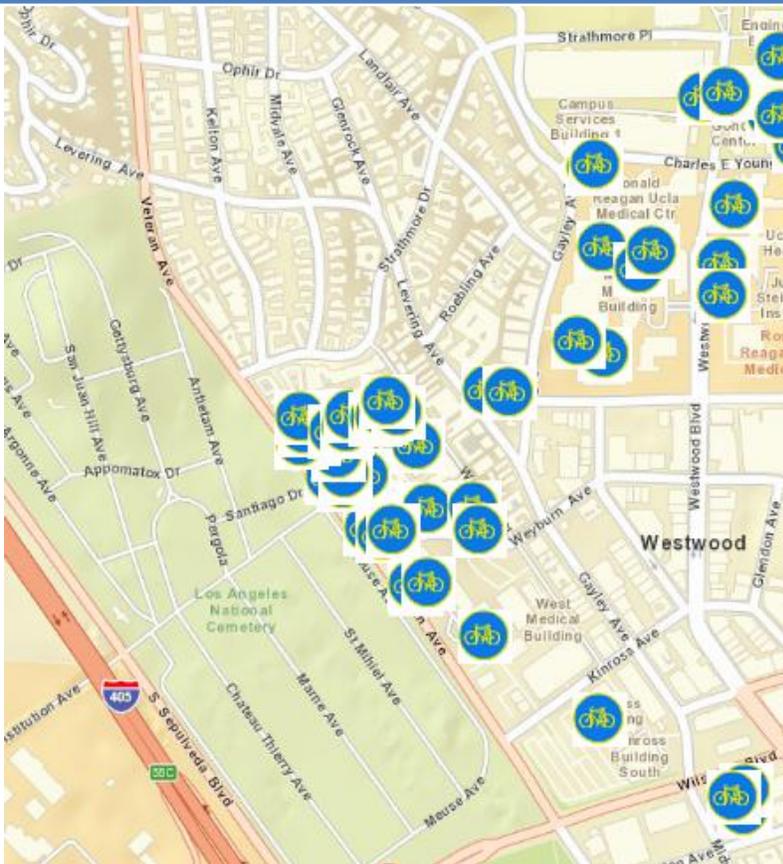




2012

Transportation & Sustainability Mapping Action Research Team (TSMART)



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Executive Summary

The Transportation Department at University of California Los Angeles (UCLA) has been hard at work to improve traffic for the 55,000 people that commute to campus each day. To assist the Transportation Department with its goal of reducing the number of cars on the road, the Transportation and Sustainability Mapping Action Research Team (TSMART) decided to create a bike information map. This bike map would consolidate all of the information relating to biking on-campus and therefore make it more readily available to the public. By making information more accessible, this map would promote community health via active transportation, while contributing to a decrease in UCLA's carbon footprint.

Throughout the process of surveying bike racks and learning what Geographical Information System (GIS) mapping is and how to use it, our team experienced the relentless roundabout complexities of bureaucracy. We were only able to progress with our mapping by working with multiple departments. This inter-departmental collaboration led to our team taking the initiative to begin the creation of UCLA's first 'green' map layer. By working with UCLA's Sustainability Coordinator, Nurit Katz, we aided in the consolidation of UCLA's significant accomplishments towards reaching its goal of reducing greenhouse gas emissions to 1990 levels.

In addition to increasing accessibility to information, our team believes that other changes must be made to increase UCLA's bike population in order for active transportation to become more widely accepted by the UCLA community. While the hilly campus may discourage bikers, we feel that making traffic-congested streets safer would alternatively encourage bikers. Some major pro-bike changes include adding bike lanes in Westwood Village and fixing cracked/broken pavements throughout the UCLA area.

Overview/Project Goals

Our project focuses on daily employee and student commutes to campus as well as their means of transportation on and around campus. Our goal is to address transportation issues, specifically relating to bicycle transportation, from the standpoint of reducing carbon emissions and increasing the public health of UCLA. This goal is shared by UCLA's Transportation Department. A strong relationship between our Action Research Team and our stakeholders was integral to the development and implementation of ideas to achieve this goal.

Introduction

Significance and Background:

To decrease the impact of commuters to and from UCLA, the UCLA Transportation Department has created and partnered with a number of groups and projects. UCLA's BruinBus transports over 1.2 million people per year to, from, and around campus. For longer trips, UCLA has partnered with shared and public transportation agencies such as Zipcar, FlyAway, and Amtrack. As of 2011, UCLA's drive-alone rate for employees was 53%, which is significantly lower than that of Los Angeles County's 72%. In an attempt to further reduce traffic and promote healthier lifestyles around campus, UCLA adopted the Bicycle Master Plan in 2006.

UCLA created a Bicycle Master Plan describing the status of bicycling at UCLA and goals for biking at UCLA. The plan also describes projects to be implemented that will improve biking at UCLA. The goal of the plan is to create a sustained bicycle program by improving bicycle safety, increasing bicycle awareness, and identifying and pursuing funding opportunities

(UCLA Bicycle Master Plan, 2006). To achieve this, UCLA's Transportation Department has created a number of programs to facilitate biking at UCLA, including the Bike (Re)cycling Day where abandoned bikes are given out for free to the UCLA community (began 2011), the Bike Library from which students can rent bicycles for a quarter (began 2010), and the installation of 3,100 bike racks on campus. Due to these projects, UCLA has received a bronze-level Bike Friendly label from the League of American Bicyclists, making it one of 26 universities in the U.S. to receive this award (State of the Commute Transportation Statistics, 2011).

Though biking is a common method of commute at other college campuses, neither the UCLA campus nor the surrounding area can be labeled as "bike friendly." The campus has many hills and is littered with stairs and dismount zones, making it difficult for students to achieve a continuous bike commute to class. The surrounding area West of campus, referred to as the North Village, is also quite hilly and much of the pavement is uneven and broken. This further discourages bikers from riding to campus. Westwood village also poses challenges to bikers because Westwood's bike lanes and routes are not all well-marked and the roads are typically congested with traffic from Westwood's business district and other commuters, making it dangerous for bikers to use the roads. According to a poll conducted by the Daily Bruin, 46% of students consider UCLA to be "very difficult to navigate on wheels" (UCLA Daily Bruin, 2012).

Because of the challenges that bikers still face, TSMART is working closely with UCLA's Transportation Department and Space Inventory Services (SIS) to increase active transport and increase UCLA's biking community. Our group intends to facilitate the growth of biking on and off campus by creating a fully integrated database that consolidates all of UCLA's biking amenities/services into one localized map. Information like safe routes that bikers can take on campus, methods of avoiding hills, and locations of all available services will help

educate new bikers about what our campus has to offer. We hope that these steps will help to make cycling an integral part of UCLA, thereby reducing UCLA's carbon footprint and making Bruins healthier.

The development of this bike map layer led to us finding improvements in Westwood Village. From the request of our stakeholders, we aided the Westwood Village Improvement Association (WVIA) by mapping out all current bike racks and suggesting locations for new ones in the village. The WVIA was created and supported by taxes from business owners in Westwood Village. They help keep the Westwood Village safe and clean for businesses and patrons alike.

Our project then transformed from promoting sustainability through bike mapping methods to showcasing sustainability. We re-directed our efforts and started working with UCLA's Chief Sustainability Officer, Nurit Katz, to initiate the creation of the university's first Sustainability Map. We set out to create a 'Green' layer on the Campus Interactive Maps.

Research Methodology

As noted above, finding our focus took some time. Methodology differed with each aspect of this project. Here we lay out the methods we used to efficiently address each relevant data collection activity.

Documentation of Bike Facilities:

The Transportation Department provided us with their most recently updated locations of bike facilities on campus. Using this information, our team dispersed throughout campus to validate and update their whereabouts. In order to get a feel for bikes on campus, we took a bike

tour of UCLA. During this tour, our group members assessed what it was like to bike around campus and found that the most tedious obstacles were the stairs.

In order to thoroughly survey the camps, we divided UCLA into four manageable geographical areas: Northwest or “The Hill”, Northeast or “North campus”, South or “South Campus”, and finally, “Westwood” (**Figure 1**). Each area was assigned to a group member who set out on foot to count and document the location and capacity of bike racks, locations of maintenance stations, stairways on campus, as well as other important bike related facilities. Data collection was done by cross-referencing new data with Transportation Department’s old data. In the end, we created an updated list of bike racks for the Transportation Department and collected the raw data needed for the Bike Map.

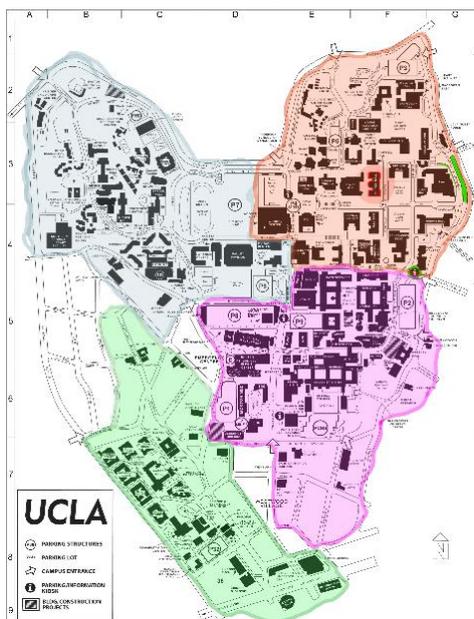


Figure 1

Location and Photographic Documentation of Bikes and Bike Racks in Westwood:

With a request from our stakeholders, Mike and Luchino of the Transportation Department, we decided to provide some assistance to the Westwood Village Improvement

Association (WVIA). This project's methods were similar to our process of documenting all bicycle facilities on UCLA's campus. Over a two-day period our group split up into specific quadrants of Westwood Village to map and take pictures of the location of all bike racks within the boundaries of the WVIA. We obtained data on the following categories: bike racks that are present, potential areas for new bike racks that fit specific criteria, and bicycles that are chained to objects that were not bike racks. The specific criteria required to install a new bike rack include the following:

- A bike rack must be 18 inches from the curb
- A bike rack cannot be installed above a storm drain
- A bike rack must be a minimum of 3 feet from the nearest piece of street furniture (red curbs usually have the least street furniture, and therefore are usually the easiest place to install bike racks)
- A bike rack can't be installed on decorative pavement (i.e. bricks, Hollywood stars, etc.)
- A bike rack should be about 3 feet from a curb cut (driveways)



Figure 2 – Shows bikes on a loop bike rack as well as bikes chained to a bench.



Figure 3 – Show bikes on a pole bike rack as well as a bike chained to a sign pole.

In order to validate the locations that we believed fit the criteria to host a new bike rack, we photographed “rogue” bicycles as well as our recommended location for an installation.

When taking these photographs, we made sure that we properly displayed the recommendation as complying with the above criteria.

Geographical Information System (GIS) Mapping:

We summarized all the information we collected for mapping into a format that the Transportation Dept. and Space Inventory Services (SIS) could easily upload and analyze by using a program called ArcGIS. GIS is a mapping system that coordinates a location, be it a point, a line, or a polygon, with descriptive information. It is used to store, analyze, and manipulate statistical, cartographic, and geographic data. Initially, no one in our group had any experience with this complicated program. With the help of our stakeholders, Mike and Luchino, we were able to set up a GIS tutorial session with a GIS expert, Dave Karwaski. After attending the tutorial on GIS, we worked on small exercises with our stakeholders to familiarize ourselves with GIS in order to start working independently. As our team became more comfortable with using the program, we started to slowly transfer all of the data gathered on locations, capacity, and facilities, etc. into map layers, or “shape files.”

We included all aspects of UCLA bike culture such as: bike racks and lockers, bike lanes, bike routes, dismount zones, shower and locker facilities, stairs, and bike maintenance stations in the GIS mapping database. We also added full descriptions of each facility that include, but are not limited to: location, website links, instructions for use, and any other pertinent information that may deal with the particular shape file. This descriptive information is part of the map; it is attached to the necessary location point. This means that when a user clicks a point, a pop-up description of that point will appear. All of the information that we put into the descriptions

were either gathered from existing sources and compiled by our group, or obtained through on-foot site research.

Future Sustainability Mapping:

Once our team started making noticeable progress on the bike mapping layer, we felt it would be helpful to expand our skill set into another mapping category. After some discussion with our stakeholders and ART Directors, we decided to map out all significant sustainable improvements that UCLA has done in order to reduce its carbon footprint. This ‘Green’ mapping layer idea was soon discussed with Nurit Katz, UCLA’s Chief Sustainability Officer. With her help, we started a comprehensive Google spreadsheet and used it to collaborate with various UCLA departments to consolidate data that will later be translated into GIS format. We also collaborated with the LEED team leaders, Claire Josephson & Jasneet Bains, in order to accurately depict all LEED certified buildings on campus.

Our methodology of mapping locations and combining descriptive information in GIS will be used to expand the interactive map as well as provide a singular location for future data analysis of sustainability at UCLA. Mapping of this ‘Green’ layer is still in progress, and we hope that it will be complete by next school year.

Several campuses, such as UC Davis, have sustainability maps featured on their regular campus map websites. UC Davis’s map incorporates some aspects of the campus’s environmentally conscious facilities and policies (<http://campusmap.ucdavis.edu/sustainability/>). There is a list of aspects on the right hand side of the map and when the respective boxes are checked an icon denotes where at UC Davis the selected aspects are located. Further inquiry is permitted with a link that can be brought up on the screen when each map icon is clicked. The

link provides in-depth descriptions of the noted sustainability aspect. This structure is similar to how we hope to format UCLA's sustainability layer.

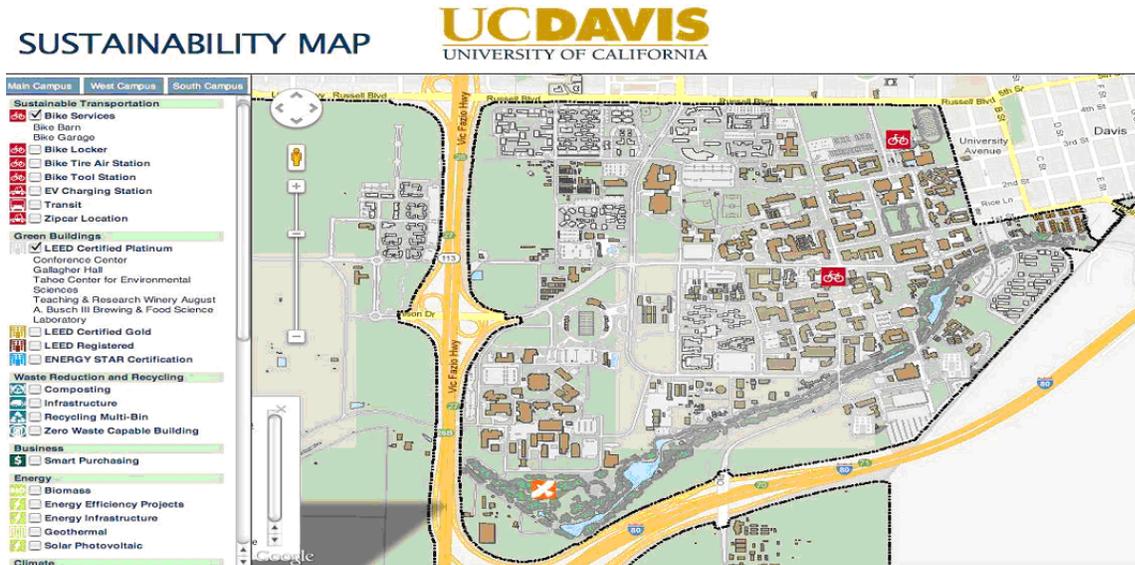


Figure 4: University of California Davis's Sustainability Map

Key Findings

Over the last two quarters we familiarized ourselves with UCLA's bike support efforts, such as bike maintenance stations and the surge of new bike racks on campus (now totaling 3,100). Although a majority of the student body believes that UCLA is not a cycling friendly campus (See **Figure 5**), UCLA has actively vested interest in supporting biking on campus.

While UCLA cannot eliminate some issues students have with biking, such as the constant complaint of campus being too hilly, there are still other qualities it can improve upon to be more bike friendly.

Poll: Bike Week

In honor of Bike Week, we're asking you: How bike-friendly is the UCLA campus?

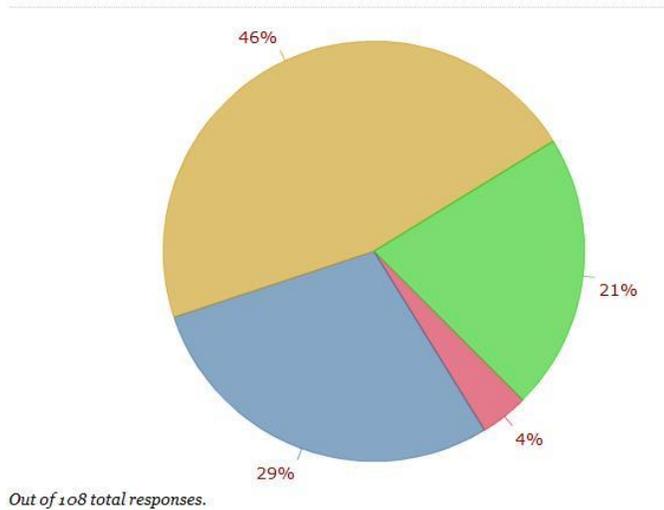


Figure 5: UCLA students were asked for their opinion regarding ease of biking on campus. 46%: 'Not bike friendly at all - the UCLA campus is very difficult to navigate on wheels.' 29%: 'Somewhat bike friendly; there are a lot of hills on campus.' 21%: 'I don't ride a bike on campus.' 4%: 'Very bike friendly. I get around campus quickly and easily on my bike.' - UCLA Daily Bruin, May 22nd, 2012.

Our Bike Layer will provide cyclists with updated information regarding dismount zones, shower and locker locations, bike lockers, and repair consulting from biking professionals.

Although we cannot predict that this bike layer will increase biking in the UCLA/Westwood area overnight, we can be confident that our map will improve the cycling experience by making information more accessible to the surrounding community. In addition to improving biking for existing bikers, we hope that this new layer will encourage the growth of UCLA's biking community.

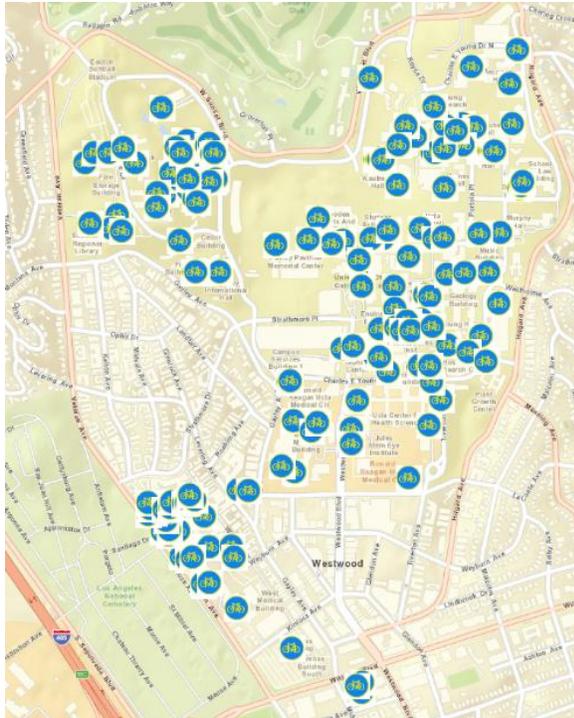


Figure 6: Bike map sublayer for locations of all bike racks on campus.

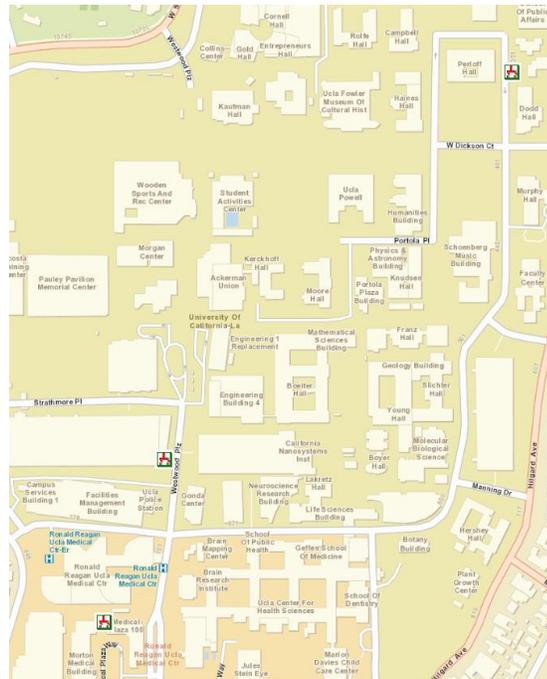


Figure 7: Bike map sublayer showing locations of bike maintenance stations.

FID	Shape*	Id	Rack_ID	Rack_Type	Number	Capacity	Usage2006	Usage2007	07svy_dt	06svy_dt	Util_Per	Usage2008	08_per	Usage2009	DESCR
0	Point	1	1	Wheel Bender	1	5	0	0	4/18/2007	<Null>	0	4	0	0	Hitch Suite W
1	Point	2	2	Gauntlet	1	10	0	1	4/18/2007	<Null>	20	2	0	0	Hitch Suite Middle
2	Point	3	3	Wheel Bender	1	18	0	6	4/18/2007	<Null>	66.7	9	0	0	Hitch Suite E
3	Point	4	4	Wave	4	44	0	18	4/18/2007	<Null>	75	29	0	0	Hedrick Hall in front of bldg
4	Point	5	5	Wave	4	44	0	1	4/18/2007	<Null>	4.2	0	0	0	Rieber Hall NE
5	Point	6	6	Wave	4	44	0	24	4/18/2007	<Null>	100	29	0	0	Hedrick Summit in front of bldg
6	Point	7	7	Wave	4	36	0	19	4/18/2007	<Null>	79.2	0	0	0	Rieber Hall W
7	Point	8	8	Wheel Bender	1	5	0	3	4/18/2007	<Null>	50	1	0	0	Saxon NW
8	Point	10	10	Wheel Bender	2	12	0	3	4/18/2007	<Null>	50	1	0	0	Saxon SW
9	Point	11	11	Wheel Bender	4	22	0	3	4/18/2007	<Null>	50	0	0	0	Saxon SE
10	Point	12	12	Wave	1	9	0	5	4/18/2007	12:00:00 AM	55.6	2	0	0	Delta Terrace NE
11	Point	13	13	Wave	1	9	0	0	4/18/2007	12:00:00 AM	0	1	0	0	Delta Terrace N
12	Point	14	14	Wave	1	13	0	0	4/18/2007	12:00:00 AM	0	3	0	0	Delta Terrace SE
13	Point	15	15	Wave	1	13	0	0	4/18/2007	12:00:00 AM	0	1	0	0	Delta Terrace W
14	Point	16	16	Wave	2	14	0	0	4/18/2007	12:00:00 AM	0	9	0	0	Covel Commons Courtyard closest to turnaround
15	Point	17	17	Wave	1	9	0	5	4/18/2007	12:00:00 AM	55.6	1	0	0	Sprout Hall between NW Auditorium and Sprout
16	Point	19	19	Wave	3	25	0	0	4/18/2007	12:00:00 AM	0	13	0	0	Covel Commons Courtyard next to Covel Commons bldg
17	Point	20	20	Wave	1	9	0	4	4/18/2007	12:00:00 AM	44.4	3	0	0	Canyon Point
18	Point	21	21	Wave	1	11	0	5	4/18/2007	12:00:00 AM	55.6	3	0	0	Canyon Point
19	Point	22	22	Wave	2	24	0	5	4/18/2007	12:00:00 AM	55.6	1	0	0	Canyon Point
20	Point	23	23	Wave	1	11	0	2	4/18/2007	12:00:00 AM	22.2	1	0	0	Canyon Point
21	Point	24	24	Wave	2	22	0	2	4/18/2007	12:00:00 AM	22.2	1	0	0	Canyon Point
22	Point	26	26	Wave	1	11	0	0	4/18/2007	12:00:00 AM	0	0	0	0	Canyon Point
23	Point	27	27	Wave	1	11	0	0	4/18/2007	12:00:00 AM	0	5	0	0	Canyon Point
24	Point	28	28	Wave	1	9	0	4	4/18/2007	12:00:00 AM	44.4	2	0	0	Courtside NW
25	Point	29	29	Wave	1	17	0	4	4/18/2007	12:00:00 AM	44.4	1	0	0	Courtside NE
26	Point	30	30	Wave	1	17	0	5	4/18/2007	12:00:00 AM	55.6	2	0	0	Courtside SE
27	Point	31	31	Wave	1	9	0	8	4/18/2007	12:00:00 AM	88.9	2	0	0	Courtside SW
28	Point	35	35	Wave	3	25	0	5	4/18/2007	12:00:00 AM	100	15	0	0	Covel SE
29	Point	37	37	U	14	15	0	0	4/18/2007	12:00:00 AM	0	2	0	0	Sunset Canyon Center
30	Point	38	38	Wheel Bender	1	7	0	4	4/18/2007	12:00:00 AM	66.7	6	0	0	Dykstra N
31	Point	39	39	Fence	2	24	0	12	4/18/2007	12:00:00 AM	200	12	0	0	Covel SE
32	Point	40	40	Fence	1	6	0	12	4/18/2007	12:00:00 AM	200	12	0	0	Covel SE
33	Point	41	41	Fence	1	6	0	11	4/18/2007	12:00:00 AM	183.3	14	0	0	Covel SE
34	Point	46	46	Fence	1	6	0	8	4/18/2007	12:00:00 AM	100	5	0	0	Dykstra N
35	Point	47	47	Fence	1	6	0	8	4/18/2007	12:00:00 AM	100	5	0	0	Dykstra N
36	Point	48	48	Fence	1	6	0	8	4/18/2007	12:00:00 AM	100	5	0	0	Dykstra N
37	Point	49	49	Fence	1	6	0	8	4/18/2007	12:00:00 AM	100	5	0	0	Dykstra N
38	Point	50	50	Fence	1	6	0	8	4/18/2007	12:00:00 AM	100	5	0	0	Dykstra N
39	Point	51	51	Fence	1	6	0	8	4/18/2007	12:00:00 AM	100	7	0	0	Dykstra N
40	Point	52	52	U	5	10	0	9	4/18/2007	12:00:00 AM	45	8	0	0	Student Activity Center S
41	Point	53	53	U	5	10	0	9	4/18/2007	12:00:00 AM	45	10	0	0	Student Activity Center S
42	Point	54	54	U	5	10	0	9	4/18/2007	12:00:00 AM	45	10	0	0	Student Activity Center S

Figure 8: This attributes table from ArcGIS gives a sample of the information we inserted into the program while creating the bike rack layer.

Westwood Village has also made bicycle friendly improvements in the last couple years by installing bike racks. Bike racks can be found in key spots, but there is a recurring problem

ambitious project ideas but the time frames didn't realistically comply with that of the Transportation Department's. Without fully understanding the logistics of making changes in a bureaucracy, we pushed forward with laying the foundation for these plans. One of our plans involved expanding the current Bruin-Bike Library. There are currently 90 bikes available for a \$45 quarterly fee. Every quarter the bikes are rented out rapidly. Given UCLA's population of over 27,000 undergraduates we felt it would help to have more bikes available to the student body. However, when we presented this idea (along with a few others) to our stakeholders a few weeks after starting, we learned that our ideas were either already in progress or were just not feasible given the amount of institutional framework required. While we discussed matters with our stakeholders to an extent in the beginning weeks, initially agreed-upon project expectations between us would have created a more efficient research process.

During the first two months of Winter Quarter, we were under the impression that we would be applying for funding from The Green Initiative Fund (TGIF) to help expand and promote UCLA's Bike Library. We met with Liz Bernier, the Community Bike Center Coordinator, to discuss this idea. We were all excited to implement ideas, however in a later meeting with our stakeholders we were informed that the Bike Library is currently at an operational capacity. Our stakeholders and the Recreation Department have already been working together to assess the current staffing and pricing model for the Library and Bike Shop. Therefore, it would be unwise to move forward with obtaining funding before finding the right staffing and price balance that would ensure that the Bike Shop is meeting customer demand and that all the services provided are financially sustainable for the future. Expansion of the Bike Library is definitely in UCLA's future, but this project could not be undertaken by our team.

Another initial idea involved creating a bicycling information smart phone application. We spent several weeks discussing this idea and searching for a company or a student that would create one for us if we gathered all of the information. The bike map application could have incorporated campus tips and information, similar to our Interactive Maps layer. However, after several weeks we learned that the bike map app project was not practical because it would require continued maintenance and updating of information as bike-related campus changes were made. Luckily, during team brainstorming for the application, we had also thought of creating an official UCLA bike map that could be used by the campus. This idea became the focus of TSMART's work as Winter Quarter came to an end.

Despite this, our team recognized that failed plans are to be expected in Action Research. We immediately shifted our focus to searching for a new project. Our adaptability was rewarded with the approval to begin creating official UCLA map layers that will provide information as a tool to increase campus sustainability.

In moving forward with our Bicycle and Sustainability maps we were met with few challenges. The first was simply overcoming learning obstacles in GIS. Our first few weeks of working with the program went slowly, but with continued practice we became familiar and increased in proficiency with the program. Through mapping the bike map layer we became quite comfortable using ArcGIS. We wanted to apply this mastery to our other idea, the Sustainability Layer. We knew we could finish mapping this layer quickly because we would no longer struggle with the components of programming. Ironically, the main challenge that we encountered with the Sustainability Layer was a lack of time to complete the project. This layer involves information taken from every niche of the campus. After gathering this information it is customary to get approval from the respective departments before displaying the description

online to the general public. Unfortunately, these approvals, along with the extensive data gathering, would not be completed by the end of the ART program, but the project will be continued on through the summer. Our team was a catalyst in starting the Sustainability Layer. Although we were not able to see it to the end, we know the end result will show the world what UCLA has done as a leader in sustainability.

This project's challenges and initial setbacks may have been discouraging at first, but they taught us that we could still move forward and accomplish something that may not have been originally planned. We gained applicable experience in how to respond to project setbacks, and to still move forward to make changes at a large institution.

Recommendations

TSMART experienced some difficulties while working with UCLA's Transportation Department. For one, UCLA has been directing itself towards sustainability for over a decade with the transportation department constantly making headway in new directions. Some projects they have completed and are constantly working on include: improved signage, growth in alternative modes of transportation, a fleet of shuttles that run on compressed natural gas, increasing bicycle parking capacity (see **Figure 10**) and improving traffic sensors to further decrease traffic. These changes around campus benefit the community's well-being. However, even with these accomplishments, our team has discovered additional improvements that can further promote sustainability.

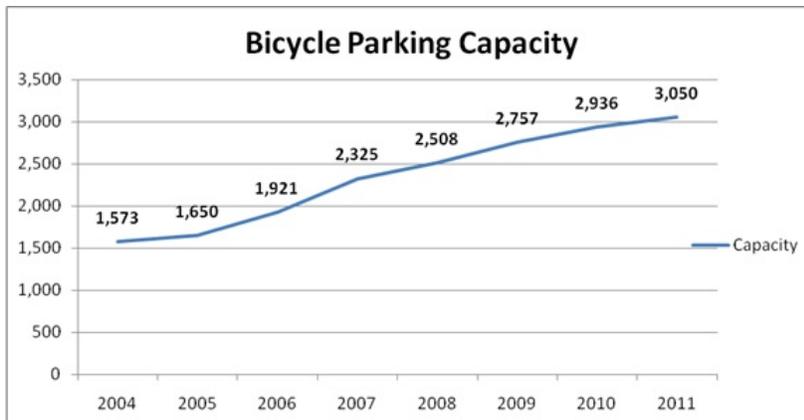


Figure 10 – Graph showing the steady increase of bike racks on UCLA campus.

Throughout Westwood Village and the surrounding apartments there are cracks in the streets and the sidewalks that pose risks for pedestrians, skateboarders, and bicyclists (see **Figures 11a-d**). If the sidewalks and streets were friendlier to non-automotive modes of transportation, commuters would be more likely to transition from cars to active forms of transportation. This project would involve communication between UCLA's Transportation Department, the City of Los Angeles, and the Westwood Village Improvement Association to repave these areas. This project would take a long time to finish and a lot of interdepartmental collaboration that would be very difficult for an Action Research team to finish within two quarters, but we feel that it is still a necessary change.



Figure 11a



Figure 11b



Figure 11c



Figure 11d

Figures 11a-d: Images of broken pavements around in the immediate area around UCLA. 11a-c shows broken pavement on sidewalks and streets around the apartments west of campus. Figure 11d shows an example of the sidewalk quality in Westwood Village. (Note - In above figures, images are taken from another project and since then the pavements have become worse.)**

Westwood Village has a large number of businesses that appear to mostly cater to the local college population. These small businesses have limited amounts of parking and are difficult to access given the overcrowded streets of the Village. With the constant buzz of traffic and the lack of bike lanes, bicyclists feel unsafe traveling through this area. If access to businesses in this area increased, the local economy would see some degree of improvement. A similar business area in Long Beach, CA took out car lanes in order to increase the number of bike lanes throughout the city. This drastic transformation started a few years ago and is continuing throughout the city. Local businesses say that this major change has increased business by allowing easier access for locals and brings stores more visibility (Linton, 2011). If UCLA's Transportation Department can work with the Westwood Village Improvement Association to make this innovative change, it would not only help local business but it would also decrease traffic in the long-term by increasing biking convenience. This has been shown to occur in other case studies like Long Beach. Similar to the previously suggested re-paving

project, this kind of project would be very difficult for a future Action Research Team due to time constraints.

Our group suggests that future Sustainable Transportation teams expand to include a broader scope of research possibilities to allow future teams to venture outside of transportation parameters. Much of our time in the beginning of this project was devoted to trying to find a research project that could be approved by UCLA Transportation. As noted earlier, we found our stride when we ventured into mapping. While it was transportation related, it ended up having the potential to further promote sustainability in general.

UCLA's Transportation Department is constantly working on multiple projects to decrease traffic in the city and increase active transportation in the community. Large-scale projects like incorporating a bike lane into the village and repaving an entire district are not practical for an ART project. We recommend that further Transportation teams establish agreed-upon expectations with their respective stakeholders so as to avoid setting unapproved goals. Bureaucracy is to be expected at large institutions, so while this may not result in the progress typically observed with Action Research Teams, this work still gave us valuable experience in working on inter-departmental projects. Given the Transportation Department's commendable self-awareness of environmental impact, there was little room for our team to expand off of their efforts. Therefore, we only recommend that a Sustainable Transportation Team be assembled if there exists a project that will require two quarter's-worth of research. If a project can be found for a future transportation team, they would definitely gain real world experiences in urban planning and come to understand the intricacies of inter-departmental collaboration.

Conclusion

TSMART set out with a rather open-ended objective: to improve sustainable transportation at UCLA. While we did not make visible changes on campus, we have significantly improved the accessibility of bicycle-related information to the UCLA community with the creation of our Bike Layer. We were also able to survey and assess the needs for more bicycle parking in Westwood Village. This information can be used by the city to make biking more convenient for the community, and potentially improve business in the process.

During our efforts we had a chance to interact with multiple departments and gain a greater insight into making real-world changes at large institutions. It was working with multiple departments that allowed us to branch out from our initial bike mapping project and expand it to include all sustainability-related aspects of UCLA's campus. While this map layer is still in progress, our team is proud to have initiated this comprehensive project that will showcase UCLA's sustainable efforts. We look forward to seeing the finished product, and are grateful for all of the help that we received from our stakeholders, Space Inventory Systems, and the ESLP Directors during this process.

After navigating our way through one of the largest research institutions in the world and actually achieving something tangible, we realize that the knowledge gained from this work-intensive process is as important as the product, if not more.

References

"Campus Map." Map. *Http://campusmap.ucdavis.edu/*. University of California Davis, 10 Nov. 2011. Web. May 2012.

Hage, Daniel. Images of streets and sidewalks or Westwood, CA. Digital image. *Broken Sidewalks, Congested Parking, and Possible Solutions for North Westwood Village*. Spring 2008. Web. 1 June 2012.
<<http://shoup.bol.ucla.edu/Daniel%20Hage%20Capstone1.pdf>>.

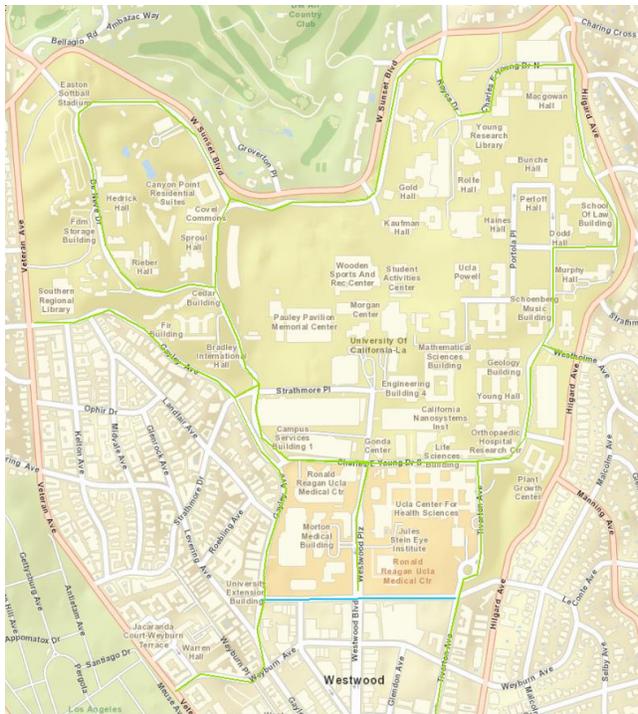
Linton, Joe. "Another Wonderful Long Beach First: Protected Bike Lanes." (21 Apr. 2011). *La.streetsblog.org*. 21 Apr. 2011. Web. 28 May 2012.
<<http://la.streetsblog.org/2011/04/21/another-wonderful-long-beach-first-protected-bike-lanes/>>.

Poll: Bike Week. Digital image. UCLA Daily Bruin, 22 May 2012. Web. 22 May 2012.
<<http://www.dailybruin.com/index.php/poll/67>>.

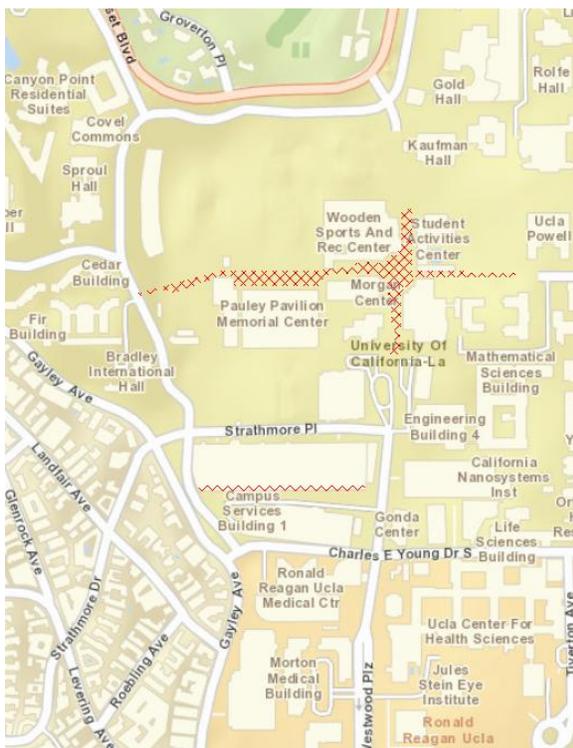
UCLA 2011 State of the Commute Report. Rep. Los Angeles, CA: UCLA Transportation, 2011. UCLA Transportation, 4 Feb. 2011. Web. 25 May 2012.
<<http://www.sustain.ucla.edu/media/files/2011-UCLA-State-of-the-Commute-Report-d5-00b.pdf>>.

UCLA Bicycle Master Plan. UCLA Transportation Services, 21 Mar. 2006. Web. 25 May 2012.
<<http://bart.ts.ucla.edu/pdf/0306FinalMasterBikePlan.pdf>>.

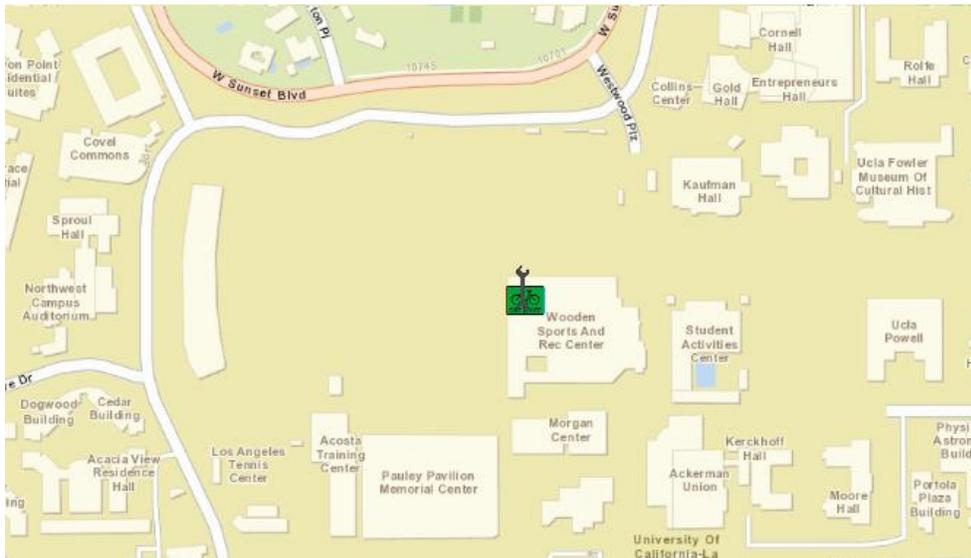
Appendix



Official bike lane (light blue) and routes (light green) of UCLA.



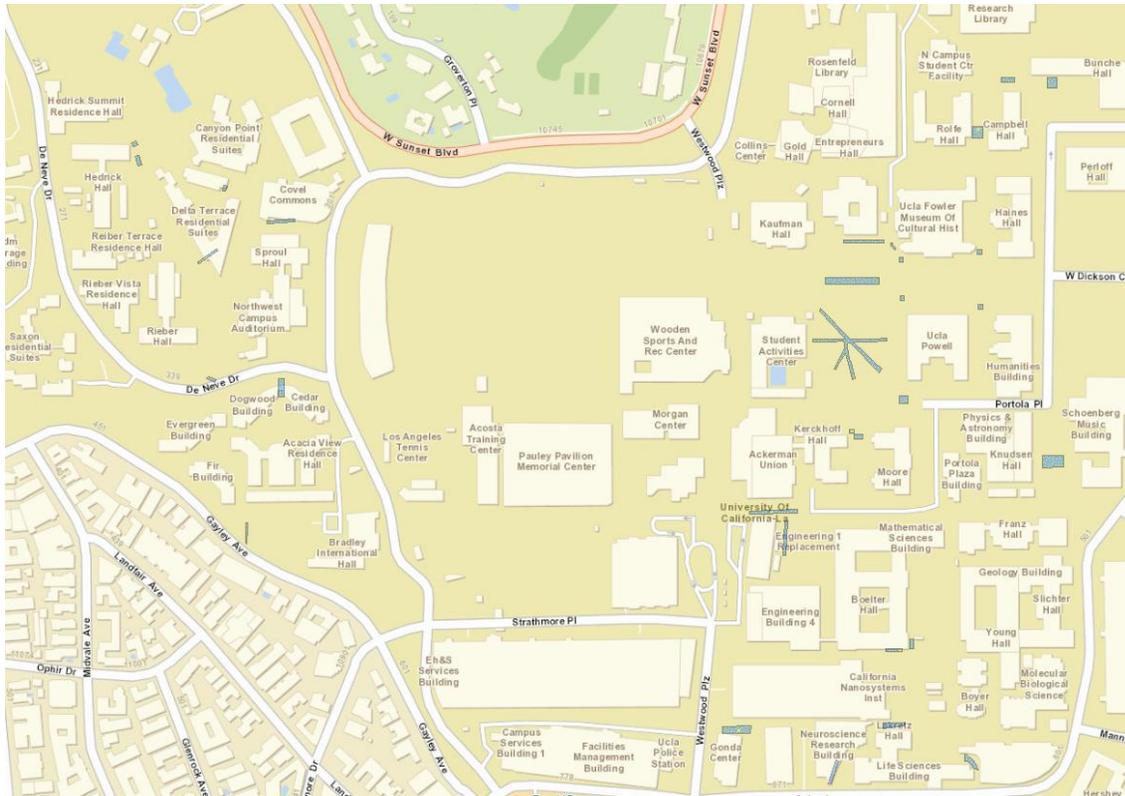
Campus ‘Dismount Zone.’ In this crowded thoroughfare, students must walk their bikes, scooters, skateboards, etc., or they will be ticketed. This rule is in place for student safety reasons.



The UCLA Community Bike Center, located in the Northwest corner of the Wooden Center, provides students with bicycle repairs and advice, rentals, and more.



Shower and locker facilities available on campus.



These light blue polygons indicate sets of stairs on campus that present a significant obstacle to student cyclists. By mapping the locations of these stairs, we hope students will be able to plan out more convenient routes to and throughout campus.