**Professional, Legal, and Ethical**

*By: Gage Christensen*

Professional, legal, and ethical considerations determine whether the system can be viably implemented within the community.

Legal Implications

The legal implications of Team 11-3’s recommendation need to be considered before it can be implemented. The regulatory bodies that would govern the solution must be identified, and then the relevant codes and standards can be identified. With this information, a compliance strategy can be generated to give the system legal viability.

To determine the relevant regulatory bodies, the scope of the project must be defined. As already mentioned, the system in its current form would only be implemented within the Reno-Sparks. Therefore, only Nevada regulatory bodies would be concerned. The Nevada Executive Committee on Traffic Safety (NECTS) would be the overarching agency. Implementing the solution requires that traffic signal software be modified and potentially that new hardware/software be installed. As such the Nevada Department of Transportation (NDOT), which is a member agency of NECTS, would be the primary agency concerned, as they oversee highway maintenance. Therefore, the codes prescribed by NDOT would be the most relevant codes to follow. It is also worthwhile to mention Chapter 70 of the Washoe County Codes & Ordinances. While this section does not mention modifying traffic signals, it does discuss general traffic law. So, if modifications to traffic law were required, the changes would be made to this section. Currently, the system does not require any new signals or signs, but since it could be expanded this is a possibility.

Section 623 of the NDOT 2014 Standard Specifications for Road and Bridge Construction discusses signals, lighting, and intelligent traffic systems. General guidelines outlined by this section include ensuring the system passes functional tests before deployment and reusing/properly disposing of old material when revising systems. The most relevant standards in this section are 623.01.06, 623.01.07, and 623.01.08. 623.01.06 discusses the maintenance of electrical systems. Most importantly, it requires that the local traffic enforcement agency and traffic signal maintenance agency be notified before any shutdown, and that written approval is obtained beforehand. 623.01.07 discusses the scheduling of work. Each traffic signal, highway lighting, and sign illumination must be ready for operation before opening the roadway to public traffic. 623.01.08 specifies safety precautions. A daily safety circuit clearance must be obtained before starting work on existing traffic lights, and electrical systems cannot be left in an exposed or dangerous condition.

The specifications from NDOT lead to the following compliance strategy. For every traffic system where the project is implemented, the following actions will be performed. The traffic departments of the Reno, Sparks, and Washoe County police departments as well as the Reno Traffic Engineering department will be notified of the shutdown of the traffic light, and be given a predicted date for completion. The roads connected to that traffic light will be shut down and detours will be provided. Before beginning work, a safety circuit clearance will be obtained. The system will be thoroughly tested before being reopened, and the electrical systems will not be left exposed by the end of any workday. Once the system is properly tested, the road will be reopened, and the system will be put to use.

In addition to the legal concerns encountered when implementing the solution, the system’s intellectual property must be concerned. To address this, an intellectual property clearance report is given in Appendix A.

The system has a strategy for legal compliance, but it also must comply to ethics to be accepted by the engineering community.

Ethical Debates

The various ethical perspectives on the recommendation must be considered to determine how the system will be perceived. This can vary depending on culture and politics.

One of the main ethical concerns about the solution is what it prioritizes. If the system were to absolutely prioritize traffic efficiency, then it might adopt unsafe road practices. In its current form this is not an issue, as increasing the efficiency around intersections would generally increase the safety of commuters. However, if the system were to be expanded, such as to also consider variable speed limits when optimizing traffic, this may become a concern.

In addition to the safety concern, there is also a potential privacy concern. The system collects a lot of data about drivers, and so if people think that data is being used without their consent, they will resent the system.

With these ethical concerns considered, the ethical defense of Team 11-3’s recommendation is given.

Ethical Defense

The recommendation must follow all Canons of the NSPE Code of Ethics. The ethical defense of the system is outlined here.

Canon VI is that engineers must conduct themselves honorably, responsibly, and ethically so as to enhance the honor, reputation, and usefulness of the profession. The engineers of Team 11-3 conducted themselves honorably and considered all legal and ethical obligations when designing their recommendation.

Canon V is to avoid deceptive acts. To ensure that details about the recommendation are not kept from the public, all information must be fully disclosed. This includes disclosing information about all the data that the sensors at traffic lights collect, and ensuring that data is not collected if it is not necessary.

Canon IV is to act for each employer or client as faithful agents or trustees. The engineers of Team 11-3 made sure to follow all ENGR 301 guidelines when designing their recommendation.

Canon III is to issue public statements only in an objective and truthful manner. As with Canon V, a key issue here is honestly disclosing the information that the system collects about commuters.

Canon II is to perform services only in their areas of competence. The engineers of Team 11-3 are all computer scientists and so they are qualified to speak about the nature of an automated traffic system.

Canon I is to hold paramount the safety, health, and welfare of the public. The recommendation performs this function as increasing the efficiency of traffic lights and providing for emergency routing both benefit the public’s safety and welfare. However, as new technology emerges, it must be ensured that this new technology prioritizes safety over traffic efficiency.