

CE474: Traffic Systems Design-Fall 2004

Class 5 – Design Project 1 Review/ Traffic Flow Theory at
Signalized intersections
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Design Project 1 – Summary of Tasks

- ◆ *A1.01: Review design project requirements*
- ◆ *A1.02: Field data collection – Existing condition report*
- ◆ *A1.03: Review of available resources*
- ◆ *A1.04: Future demand prediction*
- ◆ *A1.05: Review and documentation of design options – Preliminary analysis and design*
- ◆ *A1.06: Final design parameters – Design Alternatives-Plan for conduction analysis*
- ◆ *A1.07: Compare design alternatives – Corsim/HCS analysis*
- ◆ *A1.08 Final report*

Design Project 1 – Summary of Tasks

◆ *A1.05: Review and documentation of design options*

- The purpose of this task is to develop a preliminary list of design parameters and the range of options that you will consider for each parameter.
- Prepare a list of the design parameters as you now understand them.
- Determine the range of values (or options) that you will consider for each parameter. This will include intersection design analysis to determine the optimal cycle length and define the cycle length ranges that you will examine.

Design Project 1 – Summary of Tasks

◆ *A1.06: Final design parameters – Design Alternatives- Plan for conduction analysis*

- The purpose of this task is to prepare a final summary of design parameters that you will consider in the design project, the parameters that you will consider, the method that you use to determine the range of typical values (or options) that you will test, and the range of values that will be tested.
- By the end of this task you should clearly define the design alternatives that you will consider in your final analysis [5-8 alternatives would be appropriate for this project]

Design Project 1 – Summary of Tasks

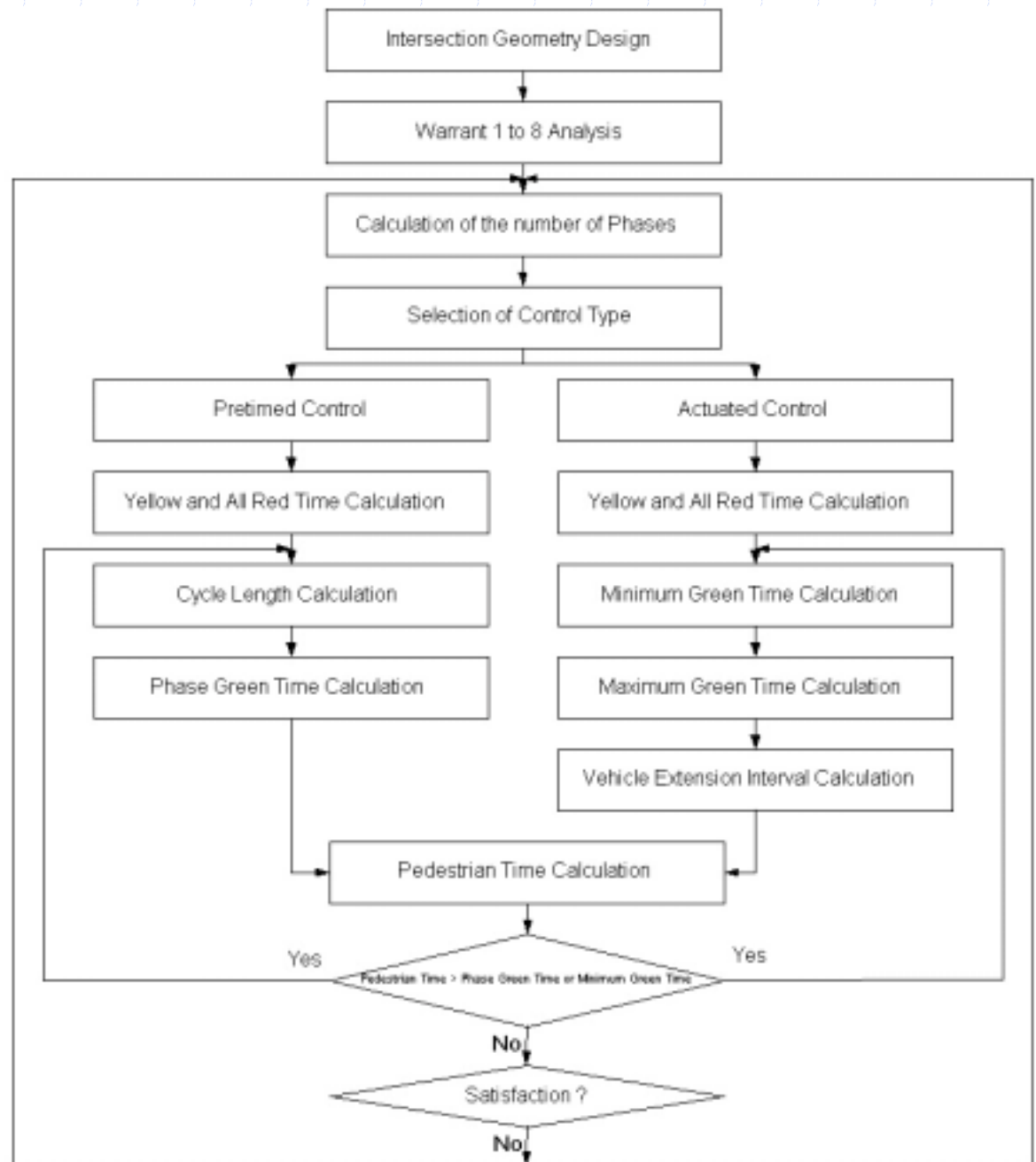
◆ *A1.07: Compare design alternatives* – *Corsim/HCS analysis*

- The purpose of this assignment is to develop your plan for comparing different design alternatives.
- You need to identify your optimization strategy and be ready to solve any conflict that might arise from using more than one MOE.
- Complete a number of runs using the CORSIM model to produce forecasts of how your intersection would perform under a range of control (and possibly geometric) conditions. You should document the process that you conduct today as well as document the results that you generate. These data should be included in the final report for the design project.

Issues to Consider

- ◆ How to document results (what gets recorded, who does it)?
- ◆ How to organize the outputs?
- ◆ How to keep track of what you've done?
- ◆ How to present results How to ensure accuracy?
- ◆ How to take into account stochastic variation?
- ◆ How to interpret results (what do the numbers mean)?

The signal Design Process



The signal Design Process: Fixed Time Signals

Webster Equation

$$C = \frac{1.5L + 5}{1 - \sum_{i=1}^n Y_i}$$

Cycles with the range 0.75 C to 1.5 C
could also be optimal

The signal Design Process: Fixed Time Signals

HCM Equation

$$C = \frac{TL}{1 - \left[\frac{\min(CS, RS)}{RS} \right]}$$

RS = Reference Sum of phase volumes. (1900*90%*PHF), in the CBD area; (1900*PHF), in other area,

CS = Sum of critical phase volumes for all phases,

TL = Total Lost time. (number of phases)*(average lost time per phase, default 4 seconds).