	1	38	3	**48**
EAST CAMPUS	0	0	0	0	2	0	**2**
BMC	1	0	0	0	4	1	**6**
UNIVERSITY	9	39	3	34	59	1	**145**
	61	**94**	**27**	**92**	**472**	**20**	**766**

Rideshare numbers for 3rd quarter 2015. Only 155 individuals were choosing to walk or bike. Source: LLUH Rideshare

Membership in the LLUH Rideshare Program, and the resulting incentives is limited to the full time employees of Loma Linda University, Loma Linda Medical Center, Loma Linda University Children's Hospital, Loma Linda University Health Care, Loma Linda University Behavioral Medicine Center, Loma Linda University Health Services, Loma Linda Adventist Health Center, Faculty Physicians and Surgeons of LLU School of Medicine and the General Conference of SDA.

The Carpool program is defined as two to six individuals riding to and from work in the same vehicle; participants may not reside at the same residence. Participants must turn in rideshare claim cards (logs) quarterly to qualify for carpool benefits, however if participants choose to, they may turn in rideshare logs monthly.

All carpool participants who are authorized to park in designated carpool parking areas must be registered in the Online Parking System and in good standing. Carpool parking hours are Monday through Friday 6:00 am to 5:00 PM.

Benefits

Bicycling & Walking

- Any Rideshare Member that rides their bicycle or walks to and from work is eligible for a $60 dollar quarterly bonus. The bonus will be added to the employee's paycheck if all requirements of membership are completed.

Bus / Transit

- Any Rideshare Member that rides public transportation to and from work is eligible for a $25 dollar a month subsidy from LLUH, pending all requirements of membership are completed.
- Qualifying members may purchase monthly transit passes from the Department of Parking & Traffic.

Carpool

- Any Rideshare Member that participates in a qualified carpool team to and from work is eligible for 10 gallons worth of gas coupons per month, pending all requirements of membership are completed.

Vanpool

- Any Rideshare Member enrolled in the LLUH Vanpool program is eligible for the following benefits, pending all requirements of membership are completed:
  - A $50 dollar a month subsidy paid directly to the Vanpool authorized agent.
  - Pre-Tax payroll deductions to pay the members share of Vanpool expenses; said payments will be made directly to Vanpool authorized agent by LLUH.
  - Up to $1,800 startup benefit for newly formed Vanpools by IE Commuter.

Problem

There is a well developed and robust Rideshare program at LLUH. The problem is that the infrastructure and development policies for this program to succeed are absent. As a result, the number of employees enrolled in the bicycle and walking programs is very low, while the number of employees living with walking or biking distance is high.

Additionally, no benefits or incentives are available for the student body.

Possible Solutions

When it comes to health, wellness, and contentment, the companies in Silicon Valley apply the same vigor that helps them stay relevant in the cutthroat technology industry. Successful companies recognized the need to thoroughly refresh and rethink existing environments, because new talent expects it. These companies even look past the physical aspect of wellness and specifically focus on the "body, mind and soul" of workers through every means possible.

It is largely because of this, and the competition to recruit top talent, that so many are drawn to work for such companies. Loma Linda University Health is well positioned to replicate these concepts because it exists within a university campus which already has a great foundation to build upon.

Another way businesses in Silicon Valley keep their employees engaged and active is by providing a bike share program. As mentioned prior, such initiative was also recently implemented by Adventist Health System in Orlando Florida. The concept is simple: communal vehicles that employees or students ride across campus rather than driving cars. This would reduce parking, searching, re-parking and increase active transportation.

Other ways to further incentivize active transportation include the following:

- Employee wellness plan benefits like further discounts on premiums or incentive payouts for employees who commit to walk or bike to work and can provide validation of their efforts
- On-site services and amenities such as shops, restaurants, daycare, etc. Services that would be more likely to sprout up in an environment with more pedestrian traffic
- Commuter bonuses on top of the annual holiday bonus received across the organization
- Bike sharing discounts for new/returning students, similar to the Zipcar initiative.
- Resource the Bike Hospital benefit/resource on campus so new and existing riders have a place for assistance and education on bike maintenance and repairs.
- Whether through a shuttle service or bus pass incentives, further exploration should be done on employee use of the underutilized sbX lot located near Anderson St. and Redlands Blvd.

7. Benefits of Healthy Planning

Economics

Many cities, businesses and universities are catching on to the economic case for active transportation investments. In an environment where congestion and parking is a major frustration, increased active transportation and infrastructure improvements could be beneficial. Additionally, communities that are choosing to make these investments also see a return on investment through an improved sense of community. This sense of community often attracts small business, new residents, and reduces the frequency of crime.

There are numerous reasons for investing in infrastructure that supports active transportation. However, as is often the case, the most convincing one deals with dollars and cents. One well-documented result for communities designed around walkability is increased property values. It is not uncommon for real estate to receive a desirability ranking based on its walkability and thus a higher valuation. One key to property value and walkability is the presence of trees. A study comparing houses with and without nearby street trees found that an adjacent tree added 3 percent to the median sale price of a house, an increase of almost $9,000 or the equivalent of adding a small bedroom[11]. Additionally, decreased spending on parking infrastructure offsets thoughtful active transportation costs.

Accessibility

Well planned active transportation infrastructure provides basic mobility for community members. Many people rely on walking and biking to access activities with high social value, such as medical services, errands, places of worship, education and employment. Poor active transportation infrastructure can lead to social isolation or exclusion, that is, the physical, economic and social isolation of vulnerable population[5]. It is in the interest of healthcare organizations to break down these walls for the betterment of the health of local populations.

Geographic Information Systems (GIS) is a great tool that can be used to assess important active transportation corridors in a manner that would be most beneficial to community members and most cost efficient. Projects around influencing decision making with GIS would provide great experience for our Public Health students and faculty.

Impact	Improved NMT Conditions	Increased NMT Activity	Reduced Automobile Travel	Community Benefit
Potential Benefit	Improved user convenience, comfort and safety	User enjoyment and mental, social and physical health benefit	Reduced traffic congestion and redundant trips to/from LLUH	Improved accessibility, particularly for non-drivers
	Improved accessibility for non-drivers, which supports equity objectives	Improved community fitness and health	Road and parking facility cost savings	Transport cost savings
	Option value	Increased community cohesion (positive interactions among neighbors due to more walking on local streets) which shows to increase local security	Consumer savings	Reduced sprawl costs and impact
	Higher property values	Risk Management benefits (healthier customers)	Reduced chauffeuring burdens	Openspace preservation
	Increased Security	More memorable visits and encounters	Increased traffic safety	More walkable, livable communities
	LLUH opportunities for leadership in health and the built environment	Greater support for active transportation funding	Energy conservation	Increased property values
	LLUH Branding	Talent recruitment and retention	Pollution reduction	Increased security
			Economic development	Stronger sense of community and place
Potential Cost	Facility/infrastructure costs and maintenance	Personal equipment costs (bike, shoes, etc.)	Slower vehicular travel	Increases some initial development costs
		Increased conflict risk with vehicles unless mitigated through proper planning	Reduced ease of driving and parking for single occupant vehicles	

Non-motorized transportation benefits and costs

Consumer Cost Savings

Active transportation affects transport costs. People with greater access to walking and biking infrastructure save on vehicle expenses. For example, one study found that households in automobile-dependent communities devote 50% more to transportation (more than $8,500 annually) than households in communities with more accessible land use and more multi-modal transportation systems (less than $5,500 annually)[6].

Consumer cost savings can be evaluated based on potential transportation cost savings. For example, walkability improvements that provide more direct routes, encouraging people to leave their car at home, can reduce vehicle ownership and operating costs.

Reduced driving saves fuel and oil. In a report by the Victoria Transportation Policy Institute, transitioning to biking or walking can save a total of 20-25 cents per mile reduced. This translates to an annual savings of $390 for someone with a 3 mile commute to work. Savings are greater if improved travel options allow a household to own fewer vehicles[5].

Land Use Efficiency

Low-density development with large swaths of land dedicated to roads and parking leads to a myriad of economic, social and environmental costs. Active transportation improvements can help lower these costs by reducing the amount of land required for vehicles while encouraging more thoughtful development in the community. Additionally, encouraging the use of park-once parking to support multiple destinations (See page 9 for existing LLUH lots) can help offset the need for additional parking lots and garages.

Community Livability and Cohesion

Community livability refers to the environmental and social qualities of an area as perceived by residents, visitors, students, and employees. Social capital is built up in a community when people feel they know their neighbors and have friends close by. This has indirect benefits like safety and health, but also contributes to property values and economic development.

- Good active transportation infrastructure increases community livability. More attractive and safe places to walk and bike increase desirability and community livability.

Fitness and Health

Supporting increased physical activity for employees, students, families, and children aligns with the organization's goals for disease prevention and health promotion. As health systems move towards the accountable care model, the health of the built environment is already bring recognized as an important factor given the following:

- Obesity is a nationwide problem that crosses all demographic lines. However, the effect on children is perhaps the most disturbing. While 50 percent of children walked to school in 1969, fewer than 15 percent do now[8].
- In the decade from 2003 through 2012, 47,025 people died while walking on USA streets. That's sixteen times the number of Americans who died in natural disasters—earthquakes, floods, hurricanes and tornadoes—over the same timeframe. By investing a similar level of energy and resources into active transportation safety, we can save many lives.
- According to the rules of the U.S. military, 25 percent of young men and 40 percent of young women are too overweight to enlist and excessive weight now kills more Americans than smoking.
- A study conducted in San Diego reported that 60 percent of residents in a "low-walkable" neighborhood were overweight, compared to only 35 percent in a "high-walkable" neighborhood[12].

Did You Know?

With street trees, we can create safer walking environments by forming and framing visual walls and providing distinct edges to sidewalks so that motorists better distinguish between their environment and one shared with people.

Not only do street trees lower ambient air temperatures by up to 15 degrees, but since people are affected by either ugly or attractive environments, they also help reduce blood pressure and can improve overall emotional health!

-Glatting Jackson and Walkable Communities, 2006

Economic Development

Economic development refers to progress towards a community's goals, including increases in economic productivity, employment, business activity, and investment. Investment in active transportation can affect economic development in several ways. As an example:

- Establishing bike paths on 8th and 9th Avenues in Manhattan increased local business retail sales up to 49% compared with 3% borough-wide.
- Expanding walking facilities in Union Square North (Manhattan) reduced commercial vacancies 49%, compared to a 5% increase borough-wide.
- Converting an underused parking lot into a public park on Pearl Street (Brooklyn) increased nearby retail sales volumes by 172%, compared to 18% borough-wide.
- Converting a curb lane into a public seating area on Pearl Street (Manhattan) increased sales volumes at adjacent businesses by 14%.
- Establishing a bus lane and other bus transit improvements on Fordham Road (Bronx) increased nearby retail sales 71% compared to 23% borough-wide.
- Developing bus- and bike-lanes on First and Second Avenue reduced commercial vacancy rates 47%, compared with 2% borough-wide.

The Lancaster Transformation

On a smaller scale, as part of a downtown revitalization project, Lancaster Boulevard in Lancaster, CA was transformed from a 5-lane highway going through town to a 1-lane street in each direction with a rambla in the center and round-abouts at the ends. This allowed for traffic speeds to slow down, the community to become active, and the local economy to return. Businesses were not doing well with the prior configuration, but as a result of the catalytic Boulevard transformation in 2009, 48 new businesses opened doors along the Boulevard, 1902 jobs were created (800 permanent), and over $130m in private investment has taken place.

In addition to strengthening of the economy, the Boulevard has experienced a decrease in traffic collisions by 50% and injury-related collisions by 85%. Thanks to the successful re-design, tens of thousands of residents come to the Boulevard for festivals, markets, and holiday parades.

-Data courtesy of City of Lancaster

Equity

"Walking and cycling provide affordable, basic transport. Physically, economically and socially disadvantaged people often rely on walking and cycling, so improving non-motorized transport can help achieve social equity and economic opportunity objectives"[5].

There is a significant population within Loma Linda, especially to the west of campus, which depends on public transportation. Active transportation improvements often boost the use of public transportation, improve community safety, and create a more equitable environment for individuals who do not own an automobile.

Did You Know?

By eliminating just 200 cars within a 2 mile commute of LLUH, over 123 metric tons of CO_2 emissions can be reduced annually.

That's the equivalent to having **90,000** 25 year-old trees cleaning our air in Loma Linda.

This does not include the daily trips for dining, meetings or any other on- or off-campus engagements.

- Transit users are more than three times as likely as drivers to achieve their CDC-recommended thirty minutes of daily physical activity[12]. Considering that walking is the first thing a child is eager to learn and the last thing an elderly person wants to give up, we have a responsibility as health providers to make walking and physical activity the easy options.

Talent Recruitment and Retention

Young professionals are seeking to work and live in places that are less car-centric that provide options for all methods of tranportation, local and diverse food establishment and proximity to work. Many cities and campuses are recognizing this desire for health-promoting places and as the example mentioned prior, 77% of surveyed universities have responded that they have some type of a bike sharing program in an effort to either reduce parking, traffic congestion, or to provide healthier transportation options.

- Those aged 18-36 are 77 million strong, or about 24% of the population – the same as Baby Boomers (between 49-67 years old).
- Millennials are breaking the trend of suburban sprawl by moving back into cities and downtown areas, because of this they are less likely to own cars-and vehicle ownership rates are declining. In 2011, 66 percent of Millennials under age 25 owned a car, compared with 73 percent in 2007 (Nielsen Poll).
- Recently, cities like Miami, Memphis, San Antonio, Portland and Jersey City have begun to attract Millennials and have adopted traditional walkable design principles in planning, including active transportation, thus making their suburbs more attractive to Millennials.

LLUH branding – A Destination for Wholeness

LLUH has been known as a worldwide leader in its healthcare delivery including medical education, proton treatment, transplants, children's healthcare, and countless cutting-edge and innovating clinical practices. The world beyond 2020, is looking at the hospitals of the future to be not only providers of excellent medical care but also to be providers of health to their community.

Healthcare systems are seeking out effective upstream interventions, those that prevent the ED's from unnecessary and repeated visits. The built environment is a major component of whole health care and with academic and medical components, LLUH's capacity to become a model medical campus is unique and ideal. LLUH can serve as a worldwide example of a true health leader embracing the mind, body and spirit.

Vision 2020 and beyond

The vision of individual and community health has been in the minds and hearts of our faculty, students, and health professionals every single day since our beginning in 1905. Our vision of a healthier, more whole world was founded on the belief that God has given Loma Linda University Health a unique commission to provide healing and hope and to restore mankind to the wholeness in which we were created.

Loma Linda University Health's model of a health and educational center - one focused on prevention and wellness while operating at the forefront of the latest scientific research - was radical a century ago. And we have never stepped away from that commitment.

The successful fundraising campaigns of today are those focused on a cause. Wholeness in Transportation and Campus Design can be that cause. We must support our heritage of Wholeness with an environment that sustains it. Thoughtful planning not only alleviates costs associated with reactionary initiatives, but it also creates a map for local need, vision and mission. Now is the time for us to take a monumental step forward towards a more comprehensive mobility strategy for the health and wholeness of our community.

8. Recommendations

How can LLUH make the campus, Loma Linda and the region a better place to live and work?

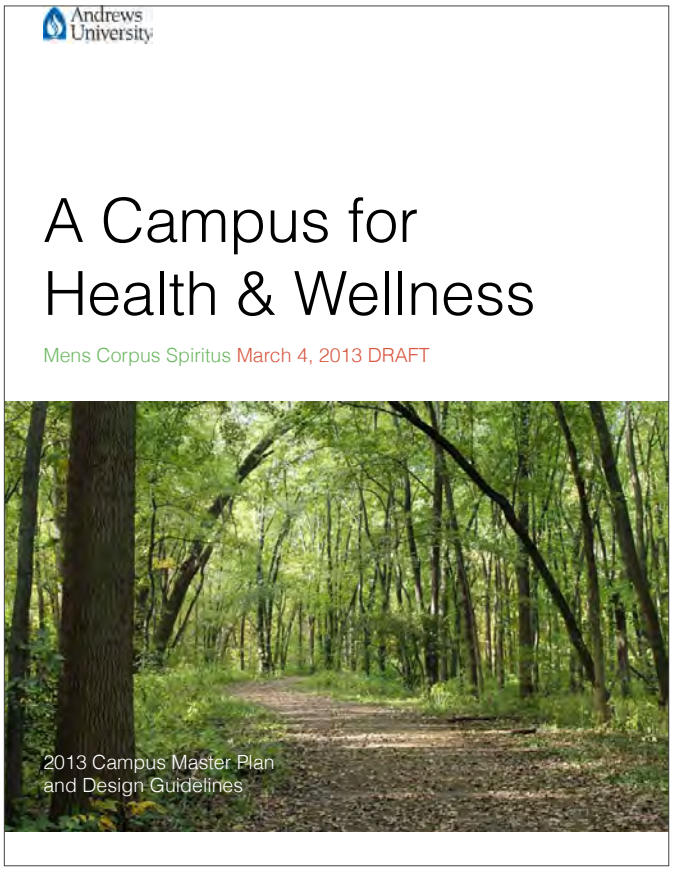
By committing to comprehensive planning and projects that make it safer and more appealing to remain physically active through walking and biking.

- Make Wholeness in Transportation a key fundraising initiative within the $15 million for the Wholeness Institute.
- Plan out measures to reduce overall demand for parking on campus by pursuing a goal that by 2025, 33% of all trips to LLUH be made by alternatives to single occupancy vehicles. This involves shifting current indirect subsidies for parking to active transportation.
- Ensure that campus master planning is a fully engaging process that also focuses on health and involves multiple stakeholders. (e.g. planning workshops that engage staff, faculty, students, city, county, etc.)
- Develop a Transportation Oversight Committee that focuses solely on strategic transportation issues and solutions such as the ones outlined in this proposal.
- Recognizing the leadership of Andrews University in this field and its' annual Urban Design Studio successes worldwide, send RFP to Andrews University School of Architecture to carry out a charrette, develop plan drafts, final plan, publication and implementation guidance for a Campus Master Plan.
- Involve the Community Health Development initiative at LLUH, implement an evaluation tool for measuring the impacts of thoughtful health-oriented transportation and master planning.

While such changes don't happen overnight, it's important for us to understand our goals and how they can be expressed within our built environment. Our vision and commitment to health should be at the forefront of all planning processes.

The Plan

The snapshots of two master plans below illustrate exemplary organizational commitment to health and wellness through the built environment, strategic development and transportation policies. They both contextually address their campus planning needs through a lens of health, efficiency, and financial and environmental stewardship. These examples both serve as a crucial part of the overall organizational future strategy. It would be in LLUH's best long-term interest to develop a similar health-focused document and a strategic planning process that will guide all future development.



Click on the covers above to view full plans. Otherwise, you may view them at the respective sites:
Andrews University: http://www.andrews.edu/campusplan
Seattle Children's: http://masterplan.seattlechildrens.org/documents/CTP_booklet_final.pdf

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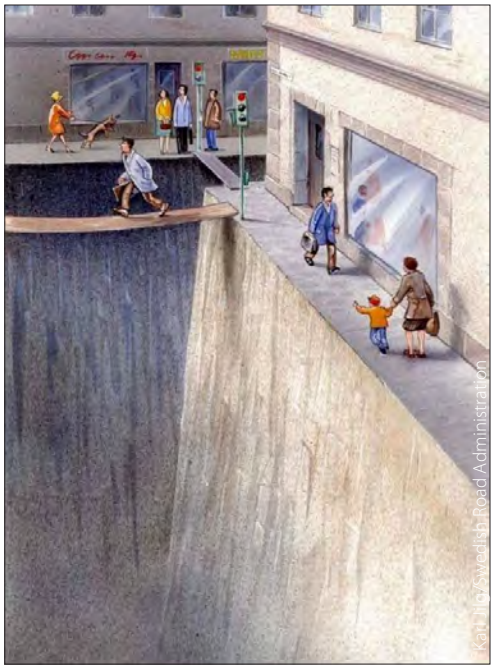

For whom shall we design?

Every Loma Linda University Health employee, student and patient deserves a safe and a desirable environment in which one can work, live, pray and play. Through strategic planning and organizational commitment as outlined in this proposal, LLUH has the opportunity to provide health as the easy and attractive option outside of a hospital setting and lead Inland Southern California in healthy and sustainable transportation.