

TRANSPORTATION

Competition Date: Friday, March 31, 2021

Competition Location: UC Davis Campus

Abstract:

The purpose of the Transportation Competition is to provide students with a practical transportation problem. This challenge requires students to analyze a real-life problem in transportation and apply methods of intersection design, geometric design, and traffic engineering to develop a solution.

The 2022 Transportation Competition requires teams to analyze and present a solution to a practical problem with the bike network of the city of Sacramento. This project requires a 5+ page document containing their project summary and a 10-minute presentation utilizing a professional poster.

Contact:

Any questions/concerns regarding the Transportation Competition may be sent to:
transportation.midpac2022@gmail.com

**Please send any questions or inquiries about the transportation competition to the above email. Messages/emails sent to any other account will NOT be addressed. Expect replies to take up to 3 business days.*

Important Notes:

- The Transportation Director has the right to make final decisions about point deductions, rule discrepancies, team order, etc.
- Please send the names and emails of your team's Transportation Competition leads. The Director will be sending out updates and will schedule a video conference call to answer questions.
- Please email the Director if you spot any errors/typos with the transportation rules.

** Please remember that the Director is a student. The Director is voluntarily dedicating time to organize this competition so please be patient and understand as the Director will make mistakes.*

Important Deadlines:

- Registration: November 27, 2021 (See Mailer I for more information)
- Requests for Information: January 15, 2022
- Design Report: March 10, 2022
- Presentation/Poster: March 24, 2022

The Director will send teams confirmation emails with teams' presentations and design reports are received.

** Failure to comply with the deadlines listed above will result in point deductions from the team's final score.*

Background

The City of Sacramento contains an extensive network of bike routes, trails, and shared-use routes in order to encourage active modes of transportation including bicycling and walking. The Sacramento Bike Map PDF file details the ranges and locations of this vast network. Two shared use routes are of particular interest and are marked in Figure 1 and the “Highlighted” PDF. Firstly, the route referred to as “Fisherman’s Lake” connects to the Sacramento River and ultimately Downtown Sacramento. The “Jackrabbit Trail” is located in the northern Natomas Crossing area and extends to Airport Road.



Figure 1 - Break in Bike Network at Natomas Crossing

Proposal Specific Goals

As Figure 1 displays, both routes abruptly end at Natomas Crossing, a small suburban area in Sacramento located directly north of the I-5 and I-80 interchange connector. Fisherman's Lake Trail ends at San Juan Road, an east-west road that passes under I-5 and over I-80. Jackrabbit Trail ends at Airport Road, which intersects San Juan. Between these points of intersection, there is no clear route for a bicyclist or pedestrian to travel from one end to the other, creating a gap in Sacramento's active transportation network.

Your project is to create a plan to connect these two endings to close the aforementioned gap. Connecting these two trails is incredibly important to providing bicyclists and pedestrians an easy and accessible route between North Natomas to Downtown Sacramento. This design must promote safety and remain cost-effective, and any construction you do must be environmentally and economically efficient.

Currently, there are plans to extend East Commerce Way south to connect it with San Juan Road which will include a new signalized intersection. This extension process will take a couple of years and a solution for pedestrians and bicyclists is needed now. However, the extension of East Commerce Way should be a consideration in your design with a discussion in your final report on how your design will need to be updated or modified when it is constructed.

The requirements for your plan's documentation and presentation are detailed below.

Proposal Submittal and Report Requirements

The entire report page limit is 25 pages. Firms may have any number of drawings and appendices but must stay within the 25-page total report limit. Please format the report double spaced, 12 point Times New Roman font, 1-inch margins, and normal width character spacing formatting. The citations, cover page, table of contents, and appendices are NOT INCLUDED in the 25-page length.

Report

At a minimum, your report should include:

1. **Cover page** – Competition information, Project title, Date, Team members.
2. **Table of Contents** – Page and section information as appropriate.
3. **Introduction** – Purpose and need for your project.
4. **Project Summary and Recommendations** – Summarize your project's features and outcomes. Recommendations for overall project adoption and project feature-specific recommendations.
5. **Design assumptions** – Any assumptions made for design parameters including but not limited to cost assumptions, pedestrian/bicyclist assumptions, etc. Provide references, reasonable justification, or calculations to support all assumptions.
6. **Site Plan** – Discuss your team's proposed pathway. Include an AutoCAD drawing of the overall system to facilitate your discussion. All figures and plans must be computer drafted in the format of ANSI B (11"x17").
7. **Roadway Cross-Sections Sheet** – Include specific cross-sections and one intersection design diagram. Include AutoCAD drawings as necessary to illustrate the explanation of the system's elements. All figures and plans must be computer drafted in the format of ANS B (11"x17").
8. **Opinion of Probable Cost** – A construction cost estimate for the project must be established via an excel spreadsheet.
9. **References and Appendices** – List references utilized in the design and analysis of this project. Provide results that are best displayed through figures and tables. List any references or manuals used in the development of the project or the report.

Report Item Details

Project Summary

The summary should review the entire project and also explain the following:

- Discuss your recommendations.
- Efficiencies and benefits to the overall design for bicyclists and pedestrians.
- Explain any innovative features of the project.
- Discuss the impacts this design may have on pedestrian/bicyclist safety.
- Discuss the impacts this design may have on automobile traffic.
- An explanation of the impacts of the future construction of the East Commerce extension and how that factored into your team's bike lane design. Any assumptions must be explained and their validity in this situation justified.
- Analyze the environmental impacts of the construction, as well as the operation of the system.
- Summarize the societal impact of the system at full buildout and justify how your chosen design maximizes the societal impact.

The project summary is limited to 10 pages. The entire report page limit is 25 pages.

Site Plan

The site plan must show the designed bike path that connects Jackrabbit Trail and Fisherman's Lake Trail with roadways extending at least 100' from the stop bar or yield line in each direction (North, South, East, and West). All medians, turn pockets, sign locations, striping, bus stops, and bike and pedestrian facilities must be clearly displayed, as well as any changes to the surface or right-of-way. Additionally, any necessary detail callouts and dimensions must be shown on the plan(s). The Site Plan may be split up into multiple sheets with appropriate match line callouts. Displaying landscaping features are optional.

Items to consider while creating your site plan:

- Consider where to place traffic signals, crosswalks, and other road signs and markings.
- Consider how the current network of sidewalks and curbs impact pedestrians, and how to further improve the infrastructure and utilities.
- Consider how sidewalks and bike paths will operate on San Juan Road on the freeway underpass and overpass.
- Consider public transportation, such as where a bus stop could be located.
- Consider how property ownership will affect the design and construction.
- Ensure right-of-way is administered correctly.

Roadway Cross-Section Sheet

Include detailed roadway cross-section and one intersection design diagram. Include AutoCAD drawings as necessary to illustrate the explanation of the system's elements.

Cross-section sheet drawings must be combined into the appropriate number of sheets. Any other details must be designed by the consulting firm and comply with any ADA standards. Additionally, roadway cross-sections must be designed and displayed in this area. Be sure to make the appropriate call-outs on the site plan that refers to the details using an organized detail

numbering system (example: "See detail 3 on sheet DT-01").

This can either be done in CAD or in programs such as StreetMix. Check out this link for StreetMix: <https://streetmix.net/-/1620523>.

Opinion of Probable Cost

A construction cost estimate for the project must be established via an excel spreadsheet. Any calculations attached to the report must be scanned from engineering paper, in neat and clear handwriting. All variables associated with the construction of the new bike path must be considered with an estimated cost (in USD). This includes any costs associated with expanding the right-of-way. Any assumptions must be clearly noted.

Presentation/Q&A Session

All schools will provide a 10-minute presentation, followed by a 10-minute question-and-answer session, to a panel of judges. Your presentation should be appropriate for your team to attempt to convince the City of Sacramento Board of Supervisors, as well as their transportation department staff, that this solution is the one they should adopt and invest in.

The 10-minute presentation must provide an overview of the project. The question-and-answer session will be conducted by the judges with team-specific questions.

Presenters

Presenters include those with speaking parts and individuals operating the computer. A minimum of three people must speak during the presentation. The use of videos will not be permitted. Teams must not pre-record any speaking parts. No handouts or other materials are to be given to the judges as part of the oral presentation.

All team members participating in the presentation must be available for the judge's questions. Presentation quality and attire will be judged as well. See rubric for scoring of the presentation and question-and-answer session.

Poster

All participating schools must prepare a poster that outlines the design around a final conceptual drawing of the intersection. Each poster must display (at the minimum) the school name, each participating member's name, a layout of the project, roadway cross-sections, and total cost. The posters will be displayed on the day of the presentation. Each team must print and bring their own poster and provide their own poster stand.

Submission

The report (including plan documents, written summary, calculations, and opinion of probable cost) must be combined into one PDF and submitted by March 5, 2022, at 11:59 PM PST to <https://forms.gle/gFK7qhGkcSHZjn876>.

A PDF of the poster must be submitted by March 24, 2022, at 11:59 PM PST to <https://forms.gle/Pj3hEbKkNKJDpLxRd9>. The PDF of the poster is for judging purposes. Each team must still print and bring their own posters on the day of the presentation.

A Google Slides or PowerPoint presentation must be submitted by March 24, 2022, at 11:59 PM PST to <https://forms.gle/Pj3hEbKkNKJDpLxRd9>.

Late submissions will incur a 5-point deduction per 24 hours up to 25 points lost.

Grading Rubric

Category	Maximum Points
Report Total	/140
Cover Page	/5
Table of Contents	/5
Introduction	/10
Project Summary and Recommendations	/30
Design Assumptions/Impacts	/5
Site Plan	/30
Roadway Cross-Sections Sheet	/30
Opinion of Probable Cost	/15
References and Appendices	/10
Late Submission Deduction	/-25
Presentation Total	/60
Quality of presentation's summarization of report's main findings	/25
Quality of PowerPoint as a visual aide	/10
Quality of Poster as a visual aide	/10
Ability to answer questions from judges	/15
Total	/400