B Street Project
12/20/03
Sustainable Campus

BY:

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Problem History

Humboldt State University was established in 1913 and slowly expanded into already existing streets of Arcata. Since the number of students in earlier years was substantially smaller than currently, many of the problems HSU student's faces today didn't exist. In particular, the lack of affordable student housing forces students out into neighboring cities and towns such as Eureka, Mckinleyville, Freshwater, Manilla, and other surrounding communities, thus creating a dependence on the automobile. Because of this, the conflict between pedestrians and vehicles has begun to surface. HSU is unique in that its campus intermingles with the community, as opposed to other campuses such as Ohio State University; which was developed with its main campus as the central focus with parking on the outer perimeter. HSU has developed within an already existing infrastructure of Arcata and therefore has many streets and small lots for parking throughout campus, intertwining vehicle and pedestrian traffic.

One area of particular concern is the section of B Street between Laurel Street and Harpst Street. With the development of various buildings surrounding B Street such as Industrial Technologies, Engineering/Biological Sciences, Gist Hall, and the newly remodeled Student Services buildings, this portion of B Street has become one of the busiest corridors on the campus.

As early as 1999, the first documented complaints of the congestion on B Street began to surface. The problem was that 60 inches wasn't wide enough to accommodate a steady flow of students commuting between classes. To address this issue, the B Street parking meters south of Laurel Street and north of Harpst Street were removed in 2000 as an attempt to accommodate the pedestrians. The twenty-six parking spaces were kept and zoned as general parking. Unfortunately, this was a futile attempt to rectify the situation, as all it did was keep people from hitting themselves on the meters. With the meters gone, the width was increased by 12 inches, and at the current width of 72 inches, there is just enough room for two people to walk side by side.

Since people walk in both directions on the sidewalks on each side of B Street, it makes communication between two people very difficult. Also, if people walk at different speeds or smoke cigarettes, which are also common, the problem is amplified. What this leads to is an environment in which students are forced to walk amongst the

vehicular traffic in the streets. This situation creates unsafe and extremely unsatisfactory conditions for one of the main pedestrian corridors on campus. With enrollment expected to steadily rise, and the approved construction of the Behavioral and Social Sciences building near B Street, this corridor will become even more congested, unsafe, and unsatisfactory.

There are a number of obstacles involved in fixing this problem. Since the street is under the jurisdiction of HSU, the city of Arcata does not need to be involved. One of the most obvious is the removal of the 26 existing parking spaces. Since there are already a number of complaints involving the lack of parking, the removal of 26 spots could pose a hardship. Another obstacle is the newly created infrastructure underneath the east side of B Street. Since the street was finally completed in the fall of 2002, cutting into the street for more surface work could also be met with resistance. Also, funds for this type of project would have to come out of an already constricted school budget.

However, the obvious need for pedestrian traffic space on B Street is much more important to many than the need for 26 parking spaces. During brainstorming at the Campus Master Plan Public Forum meeting October 2nd 2003, a reoccurring suggestion was to close all inner campus streets to vehicular traffic and develop satellite parking. B Street was the highlight of this topic, being mentioned repeatedly. The HSU community is speaking out and declaring that there shouldn't be any reason for pedestrians to have to walk single file across campus because of vehicular traffic. This is a fairly urgent situation that will require time for planning and construction, and should be addressed as quickly as possible. The problem that we need to address thus becomes apparent; motor vehicle traffic and parking on B Street creates an unsafe, congested, unattractive, and unfriendly pedestrian environment in the heart of Humboldt State University.

Goals

1. Increase pedestrian and bicyclist safety on B Street.
2. Accommodate increased pedestrian traffic on B Street.
3. Create a user-friendly corridor on both sides of B Street.
4. Increase aesthetic quality of campus.

Objectives

1. Create enough walking space to accommodate at least four (4) pedestrians walking side-by-side.
2. Decrease pedestrian and motor vehicle interactions by 100%.
3. Increase aesthetic quality of Humboldt State University campus.

Alternatives

Seven possible alternatives were developed after a brainstorming session. Those alternatives were eliminated because they were not conceived of as being reasonable, feasible, or practical. One was to remove the east sidewalk and remove parking on only this side. Another alternative which was eliminated was to remove all parking and make B Street a one way, all access road. A similar alternative was to remove parking and make B Street a one way road allowing special access vehicles only. The last eliminated alternative was to remove the road completely with no vehicular access. The three alternatives chosen to be analyzed in depth are listed below.

Alternative # 1

This alternative consists of removing all existing parking and widening the sidewalks on both sides of B Street. This alternative has several advantages and disadvantages that distinguish it from the others. As a result of taking this alternative there are a number of unintended consequences that occur as well.

Advantages

The most significant advantage that this alternative creates is a substantial widening of the existing walkways. The current sidewalk widths are 72" on the East side and 60" on the West. With the parking spaces removed, the walkways will be widened to 167" and 155". This is more than enough room for 4 people to walk side by side without

interfering with each other. This allows for at minimum, groups of 2 to walk in opposite directions without conflict. Because of this, people walking at different speeds will be able to pass and move about without compromising their safety by having to step out into the street.

By having the parking removed, safety will also be greatly increased for cyclists. There will no longer be the danger of people opening their car doors in front of bicyclists. Also, since drivers will not be looking for parking spaces they will be more inclined to pay attention to the road and the cyclists using the road.

Communication between pedestrians will be encouraged and more engaging conversations can take place since there won't be a need to weave in and out of parked and moving vehicles. One of the essential elements of a successful existing university is an environment that promotes communication between students and staff anywhere on the campus. With this walkway widening, the campus will be taking a step towards creating a non-vehicular interior. This alternative is also cost effective since construction activities will be minimal. No extensive excavation is required and the project could be completed in just a few weeks. Since the newly completed infrastructure is already in place, this would only add the thickness of the sidewalk to be placed on top of the existing asphalt.

Disadvantages

The disadvantages that this creates are primarily centered on the loss of parking spaces and inconveniences that may occur. Since the 26 spots will be removed, an already contentious debate about not enough parking could be exemplified.

There is also the continued traffic that would remain on B Street. Even though there would be no more general parking, there still exists a potential for traffic up and down the street. Since the parking meters still are in place on Laurel, the traffic to get to those parking spots will remain.

Unintended Consequences

As a result of this alternative there are a number of unintended consequences that occur. By removing the parking spots, there will be a reduction in non-point source

pollution flowing into the storm system. Since all of the parking spaces have a thick layer of oil under them as a result of leaky engines, transmissions, axles, brakes, etc., those potential sources will be eliminated. Because there won't be general parking of B Street between Harpst and Laurel, the air quality will be higher with the significantly less amount of traffic. An added benefit to all students and staff will be an increase in physical fitness as a result of having to park in one of the existing lots. As was mentioned before, it is very common for many universities to have the parking on the perimeter, rather then the interior. All of these benefits both intended and unintended will increase the appeal of the campus, and therefore, lead to a greater learning environment.

Alternative #2

The second alternative consists of removing all of the parking on B Street, South of Laurel and North of Harpst Streets. Once the parking has been removed, which was made up of 95" on both sides of the street respectively, alternative 2 calls for the widening of the East side of the current sidewalk the distance of 10' while maintaining the current width of the west sidewalk. This maintains a width of 60" on the Western sidewalk, and a new width of 192" (16') on the Eastern sidewalk. Along with the widening of the Eastern sidewalk, alternative 2 mandates that two bike lanes be painted on each side of the street with a width of 2.9'on the West and East side. With the implementation of this alternative there will be numerous advantages, disadvantages, and unintended consequences.

Advantages

This alternative allows for a large walkway, consisting of 16 feet. This will alleviate the current pedestrian congestion by allowing a minimum of four people to walk side by side, or groups of two to walk in opposite directions. The large pedestrian corridor will also allow a greater buffer zone between pedestrians and motor vehicle traffic, allowing for greater safety. Another aspect that could be included into this alternative could be the construction of an open student commons located on the west side of the Biological Engineering building where there currently is a grassy slope. The

second alternative could also allow for the planting of vegetation which could help diffuse the large amount of motor vehicle runoff.

As with alternative 1, communication between pedestrians will be encouraged and more engaging conversations can take place since there won't be a need to weave in and out of parked and moving vehicles. One of the essential elements of a successful existing university is an environment that promotes communication between students and staff anywhere on the campus. With this walkway widening, the campus will be taking a step towards promoting open communication between students and faculty. This alternative is also cost effective since construction activities will be minimal. No extensive excavation of the plumbing and fiber optic network that was buried under the east side of the B Street in the spring of 2003 is planned for at least twenty years.

Disadvantages

With the implementation of a larger sidewalk on the east side of B Street, leaving the west sidewalk in its' current state, where congestion occurs would remain.

The loss of twenty-six parking spots in the interior of campus could meet some opposition, but according to Steve Sullivan, the loss of twenty-six parking spots is minimal, though it will shift the burden to other areas of campus.

Unintended Consequences

As a result of this alternative there are a number of unintended results that occur. By removing the parking spots, there will be a reduction in non-point source pollution flowing into the storm system. Since all of the parking spaces have a thick layer of oil under them as a result of leaky engines, transmissions, axles, brakes, etc., those potential sources will be eliminated. Because there won't be general parking of B Street between Harpst and Laurel, the air quality will be higher with the significantly less amount of traffic. An added benefit to all students and staff will be an increase in physical fitness as a result of having to park in one of the existing lots, located on the exterior of campus. Another additional bonus will be the legitimization and subtle publicity of the use of bicycles as a means of transportation to and from campus with the designation of bike

lanes. All of these benefits both intended and unintended will increase the appeal of the campus, and therefore, lead to a greater learning environment.

Alternative #3

This alternative is similar to the previous two, but takes the action one step further. In addition to widening one or both sidewalks, alternative 3 proposes to block general traffic from using B Street by the use of gates.

Advantages

This action would result in a higher level of pedestrian as well as bicyclist safety by eliminating vehicle access aside from delivery, handicapped, and emergency vehicles. It would increase the air quality in the surrounding area as well as right on B Street and decrease the amount of soil contamination produced by moving and parked cars. This would nearly eliminate interior campus driving at HSU, something which is entirely feasible and has been done at many other campuses.

Alternative 3 would allow for many more pedestrians to comfortably walk on B Street by providing both the sidewalks and the roadway as a walking area. Communication between students and staff would have the maximum potential with this alternative because motor vehicles would be nearly eliminated from the area, making the area quieter and roomier. With little to no vehicular traffic in the roadway, cyclists would have plenty of room and visibility as opposed to the pedestrians and moving and parked cars that bikers have to currently dodge in the roadway.

This would also provide the largest amount of room to develop B Street into a pedestrian mall or open student commons incorporating vegetation to increase aesthetic appeal and decrease motor vehicle runoff. However, large trees wouldn't be ideal because they could easily disrupt any underground infrastructure.

Disadvantages

Going one step beyond eliminating parking on B Street, this alternative would meet with the largest amount of controversy; closing off regular traffic to the interior of a university campus will create an uproar no matter what. This would be the highest form

of "no access" possible and would gain little support because of the large vehicle inconvenience. Making B Street a gated access street would further restrict access for the disabled, especially the temporarily disabled who may not easily obtain a disabled permit or gate access. It would slow emergency vehicle reaction times because they would have to stop to open the gate. There would be increased pedestrian and cyclist congestion at the gate locations unless vertical bars were used as opposed to one horizontal bar.

This alternative would require the purchase of the physical gates and a security system to allow admittance through the gates.

Unintended Consequences

As with alternatives 1 and 2, alternative 3 will reduce non-point source pollution by eliminating parking and most driving on B Street. Air quality will be increased as well as aesthetic quality simply by eliminating most vehicles. This would greatly promote student and staff fitness in addition to basic alternative transportation use. Another unintended consequence of this action is the controversy it would produce.

Final Alternative and Decision Matrix

These three remaining alternatives were judged based on their safety, walkability, congestion, runoff, and aesthetics. Each criterion was rated on a scale of 1-5 with 5 being best. All group members individually assigned a value to each criterion for each alternative. The three tables were then averaged to determine the most appropriate alternative.

Table 1

Hans Petersen						
	Safety	Walkable	Congestion	Run Off	Aesthetics	Totals
Alternative 1	3	4	3	3	2	15
Alternative 2	4	5	3	4	4	20
Alternative 3	5	4	4	3	2	18

Astrid Dobo						
	Safety	Walkable	Congestion	Run Off	Aesthetics	Totals
Alternative 1	3	4	3	3	3	15
Alternative 2	4	5	5	4	5	23
Alternative 3	5	4	3	5	4	21

David Ferrington						
	Safety	Walkable	Congestion	Run Off	Aesthetics	Totals
Alternative 1	4	5	3	3	3	20
Alternative 2	4	5	5	5	5	24
Alternative 3	5	5	5	3	4	22

Group Average						
	Safety	Walkable	Congestion	Run Off	Aesthetics	Totals
Alternative 1	3.33	4.33	3	3	2.66	16.32
Alternative 2	4	5	4.33	4.33	4.66	22.32
Alternative 3	5	4.33	4	3.66	3.33	20.32

Construction Cost

The sidewalk in question that would be developed with the implementation of Alternative #2 consists of 8168.5 square feet. The cost of construction is based solely on a rough estimate for the cost of concrete itself. Additional costs such as the purchase of vegetation, and labor are not included in this estimate. Below is a break down of cost comparisons between traditional concrete and porous concrete.

Arcata Readimix, a local concrete company, gave an estimate of $11,925.00 for the concrete needed to fill the required area with a depth of 6". In addition to the cost of the concrete would be the need to relocate the storm drain to the edge of the new curb, and the cost of laying the concrete. Additional costs such as vegetation would drive this estimate up into the range of approximately $45,000.00. When this traditional form of sidewalk construction is compared to new concepts that are in place in areas of Florida, and currently being implemented in Clark County in Washington State, it seems almost foolish to continue with the use of concrete.

In an e-mail received this fall 2003, I was informed of the benefits from constructing sidewalks with porous concrete. Porous pavement can be used in a variety of places, but it is best used in low traffic and low load-bearing areas such as parking lots, parking lanes along residential streets, driveways, sidewalks, and more. They work in all types of climate conditions although snowplowing in cold climates needs to be done carefully and salt application should be avoided, which shouldn't be a problem in the coastal town of Arcata.

What we do receive in this unique geologic place where HSU is located is a high amount of yearly rainfall mainly concentrated in winter months. This is where porous concrete really shines. The concrete will let 4 inches of water pass through each minute, which is how much rain fell in a day during recent flooding in the Pacific Northwest. Along with the ability to absorb excess rainfall, porous concrete allows for non-point pollution from automobiles and other various sources to be absorbed by the soil and filtered, as opposed to directly entering out waterways via storm drainage pipelines. Additional bonuses from implementing porous concrete is the decreased need for drainage ditches, swales, and other storm water management techniques because if its' ability to absorb water at such a high rate. In the Clark County project, a contractor who

opted for porous concrete saved $35,000 overall by eliminating the need for a storm drain. Periodic maintenance throughout the year with a vacuum-type sweeper or a high-pressure hose will keep the pavement porous. This type of cleaning is best done directly after a big storm. Typical cost range from $2 to $4 per square foot, which can be more expensive than traditional pavements. With an area of 8168.5 square feet and a depth of 6 inches a ruff estimate cost of construction at $3.00 a square foot equals $36,758.25. The cost of laying this concrete as well as planting vegetation would surely drive this price up; however, the advantages to implementing porous concrete instead of using traditional concrete would pay off.

Pedestrian, Bicycle, and Motor Vehicle Surveys

Surveys were conducted at the same time of the day on the documented dates. We chose to take a visual assessment of pedestrians, bicycles, and motor vehicles on B Street. Dates range from September 15, 2003 to October 15, 2003, with data collection times consistently held from 1:45 p.m. to 2:00 p.m. We found that a very high proportion of pedestrian and bicyclists use this corridor versus motor vehicle use, shown in table 2. Following this survey we conducted another survey tracking the motor vehicles that use B Street between Harpst and Laurel Streets, found in table 3. Our goal was to determine whether the vehicles that drive past our viewing station would return down B Street in our allotted time; 1:45 p.m. to 2:00p.m. The returns ranged from as low as 21% to as high as 72%. These results confirm that a significant amount of the traffic on B Street consists of vehicles making return trips shortly after entering the street. As stated earlier in the report, cars driving around the interior of the campus, especially where pedestrian traffic is high is unacceptable for a successful university.

Table 2

Pedestrian vs. Vehicle Traffic Flow

Date	Pedestrians	Cars	Bikes
9/15/03	281	34	17
9/17/03	260	43	19
9/22/03	388	53	30
9/29/03	332	33	31
10/6/03	342	47	20
10/13/03	185	22	17
10/15/03	427	92	39

Table 3

Return Trip Vehicles

Date	Initial Sighting	Return	% Returns
11/3/03	25	18	72%
11/5/03	28	14	50%
11/12/03	55	34	62%
11/15/03	29	16	55%
11/17/03	28	6	21%

Implementation Timeline and Personal Assignments
November 3, 2003 to December 8, 2003

The implementation timeline describes the tasks attempted and the times at which they should have been completed. The purpose of these tasks is to help in carrying out the implementation of the B Street Plan. The greatest concentration of effort in this area goes towards tasks that will be completed before December 19, 2003. Through the execution of these tasks, our hope is that this project will be carried through to completion.

Hans

- Obtain Master Plan timelines by November 11.
- Obtain bike/vehicle/pedestrian accident reports on B Street in the last 5 years by November 11.
- Obtain dimensions of the proposed project area by November 14.
- Post informational signs on campus by December 2.

David

- Cost analysis for concrete versus porous concrete by November 21.
- Determine cost of construction by November 21.
- Create excel spreadsheet for the three narrowed alternatives to determine the final solution to project by November 3.
- Get names and e-mail addresses of Master Plan Committee November 13.
- Get names and e-mails of the firm in charge of the Master Plan November 13.

Astrid

- Publish a Lumberjack article by December 1.
- Set-up e-mail address for comments and suggestions by November 16.
- Involve the Alternative Transportation Club by providing information at their table on the Quad by November 7.
- Send notice on weekly HSU e-mail by November 16.

Group work

- Start new survey on up and down traffic on B Street by November 3.
- Organize previously surveyed car/pedestrian/bike counts by November 12.
- Create timeline for project and goals that is correlated with HSU Master Plan timeline by November 3.
- Develop tasks to be carried out after the semester to ensure the continued progress of this project with future HSU students by December 1.

- Talk to Bob Schultz and Steve Sullivan about plan implementation by November 20.
- Create an informational web page by December 1.
- Poll community opinions by December 1.

Monitoring and Evaluation

To assure the further implementation of the B Street Plan, at least one group member will attend all future Master Plan Committee meetings open to the public. At these meetings we will bring up the topic of B Street congestion in an attempt to achieve recognition and support from the Master Plan Committee.

Each group member will continue to check the group's email address designated to receive comments and suggestions for our plan. We will reply to all inquiries and consider all reasonable suggestions.

Further surveying of both methods will be performed in the future to help conclude if the congestion problem on B Street is growing or shrinking. This will be determined by evaluating a comparison between new statistics and already obtained data from our surveys. Once compiled, this new information will be added to the B Street Plan and re-submitted to the Master Plan Committee.

Time Sheets

Below is a detailed list of our individual time sheets for the fall semester, 2003. Included is our total fee at our contracted price of $70.00/hour. With a total group work hours of 132.02 * $70.00 = **$9,241.40.**

David Ferrington

Date	Time	Activity
9/8/03	45 Min.	Grp. Meeting
9/8/03	2 Min.	Phoned Bob
9/9/03	1 Min.	Phoned Bob
9/9/03	20 Min.	Car Survey
9/10/03	90 Min.	Project Development
9/14/03	30 Min.	Project Development
9/15/03	20 Min.	Car Survey
9/15/03	5 Min.	E-mails
9/15/03	20 Min.	Car Survey
9/17/03	20 Min.	Car Survey
9/22/03	20Min.	Car Survey
9/22/03	20Min,	Grp. Meeting
9/23/03	45 Min.	Meeting w/ Bob Schultz
9/23/03	45Min.	Meeting w/ Steve Sullivan
9/27/03	60 Min.	Research
9/29/03	20 Min.	Car Survey
9/29/03	180 Min.	Project Development
10/1/03	120 Min.	Project Development
10/6/03	20 Min.	Car Survey
10/12/03	60 Min.	Project Development
10/13/03	20 Min.	Car Survey
10/14/03	90 Min.	Project Development
10/16/03	60 Min.	Project Development
10/18/03	60 Min.	Project Development
10/20/03	120 Min.	Project Development
10/22/03	90 Min.	Project Development
10/25/03	90 Min.	Project Development
11/2/03	60 Min.	Project Development
11/5/03	20 Min.	Car Survey
11/10/03	20 Min.	Car Survey
11/10/03	60 Min.	Project Development
11/12/03	20 Min.	Car Survey

11/16/03	20 Min.	Car Survey
11/17/03	60 Min.	Project Development
11/19/03	180 Min.	Project Development
12/1/03	180 Min.	Project Development
12/1/03	180 Min.	Project Development
12/2/03	180 Min.	Project Development
12/3/03	180 Min.	Presentation Development
12/4/03	120 Min.	Presentation Development
12/7/03	30 Min.	Presentation Development
12/8/03	40 Min.	Presentation
12/10/2003	60 Min.	Project Development
12/11/2003	60 Min	Project Development
12/12/2003	60 Min.	Project Completion
Total	2363 Min.	
	44 .4 Hrs.	

Hans Petersen
Time sheet for B Street Project

Dates	Time (minutes)	Tasks Carried Out
9/9/2003	120	Research Sustainable Campuses
9/9/2003	20	Begin car counts
9/15/2003	120	Research/Car counts
9/17/2003	20	Car counts
9/22/2003	20	Car counts
9/23/2003	45	Meeting with Bob Schulz
9/23/2003	45	Meeting with Steve Sullivan
9/28/2003	60	Research Other Campuses
9/29/2003	20	Car counts
9/29/2003	180	Composing Problem and Background Issues
9/30/2003	30	Measuring Street
10/1/2003	120	Background/ Obstacles
10/6/2003	20	Car counts
10/12/2003	120	Working on Goals and Objectives
10/14/2003	90	Working on Goals and Objectives
10/16/2003	60	Brainstorming Alternatives
10/20/2003	120	Brainstorming Alternatives
10/22/2003	150	Refining Alternatives
10/25/2003	120	Summarizing Alternative #2
11/2/2003	60	Implementation Plan
11/3/2003	180	Implementation Plan
11/5/2003	20	Car counts
11/10/2003	20	Car counts
11/10/2003	60	Measuring Project Area
11/12/2003	20	Car counts
11/16/2003	150	Monitoring/ Evaluation/ Further Research
11/17/2003	60	Further Research/ Car counts
11/19/2003	150	Decision Matrix
12/1/2003	120	Car counts/ Editing
12/2/2003	150	Editing
12/3/2003	120	Presentation Preparation
12/4/2003	120	Presentation Preparation
12/7/2003	30	Presentation Preparation
12/8/2003	60	Presentation Preparation
12/11/2003	90	Finishing Touches
total	2890	
total time (hours)	48.2 hours	

Astrid
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Timeline

Dates	Minutes	Task
9/9	20	car/pedestrian count survey
9/15	20	car/pedestrian count survey
9/17	30	meeting preparation
9/22	20	car/pedestrian count survey
9/24	45	background research
9/29	160	problem and background development
9/29	20	car/pedestrian count survey
9/30	30	measuring B Street
10/1	120	problem and background development
10/6	20	car/pedestrian count survey
10/10	80	goals and objectives development
10/13	60	goals and objectives development
10/13	20	car/pedestrian count survey
10/15	20	car/pedestrian count survey
10/16	30	brainstorming alternatives
10/20	120	brainstorming alternatives
10/22	150	alternative development
10/26	100	alternative development
10/29	40	implementation plan development
10/29	40	background research
11/3	180	implementation plan development
11/3	20	car/pedestrian count survey
11/10	20	car/pedestrian count survey
11/10	60	measuring B Street
11/12	20	car/pedestrian count survey
11/15	20	car/pedestrian count survey
11/16	80	background research
11/17	20	car/pedestrian count survey
11/19	120	decision matrix development
12/1	20	car/pedestrian count survey
12/1	60	project development
12/3	160	presentation preparation
12/4	100	presentation preparation
12/7	200	presentation preparation
12/11	140	project development
Total Minutes	2365	
Total Hours	39.42	