

Appendix B: TERMINOLOGY

Bottleneck: A specific location where roadway performance is reduced due to a physical or temporary constraint, which when activated reduces the throughput of the roadway segment.

Calibration: Process where the modeler selects the parameters that cause the model to best reproduce field-measured local traffic conditions.

Car Following Model: Driver behavior model that controls how a following vehicle adjusts its speed in relation to the leading vehicle.

Dynamic Traffic Assignment (DTA): A process for assigning vehicle routes in a simulation model based on network conditions. It is an iterative process that converges to a path assignment based on vehicle travel time and delay between origin and destination (O-D) points in the network. While sometimes used in practice to refer to the macro- or mesoscopic traffic assignment in a travel demand model such as Visum, for the purposes of this document, DTA refers to the microscopic dynamic traffic assignment within Vissim.

Free Flow Speed: The mean speed at which traffic would travel if there were no congestion or any other adverse condition to lower speed.

Gap: The time or distance between the back end of a leading vehicle and the front end of the following vehicle.

HGV: Vissim abbreviation for heavy vehicles such as trucks

Managed Lanes: A lane that is restricted or controlled for a particular purpose (e.g., HOV lanes, bus only lanes, and toll lanes/HOT).

Microsimulation: Modeling of individual vehicle movements on a second or sub-second basis for the purpose of assessing the traffic performance of a transportation network.

MOE: Measure of effectiveness.

Model Area: The total area to be modeled in order to accurately analyze the study area (an area equal to or greater than the study area).

NEMA: National Electrical Manufacturers Association, which refers to Vissim's default emulator for standard signal controller logic (prior to Vissim version 5.0). NEMA was developed internally by PTV America to replicate the common features of a signal controller.

Random Seed: The parameter in Vissim that initializes the random number generator.

RBC: Ring Barrier Controller, which refers to Vissim's default emulator for standard signal controller logic (since Vissim version 5.0). RBC is a direct implementation of an actual real world signal controller firmware (D4) and includes more advanced features than the NEMA emulator.

Seeding Period: This is the time between the start of the simulation and when the network has the necessary number of vehicles in the system for the representative time period.

Sink and Sources: Locations that replicate an access or accesses (public or private) that is not directly included in the model network. At these locations, volumes can either be added or taken away from the network. A sink location would be where traffic is taken away and a source location would be where traffic is added.

Study Area: The area to be analyzed as part of a project or study.

T Flow Fuzzy: A matrix estimation utility used to adjust a given O-D matrix in such a way that the result of the assignment closely matches desired volumes at points within the network.

Validation: Process where the modeler checks the overall model-predicted traffic performance for a network against field measurements of traffic performance (utilizing data not used in the calibration process).

Appendix D: Seeding Period Excerpts from FHWA's Analysis Toolbox Volume III

Available in PDF format on the Traffic Analysis Website
<http://www.wsdot.wa.gov/Design/Traffic/Analysis/>

Appendix E: Example Model Development Flow Chart

Examples of a Model Development Flow Chart

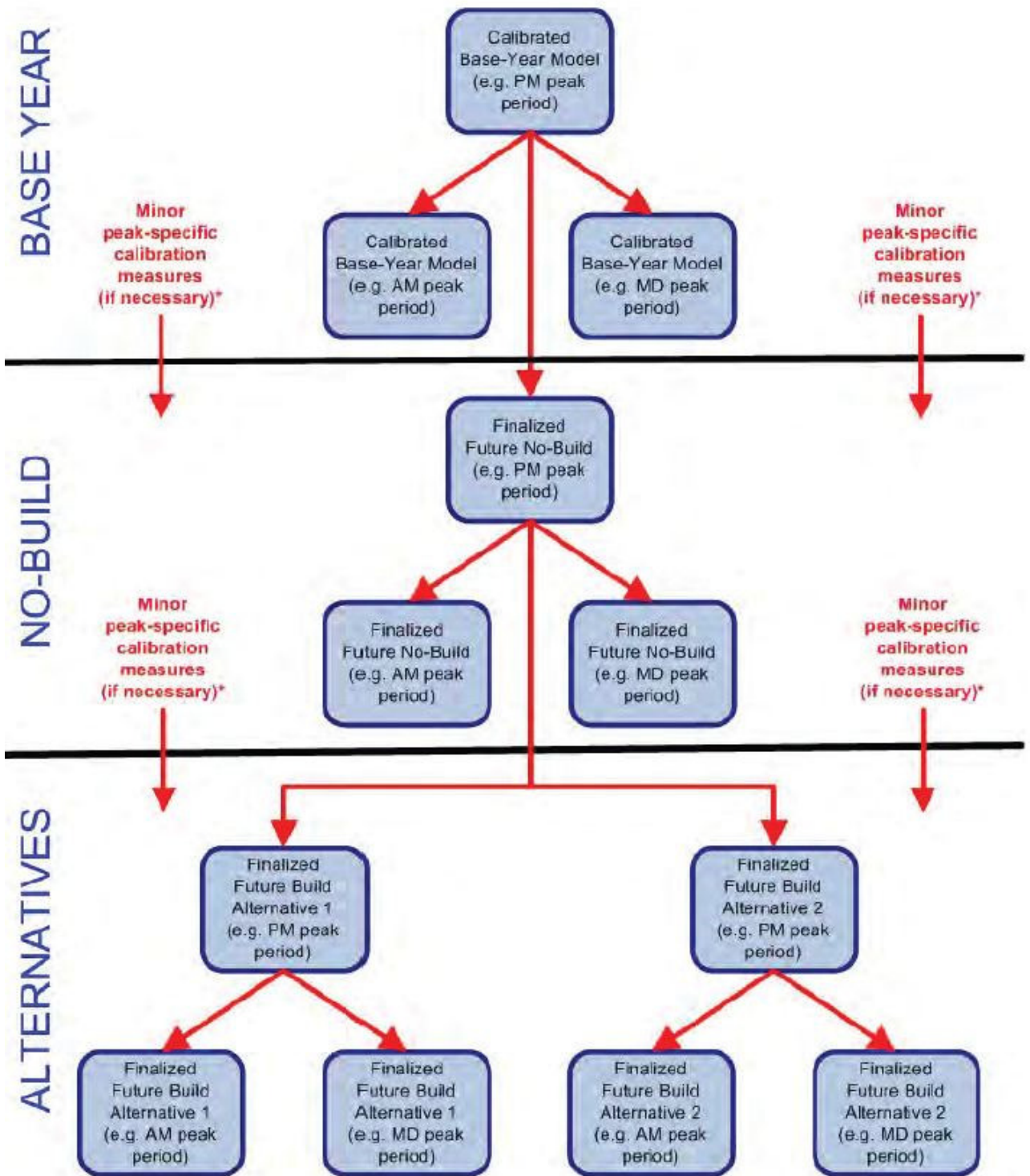
The purpose of a model development flow chart is to create a simple diagram of the model development process. The most important component of this diagram is the points at which a version of the network is copied to create multiple scenarios with the same geometry, such as different peak periods. The goal of this exercise is to emphasize the linear nature of the development process, control the number of forks in the development path, and minimize the number of network changes that must be repeated in multiple files.

Depending on the type of project, this could mean starting each stage in the modeling process (base, no-build, alternatives) by focusing on one peak period and getting it fully calibrated and functional before creating the other peak periods. This method would be used for those networks that have very few differences between peaks and the calibration measures required for one peak would apply to all of them. For example, as shown in Figure 1, one peak period should be fully calibrated and functional before the model is copied to create the other peak period scenarios. This ensures that the network geometry in each model is exactly the same. Furthermore, all scenarios in each stage should be completed before moving onto the next, which is depicted as the horizontal lines in the diagram. This should be the best approach for most projects. On the other hand, there could be other projects where each peak period is so different from the others that the calibration measures would not be common to all of them. The goal is to minimize the number of changes that have to be repeated in multiple files, so in the case the work flow depicted in Figure 2 would be more appropriate.

Creating forks in the development process too soon can have severe consequences. It can be tempting to meet an aggressive project schedule by developing alternative models in parallel to the base conditions. By fully calibrating one peak period of the base year model first, these changes to the network will only need to be done once. This also applies to future alternatives. Calibration measures in the base year will need to be carried forward in all subsequent models. Having to repeat network changes multiple times can significantly increase the level of effort required to complete the project. In addition, this premature forking of the model results in diverging models that do not truly represent a comparison of alternatives. It is very difficult to code link/connector changes (e.g. adding a dedicated turn lane) to the network exactly the same twice. Very minute differences that are not visually detectable can have an effect on the results generated by the simulation. The modeler should delay creating copies of a model for additional peak periods as long as possible to maintain consistency.

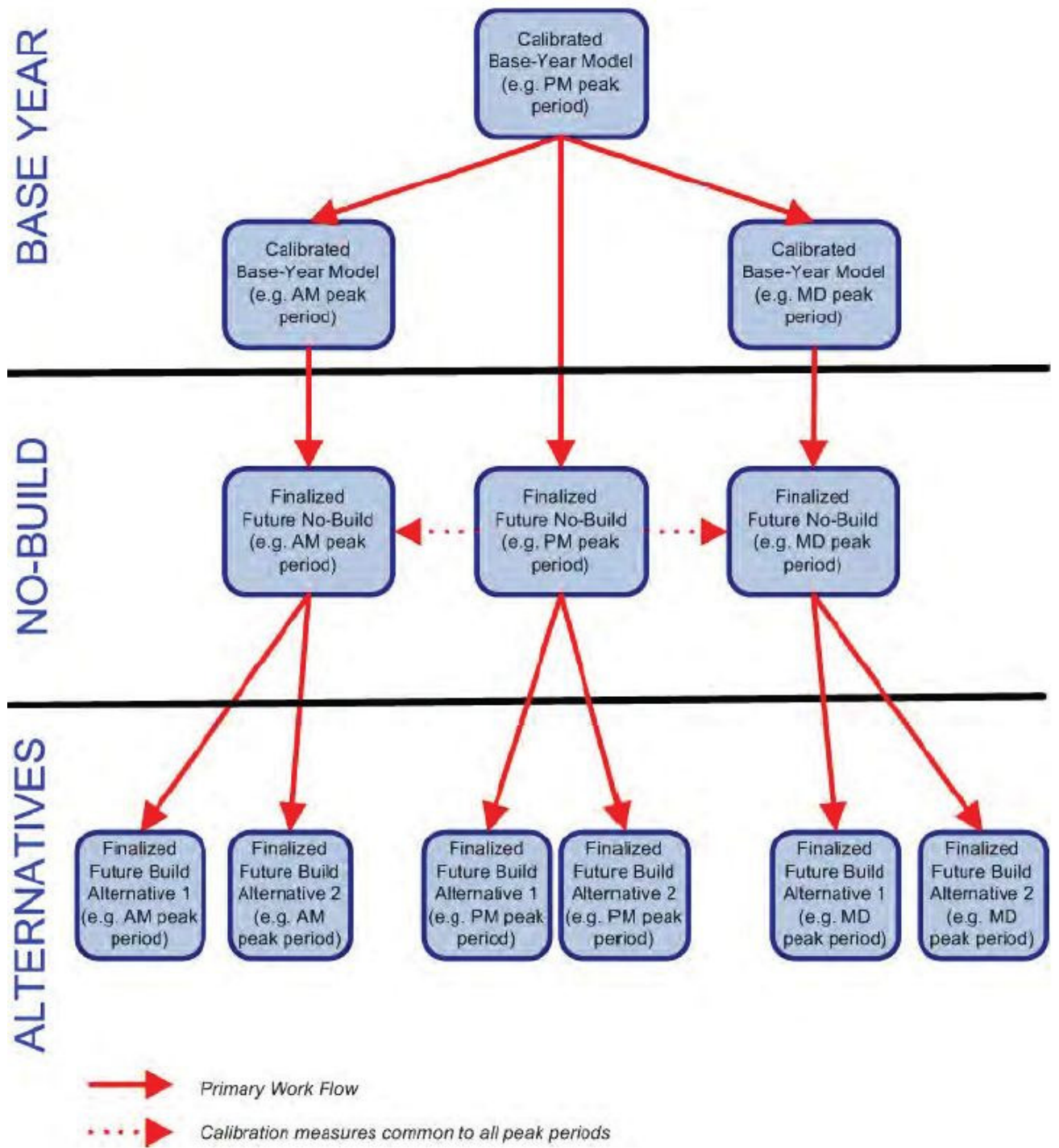
This simple exercise of preparing the model development flow chart during the scoping process gives both the modeler and WSDOT staff a clear picture of the critical path for the project and facilitates the creation of realistic and prudent schedule to complete the project on-time and on-budget. Two examples are provided below.

Model Development Tree (Example 1)



*The vast majority of calibration measures should apply to all peak periods. In order to maintain the highest level of consistency between models, these changes should be made only once in each modeling stage (base, no-build, alternatives) before copies are made to create the other peak periods. Peak-specific network changes should be minimal and will typically require less effort to recreate in each phase than the network calibration measures.

Model Development Tree (Example 2)



Appendix F: Example Speed Plot

Available in PDF format on the Traffic Analysis Website
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Appendix G: Ramp Meter Signal Timing Example

Available in PDF format on the Traffic Analysis Website
<http://www.wsdot.wa.gov/Design/Traffic/Analysis/>

Appendix H: Signal Timing Checklist

Available in PDF format on the Traffic Analysis Website
<http://www.wsdot.wa.gov/Design/Traffic/Analysis/>

Appendix I: Example Confidence and Calibration Report

Available in PDF format on the Traffic Analysis Website
<http://www.wsdot.wa.gov/Design/Traffic/Analysis/>

Appendix J: 95th Percentile Queue Example

Available in PDF format on the Traffic Analysis Website
<http://www.wsdot.wa.gov/Design/Traffic/Analysis/>

Appendix K: Sample Report Formatting

Available in PDF format on the Traffic Analysis Website
<http://www.wsdot.wa.gov/Design/Traffic/Analysis/>