Spartavius & Harris, Ltd.

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270 Skunk's Misery Lane
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October 16, 2002

Richard Garcia, Ph.D., P.E.
Department of Civil & Environmental Engineering
Michigan State University
East Lansing, Michigan 48825

Subject: RFP #14-201

Dear Dr. Garcia:

The attached proposal is submitted in response to your RFP #14-201, dated September 16, 2002: *Analysis and Potential Redesign of the Intersection of Red Cedar Road and Kalamazoo Street on the Michigan State University Campus*.

You will note that we have already collected some preliminary data on this intersection. We are grateful for the opportunity to bid on this project. If you have any questions after reviewing our proposal, please contact us.

Sincerely,

Emmylou Harris, P.E.
Principal

Encl.: Proposal

A Proposal Submitted in Response to RFP #14-201: Analysis and Potential Redesign of the Intersection of Red Cedar Road and Kalamazoo Street on the Michigan State University Campus

Submitted to: Richard Garcia, Ph.D., P.E.
Department of Civil & Environmental Engineering
Michigan State University

October 16, 2002

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Spartavius & Harris, Ltd. proposes to study the intersection of Kalamazoo Street, Red Cedar Road, and Chestnut Road on the MSU campus and, if necessary, to identify, analyze and recommend potential alternatives for improving pedestrian safety and traffic flow. This intersection, commonly known as the "Sparty" intersection, has been the subject of numerous complaints from drivers who find the intersection confusing and from pedestrians who feel it is unsafe. At this point the actual dimensions of any such problems and their effect on pedestrian safety and traffic flow remain uncertain. But potential problems might include more frequent and more serious accidents, backup from the intersection on to West Circle Drive, and extreme backups during peak hours or special events. Spartavius & Harris, Ltd. proposes to carry out a project with the following objectives:

- complete an analysis that (a) verifies whether or not significant problems regarding pedestrian safety and traffic flow exist at the current intersection; (b) determine the factors that contribute to such problems;
- develop and analyze feasible solutions to such problems;
- generate a final report that summarizes data collected and presents a recommendation that will improve pedestrian safety and traffic flow.

Spartavius & Harris, Ltd. has nearly 20 years of experience in transportation engineering and has designated a highly qualified team to undertake this project. The proposed Work Plan addresses project objectives in three phases, with a six-week timeline for completion.

Note that the objectives are statements that you can measure. In other words, they describe what conditions will exist when your work is done. In this case you will know with some certainty whether problems at the intersection require change. You will have a report that verifies the conclusion and recommends a course of action. Don't confuse ***objectives*** *with the* ***tasks*** *you undertake to achieve those objectives.*

The Executive Summary is a strategic document, meant to be read by decision-makers. In that way it differs from an abstract, which is a straightforward summation of points covered. An E.S. must bring important, persuasive points to the front to gain attention. The order of these points may differ from how they appear in the full report. Here you seek to gain the reader's attention and get he or she to read on.

INTRODUCTION

Don't worry if your Introduction contains some of the same wording as in your E.S. The Introduction is where you elaborate on the information in the E.S.

Spartavius & Harris, Ltd. proposes to study the intersection at Kalamazoo Street, Red Cedar Road, and Chestnut Road on the Michigan State University campus. The intersection is known locally as the "Sparty" intersection. Figures 1a and 1b illustrate large-scale and detailed views of this intersection. An initial site visit revealed that traffic and safety problems exist at the intersection. Spartavius & Harris, Ltd. observed pedestrians caught in the street while attempting to cross and inconsistencies in yielding behaviors among confused drivers. The potential consequences of these problems may include traffic backups onto West Circle Drive, more frequent and more serious accidents, and possible gridlock conditions during peak hours of intersection operations. Currently, the actual dimensions of any such problems and their effect on pedestrian safety and traffic flow remain uncertain. Spartavius & Harris, Ltd. will examine the safety and daily traffic operations of the intersection in order to determine whether the problems are significant enough to require changes, what factors contribute to such problems, and what improvements, if any, are necessary. The high amount of pedestrian traffic, unusual design, and local significance of the intersection are factors that will inform any recommendations.

The main **objectives** of the proposed project are as follows:

- complete an analysis that (a) verifies whether or not significant problems regarding pedestrian safety and traffic flow exist at the current intersection; (b) determine the factors that contribute to such problems;
- develop and analyze feasible solutions to such problems;
- generate a final report that summarizes data collected and presents a recommendation that will improve pedestrian safety and traffic flow.

The proposed work addresses project objectives in three phases, with a six-week timeline for completion. The balance of this proposal describes the Work Plan in detail and summarizes the qualifications of key personnel.

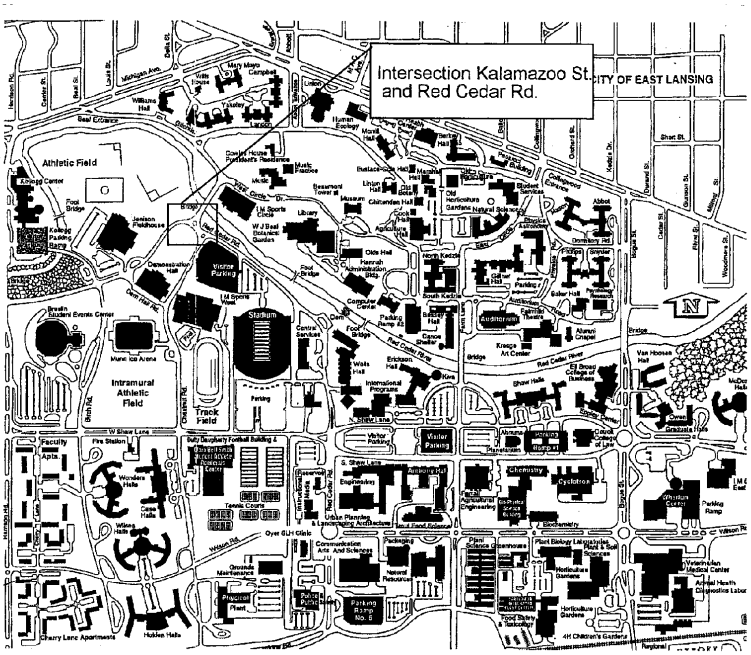

Figure 1a. The location of the "Sparty" intersection on the MSU Campus.

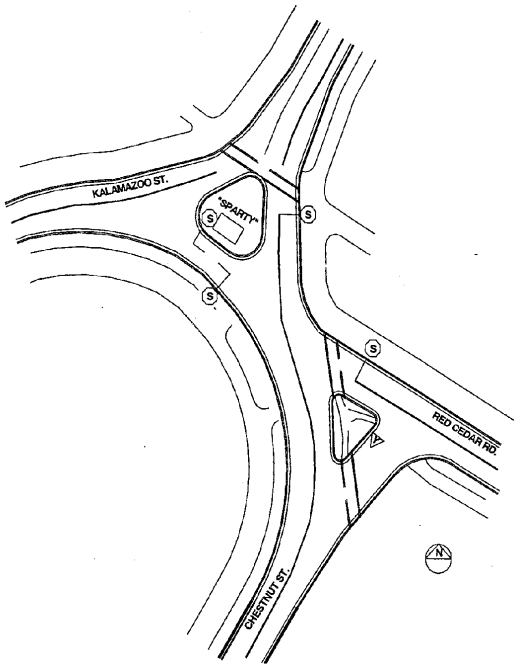

Figure 1b. An enlarged view of the "Sparty" intersection. "S" marks indicate stop signs.

WORK PLAN

Spartavius & Harris, Ltd. will conduct a study and produce a final report recommending a course of action. The proposed work will occur in three phases, each tied to project objectives, and will take place within a six-week period. Table 1 displays this work structure.

Table 1. Outline of Proposed Work.

Phase/Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Phase 1 • Data collection & analysis	Data collection	Data collection Data analysis	Data analysis			
Phase 2 • Develop & analyze options				Develop & analyze options	Develop & analyze options	
Phase 3 • Prepare final report					Prepare final report	Prepare final report

Phase 1. Data Collection & Analysis

Data to be collected includes vehicular and pedestrian traffic volumes, accident reports, geometric measurements and, as it becomes apparent through the study, anything that may contribute to problems at the intersection. These data will then be analyzed to determine the significance of existing problems and whether improvements are warranted.

Data Collection

Vehicle accident information will be collected consisting of the number and type of accidents that have occurred over the past decade. This information will be collected through the vehicle accident information (accident/crash reports) from the local police

department. This information can be used to establish the type of accidents that occur most frequently and to determine if one particular type of movement is particularly dangerous. This information will also be compared to accident information from other on-campus locations to see if accident frequencies and rates are higher then normal. These accident reports will also be used to test the assumption that accidents increase during peak traffic hours.

Traffic counts describe the volumes of vehicles and pedestrians making turning and through movements at the intersection as well as traffic, pedestrian, and heavy vehicle characteristics.

A team using electronic traffic counters will collect the traffic count information. Two individuals will collect data on the volume and direction of flow for all passenger vehicles entering the intersection during the count period. The first data counter will be positioned in the southern traffic island at the Red Cedar Road terminus. Similarly, the second counter will be positioned at the Sparty Statue located on the northern island just south of the Kalamazoo Street Bridge. The third data collector, located near the second counter, will manually record pedestrian volumes and count trucks and busses. A diagram of this collection arrangement appears in the Appendix.

Counts will be conducted over the five-day business week with three daily traffic counts taken during two-hour segments: 7:00-9:00am, 11:00am-1:00pm, and 4:00-6:00pm. This schedule will allow Spartavius & Harris, Ltd. to study the peak traffic volumes that may occur from morning and evening rush hours and lunch breaks. These traffic counts will be repeated during the following week, with the collected volumes compared to those of the previous week. If the difference between the two observations is within 20%, no additional counts will be taken. If there is variation, additional counts will be taken and averaged to determine accurate peak-hour volumes for the intersection.

Geometric factors are the dimensions and physical features of the existing intersection. This information also includes allowed movements, traffic control devices, and locations of relevant features that effect traffic operations at the intersection. This information will be used to establish constraints for how the intersection could be redesigned. Specifically, changes to the current locations of the Spartan Statue, Kalamazoo Street Bridge, and Red Cedar River may be impractical. Therefore, the exact location of the statue and other components of the intersection will be measured and taken into consideration. Dimensions of the Red Cedar River and Kalamazoo Street Bridge will also be measured.

Data Analysis

At this stage, the project team will analyze the data collected to determine the significance of existing problems and to note any trends. Information collected from the accident records can be especially useful in determining the extent of existing problems. If particular types of accidents are especially frequent, solutions can focus on that particular issue. Pedestrian and traffic counts are also useful in determining the traffic patterns and volumes at the intersection. The traffic count data will show which operations are most prevalent and how frequently they occur.

These traffic volumes will be input to the Highway Capacity Software (HCS), in which the current intersection can be "modeled" and current operations assessed. The capacity of the intersection can then be determined for various situations. Different arrangements and alternatives can easily be modeled and evaluated. The program will then compute a Level of Service (LOS) for each scenario based upon the capacity of the design. If the current level of service is deemed poor or unsafe, improvements to the intersection may be warranted. Using this same process, various alternatives can be modeled and assigned a level of service. The use of such processes will aid in comparing different alternatives.

Phase 2. Develop & Analyze Options

If the data suggest that no improvements are warranted, such a recommendation will appear in the final report. Should analysis of the data collected suggest that improvements are warranted, several practical options will be examined. Such options might range from technological improvements (such as a traffic signal to enhance traffic flow) to a potential realignment and geometric modification to the current intersection.

The project team will apply the following criteria in evaluating the options:

- Potential cost
- Likely affect on accident rates and pedestrian safety
- Resulting LOS
- Compatibility with MSU Master Plan

*Developing reasonable criteria is an important part of your analysis. Avoid the trap of simply casting issues as "pro" or "con." Things only become such **after** you apply specific criteria.*

By applying these criteria, the project team will evaluate and refine the initial options. A recommended option will then be presented in a detailed report to the client. This process will allow for the selection of a preferred alternative. This process is defined in more detail in the following sections.

Develop Options

Following the data analysis, the project team will examine the feasibility of several initial options. The team will choose options that appear be most viable given the constraints of this project and the criteria above. Options that do not substantially address criteria will then be discarded. The remaining options may be compared to highway design guidelines in an attempt to determine whether the options meet safety and design regulations.

Analyze Options

At this stage the remaining options will be measured against the criteria above to determine what recommendations should go forward. For example, the incremental gain produced by certain alternative will be weighed against the incremental cost to do it. If the benefit is much greater, the alternative will be recommended. A final

recommendation might not represent the simple choice of one right answer above the other wrong answers, but rather a determination of which option provides the best overall solution. The best solution may even emerge from a combination of elements within various options.

Phase 3. Prepare Final Report

In this stage, the project team will draft a final report for review by senior engineers at Spartavius & Harris, Ltd. The team will incorporate this feedback into a final report for the client. This final report will provide a detailed description of the project, including the final recommendation of the project team. The report will also include all data collected and a brief description of any other options considered.

KEY PERSONNEL

Spartavius & Harris, Ltd. will designate the project responsibilities as follows:

- **Project Engineer** –

  Emmylou Harris, P.E., Principal, Spartavius & Harris, Ltd.
  Ms. Harris received her B.S. (1984) and M.S. (1986) in Civil Engineering the University of Texas at Austin. She is a registered engineer in Michigan, Ohio and Illinois. She has been a principal at Spartavius & Harris, Ltd. for ten years, and has served as project manager or project engineer on nearly 50 different transportation projects.

- **Engineers and Analysts** –

  Timothy Taggart, P.E.
  Mr. Taggart received his B.S. in Civil Engineering (1997) from Michigan State University and is a registered engineer in Michigan. He has worked on numerous transportation projects, including the redesign of intersections. He was also selected by TRB as a reviewer of the most recent version of the Highway Capacity Software.

  Norris Leonard, P.E.
  Mr. Leonard received his B.S. in Civil Engineering (1996) from Michigan State University and is a registered engineer in Michigan and Ohio. He has served as project engineer on eleven different transportation projects. He is currently participating in a large-scale project (funded by TRB) to compare accident reporting systems in different states.

  David Li
  Mr. Li received his B.S. in Civil Engineering (2001) from the University of Michigan. He has supervised data collection teams on seven different projects. Mr. Li also possesses a Certificate of Study in technical communication, and he routinely edits project reports.

These individuals will be involved directly with acquiring and analyzing all data necessary for this project. The data collectors will consist of three individuals trained in this area.

You may not possess the experience of the people listed here. But the idea is to show how the skills and experience of individual team members combine to create a group well-suited to the task proposed.

Appendix

Data Collection Sites for the "Sparty" Intersection.