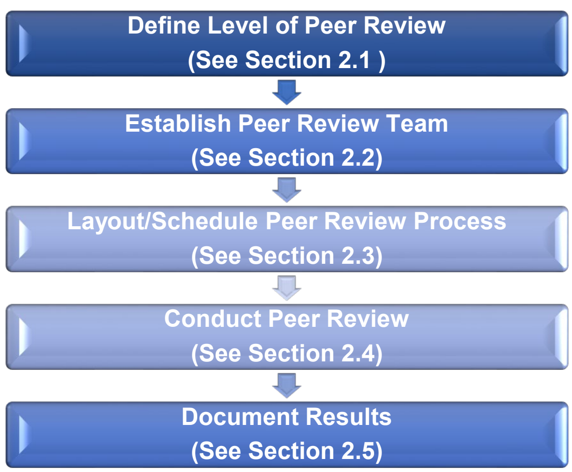
16-25-1 Introduction — September 2019

This policy addresses the peer review process for traffic models utilized to conduct traffic operations analysis for the evaluation and design of all transportation improvement projects. For this policy, traffic models refer to both the Highway Capacity Manual (HCM)-based traffic analyses and microscopic simulation (microsimulation) analyses. This policy does not cover the travel demand models (TDMs) utilized to generate traffic forecasts. Refer to the Transportation Planning Manual (TPM) for additional details regarding traffic forecasting protocols. All projects that include traffic models **shall** follow the peer review process. Coordinate with the WisDOT regional traffic staff to determine how best to implement the peer review process. Contact the Bureau of Traffic Operations (BTO) – Traffic Analysis and Safety Unit (TASU) for additional guidance and support as needed.

1.1 Overview

A peer review is a structured process for reviewing a traffic model to ensure the use of sound engineering judgment. The primary goal of the peer review process is to protect the department's and public's interests by verifying the integrity of the traffic model by assuring that it provides a reasonably accurate representation of traffic conditions that exist in the field. There are four levels of peer review, which are dependent on the complexity of the traffic model. It can take anywhere from six weeks to over four months to conduct a peer review of the traffic model for one analysis scenario. This may significantly affect the overall schedule and budget for a project. Thus, the project team *should* consider time, budget, and other resource requirements of the peer review process early on during project scoping. Figure 1.1 highlights the key steps of the peer review process for HCM and microsimulation traffic models.

Figure 1.1. Traffic Model Peer Review Process Overview



1.2 Background

Historically, there was a lack of consistency in when and how the department reviews the HCM and microsimulation traffic models. To improve consistency across the state concerning the review of these traffic models, BTO-TASU developed the Traffic Model Peer Review policy, focusing on steps 6 and 11 of the overall traffic model (does not include TDMs) development and review process. See TEOpS 16-1-1, Attachment 1.1 for an illustration of the overall traffic model development and review process.

16-25-2 Process — September 2019

2.1 Define Level of Peer Review

It is the responsibility of the project manager to ensure that the traffic model is peer reviewed, while it is up to region traffic operations to define the peer review requirements. To assist with defining the peer review requirements, this policy defines four levels of peer review for traffic models:

1. Project team level review – The WisDOT project team leads the peer review process, providing a high-level (e.g., spot-check) and independent (i.e., the reviewer cannot be part of the team developing the

traffic model) review of the traffic model. The WisDOT regional traffic modeler (if available) or regional traffic staff will provide an in-depth review of the traffic model as needed. If the regional office does not have the available knowledge or resources, they may contact BTO-TASU for assistance with the in-depth review.

2. Region level review – The WisDOT regional traffic modeler/traffic staff lead the peer review process. The WisDOT project team will provide oversight of the peer review process and BTO-TASU, WisDOT Traffic Forecasting Section (TFS), and other statewide bureaus (SWBs) will assist in the peer review as needed. The WisDOT regional office will provide an in-depth review of the traffic model. If the WisDOT regional office does not have the available knowledge or resources, they may contract with an independent consultant (one that is not a member of the consultant team developing the traffic model) to assist as necessary.

3. Independent consultant level review – An independent consultant typically leads the peer review process but works closely with the WisDOT regional traffic modeler/traffic staff on all aspects of the review. The WisDOT project team will provide oversight of the consultant's peer review and BTO-TASU, WisDOT TFS, and other SWBs will assist in the peer review as needed. The independent consultant will provide an in-depth review of the traffic model while the regional traffic modeler/traffic staff will typically provide a high-level review. In cases where the regional office has the knowledge and resources available, they may choose to forego the use of an independent consultant.

4. SWB level review with Federal Highway Administration (FHWA) oversight - An independent consultant typically leads the peer review process but works closely with the WisDOT regional traffic modeler/traffic staff, BTO-TASU, WisDOT TFS, and other SWBs on all aspects of the review. The independent consultant will provide an in-depth review of the traffic model while the regional traffic modeler/traffic staff and SWBs will typically provide a high-level review. In cases where the regional office has the knowledge and resources available, they may choose to forego the use of an independent consultant.

   Projects constructed with federal funds require FHWA oversight of the peer review process to ensure that the traffic model adheres to federal guidelines. The extent of FHWA involvement will vary depending on the specifics of the proposed project.

   Note: See the TPM for details on WisDOT TFS involvement with traffic model peer reviews.

The level of peer review will vary depending on the complexity of the traffic model, which is dependent on the project type (mega/major project, high profile project, routine improvement project, etc.), project scope, corridor type, traffic control, roadway congestion level, and traffic analysis tool(s) utilized. However, a project team or region level review is typically sufficient for most HCM-based traffic models. The SWBs, specifically BTO-TASU and WisDOT TFS, will be involved on high-profile projects, mega/major projects, and those projects that have potential for FHWA involvement.

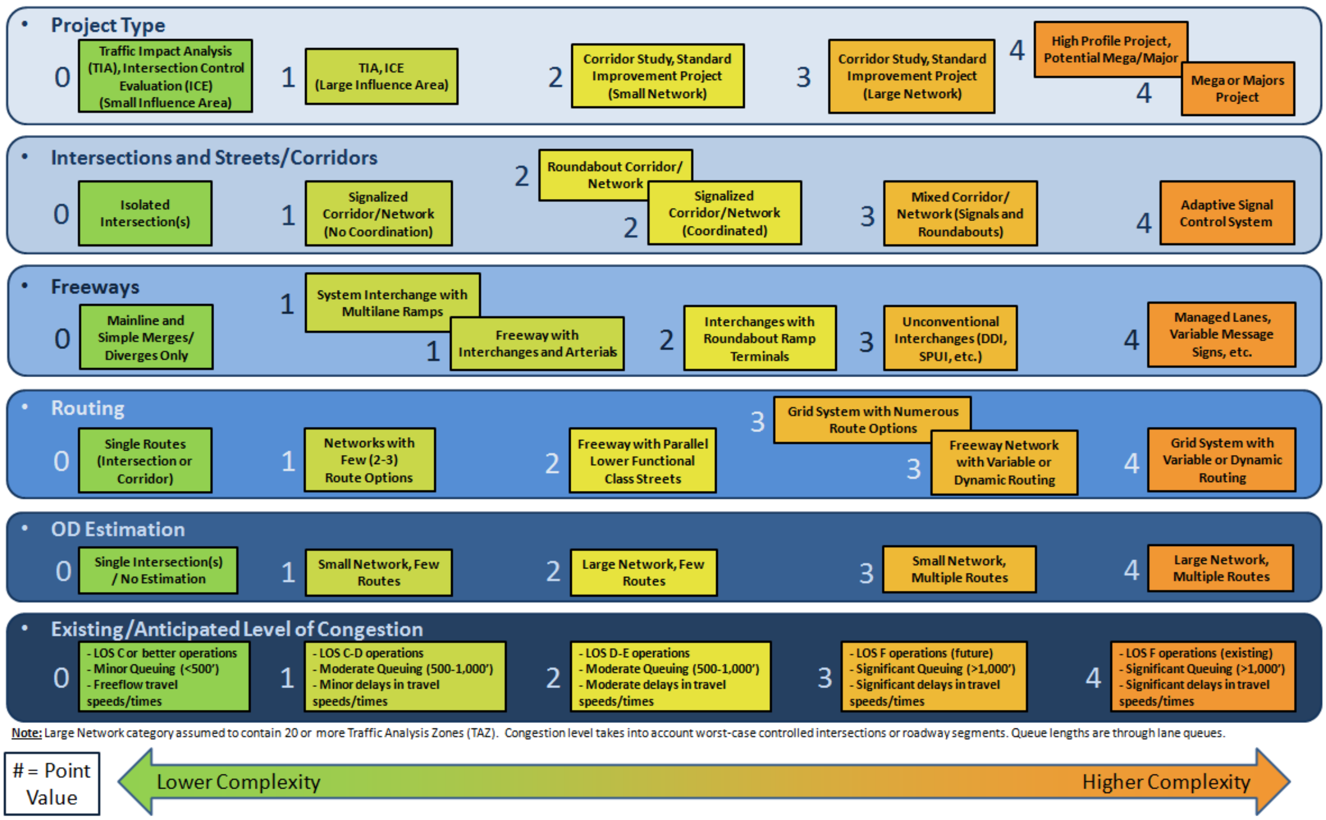
The level of peer review may significantly impact the overall schedule and budget for a project and *should* be determined early on during project scoping. However, the project team often must wait for the initiation of the traffic analysis to define the level of peer review required. Therefore, the project team *should* assume the need for the highest potential peer review level when defining the schedule and budget for a project.

To quantify the level of complexity associated with building and reviewing a traffic model (specifically a microsimulation traffic model), the department worked with a consultant to establish a scoring system. The scoring system defines the level of complexity and the level of peer review required by assigning points within the following categories:

1. Project type
2. Geometric conditions
   a. Arterial corridor
   b. Freeway corridor
3. Traffic pattern/conditions
   a. Routing options
   b. Origin-destination (O-D) matrix development
   c. Level of congestion (existing and future)

Within the geometric conditions category there are two subcategories to define the type of corridor included in the analysis: arterial corridor (includes individual intersections, streets, or corridor segments) and freeway corridor. The traffic pattern/conditions category contains three subcategories: routing options, O-D matrix development, and existing/anticipated level of congestion. Figure 2.1 provides an illustration of the traffic model level of complexity scoring system.

Figure 2.1. Traffic Model Complexity Scoring Diagram



As illustrated in Figure 2.1, there are several factors within each category and subcategory that define the complexity of a traffic model. For example, the complexity of a traffic model for an arterial corridor is dependent on whether the traffic model is an isolated intersection, an uncoordinated signalized corridor, a coordinated signalized corridor, a roundabout corridor, a mixed traffic control corridor (e.g., a corridor with signals and roundabouts), or an adaptive signal control system. Every factor has an associated level of complexity based on a scale of 0 to 4 (an isolated intersection has a complexity score of 0 while an adaptive signal control system has a complexity score of 4). If multiple factors are applicable, the score associated with the highest level of complexity dictates the overall score for that category or subcategory. For example, a Traffic Impact Analysis (TIA) project with a small influence area by itself has a complexity score of 0; however, if the TIA is a high-profile project the score for the "project type" category would be 4. Sum the highest score within each category/subcategory to determine an overall complexity score for the traffic model (maximum score of 24). The higher the overall complexity score, the more likely it is that microsimulation traffic models will be necessary. Refer to Attachment 2.1, an Excel-based template, for assistance with developing the overall complexity score for the traffic model. In coordination with WisDOT regional traffic staff, the WisDOT project team's traffic lead or project manager *should* complete the traffic model complexity-scoring template.

The overall traffic model-complexity-score defines the minimum peer review requirements for the project. It is possible to complete a higher (more intense) level of peer review. Ultimately, it is up to WisDOT regional traffic staff to define the final peer review requirements. Refer to Table 2.1 for the complexity score associated with each peer review level.

Due to modified roadway geometry, increased traffic volumes, reduced levels of congestion, etc., it is possible for the traffic model-complexity-score to be different under future alternative scenarios than it is under existing conditions. Therefore, it is critical to consider both existing conditions and potential future alternatives (including levels of service) when defining the traffic model complexity score and the associated level of peer review required. The highest traffic model-complexity-score across all the scenarios (existing and future alternatives) dictates the minimum peer review requirements.

Table 2.1. Peer Review Level Requirements

Total Complexity Score [(a)]	Minimum Required Peer Review	Notes
0-3	Project Team Level Review [(b)]	• WisDOT project team leads peer review • WisDOT regional traffic staff provides in-depth review as needed
4-7	Region Level Review [(b)]	• WisDOT regional traffic staff provides in-depth review, • SWBs provide assistance as needed • Independent consultant review as needed
8-10	Independent Consultant Level Review	• Independent consultant leads review [(c)] • WisDOT regional traffic staff provides high-level review • SWBs provide assistance as needed
11+	SWB Level Review with FHWA Oversight [(d)]	• Independent consultant leads review [(c)] • WisDOT regional traffic staff and SWBs provide high-level review • FHWA oversight may be necessary

(a) The scoring system identified within this table **shall** act as a guide and not as a rigid requirement. Ultimately, determination of the necessary level of peer review requires professional judgment.
(b) A project team or region level review is sufficient for most HCM-based traffic models.
(c) If the WisDOT regional office has the required knowledge and resources, they may choose to forego the use of an independent consultant.
(d) This indicates when there is a high probability for FHWA oversight. Prior to developing the traffic models, the WisDOT project team *should* coordinate with FHWA to determine their level of involvement (if any).

2.2 Establish Peer Review Team

Upon defining the peer review requirements, the WisDOT project team *should* meet with WisDOT regional traffic operations to identify the peer review participants and establish all internal and external stakeholders. This meeting *should* occur as early as possible but **shall** occur prior to the initiation of the traffic analysis.

Table 2.2 provides a summary of the stakeholders to consider for inclusion on the peer review team. The peer review process will vary slightly from one project to another, thus Table 2.2 *should* serve as a guide (not a rigid requirement) when establishing the peer review team.

Although Table 2.2 provides insight into when to involve the SWBs or FHWA with the peer review, unique situations not covered in the table may also trigger the need to involve a SWB or FHWA. Thus, the project team *should* coordinate with the SWBs and FHWA during project scoping to verify their level of involvement (if any) in the peer review process. In general, the SWBs (specifically BTO-TASU) will be involved on all mega/major projects and projects where FHWA participation in the peer review process is desired or required.

If the WisDOT regional office does not have the knowledge or resources available to conduct the peer review of the traffic model, the project manager, in all likelihood, will need to select and procure an independent consultant to complete the peer review, regardless of the traffic model complexity. If desired, the WisDOT regional office may contact BTO-TASU for support. BTO-TASU may also be able to conduct the peer review of the simpler traffic models (traffic model-complexity-score of 0-7).

Table 2.2. Potential Peer Review Participants

Stakeholder [a]	Level of Involvement	Notes
Region		
• WisDOT Regional Traffic Operations • WisDOT Regional Traffic Modeler (if available)	• All levels of peer review	Roles/responsibilities will vary based on level of review required
Statewide Bureaus		
• BTO-TASU • Other SWBs as necessary	• SWB with FHWA oversight level review	Provides assistance as needed on all levels of peer review Provides high-level review of all projects with potential for FHWA involvement
• WisDOT TFS	• All levels of peer review	See the TPM for details on TFS involvement with traffic model reviews
External Stakeholders		
• Independent Consultant	• Independent consultant level review • SWB with FHWA oversight level review	May get involved on lower level reviews if WisDOT regional staff do not have the necessary resources [b]
• FHWA	• FHWA oversight review	Typically involved on mega/major projects and federally funded Interstate Access Justification Reports (IAJRs)
• Local Municipalities, Regional Planning Commissions (RPCs), Metropolitan Planning Organizations (MPOs)	Typically, will not review the traffic model, but may participate in peer review discussions to ensure that the traffic model addresses local concerns[c]	

(a) The peer review team established for a specific project may include more or fewer members than those listed above.

(b) WisDOT regional traffic staff *should* assess whether they have the knowledge and resources to complete the peer review; if not BTO-TASU may be able to help with the peer review for models with a complexity score of 7 or less. If neither WisDOT regional staff nor BTO-TASU has the capability to conduct the peer review, the WisDOT project team **shall** select/procure an independent consultant to complete the peer review regardless of the traffic model complexity.

(c) Early coordination with the Southeastern Wisconsin Regional Planning Commission (SEWRPC) for mega/major projects located in the SE region is highly recommended.

If there is a need for an independent consultant, the WisDOT project team *should* follow the process outlined in the department's Facilities Development Manual Chapter 8, Section 5 (FDM 8-5) to select and procure a consultant team to perform the necessary peer review. The Statewide Master Contract for Traffic Analysis and Modeling (BTO 03) and the Statewide Master Contract for Traffic Engineering Services (BTO 01) identifies the consultants that have been previously selected and authorized to conduct traffic engineering services (including traffic model peer reviews). The list of consultants on the master contracts are updated every two-years and are available through the Contract Administration Reporting System (CARS) application or through BTO-TASU. If desired, BTO-TASU can provide assistance with the selection of the independent peer review consultant.

To ensure a truly independent peer review, it is critical that the consultant chosen to conduct the peer review does not have any affiliation or conflict of interest with the consultant team selected to perform the traffic analysis.

2.3 Layout/Schedule Peer Review Process

Upon establishing the peer review team, the WisDOT project manager **shall** coordinate with the peer review team (typically via a coordination meeting) to identify the following components of the peer review process:

1. Project milestones which will trigger the need for a peer review
2. Roles of the individual peer review members
3. Data requirements

4. Schedule for conducting the peer review(s)
5. Transfer process for traffic model(s) and peer review comments

The following provides additional discussion on each of these components.

2.3.1 Identify Project Milestones

There are typically three major project milestones for a peer review: (1) completion of the existing year traffic model, (2) completion of the design year no-build traffic model and (3) completion of each design year build/project alternative traffic model. Complex traffic models may warrant the need for peer reviews at additional project milestones, such as after the initial coding of the traffic model but prior to the full calibration of the traffic model. At the completion of the coordination meeting, both the project team and peer review team *should* have a clear understanding of where the peer review(s) *should* fall within the overall project timeline.

With HCM-based traffic models, the review of the existing year, design year no-build, and design year build/project alternative traffic models can occur simultaneously. However, due to their complexity, microsimulation traffic models will typically require a peer review at each of the three milestones described above. BTO-TASU strongly encourages the consecutive review of the existing year, the design year no-build, and the design year build/project alternative traffic models.

In other words, only after calibrating and validating the existing conditions, and only after completing the peer review process of the existing conditions model, *should* the analyst proceed with the development of other modeling scenarios (e.g., design year no-build, design year build, etc.). If the analyst chooses to develop the model alternatives prior to calibrating and validating the existing conditions model or prior to having the model go through the peer review process, they take the risk that they must go back and revise not only the alternatives model but the existing conditions model as well. This can lead to potential inconsistencies in the modeling scenarios and could result in the need for additional time to calibrate and perform the peer review(s) of the alternatives model. Although it may be tempting, especially when the project has a compressed schedule, to skip or delay the calibration, validation, or peer review process of the existing conditions model, it may end up being counterproductive, and thus, BTO-TASU strongly discourages doing such.

The subsequent text provides a description of the three major milestones.

<u>Milestone 1: Completion of Existing Year Traffic Model</u>

The existing year traffic model replicates existing field conditions. Existing year traffic conditions *should* reflect the year that is as close to the original start of the traffic analysis as possible. Whenever possible, traffic data *should* be no more than three years old and ideally, all traffic data *should* be from the same year. Ongoing construction or other extraordinary circumstances may dictate the need to use older data or data from multiple years.

This project milestone requires a peer review to ensure that the traffic model provides an accurate representation of field conditions based on data collected by the project team or peer review team. At this milestone, WisDOT TFS *should* verify that the traffic model and traffic forecasts utilize a consistent existing volume data set.

<u>Milestone 2: Completion of Design Year No-Build (FEC) Traffic Model</u>

The design year no-build traffic model reflects design year conditions absent of the proposed project. It will reflect design year traffic volumes and existing geometry or existing geometry with other planned and enumerated (or committed) improvement projects and may include signal timing modification. As such, another name for this scenario is the future with existing plus committed (FEC) scenario. The inclusion of a planned improvement project in the FEC model is contingent on it occurring after the existing year but prior to the proposed project's design year. Note that the FEC conditions for a specific project may not match the no-build conditions reflected in a travel demand model (TDM) used in forecasting traffic. Thus, WisDOT TFS *should* verify that both the traffic model and traffic forecasts reflect the same assumptions (e.g., number of travel lanes).

For the traffic model to function with the design year traffic volumes, it may be necessary to include minor geometric improvements (e.g., the extension of an existing right or left turn lane or channelization optimizations such as the removal of shared lane movements within the FEC right-of-way, etc.) beyond the committed projects. In these cases, the traffic model represents future with existing plus committed plus minor improvements (FEC+) conditions. The project team *should* document these minor improvements within the modeling methodology report and other project memoranda as appropriate.

This project milestone requires a peer review to confirm that the traffic model accurately depicts design year traffic volumes and to verify that the basic structure of the model is consistent with the existing year traffic model. If the analyst properly addresses and carries forward comments from the existing year model, the peer review process at the FEC project milestone *should* be less intensive than the initial peer review.

Milestone 3: Completion of Each Design Year Build/Project Alternative Traffic Model

The design year, build traffic models capture design year conditions with the proposed project improvements. The build traffic models may reflect “constrained” or “unconstrained” conditions. Typically, the analyst will need to develop a traffic model for more than one project alternative.

Each project alternative model requires a peer review. Peer reviews are necessary at this project milestone to ensure that the traffic model is consistent with the previous traffic models and to verify that it accurately captures the proposed improvements. Checking for geometric improvements, changes in travel demand/traffic patterns, and consistency against the existing and no-build traffic models *should* be the focus of the design year alternative model reviews. WisDOT TFS *should* verify that both the design year build traffic models and traffic forecasts reflect the same assumptions (e.g., number of travel lanes).

2.3.2 Outline Roles/Responsibilities

Table 2.1 and Table 2.2 (shown previously) may be able to assist in the assessment of the general roles (e.g., high-level review, assistance as needed, etc.) for each peer review team member. The project manager, however, *should* clarify the specific team member responsibilities (e.g., responsible for reviewing model network, responsible for reviewing traffic volume data, etc.) during the coordination meeting.

2.3.3 Define Data Requirements

In an ideal world, the analyst will collect all the traffic data needed to validate that the traffic model is properly calibrated (i.e., provides an accurate representation of real-world conditions) during the development of the traffic model. In some instances, however, it may be necessary for the peer review team to gather additional data as part of the peer review process. If there is a need to collect additional data, during the initial coordination meeting, the project team *should* define the data collection plan (e.g., how to obtain the data, when to collect the data, and who will collect the data). Refer to TEOpS 16-5 for additional details on data assembly and preparation.

Additionally, the peer review team *should* discuss whether there are any previously developed traffic models (specifically microsimulation traffic models) that could serve as a resource for the development, calibration, validation, and peer review of the proposed traffic model.

2.3.4 Define Preliminary Schedule

The schedule for the peer review is highly dependent on the complexity of the traffic model and level of peer review required. The peer review of a highly complex traffic model that requires FHWA oversight will take longer to complete than the peer review of a relatively simple traffic model that only requires a project team level review. Since the peer review schedule impacts the overall schedule of the project, it is critical for the project team to define the peer review timeline as early in the project as possible, preferably during project scoping. The project team can utilize Table 2.3 to approximate the amount of time within the overall project schedule to allow for the peer review process. The timelines provided in Table 2.3 assume that WisDOT TFS have already generated or reviewed and approved the traffic forecasts utilized within the traffic model.

Except for FHWA, all members of the peer review team may conduct their review of the traffic model(s) simultaneously. With concurrent reviews, the peer review members *should* coordinate often during the review process to avoid unnecessary duplication of review efforts. WisDOT *should* complete all internal department peer reviews (project team, region, independent consultant, statewide bureau reviews) prior to FHWA reviewing the traffic model(s). FHWA, however, may be available to answer questions and to provide suggestions for items to consider during internal department reviews.

Table 2.3. Peer Review Time Requirements

Level of Peer Review	Approximate Time Required to Complete Initial Peer Review (Including data collection, coordination, etc.)
Project Team Level Review	• 1-2 weeks for existing conditions • 1-2 weeks for each additional project milestone/alternative
Region Level Review	• 3-4 weeks for existing conditions • 3-4 weeks for each additional project milestone/alternative
Independent Consultant Level Review	• 4-8 weeks for existing conditions • 4-8 weeks for each additional project milestone/alternative
SWB Level Review *Without FHWA Oversight*	• 4-8 weeks for existing conditions • 4-8 weeks for each additional project milestone/alternative
With FHWA Oversight	• 12-16 weeks for existing conditions • 12-16 weeks for each additional project milestone/alternative

Notes:

- The time ranges shown here are approximate, thus the project team *should* only utilize these timelines to approximate the amount of time within the overall project schedule to allow for the peer review process. Actual timelines are dependent on individual project details such as the amount of data collection and the complexity of the future models.
- All timelines shown here are associated with the review of a microsimulation traffic model. The review time required for HCM-based traffic models is dependent on the WisDOT regional office resources.
- The peer review schedule may assume concurrent review by all internal WisDOT peer review team members (project team, regional traffic staff, independent consultant, SWB). However, the schedule *should* assume that FHWA peer reviews will only occur after the completion of WisDOT's review.
- If an independent consultant is part of the peer review team, add extra time to the schedule to account for scoping/contracting the independent consultant's work.
- Add additional time (a minimum of 6 weeks per milestone/alternative) to account for WisDOT TFS review of the traffic volume demand utilized in the traffic models. See the TPM and DT2340 for additional details on WisDOT TFS's role in the review of microsimulation traffic models.

2.3.5 Detail Traffic Model/Peer Review Comment Transfer Process

During the initial coordination meeting, the peer review team *should* layout the process for handing off the data (traffic model, peer review comments, etc.) between the analyst and the peer review team. It may be helpful for the project manager to set up a schedule for check-in-meetings or conference calls over the course of the peer review to help facilitate the exchange of data. The number and timing of these meetings will vary depending on the complexity of the traffic model, but could include the following:

- A hand-off meeting when the traffic model is ready to go to the reviewer(s),
- A preliminary finding meeting when the reviewer(s) has completed the initial review and developed their first thoughts and questions on the model,
- An ultimate finding meeting when the reviewer(s) has completed the peer review, and
- A response meeting when the analyst has addressed the comments raised by the review team.

2.4 Conduct Peer Review

A key concept of the peer review process is to assess whether the traffic model is suitable for meeting the goals and objectives of the study without violating current WisDOT policies (i.e., is the traffic model fit-for-purpose?). To assist the reviewer with making this decision, the project manager *should* provide the peer review team with a summary of the project scope, project goals, and intended purpose of the traffic model prior to initiating the peer review. It is important to affirm that the project scope is stable and unambiguous, as it will be difficult for the reviewer to assess the traffic model's fitness-for-purpose if the purpose itself is subject to change over the duration of the project. The project manager *should* also emphasize that the role of the reviewer is to identify problems and make suggestions to improve the quality of the traffic model, but not fix problems associated with the traffic model.

The following provides specific details on how to conduct a peer review for both HCM-based and microsimulation traffic models.

2.4.1 HCM Traffic Model Peer Review

A project team or region-level review will be sufficient for most HCM traffic models, although mega/major projects will require SWB involvement. The WisDOT regional traffic modeler/traffic operations **shall** conduct, at a minimum, a high-level review of the HCM traffic model(s) to verify that the analyst has followed standard protocols. To ensure consistency with the review of the traffic models, the reviewer (typically WisDOT regional traffic staff) *should* complete DT1887 – HCM Analysis Review Checklist while conducting their review. The reviewer, as appropriate, *should* insert "not reviewed" on DT1887 to denote which components of the traffic model they did not address during their review. Attachment 2.2 provides a copy of DT1887.

The primary purpose of DT1887 is to provide a coversheet that summarizes the major concerns/issues the reviewer has on the traffic model. The reviewer *should* document the specific/detailed comments on the traffic model in a separate memorandum and attach it to DT1887.

DT1887 provides a mechanism for the reviewer to easily identify whether the specific parameters within the traffic model (e.g., lane geometry, signal timings, etc.) and overall traffic model is acceptable, conditionally acceptable, or unacceptable. With regards to the peer review, these terms have the following definitions:

- Acceptable - The traffic model is acceptable as is without any revisions,
- Conditionally acceptable - The traffic model is acceptable based on the condition that the traffic analyst addresses a few (no more than 5) specific issues or concerns either by revising the traffic model or providing additional justification as to why no additional revisions are necessary,
- Unacceptable – The traffic model needs major revisions.

As illustrated in DT1887, the typical components of the HCM traffic model that the peer review team *should* review include:

Traffic Analysis Tool/Version

Prior to developing the traffic model, WisDOT regional traffic staff and the analyst *should* have agreed upon the appropriate analysis tool to utilize. The reviewer *should* confirm that the analyst used the agreed upon analysis tool, specifically that they used the correct software, software version, and software build (e.g., Synchro 10.3.122, Sidra 8.0.5.7916, etc.) to develop the traffic model. The traffic models *should* only utilize the department-supported software packages. TEOpS 16-10 identifies the explicit software packages that the department supports. Refer to the BTO Traffic Analysis, Modeling and Data Management Program area webpage for the version and build of software that WisDOT currently supports.

The reviewer *should* note any differences in the version or build of the software package utilized during the development and review of the traffic model.

Lane Geometry

The reviewer *should* confirm that the traffic model depicts the proper lane geometry, including lane configurations, turn bay lengths, lane widths, right-turn channelization, and distance between intersections. In some situations, the HCM methodology may not allow the coding of the actual lane geometrics (e.g., the HCM methodology limits the number of approaches/lanes). In these cases, it may be necessary to utilize an alternative tool for the analysis. The analyst **shall** obtain prior approval from WisDOT regional traffic staff prior to utilizing modified lane geometry within the HCM traffic model. Note the agreed upon modifications to actual lane geometries on DT1887 or in the accompanying comment memorandum.

Traffic Volumes/Percent Trucks/Peak Hour Factor (PHF)

The reviewer *should* verify that the analyst accurately coded the appropriate traffic volumes for the defined analysis year into the traffic model. Design year traffic volumes *should* reflect official WisDOT traffic forecasts (i.e., forecasts prepared or reviewed and approved by WisDOT TFS).

If applicable, the analyst *should* provide documentation on the process completed to develop design hour volumes (K30, K100, K250, weekday AM/PM peak, etc.), to produce O-D matrices, and balance the traffic volumes along the corridor. The reviewer *should* look at the documentation and check the volume adjustments for reasonableness.

The reviewer *should* verify that the analysis includes the appropriate percentage of trucks or heavy vehicles. Unless there is one movement that is predominately trucks (e.g., the movement goes into a truck parking facility), as prescribed in the HCM, the traffic model *should* include the percent of trucks/heavy vehicles based on intersection approach and not by the individual turning movement.

Per FDM 11-5-3, in most cases, the analysis *should* utilize a PHF based on data collected in the field, and is typically calculated for the intersection rather than approach or turning movement. If the existing field-derived PHF is less than 0.92 (the recommended HCM default), however, it may be appropriate to utilize a higher PHF for the analyses of design year conditions. Use of any value other than the field-derived PHF requires approval from the WisDOT regional traffic engineer.

Signal Timing Parameters

At a minimum, the reviewer *should* verify that all traffic models that involve traffic signals utilize appropriate signal timing and phasing plans, saturation flow rates, and right-turn-on red (RTOR) volumes. The reviewer *should* refer to the Traffic Signal Design Manual (TSDM 3-2-2) and TEOpS 16-15-5 for guidance on the recommended traffic signal timing parameters, where TEOpS 16-15-5 is the controlling policy for saturation flow rates and right-turn-on-red (RTOR) usage. WisDOT regional traffic staff may have additional guidance on the signal timing parameters.

Stop-Control/Roundabout Parameters

The reviewer *should* verify that all traffic models that involve stop-controlled intersections utilize appropriate and reasonable critical gap, follow-up times, saturation flow rates, vehicle storage in the median, and the presence of an upstream traffic signal. Unless justified otherwise by a field study, the traffic model *should* utilize default values for most parameters.

WisDOT has established Wisconsin specific critical and follow-up headway values for the analysis of roundabouts (see FDM 11-26-20.4, Table 20.3). The reviewer *should* check for proper usage of these headway values for traffic models that include roundabouts.

Freeway/Highway Parameters

For freeway weaving analysis, the reviewer *should* look at the source of the weaving volumes and verify that the assumptions made to determine the volumes are in accordance with the previously agreed upon methodology. Additionally, the reviewer *should* check the weaving segment length, number of maneuver lanes, and the minimum number of lane changes utilized in the analysis.

For freeway merge or diverge analysis, the reviewer *should* inspect the basic number of lanes, acceleration or deceleration lengths, and volume inputs for accuracy.

For basic highway segments, the reviewer *should* examine the road classification, access density, no-passing zone inputs, and free-flow speed for accuracy.

Other

The reviewer *should* note any other aspects of the traffic model (e.g., growth rates, gap acceptance, lane utilization, link speeds, etc.) that they checked during their evaluation. Additionally, the reviewer *should* provide any general comments they have regarding the overall performance of the traffic model.

Upon completion of their evaluation, the reviewer *should* provide a copy of the completed DT1887 to the project team and analyst for their response. The reviewer only needs to complete one DT1887 for an entire corridor; there is no need to complete DT1887 for every intersection along the corridor.

The analyst *should* note on the DT1887 form how they propose to respond to any comments on the traffic model (e.g., revise the traffic model or provide justification for their original assumptions). TEOpS 16-25-2.5 provides additional detail on how to document this correspondence.

2.4.2 Microsimulation Traffic Model Peer Review Overview

Due to their complexity, microsimulation traffic models typically require an independent consultant or SWB level of review. Each member of the peer review team *should* complete DT2291 – Microsimulation Peer Review Report to document their findings, comments, and concerns related to the traffic model. The TFS will document their review in DT2340 – Traffic Forecasting Section Microsimulation Checklist (see TPM for additional details). The reviewer, as appropriate, *should* insert “not reviewed” on DT2291 to denote which components of the traffic model they did not address during their review. The reviewer **shall** complete a peer review after each project milestone; however, they may combine their comments from each milestone onto one form. Attachment 2.3 provides a copy of DT2291.

The first page of DT2291 is where information regarding the peer review and traffic model is denoted (e.g., review date, reviewer, and analyst contact information, model completion/revision date, etc.).

The heart of the DT2291 form (pages 2 through 8) is where the reviewer documents their observations regarding the traffic model features and characteristics. This section of the form uses a three-column format. The left side of the form is where the reviewer identifies the overall acceptably of the traffic model component (acceptable, conditionally acceptable, or unacceptable) and notes the extent of the required revisions (no revisions, minor revisions, moderate revisions, or major revisions).

The center of the form provides space for detailed technical comments including reviewer-to-analyst communications. The reviewer *should* attach or insert additional sketches, screen shots, calculations, or other information that will assist the analyst in understanding the problems identified in the traffic model. Where relevant, DT2291 may include suggested techniques for improving the traffic model.

The right side of the form provides an area for the analyst to address the reviewer's comments. This is where the analyst *should* identify if and how they will revise the traffic model. If the analyst feels that no revisions to the traffic model are necessary, they *should* provide justification for their original assumptions.

The final section of DT2291 is the reviewer's sign-off. In this section, the reviewer *should* unequivocally inform the analyst and project team whether the model is (or is not) suitable for the intended purpose. If the reviewer deems the traffic model unacceptable, they *should* summarize the number and severity of the revisions required (e.g., model requires 2 minor revisions and 1 major revision).

While DT2291 provides documentation of the overall peer review process, it *should* not serve as the sole means of communication between the reviewer and the analyst. The reviewer *should* document all communications with the analyst and attach them to DT2291 for future reference. Ultimately, it is the responsibility of the project manager to monitor the peer review process to ensure efficient communication between the peer review team and the analyst.

2.4.3 Conducting the Peer Review

Regardless of the software program utilized to develop the traffic model, a good first step is to open the traffic model and observe the simulation. This allows for a visual inspection of the traffic model to identify if there is anything that just does not look right (e.g., vehicles make dramatic movements, vehicles suddenly drop off the network, vehicles are turning left from an exclusive right-turn lane, etc.). The visual inspection can help the reviewer identify which portions of the traffic model they *should* concentrate their review efforts.

As illustrated in DT2291, the typical features and characteristics of a microsimulation traffic model that the reviewer *should* review include:

- Network Coding
- Intersection Traffic Control and Ramp Metering
- Closures, Restrictions, and Incidents
- Entrance Ramps
- Lane Use Parameters
- Zone Structure/Vehicle Inputs
- O-D Matrices, Demand Profiles, and Time Periods
- Core Simulation Parameters
- Routing Parameters/Vehicle Routes
- Vehicle Types and Proportions
- Stuck/Stalled Vehicles
- Special Features
- Consistency with Related Traffic Models
- Calibration/Validation
- Documentation

This list is not all-inclusive and *should* only serve as a starting point for the peer review. It is possible for the reviewer to deem a traffic model acceptable based on all features listed above and yet the traffic model may still not be fit-for-purpose. The reviewer *should* keep a clear understanding of the project scope, goals, and intended purpose of the traffic model in mind while conducting the peer review. Additionally, the peer review process *should* always take into consideration the current capabilities and limitations of the software package and version utilized in development of the traffic model as new software features are seldom foolproof. The following text provides details on the key parameters of the traffic model that the reviewer *should* assess during their evaluation.

Currently, the department supports the use of SimTraffic and Vissim, for microsimulation, although prior to January 1, 2018, Paramics was the primary WisDOT-supported microsimulation software. Projects that initiated the microsimulation traffic analysis using Paramics prior to January 1, 2018 may continue to use Paramics for the duration of the project. Thus, it is possible that Paramics will still be in use in Wisconsin for several more years necessitating the need to provide some guidance on peer reviewing Paramics models. Refer to DT2291 for guidance on peer reviewing Paramics models.

The guidance below is specific for SimTraffic and Vissim; however, the general principles are applicable for all microsimulation software packages.

See below for additional information about how to evaluate each key feature of the traffic model.

Network Coding

Network coding establishes the horizontal and vertical geometry of the roadway network, including intersection spacing and roadway curvature. Network coding also includes appropriate use of settings such as link free-flow speed and turning speeds.

Intersection Traffic Control and Ramp Metering

Intersection controls are devices that regulate traffic flow at intersections (e.g., signals, roundabouts, stop control, and ramp meters). Elements of the signals/ramp meters may include the controller type, detector placement, signal heads, signal groups, coordination between signals, signal phasing, and signal/ramp meter-timing plans.

Closures, Restrictions, and Incidents

Closures represent temporary or permanent roadway segment, link, or lane closures (i.e., no traffic can use that roadway segment, link, or lane). Restrictions represent links or lanes that limit travel, either temporarily or permanently, to specific vehicle types (e.g., lanes designated for high-occupancy-vehicles (HOV) or lanes restricting truck use). Incidents include simulated vehicle breakdowns, crashes, etc.

Entrance Ramps

Entrance ramps or freeway merge areas typically require careful coding in microsimulation. This section is typically applicable to parallel freeway entrance ramps, although there are instances where this feature is appropriate for arterials as well. The reviewer *should* review the lane utilization upstream of the entrance ramp, the aggressiveness of the merging vehicles (e.g., minimum time on entrance ramp, driver headway factors), and the length of the acceleration lane and taper parallel to the entrance ramp.

Lane Use Parameters

Lane use parameters control the amount and destination of the traffic using each lane. A typical application of these parameters is to pre-position vehicles in advance of a fork in the road.

Zone Structure/Vehicle Inputs

Zone structure and vehicle inputs define where and how traffic loads into the network.

O-D Matrices, Demand Profiles & Time Periods

O-D matrices contain the network demand patterns (number of trips traveling between each pair of zones). Time periods and demand profiles control the timing for the release of vehicles into the network (e.g., are the vehicles released at a steady rate or at a gradually increasing/decreasing rate). In some cases, it is necessary to use multiple O-D matrices or demand profiles (e.g., there may be one matrix for cars and a second matrix for trucks). The reviewer *should* evaluate the source of the demand profile and time selection. WisDOT TFS *should* weigh in on the appropriate use of these features within the traffic model and may provide suggestions for source data (e.g., annual traffic recorders [ATR] data).

Core Simulation Parameters

Core simulation parameters affect fundamental aspects of vehicle behavior in the network, such as driver aggressiveness and the willingness to merge into small gaps. Default values are acceptable for some parameters, but other parameters require project-or-area-specific values. Thus, the reviewer *should* check all core simulation values for reasonableness.

Routing Parameters/Vehicle Routes

Routing parameters influence the way vehicles travel through the network. If coded improperly, these controls can cause unrealistic or erratic routing.

Vehicle Types and Proportions

The proportion and types of vehicles (such as trucks, buses, and HOVs) influence the overall performance of each part of the network. The reviewer *should* verify that the traffic model utilizes actual field data to the best extent possible.

Stuck/Stalled Vehicles

Stuck or stalled vehicles are vehicles that unexpectedly slow or stop partway through their route. They can cause backups that do not exist in the field. The reviewer *should* note any problems with stuck or stalled vehicles, including intermittent problems.

Special Features

Special features include site or study-specific items such as the use of detectors, car parks, variable message signs, special purpose lanes, speed harmonization, public transit routes, toll lanes, toll plazas, pedestrian modeling, special graphics, plugins, or scripts, among others.

Consistency with Related Traffic Models

Complex projects often involve a series of related traffic models (existing, future no-build, future build alternatives, AM/PM peak period, etc.). To assure the integrity of the study, these traffic models must be consistent. Additionally, adjacent and overlapping model areas *should* utilize consistent analysis methodologies. The results of the traffic model *should* not contradict the results of the TDM.

Calibration/Validation

Calibration refers to the process where the analyst adjusts selected input parameters within the traffic model (typically driver behavior elements including headway and reaction times, driver aggressiveness, etc. and roadway elements like sign posting) such that the traffic model represents field conditions. See TEOpS 16-20-5 for additional details on the calibration process.

Validation is the independent process where the analyst checks the traffic model outputs against field measured or benchmark data including traffic volumes, travel speeds, travel times, intersection queuing, and trip-making patterns (e.g., weaving volumes), among others. See TEOpS 16-20-8 for additional details on the validation process.

A properly calibrated and validated traffic model *should* accurately reflect real-world traffic conditions and *should* meet the purpose and need of the project. The analyst *should* document the methodology and assumptions utilized to calibrate and validate the traffic model and *should* submit the modeling methodology report along with the traffic model to the peer review team for review.

The reviewer *should* spot-check the traffic model outputs and compare them to the results documented in the modeling methodology report. If the reviewer cannot produce similar outputs, it may indicate an issue with the traffic model's calibration. See TEOpS 16-20 for additional details on model calibration and validation.

Documentation

Proper documentation of modeling methods and assumptions establishes accountability and facilitates efficient revision, updating, and follow-up. The review team *should* verify proper documentation of the modeling methods.

2.5 Document Results

It is critical to document any correspondence between the peer review team and traffic analyst regarding the peer review process. The peer review team members and traffic analyst *should* document the correspondence within, or as attachments to, the appropriate review form (DT1887 or DT2291). The correspondence **shall** include how the traffic analyst revised the traffic model to address the peer review comments or provide justification as to why the analyst chose not to revise the traffic model. On projects where the peer review team and traffic analyst interact frequently, it may be necessary to provide a separate document to detail all the correspondences. Attachment 2.4 provides examples of ways to document the communication between the project team and traffic analyst. The project manager **shall** include the additional documentation along with all completed DT1887 and DT2291 forms within the project's records file.

The region **shall** provide a summary of the peer review process for all microsimulation traffic models (including all SimTraffic models used for project or study decisions, especially any related to critical aspects of the design) to BTO-TASU for information and tracking purposes. The summary **shall** identify the following aspects associated with the peer review process:

1. Project information (project identification number, project name, study area, study limits)
2. Name of analyst
3. Name of lead peer reviewer
4. Summary of peer review results (DT1887, DT2291, correspondence documentation)
5. Copy of all FHWA comments on the traffic model

Even if BTO-TASU is not part of the peer review team, it is generally advantageous for the project team to inform BTO-TASU of any pending peer reviews, specifically those for a microsimulation traffic model. This allows BTO-TASU to assess whether there are any potential overlapping peer reviews that may impact the project's schedule.

The project manager or region traffic operations **shall** email a copy of all interim and final DT2291 forms, including FHWA comments, to BTO-TASU (DOTTrafficAnalysisModeling@dot.wi.gov). WisDOT regional traffic staff **shall** also include a copy of the relevant DT1887 and DT2291 forms with the submittal of all Phase II – Alternative Selection Intersection Capacity Evaluation (ICE) reports.

LIST OF ATTACHMENTS

Attachment 2.1	Traffic Model Complexity Scoring Template
Attachment 2.2	DT1887 HCM Analysis Review Checklist
Attachment 2.3	DT2291 Microsimulation Peer Review Report
Attachment 2.4	Sample Correspondence

Attachment 2.1 Traffic Model Complexity - Scoring Template

WisDOT Traffic Model Complexity - Scoring Template

Last Updated: 07-19-17

Applicable for determining the number of MOEs required for model validation and for determining the required level of peer review

Instructions: Fill in gray boxes to determine the model complexity, the number of MOEs needed for validation, and the level of traffic model peer review effort required. Choose appropriate project category in **Table 1: Project type**. Choose primary network type in **Table 2: Geometrics Scoring** and mark applicable categories. Mark all applicable categories in **Table 3: Traffic Pattern and Congestion Scoring**. Final scoring reflects the highest point value in each table (maximum of 24 points). **Table 4** shows the overall model complexity score. **Table 5** shows recommended procedure for identifying the type/number of MOEs to use for model validations and scoping the traffic model peer review. Consider existing conditions and potential future alternatives that the project/study is anticipated to cover.

WisDOT Region:		Ex: SE, SW, NE
Project:		Ex: STH __ Corridor Study
Project ID:		Ex: 1234-56-7890
Project Description:		Ex: City - City
Highway:		Ex: STH __
County:		Ex: Dane County
Traffic Conditions:		Ex: Base (Existing), Base and Future
Modeling Software:		Ex: Paramics, Vissim, SimTraffic

General Project Description:
Ex: Limits of project (Size of Network, # of TAZs), other software used for analysis, anticipated O-D data source, assumptions on Future scenarios, etc.

Table 1: Project Type

Complete (1):	Check all that apply:						
(1) Project Type	Category	Traffic Impact Analysis (TIA), Intersection Control Evaluation (ICE), or similar (Small Influence Area)	Traffic Impact Analysis (TIA), Intersection Control Evaluation (ICE), or similar (Large Influence Area)	Corridor Study/Operational Needs Study or Standard Improvement Project (Small Network)	Corridor Study/Operational Needs Study or Standard Improvement Project (Large Network)	High Profile Project, Potential Mega/Major Project (EA, PEL, EIS)	Mega or Majors Project
	Point Total	0	1	2	3	4	4
	Applicable?	0	0	0	0	0	0

Note: Large Network category assumed to contain 20 or more Traffic Analysis Zones (TAZs).

Table 2: Geometrics Scoring

Choose (1) or (2):	Check all that apply:						
(1) Intersections and Streets/Corridors	Category	Isolated Intersection(s)	Signalized Corridor / Network (No Coordination)	Roundabout Corridor / Network	Signalized Corridor / Network (Coordinated)	Mixed Corridor / Network (Signals and Roundabouts)	Adaptive Signal Control System
	Point Total	0	1	2	2	3	4
	Applicable?	0	0	0	0	0	0
Or							
(2) Freeways	Category	Mainline and Simple Merges/Diverges Only	System Interchange with Multilane Ramps	Freeway with Interchanges and Arterials	Interchanges with Roundabout Ramp Terminals	Unconventional Interchanges (DDI, Echelon, SPUI, etc.)	Managed Lanes, Variable Message Signs, etc.
	Point Total	0	1	1	2	3	4
	Applicable?	0	0	0	0	0	0

Table 3: Traffic Pattern and Congestion Scoring

Complete (1), (2), and (3):	Check all that apply:						
		All-or-Nothing Routing Assignment				Dynamic/Variable Routing	
(1) Routing	Category	Single Routes (Intersection or Corridor)	Networks with Few (2-3) Route Options	Freeway with Parallel Lower Functional Class Streets	Grid System with Numerous Route Options	Freeway Network with Parallel Route Options	Grid System with Numerous Route Options
	Point Total	0	1	2	3	3	4
	Applicable?	0	0	0	0	0	0
(2) OD Estimation	Category	Single Intersection(s) / No Estimation	Small Network, Few Routes	Large Network, Few Routes	Small Network, Multiple Routes	Large Network, Multiple Routes	
	Point Total	0	1	2	3	4	
	Applicable?	0	0	0	0	0	
(3) Existing/Anticipated Level of Congestion	Category	- LOS C or better operations - Minor queuing (<500') - Free flow travel speeds/times	- LOS C-D operations - Moderate queuing (500-1,000') - Minor delays in travel speeds/times	- LOS D-E operations - Moderate queuing (500-1,000') - Moderate delays in travel speeds/times	- LOS F operations (future) - Significant queuing (>1,000') - Significant delays in travel speeds/times	- LOS F operations (existing) - Significant queuing (>1,000') - Significant delays in travel speeds/times	
	Point Total	0	1	2	3	4	
	Applicable?	0	0	0	0	0	

Note: Large Network category assumed to contain 20 or more TAZs. Congestion level takes into account worst-case controlled intersections or roadway segments. Queue lengths are through lane queues.

Table 4: Scoring Results

Project Type	Total	0
Geometrics Subtotal	Intersections and Corridors	0
	Freeways	0
	Total	0
Traffic Pattern and Congestion Subtotal	Routing	0
	OD Estimation	0
	Level of Congestion	0
	Total	0
Total Points		0

Table 5: Recommendations

Point Scale	Minimum # of MOEs Required for Validation	Level of Peer Review Recommendations	
		Recommendation Type	Estimated Schedule for Initial Review (including data collection, coordination, etc.)
0 - 3	1 to 2 Primary MOEs	High-level WisDOT Region review.	1-2 weeks existing conditions 1-2 weeks per alternative
4 - 7	1 to 2 Primary MOEs 1 Secondary MOE	WisDOT Region conducts peer review with assistance from independent consultant or BTO as necessary.	3-4 weeks existing conditions 3-4 weeks per alternative
8 - 10	2 to 3 Primary MOEs 1 Secondary MOE	Independent consultant conducts peer review with WisDOT Region input and BTO assistance as necessary.	4-8 weeks existing conditions 4-8 weeks per alternative
11+	2 to 3 Primary MOEs 1 to 2 Secondary MOEs	Independent consultant conducts peer review with WisDOT Region, BTO, other WisDOT Bureau involvement and FHWA oversight.	2-4 months existing conditions (no FHWA) 2-4 months per alternative (no FHWA) 3-4 months existing conditions (with FHWA) 3-4 months per alternative (with FHWA)

***Note:** A minimum of 6 weeks should be allowed for Traffic Forecasting to review the existing/future volumes for all levels of peer review

Access Excel file via the following link: **http://wisconsindot.gov/dtsdManuals/traffic-ops/programs/analysis/trafficmodelpeerreview.xlsx**

HCM ANALYSIS REVIEW CHECKLIST

Wisconsin Department of Transportation (WisDOT)
DT1887 3/2019

			Date(s) Reviewed (m/d/yyyy)		
Project ID(s):	Highway(s)/Intersection(s):	Region:	1st Review	2nd Review	3rd Review
Lead Reviewer	Name:	Contact Information:			
Lead Analyst	Name:	Contact Information:			

TRAFFIC MODEL DESCRIPTION
Identify the model completion/revision date, the scope of the model, the analysis year(s), the analysis time period(s), and analysis tool/version

SUMMARY OF REVIEW

	Acceptability	Reviewer Comment(s):	Analyst Response(s):
Traffic Analysis Tool/Version	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		

	Acceptability	Reviewer Comment(s):	Analyst Response(s):
Lane Geometry	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		

	Acceptability	Reviewer Comment(s):	Analyst Response(s):
Traffic Volumes, % Trucks, Peak Hour Factor (PHF)	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		

SUMMARY OF REVIEW *(continued)*

	Acceptability	Reviewer Comment(s):	Analyst Response(s):
Signal Parameters (Including RTOR)	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		
Stop Control/ Roundabout Parameters	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		
Freeway/ Highway Parameters	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		
Other:	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		
Overall Model	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required		

Attachment 2.3 DT2291 Microsimulation Peer Review Report

MICROSIMULATION PEER REVIEW REPORT

Wisconsin Department of Transportation (WisDOT)
DT2291 9/2015

Reviewer, please email completed form to:

To: Project Manager & Region Contact
CC: DOT Traffic Model Peer Review
Subject: DT2291 for Project ID; Traffic Model Name

	1st Review	2nd Review	3rd Review
Date Reviewed (m/d/yyyy):			
Reviewed By:			
Model Completion/Revision Date(m/d/yyyy):			

CONTACT INFORMATION

Lead Reviewer	Lead Analyst	Region Contact
Name (First, MI, Last)	Name (First, MI, Last)	Name (First, MI, Last)
Organization/Firm	Organization/Firm	Region/Bureau
(Area Code) Telephone Number	(Area Code) Telephone Number	(Area Code) Telephone Number
Email Address	Email Address	Email Address

TRAFFIC MODEL DESCRIPTION

Project ID(s)	Project Name/Description	Region:	Highway(s)
Traffic Model Name/Description	Analysis Scenario/Alternative	Analysis Year(s)	

Analysis Time Period (s)

☐ Weekday AM Peak Hours: ☐ Weekday Midday Peak Hours: ☐ Weekday PM Peak Hours: ☐ Fri Peak Hours: ☐ Sat Peak Hours: ☐ Sun Peak Hours: ☐ Other: Hours:

Analysis Tool(s) Utilized

☐ SimTraffic- Version: ☐ Paramics - Version: ☐ Vissim - Version: ☐ Other: - Version:

SCOPE AND EXTENT OF PEER REVIEW

Purpose & Scope of Review

Description/Limit of Model

Configuration Settings

Number of Zones:	Number of Time Steps:	Speed Memory:	Assignment Type:
Mean Target Headway:	Mean Reaction Time	Matrix Structure	Vehicle Classifications/Splits
Seed Values Used for Calibration:			
Seed Values Used for Review:			
Other:			

Were any changes to the model made by the review team? If yes, please describe.

DIRECTIONS

This form is applicable for the review of all microsimulation traffic models, regardless of the traffic software program utilized to develop the traffic model. However, this form focuses on the SimTraffic, Paramics and Vissim microsimulation software packages.

When noting problems or concerns, identify the severity of the issue and the revisions recommended using the following scale: Minor, Moderate, or Major. Check the appropriate box associated with each review (the blue box for the 1st review, the green box for the 2nd review and the purple box for the 3rd review).

If more than one review of the traffic model is required, use different color text to distinguish the comments associated with each review (e.g., comments from the 1st review should be in blue text, comments from the 2nd review should be in green text, and comments from the 3rd review should be in purple text). Provide any supporting tables, screenshots, or additional images in a separate attachment to this form.

OBSERVATIONS, MODEL FEATURES AND CHARACTERISTICS

Geometrics /Traffic Control

Network Coding	*Network Coding establishes the horizontal and vertical geometry of the network. It also includes the appropriate use of settings such as link free-flow speed.* • *For SimTraffic, this is coded within the Synchro module and includes placement and interconnection of nodes and links, number of lanes, lane widths, lane configurations, roadway curvature, storage lengths, and other intersection and network geometry.* • *For Paramics this includes placement and interconnection of nodes, links and link categories, curb points, curves, turn lanes, merge points, stop bars, signposts, and other network infrastructure.* • *For VISSIM this includes the placement and interconnection of links, connectors, desired speed decisions, reduced speed areas, conflict areas, and priority rules.*	
As a whole, network coding is:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
Intersection Traffic Control & Ramp Metering	*Intersection Controls are devices that regulate traffic flow at intersections, such as signals, roundabouts, and stop-controlled intersections. Elements of the signals may include the controller type, detector placement, signal heads, signal groups, and/or coordination between signals. Ramp meters control the rate of entry to a freeway. Comments on signal and ramp meter timing plans may be included in this section.*	
As a whole, intersection controls are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review

Geometrics /Traffic Control

Closures, Restrictions, & Incidents	*Closures represent links or lanes that are temporarily or permanently closed to traffic. Restrictions represent links or lanes that are temporarily or permanently closed to specific types of vehicles (such as lanes designated for High Occupancy Vehicles or lanes restricting truck use). Incidents include simulated vehicle break-downs, etc.* • *This feature is **not** applicable for SimTraffic*	
As a whole closures, restrictions & incidents are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
Entrance Ramps	*Driver behavior and lane utilization approaching entrance ramps should be reviewed in this section.* • *For SimTraffic, modifications to the default mandatory distance and positioning distance settings should be reviewed.* • *For Paramics, modifications to default ramp headway, minimum ramp time, and ramp aware distance should be reviewed. The minimum ramp time setting specifies how long a driver will stay on the parallel entrance ramp before beginning to look for a gap to merge onto the freeway.* • *For VISSIM, the effective merging area defined by the positions of the links and connectors should be reviewed.*	
As a whole, the vehicle behavior approaching entrance ramps is:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
Lane Use Parameters	*Lane use parameters control the amount and/or destination of the traffic using each lane. A typical application of these parameters is to pre-position vehicles in advance of a fork in the road*	
As a whole, lane use parameters are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review

Traffic/Global

Zone Structure/Vehicle Inputs	*Zone structure and vehicle inputs define where and how traffic is loaded into the network.* • *For SimTraffic, the intersection turning movement volumes from the Synchro module determine how the traffic is loaded into the network. If volumes are imbalanced in the Synchro network, SimTraffic will assume a traffic source or sink between nodes (such as driveways). Reviewer should note imbalances that may not be realistic or representative of the network.* • *For Paramics, zone structure relates to the placement of the zones representing the locations where traffic enters or leaves the network. Observations related to sectors and zone connectors should be included in this section. If the microsimulation model zones are derived from a travel demand model, reviewers should use this section to note any issues related to the consistency of the Paramics input data with respect to the travel demand model data.* • *For VISSIM, vehicle inputs control where traffic is loaded into the network and how much is loaded. Reviewer should use this section to note any issues related to the consistency of input data related to the sources.*	
As a whole, zone structure and vehicle inputs are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
O-D Matrices, Demand Profiles, & Time Periods	*Origin-Destination (O-D) matrices contain the network demand patterns (number of trips between each pair of zones). Time Periods and Demand Profiles control the timing of the release of the trips into the network. In some cases multiple matrices are used (for example separate matrices for cars and heavy trucks). The reviewer should evaluate the source of the demand profile and time period selection.* • *For SimTraffic, network-wide O-D Matrices and demand profiles are not applicable. The intersection turning movement volumes, rather than network-wide O-D matrices, determines the origin and destination of the traffic. The Link O-D volumes setting can be modified within Synchro to model the weaving interaction between 2 adjacent intersections (such as zeroing out an off-ramp left-turn to on-ramp left-turn movement at a diamond interchange). Volume adjustment factors, rather than demand profiles, dictate the percentage of peak hour traffic to load into the network for each analysis period. Thus the intersection turning movement volumes, Link O-D volumes, volume adjustment factors (such as growth factor and PHF adjust settings), and the time and duration of the seeding (i.e., warm-up period) and recording (i.e., analysis period) periods should be reviewed.*	
As a whole, O-D matrices, demand profiles, & time periods are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review

Traffic/Global

Core Simulation Parameters	*Core simulation parameters affect fundamental aspects of vehicle behavior in the network, such as driver aggressiveness and the willingness to merge into small gaps. Modifications to default software values should be reviewed.* • *For SimTraffic, examples of core simulation parameters to review include driver and vehicle characteristics and behaviors.* • *For Paramics, examples of core simulation parameters to review include mean target headway, mean target reaction time, perturbation, global routing cost coefficients, driver familiarity, time steps, speed memory, allowing heavy vehicles to use all lanes, and matrix tuning.* • *For VISSIM, examples of core simulation parameters to review include Driving Behaviors, Simulation Resolution, and Speed Distributions.*	
As a whole, core simulation parameters are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
Routing Parameters/ Vehicle Routes	*Routing parameters or vehicle routes influence the way vehicles travel through the network. If coded improperly, these controls can cause unrealistic or erratic routing.* • *This feature is **<u>not</u>** applicable for SimTraffic. However, interaction between intersections can be checked as noted with the Link O-D feature in the O-D Matrices, Demand Profiles, & Time Periods section.* • *For Paramics, routing parameters (such as cost factors, turn penalties, modification of the link type hierarchy, and waypoints) override the default routing behavior and profoundly influence the route choice in the network. They are occasionally used to increase or decrease the traffic volume on specific links.* • *For VISSIM, vehicle routes and vehicle routing decisions control the flow of traffic from the entrance points through the network. They can be coded using either actual vehicle flows or percentages.*	
As a whole, traffic routing parameters are:	**Observations/Comments:**	**Analyst Response**
☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review

<table>
<tr><td rowspan="9">**Traffic/Global**</td><td>***Vehicle Types & Proportions***</td><td colspan="2">*The proportion of vehicles (such as trucks, buses, and High Occupancy Vehicles) influences the overall performance of each part of the network. Vehicle lengths (such as heavy truck lengths) should be reviewed.*</td></tr>
<tr><td>As a whole, vehicle types & proportions are:</td><td>**Observations/Comments:**</td><td>**Analyst Response**</td></tr>
<tr><td>☐ ☐ ☐ Acceptable
☐ ☐ ☐ Conditionally Acceptable
☐ ☐ ☐ Unacceptable
Extent of Revisions Required:
☐ ☐ ☐ No Revisions Required
☐ ☐ ☐ Minor Revisions Required
☐ ☐ ☐ Moderate Revisions Required
☐ ☐ ☐ Major Revisions Required</td><td>1st Review

2nd Review

3rd Review</td><td>1st Review

2nd Review

3rd Review</td></tr>
<tr><td>***Stuck/Stalled Vehicles***</td><td colspan="2">*This section should be used to note any problems with stuck or stalled vehicles (including intermittent problems). These are vehicles that unexpectedly slow or stop partway through their route (which can cause backups that do not exist in the field).*
• *For Paramics, this section should also be used for comments on the use of blockage removal tools, if used.*
• *For SimTraffic, this section should be used to comment on if short links may be resulting in stuck or stalled vehicles within the network.*</td></tr>
<tr><td>As a whole, stuck/stalled vehicle occurrence is :</td><td>**Observations/Comments:**</td><td>**Analyst Response**</td></tr>
<tr><td>☐ ☐ ☐ Acceptable
☐ ☐ ☐ Conditionally Acceptable
☐ ☐ ☐ Unacceptable
Extent of Revisions Required:
☐ ☐ ☐ No Revisions Required
☐ ☐ ☐ Minor Revisions Required
☐ ☐ ☐ Moderate Revisions Required
☐ ☐ ☐ Major Revisions Required</td><td>1st Review

2nd Review

3rd Review</td><td>1st Review

2nd Review

3rd Review</td></tr>
<tr><td>***Special Features***</td><td colspan="2">*Special features include site- or study-specific items such as the use of detectors, car parks, variable message signs, special purpose lanes, speed harmonization, public transit routes, toll lanes, toll plazas, pedestrian modeling, special graphics, Application Programming Interfaces (APIs), etc*
• *At present, SimTraffic will not model bus stops, bus routes, bus and carpool lanes, light rail, on-street parking, or short term event; thus, the use of special features is typically not applicable in SimTraffic.*</td></tr>
<tr><td>As a whole, use of special features is :</td><td>**Observations/Comments:**</td><td>**Analyst Response**</td></tr>
<tr><td>☐ ☐ ☐ Acceptable
☐ ☐ ☐ Conditionally Acceptable
☐ ☐ ☐ Unacceptable
Extent of Revisions Required:
☐ ☐ ☐ No Revisions Required
☐ ☐ ☐ Minor Revisions Required
☐ ☐ ☐ Moderate Revisions Required
☐ ☐ ☐ Major Revisions Required</td><td>1st Review

2nd Review

3rd Review</td><td>1st Review

2nd Review

3rd Review</td></tr>
</table>

Traffic/Global	***Consistency with Related Traffic Models***	*Modeling studies often involve a series of related models (base model, future no-build, and build alternatives, different times of day, etc.). To assure the integrity of the study as a whole, these models must be consistent.*	
	As a whole, model consistency is :	**Observations/Comments:**	**Analyst Response**
	☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
Calibration/Validation/Documentation	***Calibration/Validation***	*Calibration refers to the process where the analyst adjusts selected parameters within the traffic model (e.g., global and local headway and reaction times, driver aggressiveness, etc.) in order to get the traffic model to reproduce conditions observed in the field. Validation refers to the process where the analyst checks the traffic model outputs against field measured data including traffic volumes, travel speeds, travel times, intersection queuing and trip-making patterns (e.g., weaving volumes). The reviewer should spot-check the traffic model outputs and compare them to the results documented in the calibration/validation report. If the reviewer cannot produce similar outputs, it may indicate an issue with the traffic model's calibration.*	
	As a whole, model calibration is :	**Observations/Comments:**	**Analyst Response**
	☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review
	Documentation	*Proper documentation of modeling methods and assumptions establishes accountability and facilitates efficient revision, updating, and follow-up. Review team should verify that proper documentation has been provided.*	
	As a whole, model documentation is :	**Observations/Comments:**	**Analyst Response**
	☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable Extent of Revisions Required: ☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	1st Review 2nd Review 3rd Review	1st Review 2nd Review 3rd Review

SUMMARY OF REVIEW

Overall Traffic Model	As a whole, the traffic model is :	Summary of the review team's findings and recommendations
	☐ ☐ ☐ Acceptable ☐ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable	1st Review
	Extent of Revisions Required:	2nd Review
	☐ ☐ ☐ No Revisions Required ☐ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	3rd Review

REVIEWER'S CONCULSION (Check One)

☐ ☐ ☐ *It is the opinion of the review team that the model as reviewed and tested is an accurate and reasonable representation of the traffic conditions in the study area for the analysis year, time period, and scenario/alternative indicated in the title block of this document.*

☐ ☐ ☐ *It is the opinion of the review team that the model as reviewed and tested requires correction of ______ errors before it can be regarded as a reasonable representation of the traffic conditions in the study area for the analysis year, time period, and scenario/alternative indicated in the title block of this document. (Indicate number and severity of errors: Minor, Moderate, or Major).*

Prepared By (Signature)	Date	Contact Information
	Click here to enter a date.	Phone: Email:
Prepared By (Signature)	**Date**	**Contact Information (Phone, Email)**
	Click here to enter a date.	Phone: Email:
Prepared By (Signature)	**Date**	**Contact Information (Phone, Email)**
	Click here to enter a date.	Phone: Email:

HCM ANALYSIS REVIEW CHECKLIST

Wisconsin Department of Transportation (WisDOT)
DT1887 3/2019

Project ID(s):	Highway(s)/Intersection(s):	Region:	Date(s) Reviewed (m/d/yyyy)		
			1st Review	2nd Review	3rd Review
85-75-3072	USH 888 (N/S) & STH 747 (E/W)I	NE	3/12/2019	4/11/2019	

	Name:	Contact Information:
Lead Reviewer	Review is All We Do (RIAWD)	RIAWD@email.com
Lead Analyst	Traffic Models 'R Us (TMRU)	TMRU@email.com

TRAFFIC MODEL DESCRIPTION

Identify the model completion/revision date, the scope of the model, the analysis year(s), the analysis time period(s), and analysis tool/version

Synchro model for USH 888 (N/S) & STH 747 (E/W) in Blue Moose, WI, Analysis is for the 2040 AM (7-9) & PM (3:30-5:30) peak hours for the baseline and alternative #2 (enhanced signal) scenarios. Used Synchro 10.3.28. Model was completed on 11/15/2018

SUMMARY OF REVIEW

	Acceptability		Reviewer Comment(s):	Analyst Response(s):
Traffic Analysis Tool/Version	☒ ☒ ☐	Acceptable/ No Revision Required	Used the most recent version of Synchro available at time model was completed. This is acceptable. As a note for future projects, WisDOT is now utilizing Synchro 10.3.122	Thanks for the info about the new version of Synchro.
	☐ ☐ ☐	Conditionally Acceptable/ Minor Revision Required		
	☐ ☐ ☐	Unacceptable/ Major Revision Required		
Lane Geometry	☐ ☒ ☐	Acceptable/ No Revision Required	WB right turn lane is channelized in the plans but not in the model. Please correct.	WBR should be channelized. This has been corrected
	☒ ☐ ☐	Conditionally Acceptable/ Minor Revision Required	WBR is now shown as channelized in the model	
	☐ ☐ ☐	Unacceptable/ Major Revision Required		
Traffic Volumes, % Trucks, Peak Hour Factor (PHF)	☐ ☒ ☐	Acceptable/ No Revision Required	Heavy vehicle (HV) percentage set to 2% for all approaches. From the 2018 turning movement count, the NB AM has 8% HV and NB PM has 13% HV. Other approaches should also be examined in both peak periods.	2018 field data now incorporated into both the AM and PM models. These percentages are expected to remain constant.
	☒ ☐ ☐	Conditionally Acceptable/ Minor Revision Required	Truck percentages are now acceptable.	
	☐ ☐ ☐	Unacceptable/ Major Revision Required		

HCM ANALYSIS REVIEW CHECKLIST *(continued)*

SUMMARY OF REVIEW *(continued)*

	Acceptability	Reviewer Comment(s):	Analyst Response(s):
Signal Parameters (Including RTOR)	☐ ☒ ☐ Acceptable/ No Revision Required ☒ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required	The EBR Saturated Flow Rate (RTOR) is set to 90vph, or half of the 180vph AM demand; it should be set to 68vph per TEOpS 16-15-5.2 (0.38*180 = 68) RTOR volumes were updated and are now acceptable	Saturated Flow Rate (RTOR) has been set to 68 vph. All other RTOR volumes were checked and are in compliance with TEOpS 16-15-5.2
Stop Control/ Roundabout Parameters	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required	N/A	
Freeway/ Highway Parameters	☐ ☐ ☐ Acceptable/ No Revision Required ☐ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required	N/A	
Other: Pedestrian Movements	☐ ☒ ☐ Acceptable/ No Revision Required ☒ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required	NB pedestrian traffic was included in the base year analysis - why is this not included here? Given the construction of the path, it is acceptable to not consider pedestrian impacts here.	Though not documented here, an off-road paved path will be constructed to the west as part of this alternative. This will serve NB pedestrian traffic destinations and remove almost all NB pedestrian traffic. Please confirm that it is acceptable to not include any NB pedestrian traffic in the analysis.
Overall Model	☐ ☒ ☐ Acceptable/ No Revision Required ☒ ☐ ☐ Conditionally Acceptable/ Minor Revision Required ☐ ☐ ☐ Unacceptable/ Major Revision Required	EBL movement has LOS E in the PM while the NBT/SBT have LOS B. Can signal timings be adjusted to make green time more equitable? See other comments above The adjusted signal timing results in acceptable LOS for all approaches. Overall model is now acceptable.	Signal timings have been adjusted to allocate more green time to the EBL movement. Now EBL is LOS C, NBT is LOS B, and SBT is LOS C, all of which are acceptable.

Reviewer, please email completed form to:			1st Review	2nd Review	3rd Review
To:	Project Manager & Region Contact	Date Reviewed (m/d/yyyy):	2/29/2016	3/17/2016	4/20/2016
CC:	DOT Traffic Model Peer Review	Reviewed By:	RIAWD	RIAWD	RIAWD
Subject:	DT2291 for Project ID; Traffic Model Name	Model Completion/Revision Date (m/d/yyyy):	2/15/2016	3/14/2016	4/18/2016

TRAFFIC MODEL DESCRIPTION

Project ID(s)	Project Name/Description	Region:	Highway(s)
0-11-23-68	Cold Corridor - STH 999 & IH-O, Red Bayou, WI	NW	STH 999 & IH-O
Traffic Model Name/Description: Paramics Base Condition Model	Analysis Scenario/Alternative: AM, PM, FRI, SUN	Analysis Year(s): 2013	

Analysis Time Period (s)

☒ Weekday AM Peak — Hours: 6:30-8:30
☐ Weekday Midday Peak — Hours:
☒ Weekday PM Peak — Hours: 3:15-5:15
☒ Fri Peak — Hours: 4:30-6:30
☐ Sat Peak — Hours:
☒ Sun Peak — Hours: 3:00-5:00
☐ Other: — Hours:

Analysis Tool(s) Utilized

☐ SimTraffic - Version:
☒ Paramics - Version: 7.01
☐ Vissim - Version:
☐ Other: - Version:

SCOPE AND EXTENT OF PEER REVIEW

Purpose & Scope of Review

Provide a detailed review of the base condition model coding and calibration

Description/Limit of Model

STH 999 & IH-O, 0.5 miles south of Random Road north to the West River Bridge

Configuration Settings

# Zones:	# Time Steps:	Speed Memory:	Assignment Type:
25	5	8	All-or-nothing
Mean Target Headway: 0.87	Mean Reaction Time: 0.93	Matrix Structure: 2 O-D matrices, 1 for passenger vehicles & 1 for heavy vehicles	Vehicle Classifications/Splits: Separate matrices

Seed Values Used for Calibration:	113, 683, 23, 149, 593, 1039, 28567
Seed Values Used for Review:	23, 28567
Other: Variable Speed Limit	Variable speed limit (VSL) applied on IH-O

Were any changes to the model made by the review team? If yes, please describe.

No

OBSERVATIONS, MODEL FEATURES AND CHARACTERISTICS

metrics / Traffic Control

Network Coding

Network Coding establishes the horizontal and vertical geometry of the network. It also includes the appropriate use of settings such as link free-flow speed.

- *For SimTraffic, this is coded within the Synchro module and includes placement and interconnection of nodes and links, number of lanes, lane widths, lane configurations, roadway curvature, storage lengths, and other intersection and network geometry.*
- *For Paramics this includes placement and interconnection of nodes, links and link categories, curb points, curves, turn lanes, merge points, stop bars, signposts, and other network infrastructure.*
- *For VISSIM this includes the placement and interconnection of links, connectors, desired speed decisions, reduced speed areas, conflict areas, and priority rules.*

As a whole, network coding is:	Observations/Comments:	Analyst Response
☐ ☒ ☐ Acceptable ☒ ☐ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable	1st Review Intersection of This Rd and That Dr - the EB approach currently has an exclusive right turn lane, which is not coded in the model (Link 523:524). It is possible that this exclusive right turn lane was added after the model base year	1st Review Lane appears to have been in place prior to 2012 and is marked for buses, bicycles, and right turns only. An exclusive EB right turn lane has been added that extends back to the WB ramp terminal intersection. This change is not expected to affect the results
Extent of Revisions Required: ☐ ☒ ☐ No Revisions Required ☒ ☐ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	2nd Review *An EB exclusive right turn lane was added on link 523:524. This is used only by buses and right turns, since bicycles are not included in this model.* 3rd Review	2nd Review 3rd Review

Routing Parameters/Vehicle Routes

Routing parameters or vehicle routes influence the way vehicles travel through the network. If coded improperly, these controls can cause unrealistic or erratic routing.

- *This feature is **not** applicable for SimTraffic. However, interaction between intersections can be checked as noted with the Link O-D feature in the O-D Matrices, Demand Profiles, & Time Periods section.*
- *For Paramics, routing parameters (such as cost factors, turn penalties, modification of the link type hierarchy, and waypoints) override the default routing behavior and profoundly influence the route choice in the network. They are occasionally used to increase or decrease the traffic volume on specific links.*
- *For VISSIM, vehicle routes and vehicle routing decisions control the flow of traffic from the entrance points through the network. They can be coded using either actual vehicle flows or percentages.*

As a whole, traffic routing parameters are:	Observations/Comments:	Analyst Response
☐ ☐ ☒ Acceptable ☒ ☒ ☐ Conditionally Acceptable ☐ ☐ ☐ Unacceptable	1st Review Link cost factors are applied in 13 locations. It was noted that link 709:708 has an exceptionally high cost factor of 1000. Why is this so high? This link is located on STH 999 between the Random Rd ramp terminal intersections.	1st Review Link 709:708 cost factor will be adjusted. Other cost factors were generally used for routing purposes at interchanges to prevent vehicles from exiting then re-entering the freeway. No additional changes are proposed - please confirm.
Extent of Revisions Required: ☐ ☐ ☒ No Revisions Required ☒ ☒ ☐ Minor Revisions Required ☐ ☐ ☐ Moderate Revisions Required ☐ ☐ ☐ Major Revisions Required	2nd Review *This is an acceptable approach.* 3rd Review The cost factor for link 709:708 was changed to 1 which is acceptable.	2nd Review *Update completed.* 3rd Review

Microsimulation Peer Review Form Responses

Date of Last Response:	February 29, 2016
Project:	0-11-23-58 Cold Corridor – STH 999 & IH-O Up North
Analyst:	Traffic Models 'R Us (TMRU)
Traffic Model Name/Description:	Future Year (2040) AM Model

Analyst's Response Code

A = Agree completely; will revise (no written response required)

RFS = Requires further study in next phase (no written response required)

P = Agree partially; will revise to some degree (see written response)

D = Disagree; will not revise (see written response)

	1st Review:	2nd Review:	3rd Review:
Model Completion/Revision Date(m/d/yyyy):	01/07/16		
Reviewer 1: **An Employee of the State (EOS)**	02/04/16		
Reviewer 2: **Review is All We Do (RIAWD)**	02/11/16		
Reviewer 3: **FHWA**	02/14/16		

Category	**Reviewer**		**Analyst**		
	Initials	**Review Comments**	**Response Code**	**Response**	**Markup Complete**
Network Coding	EOS	#1(Link 422:413) # 2 (Link 1109:209 kerb points) #3 (Link 344:229 stopline rotation)	A A A	#1 Link adjusted to provide two lanes	TMRU – 3/02/15
	RIAWD	#1 (Model weave lengths) #2 (Ramp at node 447)	P A	#1 The study team has modified the upstream lane choice rules associated with the mainline weaves between Fake Rd. and False Dr. While there is always a degree of early or late lane changing within the model due to randomly assigned degrees of aggressiveness, awareness, etc., this issue has been mitigated to the greatest extent possible. #2 Ramp parameters modified to mitigate this issue as much as possible. The future AM model should now match the draft PM model, as this issue was more prominent during the future PM peak period.	TMRU – 03/02/15
	FHWA	#1 (Link 29:30 and 29:31) #2 (81st St./St. Peter Ave geometry)	D RFS	#1 The left turn lane here (Link 29:31) has been modeled as separate to prevent vehicles from attempting to move over, therefore blocking the lane and causing a queue. No change is proposed. #2 The design team has indicated that while the DXF does not indicate an allowable movement from SB 81st St to the IH-0 EB entrance ramp, this access could be provided as the team continues to work on design refinements. Movement from SB 81st to IH-0 EB will be modeled, and results of this will help inform the final design decision.	TMRU – 03/02/15